

**COMPARATIVE ANALYSIS OF WHITEWATER BOATING
RESOURCES IN OREGON:
TOWARD A REGIONAL MODEL OF RIVER RECREATION**

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FOREWORD

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ABSTRACT

As whitewater boating becomes more popular, public agencies will find it most efficient to manage rivers systematically, using strategies designed to offer opportunities for the boating experiences each river is best able to provide. To develop such strategies, managers need comparative data on the breadth of whitewater recreation experiences. This paper describes a comparative study of whitewater boating on four rivers representing a range of experiences offered in Oregon: Deschutes, Rogue, Clackamas, and Upper Klamath. Comparisons are made of boater characteristics, dimensions of typical recreation experiences, perceived social impacts, estimated economic values of experiences, and suitable substitute experiences. The latter issue is especially important to regional management in that it concerns how rivers might fit together as a system. Findings on substitution and similarity are analyzed to provide a checklist of river characteristics which managers may use to evaluate a particular river's place in the overall recreation "system."

Also included is an in-depth study of the Clackamas River, which differs from other rivers studied previously in Oregon and elsewhere by having an early (spring) season and by being only an hour's drive from a major metropolitan area. Along with the various issues examined for the comparative study described above, this study examines the effects of flow rates and the early peak use season on Clackamas boating behavior. Three appendixes are included: a description of methods used for economic valuation; and summaries of responses to surveys given on the Clackamas and Upper Klamath rivers.

1. INTRODUCTION

River recreation has grown steadily over the past quarter-century in Oregon as throughout the United States. Among the faster-growing river activities have been whitewater rafting and kayaking. Increased use has sometimes led to adverse resource impacts as well as conflicts between boaters and other members of an ever-more-diverse recreational user population. Public agencies have had to devote more attention to recreation, seeking ways to manage river resources more efficiently while providing the kinds of recreation experiences users prefer.

One strategy which has received attention in recent years is the concept of regional river management (Royer et al., 1977; Schreyer, 1985). As whitewater boating grows in popularity, managers are finding that it is more efficient to manage a river for the experiences it best provides, instead of trying to offer a broad spectrum of recreation opportunities on each river in a region. Government agencies are also under increasing pressure to conduct cumulative-effects analyses of resource decisions, taking into account the effects which actions may have beyond the area under the agency's direct control. In either case, managers must be able to compare river resources and evaluate how their particular river fits within a regional recreation "system."

This information has not always been readily available, however. The USDA Forest Service, Bureau of Land Management and several state agencies are all responsible for different whitewater river resources in Oregon, but none has sufficiently wide jurisdiction to adopt a truly "regional" management strategy on its own. The need for integrated, cross-agency management became even more urgent in 1988 with the passage

of legislation which greatly expanded the federal Wild and Scenic River system in Oregon and the approval of a citizens' initiative which added several new units to the State Scenic Waterway program.

This report describes findings of a research project designed to fill some of the gaps in comparative information about whitewater boating resources in Oregon. It addresses several issues given high priority by the Oregon Water Resources Research Institute, including: (1) implementation of state-of-the-art methodologies for planning and managing water resources; (2) evaluation of water-use rights, pricing and competition; and (3) better understanding of the institutional arrangements involved in water resource management.

The project had two main objectives. The first was to compare the experiences provided on some of Oregon's most popular whitewater rivers. Boating experiences have some elements which are common to all rivers, and others which vary from setting to setting. Knowledge about the variability among river settings is a key to developing regional management strategies that can help ensure that the entire spectrum of river recreation experience opportunities is offered.

The second objective was to undertake an in-depth analysis of whitewater recreation on a 15-mile stretch of the Clackamas River near the Portland metropolitan area. The Clackamas is an excellent example of an early-season whitewater boating river. Such streams provide significant recreation opportunities in Oregon but have received little research attention. In order to evaluate the Oregon river system, it was important to learn more about this type of river experience.

The Clackamas study focused on the social and economic aspects of the Clackamas whitewater experience, looking at characteristics of river trips and the people who make them. Particular attention was given to the effects of the river's seasonal character and of its close proximity to Oregon's largest population center. This information was useful in two ways. Not only could it demonstrate the role of early-season rivers in the Oregon whitewater recreation system, but it provided a baseline for future inquiry into the effects of Wild and Scenic River designation on recreation quality. The Clackamas was added to the state and federal river systems in 1988, the same year the survey was conducted.

Literature review

Although regional outdoor recreation management was first proposed more than 25 years ago (Wagar, 1963), it has not developed rapidly. In the context of rivers, the implementation of the Interagency Whitewater Committee (Yearout et al., 1977) was one of the first steps toward a regional management strategy, although the IWC has remained primarily an information clearinghouse. Noteworthy efforts have been undertaken in a few isolated cases. A management plan developed for the three forks of the Flathead Wild and Scenic River in Montana sets guidelines by which each segment can be managed for the experience it best provides (Stokes et al., 1985). Wallace (1985) made an extensive study of the Chattooga River's role in the southern Appalachian whitewater "system" before developing a management plan. Bruns (1985) developed visitor/trip profiles for seven BLM-managed river segments in Colorado, describing differences in the boating experiences provided by each segment. The

segment-by-segment comparative approach was also used by Manning and Ciali (1981), who examined differences in participation patterns for boating, swimming, and fishing among users of four Vermont rivers.

All of those efforts focused on rivers managed by a single agency. There has been little systematic integration of management strategies across agency lines, or even between different offices of the same agency. Exceptions include the Flathead River plan, which involved the Forest Service and National Park Service, and a central reservation system for five rivers in Idaho and eastern Oregon (Welsh, 1986). Data for cross-agency efforts has rarely been collected. One large comparative boater survey has examined whitewater and non-whitewater rivers throughout the United States (Knopf and Lime, 1985). While a valuable source of descriptive data, this study did not examine any setting in depth, and sampled only one or two rivers from most regions.

A different approach was chosen for the present study, which compares four Oregon rivers in considerably greater depth. The rivers chosen were the Clackamas, Deschutes, Rogue, and Upper Klamath. These rivers are among the most popular whitewater resources in Oregon, yet differ in physical and social settings. Researchers' evaluations were used to compare basic characteristics of the rivers, but the bulk of the comparative data come from detailed surveys of users of each river. Data from prior studies were used to explore boating experiences on the Deschutes (Shelby et al., 1987) and Rogue (Shelby and Colvin, 1979; Johnson et al., 1986). Questionnaires given to boaters on the Clackamas

and Upper Klamath¹ rivers were written so as to be comparable with the Rogue and Deschutes surveys wherever practical.

The remainder of this report consists of five chapters plus three appendixes. Chapter 2 briefly describes Oregon's whitewater recreation resources, with special emphasis given to rivers within a half-day drive of the Willamette Valley population centers.² Chapter 3 describes the survey methods used in the project. Chapter 4 offers detailed descriptions of the study rivers; because of its dual role in this project, the Clackamas is discussed in greater depth than the other rivers whose descriptions emphasize aspects of the whitewater experience that were examined in all four studies. Chapter 5 synthesizes the social and economic analyses. Finally, the concluding chapter discusses the implications of the research findings for managers wanting to adopt a regional management strategy. Special attention is given to boaters' evaluations of the similarity and substitutability of Oregon rivers, as those responses give clues to the rivers most likely to be affected if use restrictions are enacted on the study rivers.³ The appendixes are: (A) a review of the concepts used in economic valuation of non-market resources such as whitewater rivers; (B) and (C) frequency distributions of responses to the Clackamas and Upper Klamath questionnaires.

¹Details of the Upper Klamath study can be found in Moore (1989).

²A separate report (Brunson et al., 1990) offers a more detailed picture of use patterns and recreational impacts for Oregon's whitewater boating system.

³Although launch limits are in effect on the Rogue River, use of the other three rivers is not presently restricted. Planning efforts now under way for the Deschutes River may lead to eventual restrictions on all or part of the lower 100 miles of the river.

2. OREGON'S WHITEWATER RECREATION RESOURCES

Two ingredients are essential for providing whitewater recreation: free-flowing streams and topographic variation. Oregon has an abundance of both. Inflatable rafts are normally used only on larger streams with flows above 1,000 cfs. However, kayakers can negotiate much smaller waters, and their stream choices are limited primarily by their skills and their imaginations. The Willamette Canoe and Kayak Club lists more than 80 Oregon streams in its 1986 guidebook, and there may be dozens more which have been run at least once.

The list of streams receiving significant whitewater boating use is shorter, however. The 35 streams in Table 1 each offer at least 10 miles of runnable whitewater, and are rated at Class 2 or above on the American Whitewater Affiliation's international scale of whitewater difficulty. Class 2 streams are described as those having "easy rapids with waves of up to three feet, and wide, clear channels that are obvious without scouting. Some maneuvering is required" (Willamette Canoe and Kayak Club, 1986).

Figure 1 shows the locations of these streams. A majority of the state's whitewater rivers have their sources in the Cascades. Six are Coast Range rivers (Nehalem, Nestucca, Wilson, Coquille, Yamhill, Siletz), and seven others originate in the mountains of southern or eastern Oregon (Crooked, Illinois, John Day, North Fork John Day, Upper Klamath, Grande Ronde, Owyhee). The Snake River, which rises in the Rockies, flows through Hells Canyon along the Idaho border. The levels of these rivers fluctuate seasonally, and many are runnable only after

Table 1
Whitewater recreation resources in Oregon

Map No.	River	Miles ^a	Class ^b	Season ^c	Guide Svc.	Devel. level ^d	Primary Ownership	Remoteness ^e
1	Nehalem	14	3	R	yes ^f	high	state/priv	1
2	Wilson	23	2-4	R	yes ^f	high	state	1
3	Nestucca	22	2-3	R	yes ^f	high	priv/fed	1
4	Siletz	13	2-4	R	no	med	private	1.5
5	Coquille, S.Fk.	17	2-4	R	yes ^f	med	fed/priv	2.5
6	Rogue	38	3-4	Y	yes	high	federal	1
7	Illinois	34	4+	R,S	yes	med	federal	1.5
8	Upper Klamath	23	3-4+	S,Y	yes	med	fed/priv	1
9	North Umpqua	67	2-4	R,S,Y	yes	med	federal	1.5
10	Willamette, M.Fk.	10	2+	Y	no	med	federal	< 1
11	Fall Creek	18	2-3	R,Y	no	med	priv/fed	< 1
12	McKenzie	59	2-3	Y	yes	high	priv/fed	< 1
13	Willamette	14	2	Y	yes	high	greenway	< 1
14	Calapooia	18	2-3	R	no	med	private	1
15	South Santiam	28	2-4	R,S	no	med	fed/priv	1
16	Middle Santiam	18	3-4	R,S	no	low	federal	1.5
17	Quartzville Creek	16	4-5	R,S	no	med	federal	1.5
18	Crabtree Creek	15	2-4	R	no	med	private	< 1
19	Thomas Creek	14	2-3	R	no	med	private	< 1
20	North Santiam	35	2-4	R,S,Y	yes	high	priv/fed	< 1
21	Little N. Santiam	10	2	R,S	no	med	fed/priv	< 1
22	Molalla	21	2-5	R	no	med	private	< 1
23	Yamhill, S.Fk.	14	2	R	no	med	private	< 1
24	Clackamas	49	2-4	R,S,Y	yes	high	fed/priv	< 1
25	Sandy	35	2-4+	R,S	yes ^f	med	priv/fed	< 1
26	Hood	14	3-4	R,S	no	med	private	1.5
27	White	29	2-3+	S	no	low	federal	2
28	Deschutes	107	3-4	S,Y	yes	high	fed/priv	2
29	Metolius	28	3	Y	yes ^f	high	federal	2
30	Crooked	27	3-4	S,Y	no	med	priv/fed	3
31	John Day	114	2	S	yes	high	fed/priv	3
32	John Day, N.Fk.	40	2+	S	no	med	fed/priv	2.5
33	Grande Ronde	90	2-3	S,Y	yes	high	priv/fed	2
34	Snake	78	3	Y	yes	med	federal	3
35	Owyhee	98	4-5	S	yes	low	fed/priv	2.5

^aMileage for all stretches rated Class 2 or above, as compiled by the Willamette Canoe and Kayak Club (1986)

^bRatings on the American Whitewater Affiliation international scale of difficulty. Some runs have rapids of higher difficulty.

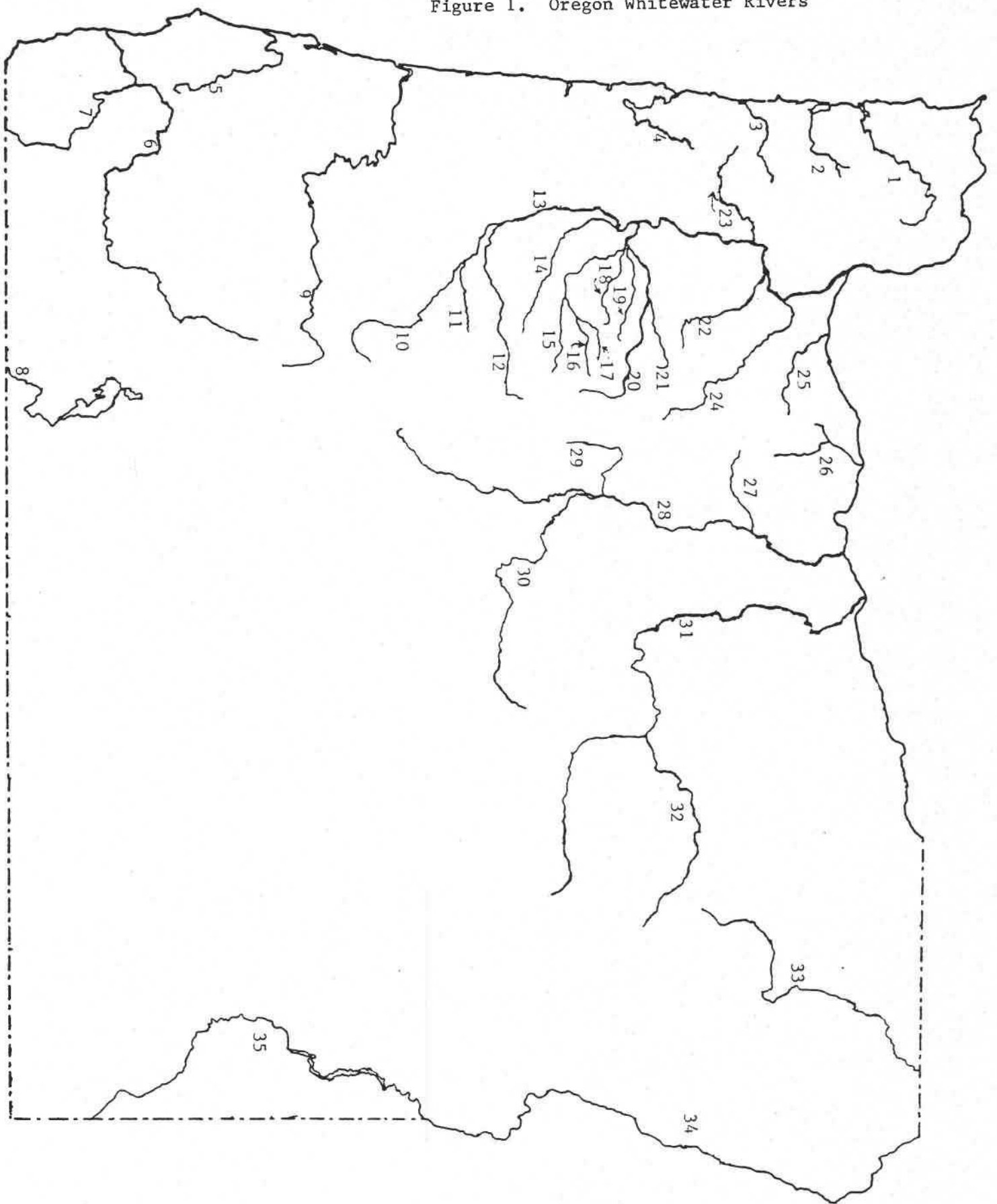
^cY=runnable year-round, R=rainy season only, S=during spring thaw

^dHigh=river has ramps and other boater facilities, and is usually followed by a road; med=few specialized facilities, road access is not difficult; low=no facilities, road access is difficult.

^eHours of travel time to put-in from nearest metropolitan area

^fGuides specialize in fishing, mainly using drift boats

Figure 1. Oregon Whitewater Rivers



rainy seasons or when high country snows thaw in spring. Only 14 Oregon rivers have segments which can be run year-round; of these, all but the spring-fed Metolius are regulated by flows from upstream dams.

There is considerable variation in the whitewater mileage, skill requirements, level of development, and range of boating-related services available on Oregon's whitewater recreation rivers. Each of those factors can influence the ways in which boaters use a particular river, and the kinds of boaters who use them. Differences in the length of whitewater runs provide an array of choices for boaters who may seek single-day, overnight, or vacation-length excursions. Remoteness also plays a part in those decisions, since people rarely are willing to drive long distances to make short-duration river trips.

All but 10 of the streams listed in Table 1 have whitewater runs within 100 miles of Portland, Salem or Eugene. Along with six nearby rivers in Washington state, these 25 western Oregon rivers offer opportunities for one-day and longer trips for the two-thirds of Oregonians who live in the nine Willamette Valley counties. Though other rivers (e.g., Rogue) may have been run at least once by most Oregon boaters, the streams listed below can be considered the state's primary whitewater "system" because of their accessibility:

Nehalem	Hood	Calapooia
Wilson	White	Thomas Creek
Nestucca	Deschutes	Crabtree Creek
Siletz	Metolius	Quartzville Creek
South Fork Yamhill	Kalama (Wash.)	South Santiam
North Umpqua	Lewis (Wash.)	Middle Santiam
Willamette	Toutle (Wash.)	North Santiam
Mid. Fork Willamette	Washougal (Wash.)	Little N. Santiam
Fall Creek	Wind (Wash.)	Molalla
McKenzie	White Salmon (Wash.)	Clackamas
		Sandy

Not all of these streams are heavily used by whitewater boaters. Some are suitable only for kayakers (e.g., Hood, Quartzville Creek). Others have relatively short seasons during some of Oregon's worst weather (e.g., Nehalem, Calapooia). Guidebook descriptions (Garren, 1974; Willamette Canoe and Kayak Club, 1986; Miskimins, 1987; North, 1987) and observations made during the course of this research project suggest that most of the use occurs on just nine of these rivers. These include the Clackamas and Deschutes, described in detail in subsequent chapters of this report, and seven others described briefly below:

Willamette. This is not normally considered a whitewater stream, yet the 14-mile stretch upstream from Eugene's Alton Baker Park is rated at Class 2. In hot weather the river "can be like a carnival with the frenzy of inner tubes and paddlers" (WKCC, 1986). Good roads and the Willamette River Greenway follow the whole length of this run, and there are many facilities for boaters.

North Umpqua. Beginning in May, the North Umpqua is a popular rafting destination used regularly by outfitting companies. Depending on water conditions, the season may end as early as late June or may continue into July or August. A renowned steelhead run begins in July, and conflicts between fly anglers and boaters sometimes occur. A state highway follows the river, with pullouts and campgrounds offering easy access. A Class 2 section near Roseburg is popular with casual boaters.

McKenzie. More than 100 outfitters and guides hold permits to float the McKenzie, which is known for its low-key whitewater and world-class trout fishing. The drift boat was invented for this river, and is still the most common craft seen here. Numerous boat ramps are located

along Oregon 126, which follows the river. The uppermost 14 miles is rated Class 3 and previously was used mostly by whitewater enthusiasts, but downstream crowding has forced more and more anglers upstream. The Forest Service estimated in 1987 that 40 percent of boaters on the Class 3 section were primarily anglers (Phil Raab, McKenzie Ranger District, pers. comm.), increasing the chance of future angler/boater conflicts.

North Santiam. This largest branch of the Santiam has 35 miles of whitewater of varied character. Springtime-only kayaking occurs on the uppermost sections, while sections below Detroit Reservoir are boated year-round. Driftboating anglers share the river with rafters below Mill City. Oregon 22 parallels the river, but most of the land along the banks is private and the infrequent access points can be crowded.

Molalla. This relatively small stream rises lower in the Cascades and has a shorter season than other rivers, usually ending in May. Land is private except for a county park near the town of Molalla, but the upper end crosses commercial timberland where recreation is tolerated if not encouraged. County and logging roads cross the river frequently. Below the whitewater section is a popular salmon/steelhead stream. The river's North Fork is a Class 5 challenge for kayakers.

Sandy. The Sandy flows past Portland's eastern suburbs but has a backwoods quality because no roads follow it and so access is limited. Another spring river, its season is longer than the Molalla's but shorter than the Clackamas'. The upper end is a Class 4+ kayak stream, followed by a six-mile gorge near the town of Sandy which attracts both rafters and kayakers. The Sandy below the gorge is rated Class 2.

White Salmon. This small Columbia Gorge river is the nearest stream to Portland offering a summer whitewater experience. A typical 11-mile run lasts two hours. Access is restricted to two privately owned launch sites near BZ Corner, Wash. One site is owned by an outfitter; at the other, a fee is charged to lower rafts into the steep canyon. Weekday and winter use is minimal, but employees at the launch sites reported a large increase in boating between 1986 and 1987.

In 1988, substantial additions were made to the Oregon State Scenic Waterways program and the federal Wild and Scenic River system in Oregon. Both programs, though slightly different, are intended to preserve rivers in a free-flowing state to protect wildlife, recreation, and scenic values. The Oregon whitewater boating streams now included in these systems are:

Federal: Clackamas, Crooked, Deschutes, Elk, Grande Ronde, John Day, Illinois, McKenzie, Metolius, North Fork of the Middle Fork of the Willamette, North Umpqua, Owyhee, Quartzville Creek, Rogue, Sandy, Snake, White.

State: Clackamas, Deschutes, Elk, John Day, Klamath, McKenzie, Metolius, Nestucca, Rogue, North Umpqua, Wallowa, Grande Ronde, Sandy, Little North Santiam, North Fork of the Middle Fork of the Willamette, Illinois, Owyhee.

3. METHODS

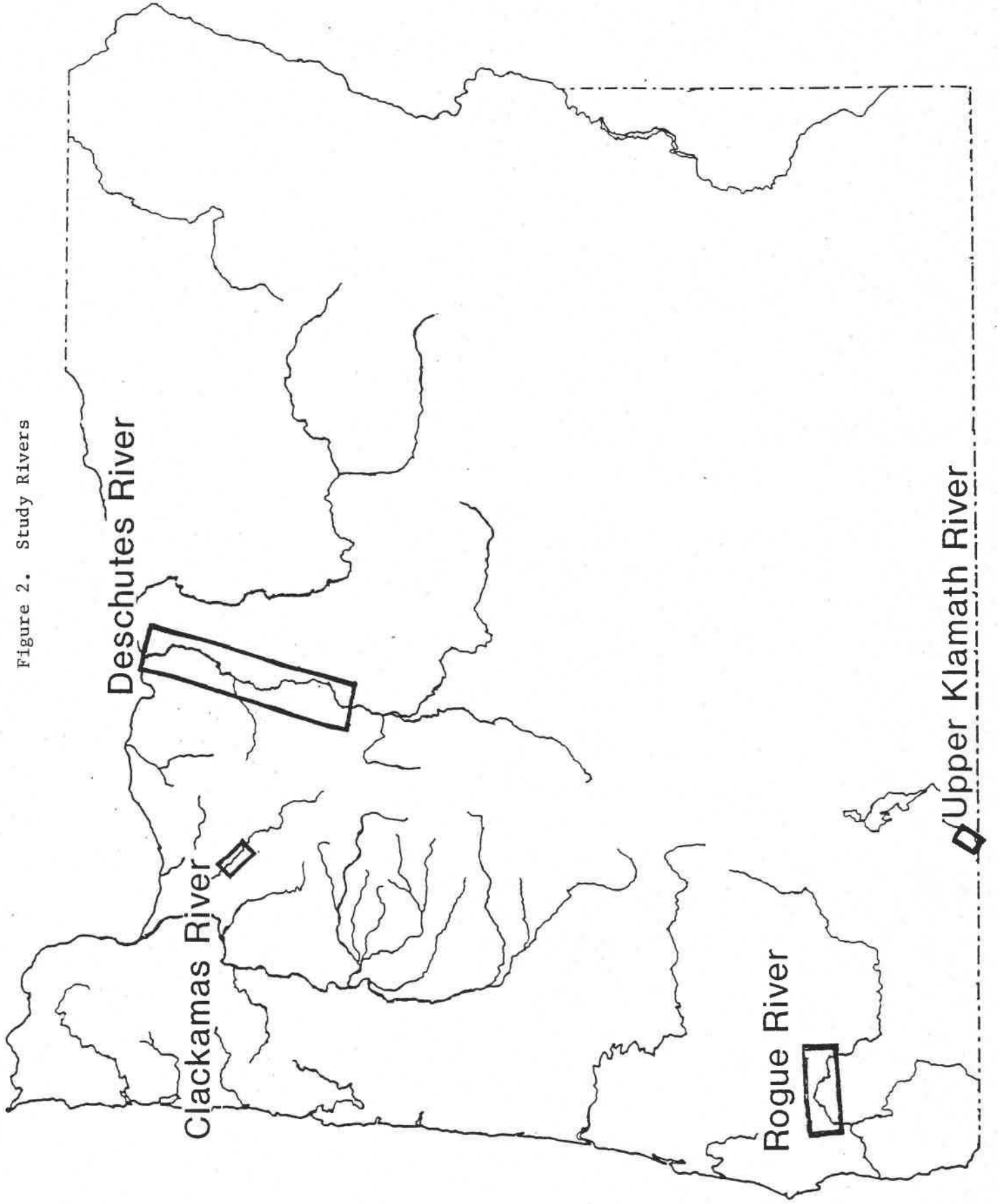
The four rivers covered in this section -- Clackamas, Deschutes, Rogue and Upper Klamath -- were chosen to represent the spectrum of boating opportunities offered on Oregon's more popular whitewater rivers. Each river serves a somewhat different boater population, though many boaters visit more than one of them regularly. The rivers cross different geographic regions (Fig. 2), and there is considerable variation in the types of whitewater boating experiences they provide and the ways in which boaters use them.

Data for the comparative analysis came from mail questionnaires completed by boaters on each of the four rivers. The surveys of Rogue and Deschutes boaters were administered prior to the inception of this project. Results of the Rogue survey came from responses by 469 private (non-outfitted) boaters who obtained permits to float the river during the summer of 1984. The Deschutes survey data came from 496 people who had purchased boater passes during 1986.¹

Though the purposes of these studies differed and the surveys were not identical, the Rogue and Deschutes boater questionnaires had several elements in common. These elements were retained in the surveys given to Clackamas and Upper Klamath boaters. (Although the Klamath study was undertaken separately from the Clackamas study and its primary purpose was an economic analysis, it had the same principal investigators. The questionnaire was designed where possible for comparability with the

¹For details on survey methods used in the Rogue study, see Johnson et al. (1986). A description of survey methods for the Deschutes study is found in Shelby et al. (1987).

Figure 2. Study Rivers



Clackamas survey.) Both surveys were administered to boaters who had visited the respective rivers in 1988.

A survey sample for the Clackamas study was obtained by contacting boaters at the most commonly used launch sites along a 13-mile section of the river (see river description below) on 19 different dates between February and July 1988. Contacts were made at least once on each day of the week, but took place primarily on weekends. The strategy aimed not to obtain a random sample, but rather to reach as much of the boater population as possible. Boaters were contacted at the Bob's Hole Rodeo, a competitive kayaking event held on April 15-16, 1988, and at the Clackamas Whitewater Festival, a rafters' festival April 30-May 1, 1988.

Using this sampling technique, a total of 431 names and addresses were acquired from boaters who said they would be willing to receive a questionnaire in the mail. Thirty people received a draft version of the survey form as a pre-test. After slight revisions were made to the questionnaire, the remaining 401 boaters comprised the study sample. Three mailings were used, following the strategy outlined by Dillman (1978). Responses were received from 309 people and 32 other surveys were undeliverable or unclaimed, for a response rate of 84 percent.

The Upper Klamath sample was obtained by contacting boaters and asking them to complete a one-page, pretrip survey as they arrived at the launch site below Boyle Powerhouse. Contacts were made on 20 different days during June, July, and August 1988. Of 567 boaters who completed the pretrip survey, 554 agreed to provide their names and addresses for a followup questionnaire. Again, 30 people were given a pre-test version of the survey, and three attempts were made to contact

each of the remaining 524 respondents. Completed surveys were received from 389 boaters and 15 other surveys were undeliverable or unclaimed, for a response rate of 76 percent.

4. SETTING DESCRIPTIONS AND SURVEY RESULTS

Clackamas River

Setting description. The Clackamas River contains 49 miles of runnable whitewater, beginning high in the Cascades and ending at the Willamette River four miles from the Portland city limits. The Clackamas is an attractive but sometimes dangerous stream which was the site of 109 drowning deaths between 1970 and 1980 (WKCC, 1986). There are three distinct river segments, each with its own character.

The uppermost 15 miles are narrow and rocky, offering challenging runs that are normally undertaken only by experienced kayakers. This section is also a popular trout fishery. Before 1987, a main attraction had been Austin Hot Springs, a semideveloped recreation area which was accessible from the river. However, new owners of the private inholding containing the springs erected "No Trespassing" signs in 1987.

The river section studied during this project begins just above the Three Lynx power station and continues to North Fork Reservoir. This has become one of the most popular day-use whitewater runs in Oregon during its season, which lasts from early November through early July but has its height in April and May. The river here is big enough for rafts, and is rated Class 3. There are 20 USDA Forest Service campgrounds along the Clackamas above North Fork Reservoir, although many are not open at the height of the boating season. Roadside pullouts along Oregon 224 offer additional access to the river.

A special attraction of the Three Lynx-to-North Fork run is a feature called Bob's Hole, where a serendipitous arrangement of rocks

creates a series of waves and eddies prized by kayakers wanting to hone their skills or try new maneuvers. Boaters often call Bob's Hole the best "play spot" in the Pacific Northwest. A two-day kayak "rodeo" featuring races and freestyle events is held at this site every April. Up to a dozen boaters can be seen at Bob's on almost any day during the peak boating season, lined up downstream from the hole waiting their turn to surf the large standing waves. On weekends, boaters bring friends and family members for picnics on the riverbank, where they may be joined by sightseers who have driven up Oregon 224 from the Portland metropolitan area.

The lower Clackamas, flowing for 21 miles below the town of Estacada to the mouth of the river, is known for salmon and steelhead fishing but offers Class 2 whitewater along its length throughout the year. Unlike the upper stretches, this section flows mostly through private land, and although it is followed by good roads, access is limited primarily to a few state or county parks. Motorized boats are more common on this stretch of the river, and commercial fishing guides use it frequently. An entry fee is charged at one of the more popular access points, McIver State Park near Estacada. This park has 2 1/2 miles of riverbank, and a popular outing for casual boaters is to float this stretch several times during a day.

Use patterns. Survey results² showed that the vast majority of Clackamas visits are single-day trips made on Saturdays or Sundays. The most popular trip begins 200 yards above the Three Lynx power station at a bridge near the turnoff for the Indian Henry Campground, and ends 13

²Complete survey results are presented in Appendix B.

miles downstream at a boat ramp opposite a log-scaling station on Oregon Highway 224. Boating is usually the sole purpose of a Clackamas visit: Only 13 percent of respondents reported that they camped at the river, and only 4 percent said they normally go fishing during their trips.

A typical boating party consists of a group of friends, or friends and family members, rarely exceeding seven people in all. Eighty percent make the trip in a boat owned by one of the party members; only five percent use a guide service. Rafts are the most popular type of boat, but 40 percent use a hard-shell or inflatable kayak. Of the latter group, 56 percent spend all or part of their day at Bob's Hole.

Some Clackamas boaters reported making as many as 50 trips to the river in a year, and the average number of visits was 6.6 during the first eight months of 1988 alone. More than half of the respondents said they had attended either the Bob's Hole Rodeo, the Upper Clackamas Whitewater Festival (a rafting event), or both. Trips are normally planned less than a week in advance, and 17 percent say they normally don't decide to make a Clackamas trip until the same day that they visit the river. This spontaneity is possible because more than two-thirds of the boaters live in the five counties of the Portland metropolitan area (Multnomah, Clackamas, Washington, Yamhill, Clark), and 86 percent of the visits are made by people who live in those counties.

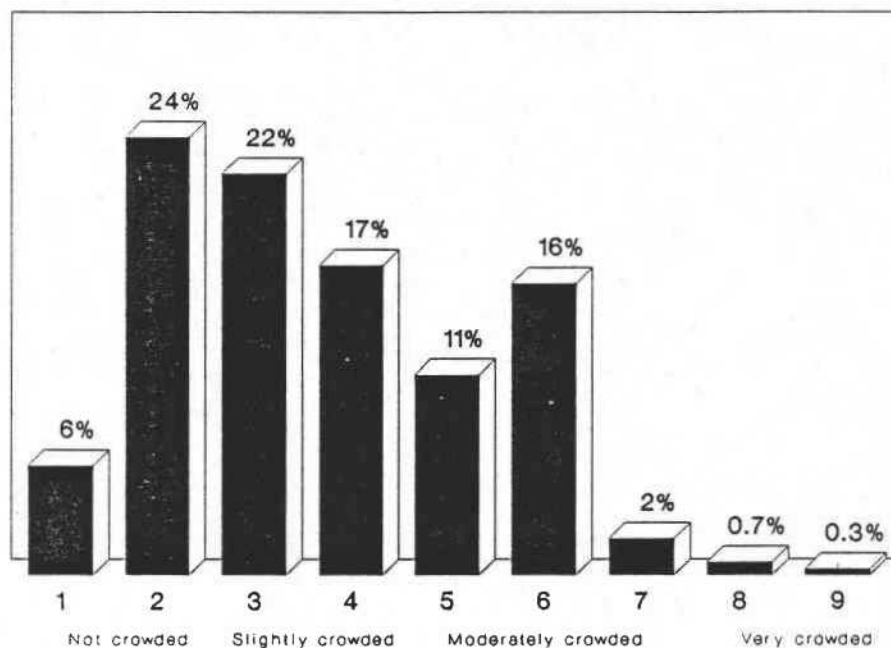
Social impacts and standards. Impacts of recreational use on the Clackamas generally remain below the levels at which boaters no longer consider them acceptable. As is commonly found in studies of non-consumptive recreation (Vaske et al., 1982), satisfaction levels are quite high, with 76 percent calling the Clackamas experience "excellent"

or "perfect." When asked to compare the Clackamas with other rivers, 71 percent rated it as being above average or higher, and 78 percent said it was their favorite river or among their favorite rivers.

Crowding levels are not high considering the river's proximity to Portland. When asked to rate the perceived level of crowding on a nine-point scale (Fig. 3), 70 percent chose a level of 3 ("slightly crowded") or greater. However, when asked how they respond to crowding, 45 percent said they had never felt crowded on the Clackamas. The apparent discrepancy may be due to question context: The first question asks boaters if they "feel" crowded, while the second asks what they do about it. Many of those who feel slightly crowded may not believe the problem is serious enough to warrant any change in their activities. Among those who did choose a coping strategy (Fig. 4), the most frequent response was for boaters to adjust their speed or wait for others to pass. Only 5 percent said they would choose a less crowded river next time, while 95 percent said crowding had not made them unhappy or dissatisfied with their trip.

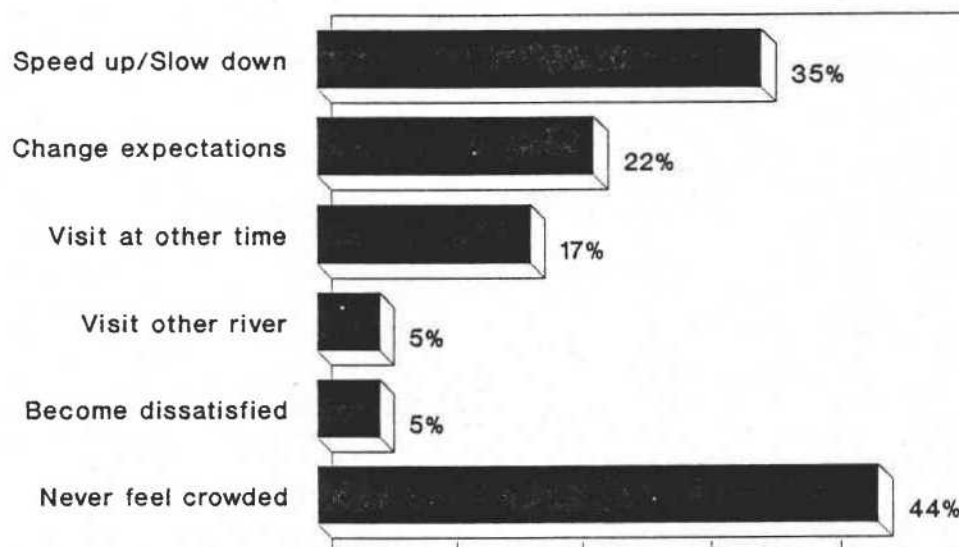
Boaters reported spending an average of 5 minutes waiting for other boaters to use the put-in areas before they can launch. This was well within the acceptable waiting-time standard, which averaged 15 minutes. Similarly, while 60 percent reported spending no more than one hour in every four within sight of other boats, more than half said they don't mind seeing other boats as much as two hours in every four. Most respondents defined the Clackamas experience as "undeveloped recreation, where you expect to see other people some of the time," or "scenic recreation, where you expect to see other people much of the time"

Fig. 3
Distribution of Crowding Scores



N = 303

Fig. 4
Responses to Perceived Crowding



N = 309

Percentages reflect multiple responses

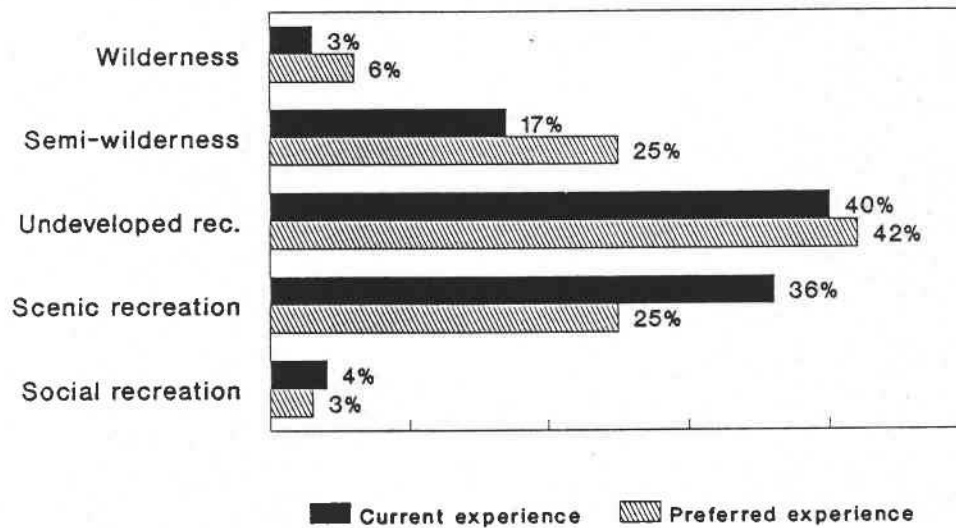
Fig. 5). This level of use was slightly higher than visitors would prefer: While 42 percent of the respondents said they preferred an "undeveloped recreation" experience, there were equal numbers of people who preferred a "scenic recreation" experience and a "semi-wilderness" experience.

Conflicts with other river users are relatively rare on the Clackamas. Two-thirds said they had never experienced conflicts on the river. Of the one-third who had experienced conflicts, half said problems do not occur on every trip. The most frequent source of conflict is riverbank anglers, who were cited by 57 percent of those who reported conflicts. Rafters were the next biggest source of problems (18 percent), while non-recreationists such as litterers, thieves, or log truck drivers were mentioned by 12 percent of those who reported conflicts.

Economic impacts and values. Reported expenditures by Clackamas boaters averaged \$41.82 per trip, including gasoline and oil, restaurant bills, lodging or camping, raft and equipment rentals, retail supplies and outfitter fees (Table 2). Expenditures made within the state of Oregon averaged \$31.62. This figure does not include fees paid to guide services, which were reported by only 5 percent of the respondents (14 people). The average guide fee reported was \$31.50. Thirteen percent of respondents reported taking time off from work to visit the river.

Two methods were used to estimate the economic value of whitewater recreation on the Clackamas: the travel-cost method (TCM) and contingent value method (CVM). The TCM uses actual behavior to infer estimates of value. The cost of making a trip, including travel expenses as well as

Fig. 5
Current vs. Preferred Experience



N = 297
Experience definitions based on
expectations for social impacts

TABLE 2
Mean reported expenses for Clackamas trips^a

<u>Category of expenditure</u>	<u>Spent in Ore.</u>	<u>Spent outside Ore.</u>
Gasoline and oil	\$ 9.60	\$16.41
Restaurants and taverns	7.42	11.21
Lodging and camping	2.82	5.49
Raft and equipment rental	1.90	2.67
Retail (groceries, etc.)	8.44	10.84
Miscellaneous	\$ 1.45	\$ 1.51
TOTAL	\$31.62 (N=285)	\$57.35 (N=43)

^aA checklist format was used for reporting expenditures. Missing values for individual categories were counted as \$0 if the respondent listed expenditures in at least one category, but were not included in the calculation if the respondent did not list any expenditures.

the opportunity cost of forgoing a substitute experience, is used as a proxy for price. Users' willingness to pay above what they currently pay (consumer's surplus) is inferred from a demand curve based on true prices. The CVM is a survey technique which simulates market conditions by simply asking users if they would or would not pay a given amount of money, in addition to what they currently pay, to visit a recreation site. (See Appendix A for a detailed review of economic methods used.)

Travel cost estimates are given in Table 3. A modified individual travel-cost method was used as suggested by Brown et al. (1983). Each respondent was assigned to one of 16 distance zones, and the dependent variable (visits) was weighted according to the population of that zone. Distances used in the travel cost calculation were measured from the zone centroid to the most frequently used Clackamas put-in. (Models fit in this manner fit better than ones which used respondents' reports of distance to the site.) The nearest distance zone was centered on West Linn, Ore., 42 miles from the put-in, and the farthest was centered on Seattle, 226 miles away. Visitors from the Clackamas, Multnomah, and Washington County zones accounted for 1,440 of the 1,705 reported visits, or 84 percent. Models were based on responses from 265 boaters.

Total direct costs of making a Clackamas trip were defined as:

$$TDC = [(D_r) * (C_m / 3 \text{ persons/vehicle})] + [(D_r / 45 \text{ mph}) * (C_t) * (Y / 2080 \text{ hrs/yr})]$$

where TDC = total direct cost
 D_r = round-trip distance from zone centroid to put-in
 C_m = mileage costs
 C_t = opportunity cost of time (fraction of wage rate)
and Y = median reported per-capita income for zone

Regression models were fit for differing assumptions about mileage costs and the opportunity cost of travel time (see Appendix A for a discussion of time costs). A sampling of these is shown in Table 3.

TABLE 3

Value estimates based on travel cost calculations: Clackamas River

VIS = visits (adjusted for zone population)
 AGE = reported age of visitor
 TDC = total direct cost of a typical visit
 STA = state of residence (Oregon = 0, Washington = 1)
 S₁ = total direct cost of visit to White Salmon River (Wash.)
 S₂ = total direct cost of visit to Deschutes River (Ore.)
 Figures in parentheses beneath each coefficient are t-statistics

MODEL 1 (R² = .541)

$$\ln(\text{VIS}) = -16.0 - .111(\text{TDC}) - .042(\text{S}_1) - .104(\text{S}_2) + .603(\text{AGE}) - .009(\text{AGE})^2$$

(-.86) (-.15) (-.60) (.79) (-.80)

MODEL 2 (R² = .582)

$$\ln(\text{VIS}) = -14.95 - .899(\text{TDC}) + .455(\text{AGE}) - .006(\text{AGE})^2$$

(-3.81) (.936) (-.931)

MODEL 3 (R² = .644)

$$\ln(\text{VIS}) = -6.78 - .064(\text{TDC}) - .855(\text{STA})$$

(-3.47) (-1.56)

MODEL 4 (R² = .686)

$$\ln(\text{VIS}) = -6.62 - .108(\text{TDC}) - .893(\text{STA})$$

(-3.92) (-1.75)

VALUE ESTIMATES:

<u>Model</u> <u>Number</u>	<u>Cost</u> <u>per mile</u>	<u>Opp. cost</u> <u>fraction</u>	<u>Avg. C.S.</u> <u>per trip</u>
1	.21	.239	\$18.77
2	.10	.114	\$ 5.99
3	.21	.239	\$15.47
4	.21	.06	\$ 9.19

Model 1 uses a mileage cost of 21 cents, suggested by the Internal Revenue Service as the average cost of operating a private vehicle. The opportunity cost of time was set at 23.9 percent of the wage rate using McConnell and Strand's (1981) method for calculating the marginal rate of substitution between travel and time costs. The model incorporates two factors other than total direct cost which may influence a trip decision: visitor characteristics (represented here by age) and the price of trips to the White Salmon and Deschutes rivers, the two most frequently mentioned substitute trips. No variables in this model are significant, however, and the coefficients of substitute prices are negative when theory suggests they should be positive. Because of this result, which is probably due to the geographic location of substitutes relative to the Clackamas and to visitors' homes, substitute prices were not used in subsequent models.

Model 2 assumes a mileage cost of 10 cents, which represents the out-of-pocket expense of making a short recreation trip (excluding fixed costs such as depreciation, insurance, or license fees) based on a 1988 U.S. Census Bureau estimate. The opportunity cost of time was set at 11.4 percent of the wage rate using the McConnell-Strand method. With these modifications and the removal of substitutes, total direct cost becomes significant but age does not, and the fit (R^2) improves from .54 to .58.

In Model 3, the mileage and opportunity cost figures are as in Model 1, but substitutes are removed and the visitor characteristic is not age, but state of residence. This dummy variable was included to model the potential effects of psychological barriers to travel. In a

study of recreational auto trips in Great Britain, Baxter and Ewing (1981) found that distance alone was not sufficient to explain reluctance to cross a large body of water. We hypothesized that Washington residents would be less likely to visit the Clackamas than people living the same distance away in Oregon because the act of crossing a state line makes the distance seem longer. With this modification, the fit improves to $R^2 = .64$ but the coefficient of the residence variable is not significant at the .05 level (one-tailed).

Model 4 is identical to Model 3 except that the opportunity cost of time is set at 6 percent of the wage. This percentage is well below that used in most TCM calculations for outdoor recreation, however Morrison and Winston (1985) have argued that it better reflects the mitigating effect of being able to sight-see during vacation travel by automobile. The 6 percent figure also corresponds best with the results of the CVM calculations reported below. This modification resulted in the best-fitting model ($R^2 = .69$), and both coefficients are significant at the .05 level.

The Rocky Mountain Travel Cost Model computer software (Rosenthal et al., 1986) was used to create a second-stage demand curve for each of the four models and to calculate average consumer surplus per trip. Estimates ranged from \$5.99 to \$18.77, with an estimate of \$9.19 per trip for the best-fitting model (Model 4).

Two CVM calculations were made, one based on boaters' willingness to pay additional dollars for a Clackamas trip, and the other on their willingness to drive additional miles from their homes to the Clackamas. For the first calculation, respondents were asked if they would still be

willing to make a Clackamas trip if their expenses were to increase by a specified amount between \$5 and \$300. Dollar amounts were assigned at random to each survey recipient; of the 21 different amounts used, each was assigned to approximately 20 survey recipients. The second calculation was based on a question asking respondents if they would still be willing to visit the Clackamas if they moved a specified distance away. Distance amounts ranging from 10 miles to 1,000 miles were randomly assigned as before.

Persons who answered "no" to either offer were asked their reason for doing so. For the willingness-to-pay question, the most frequent response (44 percent) was "The Clackamas is worth that much more to me, but I couldn't afford to pay that much." For the willingness-to-travel question, the most frequent response (65 percent) was "It isn't worth it to me to travel that much farther." Those who responded that they did not understand the question (4 percent for willingness-to-pay, 1 percent for willingness-to-travel) were not included in the analysis, nor were commercial guides or respondents who visited the Clackamas as part of multiple-destination trips.

Using this information, estimated logit equations were developed for both measures. Value estimates and coefficients of the best-fitting equations are shown in Table 4. In each model, the best equation has one variable in addition to the contingent value response. Willingness to pay is expressed as a function of the probability that a visitor will say "no" to a specific dollar offer, and also of their interactions with other Clackamas visitors; i.e., respondents were more likely to say "no" if they reported having experienced conflicts with other visitors during

TABLE 4

Value estimates based on CVM calculations: Clackamas River

Equation (1): Willingness to pay additional dollars

$$\text{Prob (no)} = 1/1+e^{[a+b(X_i)]}$$

<u>X_i</u>	<u>Coeff.</u>	<u>Prob.</u>
Constant	-44.86	.323
Value	74.05	.000
Conflict	50.42	.048

Value = the dollar offer

Conflict = a measure of whether respondents had ever experienced conflicts with other Clackamas users.

WTP (\$) = \$38.52

Reduction in uncertainty = 0.0859

McFadden's R² = 0.1178

N = 205

Cragg-Uhler's R² = 0.1985

Equation (2): Willingness to travel additional miles

$$\text{Prob (no)} = 1/1+e^{[a+b(X_i)]}$$

<u>X_i</u>	<u>Coeff.</u>	<u>Prob.</u>
Constant	2.6375	.000
Distance	0.0053	.000
BoatImpt	-0.7184	.011

Distance = the mileage offer

BoatImpt = a measure of commitment to whitewater recreation as an activity

WTP (miles) = 267

Reduction in uncertainty = 0.1003

McFadden's R² = 0.1359

N = 205

Cragg-Uhler's R² = 0.2244

one or more Clackamas trips. Willingness to travel is expressed as a function of the probability that a boater will say "no" to a specific mileage offer, and also of their commitment to the activity; i.e., respondents were most likely to be willing to travel additional miles if they considered whitewater boating to be their favorite recreation activity, and least willing to do so if they reported liking several recreation activities more than whitewater boating. Because there are a variety of goodness-of-fit equations for maximum likelihood estimation, two values for R^2 are given. These represent the high and low ends of the range of goodness-of-fit statistics.

Using these equations, the mean value of a Clackamas boat trip is estimated at \$38.52. The willingness-to-travel estimate yields a mean distance of 267 miles. These estimates are consistent if travel cost is 14.4 cents per mile. Federal guidelines suggest that the average direct cost of transportation (maintenance, parts, tires, gas and oil, taxes, and accessories) is 12 cents per mile (Walsh, 1986). The remaining 2.4 cents can be considered the opportunity cost of travel time. Assuming an average wage rate of \$18.46/hour (based on the mean household income of \$38,410) and an average travel speed of 45 mph, an opportunity cost of 2.4 cents equals approximately 6 percent of the wage rate. This fraction is well below the 25- to 50-percent range normally used in TCM estimation. However, the same opportunity cost fraction was estimated by Morrison and Winston (1986) in a study of intercity vacation travel by automobile.

Values estimated from the TCM are no more than half the estimate made using the CVM. Arguments can be made in favor of either method.

Since the TCM measures actual behavior, it may be a better reflector of consumer's surplus than the CVM, which asks a hypothetical question. Also, since a sizeable proportion of respondents made several visits in 1988, their CVM responses may not have reflected a tendency to continue visiting but to make fewer trips as expenses increase. Conversely, TCM estimates may be too low because the Clackamas is close to most boaters' homes, and the cost of each individual trip so low, that they may not be able to visit often enough to exhaust their entire store of consumer surplus.

Substitute experiences. In order to better understand where the Clackamas River fits into the overall whitewater recreation system for the region, boaters were asked what they would do if they had "been planning a Clackamas trip, but for some reason the river was not accessible to you on the day you'd planned to go." The great majority (84 percent) would boat a different river rather than choose a different activity. Among those who would choose a different river, 62 percent would expect the substitute experience to offer the same benefits or satisfaction as a Clackamas trip. However, only 34 percent of those who would choose a different activity would expect to receive the same benefits or satisfaction as they could have gotten from boating on the Clackamas. Eighty percent would expect to enjoy their substitute experience with the same companions as on the Clackamas trip, and 90 percent would try to reschedule their Clackamas trip for a later date.

Respondents who said they would visit a different river were asked which river(s) they were most likely to boat instead (Table 5). Of the 41 rivers listed, 24 are within 100 miles of the Willamette Valley (see

TABLE 5
Most likely substitute rivers for Clackamas boaters

<u>River</u>	<u>Pct.</u> ^a	<u>River</u>	<u>Pct.</u>	<u>River</u>	<u>Pct.</u>
White Salmon ^b	34%	Siletz ^b	2	Merced (Calif.)	0.4
Sandy ^b	31	Cispus (Wash.)	2	American (Calif.)	0.4
Deschutes ^b	26	Rogue	2	N.F. Willamette ^b	0.4
North Santiam ^b	24	L.N. Santiam ^b	1	Nehalem ^b	0.4
Molalla ^b	18	Wenatchee (Wash.)	1	Payette (Idaho)	0.4
Wind ^b	8	Chilliwack	0.8	Smith (Calif.)	0.4
McKenzie ^b	7	Illinois	0.8	Snoqualmie (Wash.)	0.4
Wilson ^b	^a 6	Lewis (Wash.) ^b	0.8	Thomas Creek ^b	0.4
Hood ^b	6	Lower Clackamas ^b	0.8	Tieton (Wash.)	0.4
Klickitat (Wash.)	6	Quartzville Ck. ^b	0.8	Tuolumne (Calif.)	0.4
Metolius ^b	3	Toutle (Wash.) ^b	0.8	Washougal (Wash.) ^b	0.4
North Umpqua ^b	2	Trask ^b	0.8		
Skykomish (Wash.)	2	White ^b	0.8	I don't know	1%
Breitenbush ^b	2	Crooked	0.4	It depends	4%
Green (Wash.)	2	John Day	0.4		

^aN=250; respondents could list more than one river

^bRiver located within 100 miles of Portland or Willamette Valley

TABLE 6
Rivers considered most similar to Clackamas

<u>River</u>	<u>Pct.</u> ^a	<u>River</u>	<u>Pct.</u>	<u>River</u>	<u>Pct.</u>
White Salmon ^b	37%	Wind ^b	2	Chehalis (Wash.)	0.4
Deschutes ^b	21	Illinois	2	Cowlitz (Wash.)	0.4
Sandy ^b	16	Washougal ^b	2	Calapooia ^b	0.4
North Santiam ^b	16	Lewis (Wash.) ^b	1	Kalama (Wash.) ^b	0.4
Molalla ^b	12	Klamath	1	Nisqually (Wash.)	0.4
Klickitat	9	Bull Run ^b	0.8	Smith (Calif.)	0.4
McKenzie ^b	9	Cispus (Wash.)	0.8	Thompson (B.C.)	0.4
Rogue	9	L.N. Santiam ^b	0.8	Thomas Creek ^b	0.4
North Umpqua ^b	8	N.F. John Day	0.8	Trask ^b	0.4
Metolius ^b	5	South Santiam ^b	0.8	Youghiogheny	
Wilson ^b	5	Tieton (Wash.)	0.8	(W.Va.-Md.-Pa.)	0.4
Hood ^b	3	Toutle (Wash.) ^b	0.8		
Skykomish (Wash.)	2	Wenatchee (Wash.)	0.8	I don't know	3%
Siletz ^b	2	Crooked	0.4	River is unique	12%
Green (Wash.)	2	John Day	0.4		

^aN=266; respondents could list more than one river

^bRiver located within 100 miles of Portland or Willamette Valley

Chapter 2 of this report), including the eight rivers mentioned most frequently. The rivers at the top of the list were the White Salmon (34 percent), Sandy (31 percent), Deschutes (26 percent), North Santiam (24 percent) and Molalla (18 percent). The most likely substitute river located outside the Portland/Willamette Valley whitewater "system" was the Klickitat River, a Washington river approximately 120 miles from Portland. The Klickitat appeared on 6 percent of the surveys whose respondents answered the river substitution question. Of the remaining substitutes not located within 100 miles of the Willamette Valley, six are a similar distance from the Puget Sound area, four are in southern or eastern Oregon, and four are in California.

The choice of a substitute river is likely to be dependent on two factors: accessibility (can the substitute river be reached in the time period allotted to the activity) and similarity (does the substitute offer an experience which is comparable to that on the original river). Therefore, survey respondents were also asked to list rivers which they believe "offer an experience similar to the Clackamas experience." This list is not identical to the list of substitutes, but there are many repetitions (Table 6). Forty rivers are listed, including 30 which are also listed as likely substitutes. The top five rivers are the same on both lists, with only the Deschutes and Sandy listed in reverse order. Larger rivers such as the Klickitat, McKenzie, Rogue, and North Umpqua appear more frequently on the list of similar rivers than on the list of substitutes. However, smaller rivers which are used mainly by kayakers (e.g., Wind, Hood, Wilson) were reported as likely substitutes more frequently than they were listed as similar rivers.

Only 43 people (14 percent) responded to a question about substitute activity choices (Table 7). Of the 27 activities listed, 18 could be classified as "outdoor recreation," including all but two of the activities mentioned by more than one person. Hiking or backpacking appeared on twice as many surveys as any other activity. The next most common substitutes were snow skiing, camping, working, and bicycling.

Visitor characteristics. If there is a "typical" Clackamas boater, that person is a well-educated, single male in his 30s who has a good-paying job and lives in Portland. More than 80 percent of the respondents were male, and 58 percent have a bachelor's or advanced degree. Only 45 percent were married at the time they completed the survey, and a majority had no children. Their median household income was between \$30,000 and \$40,000 per year. Thirty percent of the respondents live in Portland, and 69 percent in the five metropolitan counties: Clackamas, Clark, Multnomah, Washington and Yamhill. Eleven percent live elsewhere in the Willamette Valley, and nine percent come from the Puget Sound area.

Respondents had an average eight years of whitewater boating experience, and had been visiting the Clackamas for four years prior to 1988. They reported visiting seven other rivers besides the Clackamas in a typical year, both during and after the season when the Clackamas conditions are best. Thirty-seven percent said they prefer whitewater boating to any other recreation activity, and another 58 percent said boating is among their favorite activities. Nearly half (44 percent) belong to a raft or kayak club.

TABLE 7
Most likely substitute activities for Clackamas boaters

<u>Activity</u>	<u>Pct.</u> ^a	<u>Activity</u>	<u>Pct.</u>
Hiking/backpacking	30%	Going to movies	2
Snow skiing	14	Golfing	2
Camping	12	Horseback riding	2
Working around home	12	Hot springs bathing	2
Bicycling	9	Jogging	2
Fishing	7	Motorboating	2
Sailing	7	Photography	2
Water skiing	5	Relaxing on riverbank	2
Windsurfing	5	Shopping in Portland	2
Sea kayaking	5	Scuba diving	2
Water skiing	5	Street motorcycling	2
Auto touring	2	Watching TV	2
Rock climbing	2	I don't know	7%
Gardening	2	Depends on situation	5%

^aN=43; respondents could list more than one activity

Boaters were asked to rate on a five-point scale the importance of 12 different reasons for visiting the Clackamas. The most important reason (Fig. 6) was because the river has "good rapids," followed by "being in a natural setting" and "testing/developing boating skills." The lowest-rated reasons for visiting (in order, beginning with the least important) were "good fishing," "couldn't get permit on another river," and "camping nearby."

Effects of flow rates and seasonal change. Although the boating season peaks on the Clackamas during April and May, survey respondents reported using the river during every month of the year (Fig. 7). Boaters were asked not only about when they had visited the river, but also when they preferred to do so, as well as the reason(s) for their preferences. August and September were the least preferred months, while April and May were the most preferred. Nearly 90 percent chose months in which water levels were best (Fig. 8), while only 26 percent said weather conditions were a factor in their choice. Twenty-one percent said they chose months when the river is less crowded.

Although Oregon's weather is often inclement during the first half of the peak boating season, only 27 percent said they had ever canceled a Clackamas trip due to poor weather conditions. When asked which conditions were harsh enough to force cancellation of a trip, 33 percent said they would visit in any kind of weather, and another 40 percent said they would visit unless there were snow or freezing temperatures. Less than 2 percent said they would only make a Clackamas trip if the weather were warm and sunny. Heavy rain was sufficient deterrent for 21 percent, and fog or light rain for 5 percent.

Fig. 6
Reasons for visiting Clackamas
Mean importance ratings

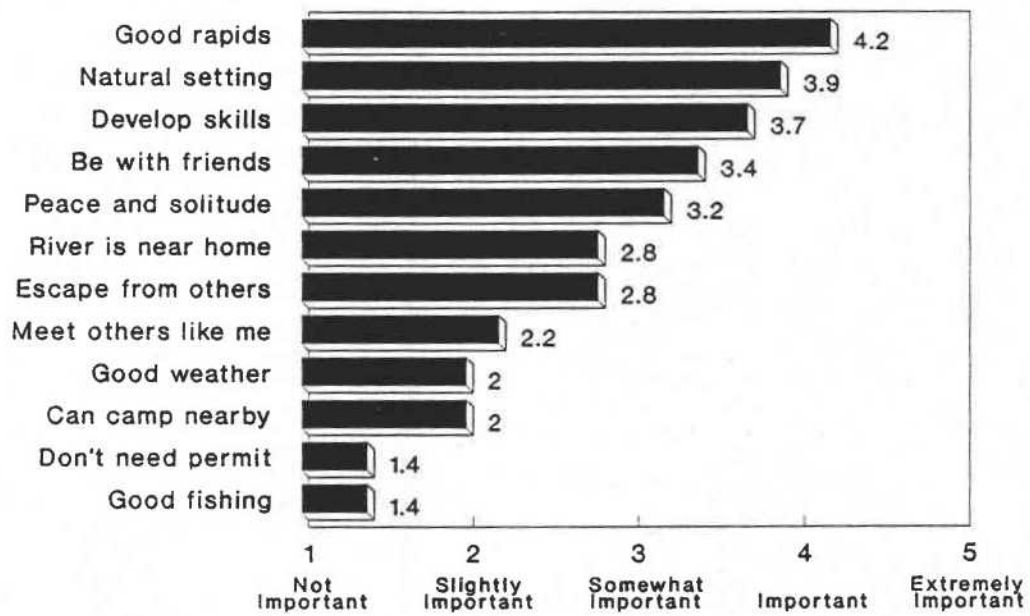
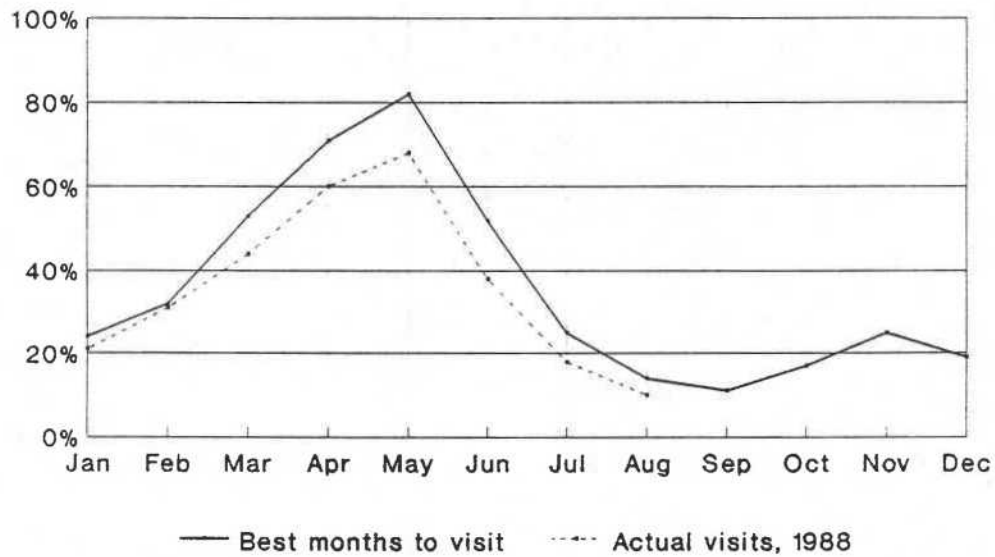
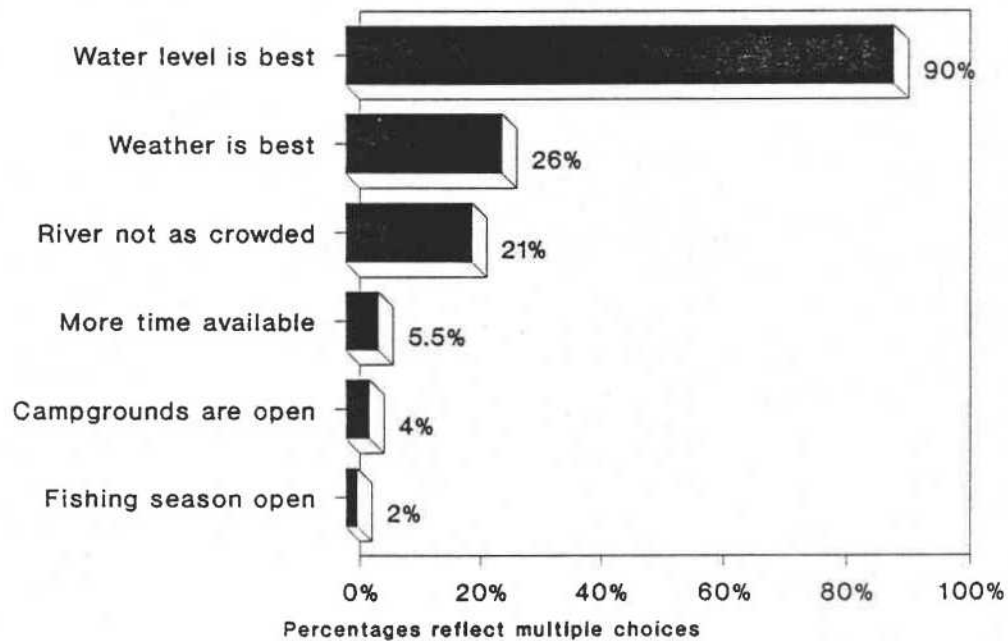


Fig. 7
Preferred and Actual Timing of Visits



Respondents indicated all months they consider best for boating, plus months of actual visits during Jan.-Aug. 1988

Fig. 8
Reasons for seasonal preference



In contrast, 58 percent said they had canceled a planned Clackamas trip at least once because the river flows weren't right for boating. Seventy-eight percent said they normally check on flows before leaving home. Flow data can be obtained by reading the river level charts in daily newspapers and comparing it with charts provided by boating clubs or equipment suppliers, or by calling the U.S. Geological Survey's river information number in Portland. Many rafters who do not check beforehand use a color-coded river gauge erected along the river by members of the Northwest Rafters Association.

Boaters who said they normally do check on river flows were asked which flow rates they considered to be the minimum, optimum, and maximum levels for boating. The average optimum flow was 2,958 cubic feet per second. Flows at the Three Lynx Creek river gauge, located a quarter-mile downstream from the most popular launch site, are most likely to be within 500 cfs of boaters' preferred optimum level during March, April, and May (Table 8). The average minimum flow considered suitable for boating was 1,305 cfs, and the average maximum boatable flow was 9,605 cfs, although some boaters said no flow was too high for boating. Table 8 shows how often flows were within the minimum-to-maximum range during the 12-month period which began Oct. 1, 1987. Flows were extremely low during the first two months of that period; in fact, a measurement of 261 cfs made on Oct. 7, 1987 was the lowest reading taken at Three Lynx in the 71 years since record-keeping began. The historic high flow was 68,200 cfs in December 1964 (USGS, 1989).

Flow preferences are somewhat related to the type of boat use. Kayakers are better able than rafters to operate under low- or high-

TABLE 8
Relationship of preferred flows to 1987-88 actual flows

	MEAN RECORDED FLOWS ^a			Optimal Days ^b	Low flow Days ^c
	Low	Mean	High		
October	532	678	821	0	31
November	553	666	907	0	30
December	1150	2805	13800	6	8
January	1020	2441	7980	6	9
February	1320	2294	5350	6	0
March	1520	2621	5620	14	0
April	2260	3226	6340	20	0
May	1810	2470	3190	14	0
June	910	1630	3050	5	15
July	678	795	931	0	31
August	612	645	675	0	31
September	600	649	769	0	30

^aCubic feet per second. Discharge records for Three Lynx Creek gauge, Oct. 30, 1987-Sept. 30, 1988, provided by Water Resources Division, U.S. Geological Survey, Portland, Ore. Data are preliminary and subject to revision before publication by USGS.

^bNumber of days in each month when daily mean flows were within 500 cfs of boaters' optimum flow rate of 2,958 cfs.

^cNumber of days in each month when daily mean flows were below boaters' minimum flow rate of 1,305 cfs. Flows exceeded the average maximum rate of 9,605 cfs only once, on Dec. 10, 1987.

water conditions, and consequently kayakers report a wider range of suitable boating conditions. For respondents who normally use rafts, the average minimum flow was 1,624 cfs, while the average optimum was 3,328 cfs and the average maximum was 8,681 cfs. Among boaters who used hard-shell kayaks, the average minimum was 1,022 cfs, the average optimum was 2,604 cfs, and the average maximum was 11,467 cfs.

Not all boaters check the flows, however, and some are willing to visit when river levels are lower than the average minimum acceptable level. Seventeen percent of the respondents said they had boated the Clackamas in July 1988, and 10 percent did so in August, even though flows never averaged more than 930 cfs during that time. This suggests that the composition of the boater population may undergo changes during the course of the year. Boaters who visit during the colder months may tend to have a higher commitment to whitewater recreation, while summer visitors might prefer a more casual, relaxed experience.

Analysis of variance (ANOVA) and Chi-square tests were performed to test for seasonal variations in user characteristics and experience preferences. The sample was divided into three groups based on responses to the question asking which month(s) are best for boating. An "early-season" group consisted of 120 boaters who did not prefer to boat during the months of June-October. A "late-season" group included 61 boaters who did not like to visit any earlier than May or later than October. A third group of 107 boaters had indicated they would boat during months in both the early and late parts of the season.

A comparison of responses on general boating behavior (Table 9) supports the hypothesis that summer boaters have lower involvement

TABLE 9
Seasonal differences in general boating behavior

	ENTIRE (N=107)	EARLY (N=120)	LATE (N=61)	F	P	Diff.
Yrs. boating experience	9.1	7.8	6.5	4.55	<.05	Lt<Ea,En
Yrs. Clackamas exper.	5.3	4.8	2.6	7.53	<.001	Lt<Ea,En
Rivers boated per year	7.5	8.8	4.3	10.50	<.001	Lt<Ea,En
Pct. in boating club	47%	53%	18%	13.67	<.001	Lt<Ea,En
Percent using own boat	90%	86%	52%	23.60	<.001	Lt<Ea,En
Importance of boating ^a	1.63	1.55	1.95	10.90	<.001	Lt<Ea,En
Satisfaction rating ^b	5.03	4.91	4.68	4.50	<.05	Lt<En
Seasonal variety ^c	92%	82%	92%	3.03	<.05	Ea<Lt,En

^aRating on three-point continuum (1=most important activity, 2=among most important, 3=not especially important)

^bRating on a six-point continuum (1=poor, 2=fair, 3=good, 4=very good, 5=excellent, 6=perfect)

^cPercent of sample who normally boat other rivers during the same season in which they prefer to boat the Clackamas.

TABLE 10
Seasonal differences in use patterns

	ENTIRE (N=107)	EARLY (N=120)	LATE (N=61)	Stat ^a	P	Diff.
Boat type						
Kayak	40 ^b	32	20			
Inlatable kayak	10	3	15			
Raft	43	64	65	27.1	<.005	
Canoe	5	1	-			
Other	3	1	-			
Advance planning						
One day or less	22	19	5			
2-7 days	61	58	51			
8-30 days	16	19	41	26.8	<.001	
31-90 days	1	3	-			
More than 90 days	-	1	3			
Distance traveled (mi.)	58	79	147	6.03	<.01	Lt<Ea,En
Total expenses/trip	\$26	\$39	\$46	3.43	<.05	En<Ea,Lt

^aChi-square used to compare frequency distributions and ANOVA to compare means.

^bPercentage of people preferring each season

levels in whitewater boating. Late-season boaters have less experience on the Clackamas, and in whitewater boating overall. They boat fewer rivers overall during the course of the year, are much less likely to belong to whitewater boating clubs, and less likely to own their own boats. Most significantly, they are much less likely to rate whitewater boating as their favorite outdoor recreation activity. The lower level of importance is also reflected in slightly lower satisfaction ratings for Clackamas trips. Early-season boaters differed from entire-season boaters on one point: They were slightly less likely to visit other rivers during the same season that they boat the Clackamas.

Numerous other differences were found between the three groups. The entire-season group had a higher percentage of kayakers than either the early-or late-season group, while boaters who use inflatable kayaks tended to prefer visiting in the summer (Table 10). Late-season boaters tend to plan their trips more in advance than other visitors, and they travel farther to reach the river. They also spend the most money on each river trip. Although their expenses are not statistically different from those of early-season boaters, they are significantly higher than those of entire-season boaters, who might be expected to make more trips to the Clackamas and therefore to have added incentive to keep the costs of each trip as low as possible.

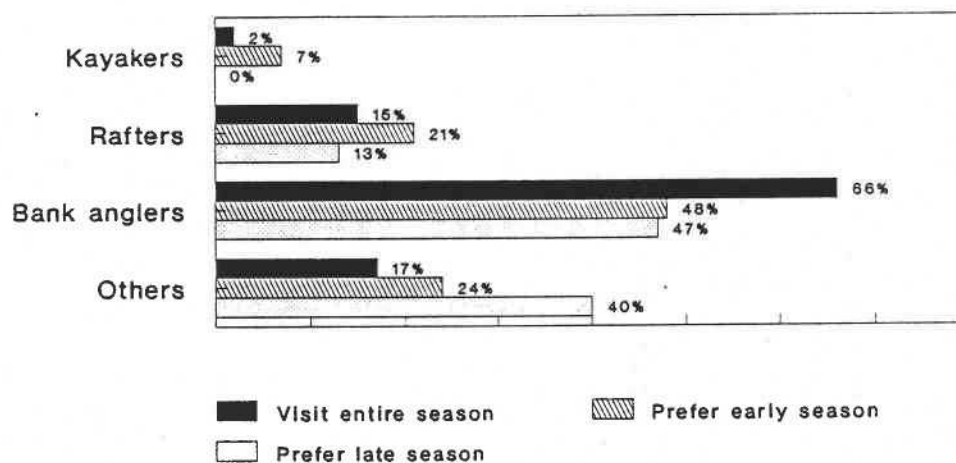
Differences were also found in the reasons why people visit the river during different seasons (Table 11). Good weather and the ability to fish were more important to late-season boaters than early-season visitors. However, late-season boaters were less likely to place a value on achieving peace and solitude, meeting other boaters, or testing

TABLE 11
Seasonal differences in trip motives

	ENTIRE (N=107)	EARLY (N=120)	LATE (N=61)	F	P	Diff.
Good rapids	4.18 ^a		4.34	4.03	2.94	NS
Good weather	1.88	1.68	2.86	35.10	<.001	Ea, En<Lt
Good fishing	1.33	1.23	1.56	3.42	<.05	Ea<Lt
Riverside camping	1.98	1.89	2.00	0.28	NS	
Peace and solitude	3.34	3.28	2.87	3.66	<.05	Lt<Ea, En
Get away from others	2.88	2.90	2.59	1.51	NS	
Be in natural setting	3.99	3.84	3.84	0.73	NS	
Meet others at river	2.22	2.36	1.71	6.29	<.01	Lt<Ea, En
Test boating skills	3.90	3.92	3.02	15.88	<.001	Lt<Ea, En
No permit necessary	1.47	1.41	1.35	0.36	NS	
Close to home	3.11	2.84	2.47	4.60	<.05	Lt<En
Be with friends/family	3.33	3.34	3.51	0.68	NS	

^aMean response on a five-point Likert-type scale

Fig. 9
Seasonal variation in perceived
source of inter-group conflicts



Responses indicate PRIMARY source group
 Early season = visits no later than May
 Late season = visits no earlier than May

and developing boating skills. They also were less likely than entire-season boaters to care whether the Clackamas is close to their homes, probably because they don't plan to visit as frequently.

Social impacts and standards do not show seasonal variation, nor are there significant differences in the definitions given to the social aspects of the Clackamas experience by early-, late-, and entire-season boaters. Perceived crowding scores were statistically identical for the three groups as well. Although there were no differences in the numbers of boaters who experience conflicts, or in the frequency of conflicts, there were differences in the user groups to which conflicts were attributed (Fig. 9). Bank anglers were blamed most frequently by all three groups. Members of the early-season group, many of whom visit before the fishing season, were slightly more likely than members of the other groups to report conflicts with rafters. Forty percent of late-season boaters complained about "other" users, including litterers, thieves, log trucks, jet skiers, river guides, and rowdy teenagers.

Substitution behavior also showed seasonal variation which appears to be related to differing levels of commitment to whitewater boating. While only 12 percent of the early- and entire-season boaters would choose a different activity if they were unable to boat the Clackamas, 28 percent of late-season boaters would do so. The groups did not differ in their expectations that the substitute experience would offer the same benefits, or that it would be enjoyed with the same companions. A comparison of the likely substitute rivers which were mentioned more than once (Table 12) shows that early- and entire-season boaters have a much broader array of alternatives to choose from. There are two likely

TABLE 12
Seasonal variation in substitute river choices

<u>ENTIRE SEASON</u>		<u>EARLY SEASON ONLY</u>		<u>LATE SEASON ONLY</u>	
White Salmon	33% ^a	Sandy	28%	White Salmon	28%
Sandy	29	White Salmon	27	Deschutes	23
North Santiam	26	Molalla	23	Sandy	15
Deschutes	22	North Santiam	20	North Santiam	11
Molalla	14	Deschutes	19	Rogue	3
Wilson	11	Wind	10	McKenzie	3
McKenzie	8	Hood	7	Klickitat	3
Wind	7	McKenzie	5		
Klickitat	7	Wilson	3		
Hood	6	Skykomish	3		
Metolius	4	Green	3		
North Umpqua	4	Klickitat	3		
Breitenbush	4	Metolius	3		
Little N. Santiam	3	Lewis	2		
Siletz	2	Siletz	2		
Trask	2	Cispus	2		
DON'T KNOW	-	DON'T KNOW	-	DON'T KNOW	3
IT DEPENDS	1	IT DEPENDS	5	IT DEPENDS	3

^aPercent of sample mentioning each river

TABLE 13
Seasonal variation in perceived river similarity

<u>ENTIRE SEASON</u>		<u>EARLY SEASON ONLY</u>		<u>LATE SEASON ONLY</u>	
White Salmon	41% ^a	White Salmon	33%	Deschutes	26%
North Santiam	18	Molalla	18	White Salmon	20
Deschutes	16	Sandy	15	Sandy	15
Sandy	11	Deschutes	14	North Santiam	11
North Umpqua	10	North Santiam	13	Rogue	8
McKenzie	9	Klickitat	9	McKenzie	8
Molalla	8	Rogue	8	Klickitat	7
Metolius	7	McKenzie	6	North Umpqua	7
Klickitat	6	North Umpqua	5	Bull Run	3
Wilson	5	Hood	4		
Rogue	4	Metolius	4		
Skykomish	4	Siletz	3		
Hood	3	Wilson	3		
Wind	3	Green	3		
Lewis	2	Illinois	3		
Little N. Santiam	2	Wind	3		
Siletz	2	Toutle	2		
Washougal	2	Tieton	2		
		N.Fk. John Day	2		
DON'T KNOW	-	DON'T KNOW	3	DON'T KNOW	8
RIVER IS UNIQUE	14	RIVER IS UNIQUE	13	RIVER IS UNIQUE	2

^aPercent of sample mentioning each river

reasons for this. First, many of Oregon's whitewater rivers are not boatable in summer. Second, the highly committed boaters who visit the Clackamas during the early season are likely to have more information about whitewater recreation opportunities in general. The latter reason is reflected in the fact that 8 percent of late-season boaters said they did not know of any rivers that are similar to the Clackamas (Table 13), compared to 3 percent of the early-season boaters and none of the entire-season group.

Deschutes River

Setting description. The Deschutes River has its source in the central Cascades and flows eastward, then northward to the Columbia River. Although whitewater recreation occurs in a few places above Bend, most boating takes place on a 97-mile undammed section below Warm Springs. The Bureau of Land Management is the largest landowner, followed by private ranchers, the state of Oregon and the Warm Springs Confederated Tribes. Access is provided by 15 launch areas.

The lower Deschutes has four distinct sections. An unroaded section from Warm Springs to Locked Gate is known for trout fishing and boater camping, and is used primarily for overnight float trips. The "day-use" section from Locked Gate to Sherar's Falls is followed by good roads and passes through the town of Maupin. It contains most of the larger rapids, and sustains the heaviest amount of boating use. Between Sherar's Falls and Mack's Canyon is a little-visited area known mainly for steelhead fishing, although a rough road also offers access for car campers. The final section is famed for its steelhead fishing in late

summer and early fall. It is unroaded, and jet boats are commonly used to travel upriver from the Columbia River confluence.

Use patterns. Sixty-three percent of Deschutes boaters use inflatable rafts, followed by drift boats (17 percent), jet boats (14 percent) and hard-shell or inflatable kayaks (6 percent). The frequent use of specialized fishing boats reflects the popularity of the fishery. Fishing is considered a highly important reason to visit the Deschutes by 45 percent of boaters, and more than half do some fishing during Deschutes trips. About 12 percent of boaters use professional guide services. This use is concentrated on the river section below Mack's Canyon, where outfitters were used by 28 percent of the boaters.

The boating season is long, but use is concentrated in the summer months. More than 85 percent of Deschutes survey respondents like to visit during the summer, compared to 45 percent during April and May and fewer than 10 percent between October and March. A moderate amount of advance planning is required: Sixty-seven percent of Deschutes trips are planned at least a week ahead, and 29 percent are planned more than a month in advance. More than two-thirds of all visitors camp, usually staying for two or three days. Boaters travel an average 109 miles one-way to reach the Deschutes.

Social impacts and perceptions of the experience. Some 71 percent of Deschutes respondents rated the river experience as either good or excellent, and 16 percent considered it perfect. However, boaters agree that the river is quite crowded -- the most crowded, in fact, of any recreation site covered in a review of more than 60 crowding studies (Shelby et al., 1989b). Fully 100 percent of weekend boaters using the

Warm Springs-to-Locked Gate section of the river considered it at least slightly crowded, while 88 percent of weekday boaters on that same section considered the river at least slightly crowded. Other sections of the river also were rated at least slightly crowded by 88 percent or more of the respondents who use those sections. Seventy percent of Deschutes boaters have had to adopt some sort of strategy to cope with high use levels, and more than half schedule their trips in an attempt to avoid peak use times.

Standards for social impacts are relatively tolerant. On average, Deschutes users are willing to accept being within sight of other boaters roughly half of the time, with somewhat stricter standards on the river segments where fishing is most popular. Nonetheless, standards were exceeded on all four river sections. On average, boaters reported being within sight of others as much as 74 percent of the time on weekends at the day-use section. Impacts also exceeded standards on some sections in several other categories, including the number of boats passing anglers as they fish from the bank, the number of incidents of rude behavior, the number of encounters with jet boats (for which most non-jetboaters have low tolerance), the amount of human waste present, and the need to camp within sight or sound of other parties.

Overall, the Deschutes experience may be best defined as "scenic recreation," where visitors expect to see other people much of the time. The preferred experience lies closer to "undeveloped recreation," where encounters are expected to occur some of the time. Only 21 percent of respondents classified the current experience as wilderness or semi-

wilderness, while 33 percent said they would prefer that the experience fall into one of those two categories.

Economic value. Estimates of the value of a Deschutes trip were calculated using the travel-cost (TCM) and contingent valuation (CVM) methods. The travel cost calculation was similar to the one described for the Clackamas (see above), although different variables were used and there was no way to adjust for the number of trips a person made to the river during the year. The CVM calculation was based on the following survey question:

"As a boater on the Deschutes you currently pay a fee of \$1.75 per person per day. If this fee were to increase, at some price you probably would not purchase a pass. What is the maximum amount you would pay per day for access to the river? Although this question asks you to place yourself in an hypothetical situation, please try to answer it as realistically as you can. Your answers will not affect permit prices on the Deschutes.

The most I would pay for a permit for river access is \$_____ per day."

The average response to this question was \$4.72 per person per day. (For the sake of comparison, all figures in this report are expressed in 1988 dollars.) The amounts varied depending on the section of the river which the respondent normally visits. For example, on the section nearest Maupin, where more than half of the visitors only stay for one day, the average response was \$3.99 per day. However, on the Warm Springs-to-Locked Gate run the estimate was \$5.08. Since 81 percent of visitors on this section camp for two or more nights, the value of this trip is approximately \$15.

The TCM calculation was based on the number of responses from each of 22 origin zones. Distances were calculated from the centroid of each

zone to the town of Maupin. The nearest zone centered on The Dalles, 36 miles from the river, and the farthest on Seattle, 271 miles away. More than half of the visitors came from four Portland-area zones averaging 100 miles away. Total direct cost was calculated as for the Clackamas, except that an average speed of 50 mph was used (instead of 45 mph) because highways tend to be wider and straighter.

Several regression models were fit (Table 14) for differing assumptions about mileage costs and the opportunity cost of travel time. Of the factors besides total direct cost which can affect a decision to visit (e.g., personal characteristics, site quality, substitute prices, etc.), the only variable which contributed significantly to predictions of visits was the average age of respondents in each zone. This variable is expressed as a quadratic because the likelihood of engaging in whitewater boating tends to decrease with the number of years that a person is older or younger than the median age of the boating population (usually ages 25-40).

Model 1 uses the Internal Revenue Service-approved mileage cost of 21 cents and an opportunity cost of travel time of 6 percent of the wage as suggested by Morrison and Winston (1985). Because Brown et al. (1983) observed that consumers' perceived travel costs tend to be slightly higher than economists usually estimate, Model 2 uses a mileage cost of 25 cents along with the 6 percent opportunity cost fraction. Model 3 also uses a mileage cost of 25 cents, but the fraction of the wage rate used for opportunity cost is 25 percent, a figure which has been traditionally used by resource economists to value recreation sites (Walsh, 1986). Model 4 assumes that only out-of-pocket costs enter into

TABLE 14

Value estimates based on travel-cost calculations: Deschutes River

VPC = visits per capita

AGE = average age of visitors in zone

TDC = total direct costs of visit

Figures in parentheses beneath each equation are t-statistics

$$\text{MODEL 1: } \ln(\text{VPC}) = -19.98 - 0.0882(\text{TDC}) + 0.73(\text{AGE}) - 0.010(\text{AGE})^2$$

$$\quad \quad \quad (-3.04) \quad (-12.08) \quad (2.03) \quad (-2.10)$$

$$R^2 = .9105$$

$$\text{MODEL 2: } \ln(\text{VPC}) = -20.07 - 0.0778(\text{TDC}) + 0.74(\text{AGE}) - 0.010(\text{AGE})^2$$

$$\quad \quad \quad (-3.04) \quad (-12.13) \quad (2.05) \quad (-2.09)$$

$$R^2 = .9104$$

$$\text{MODEL 3: } \ln(\text{VPC}) = -19.93 - 0.0345(\text{TDC}) + 0.71(\text{AGE}) - 0.010(\text{AGE})^2$$

$$\quad \quad \quad (-2.74) \quad (-10.84) \quad (1.77) \quad (-1.77)$$

$$R^2 = .8909$$

$$\text{MODEL 4: } \ln(\text{VPC}) = -20.00 - 0.2341(\text{TDC}) + 0.74(\text{AGE}) - 0.010(\text{AGE})^2$$

$$\quad \quad \quad (-3.04) \quad (-12.13) \quad (2.04) \quad (-2.07)$$

$$R^2 = .9105$$

VALUE ESTIMATES:

Model Number	Cost per mile	Opp. cost Constant	Net benefit per trip ^a
1	.21	.06	\$11.83
2	.25	.06	\$13.43
3	.25	.25	\$29.67
4	.0804	.0217	\$ 4.46

^aExpressed in 1988 dollars

decisions to make short vacation trips and uses a 1986 variable trip cost of 8.04 cents per mile (U.S. Census Bureau, 1988). The time cost fraction of 2.17 percent was estimated using McConnell and Strand's (1981) method.

Semi-log (dependent) functions produced the best-fitting models. All four models fit extremely well as judged by R^2 . The Rocky Mountain Travel Cost Model program (Rosenthal et al., 1986) was used to estimate second-stage demand curves and average consumer surplus per trip. Estimates ranged from \$4.46 per trip using the variable-cost-only calculation (Model 4) to \$29.67 per trip using the most traditional assumptions (Model 3). Since a typical Deschutes trip lasts about two days, TCM results should be reduced approximately by half for comparison with the CVM calculation.

Substitutability. When asked what they would do instead if a Deschutes trip were not available, 82 percent of respondents said they would visit a different river. Deschutes boaters were not asked what substitute rivers they were most likely to choose, but the survey did ask which rivers offered an experience similar to the Deschutes experience. The river mentioned most frequently was the Rogue, which was listed by 30 percent of the respondents. The Snake was next, appearing on 10 percent of the surveys, followed by the John Day (8 percent), Clackamas (6 percent), Sandy (3 percent), Metolius (2 percent), North Umpqua (1 percent) and Illinois (1 percent). Sixteen percent of the respondents said the Deschutes experience was unique.

Visitor characteristics. The "average" Deschutes boater is 37 years old, has 1.6 children and a family income of \$46,000 per year (in

1988 dollars). Fifty-two percent have earned a bachelor's or advanced degree, and 84 percent are male. Boaters travel an average of 110 miles to reach the river from their homes. One-third of those homes are in a city of 100,000 or more, while 25 percent are in places having 10,000 or fewer residents. The average boater has nine years of previous whitewater experience and has been visiting the Deschutes for six years.

Of 13 reasons for visiting the Deschutes, the most important was "viewing scenery and wildlife." "Running rapids" was the next most important, followed by "peace and solitude," "good weather," and "getting together with friends." The least important reasons were "can use a power boat," "couldn't get permit on another river," and "hiking along the bank." There was considerable variation from one section of the river to the next, however. For example, on the uppermost section, the three most important reasons were "viewing scenery and wildlife," "peace and solitude," and "riverside camping." On the day-use section, the top three reasons were entirely different: "running rapids," "good weather," and "getting together with friends." Good steelhead fishing was of little importance on either section, but it was ranked first among the reasons for boating both sections below Sherar's Falls.

Rogue River

Setting description. The Rogue River has been among America's most popular whitewater rivers since the early 20th century, when it was immortalized in the writings of Zane Grey. The largest river in southwest Oregon, it offers a variety of recreational opportunities including whitewater rafting, salmon fishing, jetboat excursion trips,

hiking, and gold panning. This study covers only the "wild section" of the Rogue, which begins at the confluence with Grave Creek (about 25 miles northwest of Grants Pass) and continues 35 miles to Foster Bar. Management of this segment is shared by the Bureau of Land Management and U.S. Forest Service. The river itself is part of the federal Wild and Scenic River system. Much of the land along it lies within the Wild Rogue Wilderness.

The combination of excellent scenery, lack of road access and moderately difficult whitewater has led to a situation where demand for Rogue trips exceeds the river's carrying capacity. As a result, a lottery system for the distribution of non-commercial whitewater permits began in 1983. Launches are limited to 120 persons per day during the permit season (late May through mid-September). Permits are apportioned about equally between commercially guided and private (non-outfitted) users. Only the latter were contacted for this survey.

Use patterns. A typical Rogue trip lasts three to four days, with boaters camping overnight on sandbars along the river. Thus a majority of the time on Rogue trips is spent off the water, either in camp or at attraction points such as tributary streams, historic sites (e.g., Zane Grey's cabin) or the trail which parallels the entire river segment. Fishing is popular, and is listed among the most important reasons for visiting the river by 20 percent of Rogue boaters.

Boating can be done at almost any time of year, although the peak use season coincides with the permit season. (Because the survey sample was drawn from permit applications, extreme caution should be used in applying results of this study to off-season Rogue boaters.) Although

it is possible to obtain permits on a first-come, first-served basis from a pool of "no-show" permit-holders, most people use the lottery system. This necessitates considerable advance planning, averaging four months ahead of the scheduled trip date. Boaters travel an average 225 miles one-way to visit the Rogue.

Social impacts and perceptions of the experience. Satisfaction levels are quite high among Rogue visitors. The experience was rated "perfect" by 29 percent of users and "excellent" by another 54 percent. Crowding levels are not high, averaging 3.2 on a scale of 1-9, but 54 percent said they felt at least "slightly crowded" on Rogue trips, and 6 percent said they felt "extremely crowded" despite the 120-persons-per-day launch limit. About a third of respondents said they had tried to avoid crowds by choosing a launch date when they thought there would be fewer people on the river.

Perceptions of crowding are related to boaters' standards for social impact levels on the Rogue. Using the median to represent the group standard, boaters said it was OK to have six encounters with other parties per day. Previous work on the Rogue (Shelby and Colvin, 1979) had shown that when 90 to 120 people are floating the river daily, about 12 encounters will occur and boaters will spend an average of two hours in sight of other parties, or one hour out of every four spent on the river. Actual impacts are therefore about double the standard. However, Shelby and Colvin also found that people tended to notice and to recall only about half of the encounters which actually occur, suggesting that encounter levels are actually fairly close to threshold levels. Boaters also said they were willing to spend about two nights

in five within sight of other boaters. Standards have changed over time, suggesting that displacement and product shift have occurred as a result of increased use (Shelby et al., 1988).

Given a choice of defining a Rogue trip as a "wilderness," "semi-wilderness" or "undeveloped recreation" experience, 58 percent chose semi-wilderness and 37 percent undeveloped recreation. Only 4 percent considered it a wilderness experience even though much of the trip takes place within a designated wilderness. Sixteen percent said a wilderness experience should be offered, and 58 percent preferred semi-wilderness.

Economic value. Estimates of consumer surplus were obtained using the zonal travel-cost method and by two versions of the contingent-value method. The TCM calculation used 25 distance zones with centroids ranging from 25 miles away (Grants Pass) to 838 miles (San Diego, Calif.) Seventy-five percent of the respondents lived in Oregon, and 33 percent within the three southwest Oregon counties crossed by the river. Fourteen percent were Californians.

Four different trip demand equations were estimated (Table 15): one with the cost of time equal to 6 percent of the wage rate; one with the cost of time equal to one quarter of the wage rate; one with the cost of time discounted altogether, and one in which the cost of time was based on boaters' stated willingness to pay to reduce travel time.

In each of the equations shown in Table 15, total direct cost is calculated as shown above for the Deschutes River TCM calculation. Mileage costs were set at 20 cents per mile. Two demographic variables were included in the calculation: the average age of respondents from each zone, and their average reported income. The latter variables were

TABLE 15

Value estimates based on travel-cost calculations: Rogue River

VPC = visits per capita

AGE = average age of visitors in zone

INC = average reported income of visitors in zone

TDC₁ = total direct costs of visit when time cost is 0TDC₂ = total direct costs of visit when time cost is 6 percent of the wage rateTDC₃ = total direct costs of visit when time cost is 25 percent of the wage rateTDC₄ = total direct costs of visit when time cost is equal to reported willingness to pay to reduce travel time

Figures in parentheses beneath each equation are t-statistics

$$\text{MODEL 1: } \ln(\text{VPC}) = -4.19 - 0.062(\text{TDC}_1) + .000002(\text{INC}) - .093(\text{AGE})$$

$$\quad \quad \quad (-2.87) \quad (-12.4) \quad (1.00) \quad (-2.11)$$

$$R^2 = .903$$

$$\text{MODEL 2: } \ln(\text{VPC}) = -4.72 - 0.050(\text{TDC}_2) + .000002(\text{INC}) - .095(\text{AGE})$$

$$\quad \quad \quad (-3.23) \quad (-12.5) \quad (1.18) \quad (-2.16)$$

$$R^2 = .903$$

$$\text{MODEL 3: } \ln(\text{VPC}) = -5.555 - .030(\text{TDC}_3) + .0000047(\text{INC}) - .096(\text{AGE})$$

$$\quad \quad \quad (-3.47) \quad (-10.0) \quad (2.35) \quad (-1.96)$$

$$R^2 = .884$$

$$\text{MODEL 4: } \ln(\text{VPC}) = -2.594 - .029(\text{TDC}_4) - .000003(\text{INC}) - .093(\text{AGE})$$

$$\quad \quad \quad (-1.23) \quad (-7.25) \quad (1.50) \quad (-1.48)$$

$$R^2 = .804$$

VALUE ESTIMATES:

Model No.	Time cost	Net benefit per trip ^a
1	0	\$23.88
2	6%	\$28.37
3	25%	\$43.62
4	see above	\$44.27

^aExpressed in 1988 dollars

also entered in a quadratic form, but this did not result in a statistically improved equation.

All four models fit extremely well, although goodness-of-fit tended to decline as the cost of time was increased. Signs on the coefficients are consistent with theory except in the case of Model 4, perhaps because of multicollinearity between income and willingness to pay to reduce travel time. Estimates of consumer surplus (net benefit per trip) range from \$24-\$44, depending on the functional form used.

For the CVM calculation, the survey sample was divided in two. One group was given an open-ended CVM question which instructed boaters to think of the permit fee as an admission price, and asked them what was the maximum amount they would have paid for that permit. Because research has suggested that a take-it-or-leave-it form of CVM question is a better simulator of market conditions (Bishop and Heberlein, 1985; Loomis, 1988) boaters in the second group were presented with a fixed dollar amount and asked if they would pay that much for a river permit.

Using the open-ended format, mean willingness-to-pay for a river permit was estimated at \$36.97 (1988 dollars). That total includes some \$0 responses, which may represent actual willingness to pay or may be a protest against the idea of higher permit fees (or of permit fees in general). When the zeroes are removed, mean WTP is \$38.74. The total also includes several extremely large responses. Due to the non-normal distribution of responses, the median may be a more accurate reflector of actual WTP than the mean. Median responses were \$20.65 with zeroes included and \$26.55 with zeroes removed. The dichotomous-choice

estimate yielded a median WTP estimate of \$62.38 per trip. This value is significantly higher than either the TCM or open-ended CVM results.

Substitutability. Boaters were asked, "If you had been unable to obtain a permit for this Rogue River trip, what would you have done instead?" Seventy percent said they would have chosen to run another river. The rivers they were most likely to run instead were: Deschutes (mentioned by 20 percent of those who answered that question), Klamath (13 percent), Salmon (8 percent)¹, Illinois (4 percent), North Umpqua (3 percent), Snake (3 percent), and the more developed section of the Rogue just upstream from Grave Creek (3 percent). Boaters were not asked which rivers were most similar to the Rogue. Of those who would have chosen a different activity, the most popular substitute activities were fishing, camping, and backpacking, respectively.

Visitor characteristics. Demographic characteristics of Rogue boaters are not atypical for whitewater recreation studies. Respondents tended to be male (74 percent) and married (70 percent), averaging 37 years old with 1.4 children. Fifty-seven percent had a bachelor's or advanced degree, and the average family income (adjusted for inflation) was \$45,200. In keeping with the fact that more than half of Rogue visitors live in southwest Oregon or extreme northern California, the boater population tends to live in relatively small towns: 21 percent are rural residents, 10 percent live in towns with populations below 5,000, and 37 percent in towns of 5,000-50,000 population.

¹There are two whitewater rivers named Salmon in the West. One in Idaho is very well-known and has many characteristics in common with the Rogue. The other, in California, is located less than 100 miles south of the Rogue. Most respondents did not indicate which one they meant.

Respondents were given a list of 25 features of Rogue River trips and asked to indicate which were "not at all important," "somewhat important," or "very important." Ten features scored higher than 2.5 on this three-point scale: observing plants, animals and geology; being in a natural setting; being on the Rogue River; being with family/friends; relaxing, getting away from it all; camping along the river; running rapids; water quality; seeing wildlife; and visiting historical sites. The most important of these was relaxing, followed closely by running rapids and being in a natural setting. Only one feature, fishing on the Rogue River, was rated "not at all important" by a majority of respondents. "Having the river close to your home" and "interacting with my guide or trip leader" had average ratings of 2.0 on the three-point scale, while ratings of 2.1 were given to "photographing the Rogue River" and "seeing few other people while floating." The other 10 features had scores between 2.2 and 2.5.

Upper Klamath River

Setting description. The Klamath River flows west-southwest from Oregon's Upper Klamath Lake through northern California to the Pacific Ocean. Whitewater boating is becoming increasingly popular on a 15-mile stretch of the river between the Pacific Power and Light Co.'s Boyle powerhouse, near the town of Keno, Ore., and Copco Lake just across the California border. The water is held behind an upstream dam, then released through turbines for an average of eight hours daily, usually in the morning. There is not enough whitewater for boating unless the turbines are operating, so boaters must normally launch by noon.

The Upper Klamath has been declared a State Scenic Waterway, and is being studied for federal Wild and Scenic River status. It bisects a "checkerboarded" area having alternating sections of private and BLM land. The city of Klamath Falls, Ore., has applied for a permit for a hydropower project which would require a diversion canal from the Boyle turbines to the California border, effectively eliminating whitewater boating for most of the year. Despite opposition from state agencies and the BLM, the proposal was still pending on Jan. 1, 1990.

The Upper Klamath is considered a demanding river to run, with several rapids rated at or just below Class 5. Most of the roughest water is located just above the California state line, and many boaters camp overnight at a midway point just above these rapids. The river is paralleled by very poor roads, and nearly all launches take place at a single put-in one mile below the Pacific Power facility. Although the Klamath is a blue-ribbon trout stream, it is not heavily fished in summer when catch-and-release regulations are in effect.

Use patterns. BLM records suggest that between 75 and 90 percent of use occurs on commercially outfitted trips, but the proportion of boaters on private trips appears to be growing. Inflatable rafts account for almost all river traffic, though a few non-outfitted kayakers completed surveys. Private parties tend to camp along the river, as do a sizeable minority of outfitted parties, especially those based in northern California towns which are two hours or more from the launch area. Most camping occurs at a designated area about halfway between the put-in and Copco Lake. Since launches are made in the morning, camp is often reached by early afternoon, and some outfitters

bring fishing equipment, mountain bikes and other recreational equipment for their customers to use during the trip.

Nearly half of Upper Klamath boaters are making their raft trip as part of a larger vacation trip, and about one-quarter of that group said they did not decide to float the river until arriving in the town where their outfitter was based. Overall, 76 percent of respondents said they had begun planning their trips more than a week in advance. The Klamath can be floated any month in the year, but most boating is done in June, July, or August. Commercial passengers normally make no more than one trip per year. Private floaters tend to be repeat visitors, however, averaging 2.6 trips per year.

Social impacts and perceptions of the experience. Reported satisfaction levels are high, with 37 percent rating the trip as "perfect" and 48 percent calling it "excellent." Seventy percent said they definitely wanted to make a repeat trip. The perceived crowding score was 3.65, with 72 percent of respondents saying the river was at least slightly crowded.

Reported use impacts tended to match, or slightly exceed, boaters' standards. Thus, while 58 percent spent no more than one hour in four within sight of other parties, 65 percent said use should remain within those levels. Similarly, the average reported waiting time at the launch site was two minutes longer than the average acceptable wait of 19 minutes. Campers reported being within sight of 1.3 other parties, while the average standard was 0.9 parties. Use impacts varied widely. While 27 percent said they were almost never in sight of other boats, 19 percent saw other parties at least three-quarters of the time. Forty-

eight percent reported no wait at the launch site, but others reported waiting as long as an hour.

Respondents tended to define the experience as semi-wilderness (33 percent) or undeveloped recreation (42 percent), while 8 percent called it wilderness. However, 19 percent said it should be wilderness, compared to 39 percent favoring semi-wilderness and 32 percent undeveloped recreation.

Conflicts between recreational users are rare on the Upper Klamath. Seventy percent had never experienced conflicts; of those who had experienced them, 56 percent said conflicts were rare. By far the largest source of discord was other boaters, accounting for 77 percent of the conflicts reported.

Economic value. The value of an Upper Klamath trip was estimated using the dichotomous-choice CVM method. The travel cost method was not used because nearly half of the respondents were on multiple destination trips, violating one of the major assumptions of the travel cost method. Two CVM calculations were used, one based on boaters' willingness to pay additional dollars for an Upper Klamath trip, and the other on their willingness to drive additional miles to the Upper Klamath. Respondents were asked if they would still be willing to visit the Upper Klamath if (a) they moved a specified distance away, and (b) their share of the expenses increased by a specified dollar amount. Distance offers ranged from 10 to 1,000 additional miles; dollar offers from from \$5 to \$1,000.

Persons who answered "no" to either offer were asked their reason for doing so. For the willingness-to-pay question, the most frequent response (61 percent) was "The Upper Klamath is worth that much more,

but I couldn't afford to spend that much more on a boat trip." For the willingness-to-travel question, the most frequent response (51 percent) was "It isn't worth it to me to travel that much farther." Respondents who said they could not understand the question (3.7%) were not included in the analysis.

Using this information, estimated logit equations were developed for both measures. Protest responses, missing values, and commercial guides were not considered in the analysis. The best-fitting equations are shown in Table 16. The consumer surplus estimates of \$187 and 651 miles are consistent when travel cost is 29 cents per mile. This appears to be a realistic estimate of the total direct cost of vacation travel. Federal guidelines suggest that the average direct cost of transportation (including maintenance, parts, tires, accessories, gasoline, oil, and taxes) is approximately 12 cents per mile (Walsh, 1986). If the opportunity cost of time is set at one-third of the average reported wage rate of \$24.95 per hour (assuming 1,920 hours worked per year), and the average driving speed is 50 mph, the average opportunity cost per mile is 17 cents. Thus, the total direct cost of travel would be 29 cents per mile.

In equation (2) of Table 16, income does not appear as an independent variable as it does in equation (1). When the willingness-to-travel model was fitted with income included, the sign of the income coefficient was positive and not significant. This result was opposite from equation (1) and has interesting implications.

Economic theory suggests that individuals will be constrained by both their income and their time. The extent to which a boater is

TABLE 16
Value estimates based on CVM calculations: Upper Klamath River

Equation (1): Willingness to pay additional dollars

$$\text{Prob(no)} = 1/1 + e^{(a + b X_i)}$$

<u>X_i</u>	<u>Coeff.</u>	<u>Prob.</u>
Constant	3.5713	0.0000
Value	0.0093	0.0000
Sex	0.8277	0.0021
Inc	-0.0407	0.0768
Vac	0.7760	0.0068

where Value = the dollar offer

Sex = 1 if female

Inc = income

and Vac = 1 if on a single destination visit

WTP (\$) = \$187

Reduction in uncertainty = .1646

McFadden's R² = .2185

N = 316

Cragg-Uhler's R² = .3458

Equation (2): Willingness to drive additional miles

$$\text{Prob(no)} = 1/1 + e^{(a + b X_i)}$$

<u>X_i</u>	<u>Coeff.</u>	<u>Prob.</u>	
Constant	-4.0057	0.0000	N = 316
Far	0.0030	0.0000	
Sex	0.6206	0.0368	WTP = 651 miles
Vac	0.5569	0.0728	

where Far = the additional mile offer.

Sex = 1 if female

and Vac = 1 if on a single-destination visit

WTP (miles) = 651

Reduction in uncertainty = .1064

McFadden's R² = .1332

N = 316

Cragg-Uhler's R² = .1966

constrained by either variable is determined to some extent by income. The higher one's income, the less likely one is to be constrained by income, and the higher the opportunity cost of time spent in transit. These results are consistent with the theory. Equation (1) suggests that depending on their incomes, paying additional dollars is a significant constraint for Upper Klamath users. However, the sign on the income variable in the equation for willingness to drive additional miles (not reported) indicates that those with relatively high incomes will be less likely to travel additional miles. This is presumably due to the time constraint.

Substitutability. Respondents were asked to imagine that they had planned an Upper Klamath trip, but discovered that the turbines at the Boyle powerhouse wouldn't be operating on the day they'd planned to go (thereby reducing flows below boatable levels). Fifty-seven percent said they would choose an activity other than whitewater boating, while 43 percent would go boating on a different river. About 74 percent would expect to share the substitute experience with the same companions as would have gone on the Klamath trip. Most boaters (75 percent) would try to reschedule the Klamath trip during the same season.

For those who would boat another river, 61 percent said they would not expect the substitute trip to offer as much satisfaction or benefit as an Upper Klamath trip. By far the most likely substitute river was the Rogue (including the day-use section below Grants Pass), which was mentioned by 50 percent of respondents. The next most frequently mentioned rivers were the California Salmon (12 percent), American (11 percent), Lower Klamath (9 percent), Tuolumne (5 percent) and North

Umpqua (5 percent). The rivers considered most similar to the Upper Klamath were the Rogue (mentioned by 9 percent), American (8 percent), California Salmon (7 percent) and Tuolumne (5 percent). In contrast, 18 percent said the river is unique.

For those who would choose another activity, only 25 percent said they would expect to get as much satisfaction as they would receive from a raft trip. The most popular substitute activity was hiking (chosen by 26 percent), followed by bicycling (13 percent), fishing (12 percent), sightseeing (9 percent), and attending the Shakespearean festival in Ashland (7 percent).

Visitor characteristics. Boaters' experience levels were quite low, averaging four years overall and just one year on the Klamath. This is almost certainly a reflection of the high percentage of use by guide service customers. An unusually high percentage of Upper Klamath respondents were women (46 percent), and only 49 percent of Klamath respondents were married at the time they made their trip. Other demographic variables are more typical of results on the other study rivers: an average age of 36; a mean family income of \$47,900; and high education levels, with 64 percent holding a bachelor's or advanced degree. The population is largely urban, with only 15 percent living in places of 5,000 people or less, while 45 percent live in cities or their suburbs. Upper Klamath boaters come from a wide geographical area, including several nations in Europe, but most live in California (48 percent) or Oregon (38 percent).

Boaters were asked to rate 12 likely reasons for visiting the Upper Klamath on a five-point scale (1=not important, 2=slightly

important, 3=important, 4=very important, 5=extremely important). The highest-rated reasons were "good rapids" (with a mean score of 4.5), "being in a natural setting" (4.3), "being with family/friends" (3.7) and "peace and solitude" (3.7). The least important reasons were "couldn't get permit on another river" (1.4), "good fishing" (1.5) and "meeting other boaters at the river" (1.7).

5. COMPARING THE STUDY RIVERS IN A REGIONAL CONTEXT

Oregon offers remarkable diversity in its whitewater recreation settings, from the desert canyons of the Owyhee to the rainy coastal forests of the Nehalem and Siletz. The four study rivers reflect this diversity. Both the Clackamas and Deschutes rise on the high peaks of the Cascades, yet one cuts through dense forest while the other provides a desert-like experience. The Rogue and Upper Klamath, though more similar than the Clackamas and Deschutes, show the variety of settings that may be found in southwest Oregon. However, the primary elements of whitewater recreation -- the rapids and the experiences they provide -- are less varied than the surroundings. Differences in use patterns tend to be created not by the natural settings, but by human-influenced factors such as accessibility, land ownership patterns, facilities, and managerial actions.

Nearly 1 million people live within an hour's drive of the Clackamas. The river is approached via a state highway that follows its entire length, offering numerous places to launch a kayak or raft. Once they arrive, boaters face no restrictions of their on-stream activities, but they may not camp in the river corridor except in designated Forest Service fee campgrounds. These factors, along with the fact that the boating season is finished by summer (when most people take vacations), have combined to make the Clackamas a single-day boating experience that is often repeated several times during a season.

The Upper Klamath has a whitewater stretch which is no longer than the primary Clackamas run, yet it attracts a higher proportion of

TABLE 17
Comparison of selected use-pattern variables

	<u>Clackamas</u>	<u>Deschutes</u>	<u>Klamath</u>	<u>Rogue</u>
Advance planning required				
Less than 1 day	17%	3%	4%	4%
Two to 7 days	57%	28%	20%	10%
Eight to 30 days	22%	40%	29%	22%
31 to 90 days	2%	19%	30%	17%
More than 90 days	2%	10%	17%	47%
Type of boat used				
Inflatable raft	57%	63%	97%	83%
Hard-shell kayak	31%	3%	3%	3%
Inflatable kayak	8%	2%	-	5%
Drift boat	1%	17%	-	8%
Other ^a	3%	14%	-	1%
Pct. of population who camp	13%	71%	42%	100%
Mean one-way distance traveled (mi.)	89	110	388	225
Months when boating is best ^b				
January	24%	5%	<1%	
February	32%	5%	<1%	
March	53%	5%	3%	
April	71%	5%	7%	
May	82%	45%	23%	
June	52%	45%	47%	
July	25%	87%	69%	
August	14%	87%	69%	
September	11%	87%	30%	
October	17%	6%	7%	
November	25%	6%	<1%	
December	19%	6%	-	

^aMostly canoes on Rogue and Clackamas, jet boats on Deschutes

^bPercentages do not add up to 100 because respondents could check any or all months. No seasonal preference question was asked on the Rogue survey.

overnight visitors (Table 17) because it is farther from population centers and can be reached only on rough dirt roads. Vehicle access also helps determine the length of visits to the Deschutes, where most day use occurs on the segment paralleled by a good road, and to the wild section of the Rogue, where one boat ramp is a three-day float from the next. Repeat visits can be made more easily to the Deschutes, which is less than a half-day's drive from Portland, than to either the Rogue or Klamath. Not only are the latter farther from population centers, but the ability to make multiple visits is limited by the permit/reservation system on the Rogue and the expense of outfitted trips on the Klamath.

Likewise, differences in advance planning (Table 17) are largely due to distance and management factors. The lottery system forces most Rogue visitors to begin planning in winter for trips they'll make six months later. Most of the 11 percent who plan less than a week in advance are Rogue Valley residents who can more easily take advantage of no-shows for reserved permits. Though there is no permit system on the Upper Klamath, trips tend to be planned a month or so in advance because space must be reserved with an outfitter, and because people travel farther to boat the Klamath. At the opposite extreme are Clackamas boaters, who typically can make spur-of-the-moment visits because they live close to the river, visit on weekends or after work, and have no managerial constraints to consider. Variations in use season (Table 17) also are a by-product of human intervention: The Clackamas is the only river of the four which is not usually rafted year-round because it is the only one without a large, flow-moderating dam upstream.

Even differences in the importance of fishing may be attributed to geographical and managerial influences. The Klamath and Deschutes both support high-quality trout fisheries, but the presence of shallow upstream impoundments on the Klamath warms the water so that trout are stressed and susceptible to disease in summer. As a result, only catch-and-release angling is allowed between June and October. There are no such restraints on the Deschutes fishery, and more than half of Deschutes boaters try their luck with a rod and reel. The Clackamas boating season overlaps only partly with the trout season, and the proximity to Portland affords users the luxury of making a single-purpose trip instead of combining as many activities as possible into a single visit.

Several of these factors influence the types of boats used on each river (Table 17). The Clackamas is especially suited for kayaking, not only because of the special hydrodynamic characteristics of Bob's Hole, but also because Clackamas boaters do not have to carry fishing and/or camping gear which may cause storage problems for kayakers on larger rivers. Drift and jet boats, both of which are designed for anglers, are common only on the rivers with the best fishing. Rafts are used almost exclusively on the Upper Klamath because they are more suitable for commercial outfitting. As private boating increases on the Klamath, kayak use is also likely to increase.

Social impacts and perceptions of the experience

In general, boaters' standards for social impacts are most likely to be exceeded on the Deschutes, and least likely to be exceeded on the

Clackamas. Impacts on the Rogue and Upper Klamath tend to be the same as, or slightly greater than, users' standards.

The only social impact question which was asked on all four rivers referred to boaters' standards for time spent in sight of other boaters (Table 18). Rogue boaters had the strictest standard while Deschutes users had the most lenient standard, yet the Deschutes standard was the one which was exceeded most often, and by the greatest amount. On some sections of the river, average reported time-in-sight was as high as three hours in four, while boaters would have preferred to see others no more than two hours out of four. The Clackamas standard was nearly as lenient, 1.75 hours, but reported time-in-sight was 1.4 hours. The Klamath standard of 1.4 hours was almost identical to the reported average time-in-sight of 1.32 hours. Rogue boaters were not asked to report the amount of time they spent in sight of others, but evidence from an earlier study (Shelby and Colvin, 1979) suggests that reported impacts may be close to the standard of one-half hour out of four.

Other impact-standard comparisons can be made for some of the rivers. Questions about waiting time at access points were asked for the Deschutes, Clackamas and Upper Klamath; impacts exceeded standards only on the latter. This is largely due to the physical layout of the put-in area, and Bureau of Land Management personnel have examined ways to eliminate this problem (Karen Wells, Klamath Falls Area Office, pers. comm.). Campsite impacts exceed standards on both the Upper Klamath and Deschutes, although the situation may be less serious on the Klamath, where camping along the river is an option but not a necessity as it is on the Deschutes.

TABLE 18
Comparison of social impact variables

	<u>Clackamas</u>	<u>Deschutes</u>	<u>Klamath</u>	<u>Rogue</u>
Time-in-sight standard (no. of hours out of four)	1.75	1.98	1.32	0.52
Perceived crowding score ^a	3.66	5.82	3.65	3.23
Satisfaction with experience				
Poor	0%	0%	0.5%	0%
Fair	0.3%	0.5%	1%	0.6%
Good	3%	16%	2%	5%
Very good	21%	^b	11%	12%
Excellent	58%	68%	48%	54%
Perfect	17%	15%	38%	29%
<u>Current river experience</u>				
Wilderness	3%	4%	8%	4%
Semi-wilderness	17%	18%	33%	58%
Undeveloped recreation	40%	34%	42%	37%
Scenic recreation	36%	26%	15%	^b
Social recreation	4%	11%	2%	^b
<u>Preferred river experience</u>				
Wilderness	6%	4%	19%	16%
Semi-wilderness	25%	29%	39%	58%
Undeveloped recreation	42%	37%	32%	26%
Scenic recreation	25%	25%	8%	^b
Social recreation	3%	6%	2%	^b

^aBased on a nine-point scale: 1-2 = not at all crowded
 3-4 = slightly crowded
 5-7 = moderately crowded
 8-9 = extremely crowded

^bCategory was not offered to boaters from this river

A related issue is perceived crowding, which is much higher on the Deschutes than on the other study rivers (Table 18). The Deschutes is rated as moderately crowded, averaging 5.8 on a nine-point scale, while the other three rivers all rate between 3.0 and 4.0. The Rogue score is slightly smaller than that for either the Clackamas or Upper Klamath, but all three rivers fall into the "slightly crowded" category. Since social impacts are within or nearly within boaters' standards for these rivers, we might infer that whitewater recreationists can accept being "slightly crowded" at Oregon's high-quality recreational settings, but are not willing to experience use densities beyond that level.

Clackamas and Deschutes boaters were also asked how they cope with crowding on their respective rivers. On both rivers, the most frequent coping strategy is to try to avoid other boaters (by visiting on a different day of the week, by speeding up or slowing down, etc.). This strategy was adopted by 46 percent of Deschutes boaters and 35 percent of Clackamas boaters. Thirty percent of Deschutes boaters and 22 percent of Clackamas boaters said they simply change the way they think about the river, becoming resigned to a more crowded experience. However, only 13 percent of Deschutes boaters and 5 percent of Clackamas boaters said crowding has made them unhappy with the overall river experience. Survey respondents were also asked how they would rate the whitewater recreation experience typically offered on each study river, choosing their answers from among six descriptive adjectives (except on the Deschutes, where five choices were offered). Reported satisfaction ratings are normally high in surveys of non-consumptive recreationists (Vaske et al., 1982), and as Table 18 shows, this study is no exception.

However, satisfaction ratings were slightly higher on the Rogue and Upper Klamath than on either the Clackamas or Deschutes. One reason may be that boaters tend to have invested more money and/or time in trips to the Rogue and Klamath. Thus boaters at those rivers may have more incentive to "enjoy themselves." Also, the Clackamas and Deschutes attract more repeat visitors, who may be less likely than one-time visitors to characterize a "typical" trip as being "perfect."

Specific questions about conflicts between user groups were asked on the Clackamas and Klamath surveys, while Deschutes boaters were asked about standards and impacts for angler/boater encounters and jet boat use. Conflicts were rare on the former rivers, but comparison of impacts and standards suggests that conflicts between floaters and other users are more frequent on the Deschutes. When conflicts do occur on the Clackamas, they are most likely to involve anglers and boaters. On the Klamath, boater-vs.-boater conflicts are most common.

Finally, respondents on all four rivers were given a series of definitions of the river experience, and asked which one best describes the experience currently offered and the one which should be offered (Table 18). The definitions were based on social impacts -- e.g., wilderness was "where solitude is part of the experience," while scenic recreation was "where you expect to see other people much of the time." The definition chosen by most people on the Clackamas, Deschutes and Klamath was "undeveloped recreation," where one can expect to see other users some of the time. The Rogue experience was characterized as semi-wilderness. On all four rivers, there were more people who preferred low-impact experiences than there were people who believed that such

experiences are currently being offered. The greatest gap between preferred and current experiences was found on the Upper Klamath. Yet Klamath boaters were also twice as likely as others to call their river setting a "wilderness," even though it is followed by a road. Because Klamath boaters are less familiar with the area, they may use less rigid standards for their definition of wilderness, and may also be less sure of their expectations for a Klamath River boating experience.

Economic value

It is difficult to make direct comparisons of economic values for trips made on the four study rivers. Different assumptions had to be used in the travel-cost calculations for different rivers, while the CVM calculations were based on both open-ended and dichotomous-choice methods. Nonetheless, it is possible to make some general observations about the comparative value of these rivers.

Estimates of consumer surplus varied for each river, depending on the method of estimation and the assumptions used in calculations. The results can be summarized as follows (all values are for entire trips):

- Clackamas: TCM, \$5.99-\$18.77 (\$9.19 for best-fitting model)
CVM (dichotomous-choice), \$38.52.
- Deschutes: TCM, \$4.46-\$29.67 (\$11.83 for best-fitting model)
CVM (open-ended), \$3.08-\$15.00.
- Rogue: TCM, \$23.88-\$44.27 (\$28.37 for best-fitting model)
CVM, (open-ended) \$20.65-\$38.74; (dichotomous) \$62.38.
- Upper Klamath: CVM (dichotomous-choice), \$187.00.

Variations in the estimates for individual rivers may reflect not only differences in assumptions, but also in the way different respondents defined the product for which their willingness-to-pay was measured. For example, outfitted Klamath boaters tended to report higher WTP than non-outfitted boaters, suggesting that guided and unguided trips are not the same product. The Deschutes may be especially susceptible to this "product definition bias" because of the wide variety of experiences which can be obtained on the river.

One consistent finding of this study was that dichotomous-choice CVM results are higher than those obtained through the TCM or open-ended CVM. The foremost advantage of the dichotomous-choice CVM is that its take-it-or-leave-it format simulates actual market conditions, so there is less likelihood of hypothetical bias than when an open-ended question format is used. Nevertheless, the market is simulated rather than real, and intentions to pay don't always match actual purchase behavior. TCM calculations are based on actual behavior, but they may underestimate willingness to pay for river trips because the method assumes unlimited supply, and this condition is rarely met in whitewater recreation. The supply of Rogue trips is constrained by the permit system. Seasonal variation in flow limits opportunities to boat on the Clackamas. And dam operations often limit the supply of Upper Klamath trips. In each case, boaters may have been willing to pay for additional trips to the river if there had been an unlimited supply of boating opportunities.

As we would expect, longer trips are valued higher than shorter ones. There is also some evidence that value estimates reflect the

effects of perceived crowding on experience quality. When equalized to a per-day basis, trips to the Clackamas are valued higher than trips to the more-crowded Deschutes. Within the Deschutes itself, open-ended CVM results showed that people were willing to pay 20 percent more per day for a trip on the Warm Springs-to-Locked Gate river segment than for a trip on the Maupin segment, where use densities are highest.

A consumer market segmentation approach may be useful for interpreting the relative values of the four study rivers. The Upper Klamath, which had by far the highest WTP estimate, tends to attract well-to-do California urbanites on vacation, people who don't mind paying an outfitter to attend to trip details that might otherwise detract from the fun of running rapids. At the "discount" end of the spectrum are the Clackamas and Deschutes, rivers which tend to attract Portland-area residents who use the rivers as "backyard" recreation areas, and who supply their own boats and supplies. The Rogue occupies the mid-range; for the most part, its consumers are non-urban Oregonians and Californians who may not normally buy luxury items and who (in this study, at least) furnish their own boats and supplies, but who may be willing to "splurge" on the Rogue because limited access makes river trips a kind of specialty item.

Substitute experiences

If a person is unable to participate in a planned boating trip on a certain day, he or she may choose either of two options for substitute experiences on that day: a boating trip on a different river, or an altogether different activity which may or may not be recreational in

nature. A large majority of boaters on the Clackamas, Deschutes and Rogue would substitute a different river trip (Table 19). However, a majority of Klamath boaters would choose a different activity.

Klamath boaters differ from the other user populations studied in that most visitors are on outfitted trips. They tend to have less whitewater boating experience, and only 11 percent consider whitewater recreation their favorite recreation activity (compared to 37 percent on the Clackamas, the only other river where that question was asked). Many could not list any rivers which are similar to the Klamath, and may not know of any suitable substitute trips. In addition, nearly half are combining a Klamath trip with other vacation activities, and so may not have the flexibility to visit a different river in a different locality. Even so, 76 percent of Klamath boaters would try to reschedule their trip if unable to float the river on the day they'd planned.

Among those boaters who would choose a different activity, the most likely substitute among Klamath and Clackamas boaters was hiking, while Rogue boaters would most likely go fishing. (Deschutes boaters were not asked to list substitute activities.) The second and third choices for Clackamas boaters were skiing and camping, respectively; for Klamath boaters, bicycling and fishing; and for Rogue boaters, camping and backpacking. Though the actual activities differ, it is significant that when boaters cannot run a river, they're more likely to engage in another outdoor recreation activity than to choose an entirely different leisure experience such as gardening, shopping, or watching a movie. For those who would choose a different river trip, geographic proximity appears to be a major factor in the choice of a substitute.

TABLE 19
Comparison of substitution behavior

A. Most likely substitute choice

	<u>Clackamas</u>	<u>Deschutes</u>	<u>Klamath</u>	<u>Rogue</u>
Another river	84%	82%	43%	70%
Another activity	16%	18%	57%	30%

B. Most likely substitute rivers^a

<u>Clackamas</u>	<u>Deschutes</u>	<u>Klamath</u>	<u>Rogue</u>
1. W. Salmon	-	1. Rogue	1. Deschutes
2. Sandy	-	2. Salmon	2. Klamath
3. Deschutes	-	3. American	3. Salmon
4. N. Santiam	-	4. L. Klamath	4. Illinois
5. Molalla	-	5. N. Umpqua	5. N. Umpqua
6. Wind	-	6. Tuolomne	6. Snake

C. Rivers perceived as most similar^b

<u>Clackamas</u>	<u>Deschutes</u>	<u>Klamath</u>	<u>Rogue</u>
1. W. Salmon	1. Rogue	1. Rogue	-
2. Deschutes	2. Snake	2. American	-
3. Sandy	3. John Day	3. Tuolomne	-
4. N. Santiam	4. Clackamas	4. Snake	-
5. Molalla	5. Sandy	5. Scott	-
6. Klickitat	6. Metolius	6. Deschutes	-

^aQuestion was not asked of Deschutes boaters

^bQuestion was not asked of Rogue boaters

Of the 10 most popular substitute rivers for Clackamas boaters, only one (the Klickitat) requires more than a 100-mile drive from parts of the Willamette Valley. The major rafting rivers nearest the Klamath -- Rogue, Salmon (Calif.), American, Lower Klamath and North Umpqua -- were also the top substitute choices listed. The only other river listed by at least 5 percent of Klamath respondents was the Tuolumne, which is centrally located for the Californians who make up more than half of the boater population. For Rogue boaters, the foremost substitute river was the Deschutes, located half a state away, but the next most popular choices were the Klamath, Salmon, Illinois and North Umpqua, all of which are relatively close-by. It should be noted that the Deschutes is probably the river nearest the Rogue offering an overnight raft trip through a roadless area in the summertime.

Similarity of experience also appears to be an important factor in substitute river choice. For Clackamas boaters, the five rivers which are considered most similar to the Clackamas are also the five most likely substitutes (White Salmon, Deschutes, Sandy, Molalla, North Santiam). Klamath boaters put the same three rivers at the top of both lists (Rogue, Salmon, American). Unfortunately, it could not be determined from the survey how boaters made their similarity judgments. It is interesting to note that while 21 percent of Clackamas boaters said the Deschutes offers a similar experience, only 6 percent of Deschutes boaters considered the Clackamas experience to be similar. This may be a seasonal effect, since the Deschutes can be run during the Clackamas' spring season but flows on the Clackamas are below minimum boatable levels when the Deschutes season peaks in mid-summer.

Visitor characteristics

Demographic comparison of the four user populations shows more similarities than differences (Table 20). Family characteristics are similar, though Clackamas boaters have fewer children, and are less likely to be married. Users of all four rivers are well-educated and financially comfortable, although Clackamas boaters have lower family incomes, probably because fewer belong to dual-wage-earner households. There were more male respondents than females on all four rivers, but percentage of males to females is especially high on the Clackamas and Deschutes. This may be partly due to sampling strategies which could have overrepresented leaders of boating parties. It may also be a reflection of the timing of trips. The Rogue and Klamath are commonly visited during vacations, which tend to involve family groups, while Deschutes and Clackamas trips are shorter in duration and may be more likely to involve single-sex groups of friends. Deschutes boaters tend to have the greatest amount of boating experience, on the river and overall, while Klamath boaters are the least experienced.

Analysis of the hometown locations of river users (Table 20) suggests that the Deschutes and Clackamas serve much the same geographic region. Clackamas boaters tend to be more concentrated in the Willamette Valley, while a sizeable minority of Deschutes boaters live in central Oregon, but otherwise the distributions of hometowns are virtually identical. The Klamath and Rogue, though they are not much farther apart than the Clackamas and Deschutes, serve very different geographical regions. Rogue boaters are three times as likely to come from the Willamette Valley as Klamath boaters. Also, a much larger

TABLE 20
Comparison of visitor characteristics

	<u>Clackamas</u>	<u>Deschutes</u>	<u>Klamath</u>	<u>Rogue</u>
Level of education				
High school	11%	15%	10%	16%
Some college	31%	33%	26%	28%
Bachelor's degree	36%	27%	35%	27%
Advanced degree	22%	25%	29%	30%
Household income ^a				
Under \$20,000	15%	12%	14%	13%
\$20,000-\$39,999	48%	40%	31%	41%
\$40,000-\$59,999	22%	21%	25%	25%
More than \$60,000	15%	27%	30%	21%
Average	\$38,410	\$46,240	\$47,900	\$45,212
Average age	34	37	36	37
Average no. of children	0.9	1.6	1.2	1.4
Marital status				
Not currently married ^b	55%	32%	51%	30%
Currently married	45%	68%	49%	70%
Sex				
Male	81%	84%	54%	74%
Female	19%	16%	46%	26%
Boating experience (yrs) ^c				
Overall whitewater exper.	8	9	4	-
Experience on river	4	6	1	-
Location of hometown				
Willamette Valley ^d	78%	64%	10%	30%
Southwest Oregon ^e	<1%	<1%	26%	42%
Other Oregon	5%	18%	1%	4%
San Francisco Bay area ^f	1%	<1%	24%	4%
Other California	<1%	1%	24%	9%
Washington	13%	15%	3%	8%
Elsewhere	1%	2%	12%	3%

^aAdjusted to 1988 dollars

^bIncludes single, divorced, separated and widowed persons

^cQuestion was not asked on Rogue survey

^dClackamas, Multnomah, Washington, Yamhill, Marion, Polk, Linn, Benton and Lane counties

^eKlamath, Jackson, Josephine, Curry, Coos and Douglas counties

^fMarin, Contra Costa, Alameda, Santa Clara, San Mateo and San Francisco counties

percentage of Rogue users are local residents (although not nearly so many as on the Clackamas). Meanwhile, Klamath boaters are nearly four times as likely as Rogue boaters to live in California, and six times as likely to live in the San Francisco Bay area. The difference may again be attributable to the fact that most Upper Klamath trips are led by professional guides. San Francisco is by far the largest city within a day's drive of the Klamath, so it makes sense for outfitting companies to concentrate their marketing efforts there.

Variation in the reasons which boaters gave for wanting to visit the four rivers (Table 21) can largely be explained by differences in use patterns for each river. Running rapids was the highest-rated reason for visiting the Clackamas and Upper Klamath, and second most important on the Deschutes and Rogue.¹ Conversely, the ability to relax in a natural setting was most important reason to Deschutes and Rogue visitors, and ranked second on the Clackamas and Klamath. This appears to be a reflection of differences in trip duration. Multi-day float trips are common on the Deschutes, and mandatory on the Rogue. On these longer trips, less of the total time is spent on the river, and more time is spent in camp or at attraction points where boaters can fish, study nature or enjoy other activities which may be more relaxing than negotiating challenging rapids.

¹The Rogue survey is not truly comparable with subsequent surveys, although informal comparison is possible. The survey question on the Rogue used a three-point scale instead of a five-point scale, and in several cases, two or more motives listed on the Rogue survey were combined on subsequent surveys.

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TABLE 21
Comparison of boater motives^a

A. Motive-by-motive comparison

	<u>Clackamas</u>	<u>Deschutes</u>	<u>Klamath</u>
Good rapids	4.2	3.5	4.5
Testing/developing skills	3.7	^b	2.9
The river is close to home	2.8	2.5	1.9
Good weather	2.0	3.4	3.2
Good fishing	1.4	2.6	1.5
Camping along the river	2.0	3.1	2.7
Being with family/friends	3.4	3.4	3.7
Meeting other boaters	2.2	^b	1.7
Being in a natural setting	3.9	3.7	4.3
Peace and solitude	3.2	3.5	3.6
Getting away from others	2.8	3.1	3.2
Couldn't get permit on another river	1.4	1.3	1.3

B. Relative importance

<u>Clackamas</u>	<u>Deschutes</u>	<u>Upper Klamath</u>
Good rapids	Natural setting	Good rapids
Natural setting	Good rapids	Natural setting
Develop skills	Peace, solitude	Be with friends
Be with friends	Good weather	Peace, solitude
Peace, solitude	Be with friends	Escape others
Close to home	Escape others	Good weather
Escape others	Camping nearby	Develop skills
Meet others	Good fishing	Camping nearby
Good weather	Close to home	Close to home
Camping nearby	No permit needed	Meet others
No permit needed		Good fishing
Good fishing		No permit needed

^aTable includes only Clackamas, Deschutes and Klamath results (see footnote on preceding page).

^bThis reason was not listed on the Deschutes survey

Social interaction was less important on the Rogue and Deschutes, where the ability to make overnight trips into roadless areas may tend to attract people who seek more solitude than is possible to achieve on the Clackamas or Upper Klamath. Thus the motive "being with family and friends" ranked fifth among Deschutes and Rogue boaters, but third on the Klamath and fourth on the Clackamas.

Not surprisingly, weather was much less important to Clackamas boaters than to anyone else, but Clackamas users put more importance on the fact that the river is near their homes. Clackamas boaters also put a premium on developing boating skills, while the less experienced, less committed Klamath boaters rated that motive fairly low. Fishing was unimportant to boaters on the Clackamas, Klamath, Rogue and the day-use section of the Deschutes, but was the most important reason to boat the lower sections of the Deschutes. Although it is possible that Rogue or Snake boaters who are unable to obtain a permit might be displaced to the Clackamas, Deschutes, or Klamath, there was little evidence that displacement had forced people to visit those rivers. The motive "couldn't get permit on another river" was ranked last or next-to-last at all three settings.

6. CONCLUSIONS AND MANAGEMENT IMPLICATIONS

Substitution and similarity

A significant finding of this study has been that, except on the highly commercialized Upper Klamath, boaters who cannot make their first-choice river trip are very likely to choose an alternative river experience. This result underscores the importance of examining how various whitewater resources fit together as a recreation "system," because it shows that management actions restricting access to one recreation resource will probably lead to increased use of other resources within the same system.

The challenge for recreation planners is to determine which resources are most likely to be affected. A primary goal of this research project has been to identify the elements of a whitewater recreation experience which can indicate a river's likelihood of absorbing displaced boaters. If access to one river is denied, will boaters simply move to the next nearest substitute, or must the substitute meet certain standards of quality? If so, which standards?

The problem has been tackled from two angles. The most direct approach was simply to ask boaters who had visited the study rivers which resources they would be most likely to choose for a substitute river experience. By examining the choices that were made, it was possible to identify some of the significant factors in substitutability between whitewater resources.

Geographic proximity appears to be the most important factor in choosing a substitute river. This can be expected since a boater must

choose from a set of alternatives which are feasible within constraints of time, accessibility, skill level, expense, etc. These are the constraints which define the geography of each recreation system. For example, boaters tend to schedule one-day trips for weekends or days off. Because of work obligations, few could choose a substitute river a full day's drive away. Nor would many boaters want to spend more time driving each way than they would spend at the river itself. The same constraints may not hold for longer trips. Thus, Rogue boaters consider the Deschutes their most likely substitute even though it is quite a bit farther from most of their homes, while Clackamas boaters rarely chose alternatives more than 100 miles away.

Season is another key factor in substitute choice. Summertime rafters cannot choose substitutes that are no longer runnable by July. We can expect boaters displaced from a springtime river (e.g., Clackamas, Molalla, Lewis, Illinois, North Umpqua) to choose from a set of alternatives which includes other early-season rivers as well as year-round resources such as the Deschutes, Rogue, Klamath or White Salmon. However, the reciprocal relationship may not be true. On the Deschutes, where rafting use peaks between June and September, most boaters must choose substitutes from the smaller set of year-round alternatives. There are also seasonal variations in substitute choices available to users of a single river, which is one reason why the list of substitutes chosen by late-season Clackamas boaters was much shorter than the list for peak-season Clackamas boaters.

Distance and season are not the sole criteria, however. If they were, Clackamas boaters would have favored the Sandy and Molalla over

the more distant White Salmon and Deschutes. But in fact, the White Salmon was the most likely substitute and the Deschutes ranked third, while the nearby Molalla ranked fifth. It appears that while distance and season are the primary determinants of the feasible set, actual choices from within that set may hinge on perceived similarity of experiences. The Deschutes and White Salmon, while farther away than the Sandy or Molalla, are well within the feasible set for Clackamas boaters, and they are considered to be the most similar rivers to the Clackamas. The negative effect of increased distance may therefore be mitigated by the positive effect of greater similarity.

Boaters on three of the four study rivers were asked about similarity of river experiences, but it was not possible to determine which criteria respondents used to judge similarity.¹ Questions about both similarity and substitutability were asked of Clackamas and Upper Klamath boaters; in each case, there was considerable overlap between the lists of substitute and similar rivers. Since substitute rivers are usually in the same geographic region, the fact that these rivers are also considered similar may indicate that similarity judgments are based at least partly on setting characteristics such as scenery or climate which may not affect the whitewater itself. However, many respondents may have little experience outside their home region upon which to base

¹The survey format precluded this line of inquiry because of the large number of potential criteria for making similarity judgments. One benefit of the present study is that it identifies the most likely criteria, so that future research can tackle the problem more directly.

similarity judgments. This is especially true for the Klamath, which attracts a high percentage of first-time boaters.

Other researchers have examined river diversity through the use of multi-dimensional scaling techniques. Ullrich and Ullrich (1976) found in a study of 11 western Montana rivers that the two most significant indicators of variability between rivers were the breadth of the stream and the level of development. Little difference was found between the judgments of anglers and canoeists even though the elements of their experiences on those rivers may have differed considerably. Williams and Knopf (1985) did a similar but more detailed study involving a much broader spectrum of 42 recreational rivers nationwide, and found that waterflow intensity (flatwater vs. whitewater) and trip duration were the most significant descriptors of river experiences.

Three of those dimensions appear to have influenced the similarity judgments and/or substitute choices of boaters in the Clackamas study. Differences in waterflow intensity may explain the relative unimportance of the close-by but less challenging Molalla as a substitute for the Clackamas. Stream width appears to be a factor in similarity judgments, since such small Portland-area streams as the Hood, Wind and Washougal were rarely considered similar though they are important substitutes for kayakers. Conversely, trip duration appears to affect substitute choice more than similarity judgments: Of the 10 most frequently mentioned substitute rivers, eight are day-use rivers like the Clackamas. Of the 10 most similar rivers, only five are primarily day-use rivers. There is no indication that the fourth dimension, level of development, affected either substitute choice or similarity judgments.

Variation in river settings

The second approach to the problem was to analyze the four study rivers for differences and similarities. All boating experiences have elements in common, but there are also differences. It is these differences which are likely to shape boaters' choices and preferences for substitute river experiences, thus determining how components will interact within a recreation system.

This approach, while more oblique than the first, has broader applicability. The substitute-choice approach may be too specific to meet the needs of managers except on the four study rivers. For example, though the White Salmon, Sandy, Deschutes, and North Santiam are the most likely substitute rivers for Clackamas boaters, it may not be true that a North Santiam boater would choose from among the White Salmon, Sandy, Deschutes, and Clackamas. For example, Clackamas boaters were more nearly four times more likely than Deschutes boaters to call those rivers similar. Even where users of two rivers share views about the rivers' similarity, geography requires that the primary "service area" for each river differs at least slightly.

In general, the sources of the greatest variability between study rivers tend to be obvious. These include: the season when boating takes place; the duration of a typical visit; the degree of remoteness, both in terms of vehicle accessibility and distance from major population centers; the types of boats which are typically used; and the presence or absence of commercial outfitting. These variables are easy for recreation planners and managers to work with, since the necessary data can easily be acquired if they are not currently available.

However, there are other, more subtle differences, such as advance planning requirements, motives for making a boat trip, and social impact norms and perceptions. From a manager's standpoint, these variables may seem problematic because they tend not to be visible without the aid of expensive and time-consuming survey methods.

Fortunately, these differences also tend to be manifestations of more visible variables. The length of advance planning required to make a river trip depends upon the presence or absence of administrative constraints (permit systems or other use-rationing methods), the length of time needed to reach the river, the length of time required on-site, and perhaps the need to reserve space with a guide service. Impacts and standards are largely a function of motives (especially the relative importance of escape/solitude and social contact) and of expectations for a river experience; while these are not easily observed, they are related to observable factors such as the river's remoteness and the prevalence of dispersed camping.

The study showed that some characteristics of river users and their experience vary little from resource to resource. These include many of the social impact variables (satisfaction; crowding on the Rogue, Clackamas, and Klamath; comparisons of current and preferred experience definitions) and most socio-demographic variables. One demographic characteristic is highly significant in determining a boater's array of river choices, however -- his or her hometown. To estimate the effects of management actions on adjacent river resources, managers must know where their own users live in order to predict which other resources may be within the feasible set of alternatives.

Outfitted rivers

Actions taken on rivers which are heavily used by commercial outfitters may have different effects than those taken on rivers attracting a largely non-outfitted clientele. Guided boaters using the Upper Klamath were less likely to make a boating trip if displaced from the river, and more likely to choose an alternative form of outdoor recreation. Thus the "ripple effects" of restrictive actions on the Upper Klamath would reach a wider array of recreation resources, but the impact on each individual resource would be less. Outfitted boaters, since they tend to have less boating experience, appear to be less likely to know about alternative boating opportunities. The best-known whitewater rivers may therefore attract a disproportionate share of displaced outfitted boaters.

In general, it is likely that the outfitted and non-outfitted segments of the boating public rarely overlap. McCool and Utter (1982) surveyed non-outfitted boaters who failed to obtain permits to run Idaho's Middle Fork of the Salmon River and found that not one chose to run the river with an outfitter instead. Outfitted boaters, due to their generally low levels of expertise and competence, may rarely be able to substitute a non-commercial boating experience when displaced from their preferred experience. As a result, when evaluating the effects of actions taken on heavily outfitted rivers such as the Upper Klamath, managers probably should not expect impacts to occur on rivers such as the Clackamas which have little or no outfitted use.

How managers can use this information

A primary goal of this paper has been to give managers a tool which could be used for developing regional management strategies. It has been assumed that these strategies would be especially useful in predicting the alternative river choices of persons displaced from a whitewater recreation resource. However, it should be noted that displacement doesn't only occur from one river to another. Often, the primary impact is a shift in the timing of use within the same resource, or a more even spatial distribution of use within that resource.

Studies examining the effects of use-rationing methods have shown that people typically seek and find ways to "beat the system" without having to choose a different resource. McCool and Utter (1982) found that while 35 percent of displaced boaters ran another another river, 43 percent found some other way to run the Middle Fork (i.e., waiting for a cancellation, visiting out of season, boating without a permit, or hooking up with a party whose application was not rejected). Similarly, Shelby et al. (1989a) found in a study of wilderness users that when an initial permit request was denied, most people made a second attempt which usually succeeded.

Nonetheless, displacement to a different resource is a real possibility, especially as the demand for whitewater recreation continues to grow. The results of this study suggest that when there is reason to believe that displacement will occur due to a management action, planners and managers can begin evaluating the impacts by asking these questions:

1. Where do most of the river's users live? This question must be answered first since substitute choices are largely defined by time and distance constraints. If most boaters live in a single geographic area (e.g., metropolitan Portland), the number of affected rivers is likely to be smaller than if the user population is distributed evenly within the region surrounding the river of interest. By answering this question and the next one, it is possible to define the geographic bounds of the affected "system." Where it is not practical to survey boaters to determine their hometowns, automobile license plates can often be used to determine visitors' counties of residence. (When this method is used, it is important to be sure the vehicles belong to boaters, since a river's "service area" may be different for boaters, anglers, picnickers, etc.)

2. How long do boaters typically stay at the river of interest? One-day trips tend to be substituted with other one-day trips. Resources offering multi-day trips are rarer, but they also tend to attract users from a broader geographic area.

3. What other rivers offer boating opportunities during the peak season for the river of interest? Use pressures tend to be greatest on year-round rivers, which in Oregon are also scarcer than snowmelt or rainy-season rivers. Boaters may be displaced from seasonal to year-round rivers, but rarely vice versa.

4. Do most boaters use commercial outfitting services? If so, only other outfitted rivers are likely to be affected by actions taken on the river of interest.

5. What type of boats do most visitors use? Kayakers can use smaller streams than rafters or other boaters, so they can choose from a larger set of substitute choices. If drift boats are commonly used on the river of interest, rivers offering a comparable fishery are more likely to attract displaced boaters. Where canoes are used, rivers with highly difficult (Class 4-5) rapids can be excluded from the list of likely substitutes.

6. How remote is the river? This question is related to #1 and #2 above. Rivers which are easy to reach from populated areas are more likely to be used on trips of one day or less. The list of feasible substitutes for such rivers isn't likely to include remote streams that require much greater time expenditures.

7. What management constraints already exist on the river of interest? Permit systems and use-rationing mechanisms tend to increase advance planning, which in turn fosters flexibility in choosing alternatives. If such a system is being adjusted, rather than begun from scratch, displaced users may be prepared to select from a wider array of substitutes. Other management constraints, such as special fishing regulations or bans on riverside camping, can also affect the river's clientele and therefore the substitutes they are most likely to choose.

8. How unique or diverse are the boating opportunities offered on the river of interest? A river that offers a very specialized experience, such as the freestyle kayaking opportunity at Bob's Hole, may have fewer substitutes than one which offers a fairly standard rafting experience. The converse is also true for rivers offering an

unusually wide variety of whitewater boating experiences, such as the Deschutes. Because of this diversity, restrictive management actions taken on the Deschutes would be likely to displace boaters to a wide spectrum of substitute rivers. On the other hand, planners and managers may be able to take advantage of this diversity by devising an array of strategies aimed at different user groups or different river locations.

Proponents of regional management strategies argue that America's recreation resources are becoming too scarce to plan and manage as isolated entities (Schreyer, 1985). Yet development of more efficient techniques has been stymied in part by the patchwork of state and federal agencies having planning and management responsibilities. In Oregon, for example, management actions on some rivers may require review by the U.S. Forest Service and Bureau of Land Management as well as the Oregon State Parks Division, State Marine Board, the departments of Environmental Quality and Fish and Wildlife, and others.

Coordination efforts can be cumbersome, particularly if the cooperating agencies disagree on matters of administrative control. Because management plans are generally agency- and site-specific, there is a tendency to focus on a given resource without consideration of its broader context. And the data needed to determine that context may not be available or usable because of differences in the agencies' mandates, policies and research priorities.

This project has attempted to address these concerns, not only by acquiring needed data, but also by proposing how managers may use it to evaluate the regional context of whitewater recreation resources. As for problems of cross-agency coordination, an ideal opportunity has

recently arisen for managers to tackle some of those problems. Federal law requires that management plans be prepared for each stream included in the Oregon Wild and Scenic Rivers Act of 1988. This work must necessarily involve both state and federal agencies, especially where federal and state river-protection boundaries overlap as they do on the Clackamas and Deschutes. Mechanisms for interagency coordination are now being set into place. This may offer an excellent opportunity to implement regional management of Oregon's whitewater recreation resources.

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APPENDIX A
Economic Valuation of Whitewater Recreation Resources

A goal of public land managers and policy-makers is the efficient allocation of scarce resources. Economic analysis is a traditional means of evaluating the efficiency of allocation strategies. Decisions affecting social welfare, such as those involving resources owned by the public, can be made using a "compensation criterion" which suggests that an alternative resource allocation will increase social welfare if those who gain are able to compensate the losers fully and still be better off (Bishop, 1987). It is not necessary for compensation actually to be paid, but only that it be possible. The compensation test forms the theoretical foundation for cost-benefit analysis, i.e., the test is satisfied when benefits are greater than costs.

When allocation of a given resource precludes alternative uses of that resource, managers must have comparable estimates of the benefits and costs provided by the various uses of these resources. Market prices provide reasonable estimates of value for many goods, but other valued resources are not traded in markets. Opportunities for outdoor recreation generally fall into the latter category. In order to compare the value of recreation resources such as whitewater rivers with the value of a market-traded commodity, economists have developed several techniques which provide estimates of non-market value.¹

¹Estimates of economic value should not be confused with estimates of economic impacts. The former estimate the amount "gainers" would be willing to pay "losers" for use of a resource, implying a net change in social welfare. Economic impacts show transfers of wealth from one region to another, as reflected in income, employment, sales, etc., but do not represent any net change in social welfare on a national level (Walsh, 1986).

Travel cost method (TCM)

The travel cost method (TCM), as developed by Clawson (1959), may be the most commonly used means of deriving recreation demand functions. The TCM and the contingent value method (described below) are the two officially sanctioned approaches for measuring benefits of federal investments in outdoor recreation projects (Ward and Loomis, 1986).

The travel cost method is based on the assumption that demand for a recreation experience can be inferred from the cost an individual pays to travel to a specific site. This cost is defined as the minimum costs per trip which would be avoided if the trip were not taken, and includes direct travel-related expenses plus opportunity costs (e.g., time spent in transit that could have been devoted to another beneficial activity.)

Because visitors travel different distances to a site, they incur different travel costs. The number of visits to the site by each person will also vary. By assuming that individuals would respond to changes in travel costs in the same manner that they would react to changes in entrance fees for the site, economists can infer an individual (first-stage) demand curve for the recreation experience by tracing out the price-quantity relationships. From this individual demand curve, a site demand (second-stage) curve can be developed showing the effects of different fee levels. At some point, the fee will reach a level at which no more visits are made. The area beneath this second-stage demand curve is defined as willingness to pay, or "consumer's surplus."

The simplest TCM applications use data from different origin zones consisting of one or more counties. If the number of visits from a zone is known, the effect on visits of variables such as distance, income,

age, availability of substitutes, etc., can be measured using mean or median values for that zone. The zonal method was used to calculate the economic value of the Deschutes River.

There are shortcomings associated with the zonal TCM, however. By aggregating data on travel and time costs, tastes and preferences, and other socioeconomic variables, zonal models tend to provide less precise information upon which to base the demand function (Brown and Nawas, 1973). The zonal model also may introduce non-constant error variance if the zones have radically different populations. Aggregation of individual observations tends to increase multicollinearity between explanatory variables. This is a problem in TCM estimation because travel costs are a function of both travel and time costs (Cesario and Knetsch, 1970). Many of these shortcomings can be addressed by using individual observations rather than zonal averages. This method was employed in the Clackamas calculation, using a modified individual TCM method described by Brown et al. (1983) which accounts for the effects of population densities from different origin zones.

For each river, several TCM models have been prepared using different assumptions about travel and time costs. Varying assumptions are used because there are problems associated with making accurate estimates of both the direct cost of travel and the opportunity cost of travel time.

It is not easy to obtain reliable estimates of actual travel costs. First, users may not know precisely how much they spent on travel for a specific recreation experience. Second, their perceptions of travel costs may not be consistent with those assumed by the TCM (Bishop

and Heberlein, 1980), i.e., they may perceive only costs incurred while on a specific trip such as gas expenditures while not considering costs such as tire wear and depreciation which may affect travel behavior in the long run. Estimates used in this paper range from a low of 8 cents, a figure cited by the U.S. Census Bureau (1988) as the average variable cost per mile of passenger vehicle use, to 25 cents per mile, a figure which was included as a high-end estimate of the rate at which employers reimburse business travelers for use of personal vehicles.

Even more difficult is establishment of an accurate monetary value for the cost of travel time. Failure to account for the value of time has been shown to substantially effect TCM estimates of consumer surplus (Bishop and Heberlein, 1980). However, problems arise in "pricing" time. First, there are difficulties in precisely assessing the opportunities being forgone (e.g., work, other leisure activities, or travel to a substitute site). Second, opportunity costs may vary within a travel party, as when parents who forgo work to make a trip with children who do not have opportunities to work. Third, some travelers may consider time spent in travel to be a benefit rather than a cost. In the Clackamas and Upper Klamath surveys, the latter concern was addressed by giving boaters a six-category question asking how they feel about driving to the river. One potential response indicated that the drive has positive utility: "I like the drive so much that if it were shorter, the trip would be less enjoyable." This response was chosen by 2 percent of boaters on each river, indicating that visitors to the Clackamas and Upper Klamath, at least, generally do not consider travel time to have positive utility.

Opportunity costs are usually expressed as a fraction of the wage rate. Cesario (1976) suggested that estimates between one-fourth and one-half of the wage rate are appropriate. Most subsequent models have followed Cesario, although his idea was based on urban commuter studies and may not be transferable to recreation travel. A recent study of intercity travel suggested that 6 percent was a more accurate fraction (Morrison and Winston, 1985). Using an econometric argument, McConnell and Strand (1981) showed how an appropriate fraction could be calculated using survey data for each site by estimating a model which includes out-of-pocket travel costs and the full wage rate, then using the ratio of regression coefficients as the fraction of the wage. What this ratio represents, essentially, is the marginal rate of substitution between travel time and travel costs (Walsh et al., 1989).

Since time and travel costs are both a function of distance, models which treat them separately have had multicollinearity problems (Brown and Nawas, 1973). To reduce the likelihood of multicollinearity, this paper will use a "total direct cost" variable which incorporates both costs. Several functional forms have been used in estimating first-stage TCM demand curves. The best ones tend to be semi-log dependent functions having the following basic form:

$$\log(\text{visits per capita}) = f(\text{distance, other variables})$$

This is the only functional form used in this paper.

A final problem has been the incorporation of substitute opportunities into TCM models. It has been suggested that failure to include "prices" of alternative sites in the demand equation leads to biased value estimates (Caulkins et al., 1985). In order to assess the

effect of substitute opportunities on consumer's surplus, boaters at each site were asked which river they would be most likely to substitute if the original site were unavailable. However, distance to substitutes was not found to be a significant variable at any of the rivers studied.

The TCM is only appropriate for measuring the value of a particular recreation activity at a particular site only when there is sufficient variation in both travel costs and visits to the site. In addition, users must be on single destination trips and must visit the site for a specific recreation activity. Due to the latter constraint, TCM calculations are not included for the Upper Klamath River since half of the boaters were on multiple destination trips.

Contingent value method (CVM)

Because the TCM is not applicable to many non-market recreation goods, and because of the methodological problems described above, more attention has recently been focused on the CVM. In this method, a hypothetical market is created in which a survey respondent is asked to give his or her best answer to relevant questions, as if a real market transaction were taking place. The response data can then be used to estimate the value of a given nonmarket resource (such as whitewater recreation opportunities) by estimating the maximum amount that users would be willing to pay for this resource in the hypothetically created market.

The simplest CVM calculations use open-ended question formats, as in the Deschutes River calculation in this paper. However, this method is susceptible to "hypothetical bias" which may occur because users are

unable to specify an appropriate price in situations where there is no familiar reference price to use as a basis for comparison. It has been argued that market conditions are better simulated by a dichotomous choice format, in which respondents are presented with a single price and asked if they would pay it or not (Bishop and Heberlein, 1985). CVM calculations for the Clackamas and Upper Klamath rivers used the dichotomous-choice format. Both dichotomous-choice and open-ended calculations were used in calculating the value of Rogue River trips (see Johnson et al., 1986, for details).

In the dichotomous choice method, the dependent variable is the probability that a respondent will accept or reject any given dollar amount (Loomis, 1988). The independent variables are the dollar amounts plus any other relevant variables such as income, age, etc. Because the dependent variable is a constrained value between 0 and 1, the correct functional form is a logit equation. The probability that a respondent would accept a given dollar offer can be represented by:

$$P(\text{yes}) = 1 / (1 + e^{-(a + b X_i)})$$

where $P(\text{yes})$ = the probability of a yes response

and X_i = the dollar offer and other relevant variables.

Maximum likelihood estimation is used to estimate parameters for the equation in the logit model. The equation is then integrated over the range of dollar amounts to estimate the expected value for willingness to pay. The amount that users are willing to pay represents the value of the dependent variable. Since travel is a cost, consumer's surplus can be expressed not only in terms of dollars paid (or spent), but also in terms of willingness to travel additional miles to the site. Both

methods were used in the Clackamas and Klamath surveys described in this paper.

Like the TCM, there are difficulties in using CVM. One is the problem of hypothetical bias. This is more prevalent in open-ended formats but may also affect estimates based on dichotomous choice studies if respondents are unable to decide whether they should respond to a given dollar offer. One way to reduce the latter problem is to present the hypothetical situation in realistic terms. In the Klamath and Clackamas studies, for example, dollar offers were described as inevitable increases in the costs of recreation. Use of willingness to travel additional miles as a proxy for price may also serve to reduce hypothetical bias, since recreationists already tend to make decisions based on distance and required travel time, and may be better able to respond to the hypothetical "market." In the Rogue, Clackamas and Klamath studies, respondents who rejected the dollar offer were asked why they had done so. If a boater said he or she had not understood the question, their response was not included in the analysis.

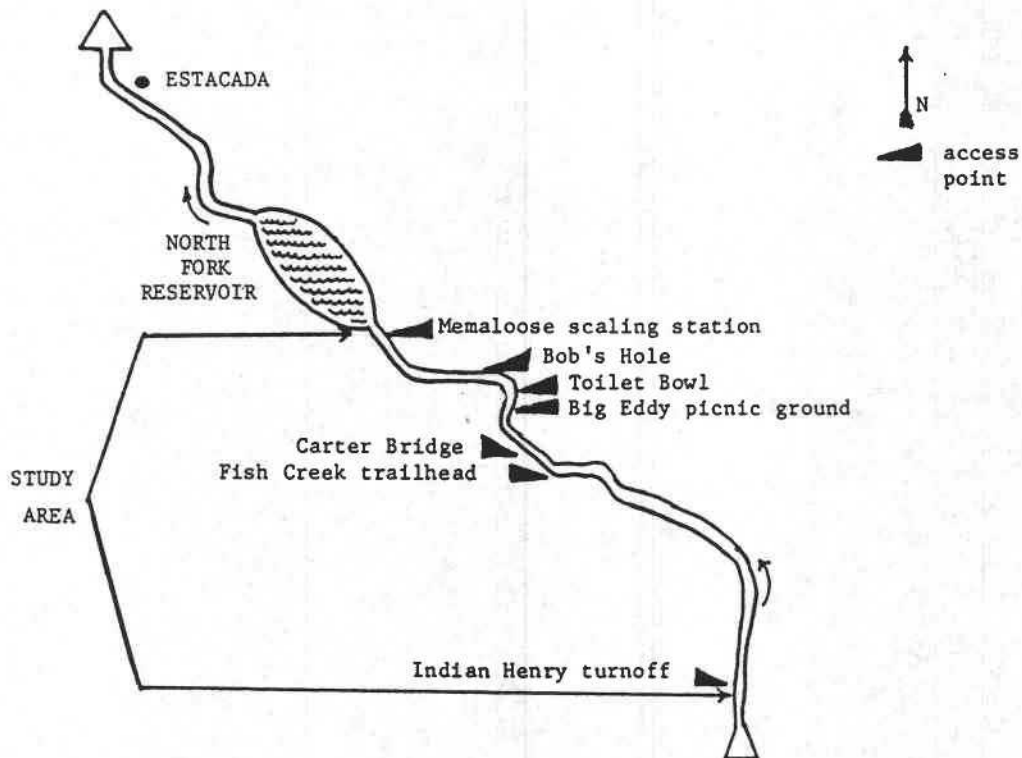
Use of these measures also helps to reduce vehicle bias, which occurs when the payment vehicle has negative connotations (e.g., if the dollar offer were presented as a tax) or is unlikely to be encountered in a real situation. A related problem is strategic bias, which may occur if respondents perceive that it is in their best interests to respond with a lower value than they would actually be willing to pay. This may occur, for example, if boaters believed that value estimates were being obtained preparatory to establishment of a user fee for their river. Although studies have shown that strategic bias is not a

significant problem (Bishop et al., 1984), several Clackamas River responses had to be removed from the sample because of protest responses which indicated strategic bias.

Another potential source of error in CVM calculation is starting point bias. This normally refers to iterative bidding approaches to CVM in which error may be introduced if the "auction" begins at a value which is inappropriate for the site. However, a related bias can occur if the range of dollar amounts presented does not accurately reflect the range of willingness to pay for different individual users. To avoid this problem, questionnaires can be pre-tested using an open-ended format. Dollar amounts (or additional mileages) presented on the final survey should normally extend beyond the range of amounts given by respondents who answered the open-ended question. Pre-tests were conducted for all three surveys which used the dichotomous-choice format.

APPENDIX B
Clackamas River Boater Survey and Results

The Clackamas River offers several different kinds of whitewater boating along its length. In this study we are interested only in your experiences on the river segment shown below, between North Fork Reservoir and the launch area at the Indian Henry turnoff.



1. Which put-in do you use most often? (N=252)

<u>62%</u> Indian Henry	<u>-0-</u> Toilet Bowl
<u>19%</u> Fish Creek	<u>8%</u> Bob's Hole
<u>6%</u> Carter Bridge	<u>-0-</u> Scaling station
<u>-0-</u> Big Eddy	<u>5%</u> Other (specify: _____)

2. Which take-out do you use most often? (N=249)

<u>-0-</u> Indian Henry	<u>2%</u> Toilet Bowl
<u>-0-</u> Fish Creek	<u>33%</u> Bob's Hole
<u>2%</u> Carter Bridge	<u>51%</u> Scaling station
<u>10%</u> Big Eddy	<u>1%</u> Other (specify: <u>North Fork Lake</u>)

1. How many times have you floated this section of the Clackamas River so far in 1988? $\bar{x} = 6.6$ (N=294)
2. In general, how would you rate a typical Clackamas River trip? (N=299)
 - 0 - Poor
 - 0.3% Fair, it just doesn't work out very well
 - 3% Good, but there are usually some problems
 - 21% Very good, but it could be better
 - 59% Excellent, only minor problems
 - 17% Perfect
3. Do you usually fish when you are boating the river? (N=303)
 - 4% Yes
 - 96% No
4. Do you usually camp when you are boating the river? (N=302)
 - 13% Yes
 - 87% No
5. What type of boat do you use most often? (N=300)
 - 31% kayak
 - 8% inflatable kayak
 - 57% inflatable raft or cataraft-----> PLEASE SKIP TO
 - 3% other -----> #7 BELOW
6. KAYAKERS: Which statement best describes your river visits? (N=119)
 - 16% I usually spend my time at or near Bob's Hole
 - 44% I usually go downriver, stopping occasionally
 - 40% I do both, in approximately equal amounts
7. How many people, other than yourself, are in your party on a typical Clackamas River trip? (N=305)
 - 0.7% none
 - 39% 1-3 people
 - 43% 4-6 people
 - 12% 7-10 people
 - 5% more than 10
8. Are your boating companions usually ... (N=305)
 - 2% Family members
 - 49% Friends
 - 33% A combination of family and friends
 - 12% Members of a boating club
 - 3% Customers of a river guide (including strangers)
 - 0.7% I usually visit the river by myself

1. Please check the month(s) when you prefer to visit the Clackamas. (N=304)

<u>24%</u> January	<u>82%</u> May	<u>11%</u> September
<u>32%</u> February	<u>51%</u> June	<u>17%</u> October
<u>53%</u> March	<u>25%</u> July	<u>25%</u> November
<u>71%</u> April	<u>14%</u> August	<u>19%</u> December

2. Please check the months when you have boated on the Clackamas so far in 1988. (N=305)

<u>21%</u> January	<u>68%</u> May
<u>31%</u> February	<u>38%</u> June
<u>44%</u> March	<u>18%</u> July
<u>60%</u> April	<u>10%</u> August

3. Clackamas boaters may have different reasons for preferring one season over another. Please check the one(s) which apply to the month(s) you chose. (N=304)

26% Weather conditions are best
90% River levels are best
21% The river isn't as crowded
4% Campgrounds are open
2% The fishing season is open
6% I have more time for boating then
3% Other (please specify) _____

4. What days of the week do you generally take this trip? (N=307)

77% Weekends and/or holidays
5% Weekdays
19% No particular day

5. How many days do you usually spend on the river when you visit? (N=305)

86% One day only
13% Two days, staying overnight
07% More than two days

6. Did you take part in any special events on the river this year? (N=297)

20% Yes, I took part in the Bob's Hole Rodeo
29% Yes, I took part in the Clackamas Whitewater Festival
8% Yes, I took part in both the raft and kayak festivals
44% No, I did not take part in either event

7. How far is your home from the Clackamas River (one way)? (N=300)

$\bar{x} = 89$ miles

8. There are a variety of reasons why people boat the Clackamas. For each of the following potential reasons, please indicate how important it is to you personally. (N=307)

<u>MEAN</u>		not important	slightly important	important	very important	extremely important
3.4	Getting together with family/friends	1	2	3	4	5
2.8	The Clackamas is close to my home	1	2	3	4	5
1.3	Good fishing	1	2	3	4	5
2.0	Good weather	1	2	3	4	5
4.2	Good rapids	1	2	3	4	5
2.0	Camping nearby	1	2	3	4	5
3.2	Peace and solitude	1	2	3	4	5
2.8	Getting away from other people	1	2	3	4	5
3.9	Being in a natural setting	1	2	3	4	5
1.4	Couldn't get permit on another river	1	2	3	4	5
2.2	Meeting other boaters at the river	1	2	3	4	5
3.7	Testing/developing boating skills	1	2	3	4	5

9. How important is the Clackamas to you? (N=300)

- 2% Not very important; I can take it or leave it
- 20% Somewhat important; if I couldn't visit the Clackamas I'd miss it, but there are other rivers I enjoy more
- 62% Important; it is among my favorite rivers
- 16% Very important; definitely my favorite river

We can understand the Clackamas River experience better by finding out what boaters consider to be an acceptable substitute for a Clackamas trip. For the next few questions, suppose that you'd been planning a Clackamas trip, but for some reason the river was not accessible to you on the day you'd planned to go.

1. Would you float a different river that day instead? (N=304)
 - 84% Yes
 - 16% No -----> PLEASE SKIP TO #4 BELOW

2. If your answer to the first question was yes, what river(s) would you be most likely to float instead? (N=250)
 - White Salmon, 34%; Sandy, 31%; Deschutes, 26%; North Santiam, 24%
 - plus 37 other rivers. Don't know, 1%; "It depends," 4%

3. Would your substitute trip be likely to give you the same benefits or satisfaction as a Clackamas trip? (N=243)
 - 62% Yes -----> PLEASE SKIP TO
 - 38% No -----> #6 BELOW

4. If you would not float a different river that day, what activity(ies) would you be most likely to participate in instead? (N=43)
 - Hiking, 20%; Snow skiing, 9%; Camping, 8%; Working around home, 8%
 - plus 24 other activities. Don't know, 5%; "It depends," 3%

5. Would your substitute activity be likely to give you the same benefits or satisfaction as a river trip? (N=50)
 - 34% Yes
 - 66% No

6. Would you expect that your substitute experience would be enjoyed with the same companions as on your original trip? (N=294)
 - 80% Yes
 - 20% No

7. Assuming the obstacle to your Clackamas visit was temporary, would you reschedule your trip for another day in the same season? (N=298)
 - 89% Yes
 - 11% No

We'd like to know more about how you feel about conditions on the Clackamas River.

1. Do you feel the Clackamas River is crowded? (please circle one) ($N=303$)

	1	2	3	4	5	6	7	8	9
$\bar{x} = 3.66$	-----								
	not at all		slightly		moderately		extremely		
	crowded=30%		crowded=39%		crowded=30%		crowded=1%		

2. About how much time are you in sight of another boat (not in your party) while you are boating the Clackamas? ($N=302$)

22% Almost never
38% About one hour out of four
18% About two hours out of four
8% About three hours out of four
9% Almost all the time
6% I don't know

3. How long do you usually have to wait for people to get out of the way before you can use the put-in and take-out areas? ($N=289$)

Approximately $\bar{x}=5$ minutes 51% never have to wait

4. Do you ever feel that the actions of other Clackamas River users (boaters, fishermen, campers, etc.) detract from your own enjoyment of a boating trip? ($N=304$)

34% Yes
66% No. -----> PLEASE SKIP TO #7 BELOW

5. How often is your enjoyment of a Clackamas visit diminished by the actions of others? ($N=103$)

50% rarely (not on every trip)
40% sometimes (once or twice a day)
10% often (more than twice a day)

6. If this does happen, what group is usually responsible? ($N=103$)

4% kayakers
18% rafters
55% bank anglers
23% other non-boaters (please specify) _____

7. If you camp on a Clackamas trip, do you try to secure a campsite before getting on the river? ($N=236$)

46% Yes
54% No

Now we'd like to know more about your preferences for a Clackamas River trip. For the next two questions, please tell us how much impact is tolerable before your experience becomes unpleasant.

1. It is OK to be in sight of other parties ... (N=303)
 - 7% Almost never
 - 25% About one hour out of four
 - 23% About two hours out of four
 - 7% About three hours out of four
 - 7% Almost all the time
 - 30% It doesn't matter to me
2. It is OK to wait to use a launch or take-out area as long as... (N=302)
 - $\bar{x} = 15$ minute(s)
 - 31% It doesn't matter to me
3. People seek out different kinds of recreational experiences in different settings. Which of the following categories best describes the current experience on the Clackamas? (N=297)
 - 3% Wilderness: where solitude is part of the experience
 - 17% Semi-wilderness: where complete solitude is not expected
 - 40% Undeveloped recreation: where you expect to see other people some of the time
 - 36% Scenic recreation: where you expect to see other people much of the time
 - 4% Social recreation: where seeing many people is part of the experience
4. Which category best describes the experience you think should be provided on the Clackamas? (N=299)
 - 6% Wilderness
 - 25% Semi-wilderness
 - 42% Undeveloped recreation
 - 25% Scenic recreation
 - 3% Social recreation
5. If you feel crowded on a Clackamas trip, how does it affect you? (check all answers that apply) (N=300)
 - 5% I become unhappy or dissatisfied with the trip
 - 22% I resign myself to a more crowded experience
 - 35% I try to avoid other boaters (by speeding up, slowing down, waiting for others to pass, etc.)
 - 17% I decide to make future visits on a day when I can expect to see fewer people
 - 5% I decide to boat on a more remote river next time
 - 44% I have never felt crowded on the Clackamas

We would like to know how you feel about the facilities provided at the river.

6. Do you believe that the present put-in/take-out facilities on the Clackamas are adequate? (N=301)

70% Yes

30% No

7. Would you like to see at least one more launch facility built? (N=292)

30% Yes

70% No -----> PLEASE SKIP TO #9 BELOW

8. If so, what location(s) would be best for a new launch site? (N=76)

Indian Henry, 22%; Bob's Hole, 13%; Fish Creek, 9%; plus 15 other sites.

9. Would you like to see any of the existing launch facilities expanded or improved? (N=289)

41% Yes

59% No -----> PLEASE SKIP TO #11 BELOW

10. If so, which launch area(s) should be improved? (N=114)

Indian Henry, 52%; Fish Creek, 16%; Sealing station, 11%; Bob's Hole, 11%.

11. Do you think more parking should be provided for boaters? (N=295)

41% Yes

59% No -----> PLEASE SKIP TO #13 BELOW

12. If so, where should parking be added? (N=107)

Indian Henry, 38%; Bob's Hole, 30%; plus 9 other locations.

13. Are enough camping facilities provided in the river corridor? (N=258)

90% Yes

10% No

14. Are enough campgrounds open in the month(s) when you want to use them? (N=250)

70% Yes

30% No

Your answers on the next two pages will help us understand more about the value you place on boating the Clackamas.

1. Do you own your own boat? ($N=305$)

80% Yes -----> PLEASE SKIP TO #3 BELOW

20% No

2. If you do not own a boat, do you pay someone else to guide you on a typical Clackamas trip? ($N=60$)

77% Yes. If so, how much do you pay? \$ 31.43 /person/day

23% No

3. Please estimate your share of any other costs for an average Clackamas trip:

	($N=285$) In Oregon	($N=43$) Outside Oregon
Gasoline and oil	\$ <u>9.60</u>	\$ <u>16.41</u>
Restaurants/taverns	\$ <u>7.42</u>	\$ <u>11.21</u>
Lodging/camping	\$ <u>2.82</u>	\$ <u>5.49</u>
Raft/equipment rental	\$ <u>1.90</u>	\$ <u>2.67</u>
Retail (groceries, supplies)	\$ <u>8.44</u>	\$ <u>10.84</u>
Other	\$ <u>1.45</u>	\$ <u>1.51</u>

4. How many people usually travel with you in one vehicle? ($N=304$)

$\bar{X}=3$ people (including myself)

5. Do you normally take time off from work to prepare for and/or take part in a Clackamas trip? ($N=303$)

13% Yes

87% No -----> PLEASE SKIP TO #7 BELOW

6. If you do take time off from work to prepare for and/or take part in a Clackamas trip, how much income do you normally give up? ($N=22$)

\$ 60.00

7. Do you usually boat the Clackamas as part of a longer vacation trip which includes activities besides boating the Clackamas? ($N=301$)

7% Yes

93% No -----> PLEASE SKIP TO #9 BELOW

8. If you normally boat the river as part of a larger trip, what percentage of your visit is devoted to boating the Clackamas? ($N=14$)

$\bar{X}=36\%$ percent

9. Do you boat the Clackamas as part of your job? ($N=301$)

8% Yes

92% No

10. The price of travel and vacations seems to keep increasing.
If your share of the expenses for a Clackamas trip were to increase by \$ _____, would you still take the trip? (N=298)
 Yes -----> PLEASE SKIP TO #12 BELOW
 No
11. If you answered "no" to the last question, was it because: (N=199)
33% The Clackamas isn't worth that much more to me
44% The Clackamas is worth that much more to me, but I can't afford to pay that much
4% I didn't understand the question
20% Other (please specify) _____
12. How long does it usually take you to drive one way from your home to the Clackamas? (Include time spent behind the wheel only) (N=298)
1 hours and 49 minutes
13. It may be that the need to spend time traveling sometimes discourages people from making river trips. Which of the following statements best describes how you feel about the need to drive to and from the Clackamas River? (N=300)
10% I don't like having to drive so far
25% It's a nice enough drive, but I wish it was a bit shorter
24% I can take it or leave it
19% I enjoy driving to the river, but I wish the drive home wasn't so long
21% Driving to and from the river makes the trip more fun
2% The trip would be even more fun if the drive were longer
14. If you lived closer to the Clackamas, do you think you would visit the river more often? (N=301)
79% Yes
21% No
15. If you moved _____ miles farther away from the Clackamas, would you still make a Clackamas trip? (N=299)
 Yes -----> PLEASE SKIP TO NEXT PAGE
 No
16. If you answered "no" to the last question, was it because.... (N=100)
65% It isn't worth it to me to drive that much farther
25% I'd like to be able to drive that much farther, but I couldn't afford to take the extra time it would require
9% I'd like to be able to drive that much farther, but I couldn't afford the cost of the longer trip
1% I didn't understand the question

1. Not counting the 1988 season, how many years have you been boating the Clackamas River? $\bar{x} = 4.4$ years (N=304)

2. Not counting the 1988 season, how many years of whitewater boating experience do you have on all rivers? $\bar{x} = 7.9$ years (N=305)

3. How many rivers do you boat in an average year? (N=299)
 $\bar{x} = 7.2$ other rivers

4. We'd like to know how you would compare the Clackamas to other whitewater rivers. Please complete the following sentence: The whitewater experience on the Clackamas is ... (N=301)

0% -Worse than on almost any other river I've visited

2% Below average

27% Average

56% Above average

15% Better than on almost any other river I've visited

5. Do you normally boat on other rivers during the same season that you usually visit Clackamas? (N=300)

88% Yes

12% No

6. Do you normally boat on other rivers after the Clackamas is too low to float? (N=302)

89% Yes

11% No

7. In a typical year, do you use other portions of the Clackamas besides the section between Indian Henry and North Fork Reservoir? (N=288)

21% Yes, I normally boat on the portion above Indian Henry

24% Yes, I normally boat on the portion below Estacada

60% No, I only boat on the middle section of the Clackamas

8. Different rivers offer different kinds of whitewater boating experiences. What rivers in Oregon and southern Washington do you believe offer an experience similar to the Clackamas experience? (N=266)

White Salmon, 37%; Deschutes, 21%; Sandy, 16%; North Santiam, 16%
plus 36 other rivers. 12% said Clackamas is unique.

9. How would you rate whitewater boating as compared with your other recreation pursuits? (N=305)

37% I prefer river-running to any other recreation activity

58% Whitewater boating is among my favorite activities

6% There are several things I like doing more than boating

10. Do you belong to any rafting or kayaking clubs? ($N=306$)
44% Yes
56% No
11. How far in advance do you generally decide to go on a Clackamas River trip? ($N=303$)
17% less than one day
57% from 2 to 7 days
22% from 8 to 30 days
2% from 31 to 90 days
2% more than 90 days
12. Have you ever canceled a Clackamas trip due to bad weather? ($N=306$)
27% Yes
73% No
13. What weather conditions would be severe enough to make you cancel a Clackamas trip? ($N=303$)
1% Cool, cloudy weather
5% Fog or rain of any kind
2% Heavy rain
40% Snow or freezing temperatures
33% Weather conditions don't deter me from a Clackamas trip
14. Have you ever canceled a planned Clackamas trip because the flow wasn't right for boating? ($N=302$)
58% Yes
42% No
15. Do you normally check on river flows before leaving for the Clackamas? ($N=304$)
78% Yes
22% No -----> PLEASE SKIP TO #19 BELOW
16. What would you say is the minimum boatable flow on the river? ($N=173$)
 $\bar{x} = \underline{1,305}$ cubic feet per second
17. What is the optimal flow? $\bar{x} = \underline{2,958}$ cfs ($N=177$)
18. What is the maximum boatable flow? $\bar{x} = \underline{9,605}$ cfs ($N=117$)
19. Do you normally check the river gauge at Carter Bridge before you put in? ($N=294$)
37% Yes
63% No

Finally, we need some personal information for an overall profile of Clackamas boaters. All answers are kept strictly confidential.

1. How old are you? $\bar{x} = 33.8$ (N=303)
2. Are you male? 81% female? 19% (N=302)
3. How much education have you completed? (N=304)
 - 2% Some high school
 - 9% High school diploma
 - 31% Some college
 - 36% Bachelor's degree or equivalent
 - 22% Advanced degree
4. What is your marital status? (N=304)
 - 42% Single
 - 45% Married
 - 13% Separated, divorced or widowed
5. How many children do you have? $\bar{x} = 0.9$ (N=289)
6. What was your total household income last year, before taxes? (N=297)

<u>1%</u> \$0-\$4,999	<u>8%</u> \$50,000-\$54,999
<u>3%</u> \$5,000-\$9,999	<u>3%</u> \$55,000-\$59,999
<u>7%</u> \$10,000-\$14,999	<u>4%</u> \$60,000-\$64,999
<u>4%</u> \$15,000-\$19,999	<u>2%</u> \$65,000-\$69,999
<u>13%</u> \$20,000-\$24,000	<u>2%</u> \$70,000-\$74,999
<u>11%</u> \$25,000-\$29,999	<u>2%</u> \$75,000-\$79,999
<u>13%</u> \$30,000-\$34,999	<u>1%</u> \$80,000-\$84,999
<u>12%</u> \$35,000-\$39,999	<u>-0-</u> \$85,000-\$89,999
<u>7%</u> \$40,000-\$44,999	<u>0.7%</u> \$90,000-\$94,999
<u>4%</u> \$45,000-\$49,999	<u>-0-</u> \$95,000-\$99,999
	<u>3%</u> \$100,000 or more
7. What size town do you live in? (N=304)
 - 12% Farm or rural area
 - 4% Small town (less than 5,000 people)
 - 20% Small city (5,000-50,000)
 - 37% Large or medium-sized city (more than 50,000 people)
 - 27% Suburb of a large city
8. What is the ZIP code of the town where you lived when you made your most recent trip to the Clackamas? _____ (N=304)

APPENDIX C
Upper Klamath River Boater Survey and Results

1. How many times have you floated the Upper Klamath River (Boyle Powerhouse to Copco Lake) since Jan. 1, 1988? (N=340)
 $\bar{x} = 1.5$ times (guides excluded)
2. Not counting the 1988 season, how many years have you been boating on the Upper Klamath? (N=377)
 $\bar{x} = 1.0$ years
3. Not counting the 1988 season, how many years of total whitewater boating experience do you have? (N=376)
 $\bar{x} = 4.0$ years
4. Do you usually boat the Upper Klamath as a (N=372)
69% Passenger on a commercially guided trip
23% Private (non-commercial) boater
9% River guide
5. In general, how would you rate an Upper Klamath boat trip? (N=380)
0.5% Poor
1% Fair, it just doesn't work out very well
2% Good, but there are usually some problems
11% Very good, but it could be better
48% Excellent, only minor problems
37% Perfect
6. How many people, other than yourself, are in your party on a typical Upper Klamath trip? (N=380)
21% 1-3 people
37% 4-6 people
18% 7-10 people
24% more than 10 people
7. Are your boating companions usually ... (N=380)
8% Family members
36% Friends
36% A combination of family and friends
2% Members of a boating club
18% Customers of a commercial outfitter

1. How far in advance do you usually decide to float the river? (N=374)

4% less than one day
20% from 2 to 7 days
29% from 8 to 30 days
30% from 31 to 90 days
17% more than 90 days

2. In which month(s) do you prefer to float the Upper Klamath? (N=380)

<u>0.3%</u> January	<u>23%</u> May	<u>29%</u> September
<u>0.5%</u> February	<u>47%</u> June	<u>7%</u> October
<u>3%</u> March	<u>68%</u> July	<u>0%</u> November
<u>7%</u> April	<u>69%</u> August	<u>-0-</u> December

3. In which months boated the river so far in 1988? (N=382)

<u>0.8%</u> January	<u>4%</u> April	<u>44%</u> July
<u>0.5%</u> February	<u>7%</u> May	<u>49%</u> August
<u>2%</u> March	<u>23%</u> June	<u>11%</u> September

4. What days of the week do you generally take this trip? (N=369)

48% Weekends and/or holidays
33% Weekdays
19% No particular day

5. Do you usually camp when you are boating the river? (N=372)

42% Yes
58% No -----> PLEASE SKIP TO #7 BELOW

6. How many nights do you normally spend on the river? (N=363)

$\bar{x} = 1.45$ nights

7. How many rivers (not counting the Upper Klamath) do you boat in an average year? (N=356)

$\bar{x} = 2.4$ other rivers

8. Rivers vary in the kinds of experiences they offer. What river(s) do you believe provide whitewater experiences that are most similar to the Upper Klamath experience? (N=272)

Rogue, 9%; American, 8%; Salmon (Calif.), 7%; Tuobmne, 5%
plus 38 other rivers. 18% said Upper Klamath is unique.

9. Do you usually combine an Upper Klamath boat trip with other activities as part of a longer vacation trip, or do you usually make your trip solely to boat the Upper Klamath? (N=368)

47% I combine boating with other vacation activities

53% I visit only to boat the river ---> PLEASE SKIP TO #13

10. If you normally run the river as part of a larger vacation, what other attractions and/or cities do you visit? (N=153)

Ashland, 31%; Shakespeare Festival, 25%; Crater Lake, 7%

plus 17 other attractions.

11. If you normally run the river as part of a larger trip, what percentage of your visit is devoted to the Upper Klamath? (N=155)

About 53 percent

12. If the Upper Klamath river trip had not been available, would you still have made your overall vacation trip? (N=171)

69% Yes

31% No

13. How far is it (one way) from your home to the put-in? (N=357)

\bar{x} = 385 miles

14. How long does it usually take you to drive one way from your home to the river (or the town where you met your guide)? (N=331)

5 hours and 21 minutes

15. How do you feel about the drive between your home and the Upper Klamath? (N=357)

9% I dislike it a lot

12% I dislike it a little

32% I neither like nor dislike it

18% I like it a little

36% I like it a lot

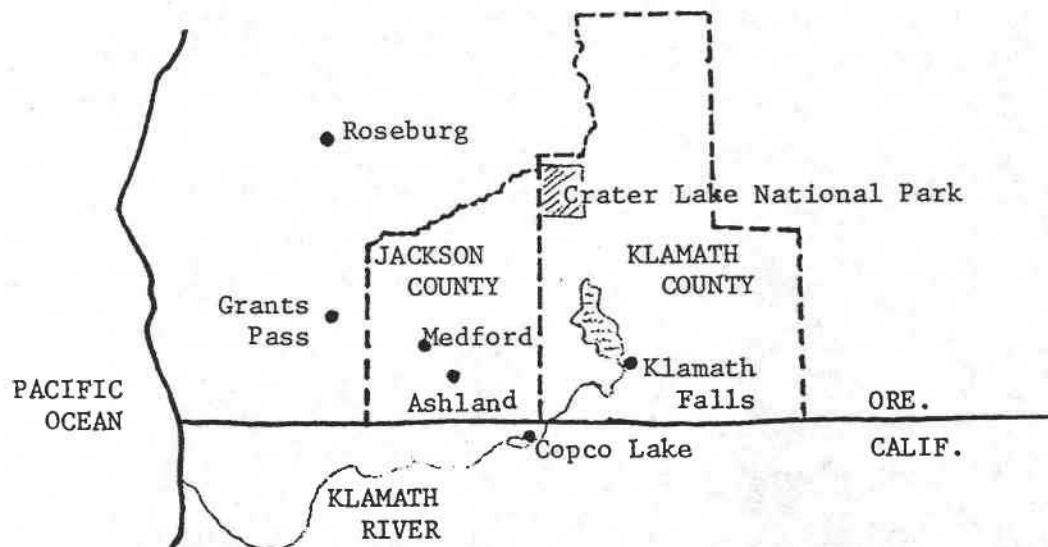
2% I like it so much that if the drive were any shorter, the entire trip would have been less enjoyable

16. What type of boat do you normally use? (N=377)

97% raft

3% kayak

1. If you lived closer to the Upper Klamath, do you think you would visit the river more often? (N=379)
80% Yes
20% No
2. If you moved _____ miles farther away from the Upper Klamath, would you still be willing to visit the Upper Klamath? (N=378)
80% Yes -----> PLEASE SKIP TO #4 BELOW
20% No
3. If your answer to the last question was no, was it because (N=59)
51% It isn't worth it to me to travel that much farther
39% I'd like to be able to travel that much farther, but I couldn't afford the extra time it would require
10% I'd like to be able to travel that much farther, but I couldn't afford the extra cost of the longer trip
-0- I didn't understand the question
4. Whose boat do you normally use on the Upper Klamath? (N=378)
77% I usually go with an outfitter/guide service
11% I usually go in a friend's boat ----> SKIP TO #6 BELOW
0.3% I usually rent a boat -----> SKIP TO #6 BELOW
11% I own my own boat -----> SKIP TO #6 BELOW
5. Which guide service did you use? (N=276)
9% Eagle Sun 1% Tributary
19% Headwaters 10% Turtle River
30% Noah's World of Water 8% Whitewater Connection
3% Ouzel 4% Whitewater Voyages
6% Sierra Whitewater 5% Wilderness Adventures
6% Other (please specify) six companies were named
6. Do you hope to float the Upper Klamath again someday? (N=379)
2% Definitely not
2% Probably not
4% Not sure
21% Probably yes
70% Definitely yes



7. We'd like you to estimate your expenses for an Upper Klamath trip. In the first column below, please list your share of the total expenses for a typical trip. In the second column, tell us how much of that total went to persons or businesses located in Klamath and/or Jackson counties (see map). For example, if you spent \$50 on gasoline and \$20 of that amount was spent in Klamath County, write \$50 in the left column and \$20 in the right. (N=314)

Total trip	Klamath/Jackson	
\$ 36.37	\$ 13.46	Gasoline and oil
\$ 52.60	\$ 30.79	Restaurants/taverns
\$ 2.82	\$ 5.49	Lodging/camping
\$ 98.24	\$ 67.27	Guide services
\$ 5.22	\$ 3.34	Rentals (rafts, etc.)
\$ 25.48	\$ 12.78	Retail (grocery, supplies, etc.)
\$ 7.02	\$ 5.77	Shuttle services
\$ 1.31	\$ 0.94	Equipment (paddles, vests, etc.)
\$ 21.23	\$ 11.67	Other

8. Do you normally take time off from work to prepare for and/or take part in an Upper Klamath trip? (N=372)

479 Yes

532 No -----> PLEASE SKIP TO NEXT PAGE

9. If you time off from work to prepare for and/or take part in a Klamath trip, how much income do you normally give up? (N=144)

\bar{x} = \$ 290.95

1. How many people (including yourself) normally ride in your vehicle on an Upper Klamath trip? ($N=349$)

$\bar{x}=4.6$ people

2. If you normally ride with at least one other person, what percentage of the travel expenses (gas, etc.) do you pay? ($N=312$)

$\sim 46\%$ percent

3. The price of travel and vacations seems to keep increasing. If your share of the expenses for an Upper Klamath trip were to increase by \$ _____, would you still make the trip? ($N=353$)

 Yes -----> PLEASE SKIP TO #5 BELOW

 No

4. If you answered no to the last question, was it because ($N=162$)

26% The Upper Klamath isn't worth that much more to me

61% The Upper Klamath is worth that much more, but I couldn't afford to spend that much more on a boat trip

4% I didn't understand the question

9% Other (please specify) Most "other" responses came from guides, who don't pay their own expenses

5. How would you rate whitewater boating as compared with your other leisure pursuits? ($N=375$)

11% I prefer whitewater boating to any other recreation

75% Whitewater boating is among my favorite activities

14% There are several things I like more than boating

6. How important is the Upper Klamath River to you? ($N=372$)

3% Not very important; I can take it or leave it

17% Somewhat important; if I couldn't visit the Upper Klamath I'd miss it, but I enjoy other rivers more

55% Important; it is among my favorite rivers

26% Very important; definitely my favorite river

7. Do you belong to any rafting or kayaking clubs? ($N=372$)

16% Yes

84% No

The questions on this page are for passengers on guided trips only.
(Guides and private boaters can skip ahead to Page 8.) Please check the responses pertaining to your most recent trip.

1. Did you decide to take part in an Upper Klamath boat trip (N=260)

81% Before leaving home on your vacation trip
13% After your trip was already under way

2. How did you learn of the opportunity to boat the river? (N=262)

57% from a friend or relative
4% from a book, magazine or newspaper article
4% from an advertisement in a magazine or newspaper
23% from a brochure
12% other (please specify seven different categories)

3. How did you learn about your outfitter/guide service? (N=262)

54% from a friend or relative
2% from a book, magazine or newspaper article
6% from an advertisement in a magazine or newspaper
23% from a brochure
15% other (please specify seven different categories)

4. Did you compare the prices and services offered by different outfitters before choosing a guide service? (N=263)

37% Yes
63% No

5. What factor(s) influenced you to choose the outfitter you used?
(please check all answers that apply to you) (N=276)

12% The outfitter I chose was the only one I knew about
11% I had made previous Klamath trips with this outfitter
15% I had made trips with this outfitter on other rivers
35% Friends/relatives had made trips with this outfitter
23% Recommendation from another source (outdoor store, tourist information service, magazine article, etc.)
19% I contacted several outfitters, and chose the one offering the best combination of prices and services
9% I chose the first outfitter I found who had space available on the day I planned to go
11% Other (please specify 8% someone else made the choice)
3% knew outfitter personally in another context

1. Do you feel the Upper Klamath is crowded? (circle one) ($N=373$)

$\bar{x}=3.65$

1	2	3	4	5	6	7	8	9

not at all	slightly		moderately			extremely		
crowded=28%	crowded=41%		crowded=30%			crowded=0.8%		

2. People seek out different kinds of recreational experiences in different settings. Which of these categories best describes the current experience on the Upper Klamath? ($N=365$)

- 8% Wilderness: where solitude is part of the experience
- 33% Semi-wilderness: complete solitude is not expected.
- 42% Undeveloped recreation: where you expect to see other people some of the time
- 15% Scenic recreation: where you expect to see other people much of the time
- 2% Social recreation: where seeing a lot of people is part of the experience

3. Which category do you think should be provided? ($N=356$)

- 19% Wilderness
- 39% Semi-wilderness
- 32% Undeveloped recreation
- 8% Scenic recreation
- 2% Social recreation

4. On a usual Upper Klamath trip, about how much time are you in sight of another boating party? ($N=371$)

- 26% Almost never
- 32% About 1 hour out of every 4
- 18% About 2 hours out of every 4
- 7% About 3 hours out of every 4
- 12% Almost all of the time
- 5% I don't know

5. If you camp on the Upper Klamath, how many other parties are usually camped within sight/sound of your campsite? ($N=350$)

- $\bar{x}=1.3$ other parties
- 57% I don't camp on Upper Klamath trips

6. Do you have to wait for others before launching your boat? (N=366)

52% Yes

48% No -----> PLEASE SKIP TO #8 BELOW

7. If so, how long do you usually have to wait? (N=192)

About 21 minutes

8. Do the actions of other river users (boaters, anglers, etc.) ever detract from your own enjoyment of a boating trip? (N=373)

30% Yes

70% No -----> PLEASE SKIP TO #11 BELOW

9. How often is your enjoyment of an Upper Klamath boat trip diminished by the actions of others? (N=106)

57% rarely

38% sometimes (once or twice a day)

6% often (more than twice a day)

10. If this does happen, what group is usually responsible? (N=97)

77% boaters

5% non-boating anglers

18% other non-boaters (campers, hikers, prospectors, etc.)

11. Now we'd like to know about your preferences for an Upper Klamath trip. Please tell us how much of the following impacts are acceptable before your experience is diminished. (N=375)

a) It is OK to be in sight of other parties as much as ...

15% Almost never

40% About 1 hour out of 4

20% About 2 hours out of 4

6% About 3 hours out of 4

4% Almost all of the time

16% It doesn't matter to me

b) It is OK to be camped within sight or sound of 0.9 other parties, or

36% It doesn't matter to me

c) It is OK to wait 19 minutes to launch my boat,

24% It doesn't matter to me

To answer the questions on this page, please imagine you had planned an Upper Klamath boat trip, but you discovered that the turbines wouldn't be operating on the day you'd planned to go.

1. What would you be more likely to do on that day instead? (N=371)
 - 43% Float a different river
 - 57% Choose a different activity -----> PLEASE SKIP TO #4

2. If you would run a different river, which one(s) would you be most (N=144) likely to choose?
 - Rogue, 50%; Salmon (Calif.), 12%; American, 11%; plus 20 others

3. Would a trip to your substitute river be likely to offer you the same benefit or satisfaction as an Upper Klamath boat trip? (N=142)
 - 39% Yes -----> PLEASE SKIP
 - 61% No -----> TO #6 BELOW

4. If you would choose a different activity, what activity? (N=172)
 - Hiking, 26%; Bicycling, 13%; Fishing, 12%; Sightseeing, 9%; plus 26 others

5. Would your substitute activity be likely to give you the same benefit or satisfaction as a river trip? (N=205)
 - 25% Yes
 - 75% No

6. Would you expect that your substitute river/activity would be shared with the same companions as on your original trip? (N=365)
 - 73% Yes
 - 27% No

7. Would you try to reschedule your trip for a new time later in the same season? (N=361)
 - 76% Yes
 - 24% No

10. There are many reasons why people enjoy river trips. Please indicate how important each of the following reasons for making an Upper Klamath boat trip are to you personally. (N=380)

<u>MEAN</u>	not important	slightly important	important	very important	extremely important
3.7	1	2	3	4	5
Being with family/friends					
1.9	1	2	3	4	5
The river is near my home					
1.5	1	2	3	4	5
Good fishing					
3.2	1	2	3	4	5
Good weather					
4.5	1	2	3	4	5
Good rapids					
2.7	1	2	3	4	5
Riverside camping					
3.6	1	2	3	4	5
Peace and solitude					
3.2	1	2	3	4	5
Getting away from other people					
4.3	1	2	3	4	5
Being in a natural setting					
1.3	1	2	3	4	5
Couldn't get permit on another river					
1.7	1	2	3	4	5
Meeting other boaters at river					
2.9	1	2	3	4	5
Testing/developing boating skills					

These questions will help us form an overall picture of Upper Klamath boaters. Individual answers are confidential. Your name will not be used.

1. How old are you? $\bar{x} = 36.0$ (N=381)
2. Are you male? 54% Female? 46% (N=385)
3. How much education have you completed? (N=372)
 - 10% High school
 - 26% Some college
 - 35% Bachelor's degree or equivalent
 - 29% Advanced degree
4. What is your marital status? (N=379)
 - 40% Single
 - 49% Married
 - 11% Divorced, widowed or separated
5. How many children do you have? $\bar{x} = 1.15$ (N=350)
6. What is your approximate family income? (N=376)

<u>1%</u> \$0-\$4,999	<u>6%</u> \$35,000-\$39,999	<u>4%</u> \$70,000-\$74,999
<u>4%</u> \$5,000-\$9,999	<u>9%</u> \$40,000-\$44,999	<u>2%</u> \$75,000-\$79,999
<u>4%</u> \$10,000-\$14,999	<u>7%</u> \$45,000-\$49,999	<u>2%</u> \$80,000-\$84,999
<u>4%</u> \$15,000-\$19,999	<u>5%</u> \$50,000-\$54,999	<u>2%</u> \$85,000-\$89,999
<u>7%</u> \$20,000-\$24,999	<u>3%</u> \$55,000-\$59,999	<u>2%</u> \$90,000-\$94,999
<u>9%</u> \$25,000-\$29,999	<u>3%</u> \$60,000-\$64,999	<u>1%</u> \$95,000-\$99,999
<u>9%</u> \$30,000-\$34,999	<u>3%</u> \$65,000-\$69,999	<u>13%</u> over \$100,000
7. What size town do you live in? (N=382)
 - 5% Farm or rural area
 - 10% Small town (less than 5,000 people)
 - 40% Small city (5,000-50,000 people)
 - 26% Large or medium-sized city (more than 50,000 people)
 - 19% Suburb of a large city
8. What is the ZIP code of the town where you lived when you were contacted for this survey? _____ (N=380)