

AN ABSTRACT OF THE THESIS OF

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Much of the research on social carrying capacity in recreation settings has focused on backcountry or primitive areas where recreationists' perceptions of social contact are a critical element of a quality experience. A challenge now facing resource managers and planners is to apply what has been learned about social carrying capacity in the backcountry to more accessible and developed natural areas; it is important to understand how social contacts impact users of these intermediate areas. Two papers are presented examining evaluative standards for social impacts in semideveloped river settings.

The first paper compares the evaluative standards of boaters on the Klamath River in Northern California, a semideveloped river setting, with those of boaters on three backcountry rivers. Encounter norms are compared to

see if they are similar for specific experiences types. Results suggest that encounter norms for Klamath boaters for semi-wilderness and undeveloped recreation experiences are defined by the same range of acceptable encounter levels as defined on the backcountry rivers, and that experience definitions are stable regardless of the setting. It also appears the measurement techniques developed in backcountry areas can be readily applied to more developed areas.

The second paper investigates perceptions of salmon anglers on the Klamath and three river settings in New Zealand. Encounter norms, norms defining activity space requirements, and perceived crowding are compared across settings. A wide range of acceptable contacts is defined by salmon anglers, suggesting a lack of crystallization regarding encounter norms. In spite of this lack of consensus, respondents still reported a strong preference for not encountering many other users. Data also suggest that norms specifying appropriate spacing for fishing along river banks are not well defined for a semideveloped experience opportunity.

**Encounter Norms in More Developed  
River Settings**

by

**Kristen S. Martinson**

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The primary data for this research came from a 1981 survey of recreation users on the Klamath River in the Klamath National Forest, northern California. The project was funded by a contract between the Forest Service and the Department of Recreation Resource Management at Oregon State University.

## TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
Thesis Overview	2
Overview of Concepts	4
Recreation Carrying Capacity	5
Recreation Planning Frameworks	6
Types of Carrying Capacity	9
Evaluative Standards	11
II. THE KLAMATH RIVER STUDY	16
Resource Setting	16
Visitors and Activities	18
Methods	19
III. ENCOUNTER NORMS IN MORE DEVELOPED SETTINGS: SIMILARITIES TO BACKCOUNTRY	22
Theory	23
Encounter Norms	23
Factors Affecting Encounter Norms	24
Experiences and Encounter Norms in Backcountry Areas	27
Methods	29
Results	30
Experience Types for Different Rivers	31
Norms for Experience Types	33
Discussion	35
IV. NORMS FOR SALMON ANGLERS: COMPARISON ACROSS FOUR RIVER SETTINGS	38
Introduction	38
Theory	40
Motives for Fishing	41
The Fishing Experience	43
Is Salmon Angling Unique?	43
The River Use Studies	46
Klamath River Study	46
New Zealand Rivers Study	47
Impact Measures	49
Results	50
Encounter Norms	51
Proximity of Other Anglers	54
Encounter Variables and Perceived Crowding	61
Discussion	64
Encounter Norms	64
Proximity Norms	68
Perceived Crowding	68
Conclusions	70
BIBLIOGRAPHY	73
APPENDIX A: Sample Questionnaires	82

## LIST OF FIGURES

<u>Figures</u>	<u>Page</u>
II. 1. Klamath River 1981 Recreation Study Area	17
IV. 1. Klamath River Encounter Standards	55
IV. 2. Upper Rakaia River Encounter Standards	56
IV. 3. Lower Rakaia River Encounter Standards	57
IV. 4. Waimakariri River Encounter Standards	58

LIST OF TABLES

<u>Tables</u>	<u>Page</u>
III. 1. Experience Types Defined by River Runners	32
III. 2. Encounter Norms of River Runners for Different Experiences	34
IV. 1. Encounter Norms of Klamath River Anglers	52
IV. 2. Norms for Encounters with Bank Anglers	53
IV. 3. Comparison of Reported and Tolerated Proximity of other Anglers on New Zealand Rivers	60
IV. 4. Perceived Crowding Among Salmon Anglers	62
IV. 5. Influence of Reported Encounters and Proximity on Crowding	63



ENCOUNTER NORMS IN MORE DEVELOPED  
RIVER SETTINGS

I. INTRODUCTION

Demand for water resources to meet the needs of consumptive and non-consumptive uses is intensely competitive (Hansen 1986). To ensure the efficient allocation of a limited water supply considerations must be given to the value of water for each of the alternative uses. Non-consumptive uses of flowing water are primarily recreational, and water has long been recognized as a key element in supporting outdoor recreation (Lime 1975, ORRRC 1962). Leisure activities associated with water resources comprise a substantial portion of all recreation participation (Hospodarsky et al. 1988).

Rivers supply a variety of recreation opportunities and the demand for recreational use of rivers has been increasing rapidly over the last few decades (Manning 1979). Manning points out that the growth in popularity for rivers and streams to support a diversity of activities is a fairly recent phenomenon, and that anglers, the traditional users, now must contend with many activities which may be incompatible with their experience. This increase in recreation use has given

rise to demands for more facilities (access, parking, and support facilities), potential for crowding conflict between users, and degradation of the environment. In turn, a greater emphasis has been placed on the need for intensive, efficient management of rivers and river users. One important component of such management is an understanding of the recreational capacities of river resources, through the study of users' norms which define acceptable levels of impacts. Understanding capacities will help determine the recreational value of a resource and identify potential resource and activity substitutes for intensively used areas (Shelby and Heberlein 1986). Recreational carrying capacities, components of capacity models, and methods for specifying capacities are discussed in the Overview of Concepts addressed in the thesis.

#### THESIS OVERVIEW

This thesis examines the measurement and application of social carrying capacity components for river runners and salmon anglers in semideveloped river settings. The primary data source is from a 1981 survey of boaters' and anglers' perceptions on the Klamath River in northern California. These data are compared to evaluative standards specified by river users on three backcountry rivers (Shelby 1981) and two New Zealand rivers (Shelby 1983). The two papers presented here discuss methods of

assessing and applying information on evaluative standards as a part of management of river resources.

The first paper compares river runners' perceptions on the Klamath River with evaluative standards of boaters on three backcountry rivers: the Colorado River in Arizona, and the Rouge and Illinois rivers in Oregon. The goal is to see whether encounter norms are similar for specific experience types, despite variations in setting modifications among the four rivers. Shelby (1981) found that boaters on the backcountry rivers defined the type of experience currently provided (wilderness, semiwilderness or undeveloped recreation) differently. Despite the variation in respondents' perceptions, they specified similar norms for encounters for the specific experience types. Klamath River boaters' perceptions of experiences and related encounter norms are compared to Shelby's findings. Information on similarities should help managers apply results from carrying capacity studies in backcountry areas to more developed settings.

The second paper discusses normative definitions of the salmon angling experience in several semideveloped river settings: the Klamath, the Waimakariri, and the upper and lower Rakaia. Previous research has addressed the motives involved in angling participation (e.g. Ley 1967; Knopf, Driver and Bassett 1973; Hampton and Lackey 1975; Ditton and Graefe 1975; and Driver and Cooksey

1977), but few studies have applied this information to identify anglers' standards for specific impacts. This paper examines encounter norms, proximity norms, and perceived crowding as components of the salmon fishing experience. More research is required to see if results show differences in norms for encounters between the Pacific Northwest and New Zealand anglers and whether these differences are due to cultural or other situational factors.

This thesis is written in accordance with Oregon State University's guidelines for the manuscript option. The two articles were written for journal publication and are meant to stand alone, without support from the remainder of the thesis. The papers discuss related subjects and there is some overlap of ideas and descriptions. Following the accepted format for journal articles, the papers are brief, with emphasis on results and discussion of results. Additional information on concepts discussed in the papers and on the Klamath River study are provided in the introductory chapters. A bibliography and appendices, including the survey instruments, conclude the thesis.

#### OVERVIEW OF CONCEPTS

Rapid growth of recreation use of natural resource areas in the 1950s and 1960s brought increasing concern about resulting impacts on the environment and recreation

experiences (Manning 1987). In response to this concern researchers have concentrated on understanding and identifying carrying capacities of recreation areas.

### Recreation Carrying Capacity

Recreation carrying capacity refers to the appropriate amount of use that a specific resource can support for a defined time period. Shelby and Heberlein (1986:18) define carrying capacity as "...the level of use beyond which impacts exceed acceptable levels specified by evaluative standards." Carrying capacity is a complex concept and this short definition encompasses the consideration of numerous factors, including the relationship between use levels and impact parameters (e.g. number of contacts per day), the type of recreation experience desired by visitors and managers, and agreement by relevant groups about "acceptable" impact levels. Carrying capacity is not necessarily a fixed number, and it may vary if factors in the carrying capacity "equation" change over time.

"Carrying capacity is a fundamental concept in resource management" (Stankey, 1973:1). Though traditionally used in range or wildlife management, the carrying capacity concept in recreation was recognized as early as 1942, when Sumner emphasized the need to regulate use in wilderness areas within the "recreational saturation point" to ensure preservation of the natural

qualities of a resource (Stankey and McCool 1984). By 1956 Stone and Taves had completed one of the first key studies in the carrying capacity literature, assessing recreationists' preferences in the Boundary Waters Canoe Area (BWCA) wilderness. This study was significant in developing a base for carrying capacity research in the BWCA, particularly in light of the numerous studies which arose from it (e.g. Lucas 1964; 1965; 1967, Lime 1970, Adelman et al. 1982, Anderson and Lime 1984, Peterson 1974, Merriam and Smith 1974). As carrying capacity research continued in wilderness and backcountry areas, scientists found that visitors had fairly specific expectations and preferences of a wilderness-type experience (Shelby 1981), including characteristics of the setting and behavior of other visitors (Lucas 1964; 1965, Stankey 1973). Carrying capacity has thus been an integrative issue in the management of recreation resources.

#### Recreation Planning Frameworks

Several approaches have been developed as potential frameworks for managing recreation resources and impacts of recreation use, namely: 1) Limits of Acceptable Change (LAC), 2) Recreation Opportunity Spectrum (ROS), 3) Visitor Impact Management (VIM), and 4) Carrying Capacity Assessment Process (CCAP). Each of the frameworks are based on related concepts. The last planning approach,

CCAP, is particularly useful in identifying and developing recreation carrying capacity strategies, and provides a basis for many of the issues discussed in the thesis. A brief description of each framework is provided.

There are two basic components necessary to consider in developing any carrying capacity strategy for a resource area (Shelby and Heberlein 1986, Graefe et al. 1983). The first is the descriptive component which identifies the relationship between use conditions and impacts associated with these conditions (e.g. the level of use and the number of contacts per day on a river). The second is the evaluative component which specifies acceptable levels of impact in light of management objectives. Identifying evaluative standards is one of the most difficult steps in making capacity decisions.

**Limits of Acceptable Change.** One of the first applications of carrying capacity research for resource managers is the model of LAC developed by Stankey (1973) as it applies to wilderness settings (see also Stankey et al. 1984). Stankey described three basic components of the model, as follows: 1) consider the source of change on the recreation resource, in other words, the impacts from recreation use (e.g. the amount of use encountered, the type of use encountered, the space and time in which encounters occur, and the behavior of the recreationists encountered); 2) identify the "acceptable" level of

change; and 3) adopt techniques to manage the resource within the limits of acceptable change (e.g. rationing, reducing visitor impacts, restoration).

Recreation Opportunity Spectrum. The ROS planning approach is based on the premise that different recreationists desire to participate in a variety of activities, in a range of different settings, in pursuit of a diversity of experiences (Driver and Brown 1978, Clark and Stankey 1979, Stankey and Brown 1981). To accommodate a wide range of recreationists, managers need to provide a range of experience opportunities. The level of acceptable impacts will vary along this continuum of opportunities. At the primitive end of the recreation spectrum, the acceptable levels of change may be considerably lower than at the more developed, urban end of the spectrum. The ROS class of a particular recreation area helps specify the limits of acceptable change for certain impacts.

Visitor Impact Management. Graefe et al. (1984) discuss factors affecting types of impacts, principles for managers to use in evaluating the impacts, and a framework to guide decision-making in visitor impact management. The authors contend that prior to determining the LAC of a component of the recreation resource, managers need to understand the nature and range of acceptable impact levels in light of the characteristic range of environs and experience



opportunities in any natural setting. Briefly, the VIM process includes: 1) preassessment data base review, 2) review of management objectives, 3) selection of key impact indicators and standards for those indicators, 4) comparison of standards and existing conditions, 5) identification of probable cause of impacts, 6) identification of management strategies, and 7) implementation.

The Carrying Capacity Assessment Process. Shelby and Heberlein (1986) have developed a detailed assessment process for developing carrying capacity studies and continued monitoring of impacts. This process, like LAC, focuses on acceptable levels of change. It incorporates use of visitor defined encounter norms in developing standards to evaluate impacts. This process involves: 1) evaluating background information and identifying current situations; 2) identifying experience opportunities to be provided; 3) indentifying impacts that may affect the resource or experience; 4) collecting data; 5) developing management alternatives which would limit impacts to acceptable levels; and 6) selecting a management strategy.

#### Types of Carrying Capacity

Four types of carrying capacity have been identified in the literature (Shelby and Heberlein 1986). Ecological capacity is concerned with the effects of use

levels on the ecosystem (e.g. soil compaction); physical capacity is concerned with the effects of space available within an undeveloped, natural area (e.g. the number of people that can camp on a river bank); facility capacity is concerned with the impact of available facilities, such as the number of boats per boat ramp; and social capacity is related to impacts which detract from or change the recreation experience. Any one or a combination of these four parameters may limit the appropriate use level of a resource. However, social carrying capacity has been a primary concern for resource managers because it is often the most limiting factor in unique or backcountry areas and is often the most difficult capacity to determine.

Different resource settings and the activities which users participate in will affect the acceptable carrying capacity. For example, a river system's physical capacity is commonly quite high. A stretch of river is usually long enough and wide enough to hold a great many users. Ecological capacities may be somewhat lower, especially in areas with unique and sensitive vegetation or natural formations. Facilities can be a limiting capacity if parking or access areas are small or few, a common problem at most remote rivers. Social capacity is often the limiting factor in wilderness-type areas, including river settings, but can be quite high on more developed rivers where users are not concerned with

solitude as an important part of the experience. Social norms define acceptable numbers of people.

Social capacities are often harder to determine than the other three types because they are based on human values and attitudes which can not be directly manipulated by managers. Perceptions of crowding and preferred levels of encounters are factors by which visitors evaluate social capacities (Shelby and Heberlein 1986). There are many factors which can influence visitors' and managers' perceptions of social carrying capacity. Included are the setting, activity, situational definition, expectations, and the experience to be obtained.

#### Evaluative Standards

There are several evaluative standards, specified by visitors, that can be used to develop management alternatives. Basing strategies on whether users are satisfied with their experience has not been very successful since most visitors report fairly high satisfaction most of the time (Shelby and Heberlein 1986). No significant relationship has been found between use levels and reported satisfaction (Vaske et al. 1984, Shelby and Colvin 1979). Other evaluative parameters against which impacts have been more successfully judged are perceived crowding and norms for encounters.

Perceived Crowding. "Crowding" is a subjective term used to evaluate a specific density. Density is an objective measure of the number of people in a specified area (Shelby and Heberlein 1986). Crowding can not simply be determined by measuring average density because use is often concentrated in the most desirable areas. A density has no inherent value (Freedman 1975) but the sensation of being crowded is a negative evaluation of a particular density. An individual's psychological determination of a crowd is based on the individual's definition of the appropriate number of people in a certain situation. For example, 500 people at a concert in a park may not be defined as a crowd, but 500 people around a remote alpine lake probably would be. Depending on the normative definition of the situation, people can feel crowded regardless of the physical space available (Shelby and Heberlein 1986). To reduce the negative effects of crowding, visitors commonly adopt a series of coping strategies, such as altering use patterns, choosing substitutes, or altering normative definitions of acceptable impacts (Graefe et al. 1983).

Perceived crowding has been explored as a rough evaluative standard for identifying capacity problems. Shelby and Heberlein (1986) collected data on perceived crowding from 22 different studies. In each study visitors were asked to indicate how crowded, if at all, they felt. The results suggest that if under one-third

of the visitors feel crowded the area is probably below capacity, but if over two-thirds feel crowded the capacity of the area has probably been exceeded. If the number of visitors feeling crowded fall between 33% and 67%, no determination about carrying capacity can be made. Thus, crowding is the most helpful as an evaluative standard when there is considerable consensus about perceptions of crowding toward the high or low end of the crowding scale.

The difficulty of using perceived crowding as an accurate evaluative standard is that there is not consistently strong relationship between use levels and crowding. Perceived crowding is affected by the personal standards people bring with them and the way they define the setting in question (Shelby and Heberlein 1986). Not only do higher contact levels tend to increase crowding but there also are numerous characteristics of the individual (e.g. preferences and expectations), the setting (e.g. evidence of litter, fire rings), and other users' behavior which influence crowding perceptions (Stankey 1973, Shelby et al. 1983, Ditton et al. 1983, Hammitt et al. 1984, Graefe et al. 1984). Due to the difficulty of measuring all of the factors which affect perceived crowding it is best used only as a rough indicator for comparing recreation opportunities and identifying problem areas.

Encounter Norms. Norms identify standards or rules which state what people should or should not think or do. They specify what type of behavior is appropriate, though actual behavior is not always consistent with normative standards (Vaske et al. 1986). Activities and environments are evaluated against social norms to determine what is good or bad. Vaske et al. (1986) have identified three structural characteristics which apply to social norms: 1) there is a range of tolerable impacts, 2) norm intensity specifies how strongly a group feels about impacts, and 3) norm crystallization identifies the amount of agreement about the norm within the group.

Encounter norms are shared standards or beliefs about the appropriate number or type of contacts for a certain activity or recreation settings. For many outdoor recreation activities these norms are not explicitly stated (e.g. the right number of encounters with anglers on a river each day) and must be determined through surveying participants (Shelby and Heberlein 1986). Though normative definitions apply to all recreation activities (Vaske et al. 1986), if there is low norm crystallization, or agreement, it is more difficult to make capacity judgements. Encounter norms are useful as an evaluative standard because they focus directly on the impact of contacts with others, not on secondary effects such as perceived crowding or

satisfaction. Research has shown that, in many cases, use levels (a parameter which managers can control) have a measurable effect on encounter rates, which directly impact the recreationist's experience. Norms for encounters help identify an important aspect of the recreation experience and provide managers with an evaluative component needed in making resource management decisions.

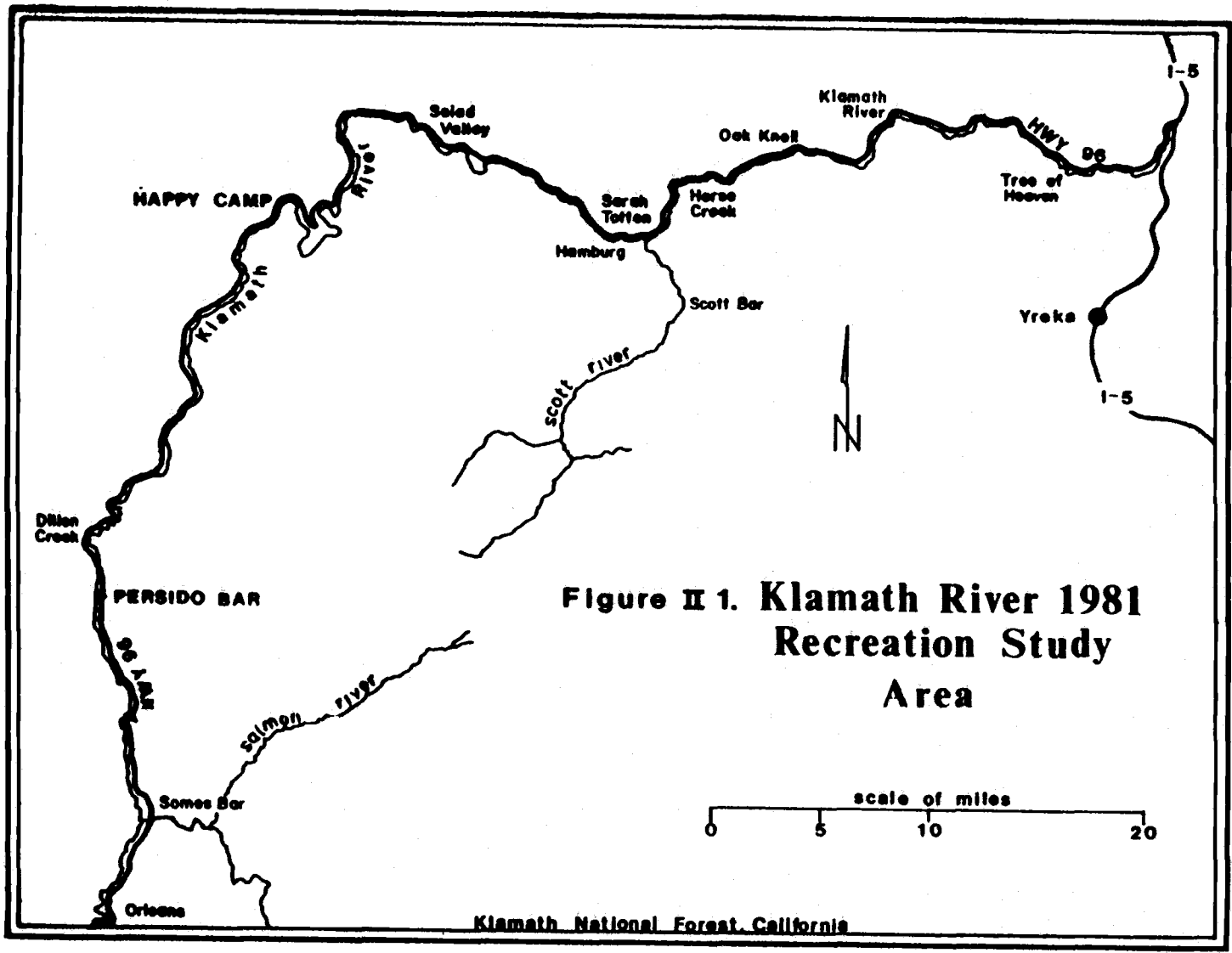
## II. THE KLAMATH RIVER STUDY

The primary data source is from a 1980 Klamath River visitor use study conducted by the Department of Resource Recreation management, Oregon State University in cooperation with the Klamath National Forest. Results from this study are compared to similar data from other study areas, extending earlier work on norms in recreation settings. First, boaters' experience definitions and encounter norms are compared with data from the Rouge and Illinios rivers in southern Oregon, and the Colorado River in Arizona. Second, anglers' preferences and standards are compared with data form three river settings in New Zealand; the Waimakariri, and upper and lower sections of the Rakaia.

### Resource Setting

The study area is located in northern California and includes approximately 106 miles along the Klamath river from just above Yreka to Orleans (Figure 1). The river gorge is characterized by a steep, narrow canyon which winds through mountainous terrain. The vegetation types in the canyon range from dry chaparral brush to stands of pine and Douglas-fir. Abundant and varied wildlife populations can be found along the river. A scenic





**Figure II 1. Klamath River 1981  
Recreation Study  
Area**

highway parallels the entire length of the river, and travelers along it are afforded picturesque views of the river gorge and distant peaks.

The Klamath River is moderately developed. There are many vehicle access points and ample footpaths to the river. The Forest Service has designated several official accesses and campgrounds along the river corridor with rustic facilities (tables, grills, outhouses). There are several small communities located along the river. The majority of the corridor has some form of development on or near the river, ranging from small farms and mining claims to a few resorts.

#### Visitors and Activities

Recreational use on the Klamath has grown rapidly, and the area now attracts visitors from many areas of California and Oregon. The Klamath was initially used as a substitute rather than primary river resource by many people, but relatively low use levels and opportunities for quality recreational experiences have drawn increasing numbers of users.

The Klamath River provides opportunities for many types of water-oriented recreation. The primary use during the summer season is river running. The character of the Klamath ranges from slow, class 1 runs floated primarily by family groups to exciting class 4 rapids run by both commercial and private groups. River runners

float in rafts, inflatable and hardshell kayaks, canoes, innertubes, and driftboats. The most heavily used portion of the river is from Happy Camp to Persido Bar. This run is approximately 30 miles of class 2 and 3 whitewater and is a popular three-day float trip. Most floaters spend the nights camping on river beaches, although some groups use the developed campgrounds. The present use distribution of this section of river is about 55% commercial and 45% private.

The primary recreational use on the Klamath during the fall is salmon and steelhead fishing. The river is renowned as providing the "best" steelhead fishing in California. The Klamath is used extensively by both local anglers and visitors from other parts of California and Oregon. Many anglers are first-time visitors, but a large portion of users have been fishing the Klamath annually for up to several decades. About three-fourths of the people fish from the shore, while the remainder fish from boats, primarily driftboats. Most of the float parties are commercial. The most heavily used sites are at the mouths of the larger tributaries and at areas which provide the best access. Most users fish during the early mornings and evenings.

#### Methods

The primary purpose of the Klamath River study was to provide baseline information on type, amount, and

location of recreational use on the river. Pilot study data regarding user preferences and evaluations were collected from July to December 1981. Information was gathered through observations, interviews, and questionnaires. Data were collected four days per week, two on weekends and two on weekdays. Weekend days were emphasized because the majority of use occurred at that time.

A one-page questionnaire was used to collect information on user preferences. All 117 questionnaires distributed to floaters during or at the end of their river trip were completed and returned. About 90% of the participants were commercial passengers (private trips were more difficult to contact because of irregular use patterns). During the fall season questionnaires were distributed to anglers either directly or via mail-back forms left on vehicles (if the individuals were not in the area). Out of 117 forms distributed, 51 were returned, a response rate of 44% (only 34% of mail-back forms were returned).

Questions collected information on satisfaction levels, reported encounters, perceived crowding, encounter norms, and type of experience provided. Satisfaction was measured as a trip rating of "poor," "fair," "good," "very good," "excellent," or "perfect." For reported encounters, respondents were asked to indicate the number of parties they actually saw along

the river each day. Perceived crowding was measured on a nine-point Likert-type scale ranging from "not at all" to "extremely crowded." Encounter norms were determined by asking users to indicate the highest number of encounters they would tolerate before the experience became unpleasant. Summer floaters were asked about river encounters during the day and camp encounters at night. Fall season fishermen were asked about encounters with both bank and boat anglers.

Participants also were asked what kind of experience they felt the study area currently provided. Five options were offered with a brief description of each type. The alternative experience types were

- \* "Wilderness," a place generally unaffected by the presence of man;
- \* "Semi-wilderness," the kind of place where complete solitude is not expected;
- \* "Undeveloped Recreation," where a natural setting is provided but meeting other people is part of the experience;
- \* "Scenic Recreation," where the idea is to see the place, and it really doesn't matter how many people you see; and
- \* "Social Recreation," where seeing other people makes the experience more fun.

Sample questionnaire forms are presented in Appendix A.

### III. ENCOUNTER NORMS IN MORE DEVELOPED SETTINGS: SIMILARITIES TO BACKCOUNTRY

Developing information about standards for acceptable levels of impacts is a major concern of resource managers and recreation researchers. A common problem with management plans is the "lack of objectives that allow managers to explicitly state the conditions they seek" (Hendee, Stankey, and Lucas 1978:80). Information about visitors' definitions of experiences can be helpful in this respect, and data on recreationists' norms for preferred levels of contacts are one aspect of such definitions (Shelby and Heberlein 1986, Manning and Ciali 1981). This information is particularly important in developing carrying capacity judgments. Perceptions of experiences and visitors' norms have been leading topics for research in the outdoor recreation field for the past twenty years (Manning 1985). Most of this research has been conducted in backcountry areas, perhaps because managers feel that these resource areas provide the most unique recreation experiences. As a result, there has been less emphasis on identifying recreation experience opportunities and carrying capacities in more developed settings. However, remote wilderness-type areas constitute only a portion of outdoor recreation resources. Clawson and Knetsch (1966) suggest that semideveloped or "intermediate" resource

areas are often more important to a greater number of recreationists than remote primitive areas because they are relatively local and provide opportunities for a wider variety of activities. Limited information on visitors' norms and experiences in more developed areas, and decreasing public funds available to collect this information, make it important to determine whether strategies developed in backcountry research can be applied to developed areas.

This paper explores recreationists' norms for encounters in a semideveloped resource setting. The paper will review literature on encounter norms, summarize a study of the three backcountry rivers (Shelby 1981), describe the Klamath River study, and then compare data from the two types of river resources.

## THEORY

### Encounter Norms

Recreationists hold individual and social norms which define appropriate conditions and behaviors in a recreation setting. Among such norms are standards which define appropriate numbers of other people. These standards are referred to as encounter norms (Vaske 1977, Shelby 1981). Encounter norms are measurable standards which can be used to evaluate social impacts such as the number of people seen each day on a river. Such standards are particularly useful for developing carrying

capacities or other management strategies (Shelby and Heberlein 1986).

#### Factors Affecting Encounter Norms

The tolerable level of contact is a function of several interrelated characteristics of the visitor, activity, resource area, and situational context (Manning 1985, Graefe et al. 1984). The number of contacts a visitor prefers strongly influences encounter norms (Shelby et al. 1983, Ditton et al. 1983). Motives for pursuing an activity, such as to achieve solitude or social affiliation, also contribute to these preferences (Absher and Lee 1981, Brown and Ross 1982, Knopf et al. 1973, Schreyer and Roggenbuck 1978, Stankey 1973). The participant's degree of experience at a recreation area help formulate expectations for encounters on future visits (Vaske et al. 1980, Schreyer et al. 1976).

An encounter norm is also influenced by the activity pursued. Vaske (1978) found that canoeists had lower encounter norms for inner-tubers than for other canoeists because tubing was a nontraditional, and therefore inappropriate use of the river. The mode of travel characteristic of the activity is another important factor. Several studies have shown that nonmotorized boaters have a lower tolerance for contacts with motorized boaters than with nonmotorized boaters (Lucas 1964, Shelby and Nielson 1976). Gramman (1982) suggests



that participants in activities for which goals are not "density-incompatible" are less sensitive to high levels of contact, even in wilderness areas.

At a more general level, encounter norms are affected by the resource setting and the situational context in which the contact occurs. These factors are more readily manipulated by managers, and they are the focus of the present study. Characteristics of the resource setting such as degree of development and other evidences of man have been shown to influence encounter norms. The average encounter norm is from zero to three per day in less developed, wilderness type settings (Shelby 1981). In contrast, floaters on the Kettle River in Minnesota, a moderately developed and readily accessible river, had a remarkably high tolerance for contacts with other boaters (Knopp et al. 1979). They did not feel that their experience became undesirable until they encountered from ten to thirty other motorized craft. It appears that certain resources are associated with specific kinds of experiences (Shreyer et al. 1976). The semideveloped nature of the Kettle River is not associated with a wilderness experience nor, according to the visitors' reported preferences, with low levels of encounters.

In a study of river recreation, Manning and Ciali (1981) hypothesized that the resource setting, in terms of the river type and cultural environment, was the best

predictor of attitudes toward desired user density. Twenty-five percent of the visitors to the "primitive, torrent" type rivers in Vermont felt crowded, even though actual user density was only 0.5 people/mile. On the "urban, meander" type rivers the same proportion of visitors felt crowded even though user density was 32 people/mile. It appears that users of the primitive rivers held much lower encounter norms than those on the urban rivers. Litter, human waste, and erosion of camps and trails in wilderness areas also appear to increase recreationists' perceptions of crowding (Stankey 1973, Vaske 1982) although studies have not yet determined whether these impacts have the same effect on perceived crowding in more developed areas.

Several studies demonstrated that the situational context, such as location or group size, can have a considerable effect on preferred contact levels (Stankey 1973, Shelby and Nielson 1976, Shelby and Colvin 1979 and 1981, Lucas 1980, Schreyer et al. 1976). For example, the majority of users in backcountry areas specified lower encounter norms for camp contacts than for contacts during the day while traveling on trails or rivers. In the Boundary Waters Canoe Area (BWCA), Lucas (1965) found that paddling canoeists perceived the wilderness as being somewhat smaller than legal boundaries because they felt that the high number of contacts at the edges of the area were inappropriate for a wilderness experience. In

addition, Stankey (1973) found that hikers in wilderness areas preferred to encounter up to ten small parties during the day rather than one large party.

These attributes of the visitor, activity, setting, and situation, which influence a recreationist's personal encounter norm, also are integral components of the perceived experience. How are these variables related? Is it possible to estimate an appropriate range of encounters from a user group's perceptions of the type of experience desired? The following section reviews a study which examines these issues.

#### Experiences and Encounter Norms in Backcountry Areas

Using data from three backcountry rivers, Shelby (1981) found considerable consistency for encounter norms for particular experience types. Boaters were asked to consider their area in terms of three alternative experiences: "wilderness," a place generally unaffected by the presence of man; "semiwilderness," an area where complete solitude is not expected; and an "undeveloped recreation area," the kind of place where a natural setting is provided but meeting other people is a part of the experience. For each experience type, river runners were asked to indicate the appropriate encounter norms for contacts on the river, at attraction sites, and at camps.

Although the three rivers were defined differently

in terms of the experience currently provided and the experience that should be provided, there was considerable agreement across rivers about appropriate norms for any one experience type. The median for river encounters per day ranged from 0.7 to 1.5 contacts for a wilderness experience, 2.0 to 2.9 contacts for a semiwilderness experience, and 2.7 to 4.4 contacts for an undeveloped recreation experience. In addition, the range of tolerable contacts was greater for the undeveloped recreation experience than for the wilderness experience.

Several other studies support Shelby's observation for backcountry (wilderness and semiwilderness type experiences) encounter norms. Stankey (1973) found that 50% of the canoeists in the BWCA accepted three or fewer encounters with nonmotorized canoeists. Lucas (1964) had comparable results in his study of the BWCA in the early 1960s. In three western wildernesses, fifty percent of the users accepted two or fewer encounters with backpackers (Stankey 1980). In a comparison of nine primitive and wilderness areas Lucas (1980) found that the majority of users in all areas felt zero to three encounters per day with other parties was "about right." The findings suggest that there may be widely shared encounter norms among backcountry users, and that an appropriate level of contacts for a wilderness-type experience is approximately zero to three per day.

## METHODS

The Klamath River is a semi-developed recreation area located in northern California. The study area is characterized by a steep, narrow gorge which winds through mountainous terrain. A scenic highway parallels the river, with numerous spurs forming a variety of developed to primitive vehicle access points. The majority of the corridor has some form of development on or near the river, including rustic campgrounds, mining claims, resorts, and several small communities.

Recreational use on the Klamath has increased rapidly over the past decade. The river attracts visitors from many areas of California and Oregon, but also is heavily used by the local population. The primary use during the summer season is river running. The character of the river ranges from class one runs floated primarily by small family and friendship groups to class four rapids frequented by both commercial outfitters and private boaters. The most popular stretch of river is a thirty-mile run of class two and three whitewater commonly floated as a three-day trip. Most floaters camp on river beaches, but some use the campgrounds.

Data were collected at major access points four days per week, two on weekends and two on weekdays. A one-page questionnaire was distributed to all users contacted on study days. All 117 questionnaires distributed to

floaters were completed on site and returned to the surveyor. About ninety percent of the participants were commercial passengers (private trips were more difficult to contact because of irregular use patterns).

Questions collected information about satisfaction levels, reported encounters, perceived crowding, encounter norms, and the type of experience provided. Encounter norms were determined by asking floaters to indicate the highest number of encounters they would tolerate before the experience became unpleasant. Floaters were asked about river encounters during the day and camp encounters at night.

Floaters were also asked what kind of experience they felt the study area currently provided. Five options were offered with a brief description of each experience type. The alternative experience types were wilderness, semiwilderness, and undeveloped recreation (all defined earlier in this paper), scenic recreation, "where the idea is to see the place and it really doesn't matter how many people you see," and social recreation, "where seeing other people makes the experience more fun."

## RESULTS

Perceptions of river runners on the Klamath River were compared with the perceptions of floaters on the three backcountry rivers. Experience definitions are

examined to see if floaters on the Klamath River actually perceive it as providing a semideveloped (rather than a wilderness) experience. Encounter norms for the four groups are then compared to see whether norms for certain experience types agree across the different resource areas.

#### Experience Types for Different Rivers

There was not unanimous agreement by floaters on the Klamath River regarding the type of experience currently provided. Forty-three percent said that they thought the area provided a semiwilderness experience, and thirty-eight percent said an undeveloped recreation experience (Table 1). Only eight percent thought the area provided a wilderness experience, seven percent said social recreation, and five percent said scenic tour. To facilitate comparisons with the other rivers, these latter two categories were collapsed with undeveloped recreation in Table 1.

Of the four river areas examined, the largest percentage of floaters defining the experience as "undeveloped recreation" were on the Klamath. The other three rivers were perceived as providing primarily wilderness or semiwilderness experiences, with the Illinois most likely to be classified as wilderness. Of the backcountry rivers, the Grand Canyon appears to provide the most developed experience, but users still

Table III. 1. Experience Types Defined by River Runners

Experience Type	Klamath	Grand Canyon	Rogue	Illinois
Wilderness	8	20	26	69
Semiwilderness	43	54	63	24
Undeveloped Recreation	50	26	11	7
Sample Size	106	398	374	185
Chi Square		24.46*	84.40*	125.02*

Figures are percents of respondents who define the setting as currently providing the specified experience.

Undeveloped Recreation for Klamath River includes also those respondents who perceived the areas as providing scenic (7%) and social recreation (5%).

Data on experience definitions from each of the backcountry rivers are compared individually to the Klamath River data.

\* Significant at  $P < .01$ .



considered it more primitive than the Klamath. The data support the hypothesis that user definitions of experience types on the Klamath are significantly different from those on each of the backcountry rivers.

#### Norms for Experience Types

In order to compare the findings to data from the Colorado, Rogue, and Illinois Rivers, responses by Klamath River users were separated into groups by experience types. Encounter norms were then analyzed. Median responses were identified for semiwilderness and undeveloped recreation experiences and compared to median responses for corresponding experience types on the three backcountry rivers. Only semiwilderness and undeveloped recreation were examined because the majority (81%) of Klamath River participants responded in those two categories. The median, rather than the mean, was used because encounter norm responses were positively skewed. Fifty percent of the responses to this question are above and fifty percent of the responses are below the median value.

The norms for river encounters per day for a semiwilderness experience are 2.4 for Grand Canyon floaters, 2.9 for Rogue River floaters, 2.0 for Illinois River floaters, and 3.0 for Klamath River floaters (Table 2). For the same experience, the norms for camp encounters (out of 10 nights) in these four areas are

Table III. 2. Encounter Norms of River Runners for Different Experiences

	Grand Canyon	Rogue	Illinois	Klamath
<b>Semiwilderness</b>				
River encounters per day	2.4	2.9	2.0	3.0
Camp encounters per 10 nights	1.3	2.2	.33	.33
<b>Undeveloped Recreation</b>				
River encounters per day	4.0	4.4	2.7	2.5
Camp encounters per 10 nights	3.0	4.2	1.3	1.3

Figures are median values. Fifty percent of respondents were above and 50% were below the value shown.

1.3, 2.2, .33, and .33 respectively.

For an undeveloped recreation experience the river encounter norms are 4.0 for Grand Canyon users, 4.4 for Rogue River user, 2.7 for Illinois River users, and 2.5 for Klamath River floaters. Camp encounter norms were 3.0, 4.2, 1.3, and 1.3 respectively for the four rivers.

#### DISCUSSION

The Klamath River study suggests several major conclusions. First, it appears that the resource setting affects perceived experience. Compared to the Colorado, Rogue, and Illinois, the Klamath is more modified in terms of recreational facilities, river access, and residential and mining developments. As a result, visitors to the Klamath River perceived the area as providing a significantly more developed experience than did visitors in studies of the three backcountry areas. The findings fit with previous studies which argue that resource setting affects perceptions of the experience (Clark and Stankey 1979, Rosenthal et al. 1982), particularly Knopp et al.'s (1979) contention that Kettle River floaters did not perceive a wilderness-type experience due to the developed character of the setting.

Second, results show that, regardless of the difference in settings, encounter norms for specific experiences are remarkably similar. It appears that the experience definition forms a frame of reference for

norms, and as a result norms for specific experiences are stable across situations. Norms for river and camp encounters on the Klamath for semiwilderness and undeveloped recreation fall within the ranges identified by Colorado, Rogue, and Illinois floaters. In fact, norms for camp encounters for both experience types examined on the Klamath are identical to those from the Illinois study. These results support Shelby's (1981) contention that there may be considerable agreement about norms for certain experiences.

Third, past research efforts have identified patterns in norms by activity, situation, and experience for natural, undeveloped settings. The present study is part of a larger effort to focus attention on semideveloped resource areas, intermediate between primitive backcountry and urban parks. For many recreationists, semideveloped areas will be as close to a "natural" environment as they choose to get. Intermediate areas also are more accessible for individuals with limited transportation or funds, and they often have better access for the handicapped.

Fourth, river management programs that have traditionally been used in rural and remote locations can be successfully applied to more developed areas. It is particularly important to focus on the management of semideveloped water resources in urban and rural areas because rivers near large population centers receive

extensive use pressure (Hecock 1977). Proper management would relieve some of the pressure from more primitive rivers, increase social and economic benefits, and increase the availability of local water resources to a greater number of recreationists (Bryan 1977, Gunn 1977, Manning and Ciali 1981).

Finally, it may be possible at some time to develop norms for certain experiences and apply them to new settings without doing extensive research. The present study shows that methods from research in backcountry areas can be readily used in more developed settings, and that norms for certain experiences are fairly consistent. If future studies show similar results, it may be possible to start developing standards for certain kinds of experiences which can be applied to a variety of settings, saving the time and expense of research efforts. More work is needed in developed settings to move in this direction.

#### IV. NORMS FOR SALMON ANGLERS: COMPARISON ACROSS FOUR RIVER SETTINGS

##### INTRODUCTION

Recreation use produces impacts on natural resources and the quality of recreation experiences, and these have become pressing issues for resource managers (Lee et al. 1988). Increasing use of many outdoor recreation areas over the past few decades has made it necessary to establish methods to describe these impacts and evaluate the level of impact which is acceptable for a given set of conditions (Stankey 1973, Graefe et al. 1984).

Evaluative standards help identify appropriate amounts of impact in terms of activities, behaviors, and environmental conditions for a particular social setting (Whittaker and Shelby, in press). Social norms are shared standards against which impacts are judged (Vaske et al. 1986). Normative information helps identify important aspects of a recreation experience, in part, by demonstrating the extent to which consensus exists and by identifying potential areas of conflict. Knowledge about norms contributes to the resource manager's ability to make informed value judgements concerning acceptable use levels and related social impacts for different types of experiences.

Though there is general agreement among researchers and managers that social norms are valuable in identifying problems and developing strategies, few studies have established methods for identifying recreationists' norms in a way which is managerially relevant (Whittaker and Shelby, in press). Early studies (e.g. Lucas 1964, Stankey 1973;1980) focused on describing users' norms, such as when visitors felt conditions were good or bad, acceptable or unacceptable. Results from these studies showed that certain types of user groups held similar norms, and that these social norms specified standards for a variety of situations. However, the studies did not identify how to use this information for establishing management standards.

More recently, studies have concentrated on developing systematic methods for measuring and applying this normative information (e.g. Vaske 1978, Vaske et al. 1986, Heberlein and Alfano 1983, Shelby 1981, Shelby, Vaske and Harris in press, and Whittaker and Shelby in press). Applying Jackson's "return potential model" (1965) to recreation settings, these studies have increased understanding of norms for encounters and other social impacts and of norm agreement for a variety of activities and settings. Based on Jackson's model, social norms in recreation settings were defined as the average of personal norms concerning a particular impact. In other words, the mean or median acceptability of an

impact is considered the norm for the social group. This model also helps determine the optimal (as opposed to maximum) level of an impact, the range of tolerable impacts, the intensity or strength of the norm, and the norm crystallization or level of group agreement concerning the impact (Whittaker and Shelby in press).

The normative approach of determining social capacities has primarily focused on backcountry settings, where impacts from recreation use are considered to be a particularly important factor affecting a quality backcountry experience. Several decades of studies have provided managers with a good understanding of how backcountry visitors perceive impacts (Graefe, Vaske and Kuss 1984). There is a need to broaden this research on evaluative standards to a variety of settings and activities (Shelby and Heberlein 1986). This paper extends the research on social norms by describing evaluative standards identified by salmon anglers in four semi-developed river settings: the Klamath River in northern California, and the Waimakariri River and upper and lower sections of the Rakaia River in New Zealand.

#### THEORY

Resources supporting quality salmon runs are threatened both in the Pacific Northwest and on the South Island of New Zealand (Netboy 1980, Teirney 1981). The growing demand for water often conflicts with or degrades



the quality of salmon fisheries and salmon fishing experiences. While opportunities for quality sport fishing may be declining (Netboy 1980), the demand for these opportunities is still quite strong (Ditton and Graefe 1975, Driver and Cooksey 1977). To assist resource managers in planning for future allocation of resources it is critical to understand the recreational value of salmon fishing and to define important characteristics of quality salmon fishing experiences. Information on angler's motives and perceptions help define this experience.

#### Motives for Fishing

Resource managers initially thought that anglers fished primarily to catch fish, and that an angler's satisfaction was heavily contingent on harvesting success. However, research suggests that catch is only a small portion of total satisfaction (Hampton and Lackey 1975, Ditton and Graefe 1975, Knopf et al. 1973, Manfredo et al. 1980). This concept was emphasized in an early study of Ohio anglers (Addis and Erickson 1969) in which more than half of the respondents reported that they obtained as much enjoyment from a fishing trip when they did not catch fish as when they did. These findings have been supported through numerous other studies (Driver and Cooksey 1977, Graefe 1980, Buchanan 1983) and suggest that fishing is a multi-dimensional activity, with

numerous factors (other than simply catching fish) contributing to a quality experience. Anglers pursue fishing for a variety of reasons and seek many types of outcomes simultaneously.

Numerous motives for fishing have been identified in the recreation literature. Even though anglers' individual attitudes are heterogeneous (Smith 1980), the literature demonstrates that motives for angling are of a similar nature (Driver and Cooksey 1977). In general, there is more of an emphasis toward self-fulfillment, relaxation, and temporary escape than harvesting or eating fish. Hampton and Lackey (1975) found primary factors influencing motives for Virginia anglers were the attitude of managers, quality of water, natural beauty of the area, and companionship. Moeller and Engelken (1972) found that elements of the natural environment and privacy while fishing were the most important qualities of a fishing experience. In a sample of anglers across the United States Ley (1965) found that the most important attributes which motivated participation were fresh air, getting out of the city, using homemade lures, escaping daily pressures, relaxing, and challenge. This type of motivational information can be helpful in determining recreation carrying capacities for specific settings (Knopf, Driver and Bassett 1973).

### The Fishing Experience

Research on social carrying capacities has given some insight into angler's preferences for encounters and their perceptions of crowding. Manning (1979), in a study of four Vermont rivers, found that anglers showed a lower tolerance for encounters than did users engaged in swimming and boating; they reported that satisfaction decreased markedly after only two contacts with any other river users. Anglers also were significantly more sensitive to setting attributes (water quality, access, etc.) in contributing to a quality experience, and perceived the most conflict (often one-sided) with other users and management.

In a study of anglers on the Bois Brule River Heberlein and Vaske (1977) found that anglers were the most sensitive group of users on the river when compared to canoeists and tubers. Anglers were less tolerant of contacts with these other types of users and preferred contacts with other anglers or other recreationist who they perceived to be the most like them.

### Is Salmon Angling Unique?

The previous findings may not apply to all types of anglers. A review of the literature on fishing suggests that the angling experience may differ by the type of species pursued, which dictates activity characteristics such as fishing intensity and technique, equipment,

season, and resource setting (Bryan 1977). Knopf et al. (1973) suggest that motives may vary for different types of anglers. In other words, salmon anglers may have different motives and different expectations for outcomes than, for example, trout anglers, even though the same individual may participate in both types of fishing.

A study of Colorado anglers by Harris and Bergersen (1985) found that trout anglers are motivated by the quality of the natural setting, the presence of native fish, and the absence of other recreational activities that interfere with fishing. They concluded that "major qualities affecting choices of where to fish related to the locale of those waters, rather than to the fish they contained." Bryan (1977) describes the trout angler as highly sensitive to environmental, managerial, and social elements of the angling experience. Such anglers are more likely to seek resource settings where they expect to encounter few others who would impact their experience. The literature suggests that the trout angling experience appears to be more resource than species dependent.

In contrast, Lowery (1978) found that, while trout anglers felt the environment of fishing was the most important element, salmon anglers indicated that "to get food" was the primary motive. Salmon have traditionally been pursued as an important food source (Smith 1980), and the meat is considered a gourmet delicacy (Anderson

1971). Salmon meat is a rare commodity and tends to be more popular than meat from other game fish.

Because success of harvest is more critical to salmon anglers than to the trout angler, it is more likely they will fish at known high catch locations (Talhelm 1973). As a result, their expectations for encounters with other anglers may be quite high (Manfredo and Conroy 1980). Another factor which may influence salmon anglers' expectations for encounters is the relatively short duration of quality salmon runs on accessible salmon rivers. These space and time restrictions mean that favored river stretches are often choked with anglers, and experienced or informed visitors will know when to expect these conditions. Manfredo and Conroy (1980) found the most commonly expected conflict for Alsea steelhead anglers was encountering other anglers at their favorite fishing holes. Higher expectations for encounters have been shown to result in higher tolerance for encounters (Shelby and Heberlein 1986), though fewer encounters are often preferred. Anglers may be willing to fish in relatively close proximity of others providing there is no actual interference with the activity (e.g. tangled lines). Several studies have suggested that sensitivity to contacts is less important for anglers unless these encounters directly impact their ability to catch game (Hammit, McDonald and Noe 1984, Vaske 1978).

This paper compares norms for two types of impacts, encounters with other anglers and acceptable proximities of other anglers. In addition, the effect of these reported impacts on perceived crowding is discussed.

## THE RIVER USE STUDIES

### Klamath River Study

The Klamath River is a semi-developed recreation area located in northern California. The study area is characterized by a steep, narrow gorge which winds through mountainous terrain, with occasional open gravel bars occurring at the confluences of river tributaries. A scenic highway parallels the river, with numerous spur roads which provide a variety of developed to primitive vehicle access points. The majority of the corridor has some form of development on or near the river, including rustic campgrounds, mining claims, small hotels and several small communities.

The Klamath has historically supported abundant runs of chinook and coho salmon and steelhead trout, and is considered one of the major recreational fisheries in California (Kershner and VanKirk 1984). Traditionally, success rates were relatively high on the Klamath, though more recently impacts on the environment and pressure from increasing numbers of anglers have made high catch rates less reliable (Netboy 1980).

Angling pressure is highest when the salmon are in

the river from about August through November. Fishing occurs primarily at and around the mouths of tributaries and in the area of convenient camping spots. The majority of anglers fish from the banks, while a smaller portion fish from drift boats (primarily commercially guided trips). Although groups are generally small (1 to 3), there were often up to 30 groups of anglers at popular sites.

The purpose of the study was to collect baseline data on fishing activities and anglers' perceptions of crowding and encounters. Data were collected through personal contacts with groups of anglers along the river and from mail-back questionnaires left on vehicles at fishing access points. The overall response rate was 44% (n=51). The questionnaire addressed satisfaction levels, reported encounters, perceived crowding, encounter norms for bank and boat anglers, and type of experience provided. In addition, the observer recorded distances between anglers along the banks.

#### New Zealand Rivers Study

Both the Waimakariri and Rakaia rivers are located on the South Island of New Zealand near Christchurch. The rivers have similar physical characteristics, dominated by wide, braided channels running eastward from the alpine divide. Both have narrow gorges in their upper reaches. Paved roads parallel the channels, well

back from the river banks, from the mouth to the gorge. Facility developments are concentrated at the gorge bridges and river mouths. The lower part of the Waimakariri has considerably greater development (due to its proximity to population centers) in terms of marinas and shops.

Both rivers support naturally sustained runs of Chinook, or "Quinnat", salmon from January through April (Cunningham 1971, West and Goode 1986). In an angler survey (Teirney 1981) the Rakaia and Waimakariri were identified as the two most popular rivers to fish out of seven major rivers examined. The Rakaia is reported as the "most preferred" salmon fishing river in Canterbury, though the Waimakariri is the most commonly used due to its proximity to Christchurch (Shelby 1983). The Rakaia is up to 1 1/4 hours farther from the primary population center of Christchurch.

The purpose of the study conducted by Shelby (1983) was to assess substitute resources and activities for salmon fishing on the Rakaia and Waimakariri rivers, and to estimate the carrying capacity for recreational salmon fishing on the two rivers. Data collection was conducted during early spring of 1983. Questionnaires were distributed on weekend days in February when the rivers were fishable and anglers were present (n=146 for the Rakaia and 121 for the Waimakariri). The questionnaire addressed preferences for activity and



resource substitutes and information on encounter norms for salmon fishing. Responses to the latter issue are discussed in this paper. Reported encounters, perceived crowding, encounter norms, and preferences for fishing proximity to other anglers were measured.

Responses from the Rakaia River are separated by upper and lower river sections, due to the distinctly different physical and access characteristics of the two segments. The upper Rakaia is less developed and more rugged, and anglers tend to congregate in small groups at fishing holes which are distinctly separated. The lower Rakaia is the mouth area where the river flows into the sea. This is an area of concentrated use, where large numbers of anglers line the banks.

#### Impact Measures

Anglers' perceptions were measured through several survey items. For reported encounters participants were asked how many anglers they actually saw. The Klamath survey asked anglers to indicate the number of anglers seen while fishing each day, while the New Zealand survey asked anglers to indicate the number within sight of the pool where they were fishing. Encounter norms were determined by asking participants to indicate the highest number of encounters they would tolerate before their experience became unpleasant. Anglers reported their norms in the form, "O.K. to see as many as \_\_\_\_\_ other

anglers." An "it doesn't matter to me" category was included. To determine reported proximities of other anglers, participants on the New Zealand rivers were asked how close the nearest anglers were on either side (proximities were not measured on the Klamath survey). Response categories included, "shoulder to shoulder", "one rod length (3 meters)", "two to four rod lengths (6 to 12 meters)", and "casting range (12 to 30 meters)." To assess proximity norms, anglers were asked to indicate the minimum distance they would tolerate between themselves and other anglers. Response categories were the same as for reported proximities, with the addition of a "makes no difference" category. Perceived crowding was measured by asking the extent to which the individual felt crowded. Responses were given on a nine point Likert-type scale ranging from "not at all" to "extremely crowded."

## RESULTS

Salmon anglers' evaluative standards on the Klamath River are compared with those of anglers on the two New Zealand rivers. Norms for encounters and fishing proximities on the Klamath, Waimakariri, upper Rakaia, and lower Rakaia are compared across the different resource settings. In addition, the effects of impact variables on perceived crowding were explored.

### Encounter Norms

Salmon anglers were asked to indicate the highest number of encounters they would tolerate before the experience became unpleasant. On the Klamath River data were gathered regarding encounters with both bank and boat anglers (Table 1). While 50% of the users said they would tolerate 13 or fewer bank anglers per day, they would only tolerate 5 or fewer anglers in boats.

New Zealand anglers on the Waimakariri and Rakaia river sections have lower encounter norms than reported by Klamath River anglers (Table 2). Anglers on the Waimakariri reported that they would tolerate up to 7 anglers in sight of their fishing hole, while Rakaia anglers reported they would tolerate up to 10 anglers on the lower section and 4 on the upper section. On the New Zealand rivers perceptions toward boat anglers were not assessed because fishing was primarily from the banks.

New Zealand anglers also were asked about preferred encounter levels. Fifty percent of the participants preferred 4 or fewer encounters on the Waimakariri and lower Rakaia and 1 or fewer on the upper Rakaia. Preferences for encounters were not assessed for Klamath River anglers.

Figures 1 through 4 show curves for encounter standards for each of the river settings. Two basic curve shapes are shown, single tolerance and multiple tolerance norms (Whittaker and Shelby in press). The

Table IV. 1. Encounter Norms of Klamath River Anglers

Type of Encounter -----	Encounter Norm* -----
with boaters/day	4.5
with bank anglers/day	12.6

-----  
\* Figures are medians. Fifty percent of the anglers would tolerate more and 50% would tolerate fewer encounters per day.

Table IV. 2. Norms for Encounters with Bank Anglers

Numbers of Encounters	Klamath	Waimakariri	Lower Rakaia	Upper Rakaia
Reported	15.5	46.6	28	6.8
Tolerable	12.6	6.9	9.5	3.8
Preferred	NA	3.6	3.5	<1

Figures represent medians.

Klamath (Figure 1) and the upper Rakaia (Figure 2) are characterized by a single tolerance norm. The majority of anglers reported standards greater than zero but few were willing to tolerate encounters beyond a certain level, represented by peaks in the graphs. In general, a single tolerance norm is characterized by a mode at some level of impact beyond zero. The difference in the modes for the Klamath and upper Rakaia show that the Klamath anglers are willing to tolerate more encounters than the upper Rakaia anglers, also shown by the median values in Table 2.

The lower Rakaia (Figure 3) and Waimakariri (Figure 4) are characterized by a multiple tolerance norm, or bimodal distribution. Anglers on these river sections do not appear to agree on what is an appropriate encounter norm, referred to as low norm crystallization (Shelby and Heberlein 1986). Between 15% and 20% (depending on the river section) of the anglers tolerate only a few encounters. As encounters increase the percent who tolerate the level drops somewhat. However, the curve turns upward at the highest impact level where between 14% and 22% are willing to tolerate over 50 encounters.

#### Proximity of Other Anglers

On the Klamath River an observer recorded proximities of anglers. With ample room along an unobstructed bank anglers spaced themselves about 30 feet

Figure IV. 1. Klamath River Encounter Standards

### ENCOUNTER NORMS FOR SALMON ANGLERS

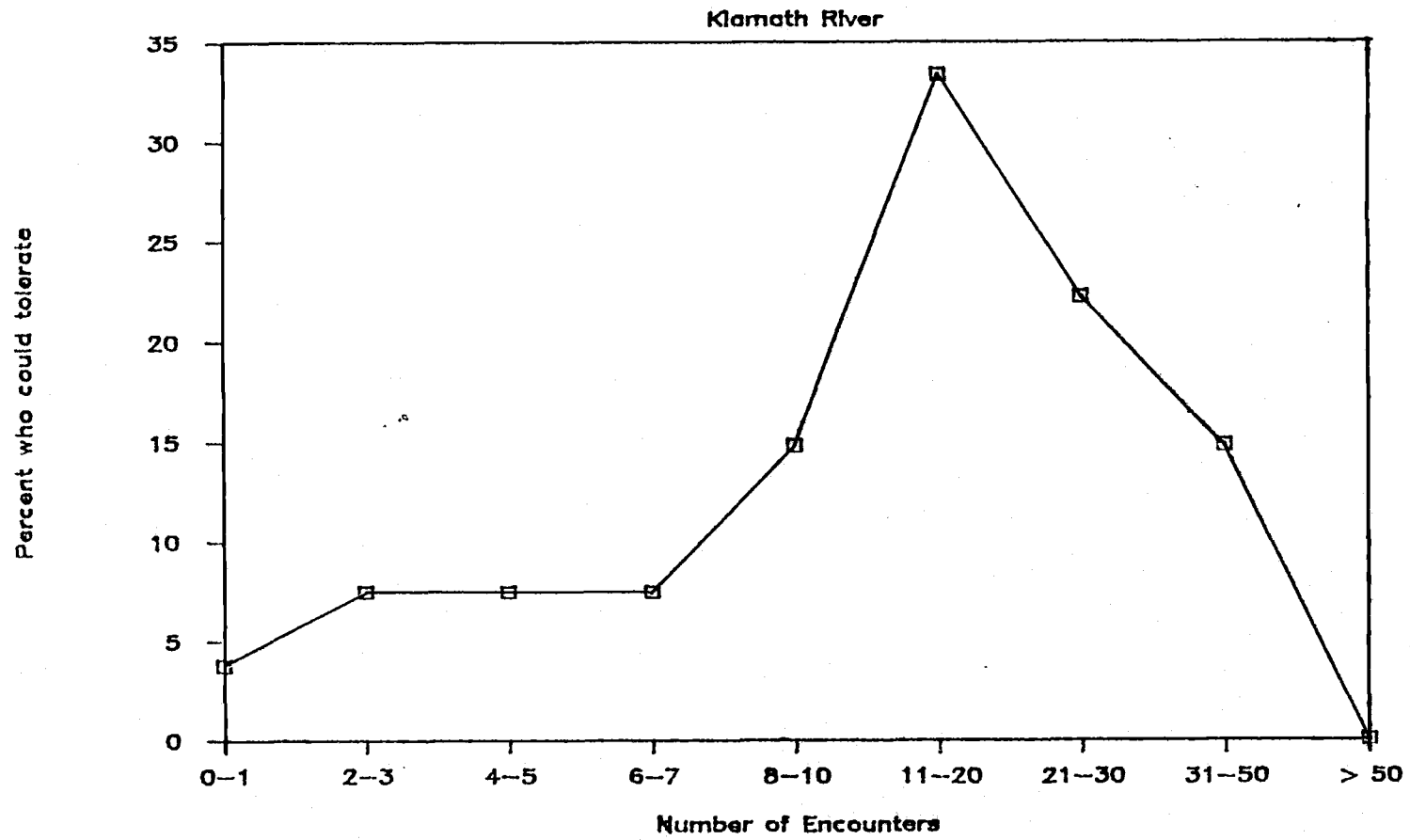


Figure IV. 2. Upper Rakaia River Encounter Standards

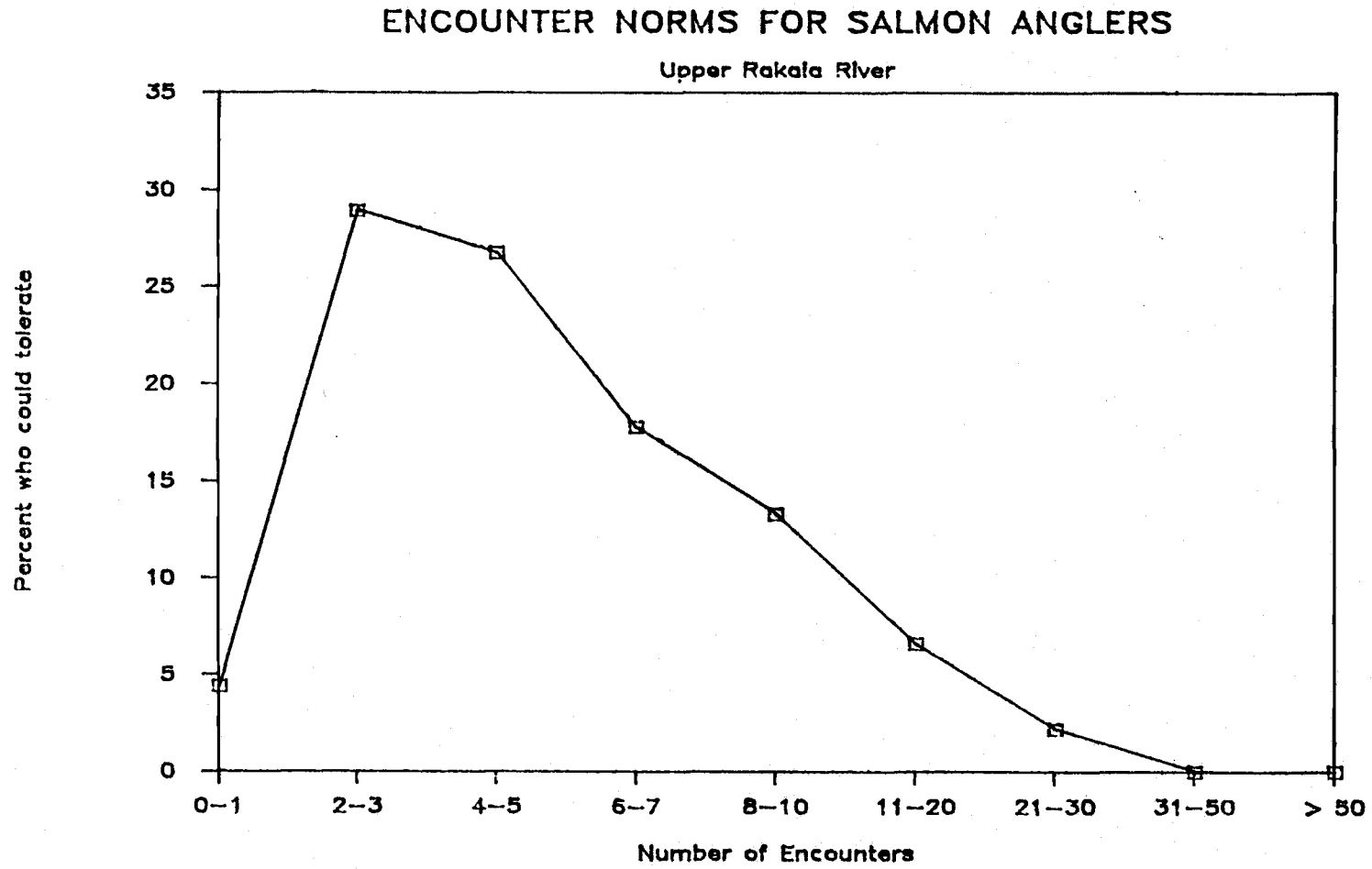




Figure IV. 3. Lower Rakaia River Encounter Standards

### ENCOUNTER NORMS FOR SALMON ANGLERS

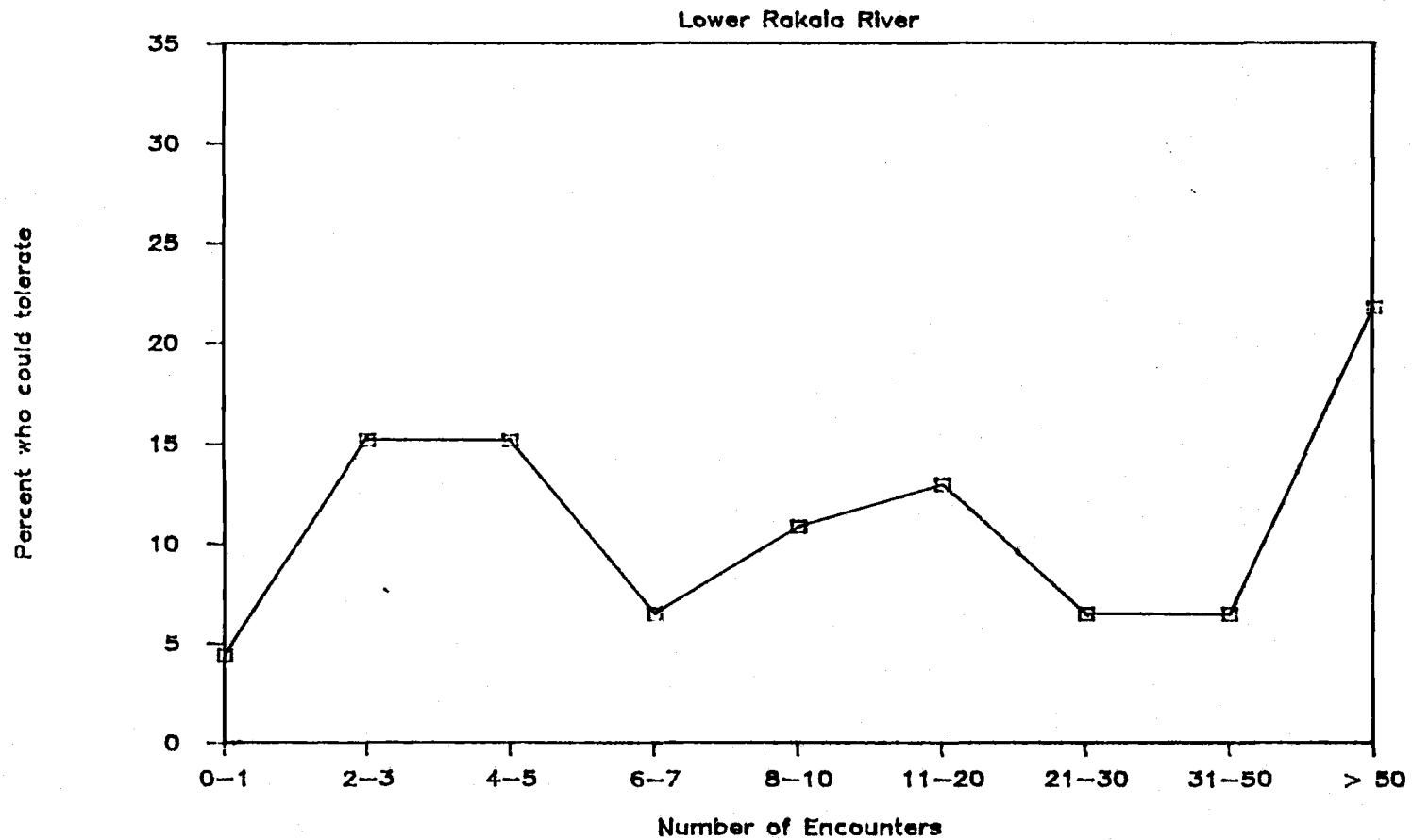
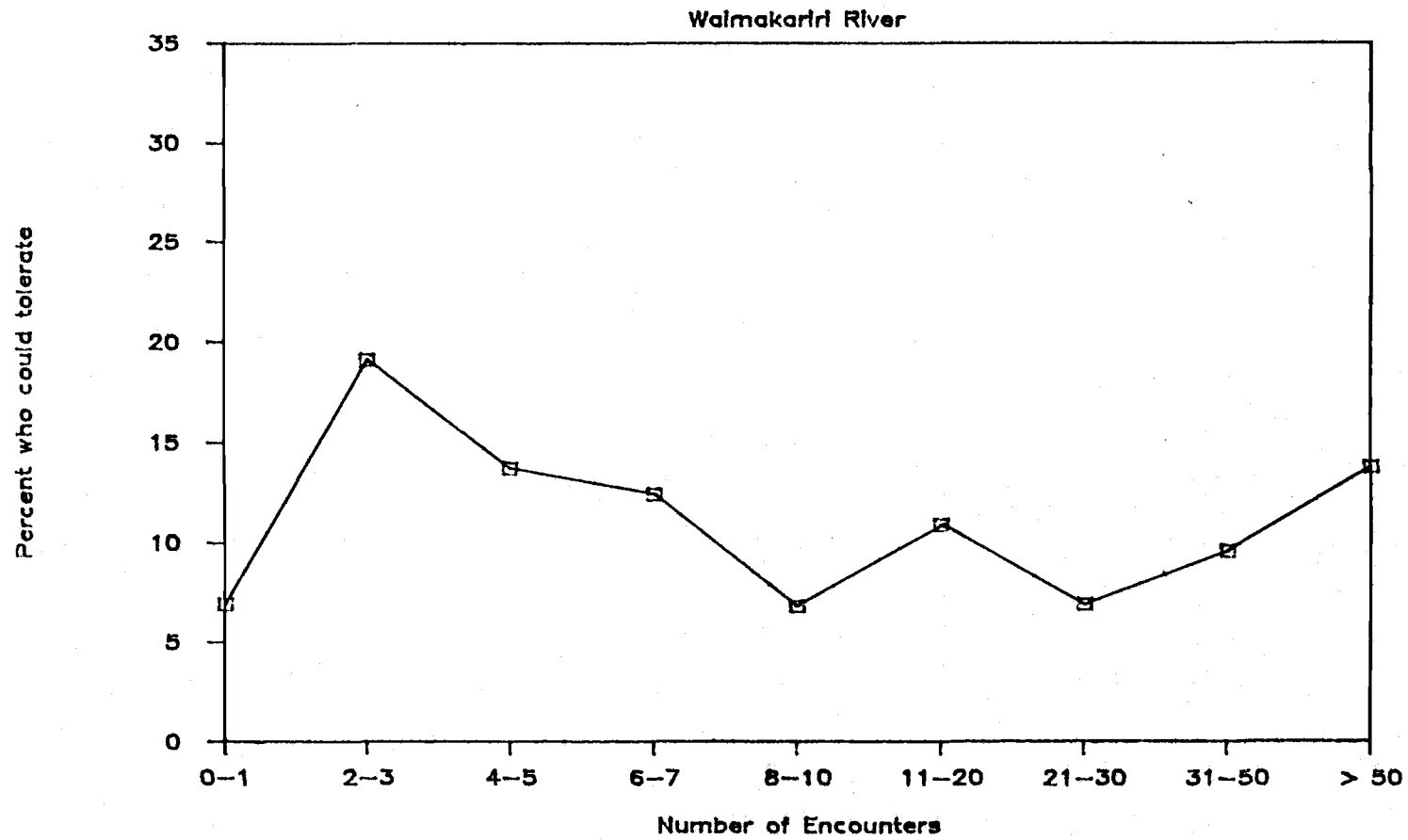


Figure IV. 4. Waimakariri River Encounter Standards

### ENCOUNTER NORMS FOR SALMON ANGLERS



apart. Anglers usually decreased the size of their territory if physical bank space was limited due to obstacles such as bushes or rocks. At heavily used locations many anglers fished elbow to elbow with strangers.

On the New Zealand rivers anglers reported that they fished as near to, or slightly closer to, other anglers as they preferred (Table 3). On the Waimakariri 52% of the anglers fished within 3 meters (about 10 feet) of others and 67% fished within 6 to 12 meters (about 20 to 39 feet) of others. Similar distances were reported on the Rakaia river sections with 67% of the anglers on the lower Rakaia and 55% of the anglers on the upper Rakaia fishing within 6 to 12 meters of others. Participants also were asked to indicate the minimum distance from other anglers they would tolerate. On the Waimakariri proximity norms were exceeded somewhat, with 52% of the participants reporting they fished within 6 to 12 meters of others but only 42% indicating they would tolerate this situation. Only 9% said they would tolerate fishing shoulder to shoulder with others. Rakaia anglers experienced roughly the fishing proximities they preferred.

On all of the rivers, regardless of setting characteristics, it appears that anglers, with no limitations on space, have an average proximity norm of

Table IV. 3: Comparison of Reported and Tolerated distances  
of other Anglers on New Zealand Rivers\*

Proximity of closest anglers	Waimakariri		Lower Rakaia		Upper Rakaia	
	Reported	Tolerated	Reported	Tolerated	Reported	Tolerated
shoulder to shoulder	25	9	21	15	5	3
3 meters	27	31	25	21	8	12
6 to 12 meters	15	26	21	26	43	45
12 to 30 meters	25	21	27	23	34	40
> 30 meters	8	14	6	15	10	0

\* Figures are percents.

about 6 to 12 meters. They apparently reduce this territory when favorite fishing holes are heavily used.

#### Encounter Variables and Perceived Crowding

When anglers on the Klamath were asked whether they felt the river was crowded 71% reported some degree of crowding (Table 4). Anglers on the Waimakariri and the mouth of the Rakaia reported similar perceptions with 75% and 70% respectively of the sample groups reporting some degree of crowding. Anglers on the upper Rakaia were significantly different, with only 48% reporting some degree of crowding. Anglers on the Waimakariri felt the most crowded with 24% feeling extremely crowded.

Anglers on the Klamath, Waimakariri, and lower Rakaia report fairly high levels of crowding when compared to recreationists in a variety of other settings (Shelby and Heberlein 1986). Shelby and Heberlein (1986), suggest that when 66% or more feel crowded it is an indication that capacities may have been exceeded. Using this "rule of thumb," these three river settings appear to have exceeded social capacity for the salmon angling experience. The upper Rakaia has not yet exceeded social capacity, but should be monitored by the resource managers to see that social impacts do not exceed standards defined by encounter norms.

Perceptions of crowding are correlated with reported encounters and proximities (Table 5). As the number of

Table IV. 4. Perceived Crowding Among Salmon Anglers\*

Perception	Klamath	Waimakariri	Lower Rakaia	Upper Rakaia
not at all crowded	29	25	30	52
slightly crowded	25	22	30	20
moderately crowded	35	29	26	20
extremely crowded	10	24	13	8
Mean	4.3	4.7	3.9	3.1
Sample Size	51	119	69	65

\* Figures are percents.

Mean from a range from 1, "not at all crowded," to 9, "extremely crowded".

Table IV. 5. Influence of Reported Encounters and Proximity on Crowding

Correlations between Crowding and  
Normative Variables

River Setting	Reported Encounters	Reported Proximities
-----		
Klamath		
Boat encounters (n=50)	.53*	NA
Bank encounters (n=51)	.50*	NA
Waimakariri (n=119)	.66*	-.65*
Lower Rakaia (n=67)	.41*	-.41*
Upper Rakaia (n=65)	.36*	-.63*

-----  
\* P < .05

Figures are zero-order correlation coefficients

encounters reported by anglers increases and the distance from other anglers decreases, perceptions of crowding increase. Reported encounters, in combination with proximity of other anglers, explains 85% of the variability in perceived crowding on the Waimakariri, and 34% and 52% of perceived crowding on the lower and upper Rakaia, respectively. On the upper Rakaia, proximity appears to be more strongly related to perceived crowding than reported contacts. On the more heavily used river sections of the lower Rakaia and the Waimakariri, proximity and reported encounters explain about equal amounts of perceived crowding.

## DISCUSSION

The results suggest that social norms exist for salmon anglers and in addition, these impacts significantly affect anglers' perceptions of crowding. This research suggests several conclusions regarding salmon anglers' encounter norms, proximity norms, and perceptions of crowding.

### Encounter Norms

First, norms for encounters are affected by the type of group contacted. On the Klamath River, anglers had a significantly lower tolerance for encounters with floaters than with bank anglers. Bank anglers commented that they felt casting room became restricted when boats



were in the area and that occasionally fishing lines became tangled with boater's lines. Some bank anglers also felt that boaters were disturbing the fish and as a result fishing quality was reduced at the site. Fishing from a boat appears to be a less acceptable form of angling participation, resulting in a conflict situation.

Graefe et al. (1984) suggest that conflicts commonly arise when recreationists with different behavioral standards interact. One-sided conflict among users in recreation settings is referred to as "asymmetrical antipathy" (Adelman et al. 1982). This phenomenon has been documented for a variety of activities, including canoeing and motor boating (Lucas 1964), hikers and horse users in wilderness areas (Stankey 1973), and for anglers and innertubers (Heberlein and Vaske 1977).

Second, encounter norms for salmon anglers vary across the four settings. Anglers on the upper Rakaia reported the lowest norms for contacts with others, perhaps due to the relatively remote, undeveloped setting and traditionally low use levels, and reported the lowest number of encounters. The higher number of contacts tolerated on the lower Rakaia and Waimakariri also may be due to anglers' realistic expectations of use levels at these sites. The New Zealand rivers were primarily used by locals who would likely have learned about the density of anglers on the various river

sections either from personal experience from other local sources.

Shelby and Heberlein (1986) have found that user's expectations are positively correlated to norms for encounters. In other words, if visitors expect higher encounter levels they are more likely to tolerate higher encounter levels. However, anglers may still prefer fewer encounters than they will tolerate, as responses of the New Zealand anglers suggest. In recreation settings, the tolerable or maximum capacity is often higher than the "optimal" capacity (Shelby and Heberlein 1986). To achieve optimal conditions higher use levels must be traded for other benefits, such as opportunities for greater solitude.

Anglers on the Klamath River reported that they would tolerate the greatest number of contacts of the 4 groups studied. There may be several explanations. In the Klamath study, participants were asked to indicate the highest number of contacts they would tolerate per day, while New Zealand participants were asked to indicate tolerable contacts for contacts within sight of their fishing hole. Though Klamath anglers generally fished for only a few hours in one area, they did spend time on the river engaged in other activities (picnicking and camping). Respondents may not have distinguished clearly between fishing and other river activities in their indication of tolerable contacts per day. Also,

responses by bank and boat anglers were not separated. Since boat anglers were more likely to travel farther on the river during their fishing outings, they may have expected and tolerated a greater number of encounters, increasing the median value. Salmon anglers in the Pacific Northwest also may be more tolerant of contacts than New Zealand anglers due to variables that were not measured, such as higher populations or greater fishing pressures.

Third, there is considerable similarity in norms for encounters for salmon fishing in a semi-developed setting, despite variation in personal and situational factors. Results from this study suggest that the appropriate number of encounters for salmon anglers fishing on the banks is from 4 to 13 people per day. Salmon anglers seem to have somewhat less norm crystallization concerning tolerable encounters than, for example, river runners in semideveloped settings (Martinson and Shelby 1986). This lower level of consensus seems to apply particularly to higher density salmon fishing situations. Shelby and Heberlein (1986) found, in a review of 22 carrying capacity studies, that there was less crystallization for higher contact experiences, suggesting that norms are less specific as the number of encounters increases. Though "privacy while fishing" may be a primary motive for some fishing experiences (Moeller and Engelken 1972), Lowery (1978)

points out that, specifically for salmon fishing, social contacts are a less important element of the experience than "catching fish".

#### Proximity Norms

Fourth, salmon anglers consider the acceptable distance from others is roughly 6 to 12 meters (about 20 to 39 feet). Though this standard may be the preferred proximity, fishing closer to others was commonly tolerated. Norms for proximities may not be as well defined as norms for encounters, though individuals may have fairly strict norms defining personal territory. Hendee et al. (1977) noted a strong sense of territoriality within groups of backcountry anglers and reported that while 80% fished within 20 feet of companions, two thirds remained 100 feet or more from strangers. The proximity standard appears to be somewhat more restrictive in a less developed setting. Hendee et al. (1977:15) further observed that "the greater the density of people at the lake, the more likely were fishermen to infringe on another group's fishing territory." This type of behavior was frequently observed on the Klamath.

#### Perceived Crowding

Fifth, crowding ratings suggest that the Klamath, Waimakariri and lower Rakaia may have exceeded social

carrying capacity for salmon fishing. If use increases, anglers who cannot tolerate high use may either be displaced to substitute rivers, redefine their salmon fishing experience to be less dependent on low contact levels, or be forced to find a substitute activity (Shelby et al. in press).

Sixth, reported encounters are positively correlated with perceived crowding. This relationship is weaker on the upper Rakaia where anglers reported the fewest encounters, and stronger on the Waimakariri where the number of reported encounters is larger. It would appear that this relationship is stronger where impacts are more severe.

These results support previous research on the effect of reported encounters in helping to predict perceptions of crowding (Shelby and Heberlein 1986, Shelby and Colvin 1981, Shelby and Nielson 1976). Heberlein and Vaske (1977) found that for anglers on the Bios Brule River 33% of crowding was explained by reported contacts. Shelby and Heberlein (1986) discuss similar studies which have shown that for other river users (canoers, river runners and tubers) 9% to 33% of crowding was explained by reported encounters. It is interesting to note that the relationship between actual contacts and crowding is considerably weaker (Shelby and Heberlein 1986) even though it has been demonstrated that actual contacts are up to twice that reported (Shelby and

Colvin 1981). This emphasizes the importance of managers understanding what visitors perceive the situation to be, and not simply assessing the situation themselves. Managers cannot control social impacts by regulating only the number of users in a setting, but must consider the activity and the desired experience.

Finally, there is a significant correlation between the proximity of other anglers and perceptions of crowding, despite the lower crystallization of the proximity norm for salmon fishing. On the upper Rakaia the relationship is considerably stronger than the relationship between reported encounters and perceived crowding. This may suggest that, in settings where anglers are less likely to have high contact levels, the proximity of the encounter, rather than the number of encounters, is more important in explaining crowding. On the Waimakariri, where the greatest percent of anglers fished within 3 meters of others, the strength of the relationship between reported proximity and crowding was the strongest. On the lower Rakaia, reported proximity only explained 17% of crowding, even though 46% reported fishing within 3 meters of others. On this river section it appears that other factors may be influencing crowding.

#### CONCLUSIONS

The results suggest that the type and level of

contacts and fishing proximities do have measurable impacts on the salmon angler's experience. It appears that these impacts may have less of an effect on higher contact experiences than on lower contact experiences. The literature suggests that salmon anglers, as opposed to other types of anglers, may be more tolerant of certain impacts. However, the salmon anglers who spent the extra effort to reach the less developed upper Rakaia River did have the lowest encounter norms of all groups analyzed. Though the type of fishing may influence the norms for evaluating impacts for particular experiences, these norms may be indirectly influenced by the setting in which the activity commonly occurs.

A range of acceptable impacts for a semideveloped experience is identified, suggesting that these norms for salmon anglers can be useful evaluative standards for resource managers to consider when making visitor management decisions. The structure of these norms for encounters show that lower density settings are characterized by single tolerance norms, or greater agreement about acceptable impact levels. On the other hand, higher density settings are characterized by multiple tolerance norms, or little agreement about acceptable impact levels. It is important for managers to be aware of these differences since the latter situation may present a greater potential for conflicts between user groups. More information is required

to see if differences in encounter norms for anglers are due to cultural differences or other situational factors.



## BIBLIOGRAPHY

- Absher, J.D. and R.G. Lee. 1981. Density as an incomplete cause of crowding in backcountry settings. Leisure Sciences 4(3):231-247.
- Addis, J.T. and J. Erickson. 1968. The Ohio Fishermen. Ohio Dept. Nat. Resources Div. Wildl. Publ. 140.
- Adelman, B.J., T.A. Heberlein and T.M. Bonnicksen. 1982. Social psychological explanations for the persistence of a conflict between paddling canoeists and motorcraft users in the Boundary Waters Canoe Area. Leisure Sciences 5(1):45-61.
- Anderson, C.G. and D.W. Lime. 1984. Boundary Waters Canoe Area- Quetico Provincial Park: An international partnership. Western Wildlands 10(2):13-19.
- Anderson, C.R. 1972. The Quinnat Salmon Fishery from the Acclimatisation Society Viewpoint. New Zealand Marine Dept., Wellington, Fisheries Tech. Report 83:31.
- Brown, P.J. and D.M. Ross. 1982. Using desired recreation experiences to predict setting preferences. pp. 10 In Forest and River Recreation: Research Update. USDA Ag. Exp. Sta. Univ. of Minn., St. Paul.
- Bryan, H. 1977. Leisure value systems and recreational specialization: The case of the trout fishermen. J. Leisure Research 9(3):174-187.
- Bryan, R.L. 1977. Canoeing use of Huron-Clinton Metropark. pp.121-124. In Proceedings: River Recreation Management and Reserach Symposium. USDA For. Ser. Gen. Tech. Rep. NC-28.
- Buchanan, T. 1983. Toward an understanding of variability in satisfaction within activities. J. Leisure Research 15(1):39-51.
- Clark, R.N. and G.H. Stankey. 1979. A framework for planning, management, and research. USDA For. Ser. Gen. Tech. Rep. PNW-98. 32p.
- Clawson, M. and J.L. Knetsch. 1966. Economics of Outdoor Recreation. John Hopkins Press, Baltimore.

- Cunningham, B.T. 1972. Status of the Quinnat Salmon Fishery regulation and licensing. New Zealand Marine Dept., Wellington, Fisheries Tech. Report 83:17-30.
- Ditton, R.B. and A.R. Graefe. 1975. Sport fishermen and their behavior. Paper presented to the Texas A&M Chapter of the American fisheries society, Texas A&M University, College Station, February 2.
- Ditton, R.B., A.J. Fedler, and A.R. Graefe. 1983. Factors contributing to perceptions of crowding. Leisure Sciences 5(4):273-288.
- Driver, B.L. and P.J. Brown. 1978. The Opportunity Spectrum concept in outdoor recreation supply inventories: An overview. pp. 24-31 In Proceedings of Integrated Renewable Resource Inventories Workshop. USDA For. Ser. Gen. Tech. Rep. RM-55.
- Driver, B.L. and R.W. Cooksey. 1977. Preferred psychological outcomes of recreational fishing. pp. 27-40 In Catch and Release Fishing as a Management Tool: A National Sport Fishing Symposium. Humboldt State University, Arcata. Sept. 7-8.
- Freedman, J.L. 1975. Crowding and Behavior. W.H. Freeman, San Francisco.
- Graefe, A. 1980. The Relationship Between Level of Participation and Selected Aspects of Specialization in Recreational Fishing. Ph.D. dissertation, Texas A&M University, College Station.
- Graefe, A., J.J. Vaske, and F.R. Kuss. 1983. Visitor Impact Management in National Parks: Application Principles and Decision Framework. Dept. of Recreation, University of Maryland, College Park.
- Graefe, A.R., J.J. Vaske, and F.R. Kuss. 1984. An integration and synthesis of twenty years of research. Leisure Sciences 5(2):385-432.
- Gramman, J.H. 1982. Toward a behavioral theory of crowding in outdoor recreation: An evaluation and synthesis of research. Leisure Sciences 5(2):109-126.
- Gunn, C.A. 1977. Urban rivers as recreation resources. pp.19-26 In Proceedings: River Recreation Management and Research Symposium. USDA For. Ser. Gen. Tech. Rep. NC-28.

- Hammitt, W.E., C.D. McDonald and F.P. Noe. 1984. Use level and encounters: Important variables of perceived crowding among non-specialized recreationists. J. of Leisure Research 16(1):1-8.
- Hampton, E.L. and R.T. Lackey. 1975. Analysis of angler preferences and fisheries management objectives with implications for management. Proceedings of the Annual Conference Southeastern Association of Game and Fish Commissioners 29:310-316.
- Hanson, L.T. 1986. Estimations of Marginal Values of Water as an Instream Resource for Recreational Fishing: A National Analysis. Ph.D. dissertation, Iowa State University.
- Harris, C.C. and E.P. Bergersen. 1985. Survey on demand for sport fisheries: Problems and potentialities for its use in fishery management planning. North American Journal of Fisheries Management 5:400-410.
- Heberlein, T.A. and G. Alfano. 1983. Social Carrying Capacity for Boating at the Apostle Islands National Lakeshore. Draft report to the National Park Service. University of Wisconsin, Madison.
- Heberlein, T.A. and J.J. Vaske. 1977. Crowding and Visitor Conflict on the Bois Brule River. Water Resources Center, Tech. Report #OWRT A-066-WAS. University of Wisconsin, Madison.
- Hecock, R.D. 1977. Recreational usage and users of rivers. pp.279-284 In Proceedings: River Recreation Management and Research Symposium. USDA For. Ser. Gen. Tech. Rep. NC-28.
- Hendee, J.C., R.N. Clark and T.E. Daily. 1977. Fishing and Other Recreation Behavior at High Mountain Lakes in Washington State. USDA For. Ser. Research Note PNW-304.
- Hendee, J.C., G. Stankey, and R. Lucas. 1978. Wilderness Management. USDA For. Ser. Gen. Misc. Publication No. 1365. Washington DC.
- Hospodarsky, D., K.S. Martinson and D.R. Field. 1988. Human Use of High Lakes: A Literature Review. National Park Service CPSU/OSU 88-8. Oregon State University, Corvallis.

- Jackson, J. 1965. Structural Characteristics of Norms. pp. 301-309 In: I.D. Stein and M. Fishbein (eds.). Current studies in Social Psychology. Holt, Rinehart and Winston, Inc. New York.
- Kershner, J.L. and R.R. Vankirk. 1984. Characteristics and attitudes of some Klamath River anglers. California Fish and Game 70(4):196-209.
- Knopf, R.C., B.L. Driver, and J.R. Bassett. 1973. Motivations for fishing. Paper presented at the 38th North American Wildlife and Natural Resource Conference, Wash., D.C., March 19.
- Knopp, T.B., G. Ballman, and L.C. Merriam, Jr. 1979. Toward a more direct measure of river user preferences. J. Leisure Research 11(4):317-326.
- Lee, M.E., D.R. Field, and K.S. Martinson. 1988. Visitor Crowding and Conflict at Whiskeytown: A Carrying Capacity Approach. National Park Service CPSU/OSU 88-7. Oregon State University, Corvallis.
- Ley, R. 1967. Why anglers really angle. Field and Stream 71(10):63,109-110.
- Lime, D.W. 1970. Research for determining use capacities of the Boundary Waters Canoe Area. Naturalist 21:8-13.
- Lime, D. 1975. Backcountry river recreation: Problems and research opportunities. Naturalist 26(1):2-5.
- Lowery, H.M. 1978. Survey of Oregon Resident Annual Angler License Holders: Recreational Fishery Use and Preferences Among Management Options. Survey Research Center, Oregon State University, Corvallis.
- Lucas, R.C. 1964. The recreational capacity of the Quetico-Superior area. USDA For. Ser. Paper LS-15.
- Lucas, R.C. 1965. Wilderness perception and use: The example of the Boundary Waters Canoe Area. In: Burton, I. and R.W. Kates. Readings in Resource Management and Conservation. Chicago: Univ. of Chicago Press.
- Lucas, R.C. 1967. The changing recreational use of the Boundary Waters Canoe Area. USDA For. Ser. Res. Note NC-42.

- Lucas, R.C. 1979. Use patterns and visitor characteristics, attitudes, and preferences in nine wilderness and other roadless areas. USDA For. Ser. Res. Paper INT-253. Ogden, Utah.
- Manfredo, M.J., P.J. Brown, and G.E. Hass. 1980. Fishermen values in wilderness. Proceedings of the Western Association of Fish and Wildlife Agencies 52:276-297.
- Manfredo, M.J. and S.J. Conroy. 1980. Alsea River Steelhead fishing study. Dept. of Resource Recreation Management, Oregon State University, Corvallis.
- Manning, R.E. 1979. Behavioral characteristics of fishermen and other recreationists on four Vermont rivers. Transactions of the American Fisheries Society 108:536-541.
- Manning, R.E. 1985. Crowding norms in backcountry settings: A review and synthesis. J. Leisure Research 17(2):75-89.
- Manning, R.E. 1986. Studies in Outdoor Recreation: Search and Research for Satisfaction. Corvallis, Oregon. Oregon State University Press.
- Manning, R.E. and C.P. Ciali. 1981. Recreation and river type: Social-environmental relationships. Environmental Management 5(2):109-120.
- Martinson, K.S. and B. Shelby. 1986. Encounter norms in more developed settings. Paper presented to the First National Symposium on Social Science in Resource Management, Oregon State University, Corvallis, May 15.
- Merriam, L.C. and C.K. Smith. 1974. Visitor impact on newly developed campsites in the Boundary Waters Canoe Area. J. of Forestry 72:627-630.
- Moeller, G.H. and J.H. Engelken. 1972. What fishermen look for in a fishing experience. J. Wildlife Management 36(4):1253-1257.
- Netboy, A. 1980. Salmon: The World's Most Harassed Fish. Ebenezer Baylis and Son Limited, London.

- Nielson, J.M. and B. Shelby. 1977. River-running in the Grand Canyon: How much and what kind of use. pp. 168-177 In Proceedings: River Recreation Management and Research Symposium. USDA For. Ser. Gen. Tech. Rep. NC-28.
- Outdoor Recreation Resources Review Commission. 1962. Sport fishing: Today and tomorrow. ORRRC Study Report 7. Washington DC: US Government Printing Office.
- Peterson, G.L. 1974. A comparison of the sentiments and perceptions of wilderness managers and canoeists in the Boundary Waters Canoe Area. J. Leisure Research 6(3):194-206.
- Rosenthal, D.H., D.A. Waldman, and B.L. Driver. 1982. Construct validity of instruments measuring recreationists' preferences. Leisure Sciences 5(2):89.
- Schreyer, R., D.W. Lime, and D.R. Williams. 1984. Characterizing the influence of past experience on recreation behavior. J. Leisure Reserach 16(1):34-50.
- Schreyer, R. and J. Roggenbuck. 1978. The influence of experience expectations on crowding perceptions and social-psychological carrying capacities. Leisure Sciences 1(4):373-394.
- Schreyer, R., J. Roggenbuck, S.F. McCool, L.E. Royer and J. Miller. 1976. The Dinosaur National Monument whitewater river recreation study. Institute for the Study of Outdoor Recreation and Tourism. Utah State University, Logan.
- Shelby, B. 1981. Encounter norms in backcountry settings: Studies of three rivers. J. Leisure Research 13(2):129-138.
- Shelby, B. 1983. Recreational Substitutability and Carrying Capacity for the Rakaia and Waimakariri Rivers. Agricultural Economics Research Unit, Lincoln College, Canterbury, New Zealand.
- Shelby B. and R. Colvin. 1979. Determining use levels for the Rogue River. Water Resource Research Institute. Oregon State University, Corvallis.

- Shelby, B. and R. Colvin. 1981. Carrying Capacities for the Illinois River. Water Resources Research Institute. Oregon State University, Corvallis.
- Shelby, B., T.A. Heberlein, J.J. Vaske and G. Alfano. 1983. Expectations, preferences, and feeling crowded in recreation carrying capacity. Leisure Sciences 6(2):1-14.
- Shelby, B. and T.A. Heberlein. 1986. Social Carrrying Capacity in Recreation Settings. Corvallis, Oregon. Oregon State University Press.
- Shelby, B. and J.M. Nielson. 1976. Use levels and crowding in the Grand Canyon. Colorado River Reserach Technical Report #3, Grand Canyon National Park, Arizona.
- Shelby, B., J.J. Vaske and R. Harris. In Press. User standards for ecological impacts at wilderness campsites.
- Shelby, B., J.J. Vaske and T.A. Heberlein. In Press. Perceived crowding as a rough indicator of social carrying capacity.
- Smith, C. 1980. Attitudes about the value of steelhead and salmon angling. Trans. Am. fisheries Society 109:272-281.
- Stankey, G.H. 1973. Visitor perception of wilderness recreation carrying capacity. USDA For. Ser. Res. Paper INT-42.
- Stankey, G.H. 1980. A comparison of carrying capacity perceptions among visitors to two wildernesses. USDA For. Ser. Res. Paper INT-242.
- Stankey, G.H. and P.J. Brown. 1981. A technique for recreation planning and management in tomorrow's forests. In Proceedings, Division 6, 17th World Congress, International Union of Forestry Research Organizations. Kyoto, Japan.
- Stankey, G.H. and S.F. McCool. 1984. Carrying Capacity in recreational settings: Evaluation, apprasial and application. Leisure Sciences 6(4):453-473.
- Stankey, G.H., S.F. McCool and G.L. Stokes. 1984. Limits of acceptable change: A new framework for managing the Bob Marshall Wilderness Complex. Western Wildlands (Fall):33-37.

- Stone, G.P. and M.J. Taves. 1956. Research into the human element in wilderness use. pp.26-32 In Proceedings of the Society of American Foresters.
- Teirney, L.D. 1981. Recreational evaluation and protection of salmon-fishing rivers. pp.36-41 In Proceedings of the Salmon Symposium, Fisheries Research Division, Occasional Publication No. 30.
- Talhelm, D.R. 1973. Defining and evaluating recreation quality. Paper presented at the 38th North American Wildlife and Natural Resource Conference, Washington DC, March 19.
- Vaske, J.J. 1978. Contact preference norms vs. actual contacts: Crowding among Brule River canoers. Paper presented at the Annual Meeting of the Rural Sociological Society. San Francisco. August.
- Vaske, J.J. and M.P. Donnelly. 1979. The influence of initial perceptions on current evaluations of a recreational resource. Paper presented to Rural Sociological Society. Burlington, Vermont.
- Vaske, J.J., A.R. Graefe and A. Dempster. 1982. Social and environmental influences on perceived crowding. Paper presented at Third Annual Meeting of the Wilderness Psychology Group. Morgantown, West Virginia. July 8-10.
- Vaske, J.J., A.R. Graefe, B. Shelby and T.A. Heberlein. 1986. Backcountry encounter norms: Theory, method and empirical evidence. J. Leisure Research 18(3):137-153.
- Vaske, J.J., F.R. Kruss and A.R. Graefe. 1984. Recreation Impacts and Carrying Capacity: A Bibliography. Department of Recreation, University of Maryland, College Park.
- Vaske, J.J., M.P. Donnelly, and T.A. Heberlein. 1980. Perceptions of crowding and resource quality by early and more recent visitors. Leisure Sciences 3(4):367-381.
- West, I.F. and R.H. Goode. 1986. Postal survey of anglers fishing for sea-run chinook salmon on the Rakaia River, Canterbury, New Zealand, 1973/1974 and 1974/1975. New Zealand Journal of Marine and Freshwater Research 20:345-354.



Whittaker, D. and Bo Shelby. In Press. Types of norms for recreation impacts: Extending the social norms concept.

**APPENDIX**

**APPENDIX A:**  
**Sample Questionnaires**

## YOUR TRIP ON THE KLAMATH

Overall, how would you rate your trip?

- \_\_\_\_\_ Poor  
 \_\_\_\_\_ Fair, it just didn't work out very well  
 \_\_\_\_\_ Good, but I wish a number of things could have  
 been different  
 \_\_\_\_\_ Very good, but could have been better  
 \_\_\_\_\_ Excellent, only minor problems  
 \_\_\_\_\_ Perfect

Did you feel the river was crowded?

1	2	3	4	5	6	7	8	9
not at all			slightly crowded		moderately crowded		extremely crowded	

During your trip, about how many times each day did you actually see another river party? If you saw the same party more than once, count each occasion separately.

We actually saw other parties about \_\_\_\_\_ times per day.

If you saw more people than you preferred, did you:

- |                                                                                                    |    |     |
|----------------------------------------------------------------------------------------------------|----|-----|
| - become unhappy or dissatisfied with the trip?                                                    | no | yes |
| - change the way you thought about the Klamath, deciding it was less remote than you had believed? | no | yes |
| - decide to go somewhere more remote next time?                                                    | no | yes |
| - attempt to avoid others by:                                                                      |    |     |
| - speeding up or slowing down?                                                                     | no | yes |
| - getting off the river to allow people to pass?                                                   | no | yes |
| - passing up places at which you'd planned to stop?                                                | no | yes |
| - changing your campsite?                                                                          | no | yes |

\_\_\_\_\_ not applicable; didn't see more than I preferred.

We are interested in how you feel about encounters with other groups on the Klamath. For each question indicate the highest number of encounters you would tolerate before the experience became unpleasant.

Number of encounters with other parties while floating on the river each day.

OK to have as many as \_\_\_\_ encounters per day.  
 \_\_\_\_ Makes no difference to me.

Number of nights spent camping within sight or sound of another party.

OK to be near others as many as \_\_\_\_ out of 3 nights.  
 \_\_\_\_ Makes no difference to me.

How would you feel about seeing other parties \_\_\_\_ times each day on the river?

1	2	3	4	5
very unpleasant	unpleasant	neutral	pleasant	very pleasant

How would you feel about camping within sight or sound of another party \_\_\_\_ out of 3 nights?

1	2	3	4	5
very unpleasant	unpleasant	neutral	pleasant	very pleasant

Would you be willing to do any of the following in order to be assured of camping alone?

Travel further during the day	no	yes
Have a less desirable campsite	no	yes
Reserve your campsites at the start of the trip	no	yes

What kind of experience does the Klamath River currently provide for you?

- "Wilderness," a place generally unaffected by the presence of man.
- "Semi-wilderness," the kind of place where complete solitude is not expected.
- "Undeveloped recreation," where a natural setting is provided, but meeting other people is part of the experience.
- "Scenic tour," where the idea is to see the place, and it really doesn't matter how many people you see.
- "Social recreation," where seeing other people makes the experience more fun.

When you made plans for this trip on the Klamath, how far in advance did you decide to go? Please fill in the appropriate numbers.

\_\_\_\_ months                  \_\_\_\_\_ weeks                  \_\_\_\_\_ days

So that we can send you a follow-up questionnaire, we need your name and address. This information will be kept confidential.

Name: \_\_\_\_\_

Street Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

## YOUR FISHING TRIP

Overall, how would you rate your trip?

- \_\_\_\_\_ Poor  
 \_\_\_\_\_ Fair, it just didn't work out very well  
 \_\_\_\_\_ Very good, but could have been better  
 \_\_\_\_\_ Excellent, only minor problems  
 \_\_\_\_\_ Perfect

Did you feel the area was crowded?

1	2	3	4	5	6	7	8	9
not at			slightly		moderately		extremely	
all			crowded		crowded		crowded	

About how many times each day did you actually see a party floating the river? If you saw the same party more than once, count each occasion separately.

I actually saw floating parties about \_\_\_\_\_ times per day.

About how many fishermen did you actually see along the river each day?

I actually saw \_\_\_\_\_ fishermen each day.

If you saw more people than you preferred, did you:

- |                                                                                                    |    |     |
|----------------------------------------------------------------------------------------------------|----|-----|
| - become unhappy or dissatisfied                                                                   | no | yes |
| - change the way you thought about the Klamath, deciding it was less remote than you had believed? | no | yes |
| - decide to go somewhere more remote next time?                                                    | no | yes |
| - attempt to avoid others by:                                                                      |    |     |
| - choosing an isolated location                                                                    | no | yes |
| - moving to another spot                                                                           | no | yes |
| - leaving earlier than you had planned                                                             | no | yes |

\_\_\_\_\_ not applicable; didn't see more than I preferred.

We are interested in how you feel about encounters with others. For each question indicate the highest number of encounters you would tolerate before the experience became unpleasant.

Number of encounters per day with parties floating the river.

OK to have as many as \_\_\_\_ encounters per day.  
 \_\_\_\_ Makes no difference to me.

Number of other fishermen seen each day along the river.

OK to see as many as \_\_\_\_ other fishermen.  
 \_\_\_\_ Makes no difference to me.

How would you feel about seeing parties floating the river \_\_\_\_ times each day?

1	2	3	4	5
very unpleasant	unpleasant	neutral	pleasant	very pleasant

How would you feel about seeing \_\_\_\_ other fishermen along the river each day?

1	2	3	4	5
very unpleasant	unpleasant	neutral	pleasant	very pleasant

What kind of experience does the area currently provide for you?

- \_\_\_\_ "Wilderness," a place generally unaffected by the presence of man.
- \_\_\_\_ "Semi-wilderness," the kind of place where complete solitude is not expected.
- \_\_\_\_ "Undeveloped recreation," where a natural setting is provided, but meeting other people is part of the experience.
- \_\_\_\_ "Scenic tour," where the idea is to see the place, and it really doesn't matter how many people you see.
- \_\_\_\_ "Social recreation," where seeing other people makes the experience more fun.

When you made plans for this trip on the Klamath, how far in advance did you decide to go? Please fill in the appropriate numbers.

\_\_\_\_ months                      \_\_\_\_ weeks                      \_\_\_\_ days



So that we can send you a follow-up questionnaire, we need your name and address. This information will be kept confidential.

Name: \_\_\_\_\_

Street Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_