

A STUDY OF FLOATING USE ON THE  
THE CHATTOOGA WILD AND SCENIC RIVER

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ABSTRACT

Floating use on the Chattooga Wild and Scenic River has increased from less than 100 floaters in the mid 1960's to 36,000 in 1979. This paper presents a review of management actions that have been implemented to date. It examines use patterns that have developed over the years as reflected by analysis of floater self registration slips. It examines the limited research findings available to date and indicates direction for future studies. It recommends policies to be utilized to regulate commercial use which constitutes two thirds of the total use.

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## A. INTRODUCTION

A Wild and Scenic River is a fragile resource in both an ecological and an aesthetic sense. The manager is challenged to provide for the use of these areas by the public while maintaining the river corridor in a substantially unmodified form.

The Act states that "Each Component of the National Wild and Scenic Rivers System shall be administered in such a manner as to protect and enhance the values which caused it to be included in said System without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration, primary emphasis shall be given to protecting its aesthetic, scenic, historic, archaeological, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development based on the special attributes of the area."

An objective will be "to provide a range of recreation opportunities characteristic of, and in harmony with, the nature of the individual river segments."

An important and probably essential characteristic of a wild river is limited use so that the natural attractions are the predominant feature. However, if wildness is not to be self defeating, there must be a compromise between complete wildness with no visitors and at the other extreme providing any and all wild river experience; some middle ground is unavoidable if the well established social goal of providing an opportunity to experience the wild river is to be maintained. But where to draw the line and establish the middle ground?

Floating use on the Chattooga River has grown from an estimated 800 persons in 1970 to 36,666 who registered in 1979. Neither the Act or the approved plans for the Chattooga set a limit on how floating use will be regulated. This paper is a review of the management of the Chattooga and a discussion of possible courses of action for the future in order to protect the river environment while maximizing visitor enjoyment.

## B. STUDY OBJECTIVES

This study was undertaken as a requirement for a Clemson University Recreation Management short course and to provide guidance for managers involved with the Chattooga. It seeks to pull together into one place what has happened on the river. It tries to analyze the data to see how to maximize the Chattooga's benefits while reducing the conflicts between various groups of floaters.

The floating use on the Chattooga is beginning to stabilize and develop into patterns after the very rapid changes when use was just beginning ten to fifteen years ago.

## C. BACKGROUND INFORMATION ON THE RIVER

1. Location - The Chattooga begins in mountainous North Carolina south of the town of Highlands and flows 10 miles before leaving the state. It then forms the border between Georgia and South Carolina for 40

miles before ending at Lake Tugaloo. The West Fork, a major tributary, joins the main river at mile 24.2 (measured from the mouth).

Over its 50 mile course it descends 2469 feet (an average of 49.4 feet/mile) from an altitude of 3360 feet to 891 feet. This rapid drop creates numerous rapids and falls and provides some of the best white water in the eastern United States.

2. Designation History - In 1968 the Chattooga was nominated as a "study river" by the Wild and Scenic Rivers Act (PL 90-542) and became a national wild and scenic river in 1974 (91 PL 93-279). The Chattooga River received only limited use, either from floater or from bank oriented activities like fishing and hiking until its nomination as a wild and scenic river. This is probably due to the publicity in local and regional newspapers and in other news media coupled with the general interest in forest type recreation in the late 1960's. Subsequent publication of the book Deliverance, considered by many to have been written about the Chattooga, and the filming of the movie Deliverance on the Chattooga gave further notoriety to this free flowing river. The result of this publicity was a massive increase in use of the river and its corridor.

The Forest Service USDA was given responsibility for managing the river with its designation as a wild and scenic river. In 1975 the Regional Forester assigned responsibility for administering floating use on the main river to the Francis Marion-Sumter National Forests since almost all the access points lie in South Carolina.

3. River Characteristics - The Chattooga offers a wide range of floating conditions, from portions of flat water up to two miles long to rugged portions with Class 4 and 5 rapids back to back. When boaters first discovered the river in the late 1960's and early 1970's many lacked the knowledge and equipment to safely run it. Numerous fatalities occurred before safety regulations were imposed in the mid-1970's.

The first twenty-six miles of the river are closed to all floating use as the river is generally too small for floating during most water levels. This also provides an area where people can fish and hike without encountering boating traffic.

The floatable portions have been divided into four sections (I through IV). Section I is a tributary stream known as the West Fork which is entirely in Georgia. The float begins at a parking/launch area at river mile 27.7 (measured from the mouth), and it ends at mile 24.2 at the newly-constructed Highway 28 parking/launch area on the main river. This is a very mild section with about fifteen rapids in the Class 1 to 2 range. The stream is generally about 30 feet wide and offers a good opportunity for beginners to practice boating skills before trying more difficult portions.

Most floaters on Section II will enter at the new Highway 28 parking/launch area and will get out at river mile 17.4 at Earl's Ford. This section of the river varies from sixty to one hundred twenty-five feet wide and has about twenty-five Class 1 and 2 rapids and one Class 3 rapid (Big Shoals). It is a good area that is safe

for beginners who often capsize, and it is also good tubing water. It does not have enough heavy water to be challenging for commercial raft trips.

Section III begins at Earl's Ford and ends at the Highway 76 bridge at river mile 6.0. Additional access points on this section are at Sandy Ford in both South Carolina and Georgia, and Fall Creek and Tilly Branch in South Carolina. It is a much more difficult portion than Section II with about sixty-two rapids Class 2, four Class 3, three Class 4, and one Class 5. The river varies in width from sixty to one hundred twenty-five feet. It is the heaviest used section of the river by private users.

Section IV begins at Highway 76 and drops rapidly to Tugaloo Lake. It is by far the most difficult section open to boating. It contains about thirty-seven rapids Class 2, two Class 3, four Class 4, four Class 5 and one Class 6. This portion of the Chattooga is the most heavily used section by the commercial raft companies. Their use would be higher if present Forest Service regulations were not in force as there is more demand on weekends than is presently permitted. Many of the commercial trips that begin on the lower portion of Section III (Fall Creek and Tilly Branch) end at Woodall Shoals which is two miles into Section IV. Since the Section IV commercial trips begin at Highway 76, this two mile overlap causes the Highway 76 - Woodall Shoals to be the most heavily used section of the river. However, this is not the problem it could be, since most of the trips starting on Section III arrive at the bridge in the afternoon while Section IV trips are floating this section in the morning.

4. Use Patterns and Trends - Table 1 shows the estimated number of floaters on the Chattooga by years. The river experienced a very rapid increase in usage between 1967 and 1974, and then the increase leveled off and began to fluctuate widely. A substantial increase was registered in 1979 which is interesting in light of the increased gasoline prices. This can be partly attributed to favorable water levels.

TABLE 1

ESTIMATED NUMBER OF FLOATERS ON CHATTOOGA

<u>YEAR</u>	<u>TOTAL USE</u>	<u>COMMERCIAL PORTION</u>	<u>REMARKS</u>
1967	100		
1968	100		
1969	300		Wild & Scenic River Study Begins
1970	800		
1971	800		
1972	7,600		Movie "Deliverance" Made
1973	21,000		
1974	28,800		
1975	22,800	7,423	First Year Registration & Accurate Counting
1976	17,100	10,233	
1977	17,400	13,089	Very Low Water
1978	30,000	20,000	
1979	36,666	23,294	First year guides included in commercial portion
1980	48,262	27,262	

The amount of floaters is correlated with water temperature and summer vacation. Private use usually peaks earlier in the summer than commercial use as private users are more knowledgeable about favorable water levels. Table 2 shows the use pattern by months and reveals the concentration during the summer.

TABLE 2  
FLOATING USE BY MONTHS

<u>MONTH</u>	<u>PRIVATE INDIVIDUAL</u>	<u>COMMERCIAL</u>	<u>TOTAL</u>
JAN	19	0	19
FEB	11	0	11
MAR	242	300	542
APR	938	1331	2269
MAY	1538	2604	4142
JUN	2362	3181	5543
JUL	2743	4571	7314
AUG	2730	5397	8127
SEP	1814	3245	5059
OCT	671	1595	2266
NOV	264	0	264
DEC	37	0	37
	<u>13382</u>	<u>23294</u>	<u>36676</u>

A diagrammatic representation of the data for August is shown to the right of the table. It consists of a large dashed-line rectangle representing the total use of 8127. Inside this rectangle, a smaller solid-line rectangle represents private use of 2730, which is labeled as 22% of the total. The remaining area, representing commercial use of 5397, is labeled as 55.9% of the total. The entire area is labeled as 88.5% of the total.

Table 3 shows the amount of use that occurred on each day during 1979 by private and total use. The commercial figure can be obtained by subtracting the smaller figure in a block (the private) from the larger figure (the total).

TABLE 3

FLOATING USE BY DAYS

	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC				
	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL			
1		2	2			4	4	34	97	0	70	48	207	267	448	38	176	187	373	4	15			>			
2								1	23	0	63	129	262	30	186	57	180	296	497	4	4	4	4	>			
3						>	>	13	13	0	80	132	197	72	226	35	218	122	314	14	35	>	47	47			
4						>	>	4	4			21	135	20	47	85	157	>	400	636	11	63	7	7	>		
5								3	3	>	137	253	3	75	41	180	>	239	469	2	49	28	85	3	3		
6	>							2	2		16	16	>	57	174	18	94	44	216	32	188	5	26	>	64	281	
7	>									>	81	210	17	76	22	164	>	205	415	18	228	21	102	>	42	239	
8										>	75	115	15	40	32	169	>	151	295	12	193	>	234	446	21	90	
9								4	21	4	29	11	54	>	210	305	50	118	16	214	>	112	349	8	20		
10										>	22	22	0	23	3	49	>	174	261	16	153	55	294	9	265		
11										>	7	7	19	64	6	84	24	144	36	110	>	286	503	11	75		
12										>	4	23	8	30	>	112	240	14	101	66	197	>	255	478	13	79	
13	>									>	2	2	6	28	>	72	97	69	112	22	219	74	212	4	75		
14	>									>	3	3	>	39	135	6	96	41	149	>	304	488	59	305	2	120	
15										>	62	68	13	115	55	219	>	234	463	60	334	>	131	311	0	14	
16											4	4	0	23	21	102	>	122	254	44	151	40	273	>	164	373	
17										>	32	84	11	11	9	61	>	115	144	35	217	36	276	6	62		
18										>	22	43	8	34	68	197	20	109	21	191	>	318	537	29	79		
19											13	13	>	213	366	71	187	49	174	>	179	416	8	48	33	91	
20	>	4	4								14	14	>	140	345	28	142	65	200	>	196	379	52	201	37	128	
21	>										4	4	>	131	253	11	155	58	228	>	109	328	25	186	>	96	296
22											15	15	>	109	328	25	186	>	96	296	12	12	3	3	>	3	3
23											22	22	10	100	23	105	>	318	481	32	156	19	128	>	120	194	
24																											
25																											
26																											
27	>	2	2																								
28	>	11	11																								
29																											
30																											
31																											
	19	19	11	11	258	538	938	2381	1539	4362	2372	5543	2751	7717	2730	8431	1814	5102	671	2266	264	264	32	32			

Comm = Total less Pvt.

> Denotes Weekends

Table 4 shows the type craft launched by private individuals at the different launch points. Earl's Ford was the major private entry point with 5062 craft or 57.4% of the total private launches.

TABLE 4

TYPE CRAFT BY LAUNCH POINT (PRIVATE ONLY)

POINT	INNER				TOTAL
	# CANOES	# RAFTS	# KAYAKS	# TUBES	
Westfork		2	13	37	123
HW 29 Bridge	991	191	225	320	1727
Long Bottom	56	21	32	42	151
Earl's Ford	2489	748	1823	2*	5062
Sandy Ford	2		4		6
Fall Creek	53	51	47		151
Tilly Branch	10	5	18		33
HW 76	317	200	1059		1576
Woodall Shoals	1	2	13		15
	<u>4888</u>	<u>1220</u>	<u>3234</u>	<u>401</u>	<u>8844</u>

\* Tubes are not permitted below Earl's Ford.

5. Definitions that have developed on the Chattooga follow:

Tubber - Any individual floating the river in an innertube. This use is restricted to Sections I and II and is generally limited to the warmer months of June - August.

Floater - A person using any device, canoe, kayak, raft, innertube to float down the river.

Commercial User - A person who pays to travel with one of the regularly scheduled raft services or instructional clinics.

Clinic - A commercial trip primarily for instruction in white water boat handling rather than simply floating the river. Clinics generally have a less than twelve students and move down the river slowly as they discuss how to run a particular rapid.

Nonprofit Organized Group - Any party where use of the river is not the primary purpose of the organization and no profit is incurred. Examples are universities, scouts and some summer camps. Camps generally run Section II while universities often run III. These groups probably have the largest number of boats per party using the river.

Individual Floater - These are people who join together to float the river without money (other than possibly for transportation) changing hands. During 1979 they numbered over 13,000. This group has the largest number of repeat users and have the greatest boating skill outside of the commercial guides. However, the group also contains novice floaters who get into numerous situations requiring skills they do not possess. Other users (frequently commercial) may have to assist them to enable them to complete the trip successfully. Almost no overnight trips are made since conditions are not conducive to carrying camping gear.

Commercial - This is the largest group of users and consists of three rafting companies and seven commercial clinics operating under special use permit. During 1979 their use including guides totaled about 23,294. The raft contracts are in the third year of a five year permit while the clinics are under an annual permit. Restrictions have been placed on their operation to limit how many people they can carry, on what portions of the river they can float and at what times they can launch.

6. Objectives for managing the river - The Act establishing the Chattooga as a Wild and Scenic River states objectives for each class (wild, scenic and recreational) that are contained in the Management Plan on pages 2 and 3. In general the classification was based on land condition when the river was studied in the late 1960's when numerous "improvements" like houses, fields, bridges and access roads existed. Now most of these man made features have been removed with the exception of the bridges. From the stand point of floating use all three classifications are managed in the same way since a floater will pass through several classification or any trip i.e. began in a recreation portion and end in a wild section. Thus it is probably more important to look at a river section i.e., II or III as a unit and try to set objectives for floating experiences section by section.
7. Regulations applied to floaters - In the early 1970's numerous deaths occurred as floaters with substandard equipment, lack of boating skills and no knowledge of the Chattooga came to pit themselves against the unforgiving river. In 1975 regulations were implemented requiring a) personal floating devices (life jackets) to be worn at all times, b) requiring a minimum of two craft on more difficult sections and c) helmets on all decked boat users and floater below Woodall Shoals. These regulations had a very positive effect in reducing the death toll.

These regulations probably caused some potential users to not use the Chattooga, but the number is not believed to be significant. A more significant factor in holding down the number of users occurred as access roads were closed at the river corridor, and users were required to walk in. This action required portage of 200 - 800 yards at all access points except those along Highway 28 and the West Fork.

In a study by Gordon Howard in 1975 before most of these closures were made, more respondents favored a 1/4 mile portage than opposed it (favor 46.5%, neutral 20.3% and oppose 33.2%). There was a drop in reported usage in 1976 but a later question study by Howard (unpublished) did not show a strong correlation between Forest Service management actions and the decline.

To date no restrictions have been placed on how many non-commercial floaters can use the river. All people are free to use the river any time they desire, the only requirement being that they register themselves at the entry point and meet the safety requirements.

However, there have been several limitations placed on the commercial sector. In 1975 it was determined that a) only three outfitters would

be permitted to run regularly scheduled raft trips, b) that a maximum of 30 customers could be carried per trip, c) that during the main summer use season only a limited number of trips would be permitted on a particular section of the river on weekends and holidays and d) a schedule for launches would be established to keep trips from bunching up.

By 1977-78 outfitters were using almost all of their allotted capacity on the weekends, and so the increase in commercial use has not come from this source. Instead it has come as commercial trips booked more people during the week when there was no limitation on number of trips and extended the season into the spring and fall.

The rationale behind the limiting the commercial sector and not the private sector was based on the following factors. First, the commercial sector is a small group (three to seven) of readily identifiable users over which the Forest Service has definite control through the special use permit as opposed to thousands of individuals. Second, the commercial sector soon became the largest group of users now carrying two times as many people as travel privately at present. Finally, their scheduled operations permitted easy administration as opposed to the logistics of trying to manage and regulate private users at ten access points during much of the year.

8. Existing studies on the Chattooga - Studies that have a direct bearing on the capacity of the river to provide recreation experiences are limited. The 1971 Chattooga River Wild and Scenic River Study Report to Congress that resulted in its classification was written when floating use was less than 800 per year and dealt with physical attributes rather than sociological.

The most complete study was in 1975 when Dr. Gordon Howard of Clemson prepared the "Chattooga River Visitor Survey". It utilized a mail out questionnaire to randomly selected private floaters who had filled out self registration forms when launching and names from commercial raft clients. The study analyzed the completed returns from 336 private and 357 commercial floaters to evaluate user perceptions, desires and opinions on different management options.

Howard followed this study the following year with a study designed to learn why use had declined and further refined use patterns. However, it has not been published to date.

In 1979 Dr. John Currier of the Forest Service implemented a water quality study to learn the impacts of boaters on the water quality in the river. This study has shown that there is no significant lowering of the water quality that can be attributed to boaters. In general the Chattooga's water quality is very good with the highest biological counts coming after storms from agricultural sources.

#### D. RECREATION USE FIGURES

The Chattooga has had a very dramatic increase in floating use from a reported 100 days in 1969 to over 36,000 in 1979. The figures prior to

about 1973 can be characterized as best guesses. In 1973 and 74 figures were estimated based on actual counts by river rangers and then expanded to cover the periods when the stations were not manned.

In 1975 a self-registration system in use today was established for the river with stations at the major entry points. Visitors filled out a permit, placing the original in a box at entry point and kept the carbon copy. The River Rangers spot check permits, writing citations to those who ignored the direction to register, in an attempt to obtain as complete information as possible. This information was coded and analyzed on the Forest Service computer for several years. It provided a good feel of use on the river.

In 1977 and 78 the computer program malfunctioned and would not analyze the data so use data was based on hand tabulation of registration slips and outfitter special use charges.

In 1979 the Forest Service contracted with Clemson University to compile the information on private users using a program developed by Gordon Howard.

The commercial use was determined by compiling by hand the monthly use figures reported on commercial special use permits.

The figures shown in Table 3 are probably low by at least 5% since some users do not register because a) they rebel at registering, b) may launch at a point without a registration station or c) may not find a pencil or registration slip at the station.

#### E. CHARACTER OF THE CHATTOOGA

Topography is one of the variables useful in determining the potential of the river to conceal one party of users from another or to congregate users. James Kuska discusses three factors - gradient, rapids and sinuosity - that can have bearing on user patterns and perceptions of other users. The numerical figures as determined from topographic maps are shown in Table 5.

1. Gradient is the rate a river drops in a certain distance. This is often expressed in feet per mile. The following table shows that there are significant differences in the gradient on different sections of the Chattooga. The greater the gradient the faster the river flows and in general the faster the people floating move down stream.

However, when the gradient is very steep it indicates rapids or waterfalls. If these are small drops, boaters move through them quickly. If they are large and difficult rapids boaters tend to stop, get out and scout or portage. This slows down movement and causes more opportunity for one group to overtake other groups.

2. Combined rapid class total is an indicator of the step effect in a river. To show this graphically the rapids class difficulty (numerical) in each one mile section was added together so that this factor could be displayed graphically. Thus if there were four Class

2 rapids and one Class 3 rapid the section would be assigned a rating of eleven. On the Chattooga the combined rapid class total for one mile sections ranges from a total of 2 on Section I to a total of 39 on Section IV.

On one mile sections with rating totaling 12 to 18, boaters not experienced with the section frequently stop and scout, causing more groups to overtake and pass groups. However, this is partially compensating as areas with rapids often produce noise that tends to block out voices of other parties. In addition rapids offer limited screening when one group is above and another is below the rapid.

3. Sinuosity provides greater sense of isolation to visual contact This is the amount of bending in a river and it relates down river viewing distances of one portion with another. Sinuosity was determined by comparing the ratio of a two mile portion of the river to the straight line distance between the two mile river points. These ranged from 1.17 (very straight) to 3.90 which indicated great bending and resulting poor visibility.

A study needs to be undertaken to learn how the gradient, combined rapid class total and sinuosity interrelate to either reduce or increase the perception of crowding on the various sections of the Chattooga.

#### F. CARRYING CAPACITY CONSIDERATIONS

Carrying capacity is the maximum number of living things (in this case floaters) that can be supported by the ecosystem (the river) during the most critical period of the year without causing harm. Three major elements comprise the recreation carrying capacity concept - physical, biotic and social. The physical carrying capacity, which includes the limitations of non-living components of a site such as soils or available parking space is the easiest to measure. The biotic carrying capacity which includes the impact on living organisms such as vegetation, wildlife, aquatic, water quality etc. can also be measured fairly easily. The social capacity involves the impact on people on one another while competing for the same or related experiences.

Unfortunately trying to set a carrying capacity is a nebulous job as many factors, opinions experiences and objectives are encountered. Many contemporary authors argue that a carrying capacity determination is impossible (and not desirable) except in the most limited of situations.

Establishment of a carrying capacity below demand presupposed that some method will be used to determine who would not be permitted to utilize the river in the manner they are accustomed (time of day or month, section of river, number of trips per year, etc.).

Several studies and reports were used extensively in the preparation of the Chattooga Study. Included in these are McCool and Utter's "Wild River Carrying Management, A Case Study of Use Permit Allocation on the Middle Fork of the Salmon River", Gordon Howard's "Chattooga River Visitor Survey" and Shelby and Danley's "Allocating River Use".

TABLE 5

<u>RIVER MILE</u>	<u>LOCATION</u>	<u>GRADIENT</u>	<u>SUM OF RAPID CLASS</u>	<u>SINOUSITY</u>
27.8	WEST FORK LAUNCH	5'	0	1.42
27		13'	4	1.33
26		15'	2	1.33
25		8'	2	1.29
24		2'	2	1.52
23	HW 28 LAUNCH	10'	2	1.14
22		18'	8	1.58
21		22'	9	1.67
20		10'	10	2.77
19		10'	10	2.19
18		10'	8	1.33
17	EARL'S FORD	15'	4	1.94
16		25'	12	2.00
15		65'	16	1.50
14		30'	17	1.58
13		35'	17	2.63
12		20'	8	1.58
11		15'	20	1.39
10		30'	13	1.27
9		10'	16	1.64
8		30'	8	1.72
7		25'	13	1.74
6		40'	18	3.90
5	HW 76 BRIDGE	30'	9	1.54
4		80'	20	1.33
3		40'	24	1.12
2		35'	18	1.17
1		55'	39	1.54
0	TUGALO LAKE			-

1. The physical carrying capacity is the easiest capacity to determine. On the Chattooga, there is adequate capacity for parking lot expansion, road access, portage trails, etc. to accommodate floating use leaves much higher than can be anticipated. While there is some physical site damage and compaction from foot traffic, with good site maintenance this could be reduced to negligible amounts at all launch sites other than Earl's Ford. The launch areas are in much better shape now than five years ago when vehicle use was permitted. At Earl's Ford erosion is occurring during flood state but this will not impose limitations.
2. No serious limitation of the biotic carrying capacity is foreseen. The Water Quality Study by John Currier indicates that far more boating use could be permitted before water quality degradation would be a limiting factor. cursory observation indicates that no impacts to vegetation, wildlife, aquatic life are occurring and no problems are foreseen even if use increased significantly.
3. This leaves the social carrying capacity as the one that would be the first to be reached or exceeded. Unfortunately it is also the one that is hardest to grasp and set. At present there is insufficient data to set a precise limit.

The most definitive study to date was done by Gordon Howard. However, this study has several biases that require additional study be done to bring it up to date.

First, only 20% of his commercial respondents floated the river on the weekend when the river use is at the highest and conflict potential is greatest. Second, the overall use by floaters has increased 60% from an estimated 22,800 people in 1975 when the study was made to 36,666 during 1979. However, this increase is not as significant as it first appears since the commercial use on weekends has not increased dramatically because of the limits placed on how many clients can be carried.

4. Analysis of studies - This current study seems to determine how the Chattooga River should be managed in keeping with the goals of the legislation and the desires of the public. Howard's study asked a number of pertinent questions that reveal how people were thinking. These include the question "I float the Chattooga River because I like to" and provided 13 situations for users to respond to. See Table 6 for private user responses and Table 7 for commercial responses.

Eight of the options do not relate to how many other users are present and could be equally done on a crowded or low use day. Two of the situations (#6 and 11) might be considered to indicate that a greater number of other boaters would reduce the quality of their experience since more people might detract from the scenery or the chance to observe wildlife. I feel this is not a realized experience for very many individuals since on only one float out of about thirty-five times on the river have I seen a deer or other large animal.

Table 7

"I Boat On The Chattooga River Because I Like To:"  
Private Users\*

Reason	N**	Strongly Agree		Agree		No Opinion		Disagree		Strongly Disagree	
		n	%	n	%	n	%	n	%	n	%
1) Take my family on the River.	308	55	17.8	84	27.3	121	39.3	29	9.4	19	6.2
2) Meet the challenge of whitewater.	319	203	63.6	101	31.7	8	2.5	7	2.2	0	0.0
3) Improve my boating skills.	315	147	46.6	124	39.4	33	10.5	10	3.2	1	0.3
4) Enjoy the clean air.	317	183	57.7	119	37.6	11	3.5	3	0.9	1	0.3
5) Meet new people.	314	42	13.4	88	28.0	125	39.8	40	12.7	19	6.1
6) Enjoy the scenery.	317	230	72.6	80	25.2	6	1.9	1	0.3	0	0.0
7) Get away from people.	313	90	28.8	104	33.2	95	30.3	14	4.5	10	3.2
8) Experience wilderness and isolation.	316	148	46.8	125	39.6	32	10.1	8	2.5	3	1.0
9) Forget about my problems.	313	76	24.3	93	29.7	108	34.5	22	7.0	14	4.5
10) Enjoy the companionship of friends.	315	124	39.4	157	49.8	26	8.3	5	1.6	3	0.9
11) Observe wildlife.	314	108	34.4	135	43.0	61	19.4	8	2.6	2	0.6
12) Fish as I boat.	314	6	1.9	16	5.1	127	40.4	91	29.0	74	23.6
13) Watch other boats run the rapids.	314	36	11.5	125	39.8	100	31.8	32	10.2	21	6.7
14) Get out of the city awhile.	312	119	38.1	130	41.7	44	14.1	11	3.5	8	2.6
15) Get some physical exercise.	317	161	50.8	127	40.1	24	7.6	3	0.9	2	0.6

\*All rows total to 100%.

\*\*The N's vary because not every respondent chose to rate each reason.

Table 6

"Boating Use Of The River Should Be Controlled By:"  
Private Users\*

Management Option	N**	Strongly Favor		Favor		No Opinion		Oppose		Strongly Oppose	
		n	%	n	%	n	%	n	%	n	%
Issuing a limited number of permits only on a first come, first served basis.	170	12	7.1	43	25.3	14	8.2	55	32.3	46	27.1
Issuing a limited number of permits only through telephone reservations.	170	14	8.2	40	23.5	27	15.9	52	30.6	37	21.8
Issuing a limited number of permits only through mail reservations.	166	22	13.3	35	21.1	18	10.8	58	34.9	33	19.9
Issuing a limited number of permits only through a daily lottery of all boaters present at a specified time.	169	0	0.0	7	4.1	11	6.5	42	24.9	109	64.5
Charging a daily entrance (use) fee.	169	11	6.5	22	13.0	30	17.8	34	20.1	72	42.6
Charging for the use of the river by the hour.	171	0	0.0	0	0.0	3	1.8	43	25.1	125	73.1
Limiting the number of trips that an individual could take during the peak use months.	171	16	9.4	33	19.3	26	15.2	47	27.5	49	28.6
Requiring a one-quarter mile portage to get to and from the river.	172	35	20.3	45	26.2	35	20.3	33	19.2	24	14.0
Requiring a one-half mile portage to get to and from the river.	170	11	6.5	24	14.1	41	24.1	48	28.2	46	27.1
Limiting the number of boats in a group.	171	20	11.7	62	36.3	31	18.1	39	22.8	19	11.1
Limiting the number of people in a group.	169	13	7.7	65	38.5	32	18.9	37	21.9	22	13.0
Launching groups ONLY at 10 minute intervals.	167	11	6.6	39	23.4	50	29.9	49	29.3	18	10.8
Launching groups ONLY at 20 minute intervals.	169	11	6.5	41	24.3	54	31.9	37	21.9	26	15.4
Launching groups ONLY at 30 minute intervals.	167	18	10.8	17	10.2	44	26.3	51	30.5	37	22.2
Limiting the use of the river to boaters from the States that border on the river (S.C., N.C., and Ga.)	172	6	3.5	6	3.5	15	8.7	41	23.8	104	60.5
Doing away with commercial outfitters and other special permit users.	168	21	12.5	24	14.3	36	21.4	50	29.8	37	22.0
Channeling ALL river use through commercial raft and guide services (no private boater trips).	172	3	1.7	0	0.0	1	0.6	11	6.4	157	91.3
Requiring each boater to pass a skills test.	171	31	18.1	48	28.1	44	25.7	33	19.3	15	8.8
Requiring each craft to carry at least 2 persons.	173	20	11.6	16	9.2	10	5.8	30	17.3	97	56.1
Requiring each craft to carry 4 persons (could mean fewer boats but more people).	172	0	0.0	3	1.7	12	7.0	34	19.8	123	71.5
Prohibiting the carrying of more than 2 people per craft (could mean fewer people but more boats).	168	7	4.2	14	8.3	32	19.1	53	31.5	62	36.9

\*All rows total 100%.

\*\*The N's vary because not every respondent chose to rate each management option.

Two of the reasons given would definitely be lessened by crowds. These are (#7) the desire to get away from people and (#8) to experience wilderness and isolation. These responses are shown as follows:

<u>Reason</u>	Strongly		No	Disagree	Strongly
	Agree	Agree	Opinion		
Get away from people (pvt users)	28.8%	33.2%	30.3%	4.5%	3.2%
	(comm users)	21.8%	31.1%	32.5%	11.9%
Experience Wilderness (pvt users)	46.8%	39.6%	10.1%	2.5%	1.0%
	and isolation (comm users)	40.5%	44.0%	13.4%	1.2%

On one question it could be argued that increased numbers of boaters would heighten the experience. This is (#13) -watch other boats run the rapids- since the more boats the greater the opportunity to watch. The number of respondents in agreement to this form of enjoyment was 51.3% in favor compared to 16.9% disagreeing.

5. Perception of Crowding - Numerous studies have shown that recreationists perceive crowding based on the number and/or size of groups encountered as well as the activity the other group is performing. Floaters in kayaks thus would be more tolerant of other kayaks than raft or inner tubes while small groups are more tolerant of small groups than large groups.

Howard sought to determine how many other groups private users would tolerate before considering the river to be crowded. Their responses were:

Number of Groups	Percent	Cumulative Percent
1-2	4.2	4.2
3-4	20.1	24.3
5-6	24.1	48.6
7-8	17.8	66.4
9-10	12.9	79.3
11-15	7.4	86.7
≥ 16	13.3	100.0

Only 10% of Howard's private users perceived the river as being crowded. This is probably due to their statement that 78% of their parties were overtaken by three or fewer other groups and 81% overtook three or fewer groups. Studies have shown that inexperienced observers underestimate the number of contacts they have with other groups which may allow a river to handle extra floaters.

One problem with the above study is that sufficient information was not collected to correlate how many people were on the river or the section in question on the dates the respondents floated the river. If the majority of the respondents floated during the week, the increase in use that has occurred since his study was made and the higher use on weekends might increase the perception of crowding to intolerant levels. This is another area where more study is needed.

When asked if they favored prohibiting commercial rafts, most private boaters said no. The commercial floaters also favored retention of the private floaters.

The average difference in floating speed is not great with kayaks traveling fastest and rafts slowest. Given adequate spacing, the number of times one group would overtake another group is low. However, the time required for different groups to run a rapid varies greatly. When the rapid class is 3 or higher, inexperienced boaters often spend a lot of time scouting or portaging while experienced boaters move through rapidly. The major points of concentration of boaters are:

<u>Section I</u>	<u>Section II</u>	<u>Section III</u>	<u>Section IV</u>
None	Big Shoals	Dicks Creek Second Ledge Painted Rock Bull Sluice	Woodall Shoals Cork Screw Crack in Rock Sockem Dog

By far the most congested point on the river is at Bull Sluice. It is really jammed when two or more commercial raft trips get off schedule and arrive at the same time as large numbers of private floaters. This point is 300 yards from the end of the Section III trip and 500 yards from the major Highway 76 crossing. This congestion attracts large numbers of people to view the rapid. The large number of floaters probably heightens their experience, as there are few opportunities to view boaters on a Class 5 rapid.

Boaters tend to concentrate their launch times further increasing the chances for conflicts and meeting other groups. Table 8 shows the distribution of private launch times at the major entry points. A three hour range captures 59 to 87% of the boaters at the major access points.

TABLE 8

TIME OF LAUNCH FOR PRIVATE BOATERS BY ACCESS POINT

<u>TIME</u>	<u>HW 28</u>	<u>EARL'S FORD</u>	<u>HW 76</u>
8-9 am	2.2%	4.0%	1.7%
9-10 am	9.3%	14.0%	6.9%
10-11 am	18.8%	35.2%	36.9%
11-12 am	20.9%	30.3%	29.6%
12-1	19.8%	11.9%	20.5%
1-2 pm	13.0%	1.0%	4.5%
2-3 pm	8.8%	1.0%	-
3-4 pm	3.6%	1.0%	-
4-5 pm	2.6%	1.6%	-
5-6 pm	1.0%	1%	-
NOT GIVEN	325 permits 18.6%	981 permits 19.2%	319 permits 20.1%

The heavy use season is May 15 - September 16, a period of 124 days during which the river was used by 26,977 floaters. A total of 13,355 floaters were present on the 36 weekend days during this period for an average of 378 people/day. During the 88 week days, 13,622 people floated, making an average of only 154. Thus, average use on a weekend day is 2 1/2 times as heavy as during the week.

This type information could be made available to persons seeking a river experience with fewer people. They could then elect to depart earlier than the rush, wait until most had passed down river, or pick a low use day.

The following charts (#1, 2, 3) were prepared to determine where the majority of floaters would be at any particular time. They are based on the launch times given on registration slips and average length of float trips shown on the river map. Since floating time increases as water levels decrease, charts were prepared for high water (3.0 feet at Highway 76 Bridge), medium (2.0 feet) and low (1.0 feet). In addition since kayaks tend to move fastest and rafts slowest, further dispersal of craft results in a wedge shaped area of floater use.

At 3.0 feet Commercial Section III trips launch from Fall Creek which is 7 1/2 miles down stream from Earl's Ford where most private trips originate. Chart #3 shows that they generally stay ahead of all but the fastest private canoes and kayaks, thus avoiding conjection.

Launch Point 2 -- Highway 28

Heaviest canoe, raft and kayak use is during June, July, August and early September with significant Saturday use in May. For the period May 1 - Sept 30 the average number of craft per day was:

	<u>Mon.</u>	<u>Tues.</u>	<u>Wed.</u>	<u>Thurs.</u>	<u>Fri.</u>	<u>Sat.</u>	<u>Sun.</u>	<u>TOTAL</u>
Canoe	3.2	2.7	3.1	1.9	3.6	13.6	8.8	36.9
Raft	0.8	0.5	0.8	1.1	0.8	5.6	2.2	11.8
Kayak	0.2	0.8	0.0	0.3	1.1	3.4	2.9	8.7
TOTAL	4.2	4.0	3.9	3.3	5.5	22.6	13.9	57.4

The heaviest innertube use occurs during the warmer months of July, August and mid-September. The "critical window" of private use lies between 1000 and 1300 with a spurt at 1400.

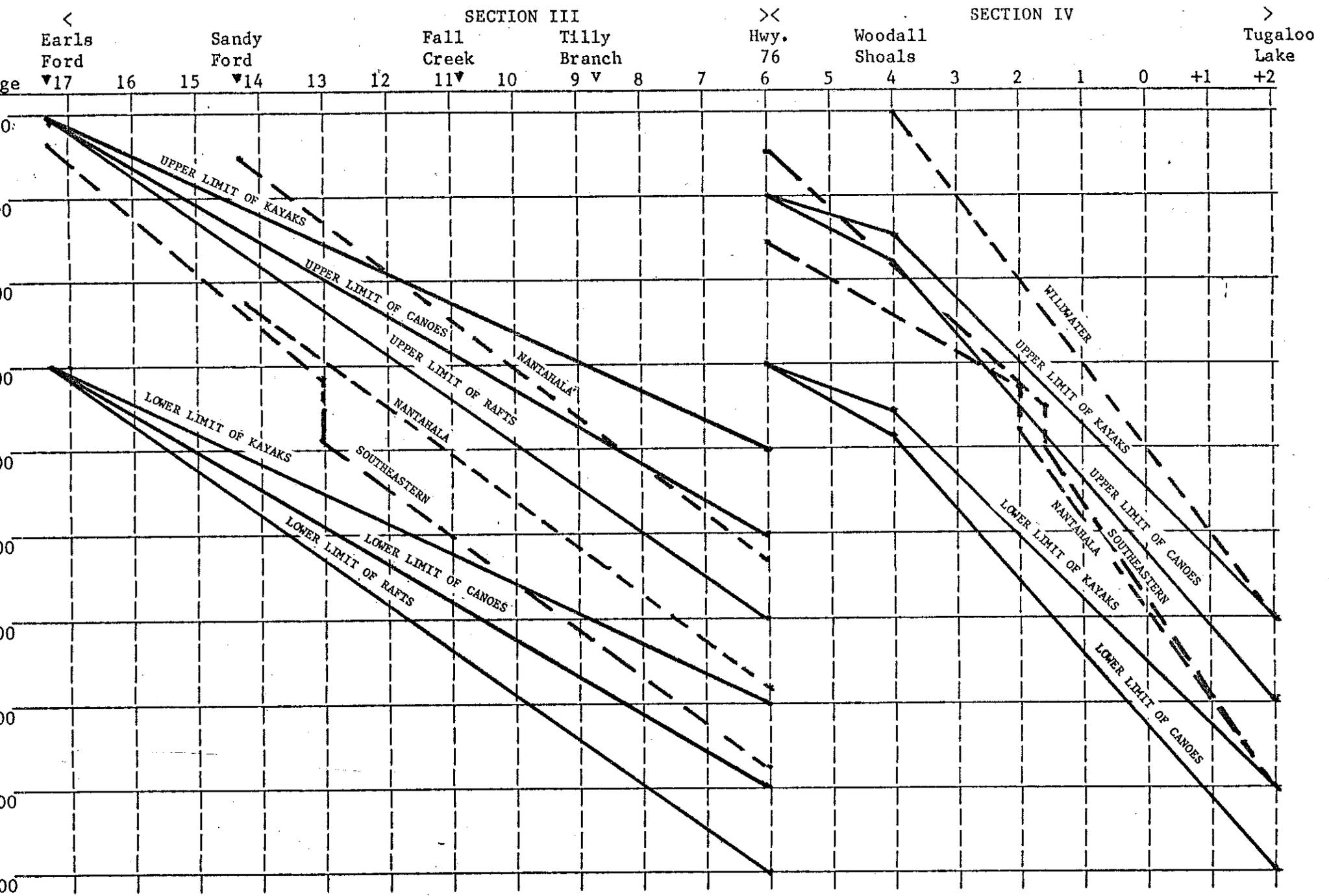
July 1 -- Sept 16

	<u>Mon.</u>	<u>Tues.</u>	<u>Wed.</u>	<u>Thurs.</u>	<u>Fri.</u>	<u>Sat.</u>	<u>Sun.</u>	<u>TOTAL</u>
Tubes	2.5	1.2	1.0	1.1	3.2	13.0	6.0	28.0

Launch Point 3 -- Long Bottom Ford

Canoe, raft, and kayak use incidental. Occasional large innertube parties occurred on Saturdays and Mondays June through mid-August. The "critical window" of private use lies between 1000 and 1300.

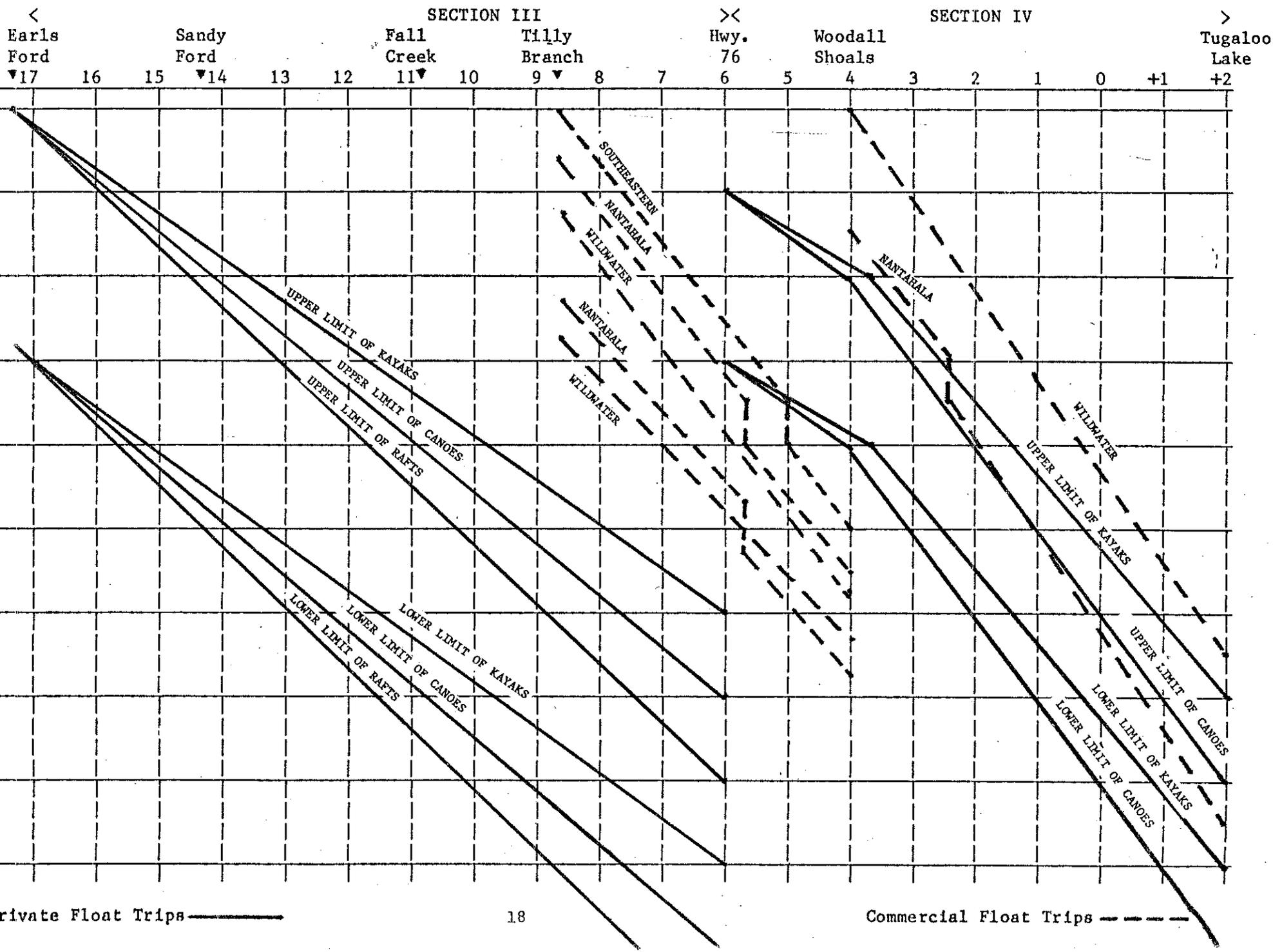
RT 2 Diagrammatic location of major body of floaters during typical days at different hours of the day when water level at the Highway 76 gauge is 2.0 feet.



Private Float Trips —————

Commercial Float Trips - - - - -

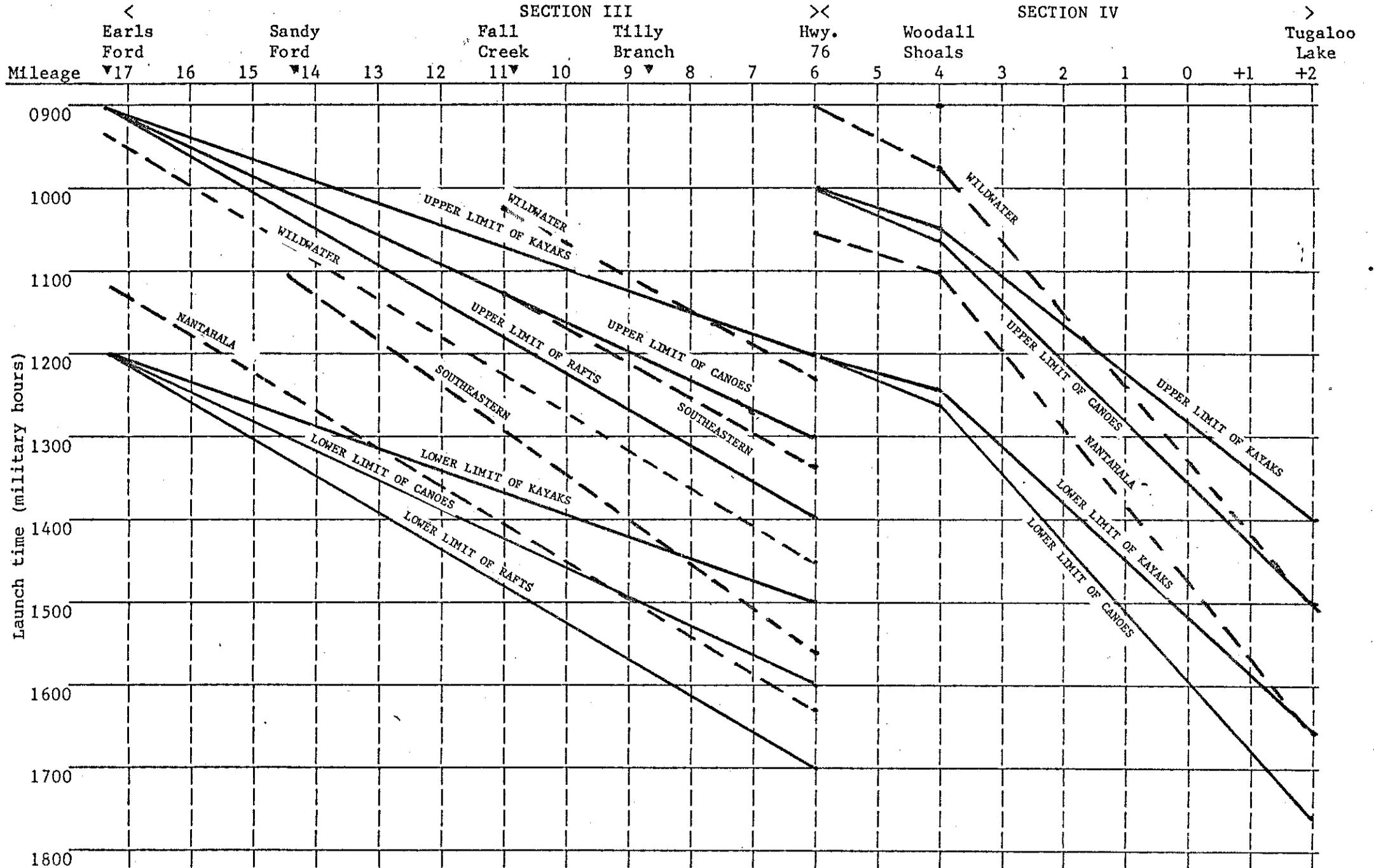
1 Diagrammatic location of major body of floaters during typical days at different hours of the day when water level at the Highway 76 gauge is 1.0 feet.



Private Float Trips ———

Commercial Float Trips - - - - -

CHART 3 Diagrammatic location of major body of floaters during typical days at different hours of the day when water level at the Highway 76 gauge is 3.0 feet.



Private Float Trips —————

Commercial Float Trips - - - - -

Launch Point 4 -- Earl's Ford

Heavy canoe, raft and kayak use occurs from mid-May through mid-September. There is sporadic heavy use in late April on weekends. Holiday use was not significant for rafts, but was for canoes and kayaks. For the period May 1 - Sept 30 the average number of craft per day was:

	<u>Mon.</u>	<u>Tues.</u>	<u>Wed.</u>	<u>Thurs.</u>	<u>Fri.</u>	<u>Sat.</u>	<u>Sun.</u>	<u>TOTAL</u>
Canoe	4.5	4.0	4.5	6.5	6.5	36.6	31.9	94.5
Raft	1.2	0.8	1.5	0.6	1.5	15.3	8.5	29.4
Kayak	3.3	2.5	4.2	1.9	4.0	26.0	27.1	69.0
TOTAL	9.0	7.3	10.2	9.0	12.0	77.9	67.5	192.9

Launch Point 5 -- Sandy Ford

Canoe, raft and kayak launch is incidental; this may change when the new Sandy Ford Road becomes known.

Launch Point 6 -- Highway 76

Heaviest use is by kayaks between late June and mid-September. Private use of canoes and rafts is low and holiday use is significant only from kayaks. During June 16 - Sept 16 the average number of craft per day was:

	<u>Mon.</u>	<u>Tues.</u>	<u>Wed.</u>	<u>Thurs.</u>	<u>Fri.</u>	<u>Sat.</u>	<u>Sun.</u>	<u>TOTAL</u>
Canoe	1.0	2.2	0.7	1.2	0.8	5.6	7.1	18.6
Raft	1.2	0.5	0.2	0.2	0.2	2.9	3.4	8.6
Kayak	4.3	3.1	3.1	2.5	4.6	14.1	22.0	53.7
TOTAL	6.5*	5.8	4.0	3.9	5.6	22.6	32.5	80.9

\* Mostly from Labor Day

The "critical window" of private use lies between 1000 and 1200.

Launch Point 7 -- Woodall Shoals

Private canoe, raft and kayak use is incidental; this may change when the parking lot is completed.

Launch Point 9 -- West Fork

Canoes and tubes sporadically have group use in summer. Raft and kayak use is incidental.

#### Launch Point 10 -- Fall Creek

Private canoe, raft and kayak use is sporadic during June, July and August.

#### Launch Point 11 -- Thrift's Ferry

Private canoe, raft and kayak use is incidental.

The analysis of the private floater registration data indicated that 13,390 people floated the Chattooga in 1979. The overall average group size was 5.25 people (Highway 28 = 4.7 people, Earl's Ford = 5.4 people and Highway 76 = 5.3 people).

Eighty-five percent of the total floating use occurs during five months - May through September. The analysis showed the following floating pattern during the highest use periods.

This information is presently being used to regulate commercial trips. One major commercial put in point is Fall Creek which is midway through Section III. Raft trips starting at Fall Creek are seldom overtaken by private users starting at Earl's Ford and passes Highway 76 after most of the other traffic has left. The information is also used to set limits on launch times for commercial instructional clinics.

Howard's study then asked "boating use of the Chattooga should be controlled by" and listed twenty-one possible strategies (see Table 31). On only three of the management options did a majority of the respondents indicate approval. These were a) requiring a 1/4 mile portage to get to and from the river (which has been implemented) and b) limiting the number of boats in a group and c) limiting the number of people in a group. They strongly opposed any system to issue a limited number of permits, charge a fee or require a time interval between parties.

#### G. FUTURE WORK NEEDED TO SET A CARRYING CAPACITY

A questionnaire study and observations of floater use patterns is under way at the present time by Carrol Townsend of North Carolina State University but the data is not sufficiently developed to incorporate into this study. Further study is needed to determine what impact one group of users has on another, and how many contacts take place on days with different number of users. This study can best be done through the following steps.

Step 1. Determine who passes who on trips. As groups launch on observation days they would be numbered consecutively with large numbers visible from shore and the launch time recorded. Observers at downstream stations would log the time each group passes their station. This would permit an accurate determination of how many times parties are passed/or pass other groups. This would be analyzed on the basis of how many floaters were on that section during the observation period.

Step 2. In conjunction with the observation program a survey based on either interviews or mail questionnaire should undertake to learn how the visitors experience was affected by other users. The study should also seek to learn what a floater would be willing to forego if he/she feels that too many users detracted from the trip. All too often the recreationist is not forced to realize that to get one level of experience he may have to give up something i.e. not come as often.

Step 3. With the benefit of the studies, statements would be prepared and approved by line officers describing the experience level that the Chattooga should provide.

A goal statement might read - A party of not more than eight boats or twenty people should be able to float Section III without encountering over three other groups (with the exception of Bull Sluice) on all but the six highest use days of the year. It is probable that different goal statements would be used for different sections since it appears that different motives for floating are involved. It is also possible that on certain days different restrictions might be applied. For example on Monday, perhaps only a limited number of boaters could use the river or perhaps commercial trips would be prohibited on Section III on that day. Thus the limited number of boaters who really felt that it was important to have access to a low use river could be accommodated while a much larger group who did not worry about larger number of boaters could also enjoy the river on other days.

Step 4. As an immediate program to help those seeking solitude, information on times of launching and days of low use should be made available. This will let the solitude seeker decide to launch at 7 AM if he wants to and never see another floater in most cases.

#### H. RECOMMENDATIONS

Jim Culp (former river administrator), Ron Lindenboom and I feel that the present use with the exception of a half dozen or so high use weekends has not reached the point where it is seriously detracting from a significant number of floaters experiences.

The three five-year raft trip permits held by Wildwater, Southeastern and Nantamaha will expire on December 31, 1982. The seven one-year clinic permits will expire at the end of 1980. It is desirable for company stability to hold a permit from several years so that investments can be budgeted and amortized. It is also beneficial to the Forest Service to have a longer permit period to reduce the time and expense of securing satisfactory permittees. However, when entering into long term permits it is possible that use will increase above the ability of the river and cutting back commercial use would probably involve court action and breach of contract. Therefore it is prudent to be conservative. With this in mind, the following policies are recommended:

1. During 1980, advertise and select a maximum of six companies to provide clinic or instructional services. The permit would be for a two-year period to expire on December 31, 1982 when the rafting

permits expire. At that time both instructional and rafting permits would be made for five-year periods.

2. No change will be made in the number of commercial rafting companies (three at present) or in the number of trips or number of clients per trip unless studies tht may be done in the future indicate a need for such change.
3. There is insufficient data to show that a limitation should be placed on the total number of private floaters who can use a section of the river on any given day. Considering the difficulty of the Forest Service to enforce limits and the hardship of the public in complying with such regulations, we feel that a significant amount of increase floating would be necessary to justify this move since private use is about one third of the total.
4. Commercial use for clinics will not interfere with the low amount of private use on Section II. Therefore clinics on this section should be able to start trips at whatever time and whatever day of the week they choose.
5. For Section III clinics, the following launch time restrictions from May 15 through September 15 on weekends and holidays should be utilized:

<u>Station</u>	<u>Water Level + 1.5 feet</u>	<u>Water Level below 1.5 feet</u>
Earl's Ford	Noon or later	Noon or later
Sandy Ford	9 a.m. or earlier	10 a.m. or earlier
Fall Creek	10 a.m. or earlier	Noon or earlier
Thrift's Ferry	11 a.m. or earlier	No Launching

When the water level is below 1.5 feet no clinic use will be permitted from Tilly Branch to Highway 76.

Section IV clinics could be permitted to start at Highway 76 Bridge after 1430 on week days and not impact significant numbers of floaters. Clinics should not be permitted below Highway 76 on weekends.

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I. MAP OF THE CHATTOOGA

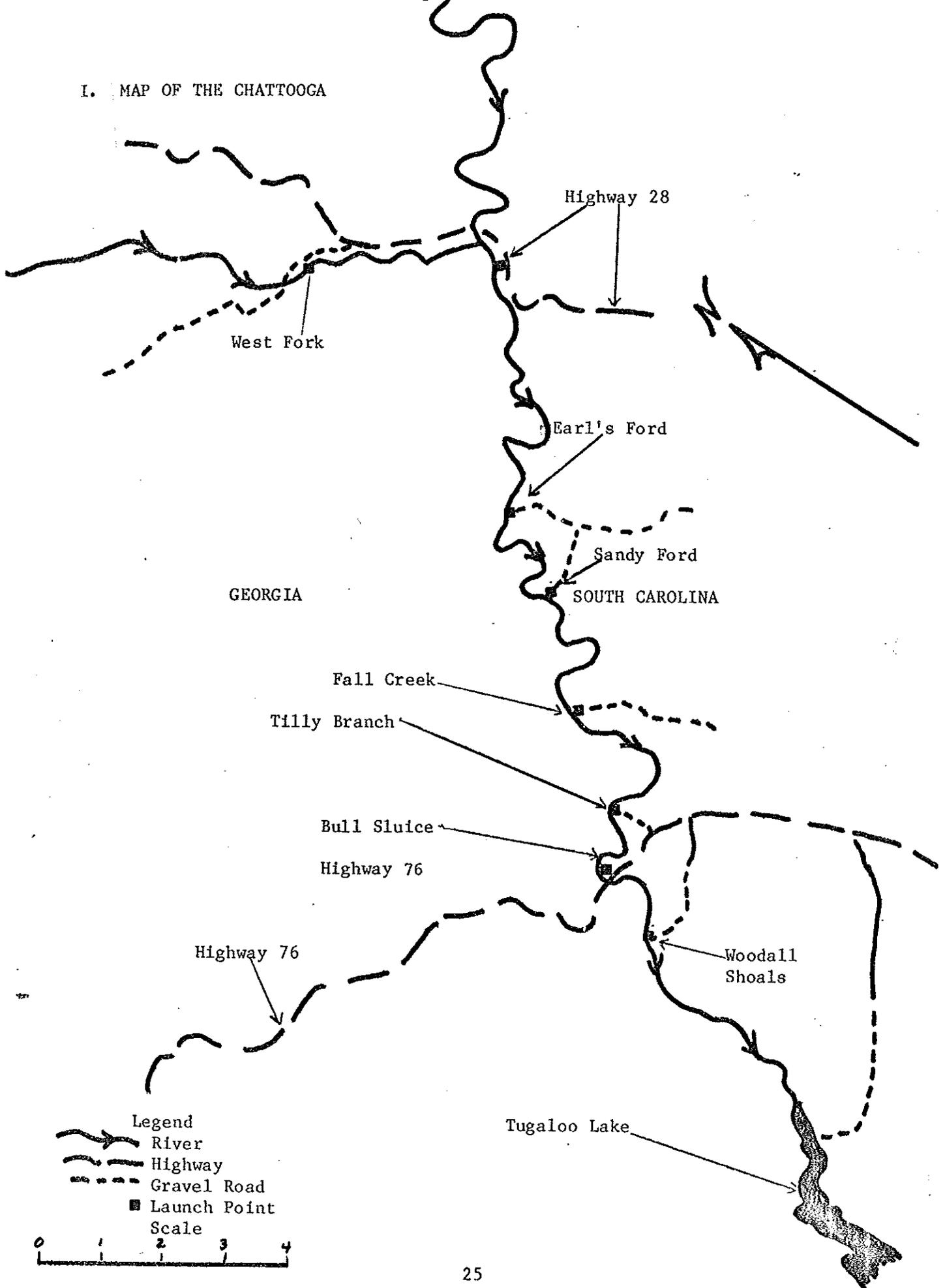
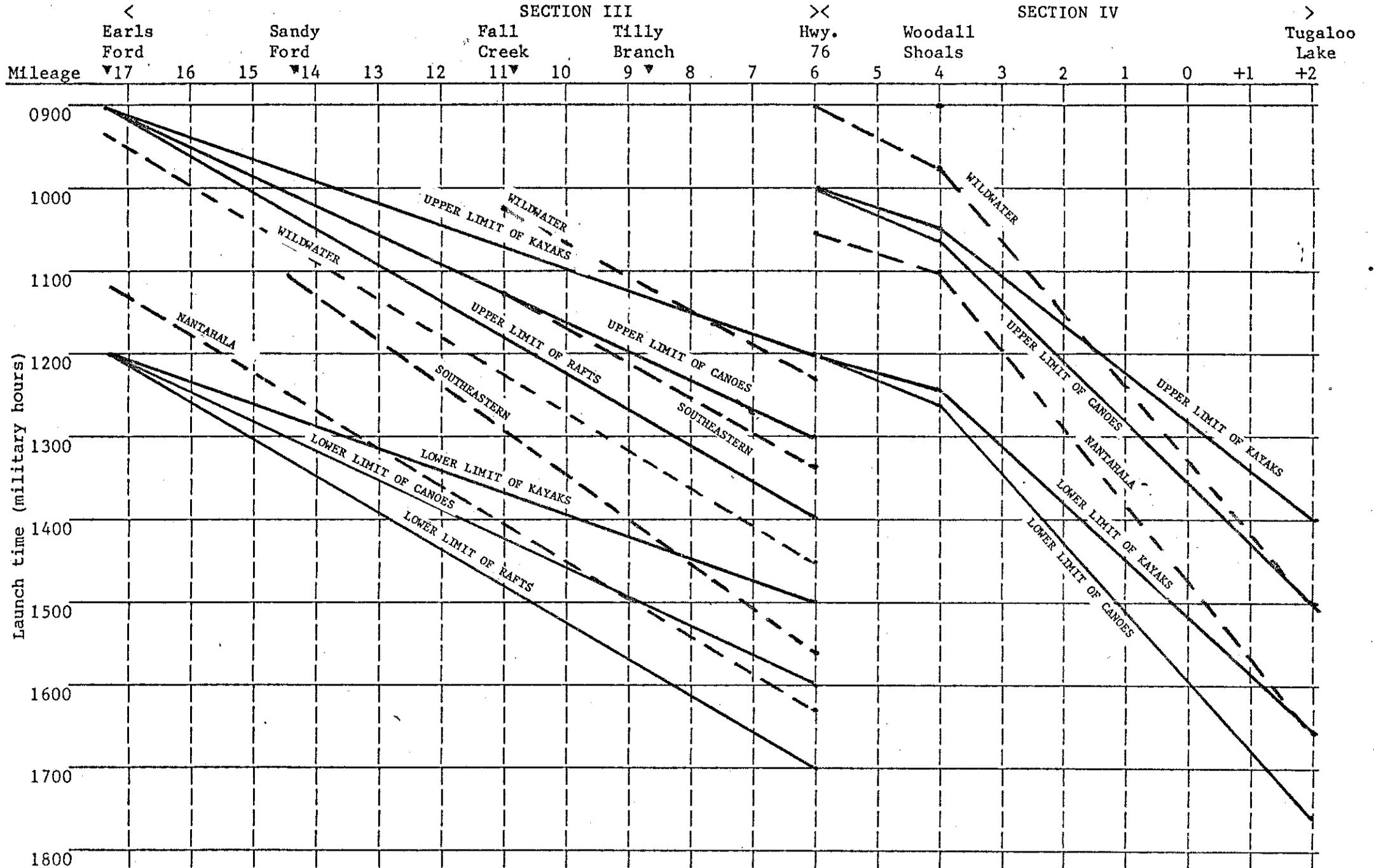


CHART 3 Diagrammatic location of major body of floaters during typical days at different hours of the day when water level at the Highway 76 gauge is 3.0 feet.



Private Float Trips —————

Commercial Float Trips - - - - -

# In Existing Sumter Plan

## I. INTRODUCTION

Congress designated 57 miles of the Chattooga River as a component of the National Wild and Scenic River System on May 10, 1974. This river corridor has the potential to become one of the most significant areas in the east providing a wide range of challenging outdoor recreational pursuits in a primitive setting. Managers will have to evaluate carefully all actions to ensure that decisions are based on a national perspective rather than on a more limited scope. This Plan provides detailed management direction for resources and people using the river under the guidance of the Forest Land Management Plan. The Plan will be reviewed annually and revised as needed.

The Chattooga River forms south of Highlands, North Carolina, and flows south for about 10 miles before leaving the state and forming the boundary between Georgia and South Carolina for 40 miles. The river ends at Lake Tugaloo, where a series of hydroelectric dams have flooded the river.

The terrain is very rugged, as the river drops almost 1/2 mile over numerous rapids and waterfalls. The Chattooga offers some of the most challenging white water in the southeast, and floating use by both commercial and private individuals has increased dramatically in the last 15 years.

The Chattooga is also a major recreation attraction for numerous fishermen who consider it to be the premier trout fishing stream in South Carolina and one of the best in Georgia. Fishermen tend to congregate at the major stocking points of Long Bottom Ford, Highway 28 Bridge, Burrell's Ford, and Bull Pen. However, many seek the recreational value of a hike into the more remote reaches between Burrell's Ford and the Highway 28 Bridge.

Only 4 bridges span the more than 45 miles of nearly solid National Forest ownership along the main river, and roads are limited. The 60 miles of foot trails permit hikers, hunters, and fishermen to leave behind civilization and motor vehicles and experience challenge and solitude only a few hours from major population centers such as Atlanta and Columbia.

Congress established a corridor averaging 1/4 mile wide on either side of the river to protect the river environment. Public use of motorized vehicles within this corridor is generally prohibited except on the few miles of existing roads that remain open. Off-road vehicle use is prohibited.

In 1975 Congress designated the Ellicott Rock Wilderness on the upper headwaters. They enlarged the Wilderness in 1984, and the Chattooga flows through the area for more than 5 miles.

Facilities within the corridor are generally primitive, and designed to protect the environment by controlling human use rather than by providing extensive facilities such as major campgrounds. Facilities for using the river are essentially adequate for most use. Fourteen parking lots with trails to the river exist. Hiking trails traverse much of the corridor above Highway 76 providing access.

Completion of the Chattooga Hiking Trail from Bull Pen Bridge to Highway 76 Bridge along the river resulted in increased hiking and dispersed camping within the corridor boundary, shifting use away from the heavily used Ellicott Rock Wilderness.

Use patterns have stabilized on the river, although use continues to rise. Floating is limited to the 26 mile portion below Highway 28 Bridge and the West Fork's lower 4 miles in Georgia. Sections of the river designated I-IV are open to boating with each section providing progressively more difficult white water than the preceding one.

## II. ADMINISTRATION

### A. MANAGEMENT OBJECTIVES

#### Description

Sixty-eight percent of the river is classified WILD, where travel will be by foot or boat only. (See map in Appendix C.) Motor vehicle use will be for emergencies only—fire or search and rescue. Five percent of the river is classified SCENIC, composed of portions where bridges cross the river. About 27% of the river is classified as RECREATION. These are areas that were under cultivation or contained roads and houses at the time of classification. They may be managed to accommodate visitors using motor vehicle access to the river, or to provide wildlife habitat. Since road closures five to ten years ago, parts of these areas are reverting, through natural regeneration, to a pristine appearance once again.

The Recreation Opportunity Spectrum (ROS) is a land classification system which categorizes National Forest land into six classes, each class being defined by its setting and by the probable recreational experiences and activities it affords. ROS does not attempt to delineate the best experience but determines what recreation the resource is presently providing and what potential for change from present exists, if any.

Land Management Plans for the three Forests list three ROS classes for land within the Chattooga River Corridor: Semi-primitive non-motorized (SPNM), Semi-primitive motorized (SPM) and Roaded natural (RN). (See the LMP and ROS users' guides for more detailed explanation.) Experience levels can be described by several factors.

EXPERIENCE LEVEL	PEOPLE CONTACT	CONTROLS EVIDENT	ENVIRONMENTAL MODIFICATION
SPNM	Low	Not evident	Not generally evident
SPM	Low	Not evident	Not generally evident
RN	Medium	Evident/but subdued	Modification can be discerned but natural environment dominates.

Most land within the Chattooga River Corridor falls within the semi-primitive experience. Numerous people may use the river at the same time, but bends and rapids prevent long sight distances, and falling water mutes sounds. Numerous other rivers, i.e., Ocoee, Chattahoochee, Nantahala, and French Broad, provide white water floating experiences but are unable to provide a semi-primitive experience due to developments including highways and railroads paralleling the river. Management will be geared to feature challenging, semi-primitive experiences in the Chattooga Wild and Scenic River Corridor.

### Objectives

The Act establishing the Wild and Scenic River program states that, "Each Component of the National Wild and Scenic Rivers System shall be administered in such a manner as to protect and enhance the values which caused it to be included in said System without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration, primary emphasis shall be given to protecting its aesthetic, scenic, historic, archaeological, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development based on the special attributes of the area."

Only 3 other rivers were found in an analysis of 48 rivers within a 250 mile radius of the Chattooga that provide quality white water rafting in a natural setting where a governmental agency could protect the scenic and isolation qualities. Since 99% of shoreline for the Chattooga's main stream in Georgia and South Carolina is federally owned, this may be the only stream in the south where these experiences may be retained, as developments change other rivers.

Management will provide a range of recreational opportunities characteristic of, and in harmony with, the nature of the individual river segments. This can be related to Limits of Acceptable Change (LAC), or the amount of human-caused change to biophysical or social components tolerable without the loss of river environment character. This is measured by indicators--various selected items serving as a sign or symptom signifying any characteristic change in the river's environment. For the Chattooga managers will seek to:

Manage WILD sections to (1) preserve the river and its immediate environment in a natural, wild, and primitive condition essentially unaltered by man's effects, and (2) provide water-oriented recreational opportunities in a primitive setting.

Manage SCENIC sections to (1) maintain and enhance the high-quality scenery, (2) provide river-oriented recreation, and (3) minimize impacts from existing roads and bridges that carry traffic across the corridor.

Manage RECREATION sections to provide (1) compatible outdoor recreational opportunities and water-oriented recreational facilities, and (2) utilize other resources and permit other activities which maintain or enhance the quality of the wildlife habitat, fisheries, scenic attraction, or recreational values.

## B. ADMINISTRATIVE RESPONSIBILITY

### Forest Supervisors

The Forest Supervisor, Francis Marion & Sumter National Forests, is responsible for administering public use and special use permits involving use of the main river or banks between Georgia and South Carolina. The Forest Supervisor, Chattahoochee-Oconee National Forests, is responsible for West Fork administration. The Forest Supervisor, National Forests in North Carolina, is responsible for the river in North Carolina. Forests will meet annually to evaluate progress and discuss needs.

### District Rangers

The Andrew Pickens District Ranger is responsible for:

1. Enforcing the Code of Federal Regulations, Regional Forester's and Forest Supervisor's Prohibitions and Orders in South Carolina and at all major access points and on National Forest land immediately adjacent to the main Chattooga River in Georgia where the primary access is from the river. Major access points are:

Earl's Ford (S.C.)	Fall Creek
Thrift's Ferry	Sandy Ford (S.C.)
Burrell's Ford	Highway 76
Highway 28	Woodall Shoals

2. Providing cleanup and maintenance at developed and undeveloped sites in South Carolina and at major access points and areas adjacent to the Chattooga River in Georgia where primary access is by boat.
3. Developing use figures and administering river registration system.

4. Administering "River Ranger" program.
5. Administering floating use.
6. Administering motion picture special use permits on main river and West Fork when in conjunction with filming on main river.
7. Monitoring bacterial water quality in the main river between Georgia and South Carolina.

The Tallulah District Ranger is responsible for:

1. Enforcing the Code of Federal Regulations, Regional Forester's and Forest Supervisor's Prohibitions and Orders along the West Fork, and assisting on the main river.
2. Providing cleanup and maintenance along the West Fork.
3. Administering motion picture permits on West Fork not in conjunction with filming on the main river.
4. Providing regulation enforcement, cleanup, and maintenance on National Forest lands within Georgia that are not major floating access points or where principal access is by land.

The Highlands District Ranger is responsible for:

1. Enforcing the Code of Federal Regulations, Regional Forester's and Forest Supervisor's Prohibitions and Orders within the Nantahala National Forest.
2. Providing all administration including special use permits, cleanup and maintenance of developed and undeveloped sites in the Nantahala National Forest.

Other

County sheriffs have responsibility for search and rescue. Initial Forest Service coordination will be by the respective District Ranger. For more details concerning search and rescue, see Section F.

C. PERSONNEL

Efficient administration of the Chattooga Wild and Scenic River requires employees knowledgeable in (1) the river's characteristics; (2) regulations and policy; (3) floater and other user group use patterns, capabilities and desires; (4) special use permit administration; and (5) ability to administer a program designed to balance public needs for a limited river resource in the spirit of the Congressional legislation. Because of the need to schedule use administer complex special use permits on the Andrew Pickens District, the Ranger should be assisted by a qualified technician who can be expected to remain in place for a number of years.

Administration in North Carolina and Georgia will not require special personnel or scheduled manning other than law enforcement. District personnel will do needed administration in conjunction with other duties.

Chattooga River administration requires special personnel known as "River Rangers" working under the direction of the District Ranger.

#### Duties

River Rangers will provide information on river and hazard conditions, existing prohibitions and orders, and safety recommendations. They should be qualified to enforce regulations. They will float parts of the river for inspections and cleanup and will be trained to render first aid. River Rangers will be briefed on rescue procedures but will not be expected to be equipped or proficient.

They will collect data, maintain registration boxes, and code and submit forms for entry into the computer. River Rangers will lead search and rescue efforts until relieved by Rescue Squads or Forest Service personnel.

#### Qualifications and Training

River Rangers must be in good physical condition, be good swimmers, and have standard Red Cross First-aid cards. Ability to float Class III rapids is desirable, but skilled candidates may be difficult to find and may require training. Selection should favor personable applicants who can skillfully meet and talk with people and portray the "Good Host" image. A minimum of 16 hours of Forest Service law enforcement training will be required for employees with citation writing authority each year, even though they may be repeat employees. They will need to receive general information about the Chattahoochee, Nantahala, and Sumter National Forests through the District orientation period.

#### Manning

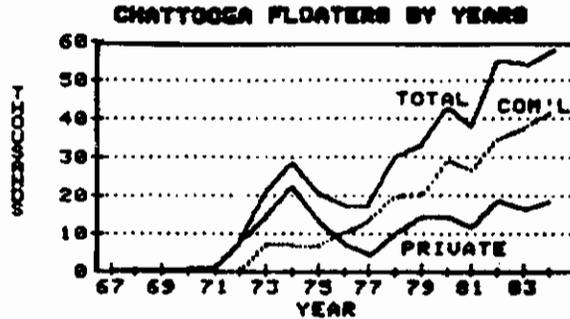
During the main use season (about May 15--September 10), River Rangers will use roving patrols on the river and visitation during peak launching times at Earl's Ford and Highway 76 Bridge to inform floaters of the regulations. Patrols will collect information on commercial trips under special use permit and information to prevent rogue outfitters.

### III. POLICY AND MANAGEMENT

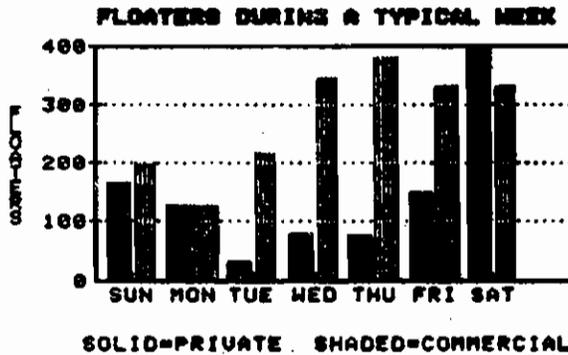
#### A. FLOATING USE

##### 1. Patterns

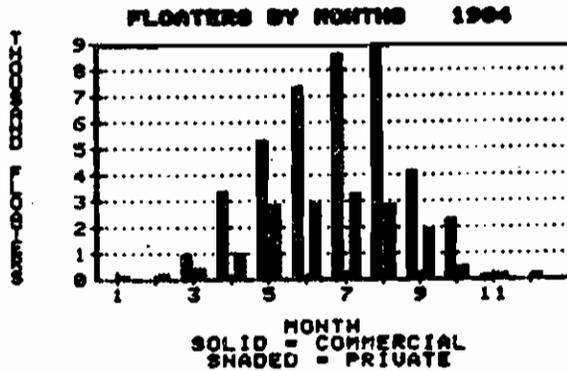
Private floating began slowly in the early 1960s. Commercial rafting began in the early 1970s, following production of a major boating movie on the river. Floating popularity grew very rapidly and is expected to increase 5-10% per year, primarily during the week rather than on weekends. As inexperienced and poorly-equipped individuals encountered very difficult white water, numerous deaths occurred during the early 1970s.



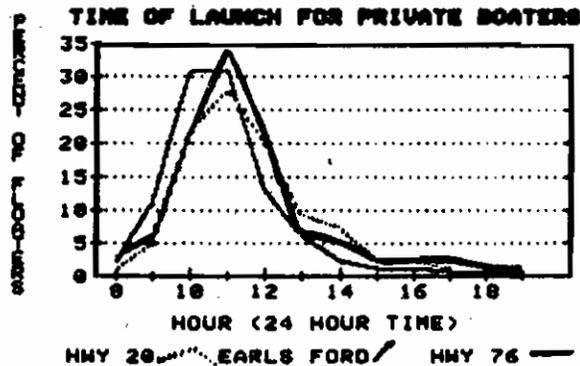
Most private floaters come on weekends or holidays. Commercial rafting and instructional clinics are permitted to carry more clients during the week than on weekends.



More out-of-season use (October to April) is developing as private and commercial floaters acquire suitable equipment which enables them to better withstand cold water and air temperatures.



Private launch times are poorly distributed, with over 2/3s of the launches occurring within a three hour period. Floaters launching in this group on heavy use weekends can expect to have numerous encounters with other floaters as trips do not move at constant speed. Some groups, especially experienced kayakers, travel rapidly, while inexperienced canoeists may spend considerable time scouting rapids. Also people stop for breaks or to empty the water from boats. Commercial launches are well distributed at present to enhance solitude. Better distribution of private launch times, either through information or regulation will be necessary to maintain a quality experience.



## 2. CARRYING CAPACITY

Carrying capacity is the ability of a resource to absorb use and can be expressed in several ways:

- a. Environmental carrying capacity is the amount and type of use permitted before unacceptable resource damage occurs, i.e., soil compaction, water pollution.
- b. Physical carrying capacity is the ability or limitation of the resource to physically meet the demand, i.e., a 90 car parking lot can hold only that many cars.
- c. Social carrying capacity is the amount of use leading to the point where a certain percentage of visitors feel the quality recreation experience declines. When overcrowding is perceived, a visitor may feel less satisfied with the experience but continue, or may stop or move to some less crowded time or location.

Limits of Acceptable Change (LAC) offers one method to determine and measure if these carrying capacities are being exceeded. Measurable objectives can be established and monitoring methods defined to determine the amount of change permitted before limits must be imposed on use or management actions, like hardening the site or reducing use, are undertaken.

### Environmental Carrying Capacity

The Chattooga's visual environment has not been affected by increased floating use. Vegetation, soil, rock, gravel, and sand constituting the shoreline reflect no significant damage from floating use. Water-quality monitoring shows continued improvement. Coliform bacterial counts have declined to levels found in most mountain streams with the exception of water entering via Stekoa Creek or following storms.

Water quality monitoring will continue at intervals frequent enough to detect pollution sources to assure water meets appropriate state and federal environmental standards.

It is possible that human waste deposits at heavily-used camping or lunch stops may create a problem. LAC will be established in 1985, and visual checks will monitor the situation. Should limits be exceeded, commercial users (67% of river use) will be required to provide approved portable depositories at problem sites and remove waste from the river corridor.

### Physical Carrying Capacity

Physical carrying capacity can be measured by the number of boats capable of floating down the river in a given time frame (bumper to bumper). This capacity measurement is inappropriate in order to meet the management objectives for the Wild Section. The physical capacity of support facilities (parking lots) is considered appropriate to the number of visitors to the river and maintains a semblance of seclusion in WILD sections. No expansion of support facilities is planned along the river to increase physical carrying capacity. Use will be discouraged when facilities are full.

Parking capacity is exceeded at the Highway 76 Parking Lot on major holidays when the large 90 car lot and the small Georgia lot are full, and numerous cars are parked along the highway. This creates a major safety hazard for pedestrians. Part of this congestion is caused by non-boaters who congregate at Bull Sluice, often spending two to four hours.

To keep LAC within the established capacity, permits for private groups such as paddling clubs, institutions and youth camps, as well as regular commercial permittees and instructional clinics, will be limited on holidays and some weekends.

### Social Carrying Capacity

This is the most difficult and nebulous capacity to set since recreationists have widely divergent perceptions of crowding. This plan will only address experience levels for floaters since fishing, hunting, swimming, horseback riding, and hiking are not concentrated in a manner similar to floating and do not appear to be high enough to be considered.

LAC limits will utilize data derived from previous studies to determine perceptions of visitors toward crowding, problems, reasons for using the Chattooga and attitudes about management options.

Studies reveal floaters are affected by the number of groups, people and boats encountered during a float trip. Analysis of a number of studies indicated a preference for not passing or being passed by more than 40 people in more than 3 groups occupying no more than 15 crafts. However these limits would be very difficult to obtain due to the irregular private floating patterns. Floating is greatest on weekends, with peaks at Fourth of July, Memorial Day, and Labor Day. Typical private weekday floating is only 1/6 to 1/3 of Saturday's use. Commercially guided float trip outfitters may conduct more trips during weekdays than weekends to take advantage of the unused capacity. Thus Management Direction encourages commercial use on weekdays and restricts weekend use.

#### Use/Limits

Field observations and use records indicate that river use is nearing the maximum during peak times on weekends that should be permitted under Wild and Scenic River objectives to provide challenging experiences in a natural-appearing environment where people are not the dominating factor. The following policies will be continued or implemented to ensure these objectives are met. Group size is important to solitude and congestion as large groups can take a long time clearing difficult rapids. All float trips (commercial, organized groups and private parties) will be limited to no more than 12 crafts or 40 people.

The following chart shows the daily capacity permitted on the river for various seasons and types of users. Organized groups like clubs are included in the private allocation. The limited amount of clinic use on Section III will be in addition to figures shown below and will be regulated by operating plans.

SEASON		SECTION III			SECTION IV		
May 1-Sep 30 HIGH	PRIVATE	Total	People/	Groups/	Total	People/	Groups/
		People	Hour	Hour	People	Hour	Hour
	Weekend	175	50	6	80	30	4
	Weekday	125	40	4	50	20	3
	COMMERCIAL	Weekday	Weekend		Weekday	Weekend	
		6	4		6	3	
Mar 20-Apr 30 Oct 1-Oct 31 MEDIUM	PRIVATE	Total	People/	Groups/	Total	People/	Groups/
		People	Hour	Hour	People	Hour	Hour
	Weekend	135	40	4	60	20	3
	Weekday	100	30	3	50	20	3
	COMMERCIAL	Weekday	Weekend		Weekday	Weekend	
		6	4		3	3	
Nov 1-Mar 19 LOW	PRIVATE	Total	People/	Groups/	Total	People/	Groups/
		People	Hour	Hour	People	Hour	Hour
	Weekday	60	30	3	40	20	2
	Weekend	60	30	3	40	20	2
	COMMERCIAL	Weekday	Weekend		Weekday	Weekend	
		3	3		3	3	

Current use exceeds these limits on peak weekends associated with Memorial Day, July Fourth and Labor Day. However most people coming on these holiday weekends do not expect to find solitude. No limits on private, non-organized individuals on these three weekends will be placed during this planning cycle. Should use rise above the chart's limits, steps to curtail use will be undertaken. Use on Sections I and II is not high enough to anticipate needing restrictions during the next five years.

Operating plans for commercial clinics and raft trips minimize encounters on Section III by scheduling most commercial use ahead of private launches at Earl's and Sandy Fords and after private launches at Highway 76. The same situation occurs on Section IV. Present actual commercial use is similar to the allocation shown in the chart. However the special use permits authorize additional trips that have not been utilized on weekends. Should additional Section III weekend trips be initiated, they would encounter numerous private users. New special use permits, issued when the present permits expire December 31, 1988, will permit use the lesser amount shown in the chart.

Spacing requirements between commercial raft trips, in use for the past several years (generally 45 minutes for Section III trips and 60 minutes for Section IV), will be continued and more frequent trips not permitted. Private floaters will be given information on to aid in selecting little used times and locations in order to reduce crowding voluntarily. Steps will be taken to develop good control over organized groups and limit size, number and timing of trips to reduce congestion. Permits for organized groups during peak times will be limited to encourage use on lesser used times or sections.

To stay current with user preference, the Forest Service or a cooperating institution of higher learning should use a National River Research Questionnaire about every five years to detect changes in user preferences.

### 3 PERMITS

Special use permits provide a means for offering recreational opportunities that many private individuals could not otherwise enjoy. The difficulty of safely running white water, expensive equipment needed, and high skill level needed required indicate that highly competent rafting and instructional clinics and guides are needed to accommodate a portion of the Chattooga's floaters. However, commercial trips must not be allowed to eliminate all private floating opportunities.

#### Commercial

Commercial use on the Chattooga is regulated through special use permits authorizing scheduled raft trips, canoe/kayak training clinics, shuttle service for boats and people, and incidental canoe and kayak instructional trips on an infrequent basis. All commercial uses require a special use permit. Commercial uses include activities where the permittee or any of his employees make a profit; receive a reimbursement of salary; receive rental for equipment; increase the value of his facilities, equipment, etc.; or support in any part, other programs or activities from amounts received from customers. This includes guiding or

transporting persons and providing equipment, supplies, or materials. Special use permits may be issued when the use does not conflict with Forest Service policy on outfitter and guides, river management objectives, is in accord with approved resource plans, provides a needed public service, and assists in the management and utilization of National Forest resources.

An operation is not commercial if there is a bona fide sharing of expenses and no fee, charge, or other compensation is collected from individual participants in excess of expenses incurred. Nonprofit status under Internal Revenue Service or Postal regulations does not determine whether a trip arranged by an organization is non-commercial. The Forest Service is not obligated to issue a permit or accommodate a desire of an individual applicant. Both temporary or transient land occupancy and annual renewable special use permits may be granted. Special use permit issuance will not establish nor set up a system of area allocation or permanence of operation which might deny use by others. The following items apply to special use permits:

- a. The Andrew Pickens District has authority to issue temporary or transient land occupancy special use permits with standard clauses specifying the limited areas and time periods.
- b. Permittees must complete and submit the Chattooga River registration forms.
- c. Permittees will provide an annual operating plan which shows their operational details.
- d. Public safety is a major concern of the Forest Service. The permit places a responsibility on the permittee to see that "his employees and patrons operate boats and vehicles in a safe and reasonable manner." Failure to comply with permit requirements may be grounds for revoking the permit.
- e. The permittee must comply with State and Federal laws and regulations relating to use of the National Forest lands and waters and assumes full responsibility for employees' conduct and client's actions.
- f. All permittees will be required to carry liability insurance "where public liability might exist."
- g. Permittees shall carry out all of their litter and garbage.
- h. No organized races will be allowed on the river.
- i. Special use permits for commercial operations will require approval of operating plans limiting launch times and locations, lunch times and locations, and timing between trips at various water levels to minimize encounters.

- j. No more than three commercially guided float (raft) trip operations will be permitted. The following conditions apply to these raft permits:
1. Rafts refer to the generally accepted craft in use for the last decade, holding four to six people, that are over four feet wide and not to the newly-developed inflatable kayaks.
  2. Raft trips will follow an operating plan designed to reduce encounters between trips and private floaters.
- k. No more than five regular commercial training clinics (canoe and kayak) will be permitted. These are for the training of individuals in specific white water skills, primarily on short river segments and are not intended as guided float trips employing rafts.
1. Clinics will be restricted to the portion of river above the Highway 76 Bridge.
  2. A limited number of clinics may be authorized by the operating plan to use the newly designed one or two person inflatable crafts (inflatable canoe/kayak). These will only be permitted on weekdays and above Sandy Ford. Their use will only be a percentage of the entire trip, as they are intended to provide a training opportunity for some members of the clinic who lack the skill to safely handle a hard shell canoe or kayak. However these are not to become float trips dominated by inflatables.
  3. Priority and temporary use will be assigned for each company annually and is subject to change.
  4. Total number of clinics by all companies combined will not exceed two clinics per section/day on weekend days.
- l. A single commercial shuttle service can adequately handle the limited number of private floaters requiring shuttle service that can be permitted to use the river.

#### Non-commercial

Special use permits may with the fee waived be issued to organized groups when they are not expected to conflict with other users. Groups may be considered organized which generally include all or part of, but not limited to, the following:

- Have a charter or is a branch of a chartered organization.
- Have written by-laws/guidelines, etc.
- Have established membership lists.
- Have elected officers.
- Are not necessarily limited by numbers of people.
- Are bonded together by common interest.

Forest Service policy requires organized groups on the river to secure permits in order to avoid crowding. Organized groups must notify the Ranger's Office in advance of their trip by submitting a brief operating plan showing date, time of arrival and departure, section, number, and type craft expected. The Ranger District will evaluate the river's ability to carry the trip without adversely impacting other users. The trip may be approved or denied, or approved with modification (time or location) to reduce conflicts. Organized group use without an approved permit is in violation. Each organized group must also complete and submit a Chattooga River registration form at the time of launch.

#### Individual Permits

Self registration stations at West Fork, Highway 28, Earl's Ford, Highway 76, and Woodall Shoals provide forms needed before parties can legally run the Chattooga. Floaters beginning trips at locations without registration stations must deposit a registration slip at one of these stations. Signing this form commits the group to follow Forest Service regulations, and the form serves as the input document for computer analysis of floating trends. (See Appendix.)

#### 4. MONITORING

Administrators will be alert to use patterns to see how actual floating use compares with planned use and to minimize conflicts and congestion. This will also evaluate new trends in equipment that could change longstanding practices.

A computer simulation model is being refined with capacity to predict contacts (passing or being passed by) between groups based on information from the daily user permit form. The model format will be evaluated for compatibility with the Forest Service Data General System. If compatible, this would allow updating printouts and evaluation with visual observations derived while floating the river.

Monitoring every other year will evaluate use. Should contacts exceed management objectives, use limitations may be imposed to protect the experience and provide the desired isolation-seclusion type experience.

#### 5. REGULATIONS

A number of regulations are in effect on the river. Some are shown in Appendix E. Floating north of Highway 28 Bridge is prohibited through a condition of the floater permit under 36 CFR 261.77 (c).

Safety requirements were instituted in 1975 following several years with numerous fatalities and accidents to floaters requiring frequent search and rescue efforts. Accidents are now infrequent, averaging one fatality every other year.

## B. CAMPING AND PICNICKING

Recreational developments within the Chattooga Corridor are limited. Most overnight camping occurs at Federal, State, and County campgrounds from 5 to 20 miles from the river, and the visitors drive to the river for the day. No developed picnic areas exist in the corridor though visitors are welcome to sit on a rock or the grass and enjoy the scenery while eating.

Very few boaters carry camping gear on the river due to the difficulty of the rapids and amount of water entering boats. However, the rafting companies are developing a limited number of overnight trips. Usually the camping gear is carried by others over land to the camping site rather than down river.

Considerable backpack camping takes place, primarily in the area north of Highway 28 where floating is prohibited. At one time resource damage in the Ellicott Rock Wilderness along the Chattooga River was very evident. This consisted of mutilated trees, large bare spots, and large fire rings. However, better administration by Wilderness Rangers and shifts in use have greatly improved this situation.

The Burrell's Ford camping area provides tables, water, campsites, and toilets. This area is closed to vehicular access and is reached by a 350 yard foot trail.

The only "primitive" camping areas open to vehicular access are Long Bottom Ford on the main river and West Fork in Georgia on the West Fork. Facilities provided include vehicle control barriers, bulletin boards, trash containers, and toilets.

Numerous designated camping areas along the river are marked with small signs. Visitors traveling by foot or boat may elect to camp in a designated site or may select an undesignated site located more than one-fourth mile from a road, 50 feet from the river or a tributary stream, or 50 feet from a hiking or horse trail. Individuals desiring to camp at sites not designated or meeting these criteria must apply for a free permit from the Ranger's Office. This will be granted unless problems are foreseen.

Permanent toilets will not be constructed within WILD sections of the river corridor. If monitoring determines significant health or visual problems develop at outfitter and clinic overnight campsites, outfitters will be required to provide containers and remove their waste to an approved disposal.

Personnel will continue to monitor remote campsites. Should resource damage be unacceptable, closure will be employed.

### C. FISHING

The Chattooga is considered to be the best trout stream in South Carolina and one of the best in Georgia. It has the size and volume to permit quality fly fishing in a very attractive setting. This is especially true on the undeveloped section north of the Highway 28 Bridge where floating use is not permitted to provide quality trout fishing. The upper portion has colder water that is more conducive to natural regeneration. Fishing pressure, especially near the bridges where access is good, is heavier than natural reproduction can replace. These areas are stocked by the states using hatchery grown trout.

Fish stocking from wheeled vehicles will be permitted at Burrell's Ford Bridge and Campground, Nicholson Field Road in Georgia, Ridley Field, Highway 28 Bridge, Long Bottom Ford, and Bull Pen Bridge on the main river and at locations along the West Fork. Helicopter stocking will be permitted in inaccessible areas in an effort to distribute fish. However, helicopter stocking in the Ellicott Rock Wilderness (between Bull Pen and Burrell's Ford Bridges) is prohibited.

A joint Forest Service/ State Wildlife department study is needed to see if measures to enhance fisheries are needed following direction provided by the Wild and River Act.

### D. WILDLIFE

Numerous species of wildlife make their homes in the Chattooga River Corridor. Hunting pressure is not heavy, primarily due to the rugged terrain and lack of timber harvesting needed to increase browse. Little conflict exists between hunting and other recreational uses since hunting occurs at times of the year when fewer floaters are present. The only direct wildlife habitat management takes place in the recreational section near Highway 28 which contains several large fields that were cultivated when in private ownership.

Mechanized cultivation of these old fields may be done to maintain landscape variety, provide openings and trees and shrubs beneficial to wildlife habitat, and provide a seed source for wildlife habitat work.

### E. TRAILS

Hiking trails along and near the Chattooga Wild and Scenic River and the Ellicott Rock Wilderness provide a very popular system for fishermen, backpackers, and day users. This inventory lists trails beginning at the headwaters and progressing downstream. Guidelines for trail management and maintenance are found in the "Trails South" booklet.

Trails are located away from the river along much of the distance to reduce encounters with floaters, hikers, and fishermen in an effort to provide more solitude.

Parallel trails on both sides of the river will not be developed along any portion of the river to minimize the impact of hikers on the river.

Existing

Chattooga River Loop Trail (NC)--A .5 mile loop beginning at the Chattooga Parking Lot and ending at the Bull Pen Bridge.

Chattooga River Trail (NC)--Beginning at Bull Pen Bridge, extends 1.0 mile northward along the river's west bank. An additional 2 miles remain to be built.

Ellicott Rock Trail (NC)--Begins at Bull Pen Road and runs 3.5 miles southwest to a ford 50 yards above Ellicott Rock and extends 3.5 miles west to Road 441 near Scotsman's Creek.

Chattooga River Trail (SC, GA)--Begins at North Carolina/South Carolina line and runs 17.3 miles downstream to the Highway 28 Bridge, crosses the Chattooga and runs another 20.0 miles to the Highway 76 Bridge. Portions of the Bartram and Foothills Trails also follow the Chattooga Trail. The trail is complete except for a footbridge across the West Fork in Georgia.

The East Fork Trail (SC)--Begins at the Chattooga Picnic Area and descends 2.5 miles to the river. This trail receives very heavy use, especially the first .25 mile. A loop in the trail crossing a bridge carries part of the traffic back to the picnic area.

The Burrell's Ford Fisherman Trail (SC)--The 1.5 miles portion of the Foothills Trail lying along the river in use before the campground was constructed. This trail is not shown on maps or signed on the ground in an effort to route hikers on the Chattooga Trail away from the river at this point to reduce congestion.

Spoonauger Trail (SC)--Beginning at Chattooga River Trail and extending .25 mile to Spoonauger Falls.

King Creek Trail (SC)--Beginning at Burrell's Ford Campground and extending .5 mile to King Creek Falls.

Foothills National Recreation Trail (SC)--Enters river corridor at Licklog Creek and extends 8.7 miles to Medlin Ridge where it leaves the corridor and heads to Highway 107. Much of this trail follows the Chattooga Trail.

Bartram National Recreation Trail (GA)--Enters river corridor at Dick's Creek and extends 10 mile to Highway 28 following the same right-of-way as the Chattooga River Trail.

Earl's Ford (SC) - Portage (SC)--A major portage trail beginning at the parking lot and extending 450 yards to river.

The Sandy Ford Portage Trail (SC)--A minor portage trail extends from the Sandy Ford Road 500 yards to the river.

The Fall Creek Portage Trail (SC)--A newly-completed major portage trail extending from Road 769 about 0.5 mile to the river.

Dick's Creek Trail (GA)--Extends from Road 9 about 0.5 mile to the river.

Licklog Trail (GA)--Extends from the Bartram Trail 0.1 mile to Dick's Creek Falls.

The Tilly Branch or Thrift Ferry Trail (SC)--A major portage trail extending from the end of Road 795 about 500 yards to the river.

The Highway 76 Portage Trail (SC)--A major portage trail surfaced with asphalt beginning at the Highway 76 Parking Lot and Information Station and extending 200 yards to the river for boater access. An unpaved spur leads to Bull Sluice rapid.

Sutton Hole Trail (GA)--Extends from Road 290-A about 0.3 mile to the river.

Woodall Shoals Portage (SC)--A major portage trail beginning at Woodall Shoals Parking Lot and extending 330 yards to the river.

Camp Creek Trail (GA)--Extends from Road 511 about 0.4 mile to the river.

Raven Rock Trail (GA)--Extends from Road 511B about 0.8 mile to the river.

Opossum Creek Trail (SC)--Begins at Road 755 and descends for 1.5 miles to the river. This is a non-standard trail, the result of early logging skid trails and roads. Portions are eroding heavily. Erosion control is needed, but measures to increase use such as signing or including on maps should be avoided to prevent enticing spectators into the Five Falls area.

Three Forks Trail (GA)--Begins at Teague Gap on the Overflow Road and runs 2 miles to the Three Forks Area of the West Fork.

#### FUTURE

Horse Trail (SC and GA)--Over the last 10-15 years, horse owners have developed an unofficial network of trails as they sought a location to ride. Much of the use originates at the undeveloped Sandy Ford Campsite along Whetstone Road in South Carolina. Riders cross the Chattooga at Earl's Ford and Sandy Ford. Approximately 7 miles exist in Georgia and about 14 miles exist in South Carolina. Approximately 1/4 of this network is within the Chattooga River Corridor.

The primary areas of conflict are at Earl's Ford where horses must cross among numerous swimmers and boaters and in Georgia where horses are sometimes ridden along the Bartram and Chattooga hiking Trails.

A study will be made to determine compatibility of horse trails with existing Wild and Scenic River uses within the River Corridor during FY 86. Closure regulations, signing, barriers, and discussions with riding groups will be used to reduce conflicts. No facilities for horse users (stalls, corrals, unloading ramps, or water systems) will be permitted within the corridor. Animals must be tethered away from trees to avoid compaction of soil around trees and debarking of trees.

These horse trails will be analyzed for possible placement on the trail system. Trail planning to determine optimum location and maintenance needs will be undertaken.

#### F. SEARCH AND RESCUE

Local sheriff departments and rescue squads have basic responsibility for search and rescue. District personnel will maintain close contact with these organizations and cooperate in search and rescue efforts.

Employees, upon being notified of lost or injured persons or accidents, will contact the appropriate sheriff's department, rescue squad, and District Ranger's Office. A River Ranger will lead search and rescue efforts until the sheriff's department or rescue squad arrives, or until relieved by other Forest Service personnel. Outfitters and experienced private boaters provide valuable assistance in rescue operations. This quick assistance prevents numerous tragedies as several hours are usually needed to get word to a rescue squad and for them to reach the remote location.

A Forest representative will accompany search and rescue parties when directed by District Ranger. Over the years, rescue squads have developed a policy to search only during daylight hours unless there is a known injury, or the missing individual(s) is under 16 years of age or elderly or severe weather is anticipated. Normally, the full scale search will start the following day, as most lost persons manage to find the way out by this time. For other emergency operations, see FSM 1590.

#### G. LAW ENFORCEMENT AND VISITOR PROTECTION

Numerous private vehicles have been broken into or vandalized while parked at access areas. Enforcing laws to protect visitors on National Forest land is the sheriff department's responsibility.

Forest Service personnel will encourage sheriffs to take an active role in visitor protection. Additional or expanded Co-op Law Enforcement Programs will be investigated. Forest Service patrols will check for illegal activities and provide information to sheriffs and assistance to people who are victimized. Messages to alert visitors to safeguard their possessions will be included on bulletin boards and in publications.

Commercial river trips operating illegally without necessary special use permits are known as "Rogue" outfitters. These frequently run substandard trips and interfere with scheduled trips by other commercial special use permittees and organized groups as well as private floaters.

The Forest Service will continue to investigate reports of rogue outfitters and prosecute when sufficient evidence is obtained.

#### H. SAFETY

The Chattooga has very dangerous white water for inexperienced or poorly-equipped floaters. Numerous fatalities occurred during the early 1970s before safety programs were implemented. The Regional Forester prescribed equipment needed to float certain sections, and this is made a condition of floating when trip leaders complete a self-registration slip before starting their trip. (See Appendix.)

Self-registration facilities are on the West Fork, S.C. Highway 28, Earl's Ford, Highway 76, and Woodall Shoals. Persons launching at other locations must use one of these registration facilities.

Some people launch or retrieve boats at the Highway 76 Bridge site in Georgia. They take up parking space needed by hikers at this important trailhead and miss the Forest Service information displays and Forest Service personnel at the main parking and launch area across the river. After the abandoned steel truss bridge is gone, a regulation should be prepared to require all floaters to use the South Carolina side of the river. This will expose them to floater information, regulations, River Rangers, and make adequate parking available for hikers at the Chattooga trailhead.

Forest Service employees and volunteers will observe all required safety conditions of use in their day-to-day administration of the river.

The Andrew Pickens District will complete a form for all serious injuries reported on the main river in Georgia and South Carolina. The Highlands Ranger and the Tallulah Ranger will be responsible for reports in North Carolina and on the West Fork, respectively. The report will include name of person killed, injured, or lost (if possible); residence; age; when killed, injured, or lost; witnesses (if any); type of equipment (if applicable); time and date of incident; violation of regulations (if any); and a short narrative of incident.

#### I. INFORMATION AND INTERPRETATION

The Chattooga River Information Service program will give the public:

- A general idea of the Wild and Scenic River System's purpose, management, and protection.
- Recreational information on and near the river.
- An understanding for personal safety, equipment needs, regulations and availability of commercial services, proper care of the river's unique environment, and the "No Trace Ethic."
- Information on scenic, geologic, and historical features of the area.

Many of these messages are contained on a map showing river floating, trail system, access points, and primitive campsites.

Bulletin boards provide information at the following major access points: Bull Pen, Burrell's Ford, S.C. Highway 28 lot in Georgia, Highway 28 access area in S.C., Earl's Ford, U.S. Highway 76, and Woodall Shoals. Bulletin boards at boating access points will provide as a minimum, the regulations, emergency phone numbers, and recommended safety precautions.

An information site at the Highway 76 parking area provides exhibits and toilets. Information panels cover: Wild and Scenic River rules and regulations; safety recommendations; locations of other recreational opportunities in the surrounding area; and general information about the National Forests in North Carolina, South Carolina, and Georgia. A large scale four color map printed on waterproof plastic covers most of the visitors' questions. A River Ranger is on duty at Highway 76 during high use periods providing an opportunity for the public to obtain additional information. Guides on commercial trips provide information and interpretation of river features to clients on trips.

#### J. VOLUNTEERS

Volunteers offer opportunities to extend services to the public that would be unavailable due to shortage of funds. Efforts will continue to involve individuals, organizations, and outfitters in activities such as trail maintenance, cleanup, and information dissemination. Volunteers can assist in disseminating and encouraging low impact use practices and provide a "Good Host" image.

#### K. INTERPRETATIVE ASSOCIATIONS

Forest Service policy permits non-profit associations to develop a partnership relationship between Forest Service and interested citizens. An association operates under direction of a Board of Directors that makes proposals to the Forest Service for approval. Profits from sale of approved items (publications, craft items, patches, etc.) are used to fund National Forest activities. Forest Service buildings and employees may be used to make sales.

The Andrew Pickens Ranger District will investigate feasibility of an association to further river and District programs and submit a report to the Forest Supervisors.

#### L. COOPERATION

Numerous organizations and agencies cooperate with the Forest Service concerning the river and adjacent lands. The situation is running smoothly and problems are not foreseen.

These include:

- County Councils in S.C., Ga., and N.C.
- Game and Fish Commissions in S.C., Ga., and N.C.
- Sheriffs Departments in S.C., Ga., and N.C.
- State Highway Departments in S.C. and Ga.
- Office of Emergency Preparedness (Rescue Squad) in S.C., Ga. and N.C.
- Departments of Health and Environmental Control in S.C., Ga., and N.C.
- Georgia Power Company with Lake Tugaloo.

#### M. ACQUISITION

Acquiring fee simple title to all lands within the Chattooga Wild and Scenic River boundary is in the public interest. Condemnation of land is prohibited by the National Wild & Scenic Rivers Act.

Land acquisition programs have been very successful in obtaining river frontage from willing sellers or through exchange. Acquisition of frontage on the main river in Georgia is complete, and only a few hundred feet remain in South Carolina. Several miles of private frontage remain in both North Carolina and on the West Fork in Georgia. Structures on acquired lands will continue to be removed and natural conditions restored. The Forest Service should continue to acquire in fee, lands identified in the Acquisition Plan on a willing seller basis. Acquire rights or ownership to a takeout point on Lake Tugaloo to permit upgrading road and parking facilities to provide greater safety while maintaining traditional uses. Scenic easements will be considered only when extensive negotiations indicate that acquisition to prevent impairment of the scenic quality or basic resource by fee simple title is impossible.

#### N. MAINTENANCE AND CLEANUP

Mechanized equipment will be permitted for Forest Service programs such as trail maintenance, wildlife habitat improvement, fire management, and recreation administration, where equipment use will not seriously interfere with recreational experiences and significant savings in time or funds are expected or equipment is the only way feasible to accomplish the task. Use will be scheduled to minimize conflicts by selecting low-use dates or time of day.

Vehicular access points have solid-waste disposal containers and regularly scheduled pick ups. Access points are cleaned as listed on the following chart. Cleanup during off-season will be as needed.

A "pack it in--pack it out" policy will be encouraged for all use inside the corridor. Outfitters assist in keeping the river clean, and Forest Service crews check areas accessible by foot and float inaccessible areas along the river to keep them clean.

CLEANUP SCHEDULE  
SEASON  
May 15 - September 15

Area	Responsibility			Once Per Week	Twice Per Use Season
	GA	SC	NC		
Bull Pen			X	X	
Ellicott Rock		X			X
Burrell's Ford Area		X		X	
Nicholson Fields		X			X
Hwy. 28 Bridge & Vicinity		X		X	
West Fork					
Three Forks	X				X
Overflow Bridge	X			X	
Warwoman Bridge	X			X	
Remainder of W. Fork	X			X	
Ridley Field Parking Lot		X		X	
Hwy. 28 Parking Lot		X		X	
Long Bottom Ford		X		X	
Earl's Ford (SC side)		X		X	
Earl's Ford (GA side)	X				X
Dick's Creek Falls		X			X
Sandy Ford (GA)	X				X
Sandy Ford (SC)		X			X
Lick Fork		X			X
Fall Creek		X			X
Thrift's Ferry		X			X
Hwy. 76, Bull Sluice and Bridge		X		X	
Sutton Hole		X			X
Woodall Shoals		X		X	
Raven Rock & Mouth of					
Long Creek		X			X
Camp Creek		X			X
All other primitive camp sites accessible by boat		X			X

0. ACCESS

Wild and Scenic River legislation seeks primarily to provide challenging experiences where visitors rely on their own strength and skill to visit the river on its own terms rather than through man's modifications. The management plans considered by Congress called for closing most roads at the corridor boundary to provide an experience different from most National Forest Lands. Exceptions included major roads such as Highway 76 and Bull Pen along with roads in the recreation section near Highway 28.

To date most roads have been closed at the corridor boundary. Prescriptive rights have blocked closure at Earl's and Sandy Fords in Georgia. However, efforts should continue to reduce access at these points. Gates will be maintained at a limited number of areas where access is needed for emergency programs, wildlife habitat management, fish stocking, and cleanup maintained.

**P. BOUNDARY**

The corridor is marked with intervisible four inch paint bands 1/2 way around trees facing away from the river corridor. Paint color will be No. 15102 or 25102 Blue in GSA Catalog Item 8010-00-680-0144 for Federal Standard No. 595a.

A boundary modification is needed in the vicinity of Warwoman Creek/Earl's Ford in Georgia to bring the corridor to approximately 1/4 mile from the river. Parking facilities are needed outside the corridor.

**Q. SIGNS**

Chattooga portal signs have been repeated targets of vandalism and will not be reinstalled unless local acceptance is anticipated. Words cut into large rocks with a sandblaster will continue to be used for trail signs at high vandalism areas.

Boaters sometimes have difficulty recognizing takeout points. Rustic locust posts (10-12 inches in diameter) with the location's name routed into a flattened side with unpainted letters should be maintained at Earl's Ford, Sandy Ford, Fall Creek, and Thrift Ferry.

**R. ABANDONED HIGHWAY 76 STEEL BRIDGE**

This bridge carried traffic from the early 1900s until replaced by a concrete bridge 50 yards downstream in 1949 when use and maintenance stopped. The wood decking rotted away, and the bridge is now a negative visual impact to all users in the area.

The bridge is also a potential safety hazard, as young people climb on the truss work 40 or more feet above the water. The Development Plan published in the Federal Register called for its removal. This should be carried out as soon as possible using Forest Service funding or a volunteer military unit following the bridge removal plan.

**S. OTHER RESOURCE MANAGEMENT**

Timber--Timber will be administered for recreation, watershed protection, aesthetic, and wildlife values. Some cutting of timber may occur in the construction of trails for safety of users or for scenic improvement.

Insects - Disease--Proposals to control insect outbreaks must be developed through an Environmental Analysis approved by the Forest Supervisor.

Fire and Other Emergencies--Fires will be controlled under regular suppression policy. Within the river corridor, the District Rangers may approve use of power saw, truck-mounted and portable pumps, helicopters, aerial tankers, tractor-plows, bulldozers (except within the Ellicott Rock Wilderness that requires Regional approval), and vehicles used by search and rescue organizations. The Rangers will use the method of fire control which results in the least amount of environmental damage while adequate to control the fire.

Incendiary activity is high along Highway 28. Prescribed burning has been used since the late 1970s to reduce fuel loads to make fire control more practical and reduce the chances of hot fires that kill the overstory. These prescribed fires have been confined to the side of Russell Mountain away from the Chattooga River. This practice should be continued until managers feel that it is no longer needed.

Special Uses--Permits for new powerlines and roads will be restricted to recreation sections of the river. No occupancy permits will be issued within the river corridor.

Applications for filming permits will be evaluated against their impacts to visitors and the river environments. The Andrew Pickens District will be responsible for filming permits on the main river between Georgia and South Carolina. Should the filming also include scenes on the West Fork, South Carolina will also administer them. Permits involving only West Fork locations will be handled by the Tallulah. Filming in North Carolina will be handled by the Highlands District. Film companies will not use motorized equipment including vehicles, generators, or helicopters in WILD sections. They may only use this equipment in SCENIC sections where the public may use motorized equipment such as parking lots and roads. Electrical cables from generators may be laid to filming sites inside the river corridor.

Minerals--Mineral and energy leasing will require special stipulations which may preclude surface occupancy. Removal of sand or gravel is not permitted on National Forest lands within the river boundary. There are no outstanding mineral rights.

Water Quality--An approved water quality monitoring plan has been prepared. The river has generally moderate to high water quality. Occasional past water pollution is indicated by high coliform counts entering via Stekoa Creek from Georgia.

Coliform levels in Stekoa Creek have greatly declined since the waste water treatment plant in Clayton, Georgia, was improved. Diverse pollution sources including livestock, septic tanks, wildlife, recreation, and community waste disposal systems may continue to infrequently cause coliform levels to exceed water contact standards. Water monitoring will continue since there are potential sources of pollution within the Chattooga watershed which could influence human health.

Russell House--This large, frame farm house replaced an earlier house burned by the Union Army. It was placed on the National Register of Historic Places in 1983. During the early 1970s the house and ten outbuildings served as a visitor center. However, its poor location on Highway 28 (away from the large volume of visitors on Highway 76) resulted in very low visitation, and the project was abandoned.

The Forest Service will continue to seek a third party willing to expend the considerable funds needed to restore and maintain the facility, in return for use of the property under special use permit in a way compatible with the overall good for the Chattooga Wild and Scenic River.

#### T. RESEARCH

Studies to evaluate user perceptions and desires should be encouraged when they can be conducted without detracting from the recreation experience. The Forest Service will cooperate with a university where potential exists to obtain information needed for river management. Research needs include:

1. Software programs to enable running the computer simulation model on Forest Service computers.
2. An economic analysis study to determine the Chattooga's contribution to the local economy.

APPENDIX A. DEVELOPMENT PLAN - SUMMARY OF ACCOMPLISHMENTS

<u>LOCATION</u>	<u>STATE</u>	<u>DEVELOPED</u> <u>SITE</u>	<u>PARKING</u> <u>LOT</u>	<u>LAUNCH</u> <u>SITE</u>	<u>TRAIL</u>	<u>ACCESS</u> <u>ROAD</u>
Bull Pen	NC	-	I	-	I	-
Burrell's Ford	SC	C	C	-	C	C
Burrell's Ford	GA	-	C	-	-	-
Ridley Field (1)	SC	-	C	-	C	-
Russell Fields	SC	D	C	C	-	-
Earl's Ford	SC	D	C	C	C	C
Earl's Ford	GA	-	I	-	I	I
Dick's Creek	GA	-	D	-	C	-
Sandy Ford (2)	SC	-	C	C	C	C
Sandy Ford	GA	-	I	-	I	I
Buckeye Branch	GA	-	-	-	D	-
Licklog	GA	-	C	D	C	C
Highway 76	SC	D	C	C	C	-
Highway 76	GA	-	I	D	-	-
Sutton Hole	GA	-	I	-	C	P
Woodall Shoals	SC	-	C	C	C	C
Cliff Creek	GA	-	D	-	D	-
Daniel's Creek	GA	-	-	-	C	P
Camp Creek	GA	-	C	C	C	C
Overflow Bridge	GA	-	D	D	-	C
West Fork (3)	GA	C	C	C	-	C
Tugaloo Lake (3)	SC	I	P	P	-	P

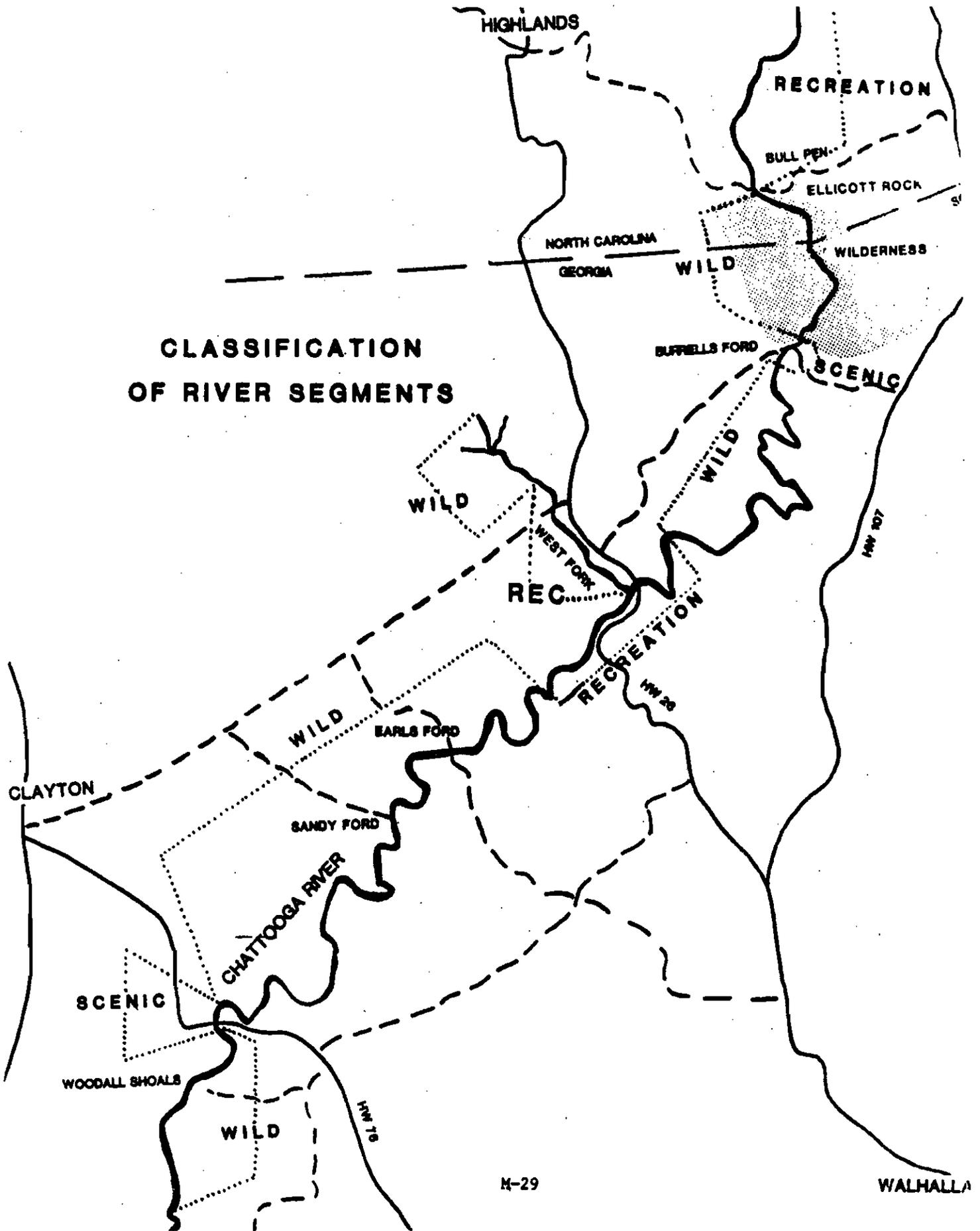
KEY TO SYMBOLS

-	Not planned	
C	Complete	(1 added 1976)
I	Incomplete	(2 added 1976)
D	Dropped	(3 added 1984)
P	Primitive	

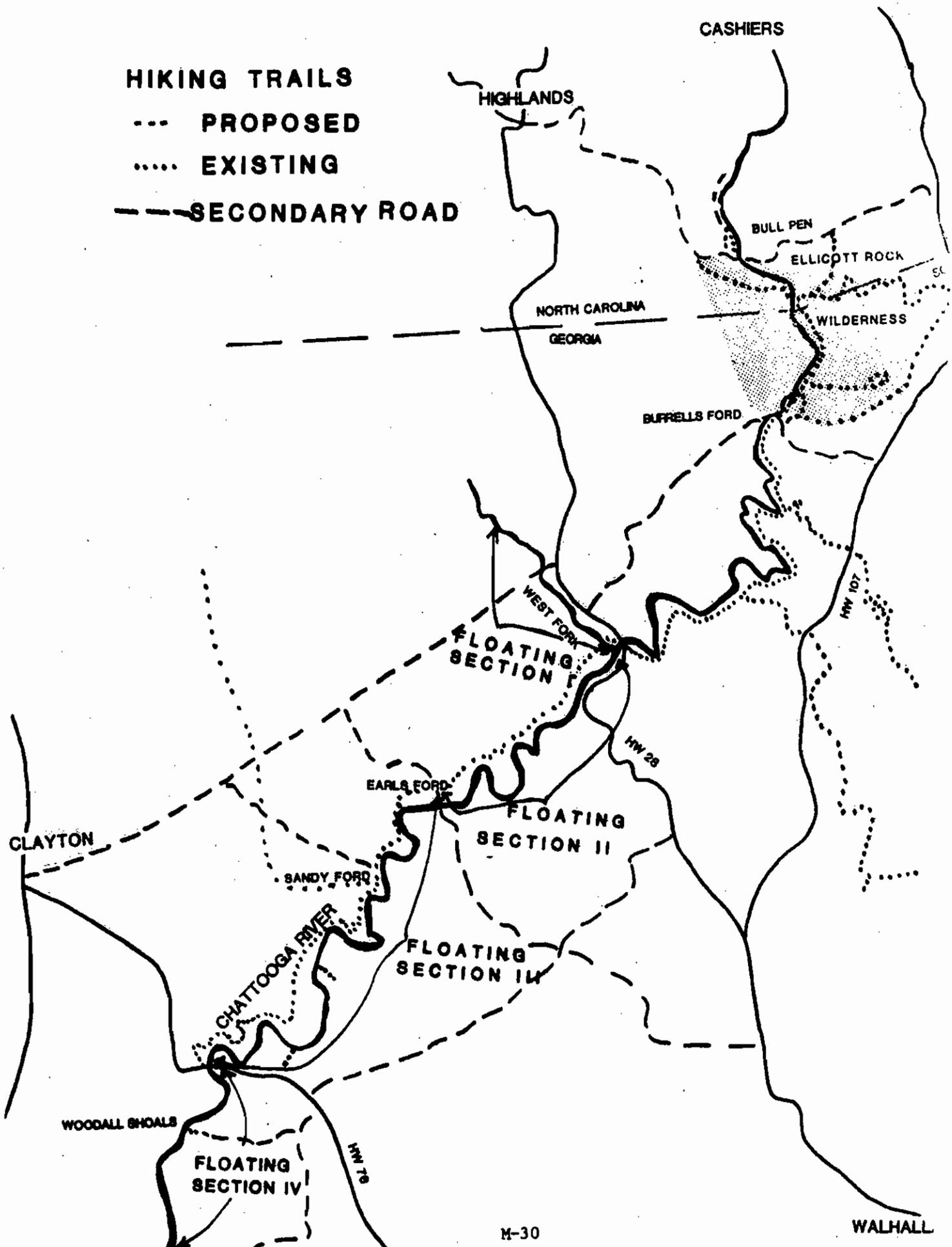
APPENDIX B. JOB LIST

PROJECT	Responsibility	Cost	Priority
<b>Non-recurrent Projects</b>			
Prepare Highway 76 Bridge Removal Plan	SC	-	1
Remove Highway 76 Bridge	SC	\$13,000	3
Remove block building on West Fork	GA	1,000	3
Treat Kudzu at Highway 76 Parking Lot	SC	500	2
Update simulation model	SC	1,000	2
Test simulation model	SC	500	2
Analyze horse trail network	SC & GA	2,000	1
Relocate horse trail from Earl's Ford	SC & GA	5,000	1
Finalize carrying capacity study	SC	3,000	2
Investigate Interpretative Association	SC	-	2
Complete Chattooga Trail north of Bull Pen	NC	10,000	4
Complete Chattooga Trail south of Bull Pen	NC	8,000	3
Complete boundary posting HW 28--Burrel's Ford	SC	2,000	4
Plan Tugaloo Lake Access	SC	8,000	1
Complete Tugaloo Lake Access	SC	125,000	3
Coordinate Tugaloo Road with County	SC	-	2
Plan & install barriers at Long Bottom Ford	SC	2,000	3
Construct parking lots at Sandy & Earl's Forde	GA	22,000	2
Cooperative FS/States fisheries study	SC & GA	3,000	2
<b>Recurrent Projects</b>			
Monitor impact of camping by floaters	SC	1,000	2
Administer private floating	SC	10,000	1
Administer commercial floating	SC	6,000	1
Administer registration system	SC	5,000	1
Cleanup, maintenance, main river, facilities	SC	23,000	1
Cleanup, maintenance, West Fork	GA	2,000	2
Cleanup, maintenance, river in NC.	NC	1,500	2
Administer filming permits	SC (GA)	1,000	2
Assist in search and rescue	SC	500	1
Maintain 33 miles of foot trails	SC	14,000	2
Maintain 23 miles of foot trails	GA	6,000	2
Maintain 5 miles of foot trails	NC	1,000	2
Recruit & supervise volunteers	SC	1,000	2
Acquire land when available	All	-	1
Work to close Earl's and Sandy Ford Roads	GA	2,000	1
Monitor water Quality	SC	4,000	2
Maintain Wildlife habitat projects	SC	4,000	2
Maintain wildlife habitat projects	GA	600	2
Coordinate helicopter-fish stocking	SC	800	2
Annual FS meeting to evaluate management needs	All	800	1

# CLASSIFICATION OF RIVER SEGMENTS



**HIKING TRAILS**  
 - - - PROPOSED  
 ..... EXISTING  
 - - - - - SECONDARY ROAD



APPENDIX E

UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

Revised Order No. 33

Date: May 10, 1980

Pursuant to 36 CFR 261.50 (a) and (b), it is hereby ordered that the prohibitions hereinafter set forth apply to the area known as the CHATTOOGA WILD AND SCENIC RIVER CORRIDOR on the Sumter and Chattahoochee National Forests, which area is depicted on the map below.

The following prohibited acts as set forth in 36 CFR 261.52 are hereby applied to the above described area:

Building, maintaining, attending or using a fire, campfire or stove fire within 50 feet of the Chattooga River or any of its tributaries or within one quarter mile of any roadway (36 CFR 261.52(a)).

Exception: Persons occupying areas designated for camping and posted with an official sign. (36 CFR 261.50(e)(1))

The following prohibited acts as set forth in 36 CFR 261.58 are hereby applied to the above described area:

Camping within 50 feet of the Chattooga River or any of its tributaries or within 50 feet of a maintained trail or within one quarter mile of any roadway. (36 CFR 261.58(e))

Exception: Persons occupying areas designated for camping and posted with an official sign, (36 CFR 261.50(e)(1))

Being publicly nude. (36 CFR 261.58(j))

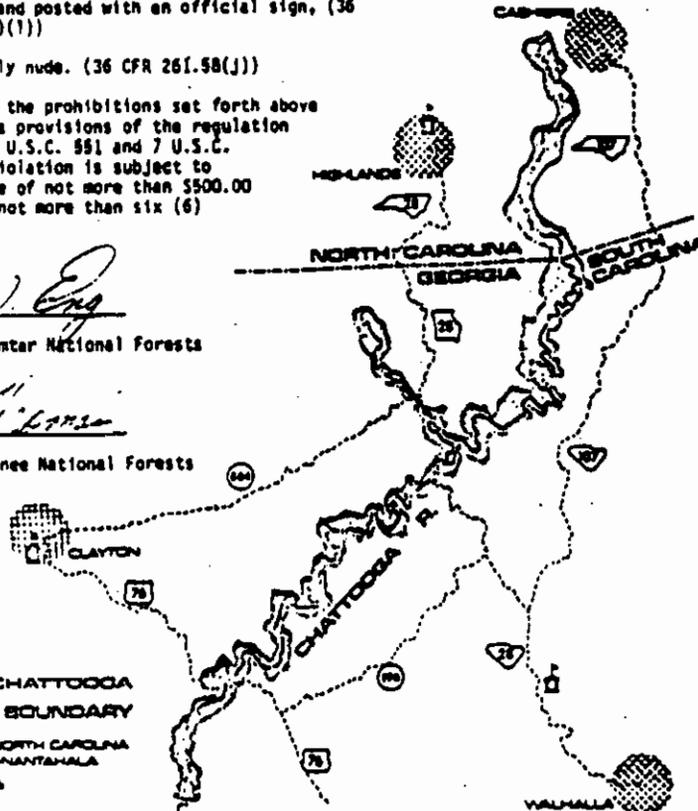
Violation of any of the prohibitions set forth above is prohibited by the provisions of the regulation cited, and under 16 U.S.C. 551 and 7 U.S.C. 1101(f), any such violation is subject to punishment by a fine of not more than \$500.00 or imprisonment of not more than six (6) months, or both.

*Lionel W. Eng*  
Forest Supervisor  
Francis Marion & Sumter National Forests

*W. H. ...*  
Forest Supervisor  
Chattahoochee - Oconee National Forests

WILD AND SCENIC CHATTOOGA RIVER & CORRIDOR BOUNDARY

SOUTH CAROLINA-GEORGIA-NORTH CAROLINA  
SUMTER-CHATTAHOOCHEE-NANTAHALA  
National Forest



(are of its users. Violation of any term or condition of such a permit is prohibited.

(42 FR 31789, June 23, 1977)

§ 261.76 Regulations applicable to Region 8, Pacific Northwest Region, as defined in § 200.2. (Reserved)

§ 261.77 Prohibitions in Region 8, Southern Region.

(a) Using or occupying any area of the Sumter National Forest or the Chattahoochee National Forest abutting the Chattooga River for the purpose of entering or going upon the River in, on, or upon any floatable object or craft of every kind or description, unless authorized by permit obtained through registration at Forest Service Registration Stations abutting the Chattooga River located at Highway 28, Low-Water Bridge, Earl's Ford, Sandy Ford, Highway 76, Woodall Shoals, or Overflow Bridge or unless authorized under special use permit.

(b) Using or occupying within the scope of any commercial operation or business any area of the Sumter National Forest or the Chattahoochee National Forest abutting the Chattooga River for the purpose of entering or going upon the River in, on, or upon any floatable object or craft of every kind or description, unless authorized by special use permit.

(c) Violating or failing to comply with any of the terms or conditions of any permit authorizing the occupancy and use specified in paragraphs (a) or (b) of this section is prohibited.

(d) Entering, going, riding, or floating upon any portion or segment of the Chattooga River within the boundaries of the Chattahoochee National Forest in, on, or upon any floatable object or craft of every kind or description, unless authorized by a permit obtained through registration at Forest Service Registration Stations abutting the Chattooga River located at Highway 28, Low-Water Bridge, Earl's Ford, Sandy Ford, Highway 76, Woodall Shoals, or Overflow Bridge or unless authorized under special use permit.

(e) Entering, going, riding, or floating within the scope of any commer-

cial operation or business upon any portion or segment of the Chattooga River within the boundaries of the Chattahoochee National Forest in, on, or upon any floatable object or craft of every kind or description, unless authorized by special use permit.

(f) Violating or failing to comply with any of the terms or conditions of any permit authorizing the occupancy and use specified in paragraph (d) or (e) of this section is prohibited.

UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
FRANCIS MARION AND SUMTER NATIONAL FORESTS

In order to implement the regulations issued under authority of 36 CFR 261.70 (a) (7), the following terms and conditions of permit for use of the Chattooga Wild and Scenic River was hereby established.

1. Each float party must register.
2. All floating is prohibited north of SC/GA Hwy. 28.
3. Air mattresses, motorized craft or other craft deemed unsuitable by the Forest Service are prohibited.
4. Rafts must have a minimum of two air chambers.
5. Each rafter, canoeist and kayaker above Earle Ford must have a life saving device available.
6. All persons using watercraft below Earle Ford must wear a life jacket rated "Coast Guard Approved."
7. Innertubes are prohibited below Earle Ford.
8. A minimum party size of two persons and two craft is required below Earle Ford.
9. All persons using decked craft and all floaters below Woodall Shoals must wear a helmet.

  
DONALD W. ENG  
Forest Supervisor

 January 8, 1981  
Date

# **Chattooga Wild and Scenic River**

*Analysis of Outstanding and Remarkable Values  
of the Chattooga Wild and Scenic River  
1971-1996*

**November 1996**

**USDA Forest Service  
Francis Marion and Sumter National Forests  
Columbia, South Carolina**

0046

# Chapter I

## ***Introduction***

Congress designated 57 miles of the Chattooga River as a component of the National Wild and Scenic River system on May 10, 1974. The river was found to have many outstandingly remarkable values including geologic, biologic, scenic, recreation and historic. A corridor averaging ¼ mile wide on either side of the river was also established to protect the river environment. This corridor included parts of North Carolina, South Carolina and Georgia. Since designation, public use of the river has increased as well as controversy surrounding the management of the river.

An evaluation team composed of individuals from the Sumter National Forest, Chattahoochee National Forest, and Nantahala National Forest compiled, reviewed and evaluated information for the Chattooga Wild and Scenic River corridor. This technical report summarizes the current condition of the outstandingly remarkable values within the river corridor and evaluates any changes in those conditions between 1971 and 1996.

The "Wild and Scenic River Study Report for the Chattooga River (1971 Study Report)"; will serve as the basis to provide most of the information on river conditions at the time of designation. The Forest Service submitted this report to Congress when the Chattooga was recommended for inclusion in the National Wild and Scenic River System. Some aspects of the 1971 Study Report, such as evaluation of possible hydroelectric development, are not relevant for this analysis.

A separate technical report will address issues and concerns about management of the Chattooga Wild and Scenic River corridor. This report will incorporate different sources for those issues and concerns including project environmental analysis, area analysis, plan revision as well as personal interactions. That technical report will also explore people's perceptions about the river.

## ***Objectives and Study Reach***

The objective of this analysis is to determine the current condition of those outstandingly remarkable resources and characteristics that lead Congress to include the Chattooga River in the National Wild and Scenic Rivers System. Information in this report will compare the current condition of the Chattooga Wild and Scenic River with descriptions of the river corridor documented in the 1971 Study Report.

The results of this evaluation will provide basic information for the (AMS) for the land and resource management plan revisions on the Chattahoochee and Sumter National Forests.

This evaluation concentrated on the river corridor, which constitutes about a ¼ mile buffer on either side of the river. However, in some instances it is necessary to include larger areas. For instance, a 27 county area was evaluated for the economic and demographic data based upon the same geographic area identified in the 1971 study report.

## ***Description of the River and Its Environs***

The Chattooga River corridor has been almost entirely in Federal ownership since the early 1970's when large tracts of land adjacent to the river were bought or acquired through exchange. Since that time, the acquiring of inholdings within the Chattooga River corridor has been a priority for the Sumter National Forest, the Chattahoochee National Forest and the National Forests in North Carolina.

Since the designation of the Chattooga River, several primitive roads within the corridor have been closed. This included three Forest Service roads that crossed the river, Earl's Ford, Sandy Ford and Warwoman Ford. Closing these roads was very controversial. Some roads on the Georgia side of the river were left open.

The 1971 study report lists bridges at Highway 76, Highway 28, Burrell's Ford, and Grimshawes. Those bridges still exist. In addition, there is a bridge crossing the river at Bull Pen Road in North Carolina. Two power lines still cross the Chattooga above Grimshawes. In addition, there is a new power line within the corridor, which is not visible from the river. This power line is located south of Highway 28, near Long Bottom, and accesses some private land inholdings.

There are few summer homes located within the wild and scenic river corridor in North and South Carolina. The homes in South Carolina, south of Highway 28, are not easily visible from the river. There are still many summer homes along the headwaters of the Chattooga.

In 1971, Burrell's Ford Campground was identified as the most popular camping site along the river. Camping has now increased including within Ellicott Rock Wilderness as well as at other sites down river from Burrell's Ford. The Forest Service built many trails in the twenty-five years since the designation. Still undeveloped trails or paths still can be found along the river and near major access points to the river. Some unofficial trails and paths have been rehabilitated, or "hardened" to reduce erosion, or have been closed. There continues to be an extensive network of horse trails along portions of the West Fork of the Chattooga, both on private land within the corridor, and on National Forest land.

### **Water Quality**

Water quality was a major issue and concern of the 1971 study report. The water quality related to point source pollution on the Chattooga River has improved since the 1970's. There has been a general increase in nonpoint sources of pollution due to increased roads, development and recreational use within the watershed.

The primary water quality concerns within the Chattooga watershed are sediment, fecal coliform levels and temperature. Best Management Practices (BMP's) have improved nonpoint source management in most forestry and some agricultural operations. On going efforts to close or improve roads within the National Forest are benefiting water quality. However, many existing roads, trails, intense recreational use, stream bank damage by cattle as well as residential and

commercial development continue to contribute sediment. Georgia, North Carolina and South Carolina recognize the Chattooga River and some tributaries as outstanding resource waters, thereby restricting impacts allowed from point source pollution.

Between states there is some variation for reducing impacts from nonpoint source pollution. BMP's vary in restrictions for local or community development and allowable pollution. Some parts of the Chattooga River has impaired water quality for recreational use from elevated fecal coliform and impaired aquatic habitat from sediment. Stekoa and Big Creeks in Georgia are the primary contributors of this pollution. Whetstone Creek is also identified as having elevated pollutants, well above other tributaries. Impacts from sediment were found in most streams throughout the drainage, and are partly due to natural conditions and past land uses

Most reaches of the Chattooga and tributaries have excellent aquatic insect diversity (Weber and Isley, 1995), with a few sites listed as good.

### **Social and Economic Characteristics**

The 1973 Study Report analyzed the general population within a 27-county area in Georgia, North Carolina, and South Carolina to define a regional zone of influence. The report estimated regional populations for the years 1980, 1990 and 2000. In 1973 the population growth for the zone of influence was less than the growth for the entire Southeast, or for the 3 state area. In 1963, approximately 15 percent of the population in the zone of influence was employed in manufacturing type jobs, and 30 percent of the land in the area was in farmland.

The population projections in the 1973 report were fairly accurate. The population census in the zone of influence in 1990 was 1,191,600 as compared to the 1973 projection of 1,228,000. The total growth of this 27 county zone of influence was 35 percent from 1970 to 1990. The largest percentage of growth, 21 percent occurred between 1970 and 1980. There was an additional 12 percent increase in population in this area from 1980 to 1990. Nationwide, the population increased approximately 10 percent between 1980 and 1990; this 27-county area grew faster than the nation during that time.

The mountain ranges that slowed past development in these southern Blue Ridge mountains are now attracting people for retirement and for improved quality of life. Improved roads and highway systems make it easier to commute to the incorporated communities and to urban centers. Since 1970, growth in the Southern Appalachians has become generally more urban, but the growth in this zone of influence continues to be rural. Between 1970 and 1990, the percentage of rural residents increased from 70 percent to 75 percent in the South Carolina portion of the zone.

Manufacturing employment increased from 15 percent to almost 30 percent of the civilians in this area. Many people moved to the area and commute to nearby urban centers. Farming, forestry, and fisheries employ between 1 and 5 percent of the population. Entertainment and recreational industries employed 5 percent to 7 percent of the civilians in the 3 state area, but there is no comparison to this type of employment before 1990.

## Chapter II

### ***Outstandingly Remarkable Values of the River***

For rivers to be considered for inclusion in the National Wild and Scenic Rivers Program they must possess characteristics that set them apart from other rivers. These characteristics can range from scenery to botany to history. The Chattooga Wild and Scenic River was found to have several outstandingly remarkable values. Each value that the Chattooga possesses will be discussed in this chapter. There will be a description the values and if it has changed since the early 1970's. Also, any significant findings related to that outstanding value will be discussed.

#### **Geological and Geomorphological Values**

Management of the river has not changed any of the outstanding geologic values since the river was designated in 1974. Instead, we have learned more about the unique characteristics of the geology and geomorphology of the river. The 1971 Study Report described the deeply dissected escarpment, and the steep, rocky, forested slopes that plunge into deep, narrow gorges. One outstanding feature of the Chattooga River recognized in the report is the series of outstanding monolithic treeless domes and slopes of exposed resistant granite which occur at the upper headwaters of the river.

As part of the Chattooga Project, an ecological classification team that summarized the geologic history and the geomorphology of the Chattooga River watershed. That report explains the geologic history of the entire Chattooga River watershed, and better defines the outstanding geologic values of the river. The rocks and geologic structures found within the watershed record episodes of mountain building, continental rifting, erosion, sedimentation, and metamorphism that range in age from 1200 million to 200 million years old. The Chattooga River occurs within the southern Blue Ridge subsection located in a geomorphically complex transition zone between the Blue Ridge and Piedmont physiographic provinces. Most rivers within the Southern Blue Ridge drain into the Gulf of Mexico via the New, Tennessee, and Coosa Rivers. But, the Chattooga River drains into the Atlantic Ocean. Another remarkable geomorphological feature discussed in the draft report from the Chattooga Team is that the Chattooga River, Tallulah River, and Chauga Rivers most likely at one time all flowed into the Chattahoochee River, but the Tugaloo River (formed by the confluence of the Chattooga River and the Tallulah River) captured those rivers from the Chattahoochee. A stream capture of this magnitude is unusual in the region. Geologists attribute this stream capture to geologic structures, namely joint sets, foliation, and compositional layering.

**Findings:** Management has not changed the outstanding geological values of the Chattooga River. Additional study within the region since designation has increased our knowledge of the geology and geomorphology in this area, and has verified that the geology of the Chattooga River is unique for the Blue Ridge Mountain subsection.

### **Biologic Values (Vegetation, Wildlife and Fisheries)**

Results of the Chattooga Project reaffirm the variety and richness of plant life which exist within the watershed of the Chattooga River, including the Chattooga Wild and Scenic River corridor. The unique geography and climate characteristics provide habitats for uncommon assemblages of endemic, disjunct, and relic plant species. The floristic survey of the upper 22 miles of the Chattooga River completed by Dumond in 1970 identified 7 plant communities and 620 vascular plant species. The 1971 study report referred to Dumond's work, which was then published in draft form. The Chattooga Project (draft reports, 1996) represent the most recent efforts to assess resources within the Chattooga drainage. Reports include "An Inventory of Spray Cliff Plant Communities in the Chattooga Basin" (Zarman and Pittillo, 1995) and "An Assessment of the Old-Growth Forest Resource on National Forest System Land in the Chattooga River Watershed" (Carlson 1995).

Rare species knowledge has progressed significantly since the early work of Dumond in the Chattooga River basin in the early 1970's. The rarest species within the Chattooga River gorge landtype are the Southern Appalachian endemics, which include the liverworts; the rock gnome lichen and the following vascular plants; Blue ridge bindweed, Fraser's loosestrife, Manhart's sedge, Biltmore's sedge pink shell azalea and divided leaf ragwort. Recent surveys within the Chattooga River gorge landtype have relocated historical or located new populations of these species.

Mountain camellia and oconee bell are two rare species specifically identified in the 1971 Study Report. Mountain camellia (*Stewartia ovata*) is currently listed as a forest sensitive species for South Carolina. The mountain camellia populations noted in 1971 still exist, and additional populations have been found since that time. There has not been any change in the populations of Oconee bell (*Shortia species*) which were noted in 1971.

The old growth assessment found approximately 1,300 acres of existing old growth forest communities within the wild and scenic river corridor. This 1,300 acres constitute approximately 9 % of the 15,930 acres in the corridor. This finding correlates with the finding in the 1971 study report that "few virgin timber stands remain along the river." Generally speaking, the old growth forest communities identified were over 80 years old, with approximately 1/3 over 150 years old.

Timber harvest has been restricted within the corridor since designation, so any changes in successional stages or composition resulted from natural occurrences. Two tornadoes have touched down within the river corridor since 1971. The first occurred in 1973, crossing the Chattooga near Woodall Shoals, the second occurred in 1994, crossing the Chattooga just north of Opossum Creek.

The predominant plant association within the river corridor is Canadian hemlock-tulip poplar/great rhododendron/hard-leaf foam flower (Plant Associations of the Chattooga River Basin, 2<sup>nd</sup> Approximation). Shortleaf Pine-Southern Red Oak or Chestnut oak/sourwood/hillside blueberry and tag alder-yellowroot shrubland are also common.

Communities within the Chattooga River corridor appear to be changing from oak and pine dominance toward species that are less fire tolerant. Red maple, blackgum, white pine, hemlock and rhododendron all show a high frequency of increase within the Chattooga River watershed

(Meier and Bratton 1996). Species that are fire dependent, such as pitch pine and table mountain pine, are expected to decrease across the landscape as the current individuals age and fail to reproduce. Historical records and current canopy trees of surveyed old growth within the watershed indicate that fire was the dominant shaper of the landscape during early European settlement (Meier and Bratton 1996). While current forested composition may be an artifact of past management practices of native Americans and their European conquerors, it is unlikely that this composition will continue to change.

Localized areas of recreational overuse have caused damage to some plant populations, but have not changed the overall quality of the vegetation resource. Patterns of access to the river have changed since 1971. Before the Chattooga was designated a wild and scenic river, most access was by existing roads and trails. Since designation, more visitors float the river and thereby access more of the river gorge. Many plant species along the river are disturbance oriented, and are therefore resilient enough to recover from some amount of trampling. However, the spray cliff communities are very fragile environments, and can be impacted by visitation.

Wildlife game species populations and habitats were described in the 1971 report. Deer are present in all sections of the Chattooga River, although the habitat in most of the corridor is not ideal for deer since an essentially unbroken overstory canopy predominates. Bear were said to be uncommon in the drainage due to the lack of isolated terrain necessary for good bear range. However, current studies are indicating that bears are much more common than previously thought in this area. Turkey are present along several sections of the river. The habitat is only fair for turkey because of the lack of openings in the forest canopy. Grouse can be found but are declining in numbers. Squirrel, rabbit, quail, raccoon, waterfowl as well as several other game species are present in the corridor.

Nongame species were not discussed in depth in the initial report. Since that time several studies have been conducted which increase the knowledge available for the entire watershed. Over 150 investigations of birds, fish, mammals, reptiles and amphibians are known to have been conducted. Most recently, the Chattooga Project initiated research on mollusks, small mammals, reptiles and amphibians as well as brown trout. There are several wildlife species within the Chattooga watershed that are considered sensitive species by Federal and state agencies.

The Chattooga River provides a variety of fishing experiences ranging from coldwater to warmwater. This is the southernmost range of natural trout habitat and the river is home to both rainbow, brook and brown trout. Trout fishing has been a long and traditional use of the Chattooga River from before designation when it was called the "secret river" to today. Due to the variable water temperatures, trout fishing is best in the upper reaches of the river including North Carolina while redeye bass and redbreast sunfish provide excellent fishing in the lower reaches. The river was being stocked at the time of designation and continues to be stocked today. The methods and locations of stocking the river have changed however.

**Findings:** We now have more information about the species and communities in the corridor. Inventories and assessments compiled for the Chattooga River Ecosystem Management Demonstration Project have reconfirmed the outstanding quality of the biotic communities within the corridor.

## **Scenery and Aesthetic Values**

In several surveys about the Chattooga river as well as other rivers in the Wild and Scenic River System, the scenery was found to play an important part of the experience. The scenery along the Chattooga River is exceptional and one of the outstanding remarkable values that leads to the designation of the river. The scenery along each section of the river was documented in detail in the study report.

The Chattooga is deeply entrenched between high ridges for most of its length. Steep forested slopes on either side of the river give a sensation of seclusion to anyone on the river. The dense forest along the banks of the river usually prevents a view of the high sloping ridges on either side. The river constantly curves and meanders, and there are good views of the surrounding ridges from these bends.

The seasons of the year affect the color, texture and character of the vegetation. During spring and summer the river is blanketed with varying shades of green. In autumn, the vegetation changes into a patchwork of red, yellow and orange, mixed with the softer-bluish green of the white pines. In winter the dense cloak of leaves is stripped away and the steep hillsides can be seen on either side of the river. The pines, rhododendrons and mountain laurel then provide patches of green color against the gray-brown hillsides and exposed rock formation.

The river itself provides a constantly changing scene. It follows a varying route over thundering falls and cascades, down raging rapids, around enormous boulders and twisting rock-choked channels, and through narrow cliff-enclosed, deep pools. Rock formations divide, narrow and concentrate the course of the water. Seldom is a straight section of the river longer than ½ mile.

**Findings:** The outstanding scenery values are still present in the corridor. Studies done since 1971 confirm that the scenery and the natural environment are primary to the experience that people seek when coming to a National Wild and Scenic River.

## **Historical Values**

The Chattooga River Wild and Scenic River Corridor was first occupied approximately 12,000 years ago by American Indians. In succeeding centuries, the inhabitants of this area underwent a series of cultural developments and technological innovations which have left an archaeological record of their material culture.

Anglo-American traders first made their way along the Chattooga River from Charleston and Virginia in the late 1600's. Several Indian trails crossed the Chattooga River. (Three of these trails were mentioned in the 1971 study report.) Contact with the white settlers lead to conflict and the eventual destruction of the Cherokee settlements in the Chattooga drainage in the early and middle eighteenth century. Most of the Cherokees left the Chattooga area as a result of fighting during the American Revolution and moved to more remote areas further west.

White settlement followed beginning in the late eighteenth century. The river corridor was only sparsely settled. Larger alluvial bottoms were cultivated as small family farms. A few roads crossed the river at major fords, but the river remained isolated. The Blue Ridge Railroad was planned to cross the river in the mid-nineteenth century, but it was never completed. The

Whetstone-Warwoman road crossing at Earls Ford is the only major road shown crossing the river on an 1820 map. Many of the houses and farms along the river had been repurchased by the mid twentieth century.

Very little systematic archeological survey has been completed in the river corridor. A total of 38 archeological sites have been recorded within the corridor. These include 15 prehistoric sites, 15 historic house or farmstead sites, a railroad embankment, 2 historic cemeteries, a nineteenth century minerals prospecting pit, and a rock shelter. Ellicott Rock, Thrifts Ferry, the Winchester Cemetery, several historic houses and other identified sites have not been recorded.

Approximately one-half of these sites are considered potentially eligible for the National Register of Historic Places. Chattooga Town is considered eligible for the National Register. The Russell House is on the National Register, but has been determined no longer eligible following a fire which destroyed the main house and many of the values which made the site eligible. More archeological evaluation is needed on the other sites to determine if they are eligible.

Since the river was designated in 1974, there has been even fewer archeological surveys within the corridor. Limits on time and money restrict surveys which are not required for specific management activities. There has been a cooperative agreement with the University of Tennessee to evaluate portions of the Chattooga Town site.

**Findings:** Generally speaking, management of the river corridor has not resulted in additional impacts to sites known to be potentially eligible for the National Register. Few additional sites have been discovered since designation.

Results from the excavations at Chattooga Town indicate that this site is eligible for the National Register. This site has regional significance, and contributes to the outstanding historic (heritage) rating for the Chattooga River.

### **Recreational Values**

The recreational values of this river are outstanding. It has the ability to offer a wide variety of activities within its 57-mile long course. These range from slow water and swimming areas to hiking with spectacular scenery to white-water rafting. The river still provides these values but the pressures on the river and its recreational values are vastly different from in the early 1970's. There are more people using the river and its environs than ever before in its history.

The river corridor accommodated several uses in the early 1970's. Fishing was one of the most popular activities on the river. There are both cold water, cool water and warm water habitats on the river. The study guide reported that fishing along the river and its tributaries accounted for the majority of the recreational use in the corridor. Roads were used to drive down to the river and fish as well as to stock the river. Many of these roads were closed when the river was designated. There are many fewer roads and access points today than there were in the early 1970's.

Hikers used the river corridor. In 1970, only a four-mile trail existed on the river corridor, from Ellicott Rock to Burrell's Ford. There were several miles of unofficial trails throughout the corridor. Therefore the shorelines were accessible for people who wanted a rugged hike.

Horseback riders were using the corridor as well as crossing the river at Earl's Ford. There was also motorized use on all the open roads along the river. Hunters used the area. Canoeists and boaters were using the river. Some people were using rubber rafts. There were some outfitter/guides taking people down the river.

There was one campground on the river, Burrell's Ford. The area around Burrell's Ford was heavily used by the early 1970's. Trails were well defined around this area. There were also many unofficial primitive campsites scattered throughout the corridor.

Although all these activities were taking place we do not have a good estimate of total recreational use of the river corridor in the 1960's and 1970's.

The experiences within the wild and scenic corridor varied but were largely primitive and semi-primitive. Areas were essentially unmodified natural environments. There was motorized use within the corridor. There were several roads down to the river. There were places along the corridor that a person could experience solitude from the sights and sounds of other people. There was a high degree of challenge and risk for recreationists considering the rugged conditions in some areas. The study guide mentions isolation, remoteness and a sense of solitude that were major reasons for the inclusion of the river into the national system

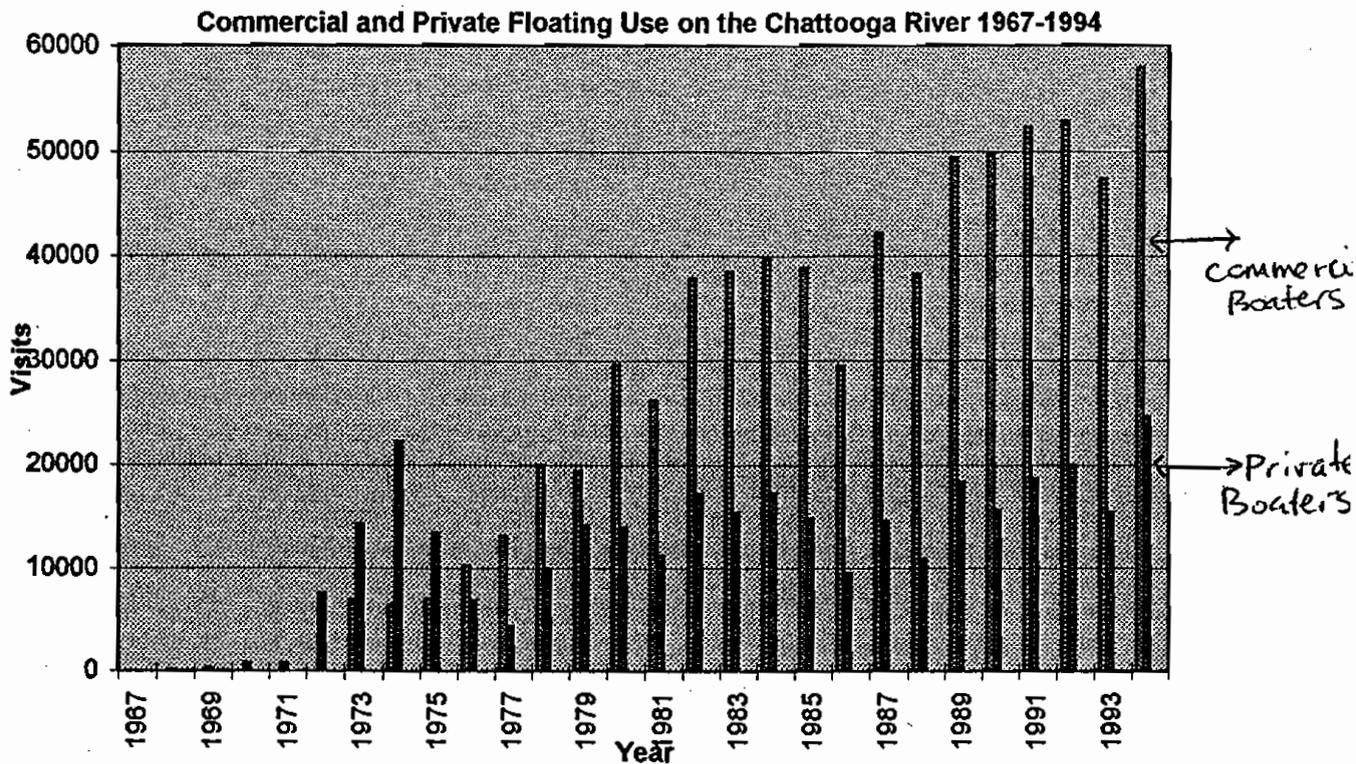
Over the last 25 years, a number of changes have taken place that have altered the recreational experience of the Chattooga Wild and Scenic River. Several facilities have been developed including Highway 76 Bridge as well as parking lots and toilet facilities. Many hiking trails have been built including portage trails down to the river.

The majority of roads on the South Carolina side within a ¼ mile of the river were closed, except for major roadways already in place. There were several roads within the corridor that people were using for fishing, swimming, picnicking and family gatherings. These closings changed the way in which people used the river. It also changed the recreational experiences within the corridor. It became more remote with much less access than before the designation of the river. There was no motorized use within the corridor except at certain bridge crossings and some open roads in Georgia.

A permit system was put in place to facilitate monitoring the floating use of the river. Boating regulations were enacted in efforts to improve visitor safety. Commercial outfitters and guides now take several thousand people down the river each year. Many private paddlers also float the river. Private companies rent canoes, kayaks and rafts to visitors. The river is nationally known by visitors, tourists, and paddlers. Changes in technology allowed more recreationists to participate in activities and for longer seasons of use.

The Forest Service does not monitor every aspect of recreational use on the Chattooga River, the best use figures are from the commercial outfitter/guides. There is a self registration for private boaters which is a good estimate of private use. Fishing use has been monitored in the last few years but not for exact numbers of anglers. Other uses, such as backpacking, hiking, horseback riding, swimming, photography, and backpacking are not closely monitored.

The following chart displays the increase in floating use on the river since 1967.



The above chart shows floater use on the river since 1967 for both private and commercial users. The private boaters have not seen a dramatic increase in use over the last twenty-five years. Commercial outfitters use has increased since designation. However the total increase in boaters on the river since designation may have caused some decrease in solitude at some points on the river during high use times of the year.

In the early 1970's it would have been unlikely to canoe/float the river and meet large parties with several rafts. In 1970 you might have canoed the river and not seen another canoeist but you may have seen individuals or families along the banks fishing, swimming or picnicking. The experiences that the river offers now are not better or worse than the experiences offered in the early 1970's they are just different.

The 1971 study report states that the river was not overused. That information is based upon the use numbers that they had at the time as well as the saturation levels that they determined. No new saturation levels (carrying capacities) have been determined for the Chattooga Wild and Scenic River since the original study report was written.

**Findings:** The outstanding recreation values that contributed to the designation of the river are still in place. However, partially due to the recognition of it being a National Wild and Scenic River, there are more recreationists using the river than ever before in its history.

## **Chapter III.**

The information and findings included in this report will be used to describe a current condition of the Chattooga National Wild and Scenic River. The most significant finding of this report would be the extraordinary amount of information that is available for the Chattooga Wild and Scenic River and for the Chattooga River watershed.

This reports find that the river still possess all the outstandingly remarkable qualities that it had in 1971. The Forest Service management of the river has not changed the outstanding qualities that the river possesses.

With the completion of this technical report it has become apparent that the biggest gap in information are surrounding the social issues of the river. People have always been extremely attached to this river. These attachments have not been fully examined or explored. A study done by the Chattooga Project began to explore these social/human issues (MacGuire, 1995). The Forest Service will prepare a second technical report to explore the social issues and concerns of the river. This document will be available in the spring of 1997.

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# Revised Land and Resource Management Plans for the National Forests in Alabama, Chattahoochee/Oconee National Forests, Cherokee National Forest, Jefferson National Forest, and the Sumter National Forest

Revised Land and Resource Management Plans for the National

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[Notices]

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DEPARTMENT OF AGRICULTURE

Forest Service

Revised Land and Resource Management Plans for the National Forests in Alabama, Chattahoochee/Oconee National Forests, Cherokee National Forest, Jefferson National Forest, and the Sumter National Forest

AGENCY: Forest Service, USDA.

ACTION: Notice of intent to prepare Environmental Impact Statements (NOI).

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SUMMARY: Pursuant to 36 CFR 219.10(g), the Regional Forester for the Southern Region gives notice of the agency's intent to prepare Environmental Impact Statements (EIS) for the revisions of the Forest Land and Resource Management Plans (Forest Plans) for the above named National Forests. For the Jefferson National Forest, this notice revises their June 28, 1993 notice of intent to prepare an EIS to revise their Forest Plan. According to 36 CFR 219.10(g), forest plans are ordinarily revised on a 10-15 year cycle. Several amendments have been made to each plan since it originated. The existing forest plans were approved on the following dates:

National Forests in Alabama; March 10, 1986  
Chattahoochee-Oconee National Forests; September 25, 1985

Cherokee National Forest; April 1, 1986  
Jefferson National Forest; October 16, 1985  
Sumter National Forest; August 2, 1985

The agency invites written comments within the scope of the analysis described below. In addition, the agency gives notice that an open and full environmental analysis and decision-making process will occur on the proposed actions so that interested and affected people are aware of how they may participate and contribute to the final decision.

**DATES:** The agency expects to file the draft EISs (DEIS) with the Environmental Protection Agency and make them available for public comment in January of 1998. The Agency expects to file the final EISs in December of 1998. Comments concerning the scope of the analysis should be received by December 2, 1996.

**ADDRESSES:** Submit written comments to Forest Supervisors of the appropriate Forest at the following addresses:

National Forests in Alabama, 946 Chestnut, Montgomery, AL 36107-3010  
Chattahoochee-Oconee National Forests, 508 Oak Street, NW, Gainesville, GA 30501

Cherokee National Forest, 2800 N. Ocoee Street (P.O. Box 2010),  
Cleveland, TN 37320-2010

Jefferson National Forest, 5162 Valleypointe Parkway, Roanoke, VA 24019  
Sumter National Forest, 4931 Broad River Road, Columbia, SC 29210-4021

**FOR FURTHER INFORMATION CONTACT:**

National Forests in Alabama: Planning Team Leader--Rick Morgan--phone:  
(334) 832-4470

Chattahoochee-Oconee National Forests: Planning Staff Officer--Caren  
Brisco--phone: (770) 536-0541

Cherokee National Forest: Planning Staff Officer--Keith Sandifer--  
phone: (615) 476-9700

Jefferson National Forest: Planning Staff Officer--Kenneth Landgraf--  
phone: (540) 265-5100

Sumter National Forest: Planning Team Leader--Tony White--phone: (803)  
561-4000

**RESPONSIBLE OFFICIAL:** The Regional Forester for the Southern Region located at 1720 Peachtree Road, NW, Atlanta, Georgia 30367, is the responsible official.

Affected Counties

This Notice of Intent affects the following Counties:

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National Forests in Alabama: Bibb, Calhoun, Cherokee, Chilton, Clay, Cleburne, Dallas, Hale, Perry, Talladega, Tuscaloosa, Franklin, Lawrence, Winston, Covington, Escambia, and Macon; Alabama.

Chattahoochee-Oconee National Forests: Banks, Catoosa, Chattooga, Dawson, Fannin, Floyd, Gilmer, Gordon, Habersham, Lumpkin, Murray, Rabun, Stephens, Towns, Union, Walker, White, Whitfield, Green, Jasper, Jones, Monroe, Morgan, Oconee, Oglethorpe, and Putnam; Georgia.

Cherokee National Forest: Polk, McMinn, Monroe, Greene, Cocke, Unicoi, Sullivan, Washington, Johnson, and Carter; Tennessee.

Jefferson National Forest: Letcher and Pike; Kentucky--Monroe; West Virginia--Bedford, Bland, Botetourt, Carroll, Craig, Dickenson, Giles, Grayson, Lee, Montgomery, Pulaski, Roanoke, Rockbridge, Scott, Smyth, Tazewell, Washington, Wise, and Wythe; Virginia.

Sumter National Forest: Abbeville, Chester, Edgefield, Fairfield, Greenwood, Laurens, McCormick, Newberry, Oconee, Saluda, and Union; South Carolina.

## SUPPLEMENTARY INFORMATION:

### A. Background Information

#### 1. An Ecological Approach to Planning

The general model for an ecological approach to land management planning includes four iterative steps: assessment decision, implementations, and monitoring. The first step involves assessment of the forest situation that characterize the biophysical and social ecosystem components at appropriate temporal and spatial scales. These provide a comprehensive description and evaluation of ecosystem structures, processes, functions, and social and economic conditions that are critical to understanding the present conditions and projecting future trends. From this information, decisions can be made to establish "desired future conditions", set goals and objectives, make resource allocations, establish standards and guidelines, determine monitoring requirements, and establish priorities. Following the implementation of those decisions, monitoring and evaluation will determine if changes should be made in the implementation, if there is a need for new decision, or if there is a need to re-assess the situation.

In the Southern Appalachian area, a Southern Appalachian Assessment has been completed. Also completed is the Chattooga Ecosystem Management Demonstration Project (Chattooga Project) which was an effort to consolidate and integrate ecological information for the Chattooga River Watershed which is located at the junction of North Carolina, South Carolina, and Georgia; and includes three National Forests.

Information from these analyses that cross State boundaries and involve multiple National Forests, along with the individual National Forests efforts to update their "analysis of the management situation" (AMS), are now being used by these National Forests to determine what decisions in their Land and Resource Management Plans (LRMP) should be re-analyzed or changed in revising their LRMPs.

#### 2. The Southern Appalachian Assessment

Recently the U.S. Forest Service has participated in the preparation of the Southern Appalachian Assessment (SAA). The Assessment culminated in a final Summary Report and four Technical Reports that are now available to the public. It was prepared by the U.S. Forest Service (the Southern Region of the National Forest System and the Southern Forest Experiment Station) in cooperation with the other Federal and state agencies that are members of SAMBA (Southern Appalachian Man and the Biosphere Cooperative). The Assessment included National Forest system lands and private lands in the George Washington/Jefferson, Nantahala-Pisgah, Cherokee, and Chattahoochee National Forests; and parts of the Sumter and Talladega National Forests. Also involved were the National Park Service lands in the Great Smoky Mountains National Park, Shenandoah National Park, and the Blue Ridge Parkway.

The Assessment facilitates an interagency ecological approach to management in the Southern Appalachian area by collecting and analyzing broad-scale biological, physical, social and economic data to facilitate better, more ecologically based forest level resource analysis and management decisions. The Assessment was organized around four "themes"--(1) Terrestrial (including Forest Health, and Plant and Animal Resources); (2) Aquatic Resources; (3) Atmospheric Resources and (4) Social/Cultural/Economic Resources (which includes the Human Dimension; Roadless Areas and Wilderness; Recreation; and Timber Supply and Demand).

As the National Forests in the Southern Appalachians were conducting their forest level efforts to describe their "Analysis of the Management Situation" (AMS), they were also providing information for the larger-scale analysis in the Southern Appalachian Assessment.

The Assessment supports the revision of the LRMPs by describing how the lands, resources, people and management of the National Forests interrelate within the larger context of the Southern Appalachian area. The SAA, however, is not a "decision document" and it did not involve the National Environmental Policy Act (NEPA) process. As broad-scale issues were identified at the sub-regional level (Southern Appalachian Mountain area) in the Assessment, the individual National Forest's role in resolving these broad-scale issues becomes a part of the "need for change" at the Forest level.

Public involvement has been important throughout both of these processes. Continuing public involvement leading to formulation of alternatives for the forest plan revision analysis efforts will now be conducted through the "scoping" period that follows the issuance of this Notice of Intent.

### 3. The Beginning of the Forest Plan Revision Efforts for the National Forests in Alabama, the Chattahoochee-Oconee, the Cherokee, and the Sumter National Forests

The National Forests in the Southern Appalachian area have applied several efforts to begin their revisions. The main objective thus far has been to do the analysis leading to a proposal to change forest management direction. A key part of that analysis, for significant portions of each of the forests, has been the SAA.

On February 24, 1995, a Notice was placed in the Federal Register (Vol. 60, No. 37) that identified the relationships between the SAA and the Forest Plan revisions of the National Forests in Alabama, Chattahoochee-Oconee National Forests, Cherokee National Forest, and the Sumter National Forest.

A February 24, 1995 Notice in the Federal Register (Vol. 60, No. 37) identified; (1) that the National Forests in Alabama,

Chattahoochee-Oconee National Forests, Cherokee National Forest, and the Sumter National Forest were each preparing an Analysis of the Management Situation (AMS), and (2) the relationship between the Southern Appalachian Assessment and those efforts. Since then, preparation of a Draft AMSs has included updating resource inventories, defining the current situation, estimating supply capabilities and resource demands, evaluating the results of monitoring, determining the "Need for Change" (36 CFR 219.12(e)(5)), review of previous public comments, and public meetings or other outreach. These Draft AMSs are

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now available for public review. Together with the results of the SAA, they are the present basis of the issues/Forest Plan decisions that will be examined during the plan revision process. Additional topics will be developed as needed to respond to public comments received on this Notice of Intent during the 120-day public comment period.

In the past, a "Notice of Intent to Prepare an Environmental Impact Statement" was issued prior to the development of the AMS. However, for these Forest Plan revisions, an effort was made to first define the current situation and estimate an "initial need for change" in a Draft AMS prior to issuing a Notice of Intent to Prepare an Environmental Impact Statement. We hope this will lead to improved "scoping", which will help the public provide more concise and specific comments. This should make it possible to develop more responsive alternatives to be analyzed in the Environmental Impact Statements accompanying the individual Revised Forest Plans.

#### 4. Status of the Jefferson, George Washington, and Nantahala-Pisgah National Forests

The Jefferson National Forest previously issued a Notice of Intent to Prepare an Environmental Impact Statement for its Revised LRMP on June 28, 1993. This NOI revises that earlier notice, and provides notification that the planning process on the Jefferson National Forest will now coincide with the planning process and timelines for the other National Forests in the Southern Appalachians.

Although the George Washington National Forest and the Nantahala-Pisgah National Forests were part of the Southern Appalachian Assessment, they are not beginning plan revisions at this time. The George Washington National Forest completed its Final Revised Forest Plan on January 21, 1993, and the Nantahala-Pisgah National Forests completed a significant amendment, Amendment 5 to their Land and Resource Management Plan on March 18, 1994. However, as information from the Southern Appalachian Assessment and the other National Forest planning process are being analyzed, a need to change these plans may be identified to ensure consistency between the National Forests in the Southern Appalachians.

#### 5. The Role of Forest Plans

National Forest System resource allocation and management decisions are made in two stages. The first stage is the forest plan, which allocates lands and resources to various uses or conditions by establishing management areas and management prescriptions for the land and resources within the plan area. The second stage is approval of project decisions.

Forest plans do not compel the agency to undertake any sitespecific

projects; rather, they establish overall goals and objectives (or desired resource conditions) that the individual National Forest will strive to meet. Forest plans also establish limitations on what actions may be authorized, and what conditions must be met, during project decision-making.

The primary decisions made in a forest plan include:

(1) Establishment of the forest-wide multiple-use goals and objectives (36 CFR 219.11(b)).

(2) Establishment of forest-wide management requirements (36 CFR 219.13 to 219.27).

(3) Establishment of multiple-use prescriptions and associated standards and guidelines for each management area (36 CFR 219.11(c)).

(4) Determination of land that is suitable for the production of timber (16 U.S.C. 1604(k) and 36 CFR 219.14).

(5) Establishment of allowable sale quantity for timber within a time frame specified in the plan (36 CFR 219.16).

(6) Establishment of monitoring and evaluation requirements (36 CFR 219.11(d)).

(7) Recommendation of roadless areas as potential wilderness areas (36 CFR 219.17).

(8) Where applicable, designate those lands administratively available for oil and gas leasing; and when appropriate, authorize the Bureau of Land Management to offer specific lands for leasing. (36 CFR 228.102 (d) and (e))

The authorization of site-specific activities within a plan area occurs through project decision-making, the second stage of forest planning. Project decision-making must comply with NEPA procedures and must include a determination that the project is consistent with the forest plan.

## 6. The Role of Scoping in Revising the Southern Appalachian Land and Resource Management Plans

This NOI includes a description of the preliminary Issues and "Proposed Actions" for the five National Forests in the Southern Appalachians that are revising their LRMPs. The "Proposed Actions" are actions within one or more of the plan decisions identified in the purpose and need.

Scoping to receive public comments on the preliminary issues and proposed actions will begin following the publication of this NOI. The public comments received during this comment period will be used to further refine the preliminary issues that should be addressed, the forest plan decisions that need to be analyzed (the "proposed actions"/"need for change"), and to help define the range of alternatives that will be developed.

For more information on how the public can become involved during the Scoping period, see Section 6 of this NOI.

### B. Purpose and Need for Action

This Notice applies to each of the 5 Forest Plans. The need to revise these plans is driven by the changing conditions identified in the SAA and in individual Forest assessments as well as the changing

public values associated with these National Forests. These conditions and values make it appropriate that all of these Southern Appalachian Forest Plan Revisions be done simultaneously.

The purpose for revision rests in the requirements of the National Forest System Land and Resource Management Planning required by the National Forest Management Act and its implementing regulations contained in Chapter 36 of the Code of Federal Regulations, section 219. According to 36 CFR 219.10(g), forest plans are ordinarily revised on a 10-15 year cycle. These five forests are all completing these cycles.

### C. Preliminary Issues

#### 1. Introduction

Early in the process there are several sources of what are called "preliminary issues". These are issues stated so that the public, when learning about the environmental analysis, can focus their needs and preferences on the forest plan decisions. One source of information leading to issue development has been the Southern Appalachian Assessment. The Assessment has produced some findings and preliminary issues of broad public interest which have implications that must be considered. This consideration may involve one or more or all Forests, depending on the issue. In addition, the Forests, working with their publics, have identified preliminary issues specific to their Forest.

#### 2. Findings of the Southern Appalachian Assessment

The Southern Appalachian Assessment (SAA) provides key information concerning those portions of the National Forests that are within the SAA area that will be used in plan

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revisions. The SAA teams compiled existing region-wide information on resource status and trends, conditions, and impacts of various land management activities and resource uses that apply to portions of each of the five forests that are revising Forest Plans. Several preliminary issues are listed that are associated with the findings of the Assessment. The findings include:

Aquatic Resources

Water Quality and Quantity

The Southern Appalachian ecosystem is widely recognized as one of the most diverse in the temperate region. The headwaters of nine major rivers lie within the boundaries of the Southern Appalachians, making it a source of drinking water for much of the Southeast. In addition, as a general finding, there has been a reduction in water use in the Southern Appalachian area.

Preliminary issues or management opportunities:

--Protection, maintenance and improvement of water resources within the

SAA area in coordination with multiple use management.

--Coordination of water quality (and quantity on some forests) needs with adjacent forests, land owners and other agencies with water management responsibilities.

--Insuring water quality and quantity needs for channel maintenance and biotic resources.

#### Stream Condition and Habitat Quality

The SAA aquatics report identified streams, water bodies, and riparian habitat that were degraded to varied extent.

Preliminary issue or management opportunity:

--Restoration of degraded streams, habitat and riparian loss.

#### Protection of Aquatic Species

Diversity of aquatic species across the Southern Appalachian area is high, with a rich fauna of fish, molluscs, crayfish, and aquatic insects. Approximately 39 percent of the SAA area is in the range for wild trout, consisting of 33,088 miles of potential wild trout streams. The three trout species within the SAA area are vulnerable to stream acidification, which is increasing, particularly in the northern part of the Assessment area and higher-elevation streams. The heritage program files indicate there are 190 species that are endangered, threatened, or of special concern within the SAA area. Mussel populations may experience additional declines over the next 30 years in the Tennessee River basin.

Preliminary issues or management opportunities:

--Protection for these aquatic species and maintenance of the water quality supporting them.

--Management for trout in suitable habitat areas.

#### Human Induced Impacts on Aquatic Resources

Although human activities that impair aquatic habitat have decreased, population growth and concomitant land development have the potential to increase pressure on aquatic resources. More than 80 percent of the river miles in most watersheds representing 75 percent of the river miles in the SAA area are rated as fully supporting their uses (fully supporting is a measure which states that 90 percent of the time the stream meets water quality criteria). Aquatic Resources within the SAA are affected by acid mine waste, National Pollutant Discharge Elimination System (NPDES) facilities, sedimentation (in certain localized situations), urban and rural development, and industrial facilities.

Preliminary issue or management opportunity:

--How the National Forests will manage human induced impacts to the aquatic resources.

## Atmospheric Resource

### Air Pollution

The SAA found that visibility in the Southern Appalachians has decreased since the 1940's as haziness has intensified due mainly to sulfates in the air. Improvements are expected; however, once the Clean Air Act Amendments of 1990 are implemented. It is expected that there will be a 50 percent reduction in SO<sub>2</sub> emissions nationwide. Acid deposition is also a problem in the region and headwater streams are most susceptible to acidification (see also, aquatic resource discussion). In addition, nitrogen oxide emissions are expected to increase, contributing to visibility impairment, acid deposition, and ground level ozone, which can cause growth reduction and physiological stress in trees. The greatest potential for growth loss due to the ozone concentration is in the northern and southern ends of the Southern Appalachian area and wherever sensitive hardwoods are located at higher elevations. Particulate matter in the air is a concern, while apparently not one that is increasing currently, especially while land managers are anticipating accelerating the use of prescribed fire for numerous purposes.

Preliminary issue or management opportunity:

--Adverse effects of air pollution on visibility, nitrogen oxide emissions, and acid deposition.

--Management's increasing use of prescribed fire and particulate matter in the atmosphere.

## Social, Cultural, and Economics

### Effects on Local Communities

The combined natural resource sector (wood-products manufacturing, forestry, mining, and tourism) provides nearly 10 percent of SAA area employment, 7 percent of wages, and 12 percent of the industry output. The number of employees (including seasonal or part-time) associated with tourism has doubled between 1977 and 1991.

Over 30,000 jobs are directly related to recreation facilities on Federal land. The counties with the greatest number of these jobs are located near the area's two National Parks and the large concentration of National Forests in western North Carolina. Counties with whitewater rivers, such as the Chattooga, Nantahala, and Ocoee have seen increases in recreation-related employment.

Preliminary issue or management opportunity:

--Resource allocation and its effect on local economies, including stabilizing and helping the economies and social structure of local communities.

### Societal Changes in the Southern Appalachian Area

Changes in the social pattern has effects on the management of natural resources in the region. Changing relative values between commodity and non-commodity uses of forest resources and Southern Appalachian ecosystems are cited by the SAA. While not consistent

across the Southern Appalachian area, the population has increased 27.8 percent in the region between 1970 and 1990. For natural resource management, however, the increase in the area's population is less significant than the economic development that accompanied the increase and the attitudes and cultural attachment that exists here.

Preliminary issue or management opportunity.

--The mix of natural resource goods and services from National Forest System lands that is sensitive to evolving demographics, attitudes, and needs.

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#### Wood products from public lands

The Federal share of timberland in individual counties ranges up to 69 percent. The decisions made by Federal agencies, therefore, can strongly influence local timber production and the economy in certain parts of the region.

The National Forests hold a large share of high-grade oak sawtimber. Since this is the kind of timber that is in shortest supply and greatest demand, National Forest timber sales can affect the markets for high-quality oak. The terrain in National Forests is more rugged and there are fewer roads, making the timber on these lands more expensive to harvest.

Preliminary issue or management opportunity:

--The role of the National Forests in supplying forest products, and the association of these products to specific Desired Future Conditions on individual Forests.

#### Recreation settings and use

Only around 8 percent of the Southern Appalachians, including the Great Smokey Mountain National Park, can be classified as having "remote" recreation settings. About two-thirds of these settings are on public lands. About 18 percent of the Southern Appalachians are highly developed settings with 2 percent in urban, 4 percent in suburban, and 12 percent in transition of emerging development settings. About 45 percent of the area is rural, and about 24 percent is natural-appearing forests.

Congestion in recreation use tends to occur on the shores of lakes and streams, because the settings are in high demand. Due to limited sources of supply, settings and facilities for mountain biking, horseback riding, off-highway vehicle driving, and white-water rafting often are congested.

A high proportion of recreation use on Federally owned land occurs at the outer edges of the Appalachian chain. As population centers grow, use patterns will creep toward the center of the mountain ranges.

Wilderness and roadless areas account for 4 percent of all land in the Southern Appalachians. As population increases and urban areas expand, there is concern that the wilderness resource will be affected by overuse.

Preliminary issues or management opportunities:

- The mix of recreation settings on National Forest system lands and the management of each.
- Increasing urbanization of lands adjacent to the National Forests and the effects on Forest Service management.
- Access to public lands.

#### Roadless and Wilderness

A total of 752,654 acres of inventoried roadless areas were identified in the SAA National Forests ranging in size from 2,035 acres to 27,293 acres and representing 61 percent of all roadless areas within the SAA area.

Preliminary issue or management opportunity:

- Management of these and other areas to meet wilderness, recreational, and other resource demands.

#### Terrestrial--Plant and Animal Resources

##### Current conditions and trends of forest landscapes

The Southern Appalachian Assessment described current conditions and trends of forested landscapes. These were applied to 9 forest classes and 4 successional classes. The Assessment found that currently National Forests contain 17 percent of the region's forests, 7 percent of the early successional habitats and 42 percent of the late successional habitats.

Currently around 3 percent of National Forest system land is in early successional habitat. This is 4 percent below mid 1970s National Forest levels. There were 10 species associates identified for this habitat. Forty-five percent of the National Forest System lands in the SAA area are in late successional habitat. This represents an increase of 34 percent since 1970.

Preliminary issue or management opportunity:

- Desired future conditions for the mix of these habitat conditions must be determined, as well as the larger landscape conditions (forested as opposed to agriculture).

##### Old Growth forests

Around 1.1 million acres of possible old-growth forest were identified in an initial inventory of SAA National Forests. Patches identified vary from 1 acre to 13,000 acres in size and across a full range of vegetative communities.

Preliminary issue or management opportunity:

- Management of these areas, as well as other types of areas, and their

spacial allocation to meet the biological, social, and cultural objectives associated with this condition.

#### Rare Communities

The Assessment found that 31 rare communities are key to the conservation of 65 percent of the Federally listed T&E species and 66 percent of the species with viability concern (globally ranked G1, G2, G3) in the Southern Appalachians. Examples of these rare communities are high elevation grassy and heath balds, mountain longleaf pine woodlands, granitic domes, high elevation rocky summits, and sphagnum and shrub bogs.

Preliminary issue or management opportunity:

--Management of rare communities.

#### Federally Listed Threatened and Endangered (T&E) and Viability Concern Species

The Assessment looks at 51 Federally listed T&E species (11 habitat associations) and the needs of 366 viability concern species (17 habitat associations). While not all of these species and habitats occur on National Forest system lands, the importance of this listing lies in the fact that the Forest Service manages habitat that is often key to preservation and recovery of many species.

Preliminary issue or management opportunity:

--Recovery and management of Federally listed T&E species and Forest Service sensitive species.

#### Game Species

The SAA provided population trends, current status, and some future forecasts for 10 major game species.

Preliminary issue or management opportunity:

--The role of the National Forests in sustaining habitats to support the major game species identified in the SAA for public hunting and viewing.

#### Black Bear Habitat

The SAA determined that National Forests contain around 4 million acres of potentially suitable black bear habitat, of which about 77 percent has relatively low road density (less than 1.6 miles of road length per square mile) and 51 percent has less than 0.8 miles per square mile. Habitat parameters include open road density, early successional habitats, late successional habitats capable of producing denning sites, and oak mast. Black bear have experienced a moderate range expansion in some parts of the Southern Appalachians over the last 25 years.

Preliminary issue or management opportunity:

--The Desired Future Condition of black bear habitat in the Southern Appalachian National Forests.

#### Area-Sensitive Forest Bird Habitats

A total of 15.8 million acres of mid- to late-successional deciduous forest

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habitat is contained in the SAA area. Approximately 66 percent of these acres are suitable forest interior habitat. Around 8.2 million acres are in forest tracts greater than 5,000 acres in size. These larger tracts have the potential to support all 16 area sensitive landbirds (primarily neotropical migrants). Habitat fragmentation and edge effect were considered. It is estimated that National Forests are currently providing 39 percent of the acreage in these large forest tracts in the SAA area. Taking into account the conditions of the larger landscape, the SAA estimated that around 90 percent of the habitat on National Forest system land is forest interior.

Preliminary issue or management opportunity:

--Management of area-sensitive forest bird habitats.

#### High Elevation Forest Habitats

About 32 percent of the high elevation montane spruce-fir/northern hardwood habitats in the Southern Appalachian area are found on National Forest system land and 23 plant and animal species are included in this habitat association. The Southern Appalachian National Forests are facing possible declines, caused by balsam woolly adelgid and air pollution, in this rare high elevation forest community.

Preliminary issue or management opportunity:

--Possible declines in high elevation forest habitats due to balsam woolly adelgid.

#### Riparian Habitat

The SAA looked at seeps, springs, and streamside areas. A total 1.5 million acres of these types are in forested cover. Of this, the SAA estimated that National Forests contain around 219,000 acres of forested riparian habitat. The future quality of these habitats is uncertain and may decline due to threats from hemlock woolly adelgid, an exotic insect.

Preliminary issue or management opportunity:

--The Desired Future Conditions for both terrestrial and aquatic riparian habitats, including the specific management of threats to

these habitats from hemlock wooly adelgid.

#### Forest Vegetation Health

The SAA addresses changes in forest vegetation or soil productivity in response to human-caused disturbances or natural processes, potential effects of presence and absence of fire, how the health of the forest ecosystem is being affected by air pollution and native and exotic pests, and how current and past management affecting the health and integrity of forest vegetation in the Southern Appalachians.

The SAA predicts that the European gypsy moth will spread as far south as northern Georgia by the year 2020. Other identified threats to forest ecosystem health include dogwood anthracnose, butternut canker, beech bark disease, southern pine beetle, and asiatic gypsy moth.

Preliminary issue or management opportunity:

- The role of fire in sustaining forest ecosystems.
- Management of identified threats to forest health.

### 3. Preliminary Issues That May Be Common to the Five Forests

Preliminary issues from the SAA and Forests have been identified that apply to one or more or all of the National Forests in this Notice. Some of these include aquatic resources, forest health, inventoried roadless areas, scenery management, T&E and Sensitive species, terrestrial resources, and wood products. Public response to scoping will be used to develop the actual issues and the forest or forests to which they apply.

### 4. Preliminary Issues on Individual National Forests

The Southern Appalachian area National Forests have also developed some preliminary issues locally. Since each National Forest must develop its own issues, the following lists will appear in somewhat different formats. The forests will further refine these, incorporate the findings of the SAA and finally, determine the significant issues to carry forward into the NEPA analysis. The following issues are identified by topics and more specific information is available at the individual Forest by contacting the planners listed at the beginning of this Notice.

#### National Forests in Alabama

Trails and associated facilities and their management  
Wilderness area management

Special area designations

Forest cover types, old growth and rotations  
Management tools to use in achieving desired future conditions  
Mix of goods and services from the Forest  
Longleaf restoration for RCW recovery

Habitat types

Fire management

Road density

Land acquisition and exchange

Chattahoochee-Oconee National Forests

Timber management

Road access management and resource protection  
Trails

Water quality and increasing forest use  
Biological diversity and timber harvesting  
Biological diversity, visual quality and hardwood harvesting  
Pesticide use and biological and social effects  
Balance between rural and urban public demands

Cherokee National Forest

Public road planning, development and management  
Timber resource management

Outdoor recreation settings

Trail network management

Forest uses and water quality

Management for biological diversity

Forest health and ecosystems and timber harvesting  
Management and scenic attractiveness--landscape patterns  
Mix of management intensities across the landscape

Jefferson National Forest

Biological Diversity

Old growth

Habitat fragmentation

Riparian areas/Aquatic ecosystems

Air quality

Special interest Areas

Proposed, endangered, threatened, and sensitive species  
Wildlife and fish management

Tree health

Wilderness and rivers

Wilderness

Wild and Scenic Rivers

Mount Rogers National Recreation Area

Recreation opportunities

Recreation opportunities

Management practices

Timber management

Fire management

Grazing

Timber production

Transportation system

Access

Off-highway vehicles

Minerals, oil and gas

Oil and gas

Minerals

Special Uses

Social and economic concerns

Below cost timber sales

Subsurface property rights

Local community economies

Sumter National Forest

Biodiversity

Variety of communities

Old growth

Proposed threatened, endangered, and

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sensitive species

Rare and underrepresented plant communities  
Riparian areas

Landscape patterns

Role of fires in forest ecosystems

Mineral development

Protection of water and other resource values  
Recreation

Mix and emphasis of opportunities

Chattooga Wild and Scenic River values  
Timber Management

Lands available for timber management and  
Desired timber products

#### D. Proposed Actions

Each National Forest did an initial analysis of its management situation focusing on changes that have taken place during the current ten-year planning period. During the past decade Forest Plan Amendments, annual monitoring, five year reviews of implementing Forest Plans, and working with the public have provided the Forests with valuable information about changes that are needed in existing Forest Plans. This initiates the determination of the need to establish or change management direction as required under the NFMA regulations at 36 CFR 219.12.(e)(5). From this information each Forest compiled a preliminary list of subject areas, or revision items, which will be used to guide their plan revision. The proposed action is to develop or revalidate goals, objectives, standards and guidelines, and prescriptions.

##### 1. Proposals that are Common to all Five Forests

When revising a forest plan, roadless areas of public lands within and adjacent to the forest shall be evaluated and considered for recommendation for wilderness areas 36 CFR 219.17(a). At least every 10 years each forest must review the designation of lands not suited for timber production (36 CFR 219.14(d). For these forests, the ten-year review is being done in this revision process so all alternatives will evaluate existing suitability designations in light of current conditions. The following list includes additional items that are shared by all of the five National Forests listed in this Notice.

--Establish desired future condition(s), goals, and objectives for resource management.

--Establish, where appropriate, consistent management direction across adjacent National Forest boundaries.

--Establish new management areas;

--Determine suitability of lands for resource management;  
--Determine timber allowable sale quantity (i.e., Timber ASQ);  
--Analyze and recommend rivers and streams for eligibility and/or suitability for inclusion in the National Wild and Scenic Rivers System;

--Replace the current Visual Management System with the new Scenery Management System and establish new visual objectives;

--Adjust the plan monitoring and evaluation requirements to address the elements of the revised plans;

--Identify any needed new special or unique areas;

- Address management needs for all forms of forest access; and
- Address the question of oil and gas leasing on the National Forest system lands.

## 2. Proposed Actions That are Unique to the Individual Forests

In addition to those items listed in A., above, there are a number of other proposed actions that the individual forests have developed. The following lists are not complete; however, at this point they contain many of the more specific actions that the forests have determined to be important and that should be incorporated in the respective plan revisions. Additional actions will be added and some may be deleted as a result of scoping.

### National Forests in Alabama

- Identify, maintain and/or restore the LLP/wiregrass community on the Conecuh National Forest where it is appropriate to do so;
- Address the 3-5 year burning rotation on the sandy soil types found primarily on the Tuskegee and Conecuh Districts and conflicts with ecosystem relationships;
- Incorporate into the Forest Plan, recovery plans for 9 T&E species;
- Incorporate conservation agreements for sensitive species--as needed;
- Incorporate the new RCW EIS into plan revision;
- Examine land ownership adjustment needs across the Forest;
- Incorporate new management direction for over-used areas, especially wilderness areas and trails, and encourage use of alternate trailheads and areas associated with the Sipsy Wilderness;
- Upgrade existing developed recreation sites to meet current standards, and provide greater accessibility for people with disabilities;
- Provide guidance for increased interpretative services and maps for wilderness areas and trails; and
- Provide management direction for regeneration and conversion to address changing conditions/emphases.
- Establish management guidelines for the fisheries program to consider where and when to install habitat structures and to fertilize lakes.
- Establish guidelines for addressing noxious weeds and exotic species, especially where they impact sensitive species or rare communities.
- Determine if grazing should be continued on the Conecuh National Forest, and if it should be woods grazing or pasture grazing.

### Chattahoochee-Oconee National Forests

- Establish Forest Plan goals and objectives, and management direction for special forest products (medicinal herbs, craft material, etc.);
- Incorporate management requirements of the Regional Forester's June 1995, decision and the U.S. Fish and Wildlife Service Recovery Plan (when completed) for the red cockaded woodpecker which apply to the Oconee National Forest.
- General forest lands need different management emphasis across the forests. Currently, the general forest area (MA-16) has the same goals and objectives for all lands. This could be true for other MA's as well.

- Clarify the use of timber harvesting to meet Forest Plan goals and objectives. The revised Forest Plan should incorporate standards and guidelines to assist the Districts in determining those conditions and situations that would enable a sale to be classified as forest stewardship (timber purposes, personal use, wildlife habitat, etc.)
- Add timber quality as a objective of timber management.
- Adjust acres on which planned timber harvesting could occur due to reductions for resource protection such as: riparian areas, cultural resources, Proposed, Endangered, and Sensitive Species (PETS), and any other factors which would effectively reduce the suitable land base.
- Establish standards, guidelines, and monitoring requirements for single-tree selection.
  
- Update direction for timber harvest in riparian areas.
- Establish recreational carrying capacities.
- Establish management direction for the Chattahoochee National Forest to restore appropriate streams to native brook trout.

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- Establish management direction for rare communities identified in the Southern Appalachian Assessment.
  
- Establish coordinated desired future conditions, goals, objectives and direction for the Chattooga River Watershed between the Sumter, the Chattahoochee-Oconee, and National Forests in North Carolina.
- Revise other management direction to incorporate new information about: range management; transportation systems; development of monitoring and recovery plans for PETS; redesign shade protection guidelines for aquatic habitat needs and establish direction for woody debris and aquatic habitat management; review and update air quality direction to clarify needs for Wilderness, non-Wilderness, problem areas, and relationship to State permitting process.

#### Cherokee National Forest

- Identify special or unique areas, and establish goals for management of such areas;
  
- Establish guidelines for production of special forest products, and minerals.
  
- Establish, where appropriate, consistent management direction across adjacent National Forest boundaries.
  
- Revise guidelines that respond to threats from pests and noxious species.
  
- Clarify the use of timber harvesting and other planned human-caused disturbances to meet Forest Plan goals and objectives.

#### Jefferson National Forest

- Develop goals, objectives, standards and guidelines for salvage of dead and dying timber where deemed appropriate. Determine and clearly describe priorities for salvage;
  
- Consider the effects of long-term fire suppression on ecosystems and

- the role of prescribed fire as a management tool;
- Address the use and effects of livestock grazing to achieve multiple use goals and objectives;
  
- Add direction to provide for new Federal regulations and the 1987 Onshore Oil and Gas Leasing Reform Act;
- Consider subsurface ownership when evaluating land allocations; and
- Provide minimum management requirements and direction for special uses (e.g., linear rights-of-way, military exercises, electronic sites and commercial services.)

#### Sumter National Forest

- Coordinate with the Chattahoochee-Oconee National Forest and the National Forests in North Carolina to establish goals, objectives, and desired future conditions for the Chattooga River Watershed.
- Link land ownership adjustment priorities with desired future condition, goals, and objective establishment.
- Establish, where appropriate, consistent management direction across adjacent National Forest boundaries.
  
- Consider insect and disease in development and evaluation of alternatives and effects.
  
- Consider historical Forest budget trends in alternative analysis.
- Incorporate carrying capacity (biological, physical, and social) of the Chattooga River in establishment of desired future condition, goals, and objectives for the Wild and Scenic River.
- Consider ecological classification in developing management areas and desired future conditions.
  
- Develop desired future conditions that integrate coordinated resource goals and objectives that will facilitate the development of multiple use projects.
  
- Revise the monitoring and evaluation direction to include effectiveness monitoring for Forest Plan goals, objectives, and desired future conditions.
  
- Develop two separate indicator lists (mountains and piedmont) to incorporate new PETS species that are readily monitored, forest interior species, area-sensitive species, and species that may indicate effects at a landscape scale.

#### E. Preliminary Alternatives

The actual alternatives presented in each forest's draft EIS will portray a full range of responses to issues which are significant on the individual Forest. The five separate draft EIS's will examine the effects of implementing strategies to achieve different desired future conditions for each forest and will develop possible management objectives and opportunities that would move the forests toward desired conditions. A preferred alternative will be identified in each draft EIS.

The range of alternatives presented in each DEIS will include one that continues current management direction and others will also be provided to address the range of issues developed in the scoping process.

## F. Involving the Public

The objective in this process for public involvement is to create an atmosphere of openness where all members of the public feel free to share information with the Forest Service and its employees on a regular basis. All parts of this process will be structured to maintain this openness.

The Forest Service is seeking information, comments, and assistance from Federal, State, and local agencies, and other individuals or organizations who may be interested in or affected by the proposed action. This input will be utilized in the preparation of the draft environmental impact statements. The range of alternatives to be considered in the EIS will be based on the identification of significant public issues, management concerns, resource management opportunities, and plan decisions specific to each of the National Forests. Public participation will be solicited by notifying in person and/or by mail, known interested and affected publics. News releases will be used to give the public general notice, and public scoping meetings will be conducted on each National Forest.

Public participation will be sought throughout the plan revision process and will be especially important at several points along the way. The first opportunity to comment will be during the scoping process (40 CFR 1501.7). Scoping includes: (1) Identifying additional potential issues (other than those previously described), (2) from these, identifying significant issues or those which have been covered by prior environmental review, (4) exploring additional alternatives, and (5) identifying potential environmental effects of the proposed action and alternatives (i.e., direct, indirect, and cumulative effects).

As part of the first step in scoping, a series of public opportunities are scheduled to explain the public role in the planning process and provide an opportunity for public input. Formats, times and places will vary. These are determined by the individual forest to meet the needs of their publics. For more specific information on times and locations, please contact the Forests. These meetings will occur as follows:

## National Forest in Alabama

## Proposed Locations and Dates:

Double Springs, Alabama; August 6, 1996  
Brent, Alabama; August 8, 1996

Heflin, Alabama; August 13, 1996

Talladega, Alabama; August 14, 1996  
Andalusia, Alabama; August 20, 1996  
Tuskegee, Alabama; August 22, 1996

## Chattahoochee-Oconee National Forests

## Proposed Locations and Dates:

Madison, Georgia; September 5, 1996  
Gainesville, Georgia; September 7,

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1996

Dalton, Georgia; September 10, 1996

Cherokee National Forest

Proposed Locations and Dates:

Elizabethton, Tennessee; October 7, 1996  
Greeneville, Tennessee; October 8, 1996  
Alcoa, Tennessee; October 10, 1996

Tellico Plains; October 15, 1996

Ducktown, Tennessee; October 16, 1996  
Cleveland, Tennessee; October 17, 1996  
Nashville, Tennessee; October 21, 1996

Jefferson National Forest

Proposed Location and Date:

Mt. Rogers NRA, Jefferson National Forest, Virginia; August 17, 1996

Sumter National Forest

Proposed Locations and Dates:

Columbia, South Carolina; August 22, 1996  
Edgefield, South Carolina; August 26, 1996  
Newberry, South Carolina; September 10, 1996  
Walhalla, South Carolina; September 21, 1996

#### G. Release and Review of the EISs

Each Draft Environmental Impact Statement (DEIS) is expected to be filed with the Environmental Protection Agency (EPA) and to be available for public comment by January, 1998. At that time, the EPA will publish a notice of availability of each DEIS (one for each Forest's DEIS) in the Federal Register. The comment period on each DEIS will be 3 months from the date the EPA publishes the notice of availability in the Federal Register.

The Forest Service believes, at this early stage, it is important to give reviewers notice of several court rulings related to public participation in the environmental review process. First, reviewers of the DEIS must structure their participation in the environmental review of the proposal so that it is meaningful and alerts an agency to the reviewer's position and contentions. *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 553 (1978). Also, environmental objections that could be raised at the DEIS stage but that are not raised until after completion of the Final Environmental Impact Statement (FEIS) may be waived or dismissed by the courts. *City of Angoon v. Hodel*, 803 F.2d

1016, 1022 (9th Cir. 1986) and Wisconsin Heritages, Inc. v. Harris, 490 F.Supp.1334, 1338 (E.D.Wis.1980). Because of these court rulings, it is very important that those interested in this proposed action participate by the close of the 3 month comment period so that substantive comments and objections are made available to the Forest Service at a time when it can meaningfully consider them and respond to them in each FEIS.

To assist the Forest Service in identifying and considering issues and concerns on the proposed actions, comments on each DEIS should be as specific as possible. It is also helpful if comments refer to specific pages or chapters of the draft statement. Comments may also address the adequacy of the DEIS or the merits of the alternatives formulated and discussed in the statements. Reviewers may wish to refer to the Council on Environmental Quality Regulations for implementing the procedural provisions of the National Environmental Policy Act at 40 CFR 1503.3 in addressing these points.

After the comment periods end on each DEIS, the comments will be analyzed, considered, and responded to by the Forest Service in preparing each FEIS. The FEISs are scheduled to be completed in December, 1998. The responsible official will consider the comments, responses, environmental consequences discussed in each FEIS, and applicable laws, regulations, and policies in making a decision regarding these revisions. The responsible official will document the decision and reasons for the decision in a Record of Decision for each Forest Plan. Each decision will be subject to appeal in accordance with 36 CFR 217.

The responsible official for each of the Forest Plans is the Regional Forester, Southern Region, 1720 Peachtree Road, NW., Atlanta, Georgia 30367.

Dated: July 25, 1996.

Gloria Manning,

Deputy Regional Forester, NRT.

[FR Doc. 96-19429 Filed 7-31-96; 8:45 am]  
BILLING CODE 3410-11-M

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File Code: 1920

Date: July 16, 2001

Interested Public

I would like to receive your comments on the attached proposed amendment to the *Sumter National Forest Land and Resource Management Plan*. The purpose and need for the proposal as well as supporting information are enclosed for your review. Comments are requested following procedures in the National Environmental Policy Act (NEPA). Comments will be used to identify issues. An issue can be thought of as a problem or concern that would result if the action were implemented as planned. An environmental assessment will be prepared. The Responsible Official is the Forest Supervisor for the Francis Marion and Sumter National Forests.

**Comments must be submitted to this office and postmarked by August 16, 2001.** Include the following information:

1. Your name, address, and (if possible) telephone number;
2. The title of the document(s) on which you are commenting (this document is Recreational Boating Use on the Chattooga Wild and Scenic River - Amendment # 14); and,
3. The specific facts or comments along with supporting reasons that you believe the Responsible Official should consider in reaching a decision.

Please mail your comments to: District Ranger, 112 Andrew Pickens Circle, Mountain Rest, South Carolina, 29664 or you may email your comments to [chattoogariver@yahoo.com](mailto:chattoogariver@yahoo.com).

A decision will be made on this proposal under provisions of 36 CFR 217 dealing with Forest Plan Amendments. Although not required, an Environmental Assessment identifying the preferred alternative will be made available for public review and comment prior to making a final decision. If you provide comments on this proposal you will receive a copy of the Environmental Assessment once completed. If you do not wish to comment but would like to receive a copy, please notify this office by mail or phone.

Comments received in response to this request, including names and addresses of those who comment, will be considered part of the public record on this proposed action and available for public inspection. Confidentiality may be granted in only very limited circumstances.

Sincerely,

/s/Michael B. Crane  
MICHAEL B. CRANE  
District Ranger



## **BACKGROUND**

Congress designated 57 miles of the Chattooga River as a component of the National Wild and Scenic River System on May 10, 1974. The river and its immediate surroundings offer many recreational uses including boating, fishing, swimming, floating, hiking, horseback riding, and sightseeing in remote settings. Recreational boating (including kayaking, canoeing, and rafting) has been a very popular use of the river and includes both commercially guided and self-guided users.

The Chattooga River is divided into four sections. (Please refer to the attached map.) Section I is the West Fork of the Chattooga River in Georgia ending at the main river channel. Section II begins at the confluence of the West Fork and the main river channel and ends at Earl's Ford. Section III begins at Earl's Ford and ends at the Highway 76 bridge. Section IV begins at the Highway 76 bridge and ends at Lake Tugaloo.

### **Commercially Guided Boaters**

The recreating public continues to ask for a diversity of experiences, settings, and opportunities on the National Forests. Many are capable of total self-sufficiency, but those selecting an outfitter want help. They may not be able to do it on their own, or want an introduction to such experiences to help them get started. They may not have the skill and equipment to be successful in remote and challenging environments or they may wish to devote full time to a specific activity such as hunting, fishing, photography, or viewing scenery. But the public lands belong to them, just as much as they belong to the residents living at the mouths of the rivers and canyons. From their visits to the wild lands they get the same benefits as those living with the wild lands at their back door. Without someone to outfit them, the Forest Service would be unable to meet this public demand.

The Forest Service works closely with river outfitters to provide high quality, safe, and responsible visitor services for those wanting the guided experiences. Guided boating is defined here as any boating use where one individual or group receives payment for guiding, instructing, or otherwise transporting any other individual or group on the river through the use of boats.

### **Self-Guided Boaters**

Self-guided boaters, sometimes referred to as private boaters, are another very important component of boating use on the river. Self-guided boating is defined here as any and all boating use on the river that does not meet the criteria consistent with "guided boating." This includes those who may be using rented equipment.

Self-guided boaters are those who have developed the necessary skills and who are able to provide or obtain for themselves the equipment and transportation necessary to be successful in meeting the challenges presented by the river. Self-guided boaters have

appreciated the ability to make their trek to the river with short notice, being able to respond to changing water levels throughout the year.

## **LAND AND RESOURCES MANAGEMENT PLAN**

The existing *Sumter National Forest Land and Resource Management Plan* (Forest Plan) gives direction and authority for managing the Sumter National Forest. Currently, this Forest Plan is undergoing revision. The revision process, begun in August 1996, will set broad, landscape level direction for all three Districts on the Forest for the next 10 to 15 years. It will likely take at least another 2-3 years to complete the revision.

Any Decision made associated with this proposed Forest Plan amendment will result in permanent modifications to the current Forest Plan. However, these and all other land management goals, objectives, and direction would be further subject to **change** during the revision process.

The Sumter National Forest is made up of three administrative units or districts, the Andrew Pickens, Enoree, and Long Cane Ranger Districts. The Chattooga River is part of the Andrew Pickens Ranger District. The Appendices to this letter contains current Forest Plan direction concerning boating on the Chattooga River. It also contains information on data collected regarding boating uses on the river since 1990.

These actions are being proposed at this time because:

- Public meetings and comments have demonstrated a significant level of interest in the issues surrounding river management.
- Proposing and analyzing these actions separately from the more broad scale Forest Plan Revision for the Sumter National Forest will allow a more focused consideration of the issues and alternatives.

## **PURPOSE AND NEED FOR THE PROPOSAL**

The current 1985 Forest Plan contains the following inadequacies with respect to boating on the Chattooga River:

1. The Forest Plan established daily limits for both guided and self-guided boating. While guided use is enforced through the administration of special-use permits, those limits associated with self-guided boaters have never been enforced. Current use exceeds Forest Plan allocations for self-guided boaters on some days – primarily in Section IV and on weekends during high-use seasons (See Graph D-2 in Appendix D). Most people have commented that these current use levels and experiences are acceptable. It is generally accepted that some of the current Forest Plan allocations are low, and that there is room for an increase in self-guided boater use on some days. The existing Forest Plan needs to be changed to accommodate existing self-guided boater demand.
2. Increased flexibility is needed within existing use allocations to enable river outfitters to effectively and economically provide the services sought by the guided public. Without these, customer service could suffer. Examples include

the flexibility to experience the river in a variety of crafts at all water levels as is already enjoyed by the self-guided public and to accommodate various trip sizes under existing daily use limits.

3. The Forest Plan allows only one permit for the shuttling of self-guided boaters to and from the river. This situation does not allow for competition that generally facilitates better service to the public. The Forest Plan should be changed to authorize a minimum of two shuttle permits.

## **RECREATIONAL BOATING USE ON THE CHATTOOGA WILD AND SCENIC RIVER**

### **PROPOSED AMENDMENT #14**

The amendment will be analyzed and decided separately from the Forest Plan revision efforts. The decision to be made will be whether or not to allow these proposed changes to the management of recreational boating on the Chattooga River, or whether some modifications to the proposal are needed to respond to public issues.

#### **Self-Guided Boating**

The proposed amendment would:

1. In Section III, establish year-round allocations for self-guided use at all water levels at 175 people per weekend day and at 125 people per weekday, holidays included. Hourly capacities would be dropped (boaters and groups per hour). See Table B-1 in Appendix B to see how this would compare to current allocations.
2. In Section IV, increase year-round allocations for self-guided use at all water levels to 160 people per weekend day and to 75 people per weekday, holidays included. Hourly capacities would be dropped (boaters and groups per hour). See Table B-2 in Appendix B to see how this would compare to current allocations.
3. Establish a procedure for the enforcement of self-guided use allocations in Sections III and IV should use increase substantially in the future.

Specifically, in Section III between April 1 and August 30, should daily self-guided use ever reach 175 people per weekend day for 20 weekend days (roughly half of the time), reservations would be required for self-guided boaters (including shuttled boaters) on Section III on weekends during those months beginning the following year. Similarly, should daily self-guided use ever reach 125 people per weekday for 50 weekdays (roughly half of the time), reservations would be required for self-guided boaters (including shuttled boaters) on Section III on weekdays during those months beginning the following year.

Since 1996, self-guided use between April 1 and August 31 in Section III has reached 175 people per weekend day for an average of 4 days/year and 125 people per weekday for an average of 0 days/year.

In Section IV between April 1 and August 30, should daily self-guided use ever reach 160 people per weekend day for 20 weekend days (roughly half of the time), reservations would be required for self-guided boaters (including shuttled boaters) on Section IV on weekends during those months beginning the following year. Similarly, should daily self-guided use ever reach 75 people per weekday for 50 weekdays (roughly half of the time), reservations would be required for self-guided boaters (including shuttled boaters) on Section IV on weekdays during those months beginning the following year.

Since 1996, self-guided use between April 1 and August 31 in Section IV has reached 160 people per weekend day for an average of 2 days/year and 75 people per weekday for an average of 4 days/year.

Whatever reservation system is used, the goal is for them to be made on a first come-first served basis and be available on a same day basis—if possible—to allow boaters to respond to changing water conditions that can occur daily. A fee would be required for each reservation.

4. Allow more than one shuttle permit.

### **Guided Boating**

The proposed amendment would:

1. Change the definition of rafts to include other craft such as inflatable kayaks.
2. On inflatable raft trips at water levels at or above approximately 1 foot at the Highway 76 gauge, allow the use of up to 12 craft on 3 trips per day.
3. Allow inflatable raft trips in Sections III and IV to be moved to Sections I or II.
4. On Section III inflatable raft trips at low water levels (below approximately one foot at the Highway 76 gauge), allow the use of up to twelve craft.
5. Allow inflatable raft trips to exceed 30 clients, as long as each trip does not exceed 40 total and as long as the total number of clients served per section and per day does not exceed the current daily limits for clients.
6. Allow the use of up to two inflatable kayaks on guided hardboat trips (previously referred to as clinics).

7. Allow a guided hardboat trip in Section IV in the place of a scheduled Section IV guided inflatable trip.

**APPENDIX A**

**CURRENT FOREST PLAN DIRECTION FOR GUIDED BOATING USE**

**Inflatable Raft Trips**

The following tables summarize the current Forest Plan Direction pertaining to guided raft and instructional clinic use on the Chattooga River. *Low* water levels are defined as those below approximately one foot on the Highway 76 gauge, *moderate* levels are from approximately 1 - 2.5 feet, *high* levels are from approximately 2.5 - 3 feet, and *very high* levels are those above approximately 3 feet.

<b>TABLE A - 1 CURRENT GUIDED RAFTING ALLOCATIONS SECTION III</b>					
<b>Water Levels</b>	<b>Capacity Permitted</b>	<b>May – September</b>		<b>October - April</b>	
		<b>Weekdays</b>	<b>Weekends*</b>	<b>Weekdays</b>	<b>Weekends*</b>
Low	Trips/day	0	0	0	0
	People/day+	0	0	0	0
Moderate	Trips/day	7	4	7	4
	People/day+	280	160	280	160
High	Trips/day	7	4	7	4
	People/day+	280	160	280	160
Very High <small>Denominator indicates portion of trips allowed from Hwy 28 to Earl's or Sandy Ford</small>	Trips/day	13/3	8/3	13/3	9/3
	People/day+	520	320	520	360

\* Includes Holidays

+ Includes Guides

**TABLE A - 2  
CURRENT GUIDED RAFTING ALLOCATIONS  
SECTION IV**

Water Levels	Capacity Permitted	May – September		October - April	
		Weekdays	Weekends*	Weekdays	Weekends*
Low <small>Denominator indicates portion of trips allowed in Five Falls</small>	Trips/day	9/6	8/4	9/6	9/5
	People/day+	360	320	360	360
Moderate	Trips/day	6	4	6	5
	People/day+	240	160	240	200
High <small>These trips may put in at Thrift's Ferry</small>	Trips/day	6	4	6	5
	People/day+	240	160	240	200
Very High	Trips/day	0	0	0	0
	People/day+	0	0	0	0

\* Includes Holidays

+ Includes Guides

- ❑ Allocations for guided, inflatable raft trips are currently limited to Sections II, III, and IV of the river only.
- ❑ A raft is defined as capable of holding 4-6 people, over 4 feet wide, and not including the inflatable kayaks.
- ❑ Guided, inflatable raft trips are limited to 40 people per trip consisting of no more than 30 paying guests per trip.
- ❑ No more than seven client-carrying rafts are allowed on guided, inflatable raft trips.
- ❑ Some Section III trips are permitted to take out at Woodall Shoals, which is approximately 2 miles below the Highway 76 bridge.
- ❑ In the past we have referred to the two different kinds of commercial use permits on the Chattooga as rafting permits and instructional permits or “clinics.” Because both the rafting and the instructional clinics involve some level of instruction and guiding, we are now referring to commercial raft use as guided inflatable use, and instructional clinics as guided hardboat trips. We believe these definitions better reflect what these trips really are.

### Instructional Canoe/Kayak (Hardboat) Clinics

Instructional clinics are for the training of individuals in white water skills associated with hardboats, primarily on short river segments. They are not intended as guided float trips employing rafts.

<b>Day of the Week</b>	<b>Capacity Permitted</b>	<b>River Section</b>	
		<b>I/II</b>	<b>III</b>
Weekdays	Trips/week	20	28
	Trips/day	6	7
Weekends	Trips/day	2	

No more than five clinic permits (canoe and kayak) are currently permitted, and;

- Clinics are restricted to the portions of river above the Highway 76 Bridge (sections I, II, and III).
- A limited number of clinics may be authorized by the operating plan to use the one or two person inflatable crafts (inflatable canoe/kayak). These are only permitted on weekdays and above Sandy Ford. Their use can only be a percentage of the entire trip, as they are intended to provide a training opportunity for some members of the clinic who lack the skill to safely handle a hard shell canoe or kayak. However these are not to become float trips dominated by inflatables.
- Total number of clinics by all companies combined cannot exceed two clinics per section/day on weekend days.
- Clinics are restricted to no more than 24 people per trip and no more than 12 craft.

**APPENDIX B**

**CURRENT FOREST PLAN DIRECTION FOR SELF-GUIDED BOATING USE**

<b>TABLE B - 1 CURRENT SELF-GUIDED BOATING USE ALLOCATIONS SECTION III</b>						
<b>Capacity Permitted</b>	<b>May 1 – Sept 30</b>		<b>Mar 20 – Apr 30, Oct 1 – Oct 31</b>		<b>Nov 1 – Mar 19</b>	
	<b>Weekdays</b>	<b>Weekends</b>	<b>Weekdays</b>	<b>Weekends</b>	<b>Weekdays</b>	<b>Weekends</b>
Boaters/day	125	175	100	135	60	60
Boaters/hour	40	50	30	40	30	30
Groups/hour	4	6	3	4	3	3

<b>TABLE B - 2 CURRENT SELF-GUIDED BOATING USE ALLOCATIONS SECTION IV</b>						
<b>Capacity Permitted</b>	<b>May 1 – Sept 30</b>		<b>Mar 20 – Apr 30, Oct 1 – Oct 31</b>		<b>Nov 1 – Mar 19</b>	
	<b>Weekdays</b>	<b>Weekends</b>	<b>Weekdays</b>	<b>Weekends</b>	<b>Weekdays</b>	<b>Weekends</b>
Boaters/day	50	80	50	60	40	40
Boaters/hour	20	30	20	20	20	20
Groups/hour	3	4	3	3	2	2

- Self-guided boaters are asked, but not required, to limit group size to no more than 12 boats per group.
- Self-guided boaters are limited to no more than 24 boaters per trip.

**Shuttle of Self-Guided Boaters**

A single, long-term shuttle service is allowed to meet the needs of the public desiring the transportation of themselves and/or equipment to and/or from river access locations.

**APPENDIX C**

**CURRENT FOREST PLAN DIRECTION FOR  
BOTH GUIDED AND SELF-GUIDED BOATING USE**

**Self-Guided And Guided Raft Allocations Compared**

Tables C-1 and C-2 show the maximum number of boaters allowed for both guided raft and self-guided boaters in Sections III and IV respectively at different times of the year and at various water levels. Once again, *low* water levels are defined as those below approximately one foot on the Highway 76 gauge, *moderate* levels are from approximately 1 - 2.5 feet, *high* levels are from approximately 2.5 - 3 feet, and *very high* levels are those above approximately 3 feet.

<b>TABLE C - 1 CURRENT DAILY ALLOCATION MAXIMUMS GUIDED RAFTING AND SELF-GUIDED BOATING Section III People per day</b>					
<b>Water Levels</b>	<b>Capacity Permitted</b>	<b>May – September</b>		<b>October - April</b>	
		<b>Weekdays</b>	<b>Weekends*</b>	<b>Weekdays</b>	<b>Weekends*</b>
Low	Guided+	0	0	0	0
	Self-Guided	125	175	100	135
Moderate	Guided+	280	160	280	160
	Self-Guided	125	175	100	135
High	Guided+	280	160	280	160
	Self-Guided	125	175	100	135
Very High	Guided+	520	320	520	360
	Self-Guided	125	175	100	135

\* Includes Holidays

+ Includes Guides

**TABLE C - 2**  
**CURRENT DAILY ALLOCATION MAXIMUMS**  
**GUIDED RAFTING AND SELF-GUIDED BOATING**  
**Section IV**  
**People per day**

Water Levels	Capacity Permitted	May – September		October - April	
		Weekdays	Weekends*	Weekdays	Weekends*
Low	Guided+	360	320	360	360
	Self-Guided	50	80	50	60
Moderate	Guided+	240	160	240	200
	Self-Guided	50	80	50	60
High	Guided+	240	160	240	200
	Self-Guided	50	80	50	60
Very High	Guided+	0	0	0	0
	Self-Guided	50	80	50	60

\* Includes Holidays

+ Includes Guides

Table C-3 shows the maximum number of boaters allowed for both guided raft and self-guided boaters in Sections III and IV combined at different times of the year and at various water levels.

**TABLE C - 3**  
**CURRENT DAILY ALLOCATION MAXIMUMS**  
**GUIDED RAFTING AND SELF-GUIDED BOATING**  
**(Sections III and IV Combined)**  
**People per day**

Water Levels	Capacity Permitted	May – September		October - April	
		Weekdays	Weekends*	Weekdays	Weekends*
Low	Guided+	360	320	360	360
	Self-Guided	175	255	150	195
Moderate	Guided+	520	320	520	360
	Self-Guided	175	255	150	195
High	Guided+	520	320	520	360
	Self-Guided	175	255	150	195
Very High	Guided+	520	320	520	360
	Self-Guided	175	255	150	195

\* Includes Holidays

+ Includes Guides

## APPENDIX D

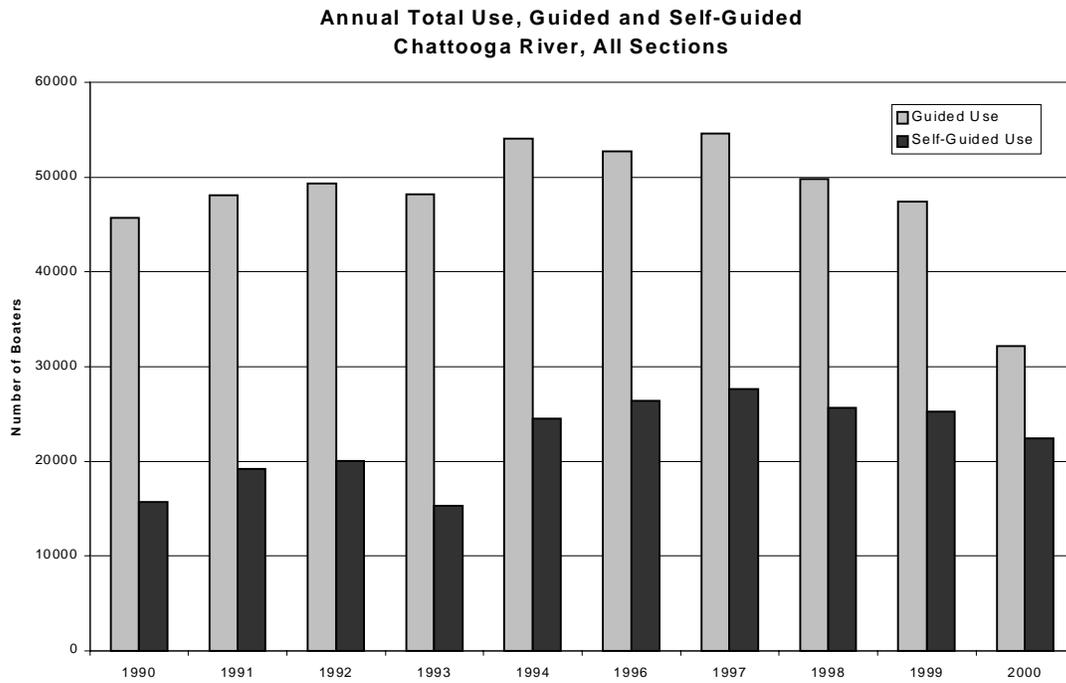
### USE DATA

Data collected from the self-registration permit system and through the administration of the Outfitter/Guide permits shows the following about boating uses on the river since 1990. The data for 1995 is not available.

#### *Annual Total Use, Self-Guided and Guided Raft*

Graph D-1 shows the annual totals for all self-guided boaters and guided boaters on all sections of the river combined since 1990.

Graph D-1

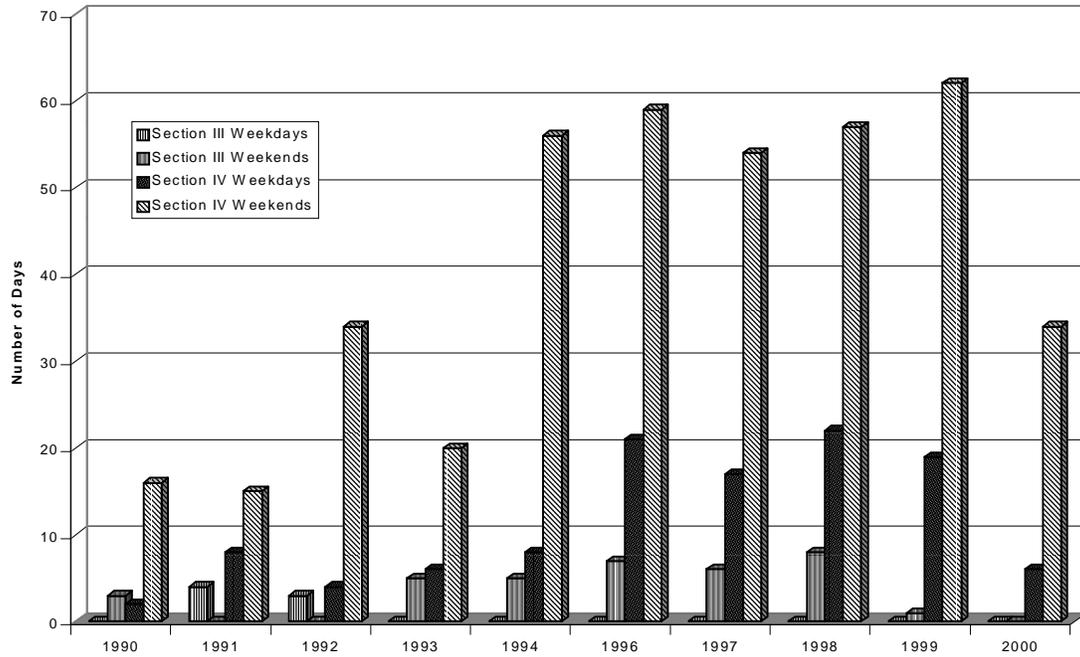


*Self-Guided Use Has Exceeded 1985 Forest Plan Allocations*

Graph D-2 shows the total number of days that self-guided use has exceeded the maximum daily allocations identified in the 1985 Forest Plan for Sections III and IV since 1990.

Graph D-2

**Number of Days Self-Guided Boaters Exceed Forest Plan Allocations**

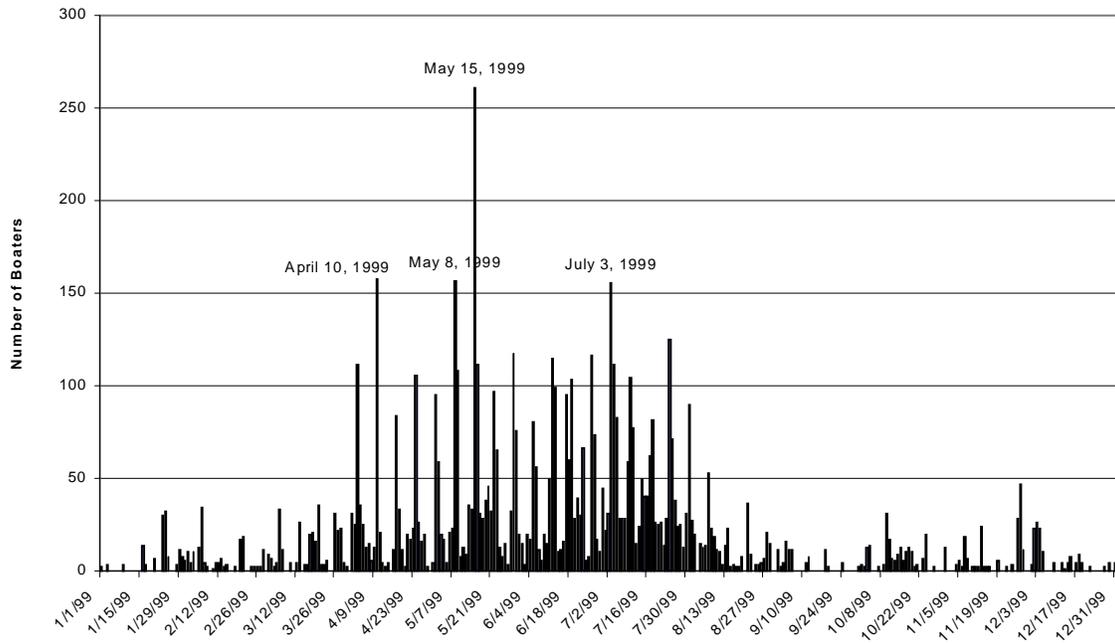


*Distribution of Self-Guided Boater Use, 1999*

Graphs D-3 and D-4 show the daily totals for self-guided boaters in Sections III and IV respectively during the year 1999.

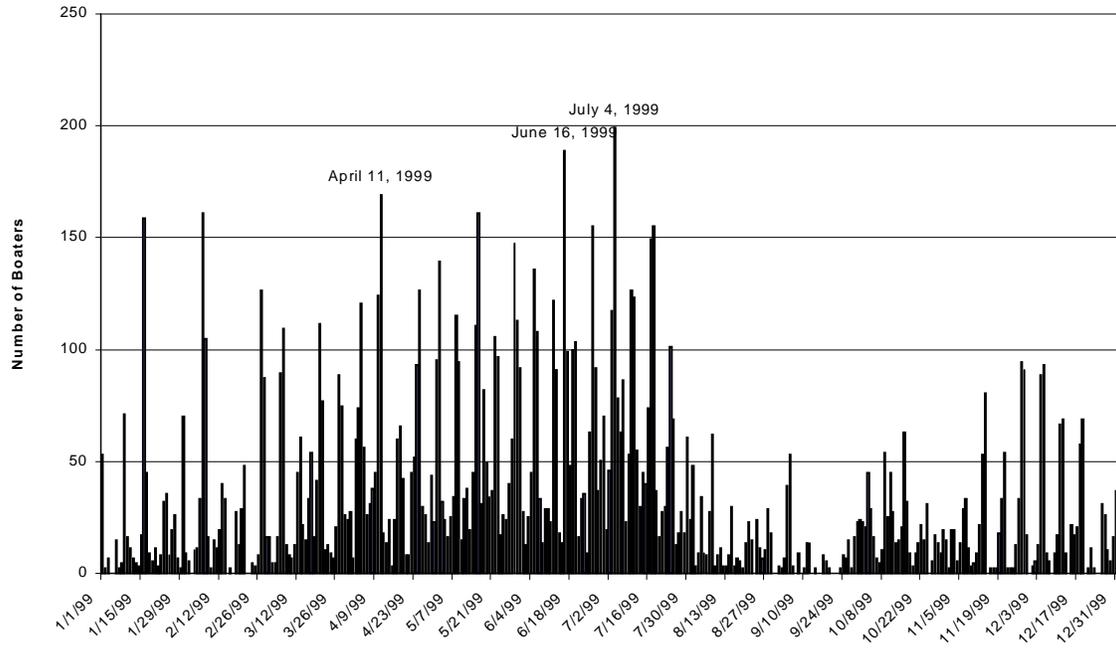
Graph D-3

**Self-Guided Boaters in Section III of Chattooga River  
1999**



# Graph D-4

## Self-Guided Boaters in Section IV of Chattooga River 1999

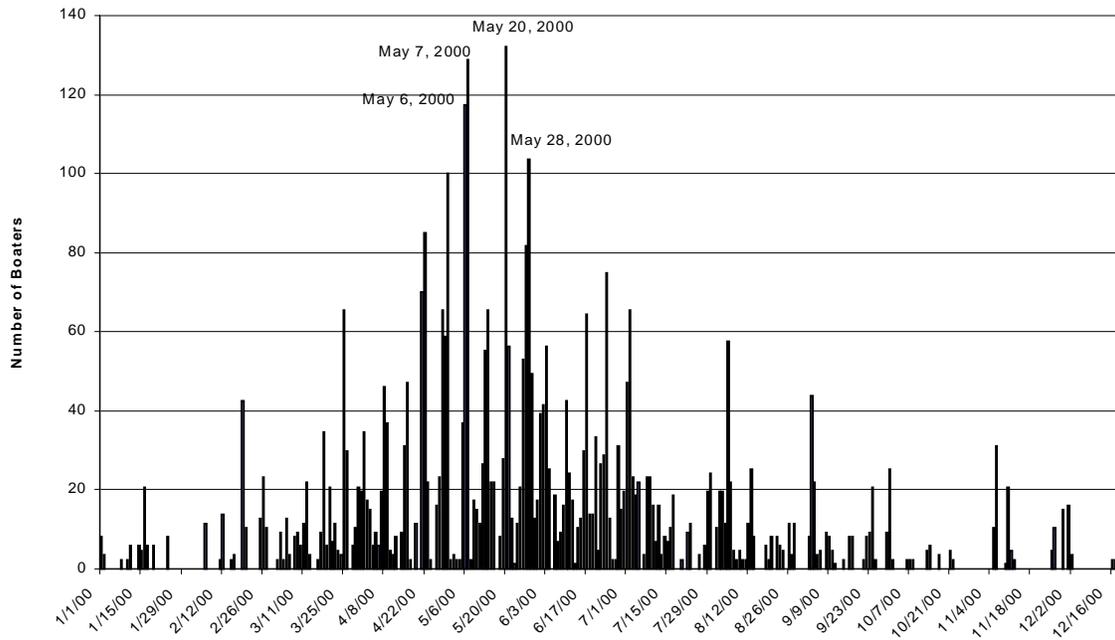


*Distribution of Self-Guided Boater Use, 2000*

Graphs D-5 and D-6 show the daily totals for self-guided boaters in Sections III and IV respectively during the year 2000.

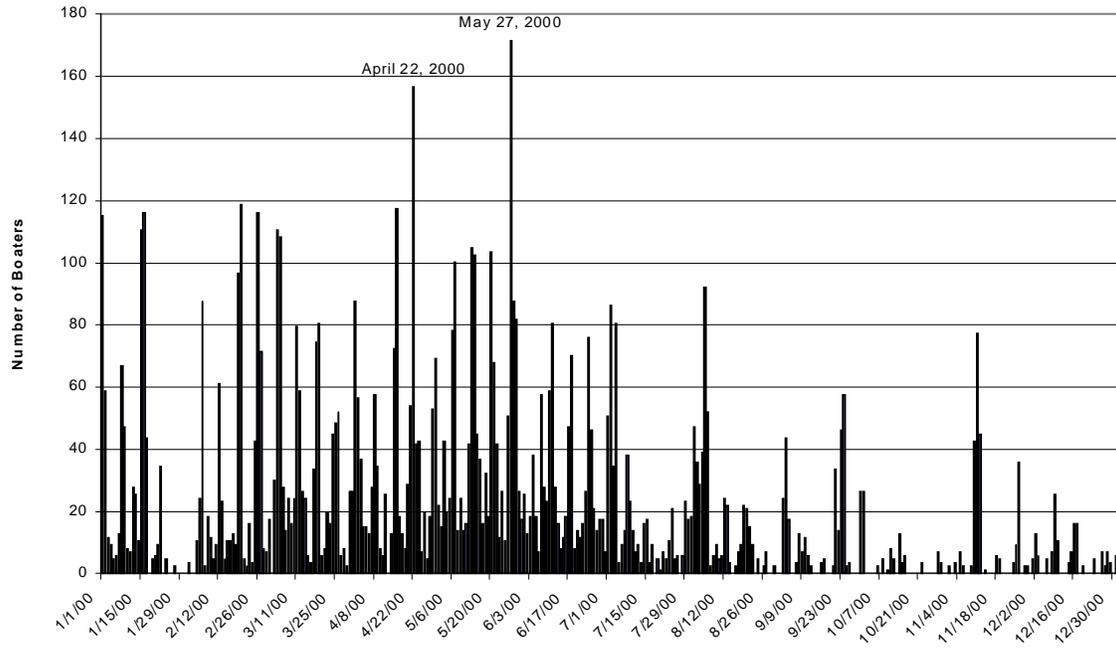
Graph D-5

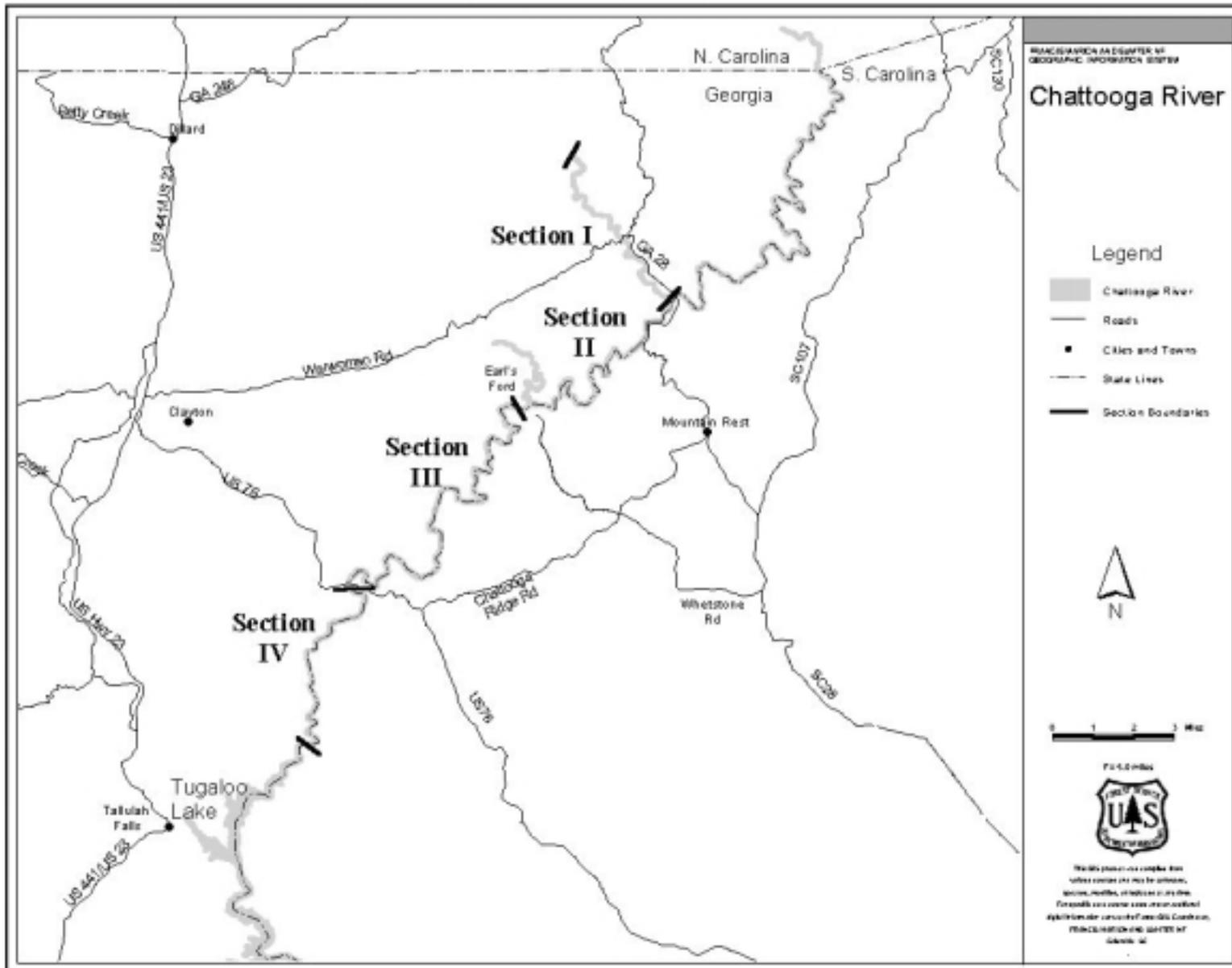
**Self-Guided Boaters in Section III of Chattooga River  
2000**



Graph D-6

### Self-Guided Boaters in Section IV of Chattooga River 2000





MANAGED BY AN EMPLOYEE OF  
 GEOGRAPHIC INFORMATION SYSTEMS  
**Chattooga River**

Legend

-  Chattooga River
-  Roads
-  Cities and Towns
-  State Lines
-  Section Boundaries



This data product was compiled from  
 various sources and may be subject to  
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 64800-01

## CHATTOOGA RIVER WATERSHED ECOLOGICAL/SEDIMENTATION PROJECT

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**Abstract** As an integral part of the comprehensive water quality investigation of the Chattooga River watershed, an ecological and sedimentological study was conducted on selected stream reaches within the study area. The objective of this study was to conduct a sediment yield study and determine if sediment was a primary cause of physical and biological impairment to streams within the watershed. As result of this study, accelerated sedimentation has been identified to be the leading determinant in loss of habitat and reduction in bedform diversity within the study area. Good correlation was observed between aquatic ecology and normalized total suspended solids (TSS) data. Based on overlaying the biological index on TSS normalized to discharge/mean discharge, TSS concentrations greater than 284 mg/l adversely affected aquatic macroinvertebrate community structure. However, based on historic regional suspended-sediment concentrations, a normalized TSS concentration of 58 mg/l or less during storm flow provides an adequate margin of safety and is protective of aquatic macroinvertebrates in the Blue Ridge physiography. Corresponding turbidity limits of 69 and 22 NTU established the threshold of biological impairment and margin of safety, respectively. Previously, a similar turbidity of 25 NTU has been recommended for stream restoration management plans. Relative to reference streams, impaired streams yielded higher bedload and suspended load. The results of this study showed that road density and associated sediment sources accounted for 51% of the total sediment loading.

### INTRODUCTION

In response to issues included in the settlement of the Georgia Total Maximum Daily Load (TMDL) lawsuit, EPA was required to conduct an evaluation of the Chattooga River watershed to determine if waters within the watershed were not meeting designated uses (Sierra Club, Georgia Environmental Organizations, Inc., Coosa River Basin Initiative, Inc., Trout Unlimited, and the Ogeechee River Valley Association, Inc., Versus: U.S. Environment Protection Agency (EPA); Carol Browner, Administrator, EPA and John Hankinson, Regional Administrator, EPA Region 4). For those waters not meeting designated uses, EPA was required to determine the cause of non-support and develop the appropriate TMDL.

Sedimentation has been reported to be the leading determinant in loss of habitat and reduction in bedform diversity within the study area. The State of Georgia is initiating a statewide effort and geographic calibration of reference conditions for assessing the ecological status of its water resources using biological assessment. However, the effort has not been completed. As an interim solution, it was necessary to develop reference conditions at the scale of the Chattooga Basin. The objective of this study was to conduct a sediment yield study and determine if sediment was a primary cause of physical and biological impairment to streams within the watershed. The results were correlated with aquatic ecological data to develop an overall condition of the watershed.

**Setting** The Chattooga River watershed, located in northeast Georgia, northwest South Carolina, and southwest North Carolina, has a total drainage area of approximately 180,000 acres, and is entirely within the Blue Ridge Ecoregion. Land cover within the watershed is primarily forested, with some areas of commercial development, urban and residential use, and agriculture. Although the average "forested" land cover within the watershed is greater than 96%, there has been concern that gradual increases in sediment inputs to streams may be causing ecological impairment. Consequently, EPA Region 4 began an evaluation of water quality conditions within the Chattooga River watershed, and how they may have changed due to forestry or forestry-related practices. To accomplish this, sampling and analysis was undertaken in 1997-2000 by U.S. EPA Region 4 for biological and habitat quality, channel morphology, selected water chemistry, and sediment yield.

## METHODS

**Aquatic Ecology** A total of 3 reference sites and 56 other sites were sampled from six subwatersheds: Headwaters (n = 14), Lower Chattooga (n = 3), Middle Chattooga (n = 10), Stekoa Creek (n = 7), West Fork (n = 11), and Warwoman Creek (n = 11). Biological sampling methods were focused on benthic macroinvertebrates and used modified rapid bioassessment protocols (RBP) (Plafkin et al. 1989, Barbour et al. 1999, and U.S. EPA's Region 4, Ecological Assessment Branch-Draft Standard Operating Procedures 1999). Reference sites were selected prior to initiation of sampling based on habitat condition, *in situ* water chemistry and surrounding land use. Reference sites R1 and R2 were located in the Chattooga River watershed and reference site R3 was on the upper Chattahoochee River outside of the Chattooga watershed. It was determined that the reference sites were representative of least-impaired conditions of the Blue Ridge Ecoregion. Data for all 59 stations were analyzed using a multimetric approach, in agreement with the recommendations of U. S. EPA (Gibson et al. 1996). From the raw data, 17 metrics were calculated including: total taxa, number of Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa, number of clinger taxa (clingers), percent clingers, percent most dominant taxon, percent 2<sup>nd</sup> dominant taxa, percent tolerant organisms, number of intolerant taxa, percent diptera, percent Chironomidae, percent EPT, North Carolina Biotic Index (NCBI), percent collectors, percent filterers, percent scrapers, percent shredders, and percent predators.

From the original list of 17 metrics, five were selected that had the greatest ability to detect impairment, determined by examining the position of the *a priori* reference sites to the overall distribution of metric values. For the most appropriate metrics, scoring criteria were determined based on the 95<sup>th</sup> percentile of all metric values for those metrics that decrease with impairment (Barbour et al. 1999). For those that increase with impairment, the 5<sup>th</sup> percentile was used. This approach was used since there were no *a priori* impaired sites against which to calibrate. Each metric was scored according to its relation to the 95<sup>th</sup> (or 5<sup>th</sup>) percentile standard (Table 1). Eighty-five percent (85%) of the area below the 95<sup>th</sup> percentile standard (or 15% above the 5<sup>th</sup> percentile) was equally divided into four ranges and each range is given a numeric value of 0, 2, 4, or 6. A score of zero was the farthest away from the percentile standard (i.e., zero was most unlike the best attainable conditions and 6 was the score closest to the percentile standard). One exception was the "North Carolina Biotic Index" (NCBI), for which the scoring criteria developed by Lenat (1993) were used.

**Table 1. Table of metrics and percentile distribution for each.**

Metric	Min	05 <sup>th</sup>	Median	95 <sup>th</sup>	Max	Percentile Standard	Expected Response to Stressors
EPT taxa	3	10	15	21	25	95	Decrease
% EPT	27.9	36.7	66.7	85.0	95.4	95	Decrease
% 2 dominant taxon	19.2	22.0	30.0	52.8	65.4	5	Increase
NCBI	2.6	2.7	4.1	5.6	6.2	5	Increase
Clinger taxa	7	7	17	23	24	95	Decrease

A final biological index was assigned to each site based on a simple sum of the scores for the five metrics. An assessment rating was then assigned by dividing the range of the overall index scores into 5 categories. Narrative descriptions of the assessments correspond to:

- < **Very Good** - best attainable conditions indicating no impairment to the aquatic community;
- < **Good** - close to best attainable conditions but at risk and possibly influenced by limited stressors;
- < **Fair** - some biological impairment observed, due to minor stressor input;
- < **Poor** - substantial impairment of stream biota observed, due to moderate stressor input; including habitat degradation;
- < **Very Poor** - severe impairment of stream biota observed, due to major stressor input, including habitat degradation.

**Sediment Sampling** Seventeen stream reaches were selected for storm flow investigations based on the following criteria: (1) relative degree of biological impairment as measured using RBP; (2) position within the watershed; (3) relative geomorphic condition; and (3) access logistics. The storm flow investigations were conducted during three storm events (March 28-30, 1998, June 15-17, 1999 and March 16-17, 2000). Prior to storm flow sampling, tape

downs were established and appropriate cross-sections for gaging and sediment collection were identified. Base flow discharge and sediment samples were collected prior to the storm initiation. Precipitation was measured at Clayton, Georgia for response planning and rapid deployment of sample teams during the storm flow study. In addition, several rain gages were strategically deployed within the watershed to address rainfall distribution. Also, stream stage was monitored in Stekoa Creek at Clayton for response planning.

A total of 58 observations were made across the 17 stations. *In-situ* measurements at each station included tape downs (start and finish), stream discharge, turbidity, and collection of suspended and bedload sediment. Stream discharge was gaged simultaneously with sediment collection. Water column samples were collected using a depth integrating suspended hand-line sampler (US DH-59). Field turbidity was determined *in-situ* at ambient air conditions using a HACH™ Model 2100P Turbidity Meter. Turbidity was field determined for future use by EPA Region IV and state water quality personnel as a rapid means of identifying potential sediment impaired streams (“red flags”). Consequently, sample temperature was not adjusted prior to measuring turbidity. Laboratory determination of total suspended solids (TSS) and total dissolved solids (TDS) followed USEPA Methods 160.2 and 160.1, respectively. Whole samples were filtered for TSS analysis. Because the TSS data were produced without subsampling, they should be directly comparable to suspended-sediment concentration data (SSC) (Gray et al. 2000 and personal communication with John Gray, USGS). Bedload sediment samples were collected utilizing a 6-inch cable suspended bedload sampler or a 6-inch wading type bedload sampler, transported to the laboratory in 1-liter containers, and processed for particle size determination (PSD) in the laboratory using the EPA-SESD wet sieve method (SESD-EAB Draft SOP, Jan. 99). The procedure was followed with the exception of the silt/clay separation step that was not required since the samples were collected in coarse NiteX™ mesh bags (250 : m).

Laboratory results of dry-weight, bedload samples ( $M_b$ , grams) were converted to bedload transport rate ( $Q_b$ , tons/day) by the following equation (Edwards and Glysson 1988):

$$Q_B = K(W_T/T) M_T \quad (1)$$

where  $Q_B$  = bedload discharge (tons/day);  
 $K$  = converts grams/second/foot to tons/day/foot  
 $W_T$  = wetted surface (ft);  
 $T$  = total time sampler on bottom (seconds);  
 $M_T$  = total mass of samples (grams)

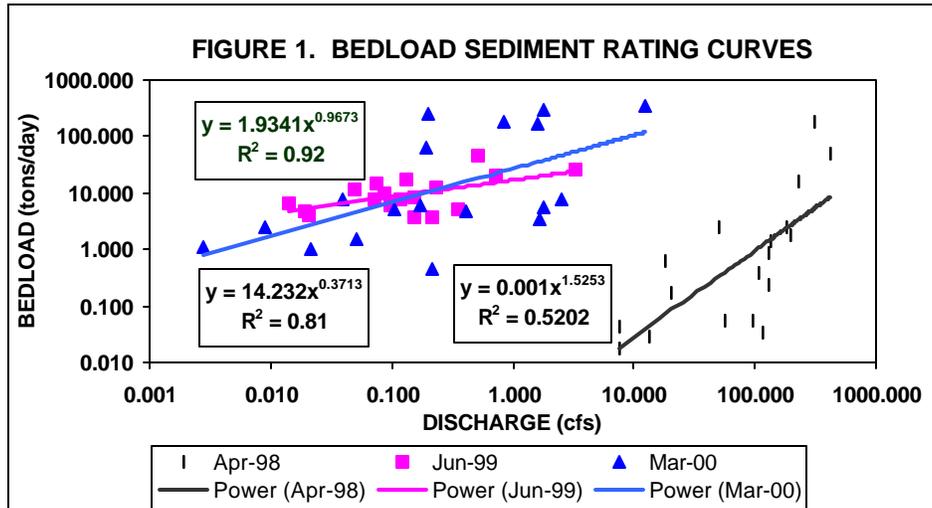
Regression relationships were tested against ANOVA at a 95% confidence level. Consequently, unless otherwise noted hereafter, significance was determined at  $\alpha = 0.05$ , based on a t-test using advanced regression.

## RESULTS

**Aquatic Ecology** Biological conditions in most streams sampled in this study show little or no impairment. Seventy-eight percent (78%) of the sites were rated as “very good” (22 sites) or “good” (24 sites). Since greater than 96% of the watershed land cover is classified as forested, this result was expected. Streams rated as “good” (41% of all stream sites sampled) are defined as possibly being influenced by some stressors. Eleven sites (19%) were rated as “fair”, and two sites (3%) were rated as “poor”. No sites were rated as “very poor”. Although some sedimentation, or the habitat effects of sedimentation, may have been evident at many sites, a negative biological response was not always evident. The sedimentation also may not have reached a level that would cause a biological response. Due to the fact that this project used multihabitat sampling of benthic invertebrates, samples were taken from some stream subhabitats that were not adversely affected by sediment deposition resulting in habitat loss. The three reference sites had high biological scores: 24, 22, and 28, respectively, out of a maximum possible score of 30. The most degraded biological community was observed in the Stekoa Creek subwatershed. This subwatershed has a higher percentage of bare land and less forest cover than other subwatersheds in the Chattooga River basin. Consequently, none of the sample stations were rated as “very good” (i.e., zero out of seven stations). Two stations were rated “good”, four stations were rated as “fair”, and one station was rated as “poor”.

**Bedload Sediment** Bedload over the three storm events averaged 13.32 tons/day (range 0.02-176.96 tons/day, standard deviation = 41.28). Median bedload particle sizes ( $D_{50}$ ) ranged from fine sand to very coarse sand. Bedload accounted for only 14 percent of the total sediment load (on average). By plotting bedload against discharge, bedload sediment rating curves for each of the three storm events were created (Figure 1). Relatively

good regression coefficients were observed within each storm event. However, regressed slopes varied between storm events.

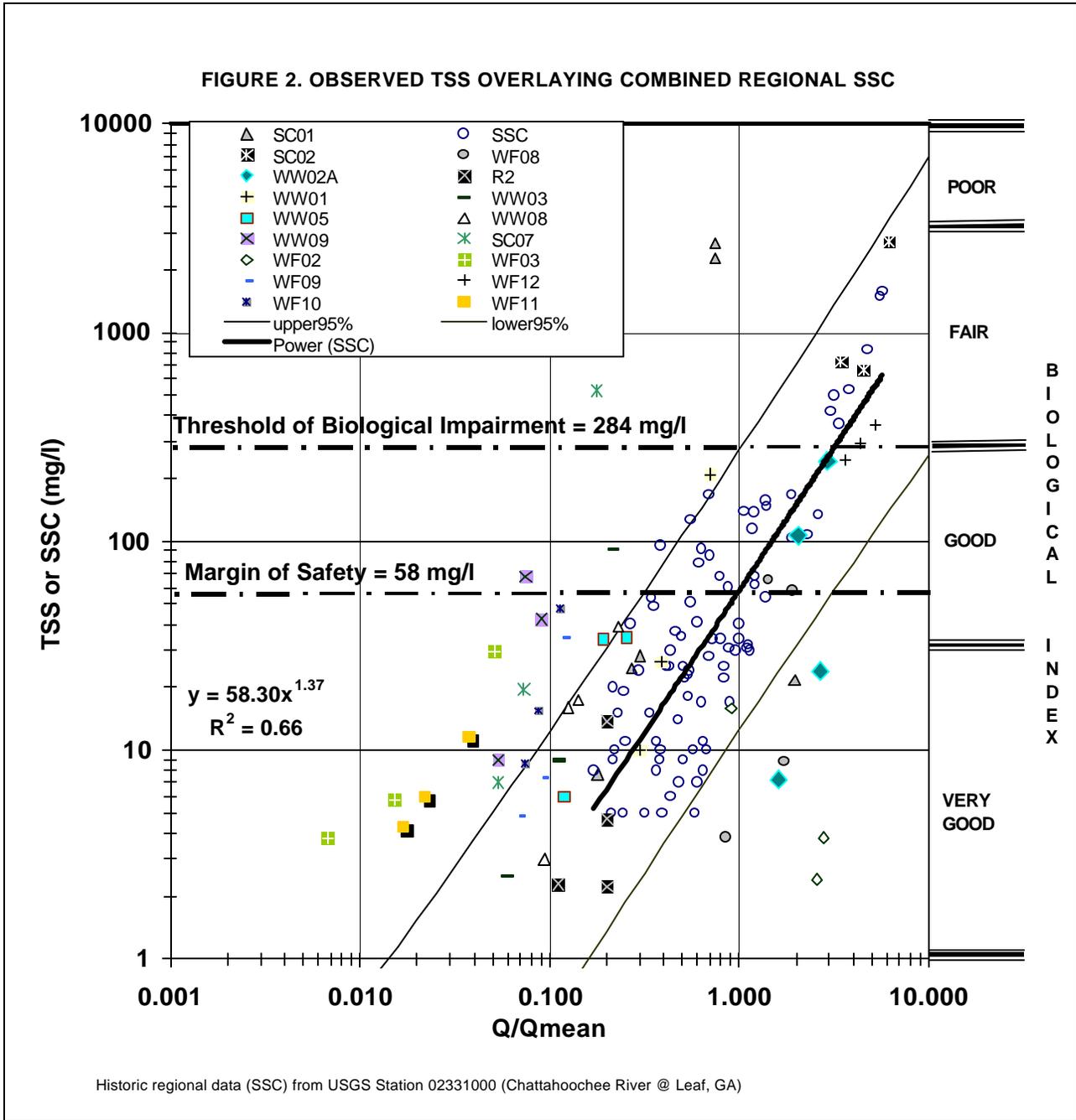


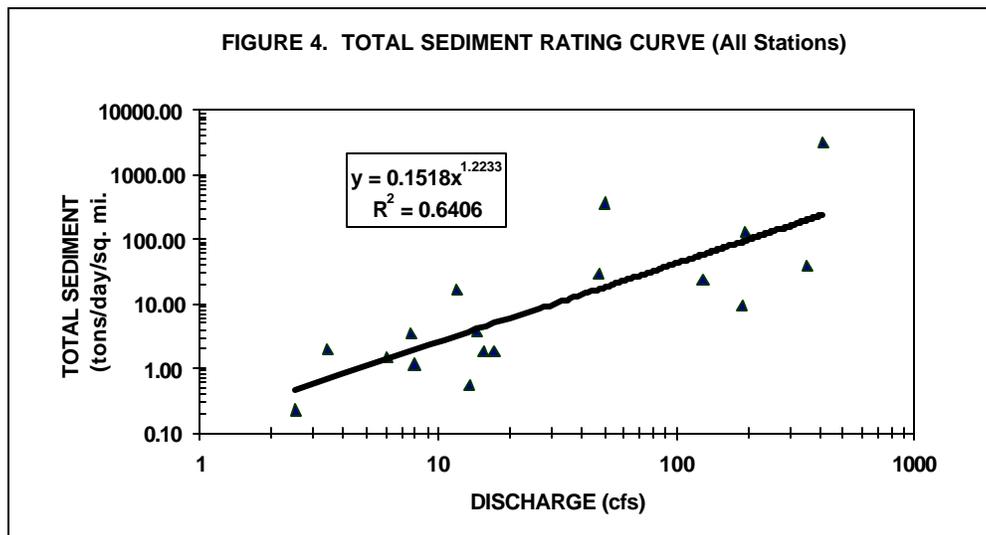
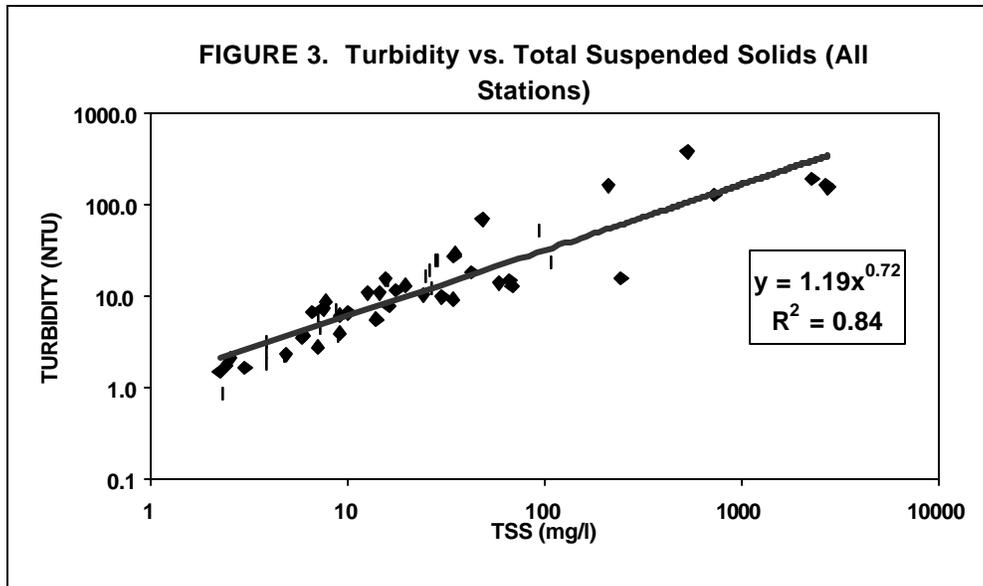
**Suspended Sediment (Regional)** Regional SSC data, compiled from the United States Geologic Survey records (Perlman 1984), were regressed against discharge normalized to mean discharge ( $Q/\text{mean}Q$ ) (Holmbeck-Pelham and Rasmussen 1997). The USGS stream station utilized in development of the regional sediment curve was the Chattahoochee River near Leaf (Station no. 02331000) for the period of record, 1958 - 1984. TSS data from the Soque River station near Cornelia (02331250) and the Chestatee River near Dahlonega (02333500) were not used due to the difference in slope of the regression as compared to the Chattahoochee River station in the former and shift upward in the regression of the latter. An improvement was observed in the regression coefficient from 0.54 to 0.66 and, consequently, confidence in using the regional data set improved as a reference. In addition, SSC data from the Chattahoochee River was the most protective as compared to the other two datasets. Regional SSC (from the Chattahoochee River) regressed against  $Q/Q_{\text{mean}}$  was observed to be significant ( $R^2=0.66$ , log transformed), given by (Figure 2):

$$\text{TSS or SSC} = 58.3(Q/Q_{\text{mean}})^{1.37} \quad (2)$$

**Suspended Sediment (this study)** TSS over the three storm events averaged 85.3 tons/day (range 0.0002-3136.2 tons/day, standard deviation = 418.0). TSS accounted for the majority (86 %) of the total sediment load over the three storm events (on average). TSS, collected by vertical integration of the water column, was regressed against discharge ( $Q$ ) and was observed to be highly variable between stations during the same storm event and between different storm events. In contrast, the log transformed relationship between TSS and NTU was significant (Figure 3). TSS data were compared against regional SSC by overlaying the two and constructing 95% confidence bands (Figure 2). Six stations, SC01, SC07, WW09, WF03, WF10 and WF11, were observed above the upper 95% confidence band (i.e., 6 out of the 17 stations during the three stormflow investigations). In general, data points that plot above the upper 95% confidence band are indicative of higher than “normal” concentrations of TSS for a given discharge to mean discharge. Other stations were observed to be below or within the normal range of the regional SSC data set. In addition, three stations, WW02A, WF02, and WF08, were below the lower 95% confidence band.

**Total Sediment** Bedload and TSS loadings were combined into total sediment load and plotted against discharge (Figure 4). Total loads were also plotted against road density (road length / corresponding drainage area) (Figure 5). Road density ranged from zero (R2 - Addie Branch, reference) to 6.60 (SC01 - Stekoa Creek). Road density represents the net impacts of road construction and maintenance, interception of subsurface interflow, routing of other non-point sources to the stream, and entrainment, mobilization, and transport of sediment to the stream. In contrast to drainage density, a significant increase in peak total loads in response to road density was observed at the two Stekoa Creek stations (SC01 and SC02).



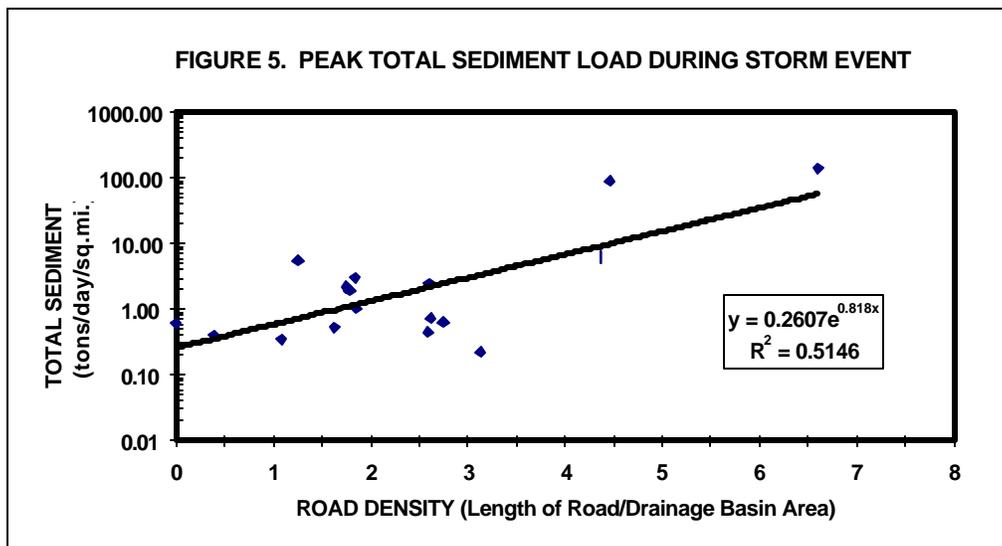


Relative to the reference stream (R2), impaired streams yielded higher bedload and suspended load. Based on the results of this study and comparison against regional sediment data, Stekoa Creek (SC01 and SC07) exhibits greater than “normal” suspended sediment loads. TSS concentrations from Addie Branch (R2) were within or below “normal” regional TSS concentrations. Total storm flow sediment load and peak total sediment loads did not increase significantly with drainage density. Increased sediment loads were correlated with an increase in road density. Road density and associated sediment sources accounted for 51% of the total sediment loading. Assuming that every road has at least one road ditch, road density nearly doubled the effective drainage density at the Stekoa Creek stations. The condition of the macroinvertebrate community of Stekoa Creek is rated as “fair” and is evidence of the impact of the accelerated sediment loads in the stream at stations SC01, SC02, and SC07.

## DISCUSSION

Presently, several states are evaluating their water quality standards to include narrative or numeric turbidity and/or TSS standards. For example, Georgia has recently enacted a narrative standard for turbidity that is based on “visual contrast in a water body due to man-made activity” (DNR 2000). In addition, Alabama and Florida use 50 and 29 NTU above background, respectively; South Carolina allows a increase of ten percent above background; North Carolina uses 10 NTU for trout streams, 50 NTU for non-trout streams, and 25 NTU for non-trout lakes; Tennessee

uses a standard that does not allow any material effect on fish or aquatic life (Kundell and Rasmussen 1995). Holmbeck-Pelham and Rasmussen (1997) recommended a reduction in average turbidities to below 25 NTU for stream restoration plans in Georgia. In addition, a turbidity of 25 NTU was recommended by the Georgia Board of Regents' Scientific Panel as an instream turbidity standard (Kundell and Rasmussen 1995). Also, the report cited a TSS concentration of 80 mg/l as a threshold between moderate and low levels of protection for fish and aquatic invertebrates (NAS 1972).



Similar findings were observed in this study. TSS concentrations greater than 284 mg/l resulted in biological impairment of macroinvertebrate communities. Also, TSS concentrations of 58 mg/l or less during storm flow provided an adequate margin of safety and were protective of aquatic macroinvertebrates in the Blue Ridge physiography. Furthermore, corresponding turbidity limits of 69 and 22 NTU established the threshold of biological impairment and margin of safety, respectively.

A relationship between TSS and turbidity (NTU) can be developed within a specific hydro-physiography. Turbidity can be used as a surrogate to TSS with the following assumptions and cautions: 1) the relationship between TSS vs. NTU is hydro-physiography specific; 2) turbidity includes inorganic and organic constituents including phyto- and zooplankton which can be extreme during the growing season; and 3) stream discharge and/or stage should be measured at the time of turbidity measurements and compared against a regional regression curve.

A biological endpoint is critical to addressing stream condition and beneficial uses. An index of biological integrity overlaying a sliding, sediment scale (concentration or load) is recommended. Additional surrogates need to be developed and tested between bedload versus embeddedness (MacDonald et al. 1991), bedload versus one-third lower bar (Rosgen 1996), and sediment load versus Pfankuch (1975) or RBP habitat assessments (Plafkin et al. 1989).

The relationship between suspended-sediment concentration and total suspended solids needs to be established for specific physiographies. In addition, in physiographies with high concentrations of clay particle sizes, filtration of the whole sample needs to be explored *in lieu* of withdrawing the supernatant using a J-tube.

The findings of this study emphasize the importance of incorporating aquatic ecological assessments into addressing the effects of accelerated sedimentation and deposition within a watershed. Biological endpoints (e.g., clinger-burrower ratio) can be directly applied to designate beneficial uses such as fishing and recreation. Consequently, comprehensive aquatic ecological studies are a critical component of identifying reference stream reaches and determining whether designated or beneficial uses are being met. Additional research should focus on developing fisheries and aquatic macroinvertebrate indices that are sensitive to impacts caused by accelerated sedimentation.

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## APPENDIX H

# CHATTOOGA RIVER HWY 28 ANALYSIS

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### **PURPOSE**

Appendix H outlines the recreational/social effects of opening up all or part of the Chattooga Wild and Scenic River upstream of Highway 28 to whitewater boating (the physical and biological effects are addressed in Chapter 3). The need to consider this action was raised as an issue during the public involvement processes for both Amendment 14 of the Sumter National Forest Plan, and the Sumter Forest Plan Revision itself.

### **DESCRIPTION OF THREE (3) ALTERNATIVES THAT ADDRESS WHITEWATER BOATING USE ABOVE HIGHWAY 28**

#### **Alternatives B, D, F, and I – No Action**

No boating is allowed above Highway 28. This is the “status quo” alternative.

#### **Alternative E – Boating allowed between NC-1107 (Grimshawes) & Highway 28**

Under this alternative, the sections of river from NC-1107 (Grimshawes bridge) to Highway 28 bridge would be open to boating all year (self-regulating alternative).

There would be:

- No limits on the number of trips per day;
- Maximum group size of 12 craft, and a minimum group size of 2 craft per trip (from Bull Pen Bridge to Burrells Ford Bridge, within the Ellicott Rock Wilderness, a maximum group size of 12 craft and 12 people);
- Self-guided use only;
- Crafts are limited to inflatable kayaks and hardboats (canoes and kayaks);
- No new access points developed, but existing facilities would be maintained.

## Alternative A – Boating allowed between Burrell’s Ford Bridge & Highway 28

Under this alternative, the section of river from Burrell’s Ford bridge to Highway 28 bridge would be open for boating from December 1 through March 31, but only at levels at or above 2.5 feet (1400 cfs) at the Highway 76 gauge.

There would be:

- No limits on the number of trips per day;
- Maximum group size of 12 craft, and a minimum group size of 2 craft per trip;
- Self-guided use only;
- Crafts are limited to inflatable kayaks and hardboats (canoes and kayaks);
- No new access points developed, but existing facilities would be maintained.

### AFFECTED ENVIRONMENT - RECREATION

The headwaters of the Chattooga Wild and Scenic River are defined for the purposes of this analysis as the sections between Grimshaws Bridge in North Carolina and Highway 28 Bridge in South Carolina. These sections cover approximately 21 river miles in the states of Georgia, South Carolina and North Carolina. They are separated into three sections by four roads (see Table H-1 and Figure H-1 below).

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*Table H-1. Identification of Chattooga River Headwater Sections*

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Section	W&S River Classification	State	Length (miles)
Grimshaws Bridge on NC-1107 to Bull Pen Bridge ( <b>GS-BP</b> )	Wild, Scenic, & Recreational	NC	5
Bull Pen Bridge To Burrells Ford Bridge ( <b>BP-BF</b> )	Wild and Scenic	NC, SC, GA	5.7
Burrells Ford Bridge to Highway 28 Bridge ( <b>BF-28</b> )	Wild, Scenic, & Recreational	SC & GA	10

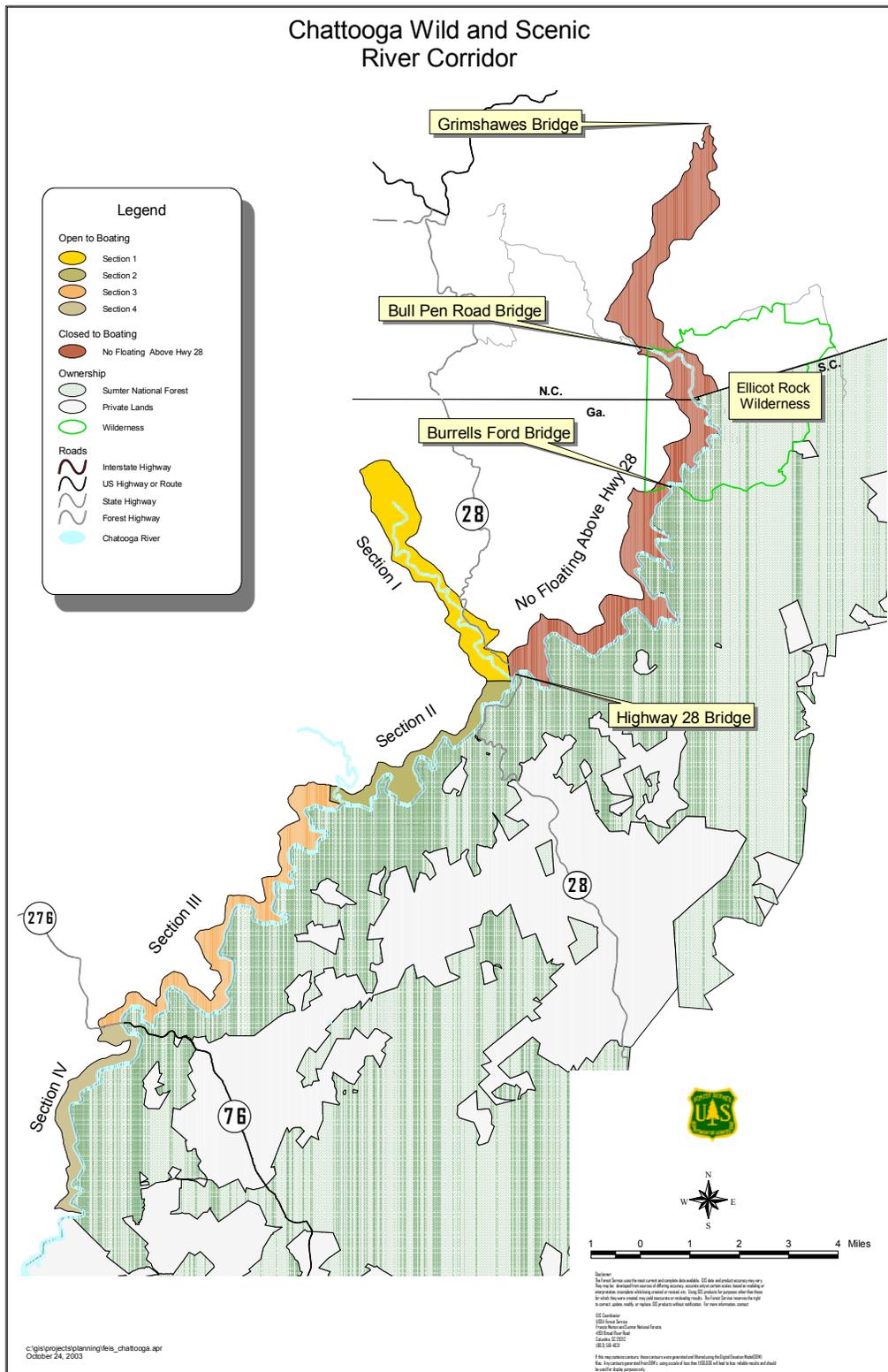


Figure H-1. The Headwaters of the Chattooga River

Congress designated 57 miles of the Chattooga River as a component of the National Wild and Scenic River system on May 10, 1974. The river was found to have many outstandingly remarkable values including geologic, biologic, scenic, recreation and historic. A Forest Service Technical Report (USDA Forest Service 1996) found that the Chattooga River still possessed all the outstandingly remarkable values that it had in 1971, and that Forest Service management of the river had not changed these values.

One of the primary reasons for nominating the Chattooga River for inclusion in the National Wild and Scenic River System was to protect and enhance its outstanding recreational value: a remote whitewater river environment where solitude, adventure and challenge could be experienced (Federal Register 1976, USDA Forest Service 1996). Restrictions in the Act limit the types of recreation use, especially in the 'wild' and 'scenic' sections. Compatible uses on the Chattooga include boating, hiking, hunting, fishing and camping.

## **Scenery**

The scenery of the Chattooga Wild and Scenic River was one of the outstandingly remarkable values that led to its inclusion in the National Wild and Scenic Rivers System in 1974. The visual characteristics are varied and tied to scenes associated with a naturally appearing river gorge that carved its way through the massive face of the Southeastern Blue Ridge Escarpment. Most of the Chattooga River upstream of Highway 28 crashes through the steepest, most pronounced portion of this gorge averaging an 84-foot drop per mile.

Scenery is a major determinant of the quality of the visitors' experience. Studies since designation have shown that visitors are pleased with the scenery on the river. In addition, the lack of man-made features adds to the enjoyment of the experience. One of the best ways to see much of the rugged and beautiful scenery of the Chattooga is from the river itself, either by foot or in a boat.

The Forest Service uses a system of classifying scenery and aesthetics of the forest. This system describes different degrees of acceptable alteration of the natural landscape based upon the importance of aesthetics. For example, in the 'wild' and 'scenic' sections of the river there is less development and relatively few signs of man. These sections are managed so that human activities are not evident to the casual observer. Most of the sections of the Chattooga above Highway 28 are designated as 'wild.'

In the 'recreational' sections of the river there are more signs of man's presence with roads paralleling the river and pastoral views. These sections are managed so that human activities remain visually subordinate to the characteristic landscape.

For a more in-depth discussion of the Scenery Management System, refer to the "Scenery" section in Chapter 3 of the Sumter Draft Environmental Impact Statement.

The section from **Grimshawes Bridge on NC 1107 to Bull Pen Bridge (GS-BP)** averages 25-30 feet in width in its upper reaches and drops on a steep gradient through whitewater cascades hemmed in by dense vegetation and high ridges. The largest free-falling waterfall on the river drops 25 vertical feet into a deep pool. The west bank rises almost 50 feet above the falls. In many places along this run sheer rock outcrops and cliffs tower 400-600 feet above the river. An especially noteworthy 2 ½ mile section known as Chattooga Cliffs involves a series of outcrops 2,800 to 3,300 feet in elevation. Exposed boulders and steep, slick, rock walled sides make it difficult to climb out of the riverbed. In another place the river enters a narrowly enclosed rock canyon where deep water flows slowly between sheer walls of solid rock rising 75 feet out of the water.

The section from **Bull Pen Bridge to Burrells Ford (BP-BF)** flows through the Ellicott Rock Wilderness for 5.2 miles. The scenery is similar to the **GS-BP** section with high ridges enclosing the river, enormous boulders, some over 50 feet high with trees growing on top, steep gradients through whitewater cascades all hemmed in by dense vegetation. Also in this section Scotsman Creek drops over a small waterfall and down a rock ledge into the river.

The section from **Burrells Ford to Highway 28 Bridge (BF-28)** flows around huge rocks and narrow sluices and drops over 25 foot Big Bend Falls and 21 small waterfalls and rapids in less than two miles. The Chattooga then enters Rock Gorge, the steepest part of the Chattooga River Gorge. High, forested ridges rise 200 feet above the river, and huge, house sized boulders constrict the river into a narrow channel with numerous falls and sluices. Below Lick Log Creek the gradient is much more gentle and the steep ridges on either side begin to widen down to Nicholson Fields.

## **Fishing Experience and Fisheries Management**

Trout fishing on the Chattooga River is a tradition for many local and regional anglers. The section of river upstream of Highway 28 is considered to be the best trout fishing waters in South Carolina. Trout Unlimited named this section one of the top 100 trout fishing streams in the nation.

For the majority of anglers on the Chattooga River, the setting where the activity takes place is at least as important as the fishing activity itself. The remote and spectacular natural settings, including forested ridges, rock outcrops, huge groves of white pine and hemlock, boulders, and rushing, clear waters, along with relatively low visitor use, combine with the angling to offer an experience which is greater than the sum of its parts. This setting also contributes to the formation of strong emotional ties between anglers and the river; feelings of ownership and attachment, a phenomenon commonly referred to as a “sense of place” (Bixler and Backlund 2002). Any change in culture or practice on the river could threaten this identity.

Historically, the Georgia and South Carolina Department of Natural Resources (GA & SC DNR) have managed the Chattooga as a trout fishery from Ellicott Rock (SC border

with NC) downstream to the Highway 76 Bridge. Backcountry anglers (for purposes of this analysis, those who fish more than one-quarter mile from an access point) experienced solitude and good trout fishing between Highways 28 and 76, except from June to early September when the water warmed and catch rates declined. Redeye bass fishing was excellent during this period and served to mitigate, in part, for some of the trout fishing trips lost annually due to warm weather. During these months there were some encounters between anglers and boaters (canoes and rafts), swimmers and tubers (at access points), contributing to a decrease in the experience of those enthusiasts for whom solitude is an integral part of their outdoor recreation experience.

The experience of solitude varies depending on the degree of naturalness (unmodified natural environment) in an area, the ease of access to that area, and the expected number of encounters with other individuals or groups in the area. In this analysis, the only factor that will vary the solitude experience of an enthusiast is the number of encounters with others. The other two variables (degree of naturalness and ease of access) remain constant.

Among trout fishermen, solitude appears to be most important to backcountry anglers. These anglers tend to fish  $\frac{1}{4}$  mile or more from access points and space themselves out along the river. These fishermen would be most affected by an increase in the number of encounters with other user groups, and in particular with boaters that might float into and through waters that are being fished, or that might require the angler to move within the river in order to allow boats to pass.

Angler access to the river and parking areas are limited and shared with other user groups such as campers and hikers. The majority of angling on the Chattooga occurs at or within close proximity to stocking access points (backcountry anglers seek a more remote experience away from these areas). In terms of angler numbers, the section from Burrells Ford to Highway 28 supports the highest use on the entire river, and within this section, the Burrells Ford area is the most popular (Rankin, pers. com.).

The Chattooga River above Highway 28 is managed today for a variety of angling experiences: the sections above Burrells Ford are managed for “wild trout” where catch and release is encouraged; the easily accessible Burrells Ford area is managed for “put and take;” the backcountry area between Burrells Ford and Reed Creek is managed “sub-adult put, grow and take;” Reed Creek to Highway 28 is managed “delayed harvest” catch and release November 1 through May 14; and the easily accessible section between Highway 28 and Long Bottom Ford is managed “put and take.” The Chattooga River now provides year-round fishing experiences for anglers seeking everything from backcountry and solitude to more accessible opportunities near roads where other people may be encountered.

## Whitewater Boating Experience

In 1976 the sections of the Chattooga Wild and Scenic River upstream from the Highway 28 Bridge were closed to boating (Federal Register 1976). In effect, paddling was zoned to the sections downstream of Highway 28, while trout angling and management was emphasized mostly upstream from the bridge.

The Chattooga above Highway 28 offers opportunities for a small sub-group (5-10%) of whitewater boaters sometimes referred to as “creekers.” “Creek” boating is a highly technical form of whitewater paddling that requires steep mountain rivers with high gradients. Generally, a part of the run will exceed 100 feet per mile (fpm) in gradient, with flow regimes typically between 100 to 500 cubic feet per second (cfs). In a typical “creeking” opportunity there are drops, vertical waterfalls, “tight and technical” water (small channel size, tight turns, short eddies), and at least one Class IV rapid.

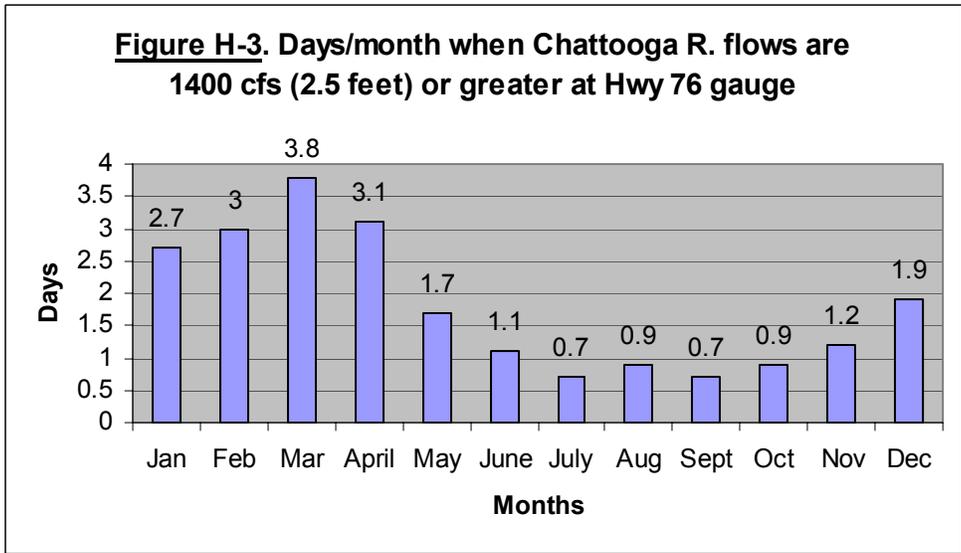
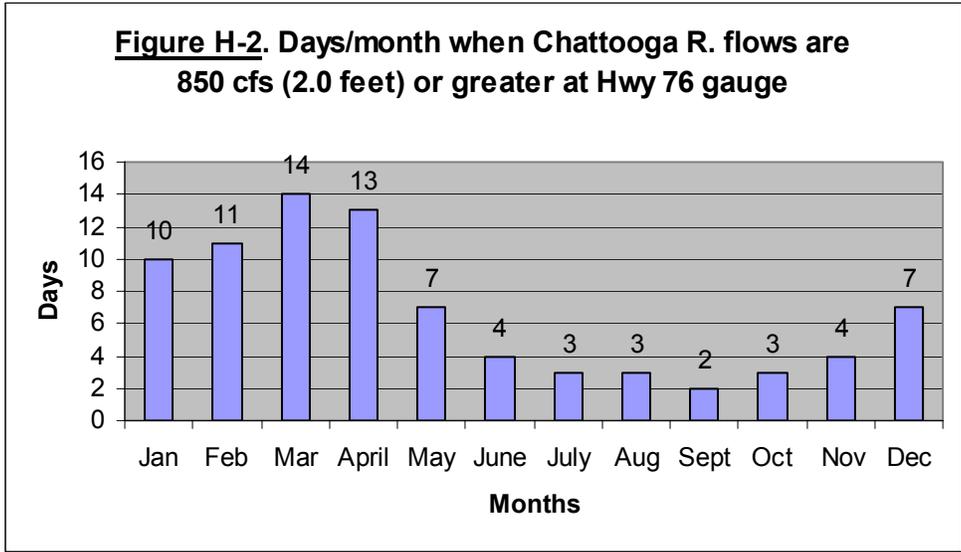
Because of their small size and low flow regimes, navigability of a “creek” is highly dependent on recent weather/moisture activity and is available for very short durations of time (creeks can rise, crest and start back down within a day or less). Many of the “creek” boaters using a particular area live within a relatively easy commute since use tends to be spontaneous and not planned in advance. Many of these boaters are well versed in the use of internet-based weather forecasting sites to better predict where a “creeking” opportunity might present itself (Kinney 1997).

“Creek” boaters usually travel in small groups of 2-6 boaters and are highly skilled in negotiating challenging whitewater. They tend to use the latest in high performance equipment specifically designed for “creeks,” and are generally trained and equipped in safety procedures and self-rescue techniques. Watercraft would likely include open canoes, decked canoes, kayaks, and high performance inflatable kayaks. This user group does not generally camp from their boat during a run because the weight of the camping gear would at best impair paddling performance (for that matter, they usually would not carry much at all with them due to performance concerns). On the Chattooga above Highway 28 boaters would be expected to access the river primarily by using existing river access points at Grimshawes, Bull Pen, and Burrells Ford. Another likely put-in site that would require a short portage is from the end of Big Bend Road accessing the **BF-28** section just above Big Bend Falls.

The Chattooga above Highway 28 is considered a “creek” boating opportunity primarily because all three sections have steep gradients, Class IV and V rapids, drops, waterfalls, and are navigable only during discreet high water events of relatively short duration. As “creeking” opportunities go, the section from Grimshawes to Bull Pen Bridge (**GS-BP**) would likely be the most difficult and would require the most water (2.5 feet or higher at the Highway 76 bridge). The section from Bull Pen Bridge to Burrells Ford (**BP-BF**) is considerably less difficult and less dangerous than nearby Overflow Creek, making it accessible to a less highly skilled boater. Finally, the section from Burrells Ford to Highway 28 (**BF-28**) falls somewhere in between the other two sections. It is longer than the other two and has a great deal of flat water to paddle below Rock Gorge. It also

requires lower water levels than the upper two. It is longer than Overflow and provides a more remote experience.

These sections would generally become floatable when water levels measure between 2.0 (850 cfs) and 2.5 feet (1400 cfs) at the Highway 76 gauge (except **GS-BP**). USGS average daily flow data for the past 62 years shows an average of 81 days per year when the Highway 76 gauge measures 2.0 feet or higher (Figure H-2). More than 50% of these days fall between December 1 and March 31 of an average year. At the 2.5 level or higher, the USGS data shows fewer boatable days available - an average of 22 per year (Figure H-3).



As is the case with anglers, there is much value added to the boating experience by the remote and natural setting of the Chattooga upstream from Highway 28 (refer to the Scenery and Fishing Experience sections above). Demand for these settings is increasing in the rapidly developing Southeast.

## **Wilderness**

The Ellicott Rock Wilderness was designated by Congress in 1975 and today has a total of 8,271 acres in Georgia, North Carolina and South Carolina. It is the only Wilderness lying in three states. Designation as a wilderness markedly increased visitation, most of which occurs within the river corridor. Opportunities to experience solitude in the river corridor are becoming more difficult because of this concentration of use. The Ellicott Rock Wilderness encompasses a 5.2 mile section of the Wild and Scenic Chattooga River between Bull Pen Bridge and Burrells Ford Bridge (**BP-BF**). Although the area is rugged and mountainous, trails accessing the Chattooga are relatively easy since they are primarily downhill to the river, but conversely, they are more strenuous coming out. Day hiking, backpacking and angling constitute the primary human use.

Trails within the Wilderness include the Chattooga Trail, which follows the river upstream from Burrells Ford for approximately 3.5 miles and terminates at a point about ¼ mile north of the Ellicott Rock survey marker within North Carolina. From that point the Ellicott Rock Trail travels 3.5 miles west away from the river to a trailhead on Bull Pen Road, and the Fork Mountain Trail travels 7.5 miles east to the Sloan Bridge Picnic Area on SC Highway 107.

Additionally, most of the primitive/undeveloped camping in Ellicott Rock occurs along the river. Rivers tend to be human attractors. People enjoy the sound of water, views, and the ease of access to the water itself. For a broader discussion on Wilderness, refer to the “Wilderness and Roadless Areas” section in Chapter 3 of the Sumter Draft Environmental Impact Statement.

## **Other Dispersed Recreation Activities**

This section captures the remaining dispersed recreation activities occurring along the Chattooga River upstream of Highway 28 not covered in the earlier sections: hiking, backpacking, hunting, and primitive camping.

Trails where the above user groups may encounter and possibly be disturbed by the presence of boaters are found along the main stem of the Chattooga. Included among these is the Chattooga Trail, which follows the river upstream for approximately 16 miles from Highway 28 to a point about ¼ mile north of the Ellicott Rock survey marker in North Carolina (the Foothills Trail overlaps the Chattooga Trail for approximately 7 miles from Lick Log Creek north to a point near King Creek and the Burrells Ford Road). The Chattooga Trail is heavily used by hikers, backpackers and anglers, a majority, if not

all, of whom seek solitude during their visit to the river corridor. The other trail, entirely within North Carolina, follows the river from Bull Pen Bridge upstream for approximately 3 miles and then turns away from the river in a northwesterly direction.

Several undeveloped/primitive campsites are found all along the river near the trails. Also, the popular Burrells Ford Walk-in Campground is located approximately ½ mile south of Burrells Ford. The site is a little more developed than the traditional primitive sites along the river (includes toilets), but still requires a ½ mile walk to access the site. The facility has several campsites, some of which are located immediately adjacent the Chattooga.

The river is the primary attraction of the trails and sites in the corridor, where visitors look to commune with nature and the river, view the gorges and rapids, take a dip in the cool water, and experience solitude. Opportunities to experience the latter are becoming a rarity.

## **Safety**

The Chattooga River drops approximately 1,500 feet in elevation within the 20 miles from Grimshawes Bridge downstream to the Highway 28 Bridge. The river has an ever-changing bottom ranging from accumulations of sand and sediments to a rough and rocky bottom with a substantial distribution of large and irregularly shaped boulders within its banks. Downed trees may also be present, particularly in the narrower sections in the upper reaches. Removal of these trees would not be compatible with the Wilderness designation. Whereas the combination of these attributes with recreational use results in inherent risks to the user, some users consider it as part of the experience defined by the challenge, adventure and satisfaction from knowing that natural dangers have been successfully negotiated.

Since 1970 there have been thirty-nine fatalities on the Chattooga River. Thirty-one of these were directly or indirectly associated with floating. All but one of these floating fatalities were self-guided boaters, the other one being a guide on a commercially guided training trip. Ten fatalities are known to be associated with the use of rafts, nine with kayaks, four with canoes, two with inner tubes, and one with an inflatable kayak.

The Forest Service promotes safety on the river in a variety of ways including the requirement to use protective equipment in certain sections; by prohibiting some kinds of craft in some sections; by restricting paddling alone in some sections; by posting pertinent information on maps, brochures, websites, and signs.

## **Search and Rescue**

The states have delegated authorities for search, rescue and recovery activities on the Chattooga River to local Sheriff's departments. The Forest Service cooperates in search,

rescue and recovery efforts with local Sheriffs, Search and Rescue organizations, the South Carolina Department of Natural Resources (DNR), Outfitter/Guide Companies, and other entities under a Memorandum of Understanding that defines authorities, roles, responsibilities, and operating procedures.

According to Andrew Pickens Ranger District staff (Borgen, pers. com.), a range of five to ten search and rescue operations are conducted each year associated with boaters on the Chattooga River. Most deal with self-guided boaters, the majority of which are not very highly impactful (i.e. generally associated with people who do not return from a trip at the originally scheduled time). However, a small number of these operations can be and are generally associated with fatalities or accessing and transporting injured persons from remote areas. Since January of 1993, seven fatalities were associated with boating while four were associated with hiking or swimming.

## **ENVIRONMENTAL/SOCIAL CONSEQUENCES - RECREATION**

### **Scenery**

#### **Alternative B, D, F and I – No Action**

##### **Direct and Indirect**

All river users would continue to experience the river above Highway 28 in its natural, free-flowing state, without roads or development alongside it. The character of the river is ever-changing as natural processes occur, trees fall, rocks shift, and water levels fluctuate. As use of the corridor continues to grow, indirect effects including litter, trampling of understory vegetation, human waste, and burning of downed wood at isolated locations (e.g. primitive campsites) would be mitigated to protect the resources and the experiences. These effects would tend to be focused from Highway 28 upstream to the Ellicott Rock survey marker, an area of the river that is trailed and heavily used by hikers, backpackers and anglers.

##### **Cumulative**

Probable future actions include the reconstruction of the Highway 28 Bridge and the paving of Burrells Ford Road and associated parking near the Burrells Ford Bridge. There are no plans to increase parking capacity or access points in order to help limit future use in the area. These actions would cause a short-term, localized impact to scenery. Considering these activities, there are no current or foreseeable activities that would cause any cumulative effects to scenery.

## **Alternatives E and A**

### **Direct and Indirect**

A greater number of river users would experience the river above Highway 28 in its natural, free-flowing state, without roads or development alongside it. The character of the river is ever-changing as natural processes occur, trees fall, rocks shift, and water levels fluctuate. There may be additional visual impacts than in Alternatives B, D, F and I since there is a new user group in the mix. As use of the corridor grows, indirect effects including litter, trampling of understory vegetation, human waste, and burning of downed wood at isolated locations (e.g. primitive campsites, put-ins, take-outs, portages, and lunch stops) would be mitigated to protect the resources and the experiences. These effects would tend to be focused from Highway 28 upstream to the Ellicott Rock survey marker, an area of the river that is trailed and heavily used by hikers, backpackers, anglers, and now boaters.

### **Cumulative**

Probable future actions include the reconstruction of the Highway 28 Bridge and the paving of Burrells Ford Road and associated parking near the Burrells Ford Bridge. There are no plans to increase parking capacity or access points in order to help limit future use in the area. These actions would cause a short-term, localized impact to scenery. Considering these activities, there are no current or foreseeable activities that would cause any cumulative effects to scenery.

## **Fishing Experience and Fisheries Management**

### **Alternative B, D, F and I – No Action**

#### **Direct and Indirect**

There would be no changes in fisheries management or fishing experience under these alternatives. The zoning that has been in place for over 25 years will continue to mitigate potential conflicts between boaters and other dispersed recreation users. Boating would continue to be restricted in the 21 river miles upstream of the Highway 28 Bridge, but would still occur downstream to Tugaloo Lake. Anglers would continue to experience high quality fishing opportunities enhanced by the remote settings and solitude that are such an integral part of the Chattooga experience.

#### **Cumulative**

No cumulative effects to the fishing experience or fisheries management would be expected under these alternatives.

## **Alternative E**

Under this alternative, the river from NC Road 1107 (Grimshawes Bridge) downstream to the Highway 28 Bridge would be open to boating year-round at all water levels. The analysis assumes that most boating would be precluded naturally (self-regulating) in the section from Grimshawes Bridge to Bull Pen Bridge until water levels reach 2.5 feet (1400 cfs) or higher at the Highway 76 gauge. In the two lower sections (Bull Pen - Burrells Ford, and Burrells Ford - Highway 28) it is assumed that most boating would be precluded until water levels reach 2.0 feet (850 cfs) or higher at the Highway 76 gauge. However, not all boaters will conform to the water level assumptions in this analysis. Some may attempt to float the river at lower levels (this is particularly true below the Burrells Ford Bridge). Additionally, improved technology and equipment in the future may facilitate low water boating.

### **Direct and Indirect**

Relying upon historical weather data gathered from 1939 to 2001, the **Grimshawes Bridge to Bull Pen Bridge (GS-BP)** section is expected to have an average of 22 days per year available for boating (see Figure H-3 below). Of these, an average of 8 days occur between December and February. Of the 14 days remaining, about 6 (40% of 14) would most likely occur on weekends and holidays.

This section is expected to have the lowest boating use of all the three sections above Highway 28, in part because it is expected that there will be fewer available days for boating, on average, and in part because of its inherent technical difficulty and smaller size.

This section also appears to have the lowest angler use of the three sections. Although data from Georgia and South Carolina DNR angler surveys is not conclusive (Table H-2), it appears to suggest that fishing declines significantly at flows of 2.5 feet (1400 cfs) or higher as measured at the Highway 76 gauge. Therefore, the potential for undesired encounters between anglers and boaters is most likely lowest in the **GS-BP** section.

*Table H-2. Results from the 1987 GA DNR Roving Angler Survey and the 1998-99 SC DNR Angler Survey (near stocking points)*

Survey	Flows at Hwy 76 gauge (ccs)	Number of Survey days	Percent Survey days	Total Number of Anglers	Percent Anglers	Average Number of Anglers per Survey day
1987	<850	167	87%	303	87%	1.8
	850-1400	23	12%	44	13%	1.9
	>1400	3	2%	0	0%	0.0
	<b>TOTAL</b>	<b>193</b>		<b>347</b>		<b>1.8</b>
1998-99	<850	33	70%	469	67%	14.2
	850-1400	11	23%	217	31%	19.7
	>1400	3	6%	16	2%	5.3
	<b>TOTAL</b>	<b>47</b>		<b>702</b>		<b>14.9</b>

The GA DNR Study was conducted between Ellicott Rock and Big Bend Falls, and the SC DNR Study was conducted near stocking points within the **BF-28** section.

*Table H-3. Average Annual (1939-2001) Days available for Boating by Alternative and River Section derived from USGS mean daily flow data at the Highway 76 gauge on the Chattooga River*

Alternative	Stream Section	Boatable days available per year	Subset of Boatable days - Dec through March	Subset of Boatable days - April through Nov	Subset of Boatable days falling on weekends/holidays - April through Nov
<b>B,D,F,I</b>	<b>GS-BP</b>	0	0	0	0
	<b>BP-BF</b>	0	0	0	0
	<b>BF-28</b>	0	0	0	0
<b>E</b>	<b>GS-BP</b>	22	11	11	4
	<b>BP-BF</b>	81	42	39	16
	<b>BF-28</b>	81	42	39	16
<b>A</b>	<b>GS-BP</b>	0	0	0	0
	<b>BP-BF</b>	0	0	0	0
	<b>BF-28</b>	11	11	0	0

**GS-BP** = Grimshawes to Bull Pen Bridge; **BP-BF** = Bull Pen to Burrell's Ford Bridge; **BF-28** = Burrells Ford to Highway 28

Correspondingly, when compared to the other two sections above Highway 28 (**BP-BF** and **BF-28**), the potential for undesired encounters between anglers and boaters at access points (Grimshawes and Bull Pen Bridge) is most likely lowest in this section.

The **Bull Pen Bridge to Burrells Ford (BP-BF)** section is expected to have an average of 81 days per year available for boating (see Figure H-2 above). Of those, an average of 22 occur at the 2.5 level or higher, leaving 59 days where the potential for undesired encounters between anglers and boaters would most likely be highest (since trout fishing is expected to decline significantly at the 2.5 foot level or higher at the Highway 76 gauge).

Of the 59 days remaining in an average year, most of the potential undesired encounters between anglers and boaters would be expected on the 39 days falling between March and November, and of these, the highest potential would be on the 16 days (40% of 39) attributed to weekends and holidays spread over the 9-month period.

This section is expected to have higher boating use than the **GS-BP** section, in part because there would likely be more days available for boating, and in part because the section is not deemed as technical.

Angler use in this section is also expected to be higher than the **GS-BP** section, especially near the Burrells Ford area. In the GA DNR survey, backcountry anglers used 57% of survey days falling between 2.0 and 2.5 feet at the Highway 76 gauge, while 100% of the SC DNR survey days conducted near stocking points at the same water levels were fished. Therefore, potential encounters between anglers and boaters is likely on the 59 days per year that would most likely be available for boating between 2.0 and 2.5 feet. This does not account for boaters who may attempt to float the river at lower levels, or for changes in equipment and technology that facilitate this action.

Correspondingly, potentially undesirable encounters between anglers and boaters at access points in this section will most likely be higher than in the **GS-BP** section. Most encounters would probably occur at Burrells Ford (particularly between 2.0 and 2.5 feet at the Highway 76 Bridge).

The **Burrells Ford to Highway 28 (BF-28)** section is also expected to have an average of 81 days per year available for boating (see Figure H-2 above). As in the **BP-BF** section, an average of 22 days will probably occur at the 2.5 level or higher, leaving 59 days where the potential for encounters between anglers and boaters would most likely be the highest.

Of the 59 days remaining in an average year, most of the potential for undesired encounters between anglers and boaters would be expected on the 39 days falling between March and November, and of these, the highest potential would be on the 16 days (40% of 39) attributed to weekends and holidays spread over the 9-month period.

This section is expected to have higher boating use than the **BP-BF** section because it is the lowest and widest of the three sections, and is likely to have more opportunities for boating below the 2.0-foot threshold.

Angler use is expected to be higher than in the **BP-BF** section also, especially in the Burrells Ford and Highway 28 areas. This is due to the intensive fisheries management

program in this section (see “Affected Environment” section). Therefore, the number of days per year when anglers might potentially encounter and be disturbed by boaters would be greater than in the **BP-BF** section. Again, this does not account for boaters who may attempt to float the river at lower levels, or for changes in equipment and technology that facilitate this action.

Although the GA and SC DNR survey data is not conclusive, the primary difference in angler use between the **BP-BF** and **BF-28** sections appears to be the anglers fishing near stocking areas. This group is heavily concentrated in the **BF-28** area.

Undesired encounters between anglers and boaters at access points are expected to be higher than in the **BP-BF** section. Most of this interaction would probably occur at Burrells Ford (particularly between 2.0 and 2.5 feet at the Highway 76 Bridge). Highway 28 Bridge would most likely be the next highest in terms of interactions, while Big Bend Road would be the least since it is not a stocking point and not as many anglers congregate there.

## Summary

As discussed above, encounters between anglers and boaters will occur under this alternative, many of which may be undesired by one or both users. Because a significant number of these encounters may be undesired, user conflicts are very likely to result. They may occur when boaters pass directly through areas being actively fished where a broken line, entanglement or other interference with the fishing activity takes place. Conflicts can also occur when an actual encounter (visual or auditory) brings about a loss of solitude. The **BP-BF** and **BF-28** sections appear to have the highest likelihood for conflict.

Similarly, conflicts might arise between anglers and boaters at access points from competition for limited parking, or when boaters congregate at the put-in or take-out and actually interfere with or otherwise disturb the fishing activity. Potential for these types of conflicts appear to be highest at Burrells Ford Bridge, followed by Highway 28.

Also, as mentioned earlier, not all boaters will conform to the water level assumptions in this analysis. Some may attempt to float the river at lower levels (this is particularly true below the Burrells Ford Bridge). Additionally, improved technology and equipment in the future may facilitate low water boating, and could thereby increase the number of undesired encounters and the potential for conflict.

From a solitude standpoint, backcountry anglers would most likely be the group whose experience would be most negatively affected from undesired encounters with boaters (Durniak and Keefer, pers. com). This is because most of these anglers prefer to commune with nature and experience their activity apart from other users, especially those users whose activities have the potential to disturb or conflict with their desired

experience. A group of boaters would almost certainly be an intrusion to their experience, particularly if the angler were wading. As the number of daily encounters increases, the greater the impact to the solitude experience – not to mention the potential for interfering with the fishing activity itself. These types of encounters would be expected to increase in the future through natural growth of both activities, and also as the greater boating public discovers this new opportunity on the nationally renowned Chattooga River. As a result of undesired encounters and the potential for conflict, it is very likely that displacement of some of the anglers may also ensue.

In a recent study of anglers who are members of the Rabun and Chattooga River Chapters of Trout Unlimited (Bixler and Backlund 2002), most respondents indicated that if the Chattooga were not able to meet their desired experience for whatever reason, they would likely select another river to secure that experience rather than selecting another activity. Fifty-one percent of the respondents indicated that they had between one and three substitutes, while thirteen percent indicated that they had no substitute for the Chattooga. The three most frequently listed rivers that were considered acceptable substitutes for the Chattooga are the Davidson, Nantahala, Tuckaseegee, and Chauga Rivers.

### **Cumulative**

Burrells Ford Road may be improved/paved in the near future. If so, indiscriminate parking near the river (on high use weekends) will be mitigated by road design features and designated parking spaces. This may cause parking to be even more of a premium, especially on those days when angling and boating activities have the highest potential to overlap.

### **Alternative A**

#### **Direct and Indirect**

Under this Alternative, boating would be allowed from Burrells Ford downstream to the Highway 28 Bridge from December 1 through March 31 at water levels measuring or exceeding 2.5 feet (1400 cfs) at the Highway 76 gauge.

According to USGS average daily flow data for the past 62 years, an average of 11.4 days are available for boaters at the 2.5 level or higher (see Figure H-3 above) between December 1 and March 31. Of these, about 5 days (40%) would be expected to fall on weekends or holidays. However, since enforcement of the 2.5 foot level is expected to be difficult, at best, it can be expected that some boating will occur on dates before 12/1 and/or after 3/31 and at levels less than 2.5 feet during the 12/1 through 3/31 time period. Despite this unlawful use, overall boating use under this alternative is expected to be less than is expected for the **BF-28** section under Alternative E (Table H-3). This is because, according to historical data, there would most likely be fewer available days for boating,

and because those days would most likely occur from December through March, during the colder months of the year.

Angler use at this time of year and at the specified water levels is also expected to be relatively low in comparison to other periods of time throughout the year. Although the angler survey data (GA DNR 1987, and 1998-99 SC DNR) is not conclusive, it appears to suggest that trout fishing in the **BF-28** section declines at flows of 2.5 feet or higher as measured at the Highway 76 gauge.

The 1998-99 SC DNR survey (targeting anglers fishing within ¼ mile of stocking points) reported 16 anglers on one of the three random survey days where flows were 2.5 feet or higher (the other two survey days reported zero). The SC DNR data appears to suggest that these anglers may be more responsive to stocking times than to actual water levels (at least at levels slightly over 1400 cfs and below).

Encounters between anglers and boaters will likely occur under this alternative. A significant number of these encounters may be undesired and could lead to conflicts, especially during the mid-February through March time period, as stated earlier. Undesired encounters could lead to conflicts. The highest potential for conflict would most likely be present at access points. Conflicts could arise here from competition for limited parking, or when boaters congregate at the put-in or take-out and actually interfere with or otherwise disturb the fishing activity. Potential for undesired encounters and possible conflicts appear to be highest at Burrells Ford Bridge, followed by Highway 28.

Also, as discussed earlier, not all boaters will comply with the stipulated time period and 2.5 foot threshold because of difficulties with enforcement and implementation. Noncompliance would increase the potential for encounters, thereby increasing the potential for disturbances and conflict.

In a recent study of anglers who are members of the Rabun and Chattooga River Chapters of Trout Unlimited (Bixler and Backlund 2002), most respondents indicated that if the Chattooga were not able to meet their desired experience for whatever reason, they would likely select another river to secure that experience rather than selecting another activity. Fifty-one percent of the respondents indicated that they had between one and three substitutes, while thirteen percent indicated that they had no substitute for the Chattooga. The three most frequently listed rivers that were considered acceptable substitutes for the Chattooga are the Davidson, Nantahala, Tuckaseegee, and Chauga Rivers. In summary, encounters between anglers and boaters (and consequently the potential for conflict) appear to be less than in the **BF-28** section under Alternative E.

### **Cumulative**

Burrells Ford Road may be improved/paved in the near future. If so, indiscriminate parking near the river (on high use weekends) will be mitigated by road design features

and designated parking spaces. This may cause parking to be even more of a premium, especially on those days when angling and boating activities have a higher potential to overlap (most likely when the “put and take” program starts sometime between mid-February and March, as stated earlier).

## **Whitewater Boating Experience**

### **Alternatives B, D, F, and I**

#### **Direct and Indirect**

Under these alternatives, boating would continue to be restricted in the 21 miles of river upstream of the Highway 28 Bridge, along the main stem of the Chattooga. Boating would still occur downstream to Tugaloo Lake, while “creek-boating” would still occur on other rivers and tributaries in the area. Some of these waters include the French Broad, Big Laurel, Thompson, Wilson Creek, Linville Gorge, Cullasaja, Horsepasture, Santeetlah, and multiple runs of the Pigeon in North Carolina; the Tallulah, Conesauga, and Mill Creek in Georgia, along with Big Creek, Holcombe, Overflow and Stekoa in the Chattooga watershed itself; and the Chauga, Brasstown, and Whitewater in South Carolina.

#### **Cumulative**

No cumulative impacts have been identified.

### **Alternative E**

#### **Direct and Indirect**

Under this alternative, the river from NC Road 1107 (Grimshawes Bridge) downstream to the Highway 28 Bridge would be open to boating year-round at all water levels. However, boating is assumed to be precluded naturally (self-regulating) in the section from Grimshawes Bridge to Bull Pen Bridge until water levels reach 2.5 feet (1400 cfs) or higher at the Highway 76 gauge. In the two lower sections (Bull Pen - Burrells Ford, and Burrells Ford - Highway 28) boating is assumed to be precluded naturally until water levels reach 2.0 feet (850 cfs) or higher at the Highway 76 gauge. However, not all boaters will conform their activities to the water level assumptions provided in this analysis.

The Grimshawes to Bull Pen Bridge section (**GS-BP**) will likely be less popular than the lower two sections because it is considered more difficult by most boaters and requires more water to navigate. Based on historical weather data, this section averages 22 days per year available for boating (Table H-3).

The Bull Pen Bridge to Burrells Ford section (**BP-BF**) arguably offers the most favorable combination of characteristics for a variety of boaters and will likely be the most popular of the three-headwater sections. This section is considered a “creeking” opportunity, but is considered less difficult and less dangerous than nearby Overflow Creek, making it accessible to less skilled boaters. Based on historical weather data, this section averages 81 days per year available for boating (Table H-3).

The Burrells Ford to Highway 28 section (**BF-28**) falls somewhere in between. It is longer and more remote than the upper two sections and Overflow Creek. It is considered more difficult than the **BP-BF** section due to Big Bend Falls and the Rock Gorge section, but less demanding than Overflow Creek. This section has the capacity to be used at lower water levels in comparison to the upper sections. Based on historical weather data, it has an average of 81 days available for boating per year (Table H-3).

Competition for parking may be an issue when angling and boating activities, as well as other non-boating activities have the potential to overlap.

### **Cumulative**

Burrells Ford Road may be improved/paved in the near future. If so, indiscriminate parking near the river (on high use weekends) will be mitigated by road design features and designated parking spaces. This may cause parking to be even more of a premium, especially on those days when angling, boating, and other activities have the potential to overlap.

### **Possible Mitigation Measures**

- Sign river access points appropriately to discourage less experienced boaters, especially at Burrells Ford Bridge access. Signs should not market the activity, but properly warn potential boaters. Website and brochure information should also be developed that warns about the dangers without encouraging use.
- Do not provide additional facilities that might otherwise encourage this use.

### **Alternative A**

#### **Direct and Indirect**

Under this Alternative, boating would be allowed from Burrells Ford downstream to the Highway 28 Bridge from December 1 through March 31 at water levels measuring or exceeding 2.5 feet (1400 cfs) at the Highway 76 gauge. According to USGS average daily flow data for the past 62 years, this translates into an average of 11.4 days per year

that would be available for “creekers” (Figure H-3 and Table H-3) December through March.

When compared to Alternative E, historical weather data indicates that, on average, there are fewer opportunities in terms of potential days available for boating. In addition, as compared to Alternative E, the diversity of settings in which to conduct the activity (both temporal and spatial) will be less.

Competition for limited parking at Burrells Ford is not expected to be a significant issue between December and March at the 2.5 water level or higher.

### **Cumulative**

Cumulative effects are not as pronounced as under Alternatives B, D, F, and I since some days will be made available for boating in the **BF-28** section.

### **Possible Mitigation Measures**

- Sign river access points appropriately to discourage less experienced boaters, especially at Burrells Ford Bridge access. Signs should not market the activity, but properly warn potential boaters. Website and brochure information should also be developed that warns about the dangers without encouraging use.
- Do not provide additional facilities that might otherwise encourage this use.

## **Wilderness**

### **Alternatives B, D, F, and I**

#### **Direct and Indirect**

There would be no changes in wilderness management or wilderness experience under these alternatives. Boating would continue to be restricted in the 21 miles of river upstream of the Highway 28 Bridge, but would still occur downstream to Tugaloo Lake. The primary attraction to the Ellicott Rock Wilderness is the Chattooga River itself. Most of the use in the wilderness is concentrated along the river corridor, where opportunities to experience solitude have become increasingly difficult.

Even though limited access and parking would continue to be a problem in meeting demand, these conditions would also serve to mitigate overuse impacts on natural resources, the quality of the remote experiences, and solitude.

## **Cumulative**

No cumulative effects to wilderness experience or wilderness management have been identified under these alternatives.

## **Alternative E**

### **Direct and Indirect**

Under this alternative, the section of river encompassed by the Ellicott Rock Wilderness (**BP-BF**) would be open to boating year-round at all water levels. However, most boating would not be expected to occur until water levels reach 2.0 feet (850 cfs) or higher at the Highway 76 gauge. This translates into an average of 81 days available for boating in an average year (Table H-3). Of those days, 35% would be expected to occur December through February when hiking and backpacking use in the Ellicott Rock Wilderness is low (refer to the “Fishing Experience and Fisheries Management” section above for a discussion of the impacts of boaters on backcountry anglers). Therefore, it is the average of 53 days available for boating between March and November (Figure H-2), and of those, the 21 or so expected to fall on weekends and holidays that appear to have the greatest potential to impact the solitude experience of wilderness users. These impacts could be significant since opportunities to experience solitude have become increasingly difficult in the corridor, even without the introduction of a new user group. This does not account for additional boaters who may attempt to float the river at lower levels, or for changes in equipment and technology that facilitate this action.

In the Ellicott Rock Wilderness, boater group size would be restricted to a maximum of 12 craft and 12 boaters.

As discussed above, boaters would not be expected to camp from their craft while using the river since the weight of the camping gear would at best impair paddling performance on the technical water. They would be expected to float from put-in to take-out and stay on the river or on the riverbanks during the entire trip. Therefore, vegetation loss, soil compaction and erosion impacts from boaters are not expected to be significant in the Ellicott Rock Wilderness.

## **Cumulative**

Burrells Ford Road may be improved/paved in the near future. If so, indiscriminate parking near the river (on high use weekends) will be mitigated by road design features and designated parking spaces. This may cause parking to be even more of a premium, especially on those days when hiking, backpacking, angling, boating, and other activities are likely to overlap (on an average of 39 days April through November, and especially on the 16 days expected to fall on weekends and holidays within that period).

## **Alternative A**

### **Direct and Indirect**

Under this Alternative, as in Alternatives B, D, F, and I, boating would not be allowed from Bull Pen Bridge downstream to Burrells Ford. There would be no changes in wilderness management or wilderness experience under these alternatives. Boating would continue to be restricted in the 5.7 miles of river between Bull Pen Bridge and Burrells Ford.

The primary attraction to the Ellicott Rock Wilderness would continue to be the Chattooga River itself. Most of the use in the wilderness is concentrated along the river corridor, where opportunities to experience solitude have become increasingly difficult.

Even though limited access and parking would continue to be a problem in meeting demand, these conditions would also serve to mitigate overuse impacts on natural resources, the quality of the remote experiences, and solitude.

### **Cumulative**

There should be no cumulative effects to wilderness experience or wilderness management under these alternatives.

## **Other Dispersed Recreation Activities**

### **Alternatives B, D, F, and I**

#### **Direct and Indirect**

There would be no changes in the experiences of hikers, backpackers, hunters and primitive campers under these alternatives. Boating would continue to be restricted in the 21 miles of river upstream of the Highway 28 Bridge, but would still occur downstream to Tugaloo Lake.

The primary attraction to the area is the Chattooga River itself. Most of the use is concentrated along the river, where opportunities to experience solitude have become increasingly difficult.

## **Cumulative**

There should be no cumulative effects to hikers, backpackers and primitive campers under these alternatives.

## **Alternative E**

### **Direct and Indirect**

Under this alternative, the river from NC Road 1107 (Grimshawes Bridge) downstream to the Highway 28 Bridge would be open to boating year-round at all water levels. However, most boating use is expected to be precluded naturally in the section from Grimshawes Bridge to Bull Pen Bridge (**GS-BP**) until water levels reach 2.5 feet (1400 cfs) or higher at the Highway 76 gauge. In the two lower sections (**BP-BF**, and **BF-28**) most boating would not be expected to occur until water levels reach 2.0 feet (850 cfs) or higher at the Highway 76 gauge. However, not all boaters will conform their activities to the water level assumptions in this analysis. Some may attempt to float the river at lower levels. Improved technology and equipment may also facilitate floating the river below the level assumptions in the future.

The **Grimshawes Bridge to Bull Pen Bridge (GS-BP)** section would have probably an average of 22 days per year available for boating (see Figure H-3 above). Of those, 35% would most likely fall between December and February when hiking, backpacking and primitive camping use is relatively low. Therefore, it is the average 14 days available for boating between March and November (Figure H-3), and of those, the 6 or so expected to fall on weekends and holidays that appear to have the greatest potential to impact the solitude experience of these user groups.

As discussed earlier, this section is expected to have the lowest boating use of all the three sections of the Chattooga above Highway 28. This is also expected to be the case for hiking, backpacking and primitive camping.

The **Bull Pen Bridge to Burrells Ford (BP-BF)** section would have an expected average of 81 days per year available for paddling (see Figure H-2 and Table H-3). Of those, 35% would be expected to occur December through February when hiking, backpacking and primitive camping use in the Ellicott Rock Wilderness is low. Therefore, it is the average 53 days available for boating between March and November (Figure H-2), and of those, the 21 or so expected to fall on weekends and holidays that have the greatest potential to impact the solitude experience of these user groups.

As mentioned in the Wilderness section above, these impacts could be significant since opportunities to experience solitude have become increasingly difficult in this part of the corridor, even without the introduction of a new user group. This does not account for boaters who may attempt to float the river at lower levels, or for changes in equipment and technology that facilitate this action.

As discussed earlier, higher boating use would be expected in this section, although boater group size would be restricted to a maximum of 12 craft and 12 boaters within the wilderness. Use is also expected to be higher for hiking, backpacking and primitive camping.

On average, the **Burrells Ford to Highway 28 (BF-28)** section would be expected to have the same number of days available for boating as the **BP-BF** section. However, actual boating use is expected to be higher because this section is lower on the river and wider, and is likely to have more opportunities for boating below the 2.0-foot threshold. Hiking and backpacking use are expected to be about the same as the **BP-BF** section, while primitive camping would likely be higher due to the popularity of the Burrells Ford Walk-in campground. Therefore, the addition of boating in this section would most likely result in a high likelihood of impacting the solitude experience of other dispersed recreation user groups. As mentioned earlier, these impacts could be significant since opportunities to experience solitude have become increasingly difficult along the river, even without the introduction of a new user group.

In all three sections boaters would not be expected to camp from their craft while using the river. This is because the weight of the camping gear would at best impair paddling performance on the technical water. They would in turn be expected to float from put-in to take-out and stay on the river or on the riverbanks during the entire trip. Competition for primitive campsites is expected to be minimal. The one exception would be the Burrells Ford Walk-in campground, especially when hiking, backpacking, and angling uses are likely to overlap with boating (on an average of 53 days March through November, and especially on the 21 days expected to fall on weekends and holidays within that period). Competition for parking at Burrells Ford would likely be an issue at these times also, and to a lesser extent, at Highway 28 and Big Bend Road.

### **Cumulative**

Burrells Ford Road may be improved/paved in the near future. If so, indiscriminate parking near the river (on high use weekends) will be mitigated by road design features and designated parking spaces. This may cause parking to be even more of a premium, especially on those days when hiking, backpacking, angling, boating, and other activities are likely to overlap (on an average of 39 days April through November, and especially on the 16 days expected to fall on weekends and holidays within that period).

### **Alternative A**

#### **Direct and Indirect**

Under this Alternative, boating would be allowed from Burrells Ford downstream to the Highway 28 Bridge from December 1 through March 31 at water levels measuring or

exceeding 2.5 feet (1400 cfs) at the Highway 76 gauge. According to USGS average daily flow data for the past 62 years, this translates into an average of 11.4 days per year that would be available for boaters (Figure H-3 and Table H-3) December through March. Of these, about 5 days (40%) would be expected to fall on weekends or holidays.

However, since enforcement of the 2.5 foot level is expected to be difficult, at best, it can be expected that some boating will occur on dates before 12/1 and/or after 3/31 and at levels less than 2.5 feet during the 12/1 through 3/31 time period. Despite this unlawful use, overall boating use under this alternative is expected to be less than is expected for the **BF-28** section under Alternative E (Table H-3). This is because, according to historical data, there would most likely be fewer available days for boating, and because those days would most likely occur from December through March, during the colder months of the year.

Competition for campsites at the Burrells Ford Walk-in campground, or for parking at Burrells Ford or Highway 28 would likely be an issue during this time period, particularly mid-February through March.

In summary, this section is expected to have less boating use than the **GS-BP** section under Alternative E (see Table H-3). Hiking, backpacking and primitive camping use is also expected to be low during this period, so the potential for undesired encounters and potential conflicts with boaters is expected to be less than in the **BF-28** section under Alternative E.

### **Cumulative**

Burrells Ford Road may be improved/paved in the near future. If so, indiscriminate parking near the river (especially on high use weekends) will be mitigated by road design features and designated parking spaces. This may cause parking to be even more of a premium on the 4 days, on average, available for boating in March (2 of which could fall on weekends or holidays), especially if these coincide with high use days for anglers.

## **Safety**

### **Alternatives B, D, F, and I**

#### **Direct, Indirect, and Cumulative**

Under these alternatives boating would continue to be restricted in the 21 miles of river upstream of the Highway 28 Bridge, but would still occur downstream to Tugalo Lake. There would be no changes expected in safety factors (direct, indirect or cumulative) on the river upstream of Highway 28 outside of what has been considered historical influences and trends.

## **Alternative E**

### **Direct, Indirect, and Cumulative**

Under this alternative, the Chattooga River from NC Road 1107 (Grimshawes Bridge) downstream to the Highway 28 Bridge would be open for boating year-round at all water levels. However, according to USGS average daily flow data for the past 62 years, section **GS-BP** would have an average of 22 days available for boating per year, while sections **BP-BF** and **BF-28** would each have an average of 81 days available (see Figures H-2, H-3 and Table H-3).

With an increase in the number of days available for boating under this alternative it is reasonable to assume that accidents, injuries and fatalities associated with boating would increase. There may also be accidents, injuries and fatalities associated with search and rescue personnel dispatched to boating incidents.

Lack of professionally guided trips may also contribute towards incidents that would otherwise be preventable. These situations could be mitigated if less experienced boaters had the option of securing professional services rather than venturing out on their own.

There are no current or foreseeable activities that would cause any cumulative effects to safety factor on the Chattooga Wild and Scenic River above Highway 28.

## **Alternative A**

### **Direct, Indirect, and Cumulative**

Under this alternative, boating would be allowed from Burrells Ford downstream to the Highway 28 Bridge from December 1 through March 31 at water levels measuring or exceeding 2.5 feet (1400 cfs) at the Highway 76 gauge. According to USGS average daily flow data for the past 62 years, this translates into an average of 11.4 days per year available to boaters December through March (Figure H-3 and Table H-3).

With an increase in the number of days available for boating under this alternative, it is reasonable to assume that accidents, injuries and fatalities associated with boating would also increase. There may also be accidents, injuries and fatalities associated with search and rescue personnel dispatched to boating incidents. However, since the days available for boating are fewer than in Alternative E, impacts to safety under this alternative are expected to be relatively less. Additionally, since boating is only available during the colder months (December through March), this would tend to inhibit boating by the less experienced and prepared boater.

Lack of professionally guided trips may contribute towards incidents that would otherwise be preventable. These situations could be mitigated if inexperienced boaters had the option of securing professional services rather than venturing out on their own.

There are no current of foreseeable activities that would cause any cumulative effects to safety factors on the Chattooga Wild and Scenic River above Highway 28.

## **Search and Rescue**

### **Alternative B, D, F and I**

#### **Direct, Indirect, and Cumulative**

Under these alternatives boating would continue to be restricted in the 21 miles of river upstream of the Highway 28 Bridge, but would still occur downstream to Tugaloo Lake. There would be no changes expected in search and rescue operations (direct, indirect or cumulative) on the river upstream of Highway 28 outside of what has been considered historical influences and trends.

### **Alternative E**

#### **Direct and Indirect**

Under this alternative, the Chattooga River from NC 1107 (Grimshawes Bridge) downstream to the Highway 28 Bridge would be open to boating year-round at all water levels. However, according to USGS average daily flow data for the past 62 years, section **GS-BP** would have an average of 22 days available for boating per year, while sections **BP-BF** and **BF-28** would each have an average of 81 days available (see Figures H-2, H-3 and Table H-3). This does not account for boaters who may attempt to float the river at lower levels, or for changes in equipment and technology that facilitate this action.

According to Andrew Pickens Ranger District staff (Borgen, pers. com.), a range of five to ten search and rescue operations per year are associated with boaters on the lower Chattooga. The majority of these operations deal with self-guided boaters. Since self-guided boater use has averaged around 25,000 per year, it would be reasonable to assume, all things equal, that the number of search and rescue operations would be comparably less above Highway 28 (because of the fewer number of days, on average, that may potentially be available for boating).

As a comparison, the section of Overflow Creek (a tributary of the West Fork of the Chattooga in Georgia) from USFS Road 86B to Overflow Creek Bridge (approximately 6 miles) is similar to sections of the Chattooga upstream from Highway 28, although considered by some to be a much more technical and difficult watercourse to navigate. It possesses several Class V rapids, very steep gradients, and the access into and out of the gorge is very difficult. However, Tallulah Ranger District Staff do not recall any reported search and rescue operations involving boaters on Overflow Creek in the last 14 years. On the other hand, the Chattooga main stem may be more of an attraction to less

experienced boaters as compared to Overflow Creek simply because of its name and renowned reputation.

Another possible proxy is the section of the Tallulah Gorge (fed by dam releases) opened to boaters in 1997 and managed by the Tallulah Gorge State Park in Georgia. This is also considered a “creeking” opportunity with difficult access in and out of the gorge. According to State Park staff, no known search and rescue efforts have been undertaken since the river opened to boaters.

When search and rescue operations do occur, a majority of them are not very highly impactful (Borgen, pers. com.) and are generally associated with people who do not return from a trip at a previously scheduled time. However, a small number of these operations do involve accessing and transporting injured persons and/or fatalities from remote areas. If and when these rescue operations are required above Highway 28, pockets of inaccessible ground in those sections could make the operation very difficult and costly (e.g. Chattooga Cliffs in the **GS-BP** section and the Rock Gorge in the **BF-28** section). There is also inherent risk to the search and rescue workers, and at times there are environmental impacts from the operations themselves (e.g. use of ATV’s and other specialized equipment to extract fatalities or the injured, opening up closed roads, warming fires, wilderness impacts, etc.).

### **Cumulative**

There are no current or foreseeable activities that would cause any cumulative effects to search and rescue operations on the Chattooga Wild and Scenic River above Highway 28.

### **Possible Mitigation Measures**

- Sign river access points appropriately to discourage less experienced boaters, especially at Burrells Ford Bridge access. Signs should not market the activity, but properly warn potential boaters. Website and brochure information should also be developed that warns about the dangers without encouraging use.
- Do not provide additional facilities that might otherwise encourage this use.

## **Alternative A**

### **Direct and Indirect**

Under this alternative, boating would be allowed from Burrells Ford downstream to the Highway 28 Bridge from December 1 through March 31 at water levels measuring or exceeding 2.5 feet (1400 cfs) at the Highway 76 gauge. According to USGS average daily flow data for the past 62 years, this translates into an average of 11.4 days per year available for boating (Figure H-3 and Table H-3). However, as was mentioned earlier,

since enforcement of the 2.5-foot level is expected to be difficult, there would likely be additional unlawful boating use during this period.

It may be reasonable to assume, that the potential number of search and rescue operations could be less (above Highway 28) under Alternative A than under Alternative E because there are, on average, fewer days available for boating.

Additionally, restricting boating to the colder months (December through March) and higher water levels may discourage the less skilled and prepared boaters. This could further reduce the potential need for search and rescue operations.

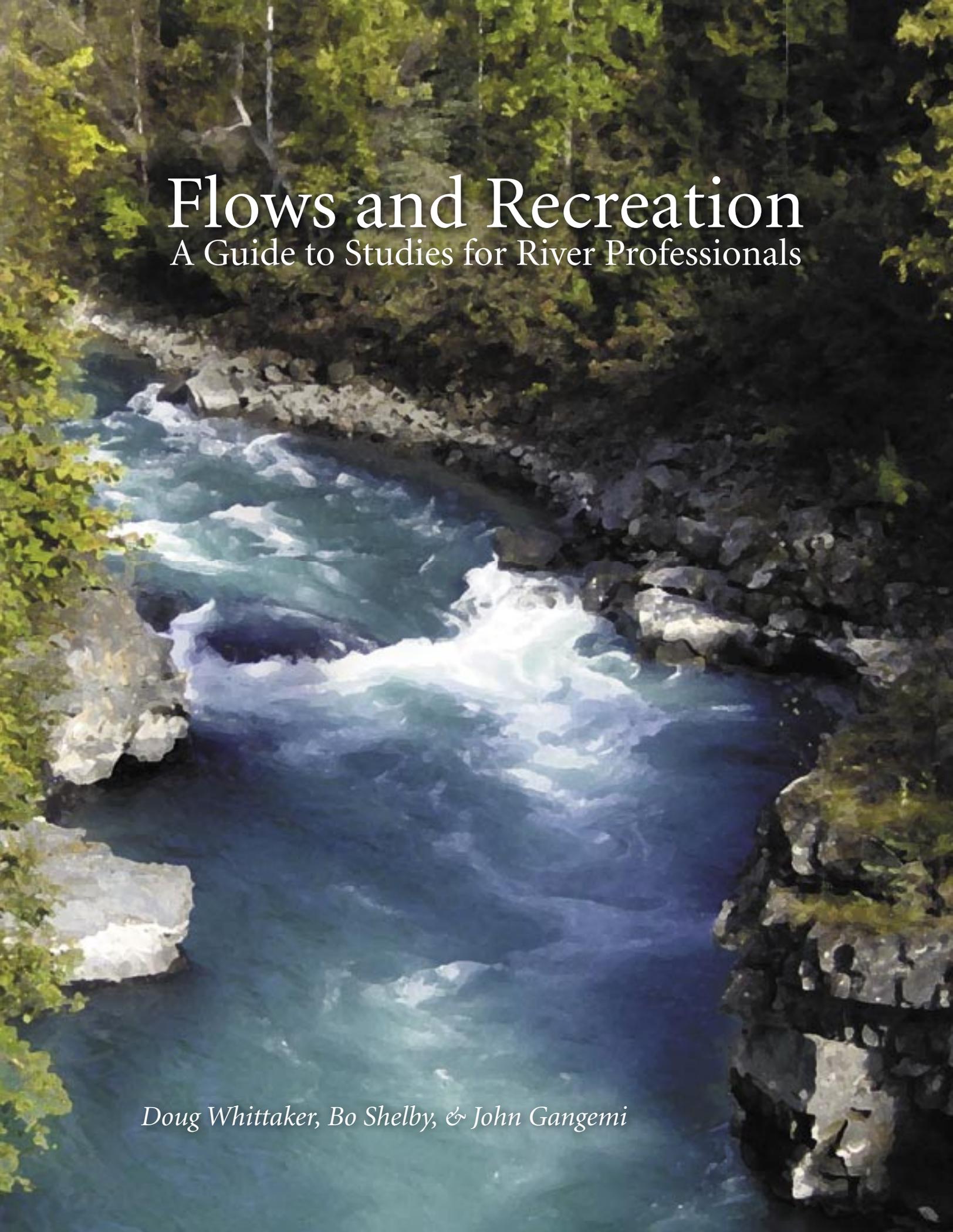
In summary, Alternative A would likely require fewer search and rescue operations than Alternative E.

### **Cumulative**

There are no current or foreseeable activities that would cause any cumulative effects to search and rescue operations on the Chattooga Wild and Scenic River above Highway 28.

### **Possible Mitigation Measures**

- Sign river access points appropriately to discourage less experienced boaters, especially at Burrells Ford Bridge access. Signs should not market the activity, but properly warn potential boaters. Website and brochure information should also be developed that warns about the dangers without encouraging use.
- Do not provide additional facilities that might otherwise encourage this use.

An aerial photograph of a river with rapids flowing through a forested canyon. The water is a vibrant blue-green color, and the surrounding forest is dense and green. The river is surrounded by dark, rocky banks.

# Flows and Recreation

A Guide to Studies for River Professionals

*Doug Whittaker, Bo Shelby, & John Gangemi*

# Foreword

This guide is intended to facilitate decision-making to define flows for recreation on regulated rivers. It provides a framework and methodologies for assessing flows for recreational use. This welcome addition to the Hydropower Reform Coalition's Citizen Toolkit for Effective Participation in Hydropower Licensing (available at [www.hydroreform.org/toolkit.asp](http://www.hydroreform.org/toolkit.asp)) should help all participants, such as license applicants, agencies, Tribes, and citizens, satisfy the new licensing regulations of the Federal Energy Regulatory Commission. Ideally, it will be used to enhance the quality of study requests and plans, as well as the implementation of studies and resolution of disputes. The authors are recognized experts and have been involved in numerous flow studies for hydropower licensing and other water resources decisions.

The guide complements and updates an earlier NPS publication, *Instream Flows for Recreation: A Handbook on Concepts and Research Methods* (Whittaker et al., 1993). This new report provides more specific guidance about a phased approach and other practical aspects of conducting recreation flow assessments.

The National Park Service Hydropower Recreation Assistance program works with parties involved in licensing hydropower facilities regulated by the Federal Energy Regulatory Commission to ensure that public interests in recreation and conservation are addressed. The program draws its authority from the Federal Power Act and technical assistance provisions of the Outdoor Recreation Act of 1962, the Wild and Scenic Rivers Act of 1968, and the National Trails System Act of 1968.

Joan Harn, Hydropower Recreation Assistance Leader  
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# Flows and Recreation

A guide to studies for river professionals

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October 2005



**HYDROPOWER  
REFORM  
COALITION**  
*Putting water, wildlife,  
and people back in rivers.*





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*Many early flow-recreation studies focused on whitewater boating, an activity where flows have dramatic effects. Flows determine whether a river is runnable by boaters with different skills or craft, and affect the size and power of hydraulics that create interesting whitewater.*

*Left: Faraday Diversion Reach on Oregon's Clackamas River at 1,220 cfs.*

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*Flow regimes have important long-term effects on a river's biophysical characteristics such as aquatic habitat, but flows also affect "fishability" or "angler habitat." Studies can define flow needs for different types of fishing opportunities.*

*Right: Oregon's Upper Klamath River at 350 cfs.*



# Introduction

Instream flow, the amount of water in a river, fundamentally affects recreation quality in most river settings. In the short term, flows determine whether a river is boatable, fishable, or swimmable, and they affect attributes such as the challenge of whitewater or the aesthetics of the “riverscape” (Brown, Taylor, & Shelby, 1991; Whittaker et al., 1993; Whittaker & Shelby, 2002). Longer term flow regimes (e.g., over a period of years) may also have effects on fish populations and other ecological resources (Bovee, 1996; Richter et al., 1997; Tharme, 2002), riparian environments (Jackson & Beschta, 1992), or channel features such as beaches, pools, and riffles (Hill et al., 1991). Many of these are critical for specific types of river recreation.

Instream flows are commonly manipulated on regulated rivers through dam releases or out-of-stream diversions; as a result, flow management has become one of the most important issues on the river conservation agenda (Stanford et al., 1996; Poff et al., 1997; Richter et al., 1997). Natural resource agencies (e.g., U.S. Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service) have been interested in assessing the impacts of flow regimes on recreation, and studies of flow-recreation

relationships have become common in most Federal Energy Regulatory Commission (FERC) licensing processes (see sidebar on “Hydropower Licensing and Recreation”). Flow-recreation issues are also relevant in other river-related issues such as navigability or water rights adjudications, or during reviews of federal dam operations.

Considerable work on flow and recreation has occurred in the past two decades (Brown et al., 1991; Shelby, Brown, & Taylor, 1992; Whittaker & Shelby, 2002), and a variety of methods have been developed (see Whittaker et al., 1993 for a review). While these are effective approaches and methodological tools, applications and integration into decision-making processes have been uneven. For a variety of reasons, including varying study quality, recreation interests may have difficulty competing with other resources in regulated river decision-making.

Several reasons help explain varying study quality. First, studies have generally been designed to answer specific questions in arenas such as FERC licensing, water adjudications, or navigability proceedings. This means that few studies have been conducted as part of a systematic research program that could expand the scope of

studies, encourage basic research, and link related elements across studies.

Second, studies are generally conducted by non-academic consultants or in-house utility staff. These professionals have fewer incentives to publish in the scientific literature, which limits information transfer. Informal “networking” remains the primary conduit for transmission of “knowledge” about how to conduct effective studies or integrate results.

Third, there has been limited guidance from agencies (FERC or others) about standards for conducting and using studies. This allows the quality and scope of studies to vary case-by-case depending upon the level of interest, expertise, and support from individual agencies, utilities, researchers, or advocacy organizations.

Some of these problems are systemic and challenging. However, clear standards for conducting and using studies would be a major improvement, particularly in FERC license proceedings. This paper offers a start toward that goal by recommending a conceptual perspective and a progression of study options, and then reviewing protocols, responsibilities, and products involved in those options.



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*Some recreation users are unaware that flows affect their activities. Careful studies can document how flows affect important conditions in “recreation habitats” such as this swimming area on California’s Klamath River at 600 cfs.*

## Objectives

The overall goal of the paper is to summarize ideas for improving flow-recreation research and its integration into decision-making (particularly FERC processes on regulated rivers). Specific objectives are to:

- Provide a conceptual perspective that differentiates descriptive versus evaluative information.
- Develop a progression of study options, with increasing resolution provided at each level, to help identify research needs in specific situations.
- Review elements associated with study options, clarifying and standardizing terminology for methods or study outputs.
- Review common roles and responsibilities of agencies, utilities, consultants, and stakeholders.
- Identify study outputs or products needed at various stages in the progression to ensure that results can be integrated into decision-making processes.
- Discuss broader challenges in integrating recreation study results with those for power and non-power resources.
- Consider how study information is used to develop cost-effective and beneficial protection, mitigation, and enhancement measures (PMEs) to include in project licenses.

In addressing these objectives, the primary aim is to provide a common understanding of flow-recreation study issues for both researchers and “professionals” who review that research. We include researchers, consultants, and staff from interest groups, agencies, and utilities under this label, but it also extends to interested recreation users or advocates who may become involved in flow-recreation work. In order for these professionals to work together effectively, they need to be able to “speak the same language.”

At the same time, we caution readers that this document does not provide all the information necessary to conduct the various study options. Quality flow-recreation studies require a range of social science and logistical skills, and experience adapting concepts and methods to specific cases. Similarly, a growing literature of technical reports may suggest examples of key study elements (e.g., question formats in a survey instrument or questionnaire), but these cannot be blindly applied. Questionnaire development is a proportionally small part of most study efforts, and the ability to tailor questions and analysis to each new case is critical. Accordingly, we have not provided example survey instruments or report findings, although these are widely available in study reports or journal articles cited in the references. Researchers interested in methodological

details of various study types are urged to more closely review this literature; this document is designed for a more general audience of river professionals who might be considered the “critical consumers” of flow-recreation research.

Finally, this document focuses on studies common to FERC licensing efforts, but many of these study options are relevant in other river “decision environments” such as navigability and water rights adjudications, or reviews of federal dam operations (e.g., Corps of Engineers or Bureau of Reclamation projects). In each of these cases, the common need is to understand how flow regimes affect recreation quality or use, and then integrate that information with findings from other resource areas. Similarly, resources to study these relationships are often constrained, which puts a premium on efficient and focused studies.

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*Wading-based fishing is dramatically affected by flows because depths and velocities determine access to fishable water.*

*Below: During a flow study on California's Pit River, anglers evaluated flows from 150 to 1,800 cfs (600 cfs shown here).*



## Organization

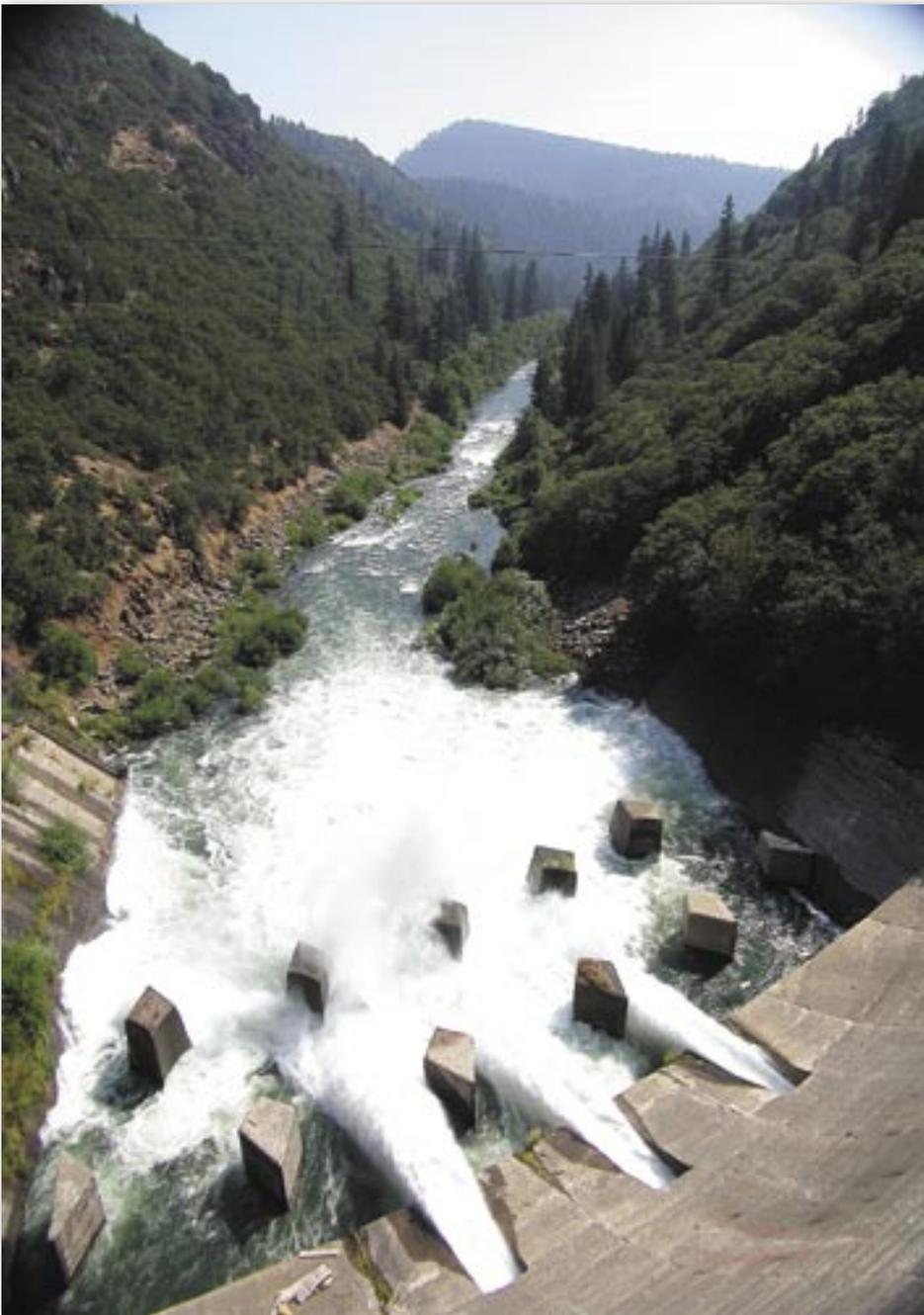
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The paper is organized by sections on 1) a conceptual perspective; 2) a progression of study options; 3) a review of study options; and 4) integration, trade-offs, and inserting findings into decision-making processes.

The document also provides a series of “sidebars” interspersed through the text. These short discussions of related topics are identified by a box outline. Separate sidebars are provided on:

- Hydropower licensing and recreation
- Flow regimes, long-term effects, and recreation
- Flows and aesthetics
- Problems with “blind” flow studies
- Flows, fish habitat, and fishability
- Roles and responsibilities during fieldwork
- Study needs for new license applications

Photos illustrating key concepts or study findings are also interspersed throughout the report. Highlighting central ideas from the document, these photos and captions also convey the breadth and depth of flow-recreation studies or the issues they have addressed.



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*“Controlled flow studies” are a powerful tool, allowing resesarchers and recreation users to evaluate a range of flows over a short period of time. These studies are common for relicensing projects that have bypass reaches. Different study options provide different levels of resolution about flow effects on recreation; this guide helps river professionals recognize the “right tool for the job”.*

*Left: Pit 3 Dam releases 1,800 cfs on California’s Pit River; this bypass reach has historically provided base flows about 150 cfs.*



---

*Even small dams can affect hydraulics, riparian vegetation, and channel characteristics, which in turn affect the type and quality of recreation opportunities.*

*Left: This diversion dam on California's Hamilton Branch of the North Fork Feather River typically leaves base flows less than 50 cfs. This provides good fishing, but boating requires about 250 cfs. The 95 cfs release shown here was boatable on the river's upper segment, but not on the steeper lower segment.*

---

*Flows affect depths, velocities, and water quality, important attributes for swimming. Less swift flows may be better for children or less skilled swimmers, but lower flows may be too shallow or appear stagnant.*

*Right: Taylor Creek, a tributary to Oregon's Rogue River.*



# Conceptual Perspective

Assessing flows for any resource requires a conceptual framework; one option is shown in Figure 1. Flow is the variable driving the system, and it can come from natural or human-regulated sources. Flow, in turn, affects resource conditions. Immediate effects are related to hydraulics (depth, velocity, width, wetted perimeter, and turbulence), but longer-term effects occur through interactions with channel geomorphology and riparian vegetation. Taken together, hydraulics, channel morphology, and riparian vegetation form a dynamic system of resource conditions that define biophysical and recreation

“habitats.” Combinations of resource conditions associated with a given flow regime, in turn, provide resource outputs. Broad categories of outputs include recreation opportunities (e.g., whitewater boating, wading-based fly fishing, family swimming and wading) and biophysical resources (e.g., quality of a sport fishery, amphibian populations, beach size or abundance).

To the extent that flow regimes can be managed to produce different combinations of outputs, the final element

in the framework assesses resource trade-offs. Here the framework moves from the “descriptive” arena (where scientists determine how flows affect resource conditions and outputs), to the “evaluative” arena (where decision-makers, resource managers, and interest groups consider the desirability of different combinations of outputs; Shelby and Heberlein, 1986). These evaluations are generally made in decision-making processes (such as FERC license proceedings) where social values are often central (Kennedy and Thomas 1995).

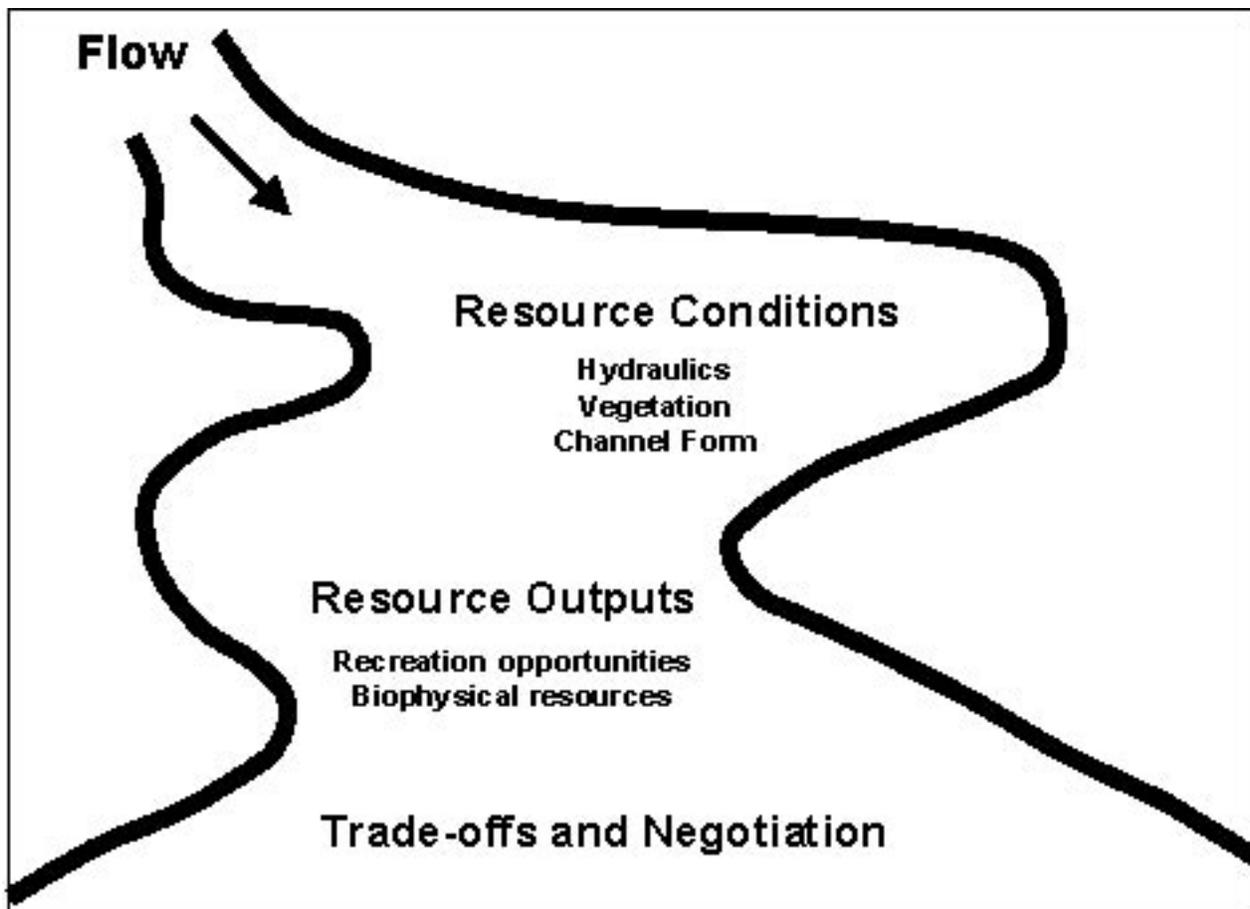


Figure 1. A framework for assessing flows for recreation or other resources.

## SIDEBAR

# Hydropower Licensing and Recreation

The Federal Energy Regulatory Commission regulates operating licenses for approximately 2,500 hydropower dams across the country, with most operated by private utilities or public utility districts. Licenses are usually granted for periods of 30 to 50 years; when those licenses expire, utilities must apply and receive a new license to keep operating a facility. Since 1993, FERC has issued or renewed more than 350 hydropower projects throughout the nation. Over the next decade, FERC is expected to consider licenses for an additional 200 projects.

The Electric Consumers Protection Act (ECPA, 1986) rewrote “the rules of the game” for assessing and mitigating impacts of projects, so relicensing generally requires consideration of issues that played little part in an “old” license. ECPA requires FERC to give “equal consideration to power and non-power values” when issuing hydropower licenses, so impacts on all these resources must be studied during relicensing and possibly mitigated in the new license. Reservoir and downstream river recreation qualify as “non-power values,” and regulations subsequent to ECPA led to a formal role for the National Park Service to provide advice or represent recreation interests in relicensing processes. Agencies that manage land affected by hydropower projects (e.g., the U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service) have similar responsibilities to represent a variety of environmental values, including recreation.

Licensing processes are complex, multi-year resource planning and decision-making efforts that generally have three major phases, although these are handled in slightly different ways depending upon whether a “traditional” (TLP), “alternative” (ALP), or “integrated” (ILP) process is being used. Until 2004, licensees chose between traditional and alternative processes (and several of these processes are on-going and “grandfathered in”), but since that time the ILP is the “default” process (although licensees can still request to use the TLP or ALP).

The first phase involves assembling existing information about the project and potentially affected resources. This helps identify information gaps that will lead to discussions about which studies should be conducted to assess impacts for alternative operation or mitigation scenarios. With traditional or alternative processes, a “first stage consultation package” was the end point in this effort. With the ILP (and all future TLP or ALP efforts), a “preliminary application document” (PAD) is the corresponding product, and it is guided by the standard of “existing, relevant, and reasonably available information.”

The second phase focuses on developing study plans, completing the studies, and integrating findings across resource areas. In traditional and alternative processes, this is usually

a two- to three-year effort that culminates in draft and final license applications from the utility. In some cases, settlement discussions between utilities, agencies and stakeholders may also be a part of this phase. Most of studies described in the present document typically occur during this phase.

The third phase focuses on resolving conflicts between the utility, agencies, and stakeholders through an impact analysis conducted by FERC through a National Environmental Policy Act (NEPA) planning process. NEPA planning requires developing a range of reasonable alternatives, assessing environmental impacts for each, public involvement, and decision-making by an interdisciplinary team. In traditional and collaborative FERC processes, scoping, alternatives, and impact analyses generally evolved from studies in the second phase. In the ILP, scoping for the NEPA track starts when the PAD is released and studies are developed, but alternative development and impact analysis still typically occur after studies are completed.

The final result of a NEPA-based decision is a license to build and/or operate a project with “articles” that prescribe operations and mitigation. When settlements between utilities, agencies, and stakeholders occur, FERC generally incorporates them into the NEPA process and final license.

Detailed comparisons between these licensing processes are beyond the scope of this document, but a few other differences between the license processes are notable. With a **traditional licensing process**, utilities generally retain greater control over the contents of draft and final license applications, although there are specific consultation requirements to encourage consideration of stakeholder or agency concerns and sometimes a more collaborative hybrid process is used. When disputes arise FERC is responsible for resolving them, but this generally occurs later in the process.

With an **alternative licensing process**, utilities, stakeholders, and agencies are encouraged to develop study plans and applications in a more collaborative fashion, hopefully increasing efficiency and avoiding some of the later-stage disputes common in traditional approaches. However, collaboration can be time-consuming and labor-intensive, and consensus may still be difficult (requiring FERC dispute resolution).

The recently-developed **integrated licensing process** is an attempt to address some of these deficiencies. The ILP prescribes earlier FERC participation, more formalized agency and stakeholder collaboration or consultation roles, and an accelerated schedule that includes concurrent NEPA issue



*FERC will “relicense” about 200 hydropower projects over the next decade, and many of these will affect recreation. FERC rules require utilities to assemble existing recreation information, develop study plans, conduct studies, and discuss findings with stakeholders. These efforts provide excellent opportunities for research and planning that result in “on-the-ground” actions. Above: Release from Faraday Diversion Dam on Oregon’s Clackamas River during a controlled flow study.*

scoping while studies and the license application are being developed. The ILP also creates a formal process for addressing conflicts about studies requested to provide information for potential mandatory conditioning of licenses by federal and state agencies, or Tribes. This formal process includes participation from an “outside” expert for the resource area in question.

ILP regulations prescribe rigorous justifications for studies and earlier, binding approval of studies by FERC. The goal is to minimize “additional information requests” (by agencies or stakeholders) and help licensing processes stay on a tighter schedule. Study requests must include: (a) study goals and objectives; (b) resource management goals or public interest considerations; (c) existing information and the need for more

information; (d) the connection between project operations, resource effects, and potential license requirements; (e) study methods consistent with generally accepted practice; (f) an assessment of study effort and costs; and (g) reasons why the applicant’s proposed studies would not be sufficient. It is premature to assess how well this new process will work.

With all processes, agencies and stakeholders have general responsibilities to help identify recreation issues; determine study needs; assist with study design, conduct, or evaluation; help integrate study results into application proposals; and facilitate settlements between agencies, utilities, and stakeholder groups. The present document is designed to help clarify those roles and responsibilities

# A Progression of Study Options

Deciding upon the appropriate “degree of resolution” is a major issue in flow-recreation studies. Some rivers have extensive recreation use that is clearly flow-dependent and affected by project operations; here more intensive and detailed efforts are necessary. On other rivers, the potential for a recreation use may be unknown (e.g., whitewater boating on a bypass reach, fishing for a species that could be reintroduced), or the use may be only marginally affected by flows that the project does not substantially affect. In these cases, less intensive studies may be required.

Given the potential diversity of situations, it is difficult to specify a single set of standards for a “sufficient” study. Instead, we recommend a progressive approach with “phased” efforts of increasing resolution. All studies have to provide similar initial information about recreation opportunities, their likely dependency on flows, and potential project effects. However, more intensive or detailed studies will only be prescribed in situations that merit them. To be effective, this approach needs 1) a clear sequential framework; 2) standardized terminology for various study options; 3) agreement about which study options provide which degree of resolution; and 4) explicit decision criteria to help determine whether the study needs to continue to the next level.

The following framework suggests three levels of resolution, with distinct study options generally linked to each level:

- **Level 1** – “desk-top” options: This is the initial information collection and integration phase. It usually focuses on “desk-top” methods using existing information, or limited interviews with people familiar with flows and recreation on the reach.

- **Level 2** – limited reconnaissance options: This increases the degree of resolution through limited reconnaissance-based

studies, more intensive analysis of existing information, or more extensive interviews.

- **Level 3** – intensive studies: This substantially increases the degree of resolution through more intensive studies, which may include multiple flow reconnaissance, flow comparison surveys, or controlled flow studies.

This framework has been applied successfully in FERC relicensing proceedings, and it has the potential to improve studies or applications in several ways. First, it focuses resources on those river reaches with greater interest to the recreation community or with greater impacts from project operations, while reducing workloads on reaches with less interest and lesser project effects. This streamlines costs by prioritizing reaches more “deserving” of additional study. This is especially useful at hydropower projects with multiple dams, powerhouses, and river reaches, where prioritization and efficiency are particularly important.

Second, it provides a transparent and defensible record for all entities (e.g., Licensees, stakeholder groups, and agencies) regarding the “sufficiency” of effort. This should lead to more efficient licensing or adjudication proceedings, and limit challenges.

Third, it helps standardize methodologies and improves comparability across situations. This should improve the quality of study products and allow them to be more efficiently used in license proceedings or other decision-settings.

Fourth, the increased transparency of the phased approach allows information to be shared earlier in the process, particularly across resources. This allows an earlier discussion of potential conflicts between flow needs for different resources, which may help researchers design studies that address solutions to those conflicts. Integrating information across resources is a major challenge in licensing

proceedings; the earlier potential conflicts are articulated, the more likely researchers can provide information about trade-offs or potential ways to address them.

Finally, there are efficiencies in conducting coordinated studies, particularly if controlled flow releases are part of the study design. Although it is beyond the scope of this report, there appear to be similar benefits of using a progressive approach with aesthetics, fisheries, or other resource studies, with parallel types of work at the desk-top, initial reconnaissance, and intensive study levels. Formally recognizing these levels and coordinating study needs can help reduce the costs of studies and encourage interdisciplinary exchanges throughout the study process.

The remainder of this guide reviews elements for each study option, including 1) objectives; 2) typical approaches; 3) products; 4) typical responsibilities of agencies, utilities, and advocacy groups; 5) “additional issues” to highlight challenging tasks or suggest protocols that characterize more successful efforts; and 6) “cautions or limitations” that may restrict use of an option or require additional information from other study options.



*Intensive studies are needed when recreation opportunities are flow-dependent and affected by project operations. Above: Boating on Oregon's Upper Klamath River is dramatically affected by a power-peaking regime that can fluctuate from 350 and 2,800 cfs in one day. A controlled flow study examined flows between 700 and 1,700 cfs (shown here) to more precisely specify flow ranges for different opportunities if peaking operations were constrained.*

## *Desk-Top Options (Generally Level 1)*

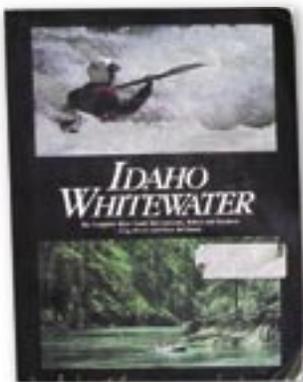
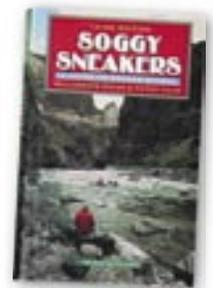
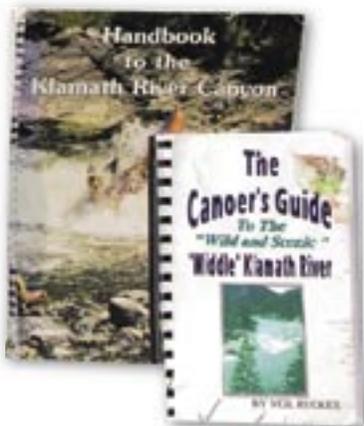
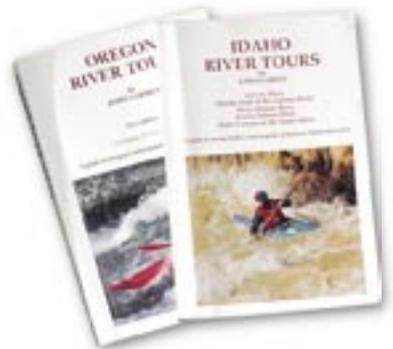
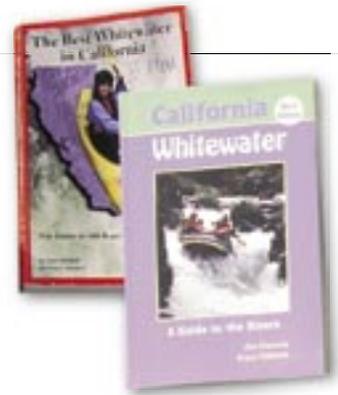
*“Desktop analysis” options are useful for developing information about existing or potential recreation opportunities, facilities, physical characteristics of the river, and recreation-relevant hydrology. In some cases, desktop methods may help develop rough estimates of flow ranges for different opportunities. The three options are:*

- Literature reviews*
- Hydrology summary*
- Structured interviews*

*While these could be done as Level 1 efforts that are part of a first-stage consultation package or pre-application document (PAD), they may also be employed more intensively as part of Level 2 efforts.*

*Under new ILP rules, resource agencies and FERC discourage significant analysis of existing information without a study plan (particularly if the PAD is being developed without extensive agency or stakeholder input), with the standard being “existing, relevant, and reasonably available information.”*

## Literature Reviews



### Objective

Review and summarize existing documents with information about recreation opportunities or the river's physical characteristics that make it attractive for recreation.

### Typical approach

Literature searches via the web, libraries, or agency collections, with systematic documentation of sources and findings. The effort may include summaries or basic analysis of agency use information.

### Product

Summary of recreation opportunities, facilities, use, and physical characteristics in a report.

### Responsibilities

Utilities (or their consultants) have primary responsibility, but agencies and stakeholders may provide documents or access to files.

### Additional issues

A "brainstorming" session among agencies and stakeholders may help identify documents; physical searches of agency files sometimes produce useful "gray literature" or use statistics.

Physical characteristics that should be listed for any segment include: length, gradient, channel type, access locations, and facilities.

Extensive analysis of use data is usually unnecessary at this stage, but a summary of typical averages and peak levels can be helpful. Qualitative discussion of seasonal or weekly use patterns may also be important.

The summary should be systematic and comprehensive, organizing information by recreation opportunities and associating appropriate physical characteristics or use data with each.

### Cautions & limitations:

Guidebooks are often a good "first source" for a river's physical characteristics and general description, but flow ranges or hydrology information from them should be used with caution. The level of accuracy and rigor varies considerably among guidebooks, and evaluations represent the opinion of the author(s) only.

*Level 1 literature reviews include guidebooks, which provide general information about river characteristics and types of recreation opportunities. Boating guides often discuss flows and gages, and may recommend flows for different skill levels. However, guidebooks are essentially the opinion of a single author, and the "quality" of those opinions varies depending upon the author's skill, experience, and the level of detail they provide.*

# Hydrology Summary

## Objective

Summarize recreation-relevant hydrology, describe project “plumbing,” and identify existing and potential operational constraints on existing or alternative flow regimes.

## Typical approach

Search for relevant summary hydrology data, usually from the USGS, state water resource departments, land managing agencies, and utilities. Assemble and summarize recreation-relevant findings that may include graphs and tables for typical or example recreation seasons.

## Product

Summary hydrology section in a report.

## Responsibilities

Utilities (or their consultants) have primary responsibility, but agencies may be able to provide access to key hydrology data or summaries to make this effort efficient (and non-duplicative).

## Additional issues

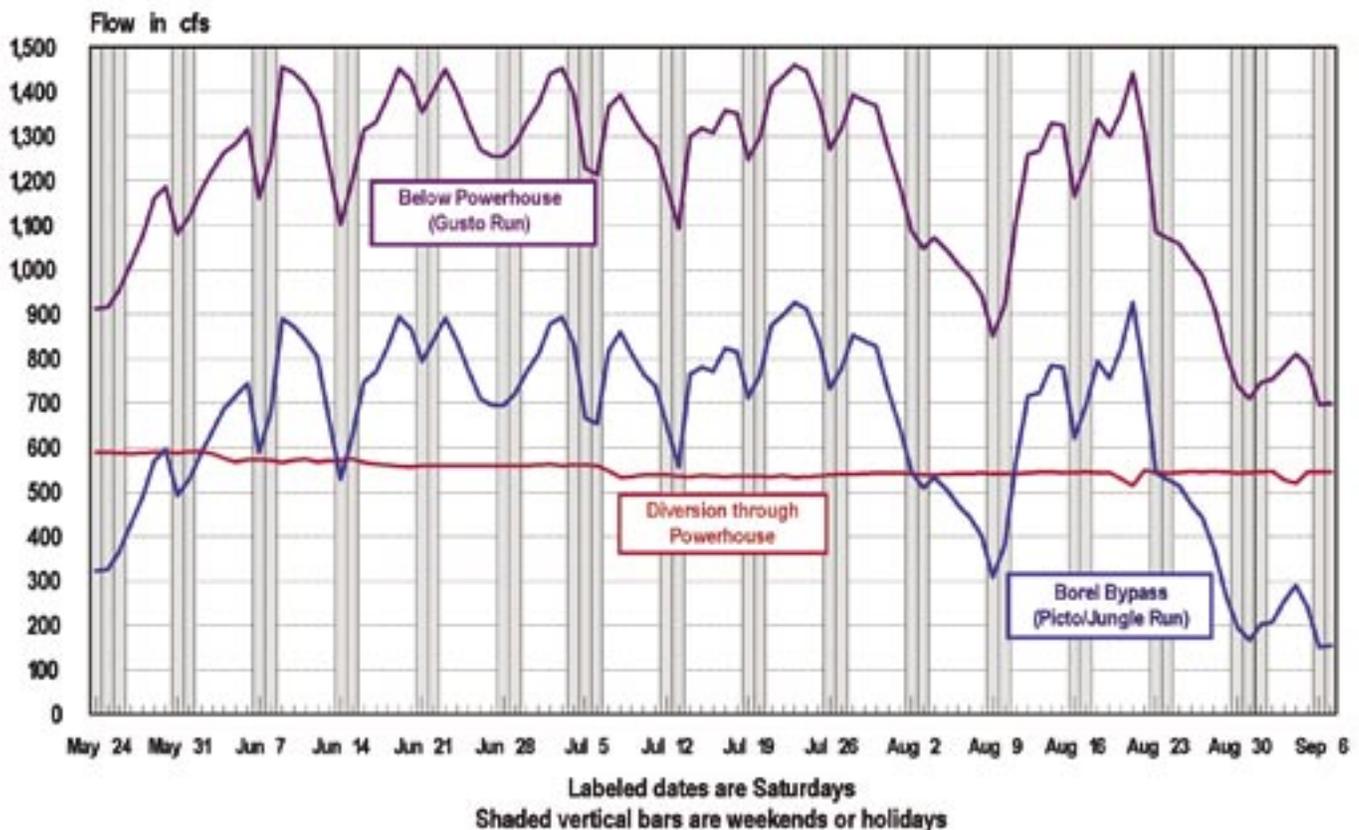
The amount of analysis and presentation involved in this task depends on the resolution needed. For a Level 1 report, summaries of existing information or example hydrographs from an average year may be adequate; more intensive analyses and presentations are usually necessary to reach a higher degree of precision common for a Level 2 or 3 effort.

## Cautions & limitations

Daily, monthly, or annual averages are often used to summarize hydrology, but these statistics may be insufficient if they mask important variability. For example, averages at a daily peaking facility may not reflect a flow that occurs for any substantial length of time.

In nearly all cases, summary hydrology data for a key gage or hydrology reports for the larger relicensing effort will not be sufficient. Raw hydrology data, gage statistics, project operational constraints, and similar information commonly need to be “re-packaged” to focus on recreation-relevant flows or seasons. The goal is a clear and concise summary to illustrate how the system works or could be operated to provide flows for recreation.

## Lower Kern River Flows, Summer 2003



Summarizing recreation-relevant hydrology usually involves re-organizing hydrology records. Above: Daily hydrographs for two segments on California’s Lower Kern River illustrate variable irrigation releases coupled with a steady hydropower diversion. Organizing information for an example recreation season shows how flows drop on weekends (adversely affecting boating).

## Structured Interviews

### Objective

Collect and organize information about “local knowledge” of the river, recreation opportunities, and potential flow effects. The source is experienced users or resource experts.

### Typical approach

Identify a list of experienced recreation users or resource experts, usually through networking. Develop questions for identifying opportunities, potential flow effects, or other relevant issues. Conduct the interviews (with documentation), analyze responses, and summarize findings.

### Product

Summary sections in a Level 1 report will identify existing and potential recreation opportunities, describe whether those are likely to be flow-dependent, and suggest potential flow-related issues or assessments (if possible). Lists of interviewees and systematic notes from interviews are commonly provided in appendices.

### Responsibilities

Utilities (or their consultants) have primary responsibility, but agencies and stakeholders can help develop the networking sample, or review interview questions and findings. Recreation groups can be particularly helpful for finding individuals that use the river for recreation.

### Additional issues

Collaborative development and review of interview lists by agencies and stakeholders is often helpful to ensure the interviewees represent a sufficient diversity of user types.

Systematic documentation of interview notes can make findings in a Level 1 report more transparent.

The number of interviews and level of coding and analysis involved in this task depends on the resolution needed. For a Level 1 report, even a few interviews, limited qualitative summaries of interview results, and occasional

“personal communication” citations may be adequate. For a Level 2 or 3 report, more interviews, quantified analysis or responses, and summary statistics or graphs may be more appropriate.

### Cautions & limitations

Interview panels may be small in a Level 1 effort, limiting the usefulness of statistics to represent group evaluations about flows or access. Interview information is best for learning about a river’s characteristics, past use, and potential flow-related issues rather than definitive evaluations for specific groups.

“Representativeness” of panels is a major issue, especially when interviewees are developed through “self-selection” techniques (e.g., requests for interviewees made through a newsletter or on a list serve). Active networking designed to reach different parts of a recreation community is likely to be more successful.



*Experienced users (right) or locals (above) may have considerable knowledge about recreation use and flow effects. Structured interviews help capture this information, but careful documentation and attention to “representativeness” are important.*



*Some fishing opportunities are less flow-dependent than others. Shore-based fishing with spinning gear on Alaska's Kenai River (left) is excellent through a wide range, from mid-summer high flows to lower fall flows. In these situations, a well-documented Level 1 effort may be sufficient.*

A Level 1 report should integrate findings from the study options above, clearly documenting information sources, summarizing findings, and linking those to raw data when appropriate. The report should identify recreation opportunities along the river, suggest whether there are flow-dependent attributes for each, and assess whether project operations are likely to have impacts on those opportunities. When there are multiple opportunities or reaches with potential project effects, these should be prioritized from those requiring more to less information.

Agency and stakeholder review is critical, but how that is accomplished depends on the licensing model in use (traditional, collaborative, or integrated; see sidebar). In general, the earlier this report can be completed and distributed, the better. This allows more time to develop intensive studies (if or when those are necessary), and can help direct resources to the opportunities and reaches that need them most. It also can serve as an “early warning” to work groups in other resource areas (e.g., fisheries, cultural) about which recreation opportunities are likely to have flow-related impacts, and it may lead to early articulation of likely flow regime

requests. The exchange of information between resource work groups is among the most challenging aspects of relicensing efforts, and early Level 1 information allows that to begin sooner.

One output of the report should be explicit decisions about whether additional study is necessary for each opportunity and reach. While the utility and consultants typically make the case for these decisions in their report, review by agencies and stakeholders (via working groups) can make those decisions more collaborative, or allow early identification of disputes. This should limit additional information requests later in the process.

Ultimately, the decision is whether Level 1 information is sufficient, or if additional study is necessary. This decision rests on answers to several questions:

- Are there flow-dependent recreation opportunities on the river segments?
- Are flow-dependent opportunities affected by project operations?
- Are flow-dependent recreation opportunities “important” relative

to other resources or foregone power generation? If certain recreation opportunities will not be considered when determining project operation decisions (e.g., if agencies and stakeholders agree that flow releases will be primarily driven by biological needs for an endangered species), more detailed information about flows may be unnecessary, and Level 1 information may be sufficient (assuming it documents stakeholder and agency agreement about this evaluation).

- Does Level 1 information precisely define flow ranges and potential project effects for each flow-dependent opportunity? For example, flow ranges for a commonly boated whitewater reach may be sufficiently well-known and agreed upon, and there may be no need for additional study.

If none of these questions are answered affirmatively, Level 1 information is probably not sufficient, and more intensive study (Level 2 or 3) may be necessary.

# Limited Reconnaissance Options (Generally Level 2)

*If recreation opportunities are flow-dependent but lack precise information about flow needs or project effects, some on-site (field) reconnaissance is typically needed. Several options are described below, offering distinct ways of enhancing information developed in Level 1. Study options for boating, fishability, and other types of recreation are discussed separately.*



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*A limited reconnaissance of the Middle Klamath River at 650 cfs supplemented interview information about flow ranges for different types of boating. This was a marginal flow for technical rafting through narrow rapids such as Dragon's Tooth.*

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## On-Land Boating Feasibility Assessment

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### Objective

Assess the feasibility and potential quality of boating opportunities, and estimate rough flow ranges by scouting a reach (or reaches) from on-land (or by wading the channel if flows are low enough). These usually occur when the reach has no history of previous boating use.

### Typical approach

Identify a short list of experienced boaters and agency staff familiar with the river to participate in the reconnaissance. Develop an evaluation form to address issues identified in Level 1. Conduct the reconnaissance by walking or driving along the reach, encouraging discussion among participants. Summarize opinions about the feasibility of boating, types of opportunities, possible flow ranges, and potential project effects.

### Product

Summary of reconnaissance effort and findings. Lists of participants, evaluation results, and discussion notes may be provided in appendices.

### Responsibilities

Utilities (or their consultants) have primary responsibility, but agencies and stakeholders commonly participate in the reconnaissance and may be asked to formally evaluate reaches, opportunities, or flows. Recreation groups can provide valuable assistance rounding up participants. If an evaluation form is developed, working groups typically review the format and content. Logistics for the reconnaissance are usually worked out among participating utilities, agencies, and stakeholders (see sidebar on fieldwork roles and responsibilities).

### Additional issues

Composition of the participants is critical. The number of participants may be small, but they should represent the diversity of recreation opportunities likely to be at issue on the reach. Stakeholder and agency agreement on composition may be useful.

Evaluating a dry or nearly dry bypass reach may be challenging, so there are

advantages to scheduling reconnaissance during potentially boatable flows if possible. In some cases, flow releases for the reconnaissance may be arranged, and they can dramatically increase the power of these assessments.

The reconnaissance may lay the logistical groundwork for more detailed study at a later date. On-land boating assessments also may be a planned interim step when a controlled flow study is expected; in these cases, fewer participants and a professional judgment-level analysis rather than formalized evaluations may be sufficient and will minimize costs.

### Cautions & limitations

On-land boating assessments may suggest whether a river is boatable, but they are unlikely to provide precise assessments of flow ranges. They are helpful for assessing safety issues for an on-water assessment and narrowing flow ranges for additional study, particularly on more challenging (higher gradient) rivers.



Left: An on-land study on Washington's Chelan River helped determine if whether boating was feasible in a gorge with limited access and a gradient over 400 feet per mile. After observing three flows in a single day, participants recommended an on-water controlled flow study.

Below: During the subsequent boating study on the Chelan River, kayakers successfully ran the gorge at 275, 390 and 475 cfs. A settlement agreement between the utility and stakeholders provides for boating flows in the future.



Below: During an on-land boating feasibility study, participants hiked Alaska's Cooper Creek (below) at approximately 60 cfs. Four waterfalls (inset) were not boatable, but some sections would provide Class III-IV opportunities at flows over 100 cfs. Challenging access, the short length, and several better alternatives in the region would limit demand, so an on-water boating study was unnecessary.



# On-Water Boating Feasibility Assessment

### Objective

Assess the feasibility and potential quality of boating opportunities and estimate flow ranges by boating the river at a single flow.

### Typical approach

Similar to an on-land boating assessment, experienced boaters usually participate in the reconnaissance, and an evaluation form may be developed to quantify findings. The difference is that the reconnaissance includes boating on the reach. Focus group discussion after the run is used to summarize opinions about the feasibility of boating, types of opportunities, possible flow ranges, and potential project effects.

### Product

Summary of reconnaissance effort and findings. List of participants, evaluation results, and discussion notes may be provided in appendices.

### Responsibilities

As with on-land boating assessments, utilities (or their consultants) have primary responsibility, but agencies and stakeholders commonly participate in fieldwork and review the evaluation form. Recreation groups can provide valuable assistance rounding up participants.

### Additional issues

As with on-land boating assessments, composition of the participants is critical and may be improved with stakeholder and agency review.

Safety and liability issues may be important, particularly on reaches that have had little or no previous boating use, or have more challenging whitewater (see sidebar on safety and liability).

On-water boating assessments may be a planned interim step when a controlled flow study is planned; when this occurs,

fewer participants and a professional judgment-level analysis rather than formalized evaluations may be sufficient and minimize costs. The feasibility assessment may lay groundwork or provide valuable logistical information for later in-depth studies.

### Cautions & limitations

On-water boating feasibility assessments at a single flow may demonstrate whether boating is possible, but they are unlikely to provide precise estimates of flow ranges for boating (unless the range is narrow and reconnaissance fortuitously occurred within that range).

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*An on-water boating study on the Lower Carmen Bypass Reach on Oregon's McKenzie River was conducted at 330 cfs. Kayakers successfully boated the reach, but the short run had difficult access, many log portages, and less-interesting-than-expected whitewater. Additional boating studies were not recommended.*



# Single Flow Fishability Assessment

## Objective

Assess the potential quality of fishing opportunities, and estimate flow ranges, through reconnaissance of the river at a single flow.

## Typical approach

Parallel to boating feasibility assessments, experienced anglers usually participate in the reconnaissance, and an evaluation form may be used. Focus group discussion after reconnaissance helps summarize opinions about the likely availability of different fishing opportunities (defined by species, tackle, and technique), possible flow ranges, and potential project effects.

## Product

Summary of reconnaissance effort and consensus findings. Lists of participants, evaluation results, and discussion notes may be provided in appendices.

## Responsibilities

Utilities (or their consultants) have primary responsibility, but agencies and stakeholders commonly participate in fieldwork and review the evaluation form or list of participants.

## Additional issues

Fishability assessments typically occur from land, but it may be useful to have anglers wade or boat the river if those are a common component of target opportunities.

It is challenging to assess a diversity of potential fishing locations during a short assessment period (a few hours or a day). Similarly, there are trade-offs between the number of sites and the quality of assessments, or between organized visits to specific locations and more “freelance” evaluations by individual anglers. These decisions are typically made on a case-by-case basis after considering segment characteristics, likely fishing opportunities, existing use, or other factors.

Fishability assessments may be unnecessary or less formal if a controlled flow study is expected, or anglers currently use a reach (and work can document their use patterns and flow ranges of interest). Unlike boating, the “feasibility” of fishing is usually not in question; the focus is on the quality of access to fishable water at different flows.

As with boating feasibility assessments, composition of the participants is important and may be improved by including local area guides or review by stakeholders and agencies.

Fishing assessments need to address potentially confounding evaluation issues related to longer-term fishing success or the condition of the fishery. For more information, see sidebar on “fishability, fishing, and the fishery.”

## Cautions & limitations

Fishability assessments at a single flow may be able to demonstrate whether a flow provides fishable water, but they are unlikely to provide precise flow ranges for different opportunities (unless the range is narrow and a flow in that range was assessed).

Fishability studies are only one component of assessing flow needs for fishing opportunities. Fishability studies generally focus on access to fishable water, offering less information about long term fishing success or effects on the fishery (see sidebar on these distinctions).

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*Flows for boat-based fishing may be different from flows for wading or shore-based fishing.*

*Right: Situk River, Alaska, where most anglers wade, but some use boats to access fishing areas.*



## Single Flow “Expert Judgment” Assessments for Other Recreation Opportunities

### Objective

Assess the potential quality of other recreation opportunities such as swimming, tubing, or general riverside recreation, and estimate flow ranges from reconnaissance at a single flow. The types of recreation considered in these studies are rarely associated with organized advocacy groups, but they are represented by NPS in relicensing proceedings.

### Typical approach

Similar to single flow boating and fishability assessments, these reconnaissance-based efforts usually involve on-site evaluations by recreation consultants familiar with the target opportunities. Participation by swimmers, tubers, or others is not common, but could be incorporated. Photos of key sites and conditions, along with rough measurements of key features (e.g., pools, current speed) are useful. If participants are involved, focus groups would also occur.

### Product

Summary of reconnaissance effort and findings. A list of participants, evaluation results, photos, measurements, and discussion notes may be provided in appendices.

### Responsibilities

As with other feasibility assessments, utilities (or their consultants) have primary responsibility, but agencies and stakeholders commonly participate in fieldwork and review the evaluation form.

### Additional issues

Participants in these activities may not be particularly flow-sensitive, so their participation is optional. However, interviews with local swimmers or tubers about their activities can be important. Defining target opportunities with sufficient specificity is probably the critical step, and can be enhanced with interview information from agencies or local users. These assessments typically occur from the shore in tandem with assessment efforts for boating and fishing. There are logistical challenges to conducting comprehensive assessments for multiple activities in a single reconnaissance.

Simple measurements of pool areas, depths, or current velocities may enhance descriptions of recreation opportunities or conditions created by flows.

There are challenges assessing a diversity of potential recreation locations during a short assessment period, with trade-offs between quantity and quality. Identifying representative locations or reaches for swimming or tubing evaluations may increase efficiency, but assumes homogeneity among locations.

Feasibility assessments for other recreation opportunities may be unnecessary if a controlled flow study is planned, or people currently use a reach for swimming, tubing, or other recreation (and can describe their use patterns and flow ranges of interest). For some opportunities, having evaluators swim or tube a reach may be useful.

### Cautions & limitations

Expert judgment assessments at a single flow may ascertain whether particular activities are possible, but they are unlikely to provide precise flow ranges for opportunities (unless the range is narrow and a flow in that range was assessed).



*Tubers on California's Lower Kern River illustrate differences between relaxed floating (bottom photo) and more challenging tubing (top photo) that have different flow needs.*



*Swimming areas on many rivers include “jumping rocks” that require adequate pool depths for safety. Measuring pool depths at different flows can help researchers determine how flows affect these kinds of opportunities. Above: Oregon’s Rogue River*



*General riverside recreation is usually “enhanced” by flows rather than “dependent” on them. Left: Waders and swimmers at an undeveloped recreation area on California’s Lower Kern River at 400 cfs. These activities were observed at study flows ranging from 400 to 1,200 cfs.*

## SIDEBAR

# Flow Regimes, Long-Term Effects, and Recreation

Most of the studies in this document focus on short-term or direct effects of flows on recreation, but long-term or indirect effects of flow regimes can also be substantial (Shelby et al., 1992; Whittaker et al., 1993). For example, flow regimes may affect riparian vegetation and the extent to which it encroaches on the river channel; the size, frequency, and distribution of beaches or other channel features; water quality; and aquatic and terrestrial species that use these ecosystems. These in turn affect “habitats” for boating, angling, camping, bird watching or other recreation activities.

It is beyond the scope of this document to review research on this wide range of long-term effects; each area has a well-developed literature and research protocols. In addition, many of these biological and physical resources receive considerable attention in relicensing or other regulated river decision-making. But connections between their work and recreation impacts are seldom carefully developed or made explicit, even though effects can be profound.

A few issues deserve consideration as river professionals look for ways to integrate findings from long-term biophysical studies with recreation information.

First, most long-term effects are not observable through reconnaissance-based or controlled flow studies, so assessing these effects may default to a comparison of current and pre-project conditions (to the extent these are even known). This may be helpful for describing how the current regime has altered the biophysical environment, but it is less useful for describing the effects of alternative future operation regimes and the “habitats” they may create.

Second, recreation controlled flow studies focused largely on short term effects typically release flows well below bankfull levels, so they are probably not capable of triggering substantial geomorphic or riparian vegetation changes that researchers can study. Controlled flow studies can help model biological or physical responses to new flow regimes, but their findings depend upon the accuracy of model “assumptions.” For example, fish habitat modeling has become more sophisticated during the past twenty years, but it may take multiple years before some population-level effects can even be detected, and research that verifies model precision has been sparse. Similarly, while sediment transfer and beach-building studies in Grand Canyon have been intensive and illuminating, experimental “floods” or revised operating regimes have yet to dramatically restore



*Beaches provide “recreation habitat” for camping and swimming. High flows and sediment sources are needed to clean and replenish beaches, a biophysical process often affected by water development.*

*Above: The number and size of beaches in Grand Canyon have decreased since Glen Canyon Dam was built.*



*Low flow regimes can produce warm temperatures with impacts such as stagnant pools and algae blooms.*

*Left: California’s Klamath River.*

*Years of low flows allow vegetation to encroach on river channels, which may affect boating safety or casting space for anglers.*

*Right: Vegetation obstructed visibility and blocked boating routes in California's Pit 5 Bypass Reach at 250 cfs.*



beaches and other geomorphic features, and no work has addressed direct connections between these features and the quality of recreation experiences in the canyon (GCMRC, 2005).

There is a need for more research into how recreation users evaluate biological and physical conditions affected by flow regimes. For example, social science studies can identify important biophysical attributes for certain activities, compare different beach sizes or camp environments, or assess trade-offs between different types of fisheries. However, to do so they need biological and physical scientists to specify alternative futures under different flow regimes. Our experience with interdisciplinary studies suggests it will be challenging to get agreement about those potential futures, even for the purposes of studying recreation users' evaluations.

There may be reasons for restoring certain riparian vegetation types, geomorphic features, or associated biological communities to a "natural" condition, but it should not be assumed that this is possible or even desirable in all cases. On regulated rivers, all alternative flow regimes are essentially "designed" or "artificial," and it may not make sense to consider the pre-project regime as the "standard." In most cases, the trade-offs are between alternative futures with different resource conditions and ecologies, or between different combinations of recreation opportunities (Schmidt et al., 1998); a priori value judgments that label certain combinations as being more "natural" is not a scientific position. There may be good reasons to recover specific ecological attributes that were present pre-project, but these goals need to be specified explicitly rather than assumed as "inherently better."



*Flow regimes have long term effects on biophysical resources such as fisheries. Modeling helps identify flow regimes to improve habitat, but doesn't predict specific changes in fish populations or anglers' fishing success.*

*Above: Bull trout are threatened on some western rivers, where relicensing efforts may suggest habitat improvements.*

## Documentation Needs and Explicit Criteria for Progressing to Level 3 Studies

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A Level 2 report should document reconnaissance efforts and findings, possibly integrating them with Level 1 information in a single revised report. Major sections need to identify specific recreation opportunities, identify flow-dependent attributes, identify rough flow ranges (if possible), and assess whether project operations are likely to have impacts on those opportunities.

Agency and stakeholder review is important, and may be implemented differently in traditional, alternative, or integrated

planning processes. Earlier reporting allows more time to plan additional work (if needed) or integrate findings with work from other resource areas.

The report should include explicit decisions about whether additional study is necessary for each opportunity and reach. The utility and consultants typically outline the issues in the report, but review by agencies and stakeholders (via working groups) can make those decisions more collaborative, or identify disputes.

Deciding whether to launch more intensive Level 3 studies is the critical study output; this depends on answers to the same questions discussed for the adequacy of Level 1 efforts. For opportunities where users are relatively insensitive to flows, or where project effects do not appear substantial, Level 2 information is likely to be sufficient. However, if project operations are likely to have direct and noticeable effects and flow regime changes are possible, greater precision may be necessary.

## *Intensive Study Options (Level 3)*

*For opportunities that are obviously flow-dependent and where precise information about flow needs or project effects is needed, more intensive effort is recommended. Several options for different types of recreation studies are described below.*

### Multiple Flow Reconnaissance Assessments

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#### **Objective**

Improve precision of estimated flow ranges for recreation opportunities by assessing multiple flows. Generally applicable to boating, fishing, tubing, or swimming on reaches with logistical complications that prevent evaluations associated with controlled flow studies (see additional issues below).

#### **Typical approach**

Similar to single flow assessments, these differ by assessing multiple flows. Participation by recreation users is typically limited (see controlled flow studies below), but may be important. Quantitative ratings (by panels or experts) are commonly made for all relevant opportunities and conditions. Photos of key sites and conditions, along with rough measurements of key features (e.g., pools, current speed) may be useful, particularly for non-boating and fishing conditions. Qualitative notes or focus group discussions after are used to summarize opinions about the feasibility or quality of different types of opportunities at different flows.

#### **Product**

Summary of reconnaissance efforts and findings. A list of participants, evaluation results, photos, measurements, and discussion notes may be provided in appendices. Usually presented in a report that is supplemental to Phase 1 and 2 reports.

#### **Responsibilities**

As with other assessments, utilities (or their consultants) have primary responsibility, but agencies and stakeholders commonly participate in fieldwork and review evaluation forms.

#### **Additional issues**

Multiple-flow assessments that rely on expert judgments usually occur when logistical constraints make it difficult to assemble or maintain an evaluation panel. Example problems might include the inability to control flows (necessitating opportunistic fieldwork when natural flows are close to target levels) or difficult access to the river reaches. For some opportunities, potential participants (e.g., tubers or swimmers) may not be particularly sensitive to flow changes (or

able to express preferences for specific flows), so it may be efficient and effective to have experts evaluate key conditions (which assumes the need to carefully document conditions and assumptions).

Multiple-flow assessments often focus on more than one recreation activity, which may present logistical challenges. Given trade-offs between the number of sites that can be assessed and the quality of assessments, identifying representative locations or reaches for more intensive work is critical.

Choosing the number and increments of flows is a case-by-case decision that generally depends on Phase 1 and 2 findings and requests from other resource areas (fisheries, etc.). Assessments of two to four flows are common.

#### **Cautions & limitations**

Expert judgments are often sufficient when supported with clear documentation of conditions at different flows, but user, agency, or stakeholder participation is important and powerful.

## SIDEBAR

# Flows and Aesthetics

Aesthetics of river environments are important in dam relicensing, particularly when reaches have waterfalls and cascades. When aesthetics are a critical attribute, studies may need to address how flows affect them.

A complete review of aesthetics literature related to flows is beyond the scope of this document. However, findings from a few studies suggest interesting generalizations. In a study from the Virgin River downstream of Zion National Park, for example, respondents were shown video footage of flows ranging from 0 to several thousand cfs (Shelby, Whittaker, & Ellingham, 1994). At low flows, small increments offered dramatic improvements in aesthetic quality; once the bottom of the channel was filled, however, there was little improvement from medium to high flows. Professional judgment curves (based on onsite reconnaissance and user interviews) for Connecticut's Shepaug River suggested similar findings (Shelby & Whittaker, 1999). In this small stream, even a 5 cfs dam release improved aesthetics, and above 50 cfs, additional water provided little aesthetic improvement.

Other studies have evaluated paired photographs (Land & Water Associates, 1992), or compared evaluations among several photographs after controlling for other scenic features such as vegetation, sky, and canyon walls (Brown and Daniel, 1991). In general, very low and very high flows were rated lower, although differences were small. Computer-manipulated images now offer opportunities to control other scenic features in photographs, so evaluations focus solely on flow elements.

Methods and analysis strategies have not been standardized in this field, but advances appear likely and should improve the ability to assess how alternative flow regimes affect aesthetics. Several study options presented in this document



*Flows may have a major impact on river aesthetics, but fewer studies have addressed this issue. Above: California's Kern River.*

are applicable to aesthetics, particularly multiple flow and controlled flow assessments. Many FERC relicensing efforts have included descriptive studies of aesthetics (i.e., photo or video documentation of key reaches, rapids, or falls at different flows). But fewer studies have included an evaluative component where aesthetic qualities of different flows are compared, and these have often based evaluations on professional judgments. The literature suggests that aesthetic evaluations by trained professionals may not match those of the general public, so studies that include recreation user evaluations may be important in some situations. Comparative flow surveys are probably most relevant study choice here, and representing different flows through photographic media provides an efficient way to avoid having users observe flows on-site.



*Small increases in flow dramatically improve aesthetics on Connecticut's Shepaug River (Left to right : 10, 60, and 200 cfs).*

## Flow Comparison Surveys of Experienced Users

### Objective

Improve precision of estimated flow ranges for recreation opportunities by surveying experienced users. Generally applicable to boating or fishing when users have a history of use and they are “calibrated” to an existing gage.

### Typical approach

Identify panel of knowledgeable users (usually boaters or anglers) and develop contact information. Develop survey instrument with sections documenting user experience and knowledge, use patterns, and evaluations of conditions and flows. Administer survey, either by mail or telephone, and code responses. Analyze data to summarize responses, with attention to disaggregating dissimilar types of users. Summarize findings in a report.

### Product

Summary of methods and findings. Methods should include descriptions of panel and instrument development, as well as potential sources of error. Findings are typically presented in both tabular and graphic forms appropriate to the analysis. The findings may be presented as a report supplemental to Level 1 and 2 reports.

### Responsibilities

As with other assessments, utilities (or their consultants) have primary responsibility, but agencies and stakeholders commonly review the sampling frame, survey instrument, and analysis plans. Agencies often possess lists of guides or other knowledgeable users (if there is a permit system) to help with panel development.

### Additional issues

Panel development is critical for this option and depends on the availability of knowledgeable users and an existing gage to which they are calibrated. Networking may under-sample “lower profile” but knowledgeable users; networking that attempts to develop samples through multiple channels (e.g., guide lists, boating or angling stores, and launch registers) is one approach to minimizing these problems. Sufficient panel sizes are important for statistical purposes, but the “minimum” number depends on the homogeneity of users and their evaluations. Sub-group panel sizes may be important if comparisons between groups are needed.

### Cautions & limitations

Assessing how well users are calibrated to a gage is important with this method. Pre-testing or pre-study interviews/focus groups should be considered to probe whether users really pay attention to a gage through the range of interest. If there is confusion in how gages are used, controlled flow studies or other options may be necessary.

Some users may not independently evaluate flows, and simply repeat “conventional wisdom” about acceptable or optimal flows for a recreation opportunity. Unfortunately, this method is limited in its ability to distinguish independent evaluations from those that are “passed down” over the years. In cases where skill and equipment advances have occurred (e.g., new types of boats or fishing techniques), this method may not be appropriate.

For angling, it may be challenging to keep evaluations of fishability (e.g., wadeability, access to fishing water) separate from evaluations of flows for the fishery (i.e., their impressions of biological needs). In these cases, controlled flow studies may be more useful. For more information on this potential confound in any fishability study, see the associated sidebar.



*“Boat dragging” on Alaska’s Gulkana River at low flows. Data from research trips at different flows supplemented boater survey information in this study for a water rights adjudication.*



Far Left: Rafters pushing a boat into the Colorado River in Grand Canyon after overnight flow fluctuations left it "high and dry." Flow comparison surveys of experienced boaters helped define fluctuation tolerances.

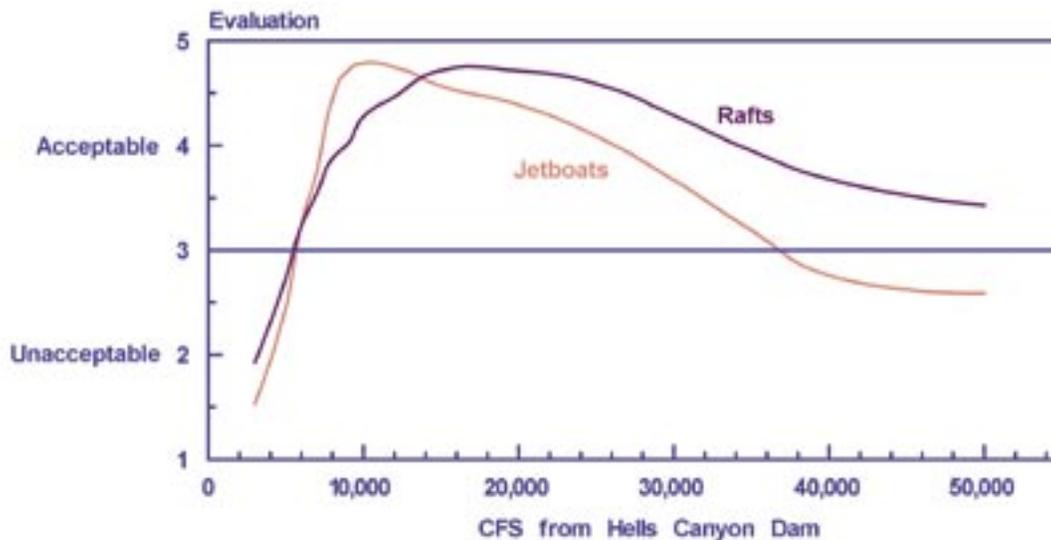
Inset: The Snake River through Hells Canyon has similar daily flow fluctuations based on power demand. Surveys showed that rafters and jetboaters preferred fluctuations of less than 3,000 cfs per day, but could tolerate 6,000 to 9,000 cfs.



operations fluctuate 12,000 cfs in some seasons. Inset: Consequences are greater for larger boats.

Far Right: Lava Falls in Grand Canyon at about 35,000 cfs. Experienced boaters are often knowledgeable about the flows that produce different types of recreation opportunities. Flow comparison studies draw on this accumulated knowledge.

Right: A commercial jetboat runs Wild Sheep Rapid in Hells Canyon at 9,000 cfs. Flow comparison surveys were used to develop overall flow evaluation curves for rafts and jetboats (below). Minimum flow needs were similar, but higher flows are better for rafts than jetboats.



# Controlled Flow Studies for Boating

## Objective

Improve precision of estimated flow ranges for boating opportunities by having a panel of boaters evaluate several known (usually controlled) flows. Generally applicable to rivers without a gage or little history of previous use, the idea is to manipulate the independent variable – flow – which introduces a quasi-experimental format to evaluations. Assembled panels may also offer opportunities to roughly explore regional “supply” of similar rivers or “demand” for similar opportunities.

## Typical approach

Level 1 and 2 information is used to determine flow range and opportunities of interest. Target flow increments are chosen and arranged for a short period of time (if possible). In some cases, the study may capitalize on natural flows instead of controlled flows. Boaters complete a pre-fieldwork survey on their experience and boating preferences, run the river at each flow, and evaluate flows and participate in a focus group after each run. After all flows have been observed, participants make overall evaluations using a “flow comparison” format. Photos and video footage of key rapids and conditions can provide useful documentation, particularly in combination with qualitative focus group notes and quantitative data from surveys. Quantitative ratings (by panels or experts) are commonly made for all relevant opportunities and conditions (see Whittaker et al. (1993) and Whittaker and Shelby (2002) for more detailed information about survey instruments and analysis options).

## Products

Summary of methods and findings in a report. Methods should include descriptions of panel and instrument development. Findings typically include tables and graphs appropriate to the analysis. Appendices typically include

a list of participants, focus group notes, photo gallery, and survey instruments. The methods and findings may be presented as a report supplemental to Phase 1 and 2 reports. Some utilities produce an edited video that highlights study findings with footage of key flow effects and interviews/focus group comments; these need to be coordinated and consistent with report findings.

## Responsibilities

These studies are more complicated and typically require substantial participation by utilities, their consultants, agencies, and stakeholders. Utilities (or their consultants) have primary responsibility, but agencies and stakeholders also play key roles (see sidebar with more detail on these potential roles).

## Additional issues

There are several important issues in conducting controlled flow studies efficiently and effectively (Shelby et al, 1998). Some of these issues become even more challenging on higher gradient rivers with little previous use (Shelby et al. 2004). It is beyond the scope of this document to provide details on these issues, but key considerations are listed below:

*Study output.* The relative precision of qualitative and quantitative data may vary depending upon the size of the panel and how data is analyzed. More precise “flow evaluation curves” or “optimal ranges” come from quantitative surveys of participants, but professional judgments by researchers may be sufficient if maintenance of a panel is difficult. More precise quantitative output becomes important when potential for controversy is high. Other resource studies typically generate specific incremental relationships between flows and resource values (e.g., IFIM studies), so parallel information for recreation is needed if careful assessments of trade-offs between resources are anticipated.

*Sample.* Sample issues trade-off “representativeness” against potential cost or logistical complexity. More participants improve precision, but they also increase complexity and make it difficult to maintain participation through a multi-day study. Most studies use “purposive sampling,” inviting participants based on their 1) skill and safety record, 2) proximity to the river, and 3) ability to evaluate a diversity of whitewater opportunities. This requires close coordination with stakeholder groups.

*Flow control.* This includes technical limitations of dams as well as administrative, political, and legal constraints, which should not be underestimated (Shelby et al., 2004). Technical limitations on releasing precise flows or narrow increments can be more problematic on higher gradient rivers, because small changes in flow may create substantial changes in difficulty. Lack of upstream storage may also constrain flow control (insufficient water in dry years; too much in wet years). Many studies require careful timing and contingency plans, which also may have administrative, political, or legal constraints.

*Flow choice.* Choosing the number and increments of flows is a case-by-case decision that generally depends on Level 1 and 2 findings and requests from other resource specialists (e.g., fisheries researchers, etc.). Three to four flows are commonly assessed in these studies.

*Impacts on other resources.* Timing of boating flows may be a major concern for other resources. If possible, releases should be timed to minimize adverse impacts to aquatic biota and power generation schedules, or at least to assess potential impacts (which may include biophysical benefits such as building beaches, cleaning spawning beds, introducing woody material, or removing encroaching vegetation).

*Study complexity.* This increases with the number of flows, length of the reach, number of participants, and types of craft or opportunities under consideration. Controlled flow studies work best when they are focused on discrete flow ranges where more precision is needed, and where boating is expected to be possible and safe. Rugged terrain associated with challenging rivers may increase the logistical challenges and safety/liability risks, which may affect panel and analysis considerations. Safety priorities may also preclude examination of flows near the

high or low ends of acceptable ranges, or increase costs if additional emergency equipment or expertise is needed.

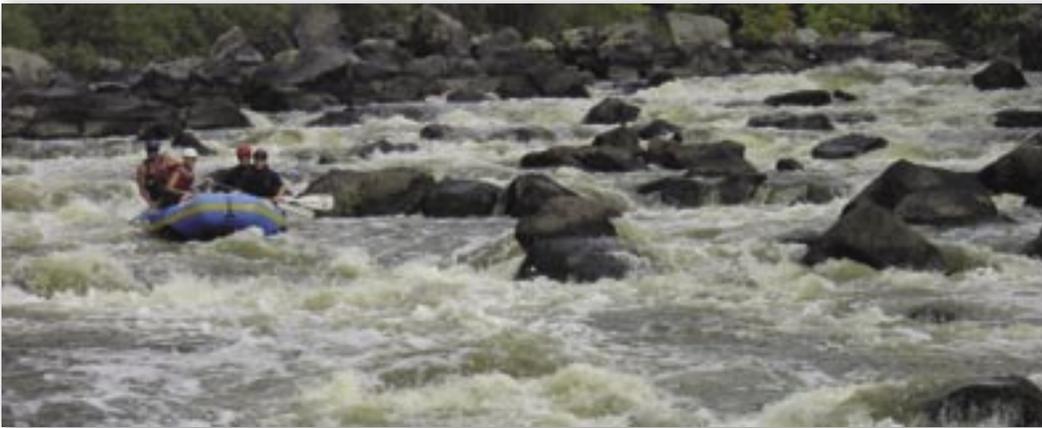
**Cautions & limitations**

Controlled flow studies are most useful where river segments are short, flows can be definitively controlled, river access is easy, and users are readily available (Shelby et al. 1998). These characteristics are commonly found on bypass reaches at hydropower projects. Applying this method to longer reaches without flow control is more problematic.

Controlled flow studies for boating focus on immediate effects on hydraulics, but they may not document longer-term indirect effects that may be important for boating or other recreation. These studies also may not address a diversity of flows through a season unless there are resources to examine many flows. They are better suited as a tool to identify specific flows that may be released as an augmentation for one or two opportunities.



*California's Pit 5 Bypass Reach during a controlled study (1,260 cfs shown here). The study examined six flows from 250 to 1,840 cfs. Optimal ranges started about 1,200 cfs for kayaks and 1,500 cfs for rafts.*



*Hells Corner rapid on the Upper Klamath River at 730 cfs (top) and 1,750 cfs (bottom) show differences between “technical” rock-dodging trips and “standard” trips with better whitewater and more route options. A commercial rafting industry has developed here because daily peaking regimes produce at least 1,500 cfs on most summer days, providing superb whitewater “action.” Lower flows are under consideration in relicensing, but the boating study showed that flows less than 1,300 cfs require smaller boats with fewer passengers, which are less commercially viable.*



*During controlled flow boating studies, participants report boatability problems such as “stops” and “boat drags.” Above: At 400 cfs on California’s Kern River, “stuck” boats created “raft jams” as upstream boaters waited for rapids clear. At 800 cfs, boatability problems were rare.*

## SIDEBAR

# Problems with “Blind” Controlled Flow Studies for Boating

When controlled flow studies for boating are proposed, the quasi-experimental nature of the effort sometimes leads agency staff or stakeholders to suggest that evaluations should be conducted “blind” (without boaters knowing which flow they are assessing). Although blind studies may increase “confidence” that evaluations are only based on the observed flow, there are several disadvantages (discussed below) that outweigh that advantage.

There may be safety concerns in not knowing flows, or the amount of change from one study flow to another, particularly on challenging rivers. Although boaters in a blind study would probably know immediately whether a subsequent flow was higher or lower, information about the magnitude of change could be crucial for deciding whether they have the skill to handle it. Boaters are accustomed to estimating how specific flow changes affect the level of challenge on other rivers; they need similar information on a study river.

Knowledge of study flows allows boaters to interpolate between flows or extrapolate beyond them for the flow comparison survey at the end of a study. If they don't know the flows they evaluated, flows between or outside the study flows cannot be evaluated.

Boaters often think in terms of cfs, and it is one of the basic metrics they use in describing a boating run (along with gradient, and the height or width of specific drops). Asking them to evaluate a reach and flow without this metric reduces their ability to do so. Just as surfers pay attention to the height of waves or skiers to the depth of snow, quantitative information is something river runners integrate into their description of what they observed.

Eliminating this variable is likely to make them less systematic in their evaluations.

Boaters often have a working knowledge of flows on many rivers that may be similar to the study reach; blind studies don't allow participants to capitalize on that knowledge. For example, it may be valuable to have boaters discuss how 500 cfs on the study reach is similar to or different from 500 cfs on another reach (something they can't do if they don't know the flow).

Withholding flow information during a study may encourage participants to think the utility or researchers don't “trust” boaters. Accurate data provided to boaters as soon as it is available generally creates a greater sense of cooperation.

Blind studies are probably not necessary to alleviate concerns about “strategic bias” (respondents answer questions in line with how they think data will be used). There has been little evidence to suggest strategic biases occur in recreation studies in general, or flow studies in particular. Based on focus group discussions and analyses of study results, differences in evaluations appear to reflect skill, equipment, or type of boating preferences rather than strategic biases. In addition, participants appear to understand that results could be used to develop flow releases, but they also know that requests for higher flows generally work against the likelihood of frequent releases. It is generally in their best interest to evaluate flows accurately so they can determine the lowest flow that provides a particular recreation opportunity.

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*Boaters can make more informed comparisons when they know the flows during studies.*

*Right: California's Pit 5 bypass reach at 1,840 cfs (boaters rated six flows from 250 to 1,840 cfs).*



## Controlled Flow Studies for Fishability

### Objective

Improve precision of estimated flow ranges for fishing by having a panel of users evaluate several known (usually controlled) flows. Generally applicable to rivers where historical fishing has adapted to an existing controlled flow regime and modifications of that regime are considered. Assembled panels may also provide opportunities to help roughly explore regional “supply” of similar rivers or “demand” for similar opportunities.

### Typical approach

Similar to boating controlled flow assessments, Level 1 and 2 reports are used to determine flow range and opportunities of interest. Target flow increments are chosen and arranged for a short period of time (if possible). Anglers complete a pre-fieldwork survey on their experience and angling preferences, observe or fish the river at each flow (usually at a sample of locations), and evaluate flows and participate in a focus group after each flow. After all flows have been observed, participants make overall evaluations using a “flow comparison” format. Photos and video footage of key fishing areas and conditions can provide useful documentation.

### Product

Summary of methods and findings in a report. Methods should include descriptions of panel and instrument development. Findings will typically include tables and graphs appropriate to the analysis. Appendices typically include a participant list, focus group notes, photo gallery, and survey instruments. Video or photographic documentation may supplement report information.

### Responsibilities

These studies are more complicated and typically require substantial participation by utilities, their consultants, agencies, and stakeholders. Utilities (or their consultants) have primary responsibility, but agencies and stakeholders also play important roles (see sidebar with more detail on these roles).

### Additional issues

In addition to issues for boating controlled flow studies, fishability studies have other complexities.

Representativeness of the panel may be particularly important because anglers who fish for certain species or use certain techniques may be poor evaluators of

flows for other species or types of fishing (e.g., wading-based trout angling with flies vs. boat-based salmon fishing with bait). This requires close coordination with stakeholder groups to represent target opportunities.

Anglers can evaluate specific locations as a group at each flow, or independently decide which locations to assess (which might change at different flows). There are advantages and disadvantages of each strategy, depending on the length of the reach, homogeneity of its physical characteristics, and the time anglers will have to assess flows.

### Cautions & limitations

As with boating controlled flow studies, fishability studies are most useful where river segments are short, flows can be definitively controlled, river access is easy, and anglers will participate.

Fishability studies are only one component of assessing flow needs for fishing opportunities. Fishability studies focus on access to fishable water, offering less information about long term effects on fishing success, the fishery, or biophysical conditions (see separate sidebar on these distinctions).



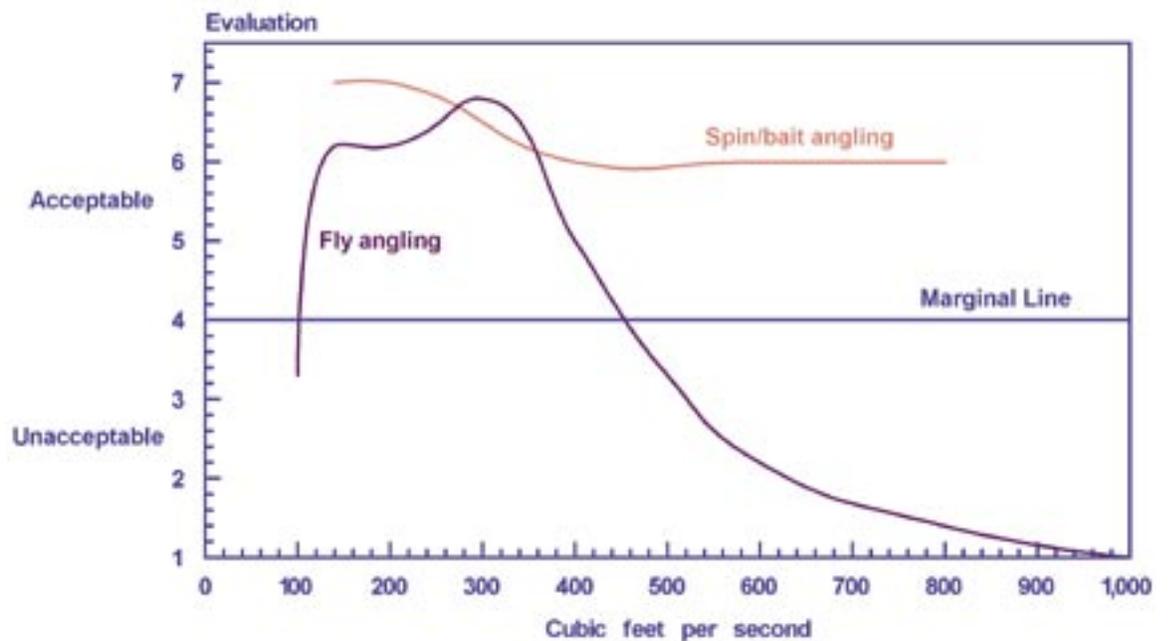
*Left: Anglers evaluated a different flow each day during a fishability study on California’s Pit River. At the end of the multi-day study, a “close-out” survey compared all the flows.*

Wadeability is critical for some types of angling, but depths and velocities also affect tackle and technique choices. Higher flows require heavier tackle to reach fish that are “holding” lower in the river, but this increases the risk of snagging.  
 Right: Idaho’s Salmon River.



California’s Pit 4 bypass reach has Project-induced base flows of 150 cfs, allowing anglers to cross the river and fish away from encroaching vegetation. The 420 cfs study flow (left) made wading and crossing difficult, dramatically reducing “fishable water.”

Angling flow evaluation curves for California’s Pit 4 reach. Optimal flows for wading-based fly fishing are between 150 and 350 cfs, with a sharp decline at higher flows. In contrast, spin/bait angling was good at all study flows because it doesn’t require wading.



## SIDEBAR

# Flows, Fish Habitat, and Fishability

High quality fishing obviously starts with good habitat and a healthy fishery, but these may not be sufficient. For some anglers, catching fish may be less important than broader experiential benefits such as “exploration,” “experiencing natural environments” or the “challenge of fishing” (Knopf et al. 1973; Fedler and Ditton 1994). A “blue ribbon” fly-fishing stream, for example, has a good fishery and good water to fish (e.g. wadeable access to riffles and pocket water, sufficient casting space away from riparian vegetation, and non-turbid water). While anglers appear able to adapt to different flow conditions, they often have preferences for specific conditions and fishing techniques (Whittaker et al. 1993); these can be affected by changes in flow that anglers can help evaluate.

“Fishability” studies have been developed to address this issue, and they have become important in some relicensing efforts where licensees and stakeholders consider changes in flow regimes, whether for boating, habitat, or other values. Value judgments about choices of recreation outputs require good information about impacts on all resources.

In conducting fishability studies, it is important to separate evaluations of “angler habitat” from evaluations of “fish habitat,” and it is clear that these habitats may not be equivalent. Flows that optimize high quality angler habitat may sacrifice fish habitat, just as flows that maximize numbers of target fish species may sacrifice important elements of anglers’ experiences. For example, would wading-based fly anglers prefer higher catch rates or larger fish if it required fishing from a boat or using spinning gear? Would anglers prefer “easier” fishing conditions (e.g. wadeable low flows where fish are concentrated) to those that are “harder,” even if harder conditions increase the number or size of fish by a certain amount?

Fishability studies only address immediate effects that anglers can evaluate; they do not provide information about immediate or long-term biophysical effects. Anglers in fishability studies consistently note concerns about flow effects on fish populations, feeding behavior, spawning success, and the overall health of the fishery. However, most anglers are

not the appropriate “experts” to assess these impacts. We suggest that the best way to prevent these biophysical concerns from confounding fishability evaluations is to discuss them in a pre-evaluation focus group. This gets these issues “out on the table” and allows anglers to voice their opinions, but then narrows the focus to attributes anglers are best equipped to evaluate: access to fishable water (wading, from the bank, or by boat) and use of fishable water (tackle and technique considerations).

It is difficult to evaluate fishing success at different flows during a controlled flow effort if study flows are provided for only a few hours. Most anglers develop evaluations of fishing conditions over multiple visits that vary where they fish or the tackle and techniques they use, as well as larger factors such as weather, season, time of day, and availability of a hatch. In addition, fish may not have “adjusted” to study flows, so anglers don’t know if fish are behaving as they would over the long term.

Fishability studies also need to carefully specify the type of fishing opportunity under consideration; in some relicensing efforts, the choice may be between different types of angling rather than more subtle changes in one type. Even on the same river, for example, boating-based fishing for salmon may have flow needs substantially different from wading-based fly angling for trout. It is also important to recognize that anglers may be “committed” to a certain type of fishing associated with a particular flow regime. New flows may change the type of fishing, and anglers may not want to “lose” the old

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*In fishability studies, anglers evaluate important attributes such as wadeability and access to fishable water.*

*Right: Wading “experiments” during a study on California’s Upper North Fork Feather River showed differences in individuals’ “willingness to wade,” but the controlled flow study showed general agreement about the flows that produced high quality fishing conditions.*



opportunity. Well-designed fishability studies can address these different opportunities and evaluations, but may require more care in developing evaluation panels and focusing on appropriate variables.

Integrating fish habitat and fishability information is also complex. As discussed in the conceptual framework (Figure 1), tradeoffs among resource outputs are related to resource conditions that may change over time. But one should not assume that the choices are to provide for one or the other (not both). There may well be “elegant” solutions where flow regimes provide critical fishery benefits at some times and optimize fishability at others. In all cases, good fisheries management requires consideration of the full range of social and biophysical outputs and their potential trade-offs (Ditton 2004).

Social scientists have begun developing models for assessing complex tradeoffs inherent in fisheries management decisions (Aas et al. 2000; Gillis and Ditton 2002), but none have been applied to flow issues. Social science can help determine anglers’ preferences for different types of fishing opportunities affected by flows. However, the opportunities

must be carefully specified with both social and biophysical information. Preferences will probably shift depending upon 1) the abundance, size, and distribution of the current versus “new” fishery; 2) whether the new fishery will include new species (e.g. salmon and/or steelhead); 3) how new species might affect existing species; 4) relationships between flow regimes and fishing success; and 5) how flow regimes would affect the way anglers fish (technique and tackle, and whether it was boat, shore, or wading-based). To assess angler preferences, biophysical scientists need to specify how flow regimes affect the fishery and social scientists need to develop data from anglers to consider the trade-offs. This is an area for truly interdisciplinary work.

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*In “angler habitat” or fishability studies, it is critical to carefully define the type of fishing (species, tackle type, and technique), just as fish habitat studies assess needs for different species and life stages. For example, king salmon (left inset) and sturgeon (right inset) fishing are relatively “flow-insensitive” because anglers often fish from boats in deeper water using bait or heavy spinning gear. Wading-based fly fishing for trout (bottom) is more “flow-sensitive” and has a narrower “fishable range.”*



## SIDEBAR

# Roles and Responsibilities During Controlled Flow Studies

The following is a list of typical tasks during a controlled flow study (for boating, fishability, or aesthetics), along with typical roles and responsibilities. These tasks may also apply in multiple flow reconnaissance efforts. The list may offer a good starting point for agreements during a study, but negotiations and flexibility are possible. Depending upon the skills, experience, and resources of utilities, their consultants, agencies, or stakeholder groups, there may be efficiencies in “trading” tasks.

### Providing flows

Utilities are usually responsible for controlled flow releases (when feasible), although these may need to be coordinated with other agencies or water administrators. Complexities here should not be underestimated; there may be technical, administrative, or legal challenges in scheduling and then achieving target flows (or capitalizing on natural variation). It is particularly important for researchers and utility relicensing staff to work closely with project operations staff; these on-the-ground staff know whether requested flows are possible, and they will ultimately be the ones responsible for providing them. Additional coordination may also be necessary with researchers from other resource areas that would like to capitalize on the availability of controlled flows. Early interdisciplinary communications to identify and coordinate goals may pay dividends.

### Flow measurement / development of flow models

Some reaches may not have existing gages, so flow measurements to ensure accurate knowledge of controlled flows are important. Coordination between agencies and the utility may suggest roles, but ultimately the utility is responsible for ensuring this task is completed. USGS or state water resource agencies may offer other options. In the case of new licenses, the development of hydrology models may be necessary to allow studies to capitalize on natural variation.

### Panel development and organizing participants

Stakeholders for boating or fishing “communities” may be able to provide names or organize groups for the study, although consultants sometimes assume this role. Depending upon the size of the panel and the number of flows to be evaluated, this task can be considerable (especially for studies that are conducted with intervals between flows). Agencies and utilities generally review lists to ensure representativeness for each opportunity of interest.

### Safety plan

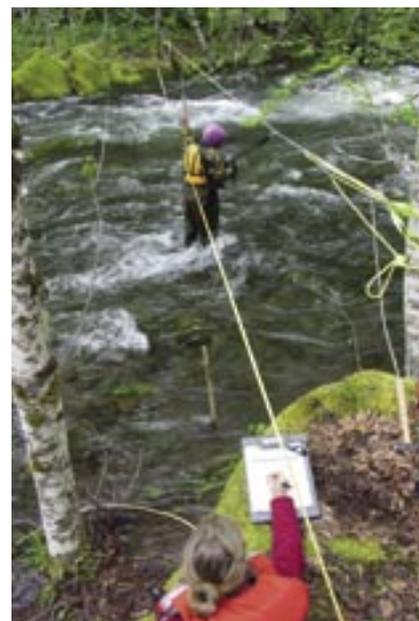
Utilities usually develop a safety plan in collaboration with participants and the stakeholder requesting the study. Although there may be exceptions for particularly challenging reaches, safety plans are typically only a few pages long. Contents typically cover equipment and skill expectations for participants, communications equipment provided by the utility, communication and rescue protocols, and lists



*Safety is always important during fieldwork. Safety plans identify potential problems and ensure that equipment and expertise are available during a study.*

*Left: Boaters on Oregon's Clackamas River were able to quickly free this raft using commonly-carried safety gear.*

*It is important to know flows during a study. Releases from dams are seldom precise, so accurate gages or field measurements (right) may be necessary.*





*Stakeholder participation helps ensure study success.*

*Left : Forest Service staff discussing conditions during the Pit River boating study.*

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of authorities to notify about the study. Safety plans do not usually describe protocols for addressing specific rescue situations at specific locations.

#### **Liability waivers**

Utility lawyers usually develop these forms; consultants and stakeholders usually review them. All participants are typically required to complete them during assessments or other fieldwork.

#### **Survey instruments**

Consultants usually develop the survey instruments; utilities, agencies, and stakeholders usually review them.

#### **Liaison with the public or other users**

The utility is usually responsible for informing other users of flow changes during a study. In some cases, restricting other uses during the study may be necessary to reduce risks. If media interest is high, some opportunity to exchange information between researchers, participants, and the media may be arranged.

#### **Logistics**

There are several tasks possible in this “catch-all” category, including shuttle/ transportation logistics, locations for meetings, meals and snacks for participants, access, coordinating public or media interest, coordination with local search and rescue organizations, camping or accommodation for participants during a longer study, and so on.

In general, the utility or its consultants are responsible for organizing and supporting these tasks, although coordination with agencies and stakeholders may suggest efficiencies or cost-savings. Most utilities provide shuttles and lunches/snacks during studies, but not all provide accommodation, pay travel costs (mileage), or cover evening meals.



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*Surveys provide quantitative data and focus groups add qualitative information, but effectively organizing, conducting, and documenting these data collection efforts requires skill and care.*

*Above: Boaters complete surveys (inset) and participate in a focus group during a controlled flow study on California's Kern River.*

# Supply and Demand Assessments

## Objective

More precisely describe regional availability of similar recreation opportunities (supply), regional demand for opportunities, or likely use levels if new opportunities were to be created by project enhancements. Regional supply and demand information can be helpful for deciding the scale or extent of potential enhancements.

## Typical approach

Level 1 and 2 efforts commonly list regional recreation opportunities to provide context for more focused flow-recreation studies. Similarly, information from interviews, focus groups, and surveys can help identify lists of “substitute” opportunities, demand for certain types of opportunities, comparative ratings among different river reaches, or likelihood of use. This Level 3 effort involves more comprehensive assessments that integrate multiple sources of information. Supply studies develop a database of regional river segments and

characteristics; analyses can quantify the number of segments that meet specific criteria (e.g., Class IV boating segments within 3 hours of city X), or describe reaches that meet those criteria. Demand studies also integrate multiple sources (e.g., national, state, or regional participation surveys; regional equipment sales; estimates from recreation leaders) to predict participation and trends. In some cases, this information may be used to help estimate use levels for specific recreation opportunities. Surveys of regional groups (e.g., local anglers) are another option that may make sense if potential project effects include the development of a new resource (e.g., a restored salmon fishery).

## Product

Summary report of supply, existing or projected demand, and estimates of use. The report includes descriptions of methods, sources and their limitations, and findings.

## Responsibilities

These studies are led by utilities or their consultants. Agencies and stakeholders may participate in reviewing supply database variables, suggesting potential demand assessment sources, reviewing surveys, or reviewing draft reports.

## Additional issues

These studies require integrating several sources of information, each with limitations or assumptions of varying certainty. Quality assessments will clearly identify sources, limitations, assumptions, and how information is combined to form conclusions.

## Cautions & limitations

Assessments of existing regional opportunities (supply) can be quite accurate, depending upon the resources available for the development of a database and the quality of analysis. Analyzing basic guidebook information can provide useful summaries of nearby opportunities and help assess how a



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*Some recreation activities are extremely popular, creating crowding or competition. Demand and supply assessments attempt to predict future use levels, which is challenging even with good information.*

*Left: “Combat fishing” for sockeye (red) salmon on Alaska’s Upper Kenai River.*

proposed enhancement might increase regional supply. However, “list-oriented” assessments usually do not provide sufficient information. Although research on substitution is sparse, there are complexities in how recreation users consider and compare substitute resources and activities (Brunson and Shelby, 1993).

Assessments of demand or estimates of use are even more challenging, particularly when they are intended to apply thirty to fifty years into the future. Recreation participation in specific activity categories is not always stable or predictable, and new activities develop over time. Other factors such as population growth and demographic trends, economic trends, new technologies, and age and the “participation cycle” also affect recreation participation and confound easy predictions. These complexities don’t mean assessments are worthless, but their limits should be acknowledged.

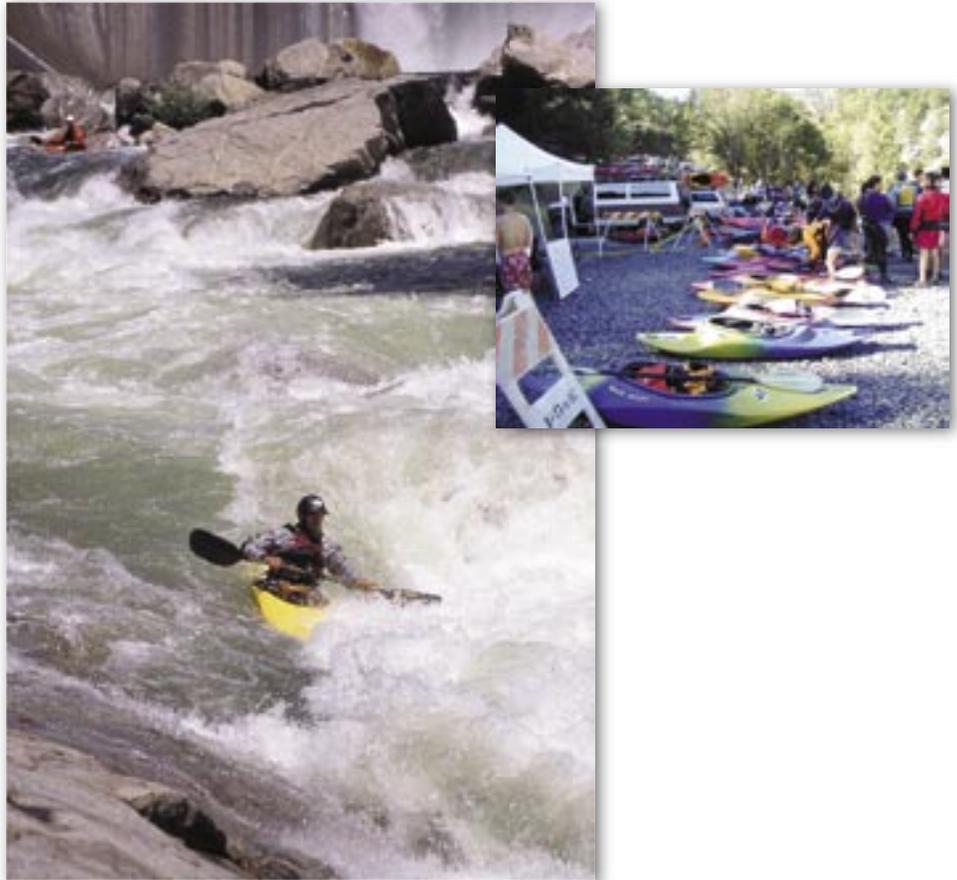
Demand or supply assessments provide context for utilities, agencies, and stakeholders to consider the relative value of existing or potential recreation opportunities and associated mitigation or enhancement measures. However, their limitations (see above) can be substantial, and the scarcity or abundance of regional opportunities or potential users are not the only criteria for protecting, enhancing, or mitigating recreation opportunities.

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*Relicensing sometimes produces a new “supply” of recreation opportunities. The number of boaters (far right) using whitewater flows on the North Fork Feather River (right) exceeded most predictions, creating management issues that demand studies help anticipate.*



*The popularity of “playboating” has made kayaking a rapidly growing river sport. Above: Oregon’s Clackamas River.*

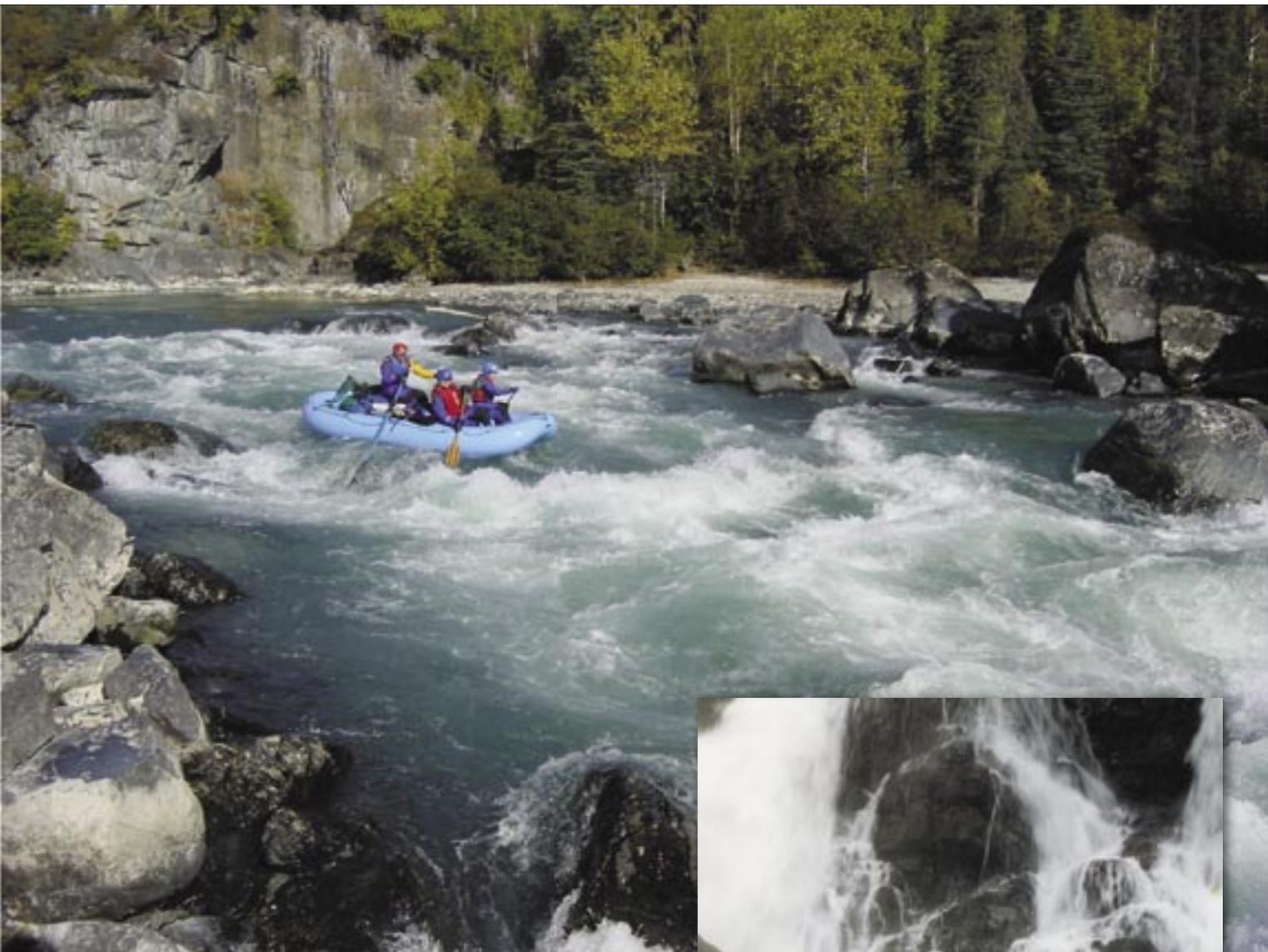


## SIDEBAR

# Study Needs for “New” License Applications

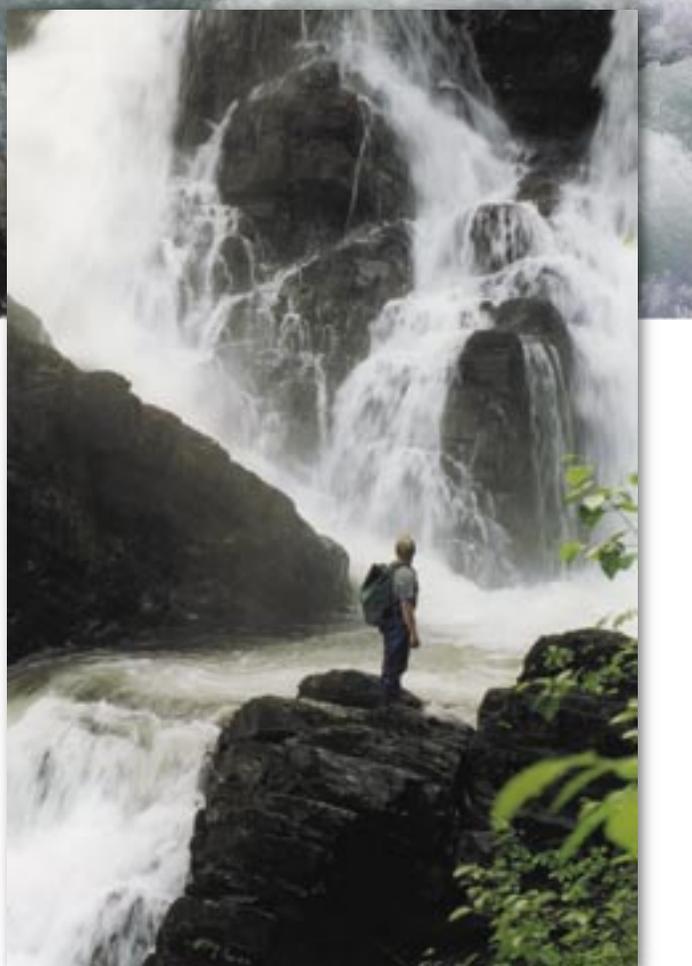
Most of this document focuses on study options for rivers where flows are already regulated (e.g., FERC re-licensing projects, water rights adjudications, or reviews of dam operations). When applied to “new” (as yet unbuilt) hydropower projects, researchers and others may find several additional challenges.

- New hydropower projects are generally proposed for currently unregulated rivers, so impacts are potentially greater than for an existing project (where decisions are limited to alternative operation scenarios). Advocates may argue for higher standards defining “acceptable” impacts because new projects are “irreversible.” This suggests studies with Level 3 precision, but this may be challenging for a variety of reasons (discussed below).
- New projects may have limited hydrology information, with insufficient data to assess wet, dry, and normal years with and without the project. Hydrology modeling is the usual solution to this problem (typically applying information from a nearby drainage), but these models are generally less precise.
- Rivers with proposed projects may be in relatively remote or limited access areas, with little history of recreation use. Recreation opportunities may not be well-known or described in guidebooks or other literature, and studies are more speculative (e.g., anticipating how changed access from a new project might induce new use).
- Remote or limited access areas complicate logistics and the ability to involve recreation users in studies (as members of reconnaissance-based assessments, participants in multiple flow assessments, or interviewees for flow comparison surveys).
- Because flows are generally unregulated, a common study option is a multiple-flow assessment that capitalizes on natural flow variation. However, this can be challenging when compounded with limited hydrology information, limited access, and limited users – particularly in a two year study period prescribed by FERC rules.
- Flow-recreation studies for projects with these kinds of constraints may be limited to reconnaissance-based, expert judgment methods (Whittaker et al., 1993, p. 59). Compared to other methods that involve users and more precise hydrology information, it is even more important that researchers have experience with the types of river recreation at issue.
- Long-term impacts on vegetation, geomorphology, or aquatic and terrestrial species are likely to play a larger role for new projects. Many long term impacts from regulated flow regimes have already occurred by the time of relicensing, and the choices for studying additional impacts due to operations choices are more limited. With a new project, the magnitude of change is likely to be larger but the ability to predict effects is more limited (especially in a two year study period). Researchers may resort to qualitative descriptions of alternative outcomes by referring to existing literature from other rivers, recognizing that applicability to new situations will be less precise.
- Estimating demand for recreation on rivers with new projects is particularly problematic if access is limited. In general, the farther a river is from population centers, the more difficult it will be to estimate demand – especially for longer planning horizons common in licensing (50 years). As an illustration, population levels in small Rocky Mountain towns (e.g., Vail, Telluride) in 1960 were small and about 1% of the national population participated in winter downhill activities such as skiing. Nearly 50 years later, amenity-based economies anchored by ski area development have created “boom towns,” about 15% of a much larger national population now ski or snowboard, and considerable societal resources are dedicated to ski industry infrastructure. The point is that predicting use over long planning horizons can be very challenging, particularly for areas where access has been limited in the past.
- Finally, new projects may need to consider trade-offs of losing wilderness/primitive recreation opportunities to less primitive opportunities on regulated, more accessible rivers. Studies that assess these trade-offs may require assessments of potential use, existence, option, and bequest values through “travel cost” or “contingent valuation” studies. These types of economic studies are beyond the scope of this document, but there is a substantial literature on recreation valuation that may apply to new hydropower proposals (Loomis and Walsh, 1997).



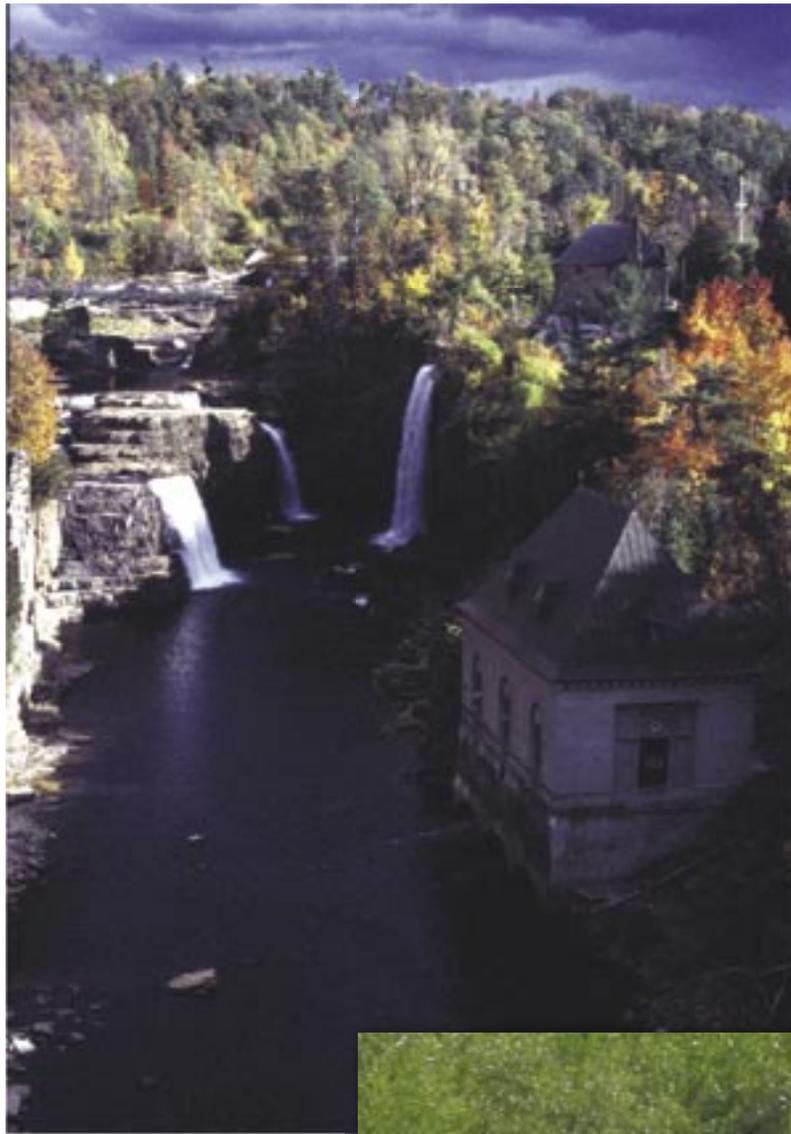
*Remote rivers are likely to have limited hydrology data, poor information about recreation use, and challenging logistics for conducting studies.*

*Above: Alaska's Talkeetna River has fly-in access, no permits or use information, and a gage distant from the whitewater segment.*



*New water projects are particularly challenging to study because development and recreation use will change substantially, and predictions of supply and demand are speculative.*

*Right: Upper falls on Falls Creek bordering Alaska's Glacier Bay National Park at 80 cfs. A licensed but unbuilt hydroelectric project would improve access to the falls and increase visitation, but reduced flows may decrease aesthetic value.*



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Early discussion across resource disciplines is necessary to integrate studies and search for “elegant solutions” that provide for multiple resources. (Left) Rainbow Falls Powerhouse on New York’s Ausable River, site of a 2005 controlled flow study.



Above: Studies on Oregon’s Klamath, a National Wild and Scenic River, may help design a flow regime that balances several “outstandingly remarkable” ecological and recreation values.

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Relicensing activities may put water back in rivers. Right: Whitewater releases are planned for this segment of California’s Pit River (1,850 cfs is shown).



# Integration and Trade-Offs: Combining Resource Values

The ultimate usefulness of studies depends on whether high quality information is provided to utilities, agencies, and stakeholders so it can be integrated with findings from other resource areas. A common shortcoming is that true “integration” is not specifically designed into relicensing processes. Most relicensing efforts include substantial numbers of meetings designed to track the overall effort, but these tend to focus on decision-making structures and reviews of study progress (e.g., schedules, budgets). They often fall short on sharing findings or implications across resource areas, and sometimes miss opportunities to work across disciplinary boundaries and seek “elegant solutions.”

Within resource areas, work groups tend to focus on specific findings and implications, rarely scheduling time to consider how those dovetail with information from other work groups. Periodic “cross-pollination” sessions focused on other resource areas would be helpful.



The timing of these sessions is also important. Integration that only occurs toward the end of the process as a massive license application is put together (with findings from dozens of studies) is less likely to be successful. In addition to encouraging consistent cross-discipline terminology and core information, earlier information sharing may provide opportunities for researchers in one area to assess flow regimes that researchers in another resource area are considering. In an ideal world, sufficient information about the effects of any flow regime would be prepared for each resource area; in reality, scientific information can

only address a limited number of alternative “scenarios.” The challenge is developing “relevant” alternatives early in the process.

Earlier discussion among work groups also encourages less adversarial integration of findings and aids in the search for “elegant solutions” that may provide for multiple resources. If agencies and stakeholders only hear proposals from work groups at the end the relicensing process, positions may already be “hardened.” The sooner everyone learns about potential proposals (or the range of potential proposals), the easier it is to systematically design studies to address the issues and clarify advantages and disadvantages.

A final consideration in effectively using flow-recreation information is encouraging distinct roles among participants. One challenge here is to ensure that scientific information is developed by researchers who are not advocates. Utilities, agencies, or stakeholders then use that information to inform their positions, which may be competing or adversarial. While utilities are responsible for collecting flow-recreation information or hiring consultants to conduct associated studies, it is important that all parties perceive those studies as unbiased. The study options discussed in this paper suggest ways that utilities, agencies, and stakeholders can participate in these efforts.



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# Photography Credits

Doug Whittaker: Cover, opposite 1, 1, 4 (top), 7, 10, 12 (left), 14, 15 (top right, bottom, inset), 17, 18, 19 (bottom), 20 (bottom left), 21 (top), 23 (top), 25 (top), 28, 29, 30, 33(top left), 34, 35 (top), 36, 37 (top), 41 (top), 44.

Bo Shelby: 9, 12 (right), 13, 15 (top left), 16 (inset), 19 (top), 20 (middle), 23, 24 (bottom), 25 (bottom right), 28 (top 2), 31 (top), 32, 35 (bottom & inset), 41 (right), inside back cover.

Robert de Haas: 2, 3, 27, 31 (middle), 33 (bottom), 41 (bottom).

John Gangemi: 21, 37 (bottom right), 40 (top).

Kathy Shelby: 4 (bottom), 16.

Idaho Power: 25 (top inset), 33 (top right).

Neil Moisey: 20 (top)

Jed Weingarten: 37 (bottom left)

Rich Bowers: 37 (bottom right).

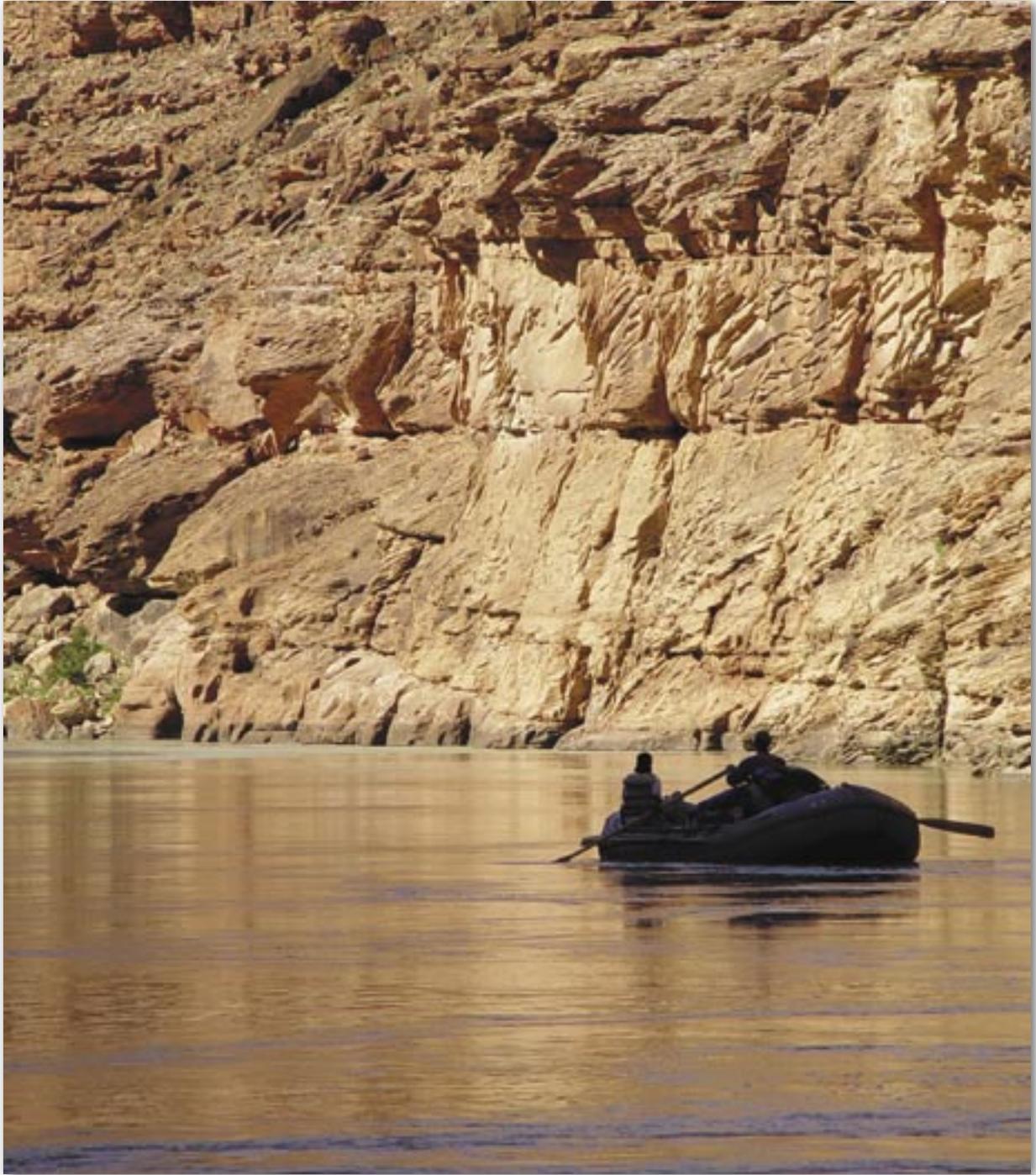
Gustavus Electric Company: 39 (bottom).

Kevin Colburn: 40 (top left)



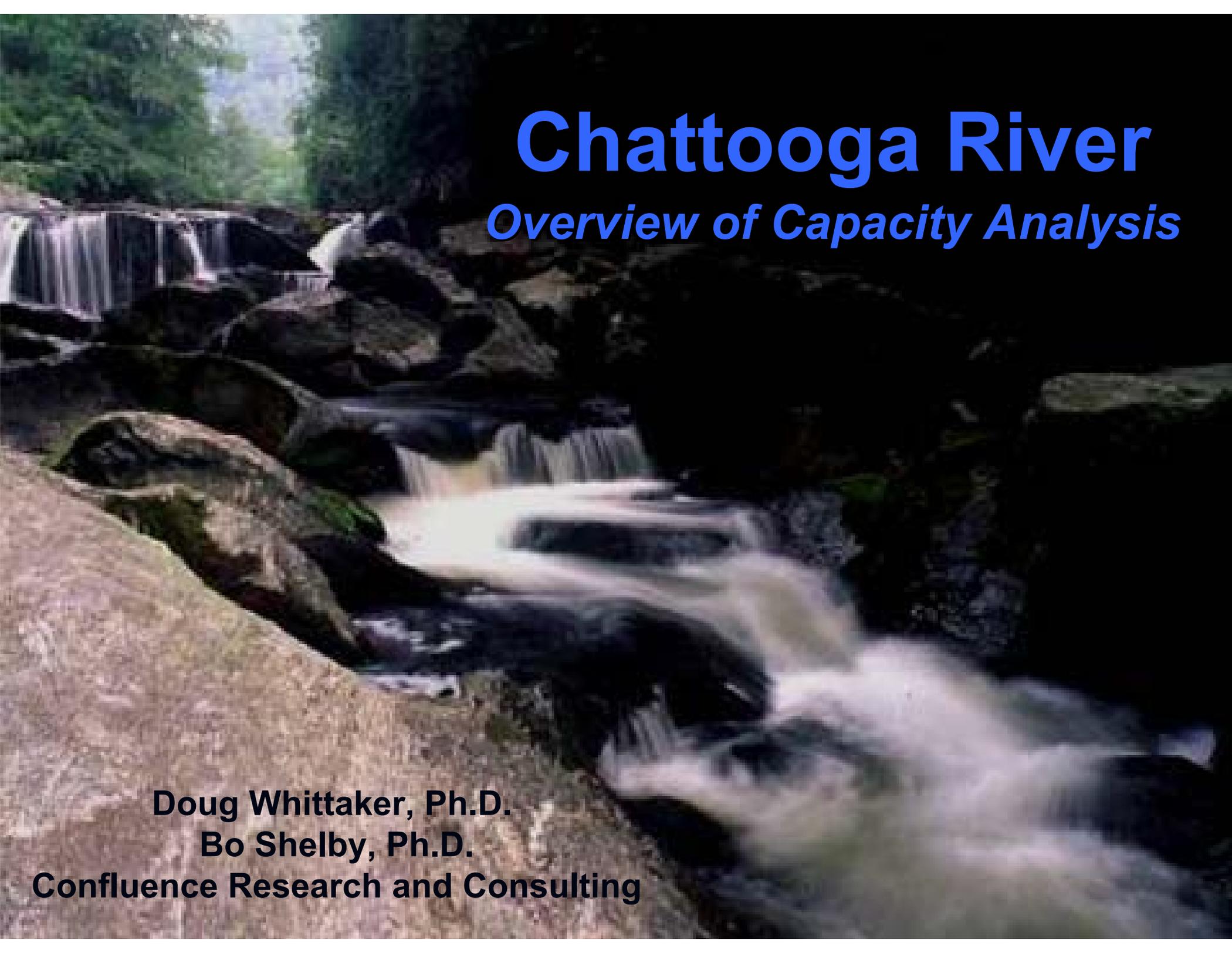
*Flow-recreation studies also may be important in water rights and navigability adjudications.*

*Above: Studies formed the basis for a water rights settlement that protects flows for recreation opportunities, aquatic habitat, and beach formation on five National Wild and Scenic Rivers in Idaho (the Main Salmon shown here).*



*Flows in Grand Canyon have profound effects on whitewater, camping, beaches, time for exploring, and naturalness. Flow-recreation studies were pioneered here in the early 1980's and they continue today.*





# **Chattooga River**

## ***Overview of Capacity Analysis***

**Doug Whittaker, Ph.D.**

**Bo Shelby, Ph.D.**

**Confluence Research and Consulting**

# Overview Presentation

- **Our role...**
  - **General advice (last fall)**
  - **Overview of options (this spring)**
  - **Integrate information (later)**
- **Analysis objectives**
- **Capacity concepts**
- **“Big picture” information needs**

# Analysis Objectives

A scenic view of a river flowing through a dense forest. The river is the central focus, with water cascading over several large, dark rocks in the foreground. The banks are lined with lush green trees and vegetation. On the left bank, a large, light-colored boulder is visible. The background shows a dense forest of tall trees, creating a sense of depth and tranquility. The overall atmosphere is peaceful and natural.

# Appeal Response

- **Multi-faceted document**
- **Beyond scope to interpret...rec. reading**
- **For this analysis...provides some direction**
- **1. Do a capacity analysis**
- **2. Consider all uses...including boating**

# Assumptions and Constraints

- **Consistency with FS policy**
- **Don't pre-judge potential actions**
- **Minimize impacts from analyses**
- **Transparency about methods / findings**
- **Involve affected parties (why we're here)**

# Analysis Plan Objectives

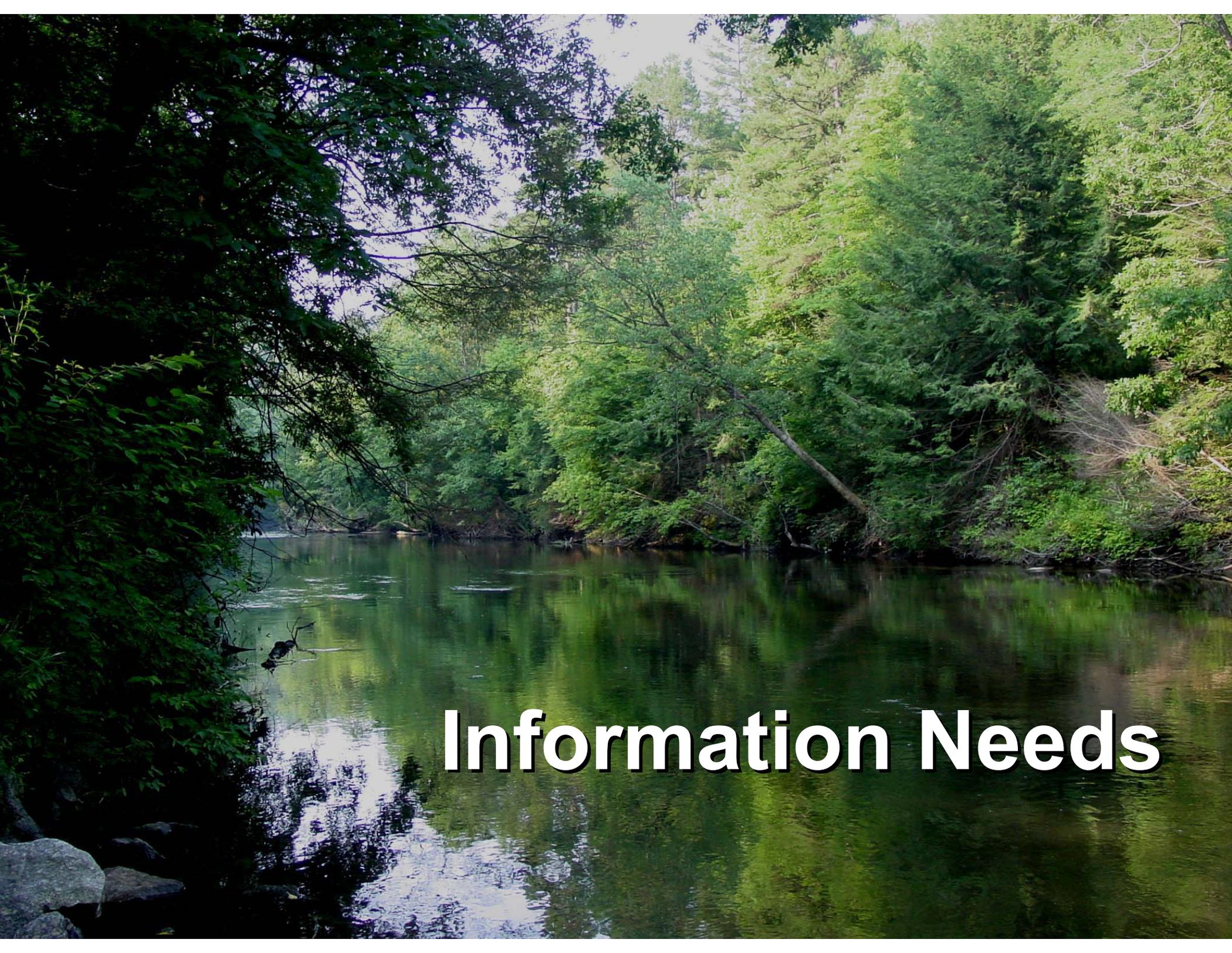
- Review information needs
- Describe potential “elements”
- Estimate costs & challenges
- FS to review & choose among options
- Mission: as much information...



# Capacity Concepts

# Recreation capacity principles

- Any use creates some impact
- Impact not necessarily damage
- Focus on indicators and standards
- Link actions to standards
- Manage by design, not by default



# Information Needs

# 1. “Decision Environment”

- Appeal response – some guidance
- Question: what else?
  - History of original boating ban
  - Capacities on other W&S rivers

## 2. Use Information



# 3. Impact Information

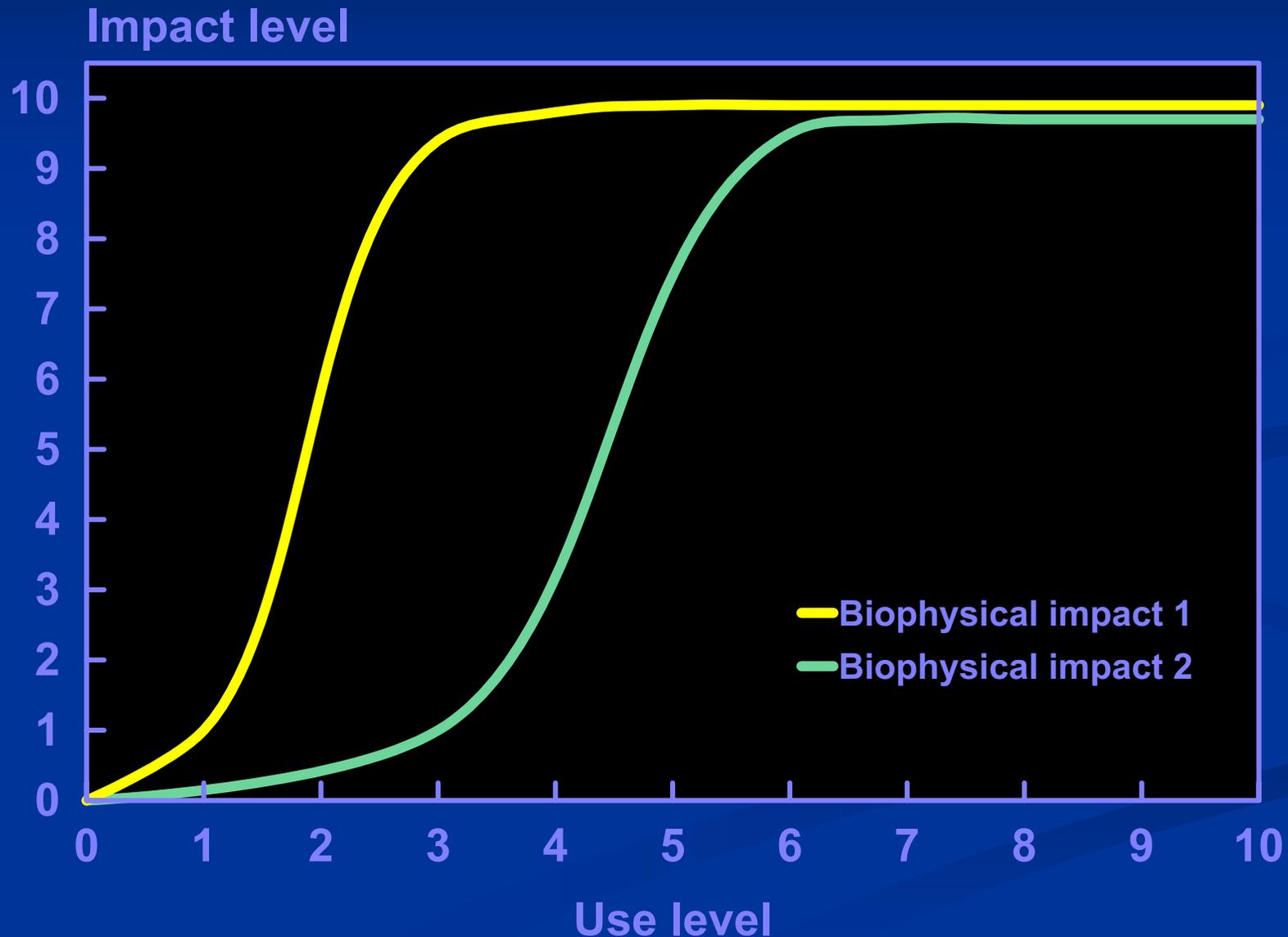
- Current and potential
- Social and biophysical



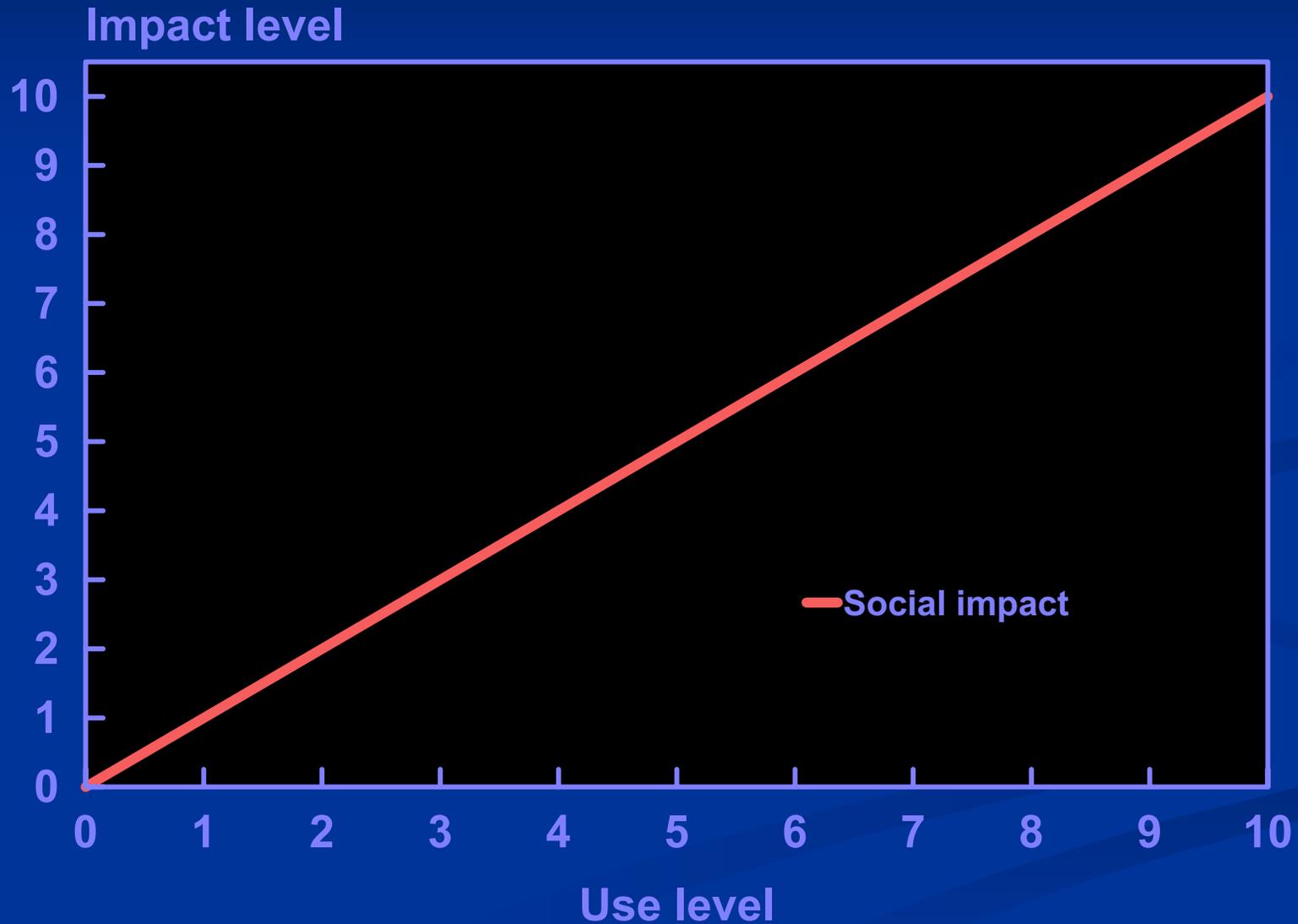
# Some impacts and tolerances

	<u>Impact</u>	<u>Tolerance</u>
Litter	15 to 20%	5%
Waste	15 to 25%	5%
Fishing comp	20 to 30%	25 to 35%
Upper floaters	4	5
Lower floaters	5	5

# Use vs. biophysical impacts



# Use vs. social impacts



## **4. Management Action Acceptability**

- **Urge to focus on actions is strong...**
- **What's appropriate & effective?**
- **Categories of actions:**
  - **Development / maintenance**
  - **Education**
  - **Regulation**
  - **Use limits**

## 5. Flow-related Information



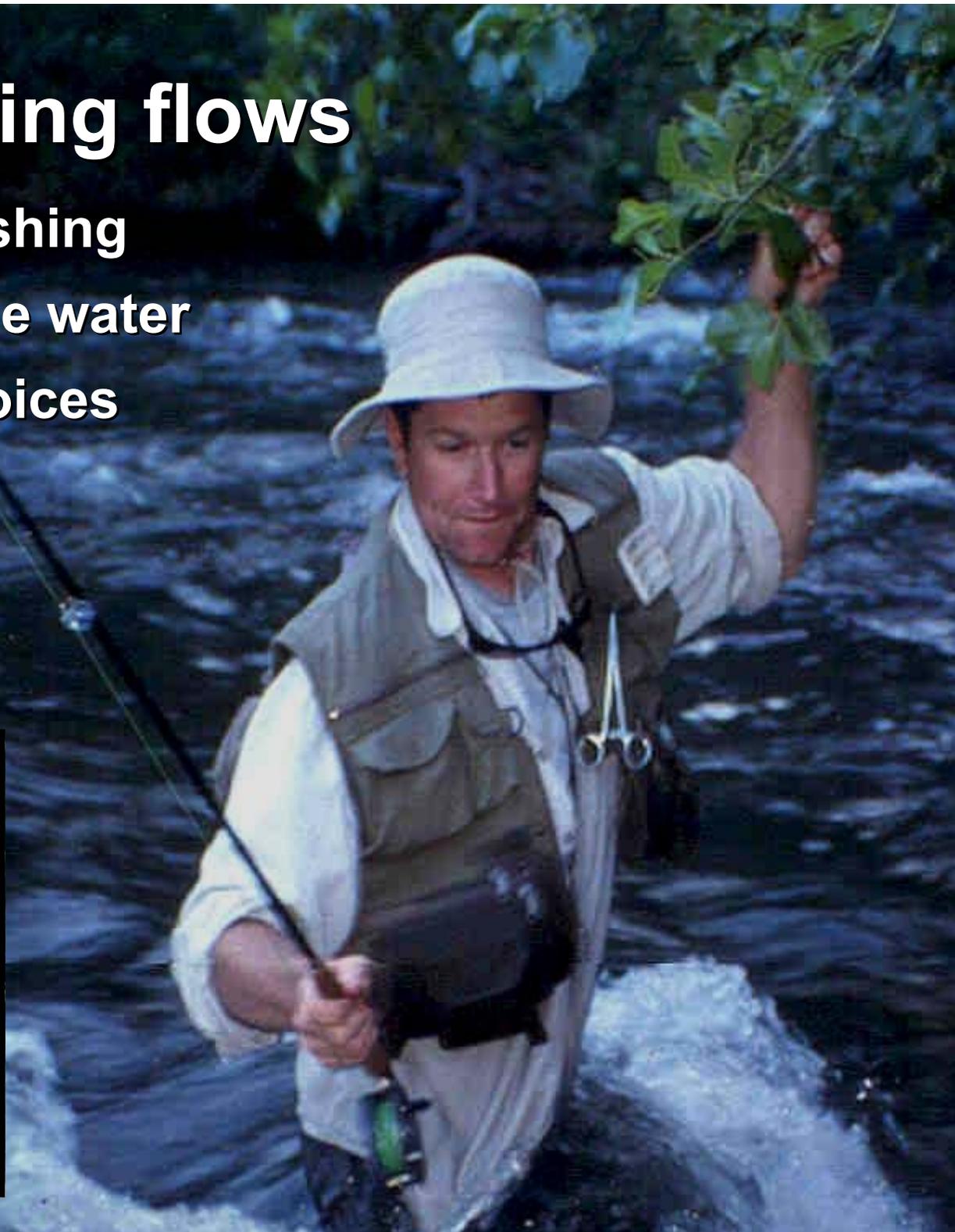
# Evaluating fishing flows

Depends on type of fishing

Key: access to fishable water

Tackle / technique choices

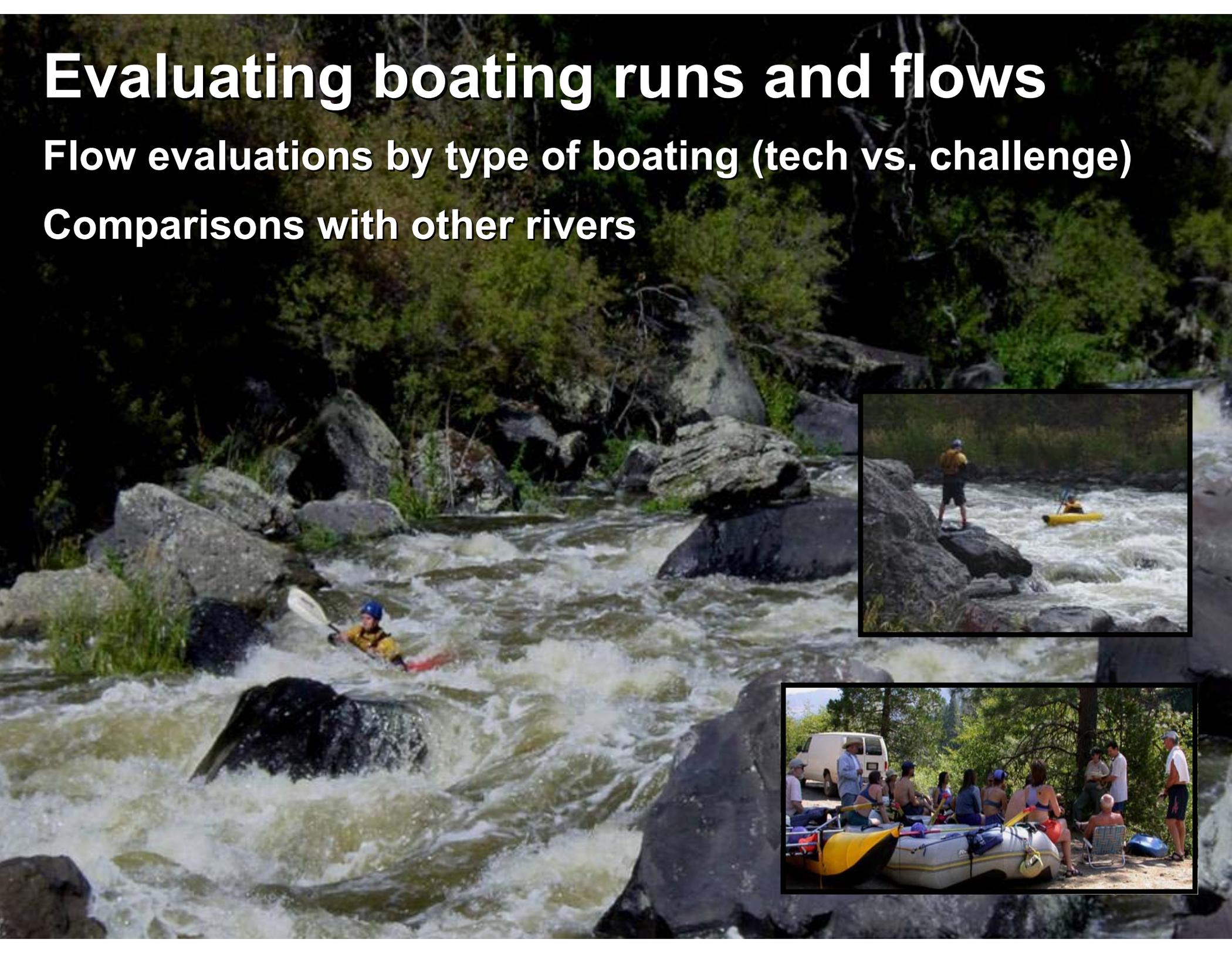
Location choices



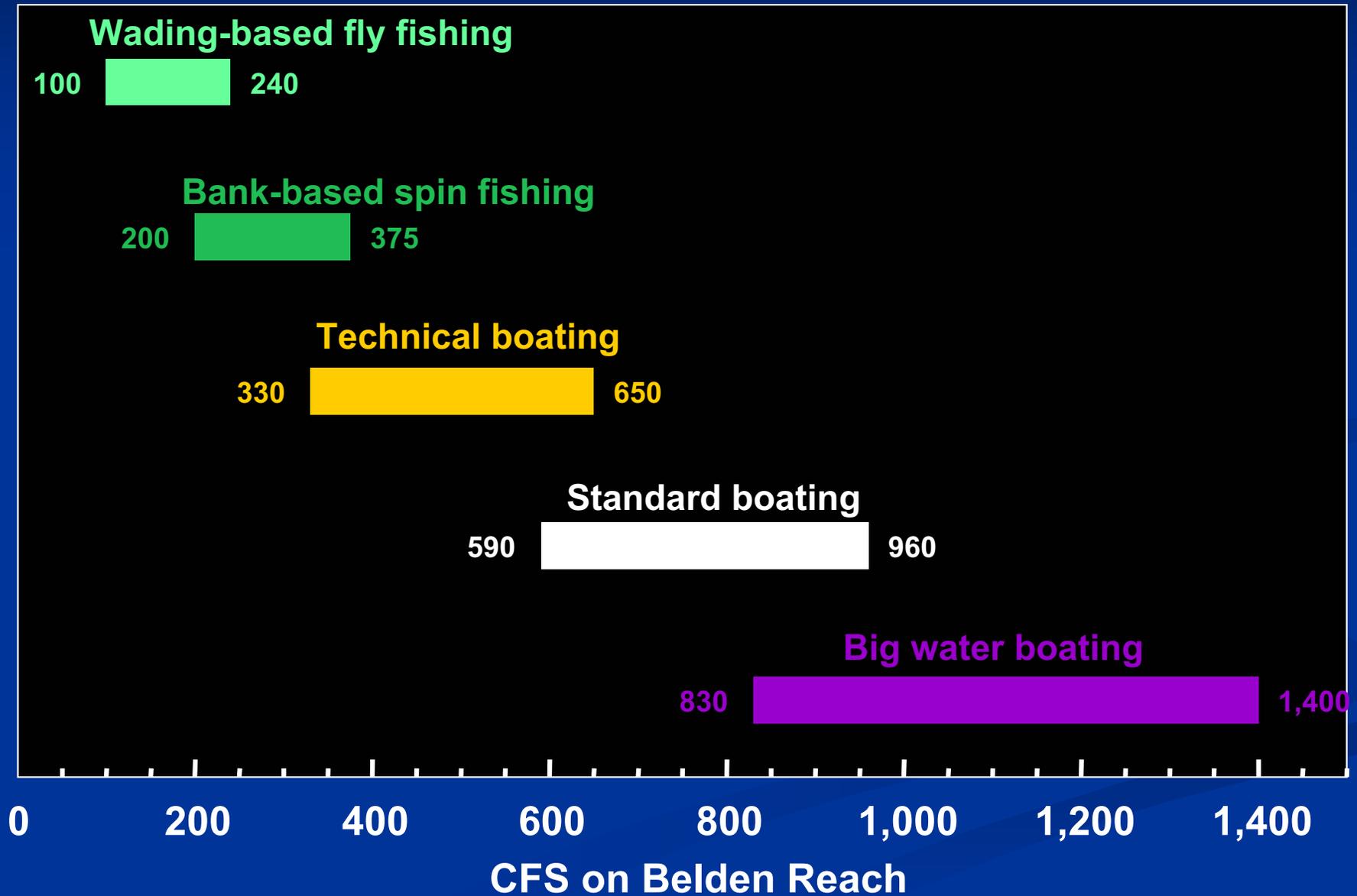
# Evaluating boating runs and flows

Flow evaluations by type of boating (tech vs. challenge)

Comparisons with other rivers

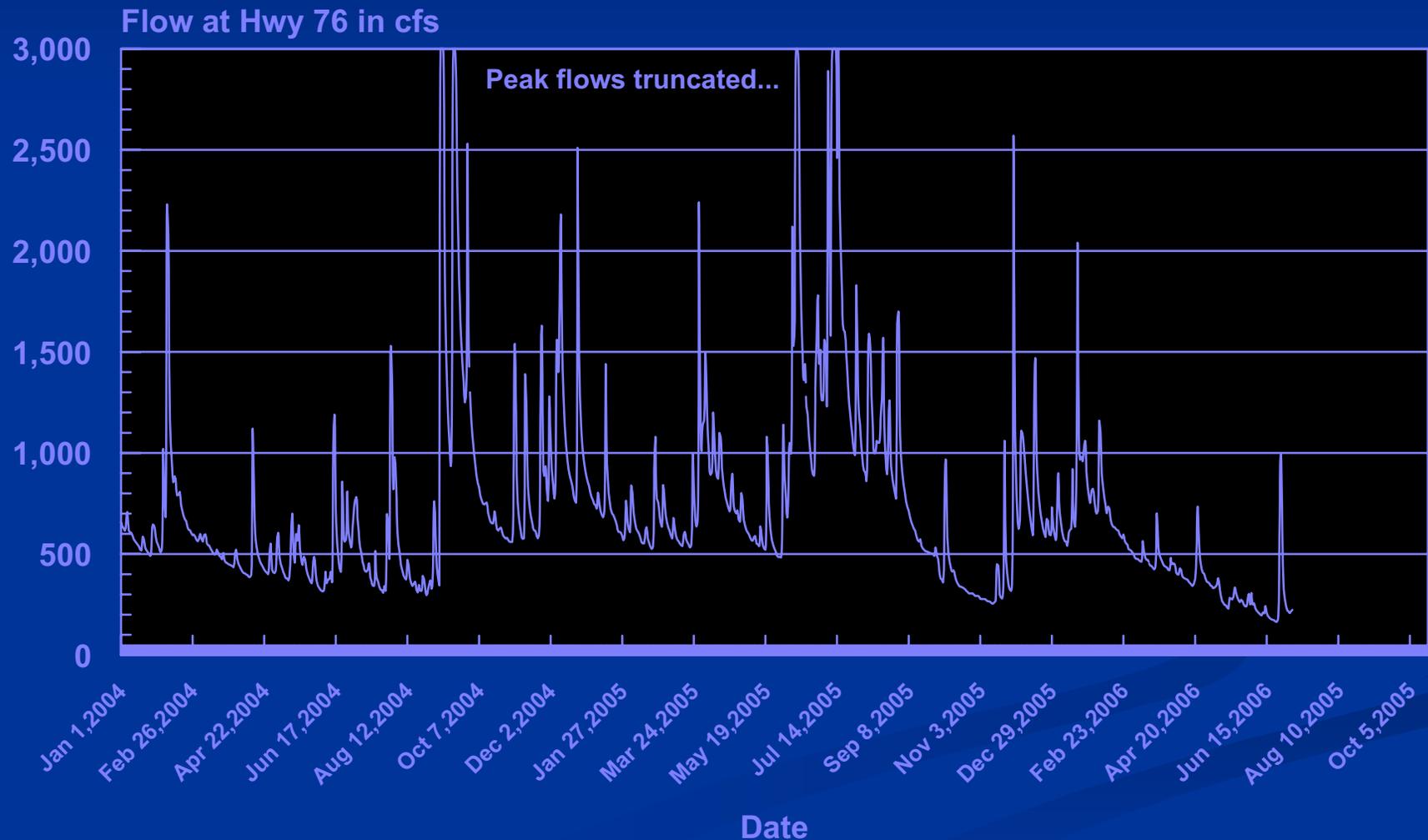


# Example acceptable ranges for opportunities



# Integrate with hydrology information

## Mean daily flows 2004-2006



A person is fishing in a river with large rocks and dense green foliage. The person is standing on a rock in the foreground, casting a line into the water. The river flows through a rocky landscape with many large boulders. The water is a mix of green and blue, reflecting the surrounding vegetation. The background is filled with lush green trees and bushes.

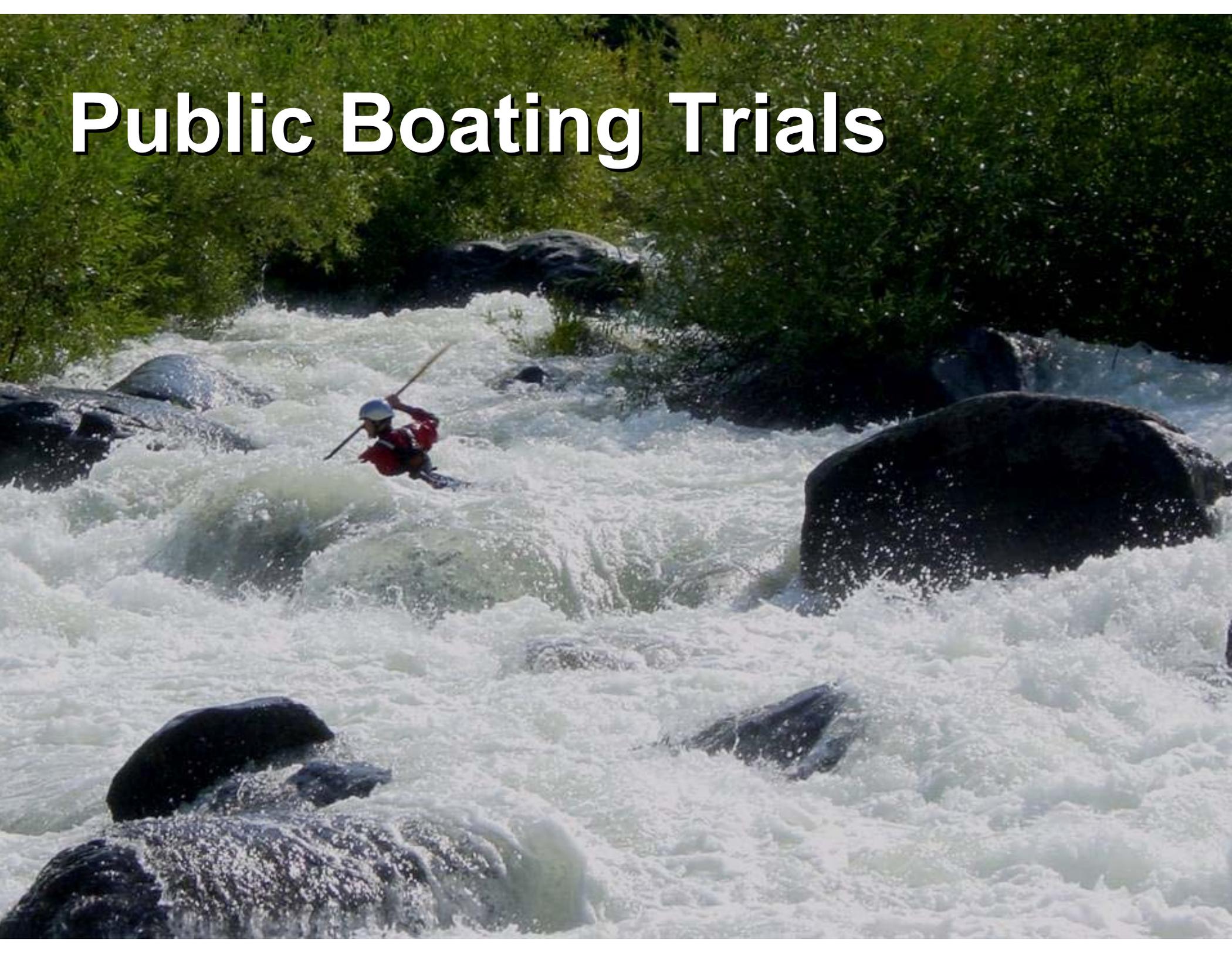
# **A phased approach**

- **Phase 1 – every topic**
- **Phase 2 – need more precision?**
- **Phase 1 informs / refines Phase 2**

A scenic view of a river with rapids. The water is a deep blue-green color, turbulent with white foam from the rapids. On the left bank, there is lush green vegetation and a person standing in the water, likely fishing. On the right bank, a person is kayaking through the rapids. The overall scene is bright and sunny.

# Focus groups and surveys

# Public Boating Trials



**Onward...**

