ECONOMIC VALUES AND PRODUCT SHIFT ON THE ROGUE RIVER: A STUDY OF NON-COMMERCIAL WHITEWATER RECREATION

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ABSTRACT

A survey of non-commercial whitewater recreationists on the Rogue River was administered in 1984 to gather information on users' characteristics, perceptions, and values. This information was compared to results from a 1977 study in a longitudinal analysis.

Non-commercial whitewater use increased from 8,370 in 1977 to 10,388 in 1984. As a result of this, fewer users in 1984 thought the Rogue provided a wilderness or semi-wilderness experience. Nevertheless, the perceived crowding and satisfaction of users did not change significantly over the seven year time period. Since the demographic characteristics of the users suggests that they are the same cohort that were there in 1977, it appears that a "'product shift" has taken place during this time, and the Rogue now offers an opportunity for a higher density recreation experience.

The economic value of non-commercial whitewater recreation was assessed using both the travel cost method (TCM) and the contingent value method (CVM), The results from the TCM show a range of values between $20.24 and $37.52 per trip, depending on the value which is assigned to the opportunity cost of time. The open-ended CVM results show the expected divergence between willingness to pay (WTP) estimates and willingness to sell (WTS) estimates. The WTP estimate of $31.33 per trip is within the range of TCM values, while the WTS estimate of $133.28 per trip reflects problems from protest responses and hypothetical bias. The dichotomous choice format of the CVM resulted in a value of $52.86.

FOREWORD

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It is Institute policy to make available the results of significant water-related research conducted in Oregon's universities and colleges. The Institute neither endorses nor rejects the findings of the authors of such research. It does recommend careful consideration of the accumulated facts by those concerned with the solution of water-related problems.

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EXECUTIVE SUMMARY

This report presents the results of a 1984 survey of non-commercial whitewater users of the Rogue River. The survey was designed to elicit information on user characteristics, perceptions, and values.

A review of previous relevant research (Chapter 2) describes past studies which have employed the travel cost method (TCM) and the contingent value method (CVM) for estimating recreation values. Advantages and disadvantages to both of these methodologies are described. The dichotomous choice format of the CVM is presented along with the open-ended format (pp. 6-10).

Previous research on user characteristics and perceptions in situations of permit rationing are also summarized in Chapter 2 (p. 10).

Chapter 3 presents the methods and procedures which were used in this study. A mail survey was sent to 600 people from three different types of permit holders. The sampling procedure, described on pages 24 to 26, resulted in a 79% response rate.

The hypothesis that a "product shift" occurred in the Rogue River experience between 1977 and 1984 is explored in Chapter 4. Over this time, use increased from 8,370 in 1977 to 10,388 in 1984 (p. 19). This represents a higher density experience and the percentage of users who think the Rogue provides wilderness or semi-wilderness has decreased, while the percent who think it provides undeveloped recreation has increased. A similar shift in the type of experience that people think should be provided has also occurred (pp. 21-23). The mean number of acceptable encounters at campsites has also increased over this time period (pp. 24-26). The perceived crowding, and satisfaction of users, has not changed significantly over the seven years (pp. 26-28).

The demographic changes in the user population suggest that non-commercial users on the Rogue are the same cohort that were there in 1977 (pp. 26-29). This suggests that a

product shift has occurred for the users in response to changing conditions, and the Rogue now provides an opportunity for a higher density recreation experience.

A zonal travel cost model was chosen as one of the valuation methodologies (p. 33), and zones were delineated within the Oregon-Washington-California area. Seventy-five percent of the visits in 1984 originated from within Oregon (p. 34).

Alternative specifications of the price variable in the TCM are explored in Chapter 5. A high correlation was found between what people said they spent for the variable costs of the trip and the calculated travel costs based on the number of miles which they travelled from their home counties (p. 38). An adjustment for multiple destination trips by using the percentage of trip purpose which respondents said was devoted to the Rogue River was also used (p. 40).

Four different specifications of the opportunity cost of time were used in the estimation of the trip demand curve (pp. 40-42). The difference in net benefit estimates ranged from $20.24 per trip when time was valued at zero opportunity cost, to $37.52 per trip when the willingness to pay to reduce travel time was used as the opportunity cost (p. 46).

The contingent value method results are presented for the open-ended format (p. 50) and the dichotomous choice format (pp. 49-52). The WTP for the open ended CVM was $31.33 per trip, while the dichotomous choice result was $52.86. The WTS question suffered from both lack of understanding and protest by the respondents, which likely contributed to the high estimate of $133.28 (p. 50).

CHAPTER 1.

INTRODUCTION

The Rogue River in southwest Oregon is one of the most popular whitewater rivers in this region. The combination of excellent scenery and whitewater that is exciting, but not exceedingly difficult, has led to a situation where demand exceeds carrying capacity. As a result, a lottery system for the distribution of non-commercial whitewater permits was instituted in 1983. The fees for both the lottery and the actual permit are administratively set at $2.00 and $5.00, respectively. These administrative prices are not the result of the interaction of supply and demand in the market for whitewater trips. Because of this, they are not an indicator of the economic value of whitewater recreation to non-commercial Rogue River users. It is not the objective of the U. S. Forest Service (USFS) or the Bureau of Land Management (BLM) to set prices at a profit-maximizing level. Equity considerations and distributional consequences of a pure "efficiency" criterion for setting prices have kept these public agencies from using price as the sole rationing mechanism. At the same time, these agencies must allocate the resources under their management to various, and sometimes conflicting uses. Information on the relative economic value of each use can be extremely valuable. In this study, two frequently used methodologies were employed to estimate the economic value of non-commercial whitewater recreation. Alternative assumptions and applications of these methodologies were explored, using the results from a survey of non-commercial users in 1984.

The survey of whitewater recreationists from this study also enabled a comparison between users in 1977 (see Shelby and Colvin 1979) and users in 1984. Information on both users' characteristics and users' perceptions of the recreation experience was collected. The results indicate that a "product shift" may have taken place between 1977 and 1984. This hypothesis is explored fully in Chapter 4.

The Water Problem Addressed

Agencies managing river resources need accurate information about trade-offs between different uses (see Oregon Senate Bills 225 and 253 regarding minimum flows and water planning). Particularly important are the trade-offs between non-consumptive uses such as recreation or preservation and consumptive uses such as logging of river corridors or hydroelectric or irrigation development. Because recreational use of rivers is generally a non-market commodity, monetary values for recreation are often unavailable. Such information would be particularly useful to the interagency group managing the Rogue River, which includes representatives from the USDA Forest Service, Bureau of Land Management, State Marine Board, and State Scenic Waterways Program (representatives from Jackson, Josephine, and Curry counties participate occasionally in decision-making). To the extent that results of this study can be generalized, other agencies in the state and region can also use the findings to assess the benefits of managing rivers for whitewater recreation versus managing for consumptive uses. The Grande Ronde and Snake Rivers are examples of other areas in Oregon where such information would help resolve on-going controversies. This study is a first step in building the data base necessary for better decisions.

Research Objectives

The objectives of this study are to:

1. Provide estimates of the value of non-commercial whitewater river recreation on the Rogue River.
2. Compare the Travel Cost Method and the Contingent Valuation Method as methodologies for valuing nonmarket goods.
3. Provide some basic data on the characteristics of whitewater recreationists.
4. Explore possible "product shift" or the change in users' perception of the Rogue River recreation experience.

Chapter 2

LITERATURE REVIEW

The valuation of nonmarket goods, such as river recreation, is achieved through various indirect measures of users' value. The Water Resources Council (WRC), an interagency committee of the U. S. government, recognizes three acceptable methods of recreation valuation (WRC, 1977): 1) the travel cost method (TCM), 2) the contingent valuation method (CVM), and 3) unit day values. The TCM is the WRC's recommended method of valuation, and is favored by many economists. It is based on actual observed behavior of a sample of users in response to the actual costs of travel, both direct costs and time costs, and it has a clear theoretical base. The CVM is based on a survey approach and uses the expressed willingness to pay for the recreational good as if a market actually existed. This method is recommended by WRC when TCM is not feasible or applicable. However, many economists now favor the CVM, and for some applications, it is the only appropriate valuation method. The WRC recommends that the unit day value method be abandoned and unit day values are not used in this study.

There have been numerous comparative studies of different nonmarket valuation mechanisms. Many of these studies have produced "meaningful though inaccurate" economic information (Bishop, Heberlein and Kealy, 1985). This is not surprising considering the extremely difficult nature of the measurement problem. As nonmarket goods are threatened by economic pressures in an environment of increasing resource scarcity, the things with unknown economic value tend to be given little or no value when compared with market goods. If reliable information is to be provided to public decision-makers, research must evaluate different valuation methods and find which work best in different situations. Studies should also account for sources of bias, both upward and downward, that could be present in valuation situations. These questions call for both economic and social/psychological expertise to adequately understand not only different measures of value, but, also, the context of the valuation process.

Travel Cost Method

The TCM has two stages. First, an individual or per capita demand curve is estimated. In its simplest form, this is econometrically estimated with visits or visits per capita as the dependent variable and travel costs as the independent variable. Travel costs represent the price that the recreationist pays to visit the site, and the model is based on the assumption that a decrease in visits will occur as price or distance traveled increases. The second stage or site demand curve is then derived, from which consumer surplus is calculated as the area under that demand curve. The model can be made more sophisticated by the addition of independent variables reflecting income, price and availability of substitutes, characteristics of the resource, congestion, and other relevant economic variables. This was the approach used in the present study.

One of the most difficult aspects of the TCM is establishing an accurate monetary value for time costs. As distance from the site increases, transportation costs increase and time spent in traveling also increases. Problems arise in "pricing" time. First, there are difficulties in precisely assessing what opportunities are foregone (for example, work, other leisure activities, or the same activity at a different site). Second, there is the problem of time costs for children and adolescents who have no ascribable wage rate from which to compute a time cost. Third, the use of a fraction of the wage rate leads to somewhat arbitrary choices regarding which fraction to use. This choice can have a pronounced effect on estimated benefits. Bishop and Heberlein (1978), in their Horicon goose hunting permit study, made TCM estimates using three different time cost values. The results were:

	Surplus per permit
Model 1 (time value = 0)	$11
Model 2 (time value = 1/4 median income rate)	$28
Model 3 (time value = 1/2 median income rate)	$45

To further complicate the issue, some recreationists may consider time spent in travel a benefit rather than a cost. Walsh, Sanders and Loomis (1985), in their study of Colorado river users, asked how much users would pay to avoid travel time. Fifty percent were not willing to pay to avoid or gain travel time, 8% reported travel time as a cost and 42% considered travel time a benefit. They decided to exclude time costs from their model.

It is difficult to use the TCM to estimate value for multi-purpose or multi-site trips because the actual travel cost total will include the price of other activities outside the scope of the model. An accurate separation of costs to the activity of interest is difficult and interferes with the otherwise clear basis of the model. Substitute sites, if they exist, must also be considered, as well as the possibility of a correlation between the availability of substitutes and the distance from the site when substitutes are not included in the estimation. It is possible to estimate a TCM model on either individual observations or on a zonal average basis. If an individual observation approach is used, the individual observations should be on a per capita basis to adjust for differences in zone population and participation rate and to minimize potential bias in parameter and consumer surplus estimation (Brown et al 1983).

Contingent Valuation Method

Because the TCM is not applicable to many nonmarket recreational and environmental goods and because of the methodological problems mentioned above, more attention has recently been focused on the CVM. There are a variety of CVM techniques. One of the most common is the iterative bidding process, administered either by personal interview (Brookshire, Randall and Stoll 1980) or, less commonly, by mail (Bishop and Heberlein 1980). The respondent is asked if she would be willing to pay an initial amount for a recreational activity or environmental amenity. If the answer is positive, then the amount is incremented and the respondent is asked again at the new amount. The process continues until the maximum amount to be paid is reached or until the respondent becomes tired of the process and terminates the iterations by simply accepting the

current amount. Several auction-type variations of this method have been operationalized and evaluated (Bishop and Heberlein 1978).

This study employed two different contingent valuation techniques, the open-ended question and the take-it-or-leave-it (TIOLI) or dichotomous choice model, both of which are amenable to mail surveys. Both techniques establish the hypothetical nature of the "market" while asking that the respondents give their best answer "as if" a real cash transaction were taking place.

The open-ended question simply asks for the maximum willingness to pay (WTP) or minimum willingness to sell (WTS) amount for a river permit, and a mean amount is calculated from the sample. The TIOLI format presents the respondent with a dollar amount and asks for a yes (take it) or no (leave it) answer, simulating conditions actually found in the real marketplace. This technique has been used by Bishop and Heberlein (1979), Loehmman and De (1982), Sellar, Stoll and Chavas (1984) and others. W. Michael Hanemann (1983) has developed a utility theoretic framework for the logit analysis which is used to estimate values, and he has applied two distinct types of welfare measures (the median and the mean of the distribution of the true compensating or equivalent surplus) to the original Bishop and Heberlein data.

With the TIOLI method the dichotomous response (the yes or no answer) is the dependent variable in a logit equation, with the dollar offer amounts and other relevant data as the independent variables. The logit is a cumulative density function which represents the probability that a respondent will accept or reject any given dollar amount, (McFadden 1976). The logit model takes the form

$$Pr(i) = [1 + e^{(-f(x))}]^{-1} \qquad (1)$$

where Pr(i) is the probability of giving a negative answer to a willingness to pay question with x amount of dollars. The logit equation yields a probability between 0 and 1.

Using maximum likelihood estimation, parameters are estimated for the equation:

$$Pr(i) = \frac{1}{1 + e^{-(a + b(x))}} \qquad (2)$$

where x is the dollar amount offered. This equation is then integrated to find the expected WTP:

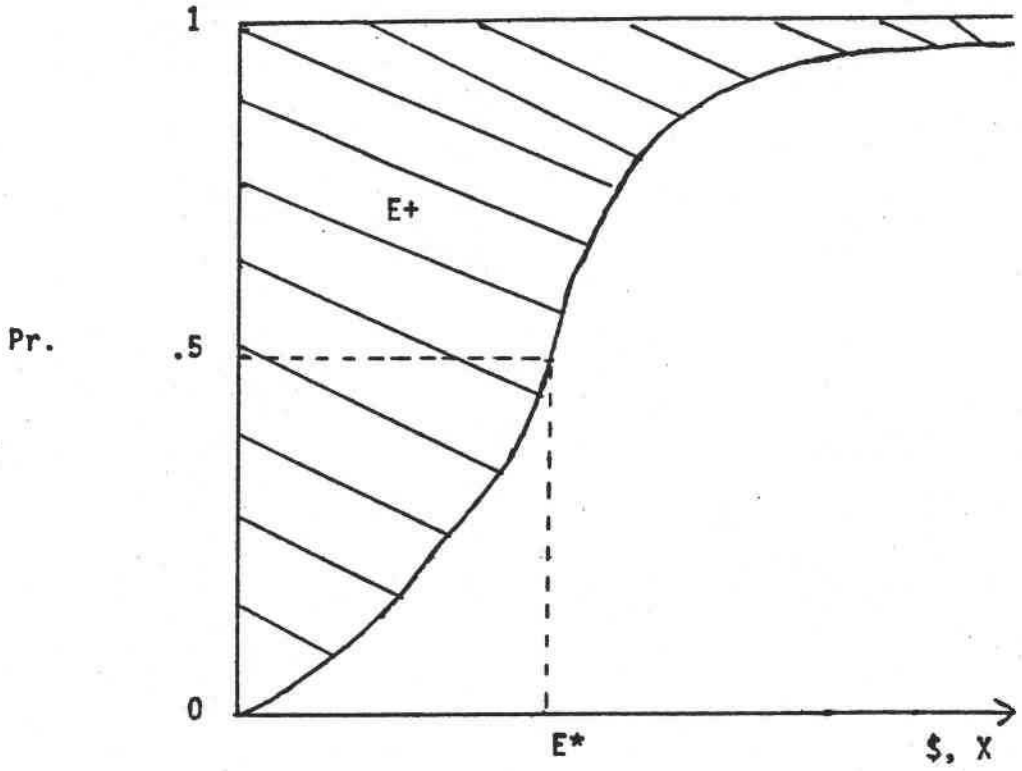
$$E(WTP) = \int_{0}^{X\,max} X \cdot g(x)\, dx \qquad (3)$$

where g(x) is the probability distribution function for accepting the offer. This gives the mean WTP (or WTS). However, Hanneman suggests that a more reliable measure of welfare is the median of the probability distribution rather than the expected value of WTP or WTS. The two different measures can be depicted graphically by Figure 1. E+, the expected value of WTP, is represented by the area above the curve (where Pr. is the probability of a negative answer) while E* represents the dollar amount at which the probability of acceptance is 0.5. Hanemann finds E* to be less sensitive to disturbances (such as errors in the data or outliers) that would alter the distribution and finds E* a more reliable measure because it is more robust.

A second issue in calculating consumer surplus from the logit function involves the issue of the tails of the distribution. There is some disagreement over truncating the range of integration (Boyle and Bishop 1984). The integral must be evaluated over some range, so a point must be chosen to truncate the integration. One method of truncation is to use only the area under the curve for which there are observations. Bishop and Heberlein (1979) and Sellar, Chavas and Stoll (1984) used the highest offer as their cut-off point. Since this is an arbitrary process, Boyle and Bishop suggest truncating at the offer corresponding to the 9Oth percentile.

Like the TCM, the CVM has difficulties, principally the problem of hypothetical bias and other related sources of error -- information bias, starting point bias, vehicle bias, instrument bias, and item non-response bias. The artificial nature of CVM is the source of the problem and attempts are being made to lessen the artificiality through improved question design. In a different direction, a recent laboratory experiment by Hovis, Coursey and Schulze (1984), produced results that may indicate that hypothetical bias is a major problem for willingness to sell but not for willingness to pay.

Figure 1. The Logit Function



Gamesmanship, or strategic behavior, has been thought to be a major source of bias in the CVM in the past. Although a hypothetical market situation is created, the respondent is asked to answer questions as if the situation were real. At the same time, respondents are told that their responses will not affect actual charges to be levied now or in the future. If the respondents accept the situation as completely hypothetical, their responses may not reflect actual preferences. If the respondents feel their answers may lead to higher "prices" or fees, they will protect their self-interest by lowering their actual willingness to pay. However, numerous studies have shown that strategic bias is not a critical factor in hypothetical value methodology (Bishop, Heberlein and Kealy 1984).

A number of studies have compared different valuation methods. Bishop and Boyle (1984) have compared three different CVM techniques. Sellar, Stoll and Chavas (1984), and Walsh, Sanders and Loomis (1985) have compared CVM and TCM. Brookshire, et al (1982) have compared survey and hedonic approaches. Bishop and Heberlein (1980) have compared the TCM, the CVM and the SM (simulated market). Hanneman (1983) has analyzed the Bishop and Heberlein data set using both generalized least squares and maximum likelihood estimation.

Because the measures of value derived through the various contingent valuation techniques are all artificial to greater or lesser degrees, it is difficult to validate the results by observation of actual behavior. This necessitates the comparison of the different estimated values with each other under the assumption that one of the estimates reflects the "true" value of the commodity. The choice of the indicator method for the true value is uncertain. Frequently, the travel cost method is chosen to represent one of the bounds of value because it is based on actual observed behavior. Other studies use economic theory to suggest a true value. Some researchers (Walsh, Loomis and Sanders 1985) have used different methods and estimated values across methodology that are virtually equal. Others (Bishop, Heberlein, and Kealy 1984, and Bishop and Heberlein 1979) have estimated a range of values that, while in the same "ballpark," must contain some inaccuracies. For example, Bishop, et al, using three different types of the CVM, the TCM and

simulated market, estimated willingness to pay and willingness to sell amounts ranging from $11 to $101. The nature of these discrepancies remains unclear.

The Value Context: User Characteristics, Perceptions and Permit Rationing

In order to define an accurate measure of welfare, valuation methods can and should be evaluated in relation to each other. But it is important to maintain a perspective on the values being measured. Rather than existing in a vacuum, values exist as a function of the social context created by the users' and society's value system. Changes in users' characteristics and perceptions, as well as changes in allocation methods (with their accompanying equity and efficiency considerations) are relevant to both the theoretical and methodological aspects of valuation. Various publications of the WRRI (#32, 52, 63) explore the carrying capacity concept, motorboat usage, and determination of use levels on the Rogue River. They also provide baseline data on users' characteristics. This information can be compared to the information in the current study to explore changes in visitor perceptions and attitudes toward the river, which may indicate a "product shift," and affect user benefits.

The Rogue River utilizes a permit system to allocate or ration use during the peak season. This is only one of many allocation systems that have been explored in the large body of literature dealing with rationing techniques and the equity and efficiency problems that go with them. Stankey and Baden's Rationing Wilderness Use: Methods, Problems and Guidelines (1977) provides an overview of rationing issues and problems. Danley's (1980) study of permit allocation in Hell's Canyon provides an analysis of the theoretical assumption that user characteristics influence both the perception and evaluation of five allocation techniques. Shelby and Danley (1980) review allocation issues from a management perspective.

For a strictly nontheoretical, empirical approach to the river permit allocation system, the USFS publication, "1984 Wild Rogue River Actual Use," provides raw data on lottery applications, launches, no-shows, and other relevant information about permit allocation on the Rogue River.

Chapter 3

METHODS AND PROCEDURES

The River

The Rogue River is one of the best known whitewater rivers of the Pacific Northwest. It provides a wide spectrum of recreational opportunities, from fishing and whitewater boating to cultural and historical sites. The river has been under federal management since 1968 by virtue of the National Wild and Scenic Rivers Act. Eighty miles of the river are classified as either wild, scenic, or recreational. The forty mile "wild" section of the river, from Grave Creek to Watson Creek, contains the most spectacular scenery and best whitewater. Permits are required for use of this section of the river and, since 1983, a lottery system has been used to distribute permits to potential river users.

The data for this study were obtained from surveys mailed to recreationists who were on the Rogue River in the summer of 1984 during the season when permits are required. The permits for non-commercial users are allocated by the USFS, while commercial use is regulated by the BLM. The study surveyed only non-commercial users.

Sampling Procedure

The study population consisted of three subsets: (1) permit holders who received their permits through the January lottery, (2) permit holders who received their permits after the lottery through either a phone-in distribution of unused commercial permits or through use of a no-show permit, and (3) non-permit holders who were passengers in a permit holder's party. Samples of the first two groups were randomly selected from the total population of permit holders. The passenger sample was randomly selected from the list of passengers that the Forest Service required of each permit holder. Each sub-sample consisted of 200 respondents, for a total sample of 600.

The sample was further subdivided into two groups of 300, 100 from each of the three samples. The two groups received similar surveys with the only difference being the contingent value method question. One group received the open-ended CVM, the other, TIOLI. The TIOLI surveys were mailed approximately three weeks after the open-ended group in order to use a sample of the open-ended dollar amounts submitted to establish a statistically accurate distribution of the TIOLI amounts.

Potential respondents were sent surveys with a cover letter (with the OSU letterhead) explaining the purpose and nature of the study. A follow-up post card was sent within a week and a follow-up letter was sent approximately three weeks after the initial mailing. Finally, a second survey was sent to the open-ended CVM group and a second follow-up letter was sent to the TIOLI group. Both were sent by registered mail.

From the initial mailing of 600 surveys, ten were undeliverable or otherwise unusable. Of the remaining 590, 466 were completed and returned, a response rate of 79%. Response rates for the sub-samples are shown in Table 1. As expected, the response rate for lottery permit and non-lottery permit holders was higher than passengers in both sub-samples. Also the group receiving a second survey had a slightly higher response rate. Because of the stratified cross-section of river users contacted and the high response rate, it appears that a reliable sample of private river users is represented in the survey results.

Survey Procedures and Areas of Interest

The river survey (a complete copy of which can be found in Appendix 1) focused on four areas: (1) users' socio-economic characteristics, (2) users' attitudes towards and perceptions of their river experience, (3) the lottery rationing techniques, and (4) valuation of benefits by the TCM and the CVM, both open-ended and TIOLI.

In order to provide an accurate profile of river users, respondents were asked their age, sex, education, income, marital status, number of children, type of area lived in presently and

Table 1. Response Rates for the Mail-back Questionnaire

	Lottery	Non-Lottery Permit	Passengers	Total
Group I	(84/98)	(83/97)	(80/97)	(247/292)
Open-Ended CVM	85.7%	85.5%	82.5%	84.6%
Group II	(77/100)	(74/98)	(68/100)	(219/298)
TIOLI CVM	77.0%	75.5%	68.0%	73.5%
Total	(161/198) 82.3%	(157/195)1 79.3%	(148/197) 75.1%	(466/590) 79.2%

when young, primary occupation, and work status. This provides information on who is using the river as well as control variables for valuation and other analyses.

Satisfaction was measured by asking respondents to rate their river trip on a 1 to 6 scale ranging from "poor" to "perfect." Perceived crowding was measured on a nine point scale ranging from "not at all" to "extremely crowded." Users were also asked about acceptable encounter levels (both on the river and at camp) and whether they attempted to plan their trips to avoid crowds.

Because a management plan is in part determined by the type of experience to be provided, user perception of the experience is important. Respondents were given three alternative descriptions of the river: wilderness, semiwilderness, and undeveloped recreation area (see survey for definition of these terms). Two questions then asked the respondent to indicate the type of experience the river "currently provides" and the experience the river "should provide." This information can be compared with data from past studies to assess changes in visitor perceptions. A river experience also offers a number of different features. A section of the survey listed 25 features (e.g., feeling safe, good food, running rapids) and asked the respondent to rate each one as very important, somewhat important, or not at all important.

A section of the survey explored users' attitudes and behavior toward the permit system. Respondents were asked if they applied for a permit through the lottery, and for what reasons if they did not. Other questions asked how many attempts, either by lottery application, phone call, or walk-in application, were made to get a permit for this and other river trips.

To find a maximum WTP for the lottery, respondents were asked if they would be willing to pay more than the present $2 charge for the lottery and, if yes, the maximum amount they would have paid. A similar question was asked for river permits. Also, respondents were asked their maximum WTP, in January, at the time of the lottery, for a "reservation" on the river at the time of their choice.

The effect of the permit system on the number of trips taken was measured by questions asking for the number of trips that would have been taken if there were no permit restrictions versus the number of trips actually taken.

Substitutability is currently an important topic to resource managers and researchers. Respondents were asked what they would have done had they been unable to obtain a permit. They were asked if they would "run another river" (and, if yes, what river), engage in "other recreation" (and, if yes, what recreation), "stay home," "work," or engage in some "other activity."

In order to build a model that uses travel costs to estimate value, information is needed that reports user travel and time costs. Questions were asked regarding the time spent traveling, distance traveled, number of people traveling together, purpose of trip (only to the river or multi-purpose), percentage of time devoted to purpose(s) of trip, time spent preparing for the trip, days on the river, time off from work, income lost from time off, hours worked per week, vacation time, and county of residence. From this information, travel costs can be estimated. Respondents were also asked for their own estimates of transportation, lodging, shuttle, food, and other costs. Calculated travel costs can then be cross-referenced with users' perceived travel costs.

In order to establish "cost of participation," a section of the survey asked for a comprehensive listing of information about the boat (or cost of rental) and related equipment. This information contained original cost of equipment, year purchased, and days used per year. Finally, in an effort to establish a monetary "time cost," respondents were asked their willingness to pay to reduce travel time to one half hour.

The open-ended and TIOLI CVM questions were operationalized in a straight-forward manner. The respondents were asked to write in the maximum amount they would be willing to pay and the minimum amount they would accept as compensation for their permit. For the TIOLI measure, the respondents were presented with a dollar amount and asked to indicate if they would pay or accept as compensation that amount for their permit. Yes or no were the two choices.

Chapter 4.

"PRODUCT SHIFT" ON THE ROGUE RIVER

The evolution of the social carrying capacity concept created a framework for theoretical model building. One of the most controversial models was developed through the application of the concept of marginal utility and other analytical tools of production economics (Clawson and Knetch 1966, Fisher and Krutilla 1972, Alldredge 1973). The resulting bivariate satisfaction model requires or assumes an inverse relationship between level of use and user satisfaction. Contrary to the expectations of the model, however, empirical studies showed that the satisfaction of users remained high at different use levels. A review of fourteen studies by Kuss, et al, (1984) found only two significant relationships between density and satisfaction, both positive (the opposite of the predicted direction). Researchers have developed four explanations for the inadequacy of the economic satisfaction model (Heberlein and Shelby 1977).

First, satisfaction is related to a number of other factors, including expectations, personal benefits, social interaction, and the wilderness character of the experience (Shelby 1980). The simple bivariate impact of density on satisfaction, when it exists, is likely to be small and possibly obscured by other variables. Second, because recreation behaviors are largely voluntary and, therefore, self-selected, users choose activities which are satisfying for them. They will thus tend to show high satisfaction levels, regardless of use level. That people voluntarily select an activity and make a substantial investment of money and vacation time may also lead to a positive evaluation of the experience, as dissonance theory suggests. It may be that this effect is more likely in high- involvement activities that require large expenditures of time or money or involve waiting for a permit for a long period of time (for example, rafting on the Grand Canyon) and that this effect is less pronounced for more "everyday" recreational activities (Manning and Ciali 1980).

Third, again because recreation activities are self-selected and voluntary, displacement may occur (Clark 1973, Schreyer 1979). Individuals dissatisfied with crowding or other resource

conditions caused by crowding, will move to other sites and be replaced by individuals who are tolerant of higher densities. However, the increasing demand for and use of previously remote recreation sites may result in a scarcity of recreation areas to which the density-sensitive user can be displaced. The recreationist is then faced with the choice of either adjusting to new conditions in the same site or the increasingly difficult task of finding a new site. This may involve high information costs and uncertainty in addition to higher time and money costs.

Finally, increasing densities may cause a product shift, or a change in the definition of the experience. Increased use alters the character of the experience; for example, from zero contact wilderness to moderate contact semiwilderness. As this happens, people probably change their normative definition of appropriate contact levels. Changes in the experience, then, cause individual normative changes and satisfaction remains high. This shift is subtle and gradual and, therefore, is difficult to capture in the typical cross-sectional survey. An exception to this is the longitudinal study of Lapage and Ragain (1974), which provides some evidence of the evolutionary nature of recreation experiences.

This section explores the "product shift" notion. This idea suggests several interesting hypotheses in terms of user response to increased density. First, at a fairly general level, we would expect that users would be more likely to change their definition of the experience than to become dissatisfied or displaced. Second, experience definitions will change toward higher density experiences. Third, because of changed experience definitions, encounter norms will change to higher levels. Fourth, because norms have changed, perceived crowding will not change. Finally, satisfaction will remain high.

Baseline data came from a 1977 study of river runners on the Rogue (Shelby and Colvin 1979). Longitudinal comparison is made possible using identical measures from the current study. User definition of the river experience was examined by presenting the respondent with three alternative experiences: wilderness, semiwilderness, and undeveloped recreation area. The respondent was then asked to select the alternative that best describes the experience currently provided and the experience the river should provide. Encounter norms were measured by asking

respondents how many encounters per day were acceptable, both on the river and at their campsite. The 1977 survey also asked respondents to describe their reaction to unexpected density. This item explored the tendency of recreationists to become dissatisfied, to be displaced, or to redefine the experience. Crowding was measured on a 1 to 9 scale in which users rated crowding on the river from "not at all" to "extremely crowded," Satisfaction was measured on a 1 to 6 scale in which users rated their trip from "poor" to "perfect."

Use levels on the Rogue changed gradually between 1977 and 1984. Total use during the 1977 season (Memorial Day to Labor Day weekends) was 8370, an average of 84 people per day. Total use during the 1984 season was 10,388, an average of 102 people per day. this represents a 21% increase over 1977 use levels.

Table 2 shows the responses to the question from the 1977 survey asking what respondents would do if they saw more people than they expected. The three possible responses reflect different psychological strategies for dealing with unacceptable density levels (assuming the expected level is the individual's norm).

Only 11% said they would "become unhappy or dissatisfied with the trip." This substantiates the dissonance reducing tendency of self-selecting activity choice. The personal and economic resources invested in the activity (which may be substantial in a multi-day river trip) reinforce the tendency to have a "good time" no matter what.

A slightly higher proportion (19%) said they would "decide to go somewhere more remote next time." This item quantifies the displacement potential of Rogue River users. The move to a more remote site may be perceived as difficult and/or expensive.

The most favored coping strategy (for 34% of river users) was to change the way they thought about the Rogue, deciding it was less remote than they had believed. This response operationalizes "product shift." The product is the river experience and the shift is the redefinition of the experience in the face of conditions which may be unacceptable within the context of the users' original expectations.

Table 2. How People Reacted to Unexpected Density (1977 Survey).

	% Responding		
	No	Yes	Number Responding
If you saw more people than you expected, did you:			
- become unhappy or dissatisfied with the trip?	89%	11%	287
- change the way you thought about the Rogue, deciding it was less remote than you had believed?	66%	34%	288
- decide to go somewhere more remote next time?	81%	19%	282
Attempt to avoid others by:			
- speeding up or slowing down?	56%	44%	278
- getting off the river to allow people to pass?	72%	28%	274
- passing up places at which you'd planned to stop?	66%	34%	277
- changing your campsite?	59%	41%	277

Consider the three coping strategies together. The tendency to reduce cognitive dissonance, especially strong in a high involvement activity, makes the first choice (becoming dissatisfied) unacceptable. Time, economic, and information constraints appear to render the second choice (being displaced) undesirable for most users. The recreationist is thus left with the third choice, redefinition of the experience. The response goes on to give the respondent an example of a change in thinking ("believing it was less remote than you had believed"), but other changes are also possible. These might include the feeling that "you see more people in remote areas now," or changing the expectation of a wilderness trip to an undeveloped recreation experience. Taken together, the three responses show that users are more willing to change their thinking than to be dissatisfied or displaced.

Respondents were asked what kind of experience the Rogue River "currently provides" and what kind of experience it "should provide." Results are shown in Table 3 and 4. (The 1984 study surveyed three separate groups of users: Lottery permit-holders, non-lottery permit-holders and passengers. There were no significant differences among groups in response to either question; (chi-squared = .833, 1.95, 4 df.)

In terms of what is currently provided, a significant shift to higher density experiences has occurred since 1977. The percentages of users who think the Rogue provides wilderness or semiwilderness has decreased, while the percent who think it provides undeveloped recreation has increased.

For the experience that should be provided, a similar shift has occurred. The numbers in the wilderness category have decreased, while the numbers in the semiwilderness and undeveloped recreation categories have increased.

Results regarding changes in encounter norms are shown in Tables 5 and 6. The mean number of acceptable encounters on the river goes from 5.8 in 1977 to 6.3 in 1984 (see Table 5). This change in the mean is in the hypothesized direction, but the change is not significant (p-value < .12), nor is the change in the distribution of the encounter norms (p-value < .24). The change in

Table 3. Recreation Experience Currently Provided on the Rogue River

	1977*	1984
Wilderness	20%	4%
Semiwilderness	66%	59%
Undeveloped Recreation	14%	37%
N	134	464

chi squared = 21.2, p-value < .001

*Private boaters only

Table 4. Recreation Experience That Should Be Provided on the Rogue River

	1977*	1984
Wilderness	38%	16%
Semiwilderness	52%	58%
Undeveloped Recreation	10%	26%
N	135	464

chi squared = 17.0, p-value < .001

*Private boaters only

Table 5. Rogue River Encounter Norms.

OK to have as many as ____ encounters per day		
	1977*	1984
0-1	7%	3%
2-3	23%	24%
4-5	25%	26%
6-7	7%	8%
8-9	3%	12%
10+	13%	17%
Don't Care	22%	10%
N	135	464
Mean	5.75	6.3

chi squared = 6.8, p-value < .24 (without Don't Care):

t-statistic = 1.6, p-value < .12

*Private boaters

Table 6. Camp Encounter Norms.

OK to be near others as many as ____ nights out of 5.		
	1977*	1984
0	30%	14%
1	31%	25%
2	24%	37%
3	7%	19%
4	2%	2%
5	6%	3%
N	110	384
Mean	1.39	1.82

chi squared = 15.6, p-value < .01; t-statistic = 5.6, p-value < .001

*Private boaters

the number of acceptable camp encounters is significant (see Table 6). The mean of 1.39 in 1977 increased to 1.82 in 1984. The overall distribution also shows a significant shift to higher levels.

Responses to the perceived crowding items are shown in Table 7. The distribution for 1984 is not significantly different from the distribution for 1977. If anything, perceived crowding is slightly lower (the mean has decreased from 2.05 to 1.86).

Changes in satisfaction ratings are shown in Table 8. As with perceived crowding, there is no significant change in the distributions. If anything, satisfaction is slightly higher (the mean has increased from 4.96 to 5.06).

If there was no evidence of displacement, then it could be said that users may have become psychologically displaced and have resorted to coping mechanisms, both behavioral and through a process of rationalization, that redefine the experience and its attendant norms, i.e. product shift. Unfortunately, the information on users is not that precise. What is available is demographic information that may reflect whether or not the same type of recreationist is visiting the site.

Demographic Changes in the User Population

Demographic variables are shown in summary form in Table 9. Education, occupational prestige, and the proportions of males and females have not changed markedly. Average age has increased by six years, unadjusted income has increased, a higher percentage are married, and the average number of children has increased. Users are more likely to live in small cities, average distance traveled to the river appears to have decreased, and average trip planning time has increased from 1 to 4 months (probably because of permit procedures which were not in effect in 1977). Taken together, these demographic data suggest that private river runners on the Rogue are the same cohort that were there in 1977, progressing through the life cycle.

Table 7. Crowding Perceptions.

Did you feel the river was crowded?	1977	1984
Not at all	32%	46%
Slightly crowded	39%	28%
Moderately crowded	21%	20%
Extremely crowded	8%	6%
N	329	464
Mean	2.05	1.86
chi-squared = 4.20, p-value < .24		

Table 8. Overall Satisfaction Ratings.

Overall, how would you rate this particular river trip?	1977	1984
Poor	0%	0%
Fair	0%	1%
Good	4%	5%
Very Good	16%	12%
Excellent	60%	54%
Perfect	20%	29%
N	386	468
Mean	4.96	5.06

chi-squared = 4.88, p-value < .43.

Table 9. Demographic Characteristics of Users.

		1977	1984
Age		31	37
Sex	Male	71%	74%
	Female	29%	26%
Education		BA or BS	BA or BS
Occupation Level		5	5
Income (Unadjusted)		$20-24,000	$36,000
Marital Status			
	Single	36%	20%
	Married	54%	68%
	Separated, Divorced, Other	10%	12%
Number of children		1.1	1.6
Residence		Large City (50-500,000)	Small City (5-50,000)
Distance Traveled to River			
	Miles (one way)	432	225
Planning Time, days		32	120

State	1980	1981	1982	1983	1984
OR	80%	82%	83%	84%	80%
CA	10%	13%	10%	10%	12%
WA	5%	4%	5%	4%	5%
Other	5%	1%	2%	2%	3%

(All private boaters for permit season, from USFS data)

PRODUCT SHIFT - SUMMARY AND CONCLUSIONS

To summarize, most of the hypothesized relationships regarding product shift were supported. Data from the 1977 study suggest that users are more likely to change their definition of the experience than to become dissatisfied or displaced, although 19% indicated that they might choose the displacement option. Comparisons of the 1977 and 1984 data showed that use levels have increased, experience definitions have changed toward the higher density end of the recreation opportunity spectrum, and camp encounter norms are higher (although river encounter norms are not). These data suggest that a product shift has taken place; users are now much more likely to say the Rogue provides an undeveloped recreation experience.

User opinions about what should be provided have also changed since 1977, although these sentiments changed less than definitions of what is currently being provided. The majority of users still think that a semiwilderness experience should be provided.

Demographic data suggest that the same "age cohort" or "generation" is using the river, although this does not mean that the same individuals are using the river. There was a substantial minority (19%) of the 1977 sample who said that their response to excessive encounters would be to go somewhere more remote next time (i.e., they would be displaced). If they have actually done so, this group is no longer running the Rogue. This means that their preferences for lower density experiences and lower numbers of encounters are not being included in the 1984 data; they have been replaced by new users (of the same generation) whose preferences are more tolerant of higher densities. This displacement process has been likened to the "invasion and succession" process in plant communities.

Average levels of perceived crowding and satisfaction have not changed significantly. This can be partly attributed to the changes in the user population described above; it appears that the majority of those remaining on the Rogue either were tolerant of higher densities in the first place, have changed their preferences in that direction, or are new users with such preferences. In addition, satisfaction and perceived crowding are affected by a number of other factors, making them poor criteria for management decisions about use limits.

Use on the Rogue is currently limited to 120 people per day, 60 each in the private and commercial groups. In 1977 commercial use was limited to 60 people, while private use was unlimited until 1978, when the present policy went into effect. The observed increase in actual use between 1977 and 1984 can be attributed to increased demand and more complete utilization within the 120 person limit.

Should use limits be changed? It appears that it is not feasible politically to decrease the use limit on the Rogue, so this option will not be discussed here. The majority of private users in both samples supported "semiwilderness" as a goal for what should be provided. User responses to the options in the "current experience" item suggest that type of experience was being provided in 1977. Most say it is still being provided now, but the 1984 figures suggest that the situation is moving towards a higher-density undeveloped recreation experience. If the management objective is to provide opportunities for the medium-density semiwilderness experience, then use levels probably should not be increased beyond the 120 person limit, especially since there is still room for average use levels to increase towards the 120 per day limit, as they have since 1977.

Chapter 5

VALUATION METHODOLOGIES; THE TRAVEL COST METHOD AND THE CONTINGENT VALUE METHOD

Travel Cost Method

The travel cost method (TCM) for estimating the economic value of recreation sites is an indirect market-based approach to valuation (Hueth and Strong, 1984). The value that the recreationist places on the site is derived indirectly by observing the recreationist's demand for marketed goods which are complementary to the site. The marketed good which makes up the largest share of the recreationist's expenditures is transportation. Therefore, travel costs are used, along with other expenditures that are directly related to the trip, as the implicit price of the total recreation experience.

As long as these expenditures vary among participants and can be measured, a trip demand curve (sometimes called a first-stage demand curve) can be estimated. The site demand curve (or second-stage demand curve) is derived by calculating the number of visits that would be demanded at increasing trip costs to the site. The ordinary consumer surplus from the site demand curve represents the net economic value of the recreation site. In this study, we have used the TCM to estimate the net economic value of non-commercial whitewater recreation on the wild and scenic portion of the Rogue River.

The Choice of Zonal TCM vs. Individual TCM

The travel cost method can be applied either to observations on individual behavior or to observations on groups of individuals who live similar distances from the recreation site. The latter is called a zonal model, and the dependent variable in the trip demand function is visits per capita. Alternatively, the individual model uses number of visits by each recreationist as the dependent variable. There are advantages to each approach, and discussions of the relative merits can be found in Brown, et al (1983).

In this study, most recreationists took only one trip to the Rogue River. If an individual model had been used, where the dependent variable was the number of visits an individual made, almost all the observations would have the same value (equal to one) for the dependent variable. Information on non-participants, whose value for number of visits would equal zero, was not collected in this study. Therefore, aggregating individuals into zones and calculating visits per capita results in a continuous dependent variable and allows the simplest estimation of the trip demand curve.

Delineation of Zones

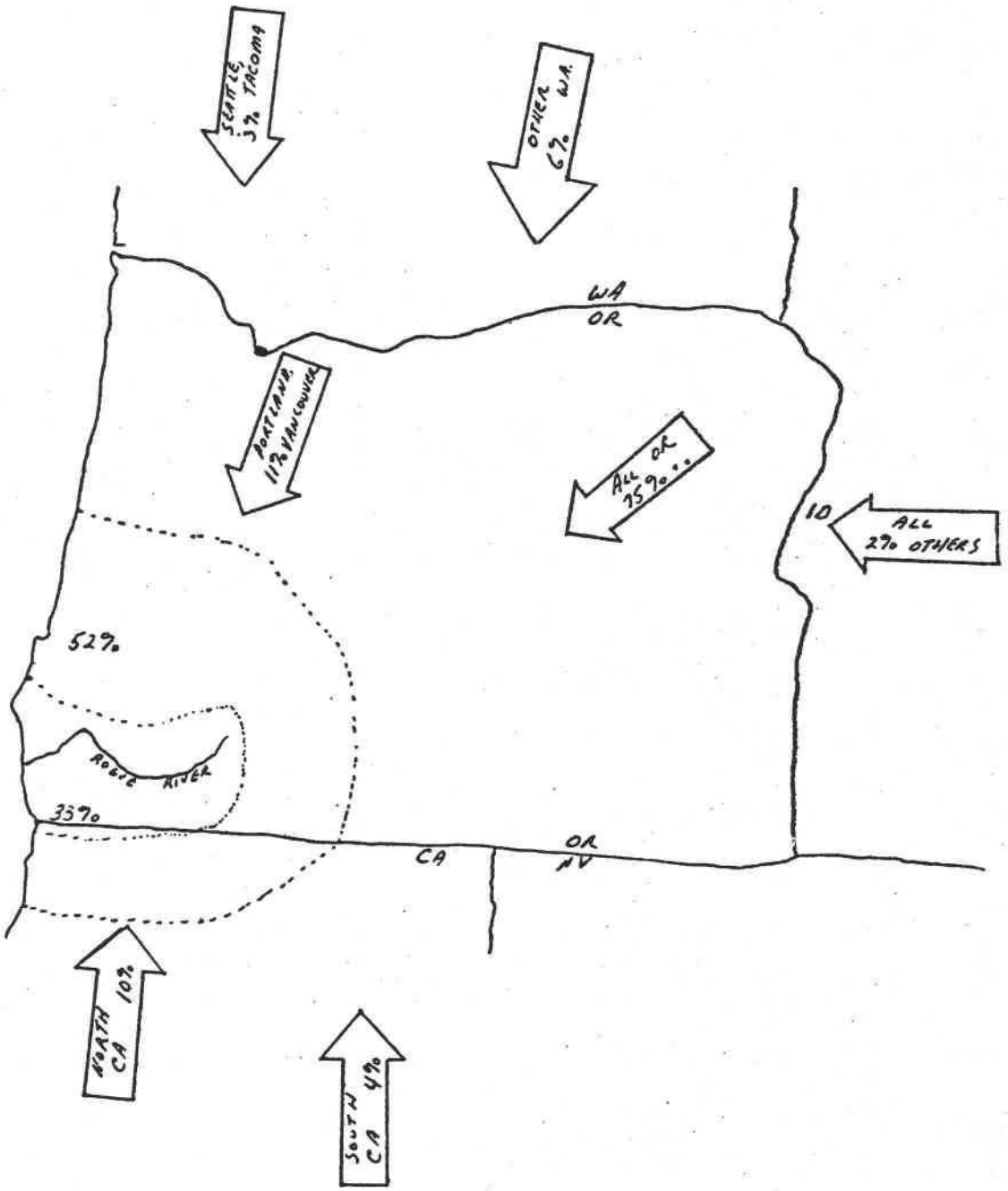
Each participant in the survey was asked for their county of residence, and an assumption was made that their trip originated from that county. Figure 2 shows the distribution of visits in relation to Oregon. The total number of trips taken from any county was then converted to trips per capita by using the population of each county (U.S. Bureau of the Census, 1983) as the denominators. Counties with less than three visits were aggregated with neighboring counties and the populations combined as well to calculate visits per capita.

It is clear from Figure 2 that the main market area for the Rogue River is within the western half of Oregon. Seventy-five percent of the total visits from this survey originated within the state of Oregon. At the same time, the 25% of the visits originating outside of Oregon are not insignificant, and most of these observations were included in the model. The observations from locations other than Oregon, Washington, or California were from quite distant locations and were, therefore, excluded as outliers.

Independent Variables

The general travel cost model includes a trip demand curve which relates the number of visits per capita from any origin to specified independent or explanatory variables. The general form of the zonal model can be written as:

Figure 2. Distribution of 1984 Non-Commercial Rogue River Users.



(4) $VPC_i = f(P_i, S_i, Y_i, D_i)$

where:

VPC_i = visits per capita from origin $_i$

P_i = the total price or cost of a visit from origin $_i$

S_i = an index or price variable for substitutes for origin $_i$

Y_i = household income of origin$_i$

D_i = measures of relevant demographic characteristics of origin $_i$

In this study, a single site TCM was used which focused mainly on alternative ways to specify the price or cost variable. In addition, several demographic variables were available from the survey which were also considered as relevant independent variables. In the regression analysis, however, only household income and age of the participant proved to be significant explanatory variables. It is likely that these two variables are highly correlated with other demographic variables, such as education and occupation, and multicollinearity could have caused the coefficients of these other variables to be statistically nonsignificant.

Travel Costs

The questionnaire used in this study was designed to gather detailed information on the costs that recreationists incurred for the purpose of their Rogue River trip (see Appendix 1 for the complete questionnaire). Many travel cost studies have had to rely on distance as the sole indicator of cost to the recreationist, even though the direct price of the trip includes many other costs such as lodging, food, beverages, and equipment rental (see Walsh, 1985, chapter 4.) If these other components of cost do not vary with distance travelled, then the simple method of using distance as an indicator of cost works fine in the travel cost method. The location of the market area relative to the recreation site being studied will determine whether these other costs are related to distance.

Table 10 shows the Rogue River data grouped into combinations of counties located different distances from the River. The categories of expenses or costs are from estimates given by the respondents on the questionnaire, and are averages for the groups. The respondents were asked

Table 10. Categories of Average Expenses by Distance Travelled.

Calculated Miles	Reported Travel Expense	Shuttle Cost	Food and Beverage Cost	Lodging Cost	Other Expenses	Total
25	12.69	16.55	25.83	0.00	20.27	75.34
50	17.63	15.50	31.67	0.00	5.00	69.80
59	18.30	21.30	33.10	7.62	35.41	115.73
88	28.70	23.37	59.44	10.00	0.00	121.51
95	15.38	17.22	22.92	0.00	38.75	94.27
133	27.50	17.67	22.40	20.00	75.00	162.57
152	27.64	20.13	40.97	19.75	11.75	120.24
176	20.00	10.00	21.25	0.00	50.00	101.25
195	25.48	15.60	22.86	7.70	18.75	90.39
210	43.50	22.22	37.00	35.00	45.00	182.72
218	42.50	16.25	26.25	46.75	12.50	144.25
235	145.00	39.17	68.57	22.00	18.33	293.07
244	36.00	16.00	87.50	32.50	0.00	172.00
249	39.44	26.67	76.67	100.00	36.67	279.45
259	40.71	21.62	46.93	42.22	25.00	176.48
264	28.00	23.65	48.68	11.25	14.25	125.83
266	29.86	18.71	35.00	15.00	30.00	138.57
273	48.75	23.75	73.33	0.00	0.00	145.83
280	63.33	45.00	58.67	14.00	0.00	181.00
350	54.17	23.20	29.09	24.00	90.00	220.46
407	70.83	42.54	38.64	34.33	10.00	196.34
420	40.63	18.07	37.69	34.29	8.00	138.68
453	133.33	14.00	21.67	0.00	0.00	169.00
705	236.54	20.82	70.56	71.25	133.40	532.57
838	185.00	10.00	16.67	40.00	0.00	251.67

for their share of each of these expenses, and therefore zero responses could occur. It is clear from inspection of Table 10 that total expenses are related to miles travelled (simple correlation = .74). However, when transportation expenses are not included in the total, the simple correlation between the other expenses and miles is .44. This does not show as strong a correlation between distance and non-transportation expenses, but these variables were still included in the regression analysis for the trip demand curve to test whether they were related to visits per capita from each zone.

An alternative to asking respondents about their expenses is to calculate an estimate of travel cost from the distance that people travelled. The advantage to this approach is that errors due to lack of recall from 6 months prior can be avoided. The disadvantage is that true variations from a distance-based cost (such as that due to people staying an extra night in a motel or people who don't share in the expenses) can't be accounted for.

There were two alternative measures of distance which could have been used to calculate travel cost. Highway mileage charts were used to calculate the distance between a zone and the Rogue River, and these are listed in Table 10 and 11 as Calculated Miles. Respondents were also asked to estimate their one-way miles to the Rogue. The group averages of these are reported in Table 11 as Reported Miles. Distance was converted to round trip travel cost by the following:

$$(5) \qquad TC_i = \frac{(D_i * 2 * .20) * PERC_i}{Ni}$$

where:

TC_i = travel cost from origin $_i$ to the Rogue River

D_i = measure of distance from origin $_i$, in miles

$PERC_i$ = percent of the trip which respondents stated was for the purpose of running the Rogue River, averaged by origin $_i$

N_i = average number of people per vehicle for each origin $_i$

Table 11. Alternate Measures of Distance and Cost.

Calculated Miles	Reported Miles	TC Based on Calculated Miles TC_i	TC Based on Reported Miles TC_i	Reported Travel Expense RTE_i
25.00	28.64	3.14	3.60	12.03
50.00	107.50	5.08	10.91	17.63
59.00	57.40	6.77	6.57	17.80
88.00	69.00	10.35	8.12	28.70
95.00	181.15	9.34	17.80	15.38
133.00	153.33	18.62	21.47	25.03
152.00	161.73	15.39	16.38	26.52
176.00	121.14	25.98	17.88	20.00
195.00	236.30	33.03	40.02	24.81
210.00	201.50	33.60	32.24	40.02
218.00	215.00	51.80	51.08	39.38
235.00	241.43	19.08	19.60	114.19
244.00	226.00	31.23	28.93	34.56
249.00	213.50	35.04	30.05	37.47
259.00	287.00	31.11	34.47	40.71
264.00	273.70	43.31	44.90	27.68
266.00	287.50	39.26	42.44	29.86
273.00	350.00	40.80	52.43	63.33
280.00	358.75	49.78	63.78	48.75
350.00	426.92	61.35	74.83	49.14
407.00	385.00	53.43	50.54	69.74
420.00	486.78	74.47	86.29	36.02
453.00	566.67	60.40	75.56	133.33
705.00	860.71	95.39	116.46	166.43
838.00	650.00	110.30	85.55	141.89

Table 11 shows the alternative measures of travel cost, based on the two different estimates of mileage -- the respondents' and the researchers'. The correlation between them is quite high (=.95), although in certain cases the difference is large. Table 11 also shows the reported transportation expense that respondents give when asked for their share of the trip costs. This measure is also highly correlated with the two TC_i - RTE: r = .73; TC_i - RTE: r = .71), but the large differences in certain cases is more frequent. All three of these measures of travel were tested in the regression equation for VPC_i to determine which was more highly correlated with actual trips.

It should be noted from equation (5) that the travel cost calculations have been adjusted for respondents who said that the Rogue River was not the sole purpose of their trip. In many previous studies, participants that had multiple purposes were omitted from the travel cost analysis. In this study, respondents were asked to estimate the percent of their trip purpose which was devoted to the Rogue River (see Appendix 1 for actual question). While most people responded that 100% of their trip was for this purpose, it turned out that adjusting travel costs for those with less than 100% resulted in improved regression statistics for the VPC_i equation. If this method for handling multi-purpose trips can be used as successfully in future studies, it would be a significant improvement over omitting observations, especially when data are sparse.

Time Costs

An important issue in previous TCM studies has been whether or not to include the opportunity cost of time in the price variable of the trip demand equation (see, for example, Bishop and Heberlein, 1979; Wilman, 1980). Theoretically, if an individual would have engaged in some other valuable activity during the time spent travelling to the recreation site, then that time has an opportunity cost which should be included in the price of the trip. In practice, there are two difficulties which arise. The first is that the opportunity cost of travel time for different individuals is not known, although studies have been done to attempt to measure it (see Winston, 1985, for a survey of past studies.) The second problem is that the inclusion of the time costs incurred during

travel makes it clear that any benefits which result from the travel itself also need to be included. It has often been noted in previous studies that people may enjoy their time spent travelling, either because the travel route is particularly scenic, or because some people simply find driving to be enjoyable. This does not imply that the individual does not have an opportunity cost of time, but that the benefit from travel time may be greater than the opportunity cost. If this is the case, then the TCM should actually reduce the price variable for those individuals, rather than increase it by some constant opportunity cost of time for all individuals.

This study addressed the issue of time costs in a variety of ways. The traditional method of using a constant opportunity cost of time for all individuals was employed at two different levels. Rosenthal and Donnelly (1985) have suggested using 1/4 of the wage rate, while Winston (1985) has suggested that 6% of the wage rate is more appropriate for recreationists. Both of these fractions were applied to the average hourly income reported by respondents. The resulting time costs, averaged by zone, are reported in Table 12.

An alternate method for estimating the time costs to an individual is to ask what people would be willing to pay to reduce their travel time. If people derive benefits from travel, this should be reflected in their response, and a "net" cost should be the result. This study asked people what they would be willing to pay to reduce their travel time (see Appendix 1 for the actual question,) and the results were converted to a total trip time cost variable (see Table 12). There was a drawback to this method, however, that should be emphasized. If people had a net positive value for travel time (benefit > cost), there was no way for them to express this. The limit on the response was to state that the willingness to pay to reduce travel time was zero. Therefore, the averages for each zone may be biased upward for this variable and future studies should attempt to correct for this problem.

Table 12. Alternative Measures of Time Costs.

Zone	Time Cost at 6% of wage	Time cost at 25% of wage	Willingness to Pay to Reduce Travel Time
1	0.83	3.42	15.08
2	1.25	5.19	18.00
3	2.49	10.37	16.99
4	3.25	13.54	23.27
5	3.68	15.35	67.60
6	4.13	17.22	81.38
7	6.63	27.21	29.68
8	6.25	26.06	70.80
9	6.31	26.30	43.97
10	7.13	29.72	48.25
11	8.86	36.91	33.98
12	9.91	41.28	8.57
13	11.46	47.75	69.33
14	17.47	72.78	74.33
15	11.48	47.82	86.86
16	10.36	43.16	44.80
17	7.24	30.18	95.48
18	9.26	38.59	53.66
19	15.51	64.62	107.69
20	13.33	55.56	57.95
21	19.79	82.46	112.41
22	15.29	63.73	106.77
23	29.90	124.58	45.34
24	32.05	133.55	88.85
25	38.55	160.62	31.93

Regression Results

The single site trip demand curve which was estimated in this study was of the following form:

(6) $VPC_i = a + b_iTDC_i + b_2INCOME_i + b_3AGE_i$

where:

VPC_i = visits from origin $_i$ / population of origin$_i$

TDC_i = total direct cost of the trip from origin$_i$

= transportation cost and time cost from origin$_i$

$INCOME_i$ = average reported income from origin$_i$

AGE_i = average of the respondents from origin$_i$

The variables for income and age were also entered in a quadratic form, but this did not result in a statistically improved equation. The TDC_i variable took the various forms which were explained in the last section. Table 13 shows the estimated forms of four different trip demand equations: one without any cost of time included, one with the cost of time equal to 6% of the wage rate, one with cost of time equal to one quarter of the wage rate, and one with the cost of time equal to what respondents said they would pay to reduce it.

The goodness-of-fit statistics for all of these equations are quite high relative to other studies. The signs on the coefficients are also in accordance with what is expected in theory, except for the sign on income in the last equation in Table 13. There could be a correlation between the income variable and the stated willingness to pay to reduce travel time which results in a multicollinearity problem.

Net Benefits to Non-Commercial Users -- TCM Results

The four alternative specifications of the trip demand curve in Table 13 can be used to generate net benefit estimates with the TCM. A software package by Rosenthal and Donnelly (1985) has been developed which generates the second stage or trip demand curves and calculates

Table 13. Estimated Trip Demand Curves with Alternative Price Variables.

(a) ln(VPC) = -4.187 - .062(TDC1) + .0000002(INCOME) - .093(AGE)
(1.461) (.005) (.000002) (.44)

R2 = .903 F = 65.67 N = 25

(b) ln(VPC) = -4.721 - .050(TDC2) + .0000002(INCOME) - .095(AGE)
(1.460) (.004) (.0000017) (.44)

R2 = .903 F = 65.67 N = 25

(c) ln(VPC) = -5.555 - .030(TDC3) + .0000047(INCOME) - .096(AGE)
(1.600) (.003) (.000002) (.49)

R2 = .884 F = 53.20 N = 25

(d) ln(VPC) = -2.594 - .029(TDC4) + .000003(INCOME) - .093(AGE)
(2.113) (.004) (.000002) (.63)

R2 = .804 F = 28.73 N = 25

where:

TDC_1 is measured with time cost equal to zero
TDC_2 is measured with time cost equal to 6% of the wage
TDC_3 is measured with time cost equal to 25% of the wage
TDC_4 is measured with time cost equal to reported willingness to pay to reduce travel time.

Numbers in parentheses are standard errors

the associated consumer surplus. This package was used for the Rogue data and the results are in Table 14. These results show that the value assigned to the opportunity cost of time has a significant impact on the resulting net benefits. Because the problem of estimating the opportunity cost of travel time has not been satisfactorily resolved in the literature, none of these estimates should be considered more "accurate" than another. However, since the reported willingness to pay to reduce travel time is likely to be biased upward (see the section on time costs), the estimate of $37.52 per trip can be considered an upper bound, while the estimate of $20.24 (where the opportunity cost of travel time = 0) can be considered a lower bound.

Contingent Valuation Methodology

The contingent valuation methodology (CVM) for assessing net benefits relies on the respondents' stated willingness to pay (WTP) for access to the resource under study. In this case, a permit for the Rogue River grants the user access to the whitewater and, therefore, the respondents could simply be asked for the maximum amount they would pay for a river permit (see Appendix 1 for the actual question.) This is an advantage over some of the previous studies where respondents may have found it difficult to imagine having to pay for access to a resource. Particular attention was paid to the wording of the CVM questions for this study. In an effort to avoid hypothetical bias problems, the respondent was reminded that the permit represented a "price of admission" for the respondent only. The payment vehicle (the permit) is a realistic and familiar method for the respondent to gain access, and the respondent was told to state the maximum amount that they alone would pay for that permit. In an effort to avoid strategic bias, the respondent was told that the answers would not affect the price of river permits.

The CVM was also used to elicit the minimum amount that the respondent would accept (WTS) to sell their permit to someone else. The same precautions were taken to avoid potential biases, although this type of question is more likely to suffer from hypothetical bias because of unfamiliarity with this type of transaction.

Table 14. Net Benefit Estimates - TCM

(a) Time value = 0; Average Net Benefit per trip = $20.24
Total Net Benefits to Non-commercial Users* = $114,639

(b) Time value = 6% of wage; Average Net Benefit per trip = $24.04
Total Net Benefits to Non-commercial Users = $136,163

(c) Time value = 25% of wage; Average Net Benefit per trip = $36.97
Total Net Benefits to Non-commercial Users = $209,398

(d) Time value = willingness to pay to reduce travel time;
Average Net Benefit per trip = $37.52
Total Net Benefits to Non-commercial Users = $212,513

*Based on 5,664 non-commercial users of the Rogue River in 1984.

It has been suggested in previous research (see Hanemann (1984) for example) that the CVM can be more realistic if the respondent is simply confronted with a dollar amount and asked whether they would pay (WTP) or take (WTS) that amount for the right of access to the resource. This method (sometimes called take-it-or-leave-it, TIOLI) is much more representative of the conditions which exist in an actual market situation. In this study, half of the sample was given a questionnaire with a TIOLI format. The dollar amounts which were presented to the respondents were generated from the early returns of open-ended questionnaires. In particular, the frequency distribution of open-ended responses was graphed and random numbers were used to generate TIOLI offers which would follow the same frequency distribution. The responses to the TIOLI offers were analyzed with a logit model, as described in an earlier section.

Open-Ended CVM Results

Previous studies which have employed the CVM have encountered problems with "protest" responses to the hypothetical questions. The problem arises when the protest takes the form of a zero response when, in fact, the respondent's true WTP or WTS is a positive amount. Unfortunately, the Rogue River survey did not systematically test for the presence of protest zeros, but inspection of the actual questionnaires allowed the identification of at least some of the protest responses. Table 15 summarizes the types of responses to the CVM questions and shows that protest responses were not prevalent in the WTP question, but are a potential source of bias in the WTS question. The unfamiliarity of the WTS framework was probably a contributing factor to the high number of protest responses to this question. There is also the implication in the WTS framework that the respondent is being asked to give up something which he has a right to and perhaps even invested a large amount of time to gain in the first place. The difference in the rights position of the respondent implied in the WTP and WTS situations accounts for both the larger protest responses to WTS and larger average dollar responses to WTS.

The responses to the open-ended CVM questions were analyzed using SPSS on a mainframe computer. The descriptive statistics for both the WTP and WTS questions are reported

Table 15. Frequency of Protest Responses to Open-Ended CVM Questions.

Type of Response	WTP Frequency	WTS Frequency
No Response	2	4
Protest or Don't Understand the Question	6	36
Protest and enter "0"	1	1
Enter "0"	11	19
Enter a Dollar Amount	230	190
	N = 250	N = 250

in Table 16. Recall that the sample was divided into three different types of respondents: those who received their permit through the lottery; those who obtained their permit from those unclaimed by lottery permit-holders; and passengers on someone else's permit. The results showed no statistically significant differences in the average willingness to pay among those three groups, for either the WTP or WTS responses. Therefore, the statistics in Table 16 represent the combined data from all three groups.

The extremely high WTS estimate relative to the WTP estimate is similar to the results from the Bishop and Heberlein study cited earlier. It is clear that the difference in these two measures is due to more than an income effect and is likely to be a result of the different rights positions, as described earlier. The consistent differences between these two measures in past studies has not been satisfactorily explained and is certainly an area where more research needs to be done. Table 17 describes the relationship between WTP and WTS estimates for an individual respondent. Over 70% of the respondents gave a WTS price that was greater than or equal to their WTP price, which is what we would expect a priori.

Dichotomous Choice Results

In the TIOLI format of the CVM, the respondent is faced with the dichotomous choice of answering either "yes" or "no" to the dollar amount in the question. Since different respondents were presented with different amounts ranging over the frequency distribution described previously, the responses can be analyzed to find the probability of responding "yes" or "no" to different dollar amounts. A maximum likelihood technique was used to estimate the parameters of the following equation:

$$(3) \qquad Pr(NO) = 1/1 + e^{-[-.922 + .0179(AMOUNT)]}$$

The t-statistic for the coefficient on AMOUNT was statistically different from zero at the .01 level.

A previous section described alternative statistics from this equation which can be used to represent the average willingness to pay for the river permit (also, see Hannemann, 1984). Of

Table 16. Results of the Open-Ended CVM-WTP and WTS.

	With Zeros		Without Zeros		
	Mean	Median	Mean	Median	Mode
Willingness to Pay (WTP)	$31.33	$17.50	$32.83	$22.50	$50.00
Willingness to Sell (WTS)	$133.28	$22.50	$146.61	$45.00	$50.00

Table 17. Relationship Between An Individual Respondent's WTP and WTS.

Relationship	Frequency	Relative Frequency
WTP = WTS	75	30%
WTP = WTS	104	41.6%
WTP = WTS	14	5.6%
WTP = WTS = 0	10	4%
WTP = WTS = No Response	1	.4%
WTP = WTS = Protest or Don't Understand	4	1.6%
Incomplete Pair or Protest in One Response	42	16.8%
	N = 250	100%

these, Hanneman states that the median of the distribution is the most robust estimate, i.e., less sensitive to errors in specification or outliers. The median of the WTP dichotomous-choice question was:

$$E^* = \$52.86$$

This value is significantly higher than either the open-ended CVM or the TCM results. This suggests that more empirical work needs to be done in the comparison of open-ended and TIOLI methods of the CVM. Since both of these methods were hypothetical in this study, there is no "true" or cash value with which to compare them. More studies of the type that Bishop and Heberlein did with simulated markets would be extremely valuable for addressing this issue.

ECONOMIC VALUES - SUMMARY AND CONCLUSIONS

The economic values which have been reported in this section cover a relatively wide range. However, a case could be made for considering the estimates between $24.04 and $37.52 per trip as the most reliable estimates for the value of non-commercial whitewater recreation on the Rogue in 1984. The low estimate of $20.24 per trip does not account for any opportunity cost of time spent travelling. The results of this survey, where people were asked what they would be willing to pay to reduce travel time, and other studies, such as those reported in Winston (1985), show that many people do consider their time spent travelling as a negative net benefit. The assignment of 6% of the wage rate as a value for time represents a very conservative adjustment for time costs, compared to previous studies.

The results from the WTS question clearly suffered from a lack of understanding by respondents as to the nature of the transaction about which they were being asked. In addition, there is a difference in the position of the respondent with respect to property rights between the WTP and WTS questions. This difference in rights has led to divergent estimates of WTP and WTS in repeated studies of this type. It is a policy issue to define the property rights positions before choosing the appropriate welfare measure and, therefore, there may be times when the WTS measure is more appropriate for decision-making. Unfortunately, the WTS estimates from this

study show indications of suffering from hypothetical bias. Comparisons with a simulated market would be extremely helpful in sorting out these issues.

Finally, the value of $52.86 per trip which resulted from the dichotomous choice format of the CVM should be used with caution. Current research is still investigating the alternative indicators of value which can be derived from a dichotomous choice framework, and this study has only reported the most robust estimate, according to Hannemann's work. The take-it-or-leave-it framework of the dichotomous choice CVM has the advantage of conforming to real market conditions. More research should be done to develop reliable estimates from this format.

It should be stressed that the results of this study do not imply that public agencies should charge fees set at the level of net economic benefit to non-commercial users. The question of whether user fees should be implemented, at any level, is a separate issue. The values presented in this study are intended to provide information about one of the uses of the Rogue River. Alternative uses of the river may not be characterized by the same institutional structure as the whitewater permit system, and economic values may not be directly comparable in that case.

REFERENCES

Alldredge, R.B. (1973). "Some Capacity Theory for Parks and Recreation Areas." Trends, 10(Oct. - Dec.):20-29.

Bishop, R.C. and T.A. Heberlein. (1979). "Measuring Values of Extramarket Goods: Are Indirect Measures Biased?" American Journal of Agricultural Economics, Vol. 61:926-930.

Bishop, R.C., T.A. Heberlein, and M. Kealy. (1983). "Contingent Valuation of Environmental Assets: Comparisons With a Simulated Market." Natural Resources Journal, Vol. 23:619-633.

Bishop, R.C., T.A. Heberlein, M.P. Welsh, and R.M. Baumgartner. (1984). "Does Contingent Valuation Work? Results of the Sandhill Experiment." Invited Paper, Joint Meeting of AERA and AAE.

Boyle, K.J. and R.C. Bishop. (1984). "A Comparison of Contingent Valuation Techniques." Agricultural Economics Staff Paper, No. 222. University of Wisconsin.

Brookshire, D.S., A. Randall and J. Stoll. (1980). "Valuing Increments and Decrements in Natural Resource Service Flows." American Journal of Agricultural Economics, Vol. 63:165-177.

Brown, W.G., C. Sorhus, B. Chou-Yang, and J.A. Richards. (1983). "Using Individual Observations to Estimate Recreation Demand Functions: A Caution." American Journal of Agricultural Economics, Vol. 65:154-157.

Clar, R.N., J.C. Hendee, and F. Campbell. (1971). "Values, Behavior, and Conflict in Modern Camping Culture." Journal of Leisure Research, 3(3):143-59.

Clawson, M. and J.L. Knetsch. (1966). Economics of Outdoor Recreation. Baltimore, Maryland: Johns Hopkins University Press.

Danley, M.S. (1980). "Resource Allocation and the Ability to Pay: A Case Study of Float Permits in Hells Canyon." M.S. Thesis, Oregon State University, Corvallis, Oregon.

Dwyer, J.F., J.R. Kelly, and M.D. Bowes. (1977). "Improved Procedure for Valuation of the Contribution of Recreation to National Economics Development." Water Resources Center, University of Illinois, Research Report No. 128.

Fisher, A.C. and J.V. Krutilla. (1972). "Determination of Optimal Capacity of Resource-based Recreation Facilities." Natural Resources Journal, 12:417-444.

Hanneman, W.M. (1984). "Welfare Evaluations in Contingent Valuation Experiments with Discrete Responses." American Journal of Agricultural Economics, Vol. 66:332-341.

Heberlein, T.A. (1977). Density, Crowding and Satisfaction: Sociological Studies for Determining Carrying Capacity. In Proceedings: River Recreation Management and Research Symposium, pp. 67-76. USDA Forest Service Technical Report, NC-28. North Central Forest Experiment Station, St. Paul, Minnesota.

Heberlein, T.A. and B. Shelby. (1977). "Carrying Capacity, Values, and the Satisfaction Model: A Reply to Greist." Journal of Leisure Research, 9(2):142-146.

Hueth, D. and E. Strong. (1984). "A Critical Review of the Travel Cost, Hedonic Travel Cost, and Household Production Models for Measurement of Quality Changes in Recreational Experiences." Oregon State University, Corvallis, OR (mimeo).

Kuss, F.R., A.R. Graefe, and J.J. Vaske. (1984). "Recreation Impacts and Carrying Capacity: A Review and Synthesis of Ecological and Social Research." University of Maryland, College Park, Maryland (forthcoming).

Lapage, W.F. and D.P. Ragain. (1974). "Family Camping Trends--An Eight Year Panel Study." Journal of Leisure Research, 6(4):101-112.

Manning, R. and C. Ciall. (1980). "Recreation Density and User Satisfaction: A Further Exploration of the Satisfaction Model." Journal of Leisure Research. 12(4):329-345.

McFadden, D. (1976). "Quantal Choice Analysis: A Survey." Anals of Econ. and Soc. Meas., Vol. 6:363-390.

Schreyer, R. (1979). Succession and Displacement in River Recreation. Paper presented for River Recreation Project. USDA Forest Service North Central Experiment Station, St. Paul, Minnesota. 45 pp.

Sellar, C., J. Chavas and J.R. Stoll. (1984). "Specification of the Logit Model: The Case of Valuation of Nonmarket Goods." Journal of Environmental Economics and Management. (forthcoming).

Sellar, C., J.R. Stoll and J. Chavas. (1985). "Valuation of Empirical Measures of Welfare Change: A Comparison of Nonmarket Techniques." Land Econ. 61 (MAY 1985): 156-75, (forthcoming).

Shelby, B. (1980). "Crowding Models for Backcountry Settings: Studies of Three Rivers." Journal of Leisure Research, 13(2):129-138.

Shelby, B. and R.B. Colvin. (1979). Determining Use Levels for the Rogue River. Water Resources Research Institute, #63. Oregon State University, Corvallis, OR.

Shelby, B. and M. Danley. (1980). Allocating River Use. USDA Forest Service Region 6, Portland, OR.

Shelby, B., T.A. Heberlein, J.J. Vaske, and G. Alfano. (1983). "Expectations, Preferences, and Feeling Crowded in Recreation Activities." Leisure Sciences, 6:1-14.

Stankey, G.H. and J. Baden. (1977). Rationing Wilderness Use: Methods, Problems and Guidelines. USDA Forest Service Research Paper INT-192.

U.S. Bureau of the Census. County and City Data Book, 1983. U.S. Government Printing Office: 1983.

U.S. Dept. of Agriculture. (1984). "1984 Wild Rogue River Actual Use." USDA Forest Service (mimeo).

U.S. Water Resources Council. (1979). "Procedures for Evaluation of National Economic Development (NED) Benefits and Costs in Water Resources Planning," Federal Register, 44:242:72,950-965.

Walsh, R.G. (1985). Recreation Economic Decisions. Colorado State University, Ft. Collins, CO. Venture Publishing, State College, Pennsylvania.

Walsh, R.G., L.D. Sanders, and J.B. Loomis. (1985). Wild and Scenic River Economics: Recreation Use and Preservation Values. American Wilderness Alliance, Englewood, Colorado.

Wilamn, E. (1980). "The Value of Time in Recreation Benefit Studies." Journal of Environmental Economics and Management, 7(3):272-286.

Winston, C. (1985). "Conceptual Developments in the Economics of Transportation: An Interpretive Survey." Journal of Economic Literature, XXIII (March):557-94.

Rogue River Whitewater Survey

Everyone wants the Rogue River to remain a high quality recreation area. But this requires careful planning. This survey will provide information about river runners and their feelings about the Rogue River as a recreation site. The information will be used by researchers at Oregon State University who are interested in the recreation value of a wild river.

Please try to answer every question, since a single missing answer will decrease the value of all your answers. There are no right or wrong answers; the best answer is the one which is closest to your own feelings and beliefs or what you actually did.

You may have run the Rogue River more than once during the 1984 permit season (Memorial Day to Labor Day). We are interested in the most recent trip you took during this period. *Please consider only this trip in answering the questions.*

For this trip, was the permit issued to you personally?

33% No
67% Yes → If yes, did you get the permit through the lottery in January?
- 63% Yes, I got my permit in the lottery in January.
- 37% No, I got my permit at a later time.

In this first section, we would like to ask some general questions about your river trip.

Overall, how would you rate this particular Rogue River trip?

	%		
	0	1	Poor
	.6	2	Fair, it just didn't work out very well
	4.5	3	Good, but I wish a number of things could have been different.
x =5.0	11.7	4	Very good, but could have been better.
	54.2	5	Excellent, only minor problems.
N=466	28.8	6	Perfect

Did you feel the river was crowded?

	1	2	3	4	5	6	7	8	9
%	21.5	23.9	15.1	12.6	8.3	11.5	4.3	1.5	.2
x =3.2	not at all		slightly crowded			moderately crowded			extremely crowded
N =454									

We are interested in how you feel about encounters with other groups during the trip. For each question, indicate the highest number of encounters you would tolerate before the experience becomes unpleasant. Please assume that all encounters are with float parties.

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

OK to have as many as x =6.5 encounters per day.

N =445 9.7% makes no difference to me.

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

OK to be near others as many as x =1.8 out of 5 nights.

N =443 13.1% makes no difference to me.

In planning this trip, did you attempt to avoid crowds by choosing a time when you thought there would be fewer people on the river?

N =466 44% No 34% Yes 22% It didn't matter

Different people think of the "Rogue River experience" in different ways. Three different alternatives are described below. Please take a moment to consider the alternatives and then tell us how you think of the Rogue.

Alternative 1: "Wilderness," a place generally unaffected by the presence of man.

Alternative 2: "Semi-wilderness," the kind of place where complete solitude is not expected.

Alternative 3: "Undeveloped recreation area," the kind of place where a natural setting is provided but meeting other people is part of the experience.

Of the three kinds of experiences described above, which do you think the Rogue River trip currently provides (check one)?

%	
4.3	wilderness
58.4	semi-wilderness
37.3	undeveloped recreation

N =464

Of the three kinds of experiences described above, which do you think the Rogue River trip should provide (check one)?

15.7	wilderness
57.8	semi-wilderness
26.5	undeveloped recreation

River trips on the Rogue have a number of features. People differ in what they feel is important for them personally. In this next section, we list a number of features of a Rogue River trip. Please indicate how important each feature was for you on your trip. (Circle one number from each item.)

x=		Not at all Important	Somewhat Important	Very Important	Didn't Experience
2.6	Observing plants, animals, and geology	1	2	3	0
2.9	Being in a natural setting	1	2	3	0
2.6	Being on the Rogue River	1	2	3	0
2.7	Being with family/friends	1	2	3	0
2.8	Relaxing; getting away from it all	1	2	3	0
2.7	Camping along the river	1	2	3	0
2.8	Running rapids	1	2	3	0
2.0	Having the river close to your home	1	2	3	0
2.2	Stopping at side creeks	1	2	3	0
2.2	Learning about the history of the Rogue River	1	2	3	0
2.1	Photographing the Rogue River	1	2	3	0
2.1	Seeing few other people while floating	1	2	3	0
2.2	Floating on quiet stretches of the river	1	2	3	0
2.8	Water quality	1	2	3	0
2.7	Seeing wildlife	1	2	3	0
2.0	Interacting with my guide or trip leader	1	2	3	0
2.7	Visiting historical sites	1	2	3	0
2.3	Sense of accomplishment from making it through the trip	1	2	3	0
2.3	Feeling safe	1	2	3	0
2.4	Confidence in my guide or trip leader	1	2	3	0
2.5	Good weather	1	2	3	0
2.5	Good food	1	2	3	0
2.5	Interacting with others on my trip	1	2	3	0
2.2	Seeing few other people at camps or attraction sites	1	2	3	0
1.7	Fishing in the Rogue River	1	2	3	0

Did we miss anything else that was important? (please specify)

_____

In this next section we would like to know about your preparation and travel for the trip.

When you made plans to run the Rogue, how far in advance did you decide to go?

About _____ months, _____ weeks, or x=119 days in advance.
M=90, Mode=180, Range=1 to 730 N=459

How much time did you spend traveling to the river?

About x=6.5 hours (one way). M=4.2, Mode=1.0, Range=1 to 120
N=465

How many miles did you travel to the river?

About x=225 miles (one way). M=165, Mode=200, Range=1 to 3000
N=450

How many people traveled with you in the same car?

Myself and x=3 other people.

Was the Rogue River your only purpose for this trip?

%	
89	Yes
11	No → If not, please list all your purposes and the percent of the total time devoted to each.

Purpose	% of time
Run Rogue River	
Total Trip	100%

How much time did you spend preparing for the trip?

About x=11.2 hours M=7.6, Mode=6, Range=0 to 80
N=460

How many days were spent on the river? Count the first and last days as whole days.

x=3.8 days. M=3.6, Mode=3, Range=1 to 9
N=464

Did you have to take time off from work to allow time for preparing for the trip, traveling to and from the river, or running the river?

N=466

%	
43	No
57	Yes → If yes, how much income did you lose by taking time off?

About $ x=230 N=221

How many hours do you work in a week? About x=41.6 hours.

How much paid vacation time do you have? x=2.8 weeks per year.

The following section asks about the dollar value of river running. This is a serious and important research issue. Even though these questions ask you to put yourself in an imaginary situation, please give us the best answer you can for each question. Your answers will not affect the price of river permits.

Think back to the time before you left home for your river trip. Assume you did not already have a permit, but that you could have purchased one for the date of your actual trip. What is the highest whole dollar amount you would have paid for a permit to get on the river? Think of this amount as the price of admission for yourself only, all of which you would have to pay. Even though this is an imaginary price, we would like you to fill in the same amount you would if it were the real cash price of a permit which you would pay.

The highest whole dollar amount I would actually have paid for a permit is

$ x=33.45 M=24.64, Mode=50.0, Range=0 to 450
N=234

Once again, think back to the time before you left home for your river trip. Assuming you already had a permit, what is the lowest whole dollar amount you would accept if someone wanted to buy it from you? Assume that the permit you are selling is for yourself only, so you could keep all the money. Even though this is an imaginary price, we would like you to fill in the same amount you would if it were the real cash price which someone would actually pay you.

The lowest whole dollar amount I would have accepted to give up my permit is

$ x=162.02 M=49.76, Mode=50.0, Range=0 to 5000
N=208

The following section contains questions about expenses for your Rogue River trip and the equipment you used on the river. We know it has been a while since the trip; just do the best you can to answer each question.

What type of boat did you use on the river trip?

%	
83	raft
5.5	inflatable kayak
7.7	drift boat
3.0	kayak
1.0	other (please specify)_____

Do you own this boat?

%	
32.5	No
67.5	Yes → If you own the boat, what was the total purchase price of the boat and related equipment (oars, frame, cooler, paddles, float bags, etc.)?

$ x=1963.00

What equipment is included in the above value for "boat and related equipment?" (Check those which are included).

_____ oars
_____ frame
_____ cooler
_____ paddles
_____ float bags
_____ spray skirt
_____ life vest
_____ helmet
Other (please specify):_____

What year was the boat purchased?_____

How many days is it used in an average year?_____

Did others in the group pay you for the use of your boat?

_____ No
_____ Yes → If yes, how much (total for group) $_____

If you rented or borrowed the boat and related equipment, what was your share of the cost?

$ x=77.70 N=129

Please list other equipment items which you own and used on this trip (such as camping gear). Please include only those items which have value over $25.00. For each item, please estimate its original cost, year purchased, and days used per year.

Do not include items listed above as part of "boat equipment."

Equipment	Original cost	Year purchased	Days used per year
tent			
sleeping bag			
camp stove			
dry bags			
cooler			
wet suit			
helmet			
life jacket			
Other (please list)			

Please estimate <u>your share</u> of the other expenses for your river trip (do not include boat and related equipment here).

Transportation expense N=411	$ x=42.90
Shuttle cost N=372	$ x=21.47
Food and beverages (above normal [at-home] food expense) N=387	$ x=39.53
Lodging en route and on river N=155	$ x=24.40
Other expenses (please specify): N=82	$ x=36.34

We think there are river runners who would like to run the Rogue River and could afford to do so, but they don't want to spend the time it takes to travel from their residence. They might be willing to pay some money if somehow paying cash could reduce the travel time. Assuming some alternatives were available, what would you be willing to pay to reduce to one half hour the travel time from your residence to the Rogue?

I would pay $<u>x=25.77, N=315</u> each way to reduce travel time to one half hour. x=38.40 (no zeros) N=201

The following section asks about your permit application and the permit system. Answers to some of the questions will be used to help estimate the value of whitewater recreation on the Rogue. Please give what you consider to be accurate estimates.

Did you apply for a permit through the lottery system?

N=457	%	
	77.2	Yes
	22.8	No→If not, why not? (check all the reasons which apply)

N=		
	13	Didn't know about the lottery.
	11	Not willing to pay $2 lottery application fee.
	32	Couldn't plan that far ahead.
	42	Didn't decide to go on river until after the lottery.
	39	Other (please specify)

How many attempts did you make to get a permit for <u>this</u> river trip?

x= 4	Number of lottery applications for this trip.
5	Number of phone calls for this trip.
1	Number of walk-in applications for this trip.

How many attempts did you make to get <u>other</u> Rogue River trip permits this season?

x= 4	Number of lottery applications for other trips.
7	Number of phone calls for other trips.
1	Number of walk-in applications for other trips.

If you applied for a permit through the lottery, you paid two dollars to enter the lottery. Would you have been willing to pay more?

N=421	%	
	51	No
	49	Yes→If yes, what is the maximum amount you would have paid?

$ x=7.77 M=5.20, Mode=5.0, Range=2 to 50 N=203

If you did not apply to the lottery, but would have done so if the fee were lower, what is the highest amount you would have paid?

$_____

If you phoned to ask for a permit, about how much money did you spend on phone calls?

$ x=6.60
_____ Did not phone for permit.

You paid a five dollar fee when you picked up your river permit. Would you have been willing to pay more?

N=446 % 42 No
58 Yes → If yes, what is the maximum amount you would have paid?

$ x=17.16 M=10.40, Mode=10.0, Range=1 to 100
N=257

How many trips on the Rogue did you actually take during the 1984 season (Memorial Day to Labor Day)? Include the trip you are describing in this questionnaire.

I actually took x=1.6 trips. M=1.23, Mode=1 (N=310), Range=1 to 10
N=459

How many trips would you have taken on the Rogue this season if there were no permit restrictions? Include the trip you are describing in this questionnaire.

I would have taken x=2.7 trips. M=2.2, Mode=1 (N=146) Range=1 to 25
N=452

Think back to the time of the lottery in January. Assume there were no restrictions and you could simply pay to reserve a space on the river on the the date of your choice. At that time, what is the maximum amount you would have paid for yourself only to reserve a space on the river?

In January I would have paid $ x=20.86 to reserve a space for myself on the day of my choice. N=431
M=14.6, Mode=10, Range=0 to 200

If you had been unable to obtain a permit for this Rogue River trip, what would you have done instead?

		%				
N=387	Run another river?	30	No	70	Yes	What river? 3. Salmon
N=267	Other recreation?	28	No	72	Yes	What activity? 1. Fishing
N=228	Stay home?	58	No	42	Yes	
N=220	Work?	57	No	43	Yes	
N=132	Other?	57	No	43	Yes	Specify

1. Deschutes
2. Klamath
3. Salmon

2. Camping
3. Backpacking

In this final section we would like to ask some questions about your background and occupation which will help us compare your answers with those of other people. We should stress that all of your answers are strictly confidential.

How old are you?

x=37 years old Range=9 to 77 N=467

Are you?

74% Male
26% Female

How many levels of school have you completed? (Circle the highest year or level)

1 2 3 4 5 6 7 8 9 10 11 12

x=13.7 _____ some college 13 _____ B.A. or equivalent 14
_____ M.A., M.S., or equivalent 15 _____ Advanced degree (M.D., Ph.D., etc.) 16

Please check the space that comes closest to your total household income before taxes. (Choose one)

_____	$0 to $3,999	_____	$48,000 to $51,999
_____	$4,000 to $7,999	_____	$52,000 to $55,999
_____	$8,000 to $11,999	_____	$56,000 to $55,999
_____	$12,000 to $15,999	_____	$60,000 to $63,999
_____	$16,000 to $19,999	_____	$64,000 to $67,999
_____	$20,000 to $23,999	_____	$68,000 to $71,999
_____	$24,000 to $27,999	_____	$72,000 to $75,999
_____	$28,000 to $31,999	_____	$76,000 to $79,999
_____	$32,000 to $35,999	_____	$80,000 to $83,999
x=10	$36,000 to $43,999	_____	$84,000 to $87,999
_____	$40,000 tO $43,999	_____	$88,000 to $91,999
_____	$44,000 to $47,999	_____	$92,000 or more

N=443

Are you currently: (Choose one)

20% single
10% separated, divorced or widowed
68% married
2% other

How many children do you have?

x=1.6 children

Where do you presently live?

21% farm or rural area
10% small town (4,999 or less)
37% small city (5,000 to 49,999)
18% large city (50,000 to 500,000)
6.5% very large city (over 500,000)
7.5% suburb - within 15 miles of a large or very large city

What county do you live in? _____

Where did you live (mostly) when you were growing up? (Choose one).

20% farm or rural area
11.5%small town (4,999 or less)
31.6%small city (5,000 to 49,999)
19% large city (50,000 to 500,000)
10% very large city (over 500,000)
8% suburb - within 15 miles of a large or very large city

What is your primary occupation? Please be as specific as possible. If retired, give former occupation.

7=18%, 6=23%, 5=27%, 4=14%, 3=10%, 2= 3%, 1=5% x=5, Mode=5

With reference to your primary occupation, are you currently: (choose one)

1.5% fully retired
3.3% semi-retired, working part-time
.7% retired, working at a different job part-time
2.5% unemployed, laid-off
80.6%working full-time
10.9working part-time

THANKS FOR YOUR TIME AND EFFORT TO HELP US WITH THIS STUDY. WE HOPE THE EXPERIENCE HAS BEEN PLEASANT FOR YOU. PLEASE RETURN THE QUESTIONNAIRE AS SOON AS POSSIBLE IN THE ENCLOSED SELF-ADDRESSED, STAMPED ENVELOPE.

Occupation code: 7-higher executives and professionals
6-managers and lesser professionals
5-administrative personnal, small business owners
4-sales workers, technicians 3-skilled manual employees 2-semi-skilled workers 1-unskilled employees