

Research Technical Completion Report
Project A-055-IDA

RELATIVE VALUE OF WATER AND
LAND OUTDOOR RECREATION ACTIVITY AREAS

by

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Submitted to

Office of Water Research and Technology
United States Department of the Interior
Washington, D.C. 20242

The project was supported primarily with funds provided by the Office of Water Research and Technology as authorized under the Water Resources Research Act of 1964, as amended.

Idaho Water Resources Research Institute
University of Idaho
Moscow, Idaho

April, 1979

Research Institute for the Study of
Project 100-114

INSTITUTE OF WATER AND

LAND SURVEY RESEARCH ACTIVITY

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Location of

Office of Water Research and Technology
United States Department of the Interior
Washington, D.C. 20250

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of Water Research and Technology, United States Department of the Interior,
Research Act of 1964, as amended.

John A. Hays, Research Director, Institute
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April 1968

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ABSTRACT

Preferences for selected water and land outdoor recreation activities at Heyburn State Park, Idaho are measured by the paired comparison method. Four sets of activities are measured. These are: (1) fishing, boating, swimming, hiking, camping, and picnicking; (2) dock fishing, boat fishing and shore fishing; (3) water skiing, motorboat fishing, and motorboating (for Pleasure); and (4) canoeing, sailboating, and motorboating. Preference scales for each set are compared between: (1) corrected and uncorrected for length of stay bias, (2) all respondents and only transitive respondents; and (3) all respondents and only those respondents who participated in both activities of the pair being compared. Preference rankings within a set sometimes vary with the criteria.

For the activity set fishing, boating, swimming, hiking, camping and picnicking the mean proportions of respondents and percentage of respondents selecting that activity are related to the percentage of management funds being spent on that activity area to derive a preference-cost ratio. These ratios were computed for all respondents, both corrected and uncorrected for length of stay bias; and head of party, both all respondents and those who participated in both activities of the pair. The number of participants is multiplied by the ratios to obtain weighted values. Boating was ranked first, and hiking was ranked second. Other activities in decreasing rank order are fishing, swimming, picnicking, and camping. The preference-cost ratios identify where unequal resource allocations are occurring. They do not, however, indicate whether or not it should be changed or how it should be changed if it is to be changed.

INTRODUCTION

Public park managers are continually making decisions concerning the allocation of funds at their disposal. Usually these are decisions by the manager, and they are influenced by the facilities and developments in the park and the manager's interpretation of visitor needs and desires. His value judgments are seldom based on a detailed analysis of visitor preferences since the profession does not have a generally accepted method of collecting this information.

The basic problem is one of not having a market system where free competition and consumer's choice will allocate the supply of resources and the demand for products and establish a price (value) of the product at the point where supply equals demand. Public recreation areas are almost always provided at less than cost and very seldom does a park agency have to raise specific portions of its budget through user fees. When user fees are charged, they are seldom activity specific, being usually an entrance fee into a park area. The only general exception is camping fees, but camping areas are seldom expected to pay for themselves. In the absence of a market system those who are responsible for the allocation of funds for outdoor recreation have had to rely on other methods of determining the value of the recreational experience (product). Usually, these are rather arbitrary decisions by the manager or other agency personnel.

Considerable effort has been expended by the research community to provide a way of measuring value. The two general methods currently in use, the willing to pay and the expenditures approach, try to measure the absolute value. Neither has been widely adopted as an allocation decision tool by park agencies. (See, Recreation Valuation by Dwyer, et. al., 1977, for a discussion on these two methods.)

For many decisions in park management, knowing the relative value of alternatives would be as useful as knowing the absolute value. When park managers allocate funds they are making relative judgments as to how much should go to each activity area. Since parks are usually not expected to "break even" or "make a profit" there is no need to know the absolute value.

PURPOSE AND OBJECTIVES

The purpose of this project is to implement a methodology to determine the cost effectiveness of each activity area in a water-oriented park. The specific objectives are to:

1. Measure the relative value of each activity by the paid comparison method.
2. Determine the preference-cost ratio or efficiency index for selected activities by comparing the relative value of the activity with the management cost of providing the area for the activity.

METHODOLOGY AND PROCEDURES

METHODOLOGY

The method selected to objectively measure the relative value or preference of outdoor recreation activities is the paired comparison method. This method, first developed by the sociologist Thurston in 1927 as part of his Law of Comparative Judgment (Dawes, 1972; and Edwards, 1957) provides a means of scaling items along a psychological continuum. From the information obtained from respondents, it is possible to place each item on the continuum and the distance between items is a measure of relative value. In this study the items are the recreation activities and the continuum is the value of or preference for the recreational activities.

The law of comparative judgments assumes that for a given stimulus there is associated a most frequently aroused response or discriminial process on a psychological continuum. The discriminial process is a theoretical concept and it is that which goes on when we make a response involving a judgment of some attribute. The law of comparative judgments also assumes that the distribution of discriminial processes is normally distributed when evoked by a stimulus.

In paired comparison techniques, respondents are asked to make comparative judgments of two items and to indicate which is the more favorable response to the stimuli (question). If the two items compared are equal, then respondents would indicate each item as being more favorable half of the time (ties are not permitted). If, however, one item of the pair is more favorable to some respondents, then those respondents would indicate that item as being more favorable.

The proportion of respondents giving value to each item of a pair can be expressed as a measure of the standard deviation of the distribution.

For example, the proportion of 67 to 33 for item "i" over item "j" of a pair can be expressed as 0.440 and -0.440 standardized values or z-scores, respectively.

If a number of items have been compared against each other then the relative value of any item can be found by summing all the standardized values or z-scores given for each item and dividing by the number of items. The item with the highest mean standardized value or z-score is the most valued item. The mean for each item provides or determines its location on the preference scale and is a measure of its relative value compared to the other items.

A drawback of the paired comparison technique is that each item must be compared against every other item that will be on the same scale. For example, if you are comparing 10 items, then the number of paired comparisons is $n(n-1)/2$ or 45 comparisons. For large number of items the method becomes very cumbersome and time consuming for the respondents.

To avoid this time consuming aspect, this study utilizes four sets of items in the paired comparison questions. The first set of items consists of the activities fishing, boating, swimming, hiking, camping and picnicking. The second set consists of dock fishing, boat fishing and shore fishing. The third set is composed of water skiing, motorboat fishing, and motorboating (for pleasure). The fourth set is the activities canoeing, sailboating, and motorboating. Within each set each item was compared against every other item and respondents were asked to "...pick the one activity in each pair that gives you greater enjoyment or that you think you would enjoy more if you were ever to participate in both activities at Heyburn State Park." Appendices A and B contain copies of the paired comparison questions.

One assumption of the paired comparison method is that each respondent has the same total preference or possible enjoyment for his visit. All visitors are considered equal in the weight given to his/her visit. This method does not consider or take into account the preference a visitor may have for visiting Heyburn State Park rather than some other park and recreation area.

PROCEDURES

Heyburn State Park in northern Idaho was selected as the study area for several reasons. One is that the enjoyment derived from or the value of different recreation activities depends in part on the location in which they occur. For example, camping in a flat, desert area would probably have a different value for many people than would camping by a lake in a forested mountain area. If a study like this is not site or location specific then the results are general and possibly not valid for any specific area.

A second reason why Heyburn State Park was chosen is because it is a water-oriented park, being located at the south end of Lake Coeur d'Alene. This permitted the comparison of water and land related activities. Other reasons for studying this park include: being fairly close to the University of Idaho at Moscow; it is a well known park, as it is the oldest state park in Idaho; and all the developments have been available for a number of years so that recreation opportunities available to visitors are probably as widely known as can be expected.

Heyburn State Park encompasses 5,505 acres of land and 2,333 acres of water at the southern tip of Lake Coeur d'Alene in northern Idaho. Developments in the park include three campgrounds (136 campsites), four

picnic areas, three boat ramps and docks, two docks without boat ramps, one swimming beach, and several trails.

The technique used to collect the paired comparison data was the interview questionnaire. Respondents were stopped at several areas in the park and asked to fill out a questionnaire on the spot. Every member of a party that was stopped, who was 12 or over, was asked to complete a questionnaire. Heads of parties were given a questionnaire that asked for demographic and socio-economic information as well as the paired comparison questions. Appendix A contains the questionnaires given to party heads and Appendix B the questionnaire given to other members of the party.

On 30 randomly selected days visitors were stopped at four types of areas in the park. These four types of areas are: (1) Rocky Point swimming and picnic area, eight survey days; (2) boat ramps and docks, eight survey days; (3) picnic areas (except Rocky Point), seven survey days and (4) campgrounds, seven survey days. On a given survey day only one type of area was covered and the interviewer would contact visitors at that type of area. But since there are several picnic areas, boat ramps and docks, and campgrounds, the interviewer would travel from site to site and speak to all visitors at the site. Visitors using a facility but not at the site when the interviewer was there were not included in the sample. This non-response bias would be most pronounced at the boat ramps, where the length of stay for most visitors is fairly short.

A total of 403 interview questionnaires were obtained from 227 groups. There were 297 collected on weekends/holidays and 106 on weekdays. The biggest number, 169, were collected in the campgrounds, while 58 were passed out at picnic areas, 77 at boat ramps and docks, and 99 at Rocky Point picnic area and swimming area. Boats that come into the park's water area from other parts of the lake but did not use the docks or ramps were not included

in the survey since the park did not incur any management costs. Appendix C contains a list of survey days, the location, and the number of questionnaires obtained.

After the data were collected the responses were transferred to data processing cards. Analysis was then prepared by the University of Idaho Computing Center.

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puter center.

RESULTS

The results section is separated into three parts. The first part presents social and demographic data, the second part contains the paired comparison preference analysis, and the third part presents the preference-cost analysis.

One possible source of bias in the results is that those who stay longer than one night are over represented in the sample. This is because those who stay longer have a greater chance of being selected in the sample. This bias can be corrected by multiplying the frequency of occurrence by the reciprocal of the length of stay ($1/\text{length of stay}$). Then when frequencies are summed, those who stayed longer have less effect on the proportion matrix. The values given below in the social and demographic/narrative are uncorrected for length of stay bias unless otherwise noted. Results given in paired comparison analysis are corrected for length of stay bias unless otherwise noted.

SOCIAL AND DEMOGRAPHIC ANALYSIS

The head of party respondents were asked to indicate which activities they participated in. The activity with the greatest participation is camping with 152 respondents. This is not unexpected since the greatest number of interview questionnaires were distributed in the campgrounds. But the large response compared to the total interview-questionnaires collected in campgrounds indicates that many groups in day use areas were also camping in the park (Table 1).

Table 1
ACTIVITIES PARTICIPATED IN BY HEAD OF PARTY RESPONDENTS

	Number	Percentage ¹
Camping	152	67.0
Hiking	75	33.0
Picnicking	127	55.9
Swimming	135	59.5
Fishing	130	57.3
Dock Fishing	75	33.0
Boat Fishing	85	37.4
Shore Fishing	38	16.7
Boating	124	54.6
Water Skiing	68	30.0
Canoeing	16	7.0
Sailboating	5	2.2
Motorboating	97	42.7
Nature Study	40	17.6

Total number of respondents is 227.

¹Does not add to 100 percent since a respondent may have participated in more than one activity.

By sex, there were 188 male respondents and 202 female respondents (13 did not indicate sex). By age categories the single greatest number of respondents was 96 in the age category 20-29 years. Over half, 65 percent, were under 40 years of age. The average age was 33.5 years (Table 2).

Table 2
AGE CATEGORIES OF RESPONDENTS

Age Category (years)	Number of Respondents	Percentage
1 - 19	80	20.4
20 - 29	96	24.5
30 - 39	86	21.9
40 - 49	69	17.6
50 - 59	36	9.2
Over 59	25	6.4

Based on 392 responses (11 persons did not answer this question).

There were a total of 227 groups that were stopped and asked to complete an interview questionnaire. Most of the "head of the group" respondents (88 percent) indicated that Heyburn State Park was a "destination" area rather than a "passing thru" area.

The number of people in the group varied from 1 person to 35 persons. The average (mean) group size was 5.5 persons while the median group size was 4.2 persons. But the average group size is strongly influenced by a few large groups since 68 percent were in groups of five or smaller. Table 3 lists the frequencies by group size.

Table 3
PERSONS PER GROUP

Group Size	Number of Groups	Percentage
1	4	1.8
2	39	17.3
3	31	13.7
4	57	25.2
5	24	10.6
6	14	6.2
7	12	5.3
8	11	4.9
9	7	3.1
10	11	4.9
12	2	0.9
13	4	1.8
14	1	0.4
15	2	0.9
16	1	0.4
19	1	0.4
20	1	0.4
22	1	0.4
30	1	0.4
32	1	0.4
35	1	0.4

Based on 226 groups (1 group did not respond)

Most of the groups, 40.1 percent, were composed of immediate family members only. Groups containing family and friends were the second most numerous while only 7 groups, or 1.3 percent, were part of organized groups such as a church group or boy scout troop. Table 4 lists the number of groups by category.

Table 4
CATEGORY OF GROUP

Category	Number of Groups	Percentage
Individuals	4	1.8
Immediate Family	87	38.3
Friends	28	12.3
Family and Friends	45	19.8
Family and Relatives	36	15.9
Family, Friends & Relatives	24	10.6
Organized Groups	3	1.3

Based on 227 groups

Most head of group respondents, 62.8 percent, indicated that their one way travel distance was less than 75 miles. The single greatest travel range was 51-75 miles with 30 percent traveling this distance. Table 5 lists the number of groups by travel distance.

Table 5
ONE WAY TRAVEL DISTANCE

Distance	Number of Groups	Percentage
0 - 25 miles	30	13.3
26 - 50	44	19.5
51 - 75	68	30.1
76 - 100	27	11.9
101 - 150	14	6.2
151 - 200	4	1.8
201 -1000	22	9.7
over 1000	17	7.5

Based on 226 groups (1 group did not answer this question).

The average length of stay for each group is 4.7 days while the average adjusted for length of stay bias is 1.6 days. These uncorrected results, however, are strongly influenced by 5 groups that stayed all summer. Approximately 30 percent of the groups were day users only, while 60 percent stayed from 1 to 6 nights. For overnight visitors 29 percent stayed two nights. (Table 6).

Table 6
LENGTH OF STAY

Time	Number of Groups	Percentage
Less than 3 hours	9	4.0
3 - 6 hours	33	14.7
6 -12 hours	21	9.4
12 -18 hours	4	1.8
1 night	22	9.8
2 nights	65	29.0
3 nights	28	12.5
4 nights	10	4.5
5 nights	7	3.1
6 nights	4	1.8
7 nights	7	3.1
9 nights	1	0.4
11 nights	1	0.4
12 nights	1	0.4
14 nights	3	1.3
30 nights	1	0.4
21 nights	1	0.4
30 nights	1	0.4
all summer	5	2.2

Based on 224 groups (3 groups did not respond).

Of the head of group respondents, 89 percent possessed a high school degree or more, and 26.9 percent had a college degree or better. Table 7 gives the education level.

Table 7

EDUCATION LEVEL

Education	Number of Groups	Percentage
Elementary	1	0.5
Some High School	24	10.9
High School Graduate	53	24.1
Some College or Vocational Education	88	40.0
College Degree	30	13.6
Working on Advanced Degree	6	2.7
Advanced Degree (M.A., M.S., Ph.D., M.D., etc.)	18	8.2

Based on 220 head of group respondents (7 respondents did not answer this question).

INCOME

Less than 17 percent of the head of the group respondents had family incomes of less than \$10,000 annually. Over half, 65.1 percent, had incomes in the \$10,000 to \$25,000 range. Table 8 gives the family income levels.

Table 8

FAMILY INCOME

Range	Number of Groups	Percentage
\$ 0- 2,999	7	3.4
3,000- 4,999	9	4.4
5,000- 9,999	18	8.8
10,000-14,999	49	24.0
15,000-19,999	46	22.5
20,000-24,999	38	18.6
25,000-29,999	19	9.3
30,000-34,999	8	3.9
35,000-39,999	3	1.5
40,000-44,999	4	2.0
45,000-49,000	1	0.5
over \$50,000	2	1.0

Based on 204 head of group respondents (23 respondents did not answer the question).

PAIRED COMPARISON ANALYSIS

The first two items to be compared asked for the respondents' preference for water-based or land-based recreation. There were 57.2 percent who stated that they enjoyed water-based activities more than land based activities, indicating that Lake Coeur d'Alene is the main reason why visitors go to Heyburn State Park. Camping may be the activity with the greatest number of participants, but as a group, water related activities are the preferred activities.

The preferences for each activity of the pairs are converted to proportions and assembled in a matrix for each set. The proportion matrices are the intermediate step in preparing the scales of the paired comparison method. The proportion matrices are found in Appendix D.

The proportion matrix is used to determine the standardized values or z-scores. These scores are used to find the mean preference of each activity by summing the scores of a column and dividing by the number of non-zero scores in that column. The z-scores or standardized value matrices are found in Appendix E.

The next step was to plot the standardized values or z-scores on a graph. This permits a visual analysis of the preference difference or distance between activities. These graphs are found in Figures 1 through 8. The highlights of each figure are given below.

ALL RESPONDENTS

Camping, with a scale value of .447 is the most preferred activity for the set of activities fishing, boating, swimming, hiking, camping and picnicking. Boating was second with a scale value of .252 while fishing and hiking were last with scale values of $-.266$ and $-.355$ respectively. Figure 1 shows the relative scale positions and scale values for each activity of the set, for both uncorrected and corrected for length of stay bias.

The activity set motorboating, canoeing, and sailboating showed a very strong preference for motorboating with a scale value of .490. It was almost .6 units higher than the scale value of canoeing. The scale values for canoeing and sailboating were very close with values of -.231 and -.259, respectively. Figure 2 contains the scales for both uncorrected and corrected for length of stay bias.

The activities of the set waterskiing, motorboating (for pleasure) and motorboat fishing were all closely grouped together with scores of .159, .058 and -.216, respectively. This indicated only slight preference for one activity over the other activities. Figure 3 has the scale values for both uncorrected and corrected for length of stay bias.

The fourth set of activities has the greatest preference range. Boat fishing, at .581 is preferred above shore fishing at -.567 by over 1 unit. Dock fishing lies approximately in the middle of the preference scale at -.015. Figure 4 presents the scale values for both uncorrected and corrected for length of stay bias.

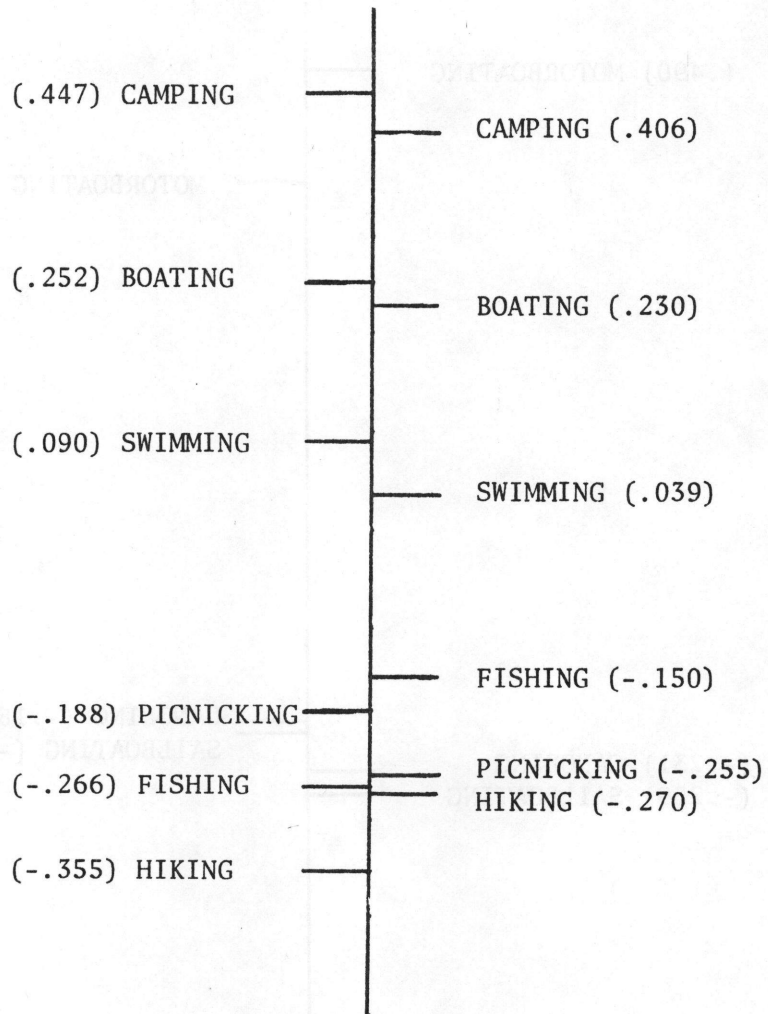
The effect of correcting for length of stay bias on the preference scales is of two types. The one effect on all scales (Figures 1 through 4) was to widen or lengthen the scale distance between the highest and lowest activities items on the scale. On one scale, Figure 3, it doubled the distance between the highest and lowest activities, water skiing and motorboat fishing. Those who stay more than one night tend to give equal value to all the activities.

The other effect of correcting for the length of stay bias occurred on the scales for the six activities fishing, boating, swimming, hiking, camping, and picnicking (Figure 1). The activities picnicking and fishing changed locations on the scale. Picnicking changed from fifth to fourth while fishing did just the opposite. Those who stay one night or less place a higher value on picnicking than they do fishing.

Figure 1
 PREFERENCE SCALE FOR
 FISHING, BOATING, SWIMMING, HIKING, CAMPING, AND
 PICNICKING
 All Respondents
 Standardized Or Z-Score Means

Corrected¹

Uncorrected¹



¹ For length of stay bias z-score matrices are found in Appendix E

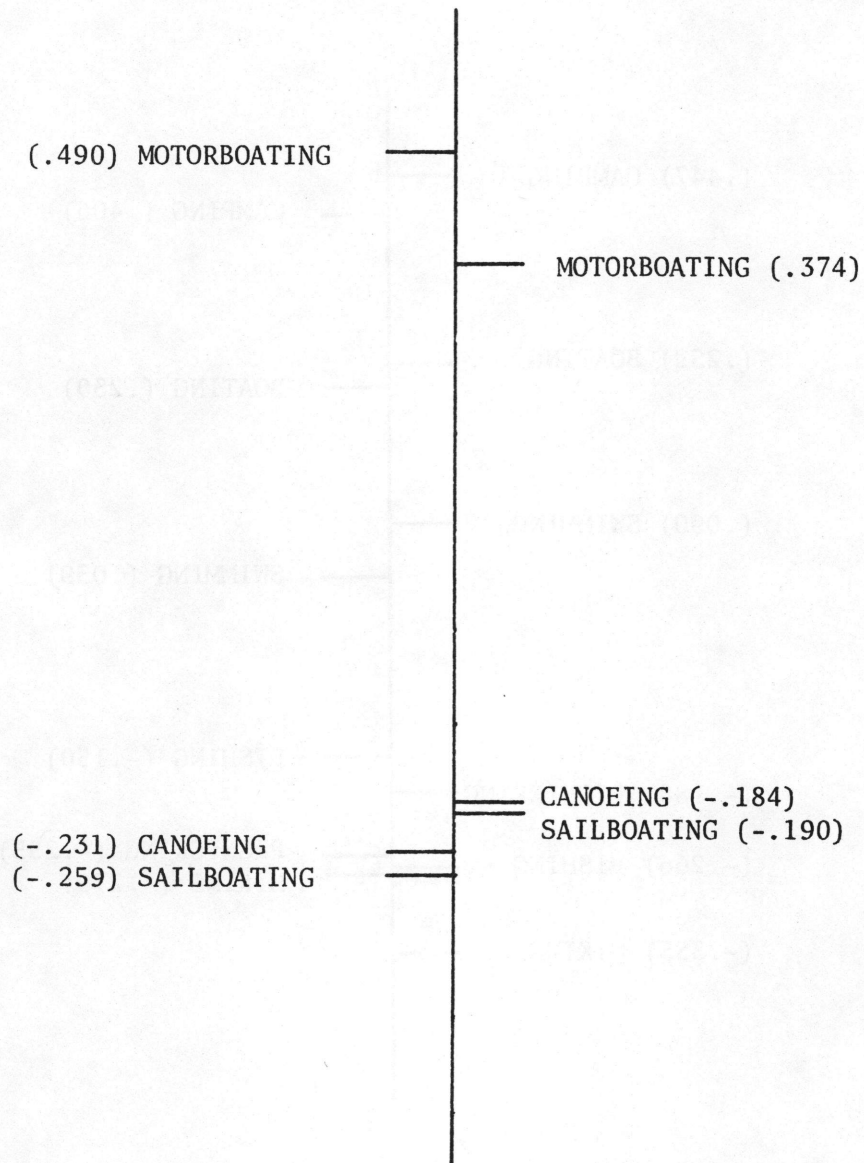
Figure 2

PREFERENCE SCALE FOR
CANOEING, MOTORBOATING, AND SAILBOATING

All Respondents
Standardized Or Z-Score Means

Corrected¹

Uncorrected¹



¹ For length of stay bias
z-score matrices are found in Appendix E

Figure 3

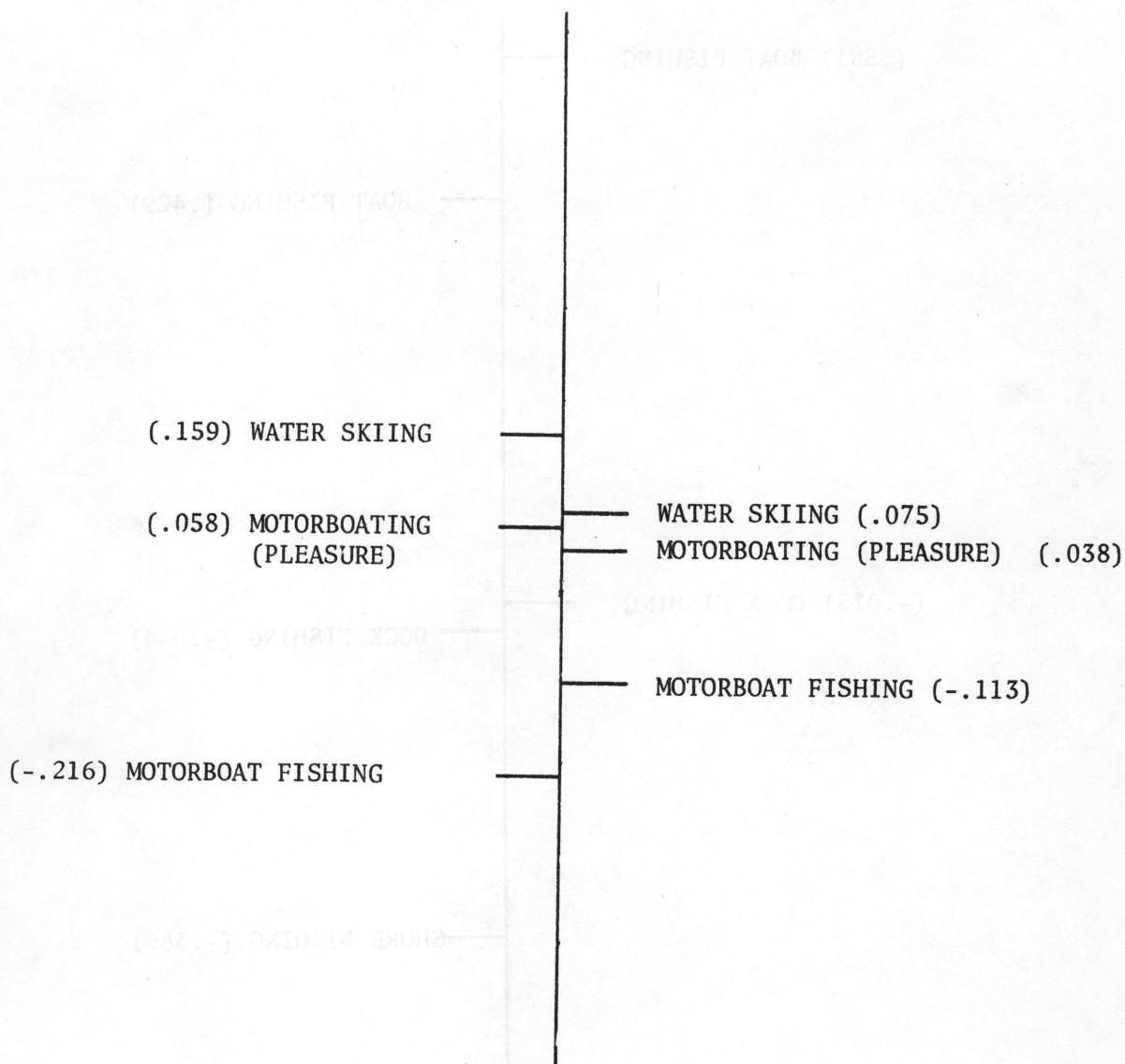
PREFERENCE SCALE FOR
WATER SKIING, MOTORBOAT FISHING, AND MOTORBOATING (PLEASURE)

All Respondents

Standardized Or Z-Score Means

Corrected¹

Uncorrected¹



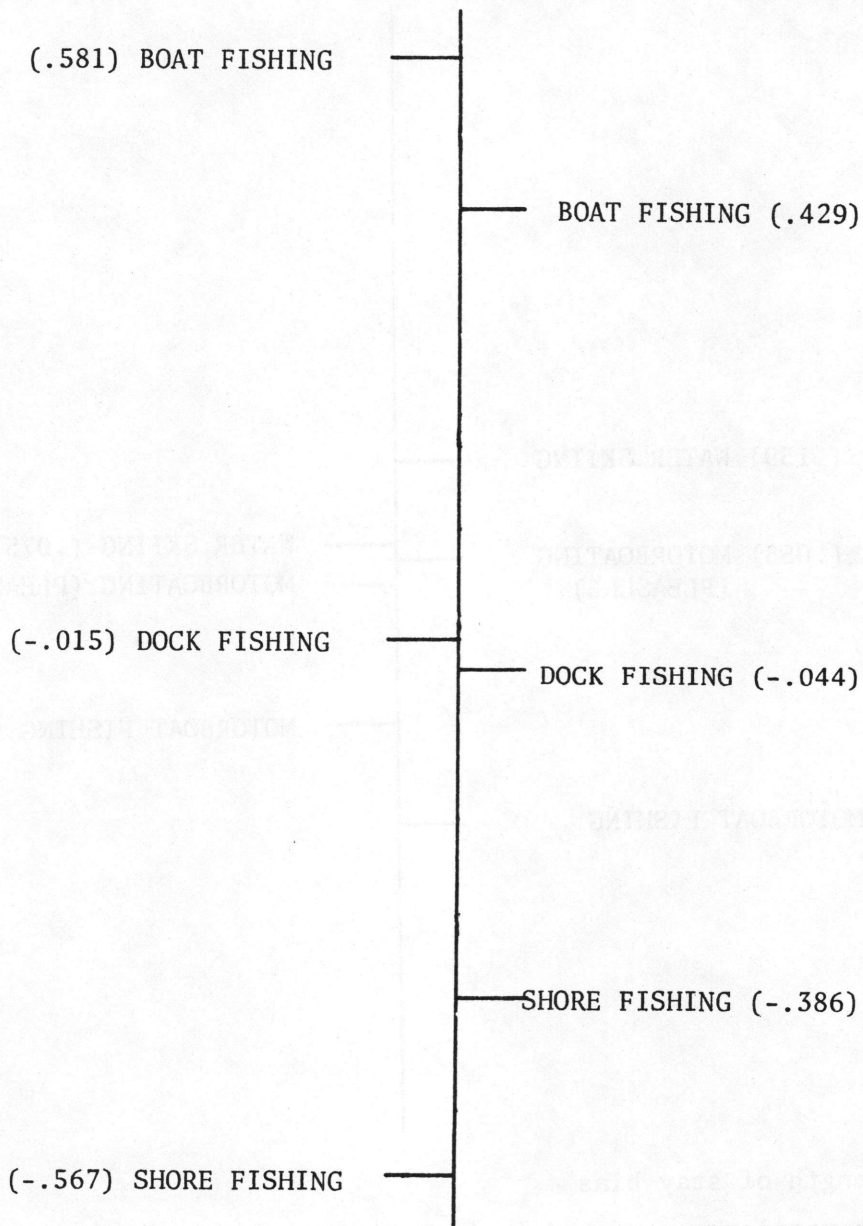
¹ For length of stay bias
z-score matrices are found in Appendix E

Figure 4

PREFERENCE SCALE FOR
BOAT FISHING, SHORE FISHING, AND DOCK FISHING
All Respondents
Standardized Or Z-Score Means

Corrected¹

Uncorrected¹



¹ For length of stay bias
z-score matrices are found in Appendix E

INTRANSITIVES

One of the potential problems of the paired comparison approach is intransitives, or observations wherein the respondent states that A is preferred to B, B is preferred to C, but C is preferred to A. When this occurs A and C are said to be intransitive. (Tversky, 1969) There are two explanations for intransitives. One is that the activities are equal in preference to the observer and, therefore, there is a 50 percent chance for an intransitive situation.

The other explanation is that there is more than one underlying dimension or different dimensions used to evaluate A, B and C. If this is the case then the answers are logical but one of the assumptions of the paired comparison approach is violated. This is that all variables are measuring the same thing.

The analysis for intransitives is done according to the statistical method developed in the computer program CLUSTR (Steinhorst, 1978). (This approach does not correct for length of stay bias.) The analysis for the effect of intransitives is accomplished by identifying and removing any individual pairs that contain intransitives and then reanalyzing to see if the ranking is changed. (If more than 50 percent of the pairs of that observation were intransitive then the whole observation was deleted.)

The inclusion or removal of intransitive pairs for the three sets of three activities each did not have any effect on the ranking of the activities. This is not surprising in view of the low number of intransitives present in each set. For the set of activities boat fishing, shore fishing and dock fishing, there were 17 intransitive observations. For the set canoeing, motorboating and sailboating, there were eight intransitive observations. The activity set water skiing, motorboat fishing, and motorboating had 14 intransitive observations. These intransitives are out of a possible 403 observations.

The activity set fishing, boating, swimming, hiking, camping and picnicking had the greatest number of intransitive situations, 145. This can be explained in part by there being more changes for intransitives since there are 15 comparisons being made on each observation (instead of three as in the other sets). Other possible explanations include two or more activities being nearly equal in value or two or more activities have different underlying dimensions being measured.

Removal of intransitive pairs for the set of activities fishing, boating, swimming, hiking, camping and picnicking resulted in a new ranking for two activities. The last two, hiking and picnicking changed places, with picnicking placing last. When the intransitive pairs are not included, the interpretation of this change is that there are different dimensions underlying preference for these two activities. However, since the preference scale values before removing intransitive pairs were very close (picnicking is .255 and hiking is .270) the underlying dimensions may be very similar. Unfortunately the computer program PRCLUSTER does not provide a respondent or proportion matrix to allow development of preference scales with intransitive pairs not included.

HEAD OF PARTY RESPONDENTS

The activity participation question was only completed by head of party respondents. Therefore, the following analysis is limited to these respondents. A comparison of preference scales for head of party respondents between all respondents, and respondents who participated in both activities of the pair is discussed below. All observations have been corrected for length of stay bias.

It should be noted that when participation in both activities is required for scale construction then the number of respondents changes considerably. For example, only 27 head of party respondents participated in both boating and hiking activities, and when this number is adjusted for length of stay bias it is the equivalent of 13.13 respondents. (Tables 9 through 12 give the number of respondents for each pair.)

For the set of the six activities camping, boating, swimming, fishing, hiking and picnicking there was a large shift for two activities while the other four activities remained essentially the same. This change occurred only on the scale where participation in both activities of the pair is a requirement. Hiking changed from sixth place to fifth place while its scale value changed from $-.495$ to $-.207$. Picnicking changed from fourth place to sixth place and its scale value changed from $-.110$ to $-.482$. These changes indicate that those who participate in both activities have, for two activities, different value judgments as to the relative value of each activity. (Figure 5 contains the scales.)

The set of activities boat fishing, dock fishing, and shore fishing did not change rank between all respondents and those who participated in both activities of the pair. The effect of participating in both activities was to increase the difference in relative value. For example, boat fishing on the all respondent scale was 0.568 while on the both activities scale it was 1.141 . (Figure 6 contains the preference scale.)

Table 9

RESPONDENT MATRIX FOR THE ACTIVITIES
FISHING, BOATING, SWIMMING, HIKING, CAMPING, AND PICNICKING

Participation in Both Activities of the Pair

Heads of Parties

Corrected for Length of Stay Bias

	Fishing	Boating	Swimming	Hiking	Camping	Picnicking
Fishing	0	16.92	17.42	9.14	19.97	20.32
Boating	20.34	0	15.14	5.54	18.33	8.51
Swimming	13.45	24.66	0	8.30	24.61	20.16
Hiking	6.08	7.58	10.97	0	19.10	11.99
Camping	15.13	14.57	7.66	7.76	0	4.73
Picnicking	20.29	34.40	37.41	6.78	27.85	0
TOTAL	75.29	98.13	88.60	37.52	109.86	65.71
MEAN	15.06	19.63	17.72	7.50	21.97	13.14
PERCENTAGE OF THE GRAND TOTAL (Sum of all columns)	15.85	20.66	18.65	7.90	23.13	13.83

The value in the Matrix is the number of respondents picking the column activity over the row activity.

Table 10
 RESPONDENT MATRIX FOR THE ACTIVITIES
 CANOEING, MOTORBOATING, AND SAILBOATING
 Participation in Both Activities of the Pair
 Heads of Parties
 Corrected for Length of Stay Bias

	Canoeing	Motorboating	Sailboating
Canoeing	-	1.01	0.0
Motorboating	0.50	-	1.00
Sailboating	0.01	0.44	
TOTAL	0.51	1.45	1.00
MEAN	0.255	0.725	.500

The value in the matrix is the number of respondents picking the column activity over the row activity.

Table 11
 RESPONDENT MATRIX FOR THE ACTIVITIES
 WATER SKIING, MOTORBOAT FISHING, AND MOTORBOATING (PLEASURE)
 Participation in Both Activities of the Pair
 Heads of Parties
 Corrected for Length of Stay Bias

	Water Skiing	Motorboat Fishing	Motorboating (Pleasure)
Water Skiing	-	3.62	7.34
Motorboat Fishing	10.98	-	10.86
Motorboating (Pleasure)	20.31	15.60	-
TOTAL	31.29	19.22	18.20
MEAN	15.65	9.61	9.10

The value in the matrix is the number of respondents picking the column activity over the row activity.

Table 12
 RESPONDENT MATRIX FOR THE ACTIVITIES
 BOAT FISHING, SHORE FISHING, AND DOCK FISHING
 Participation in Both Activities of the Pair
 Heads of Parties
 Corrected for Length of Stay Bias

	Boat Fishing	Shore Fishing	Dock Fishing
Boat Fishing	-	0.64	3.31
Shore Fishing	7.20	-	8.63
Dock Fishing	13.94	3.58	-
	TOTAL	4.22	11.94
	MEAN	2.11	5.97

The value in the matrix is the number of respondents picking the column activity over the row activity.

Figure 5
 PREFERENCE SCALE FOR
 FISHING, BOATING, SWIMMING, HIKING, CAMPING AND PICNICKING
 Participation in Both Activities of the Pair
 Head of Party Respondents
 Standardized or Z-Score Means
 Corrected for Length of Stay Bias

All Respondents

Participation in Both
Activities of the Pair

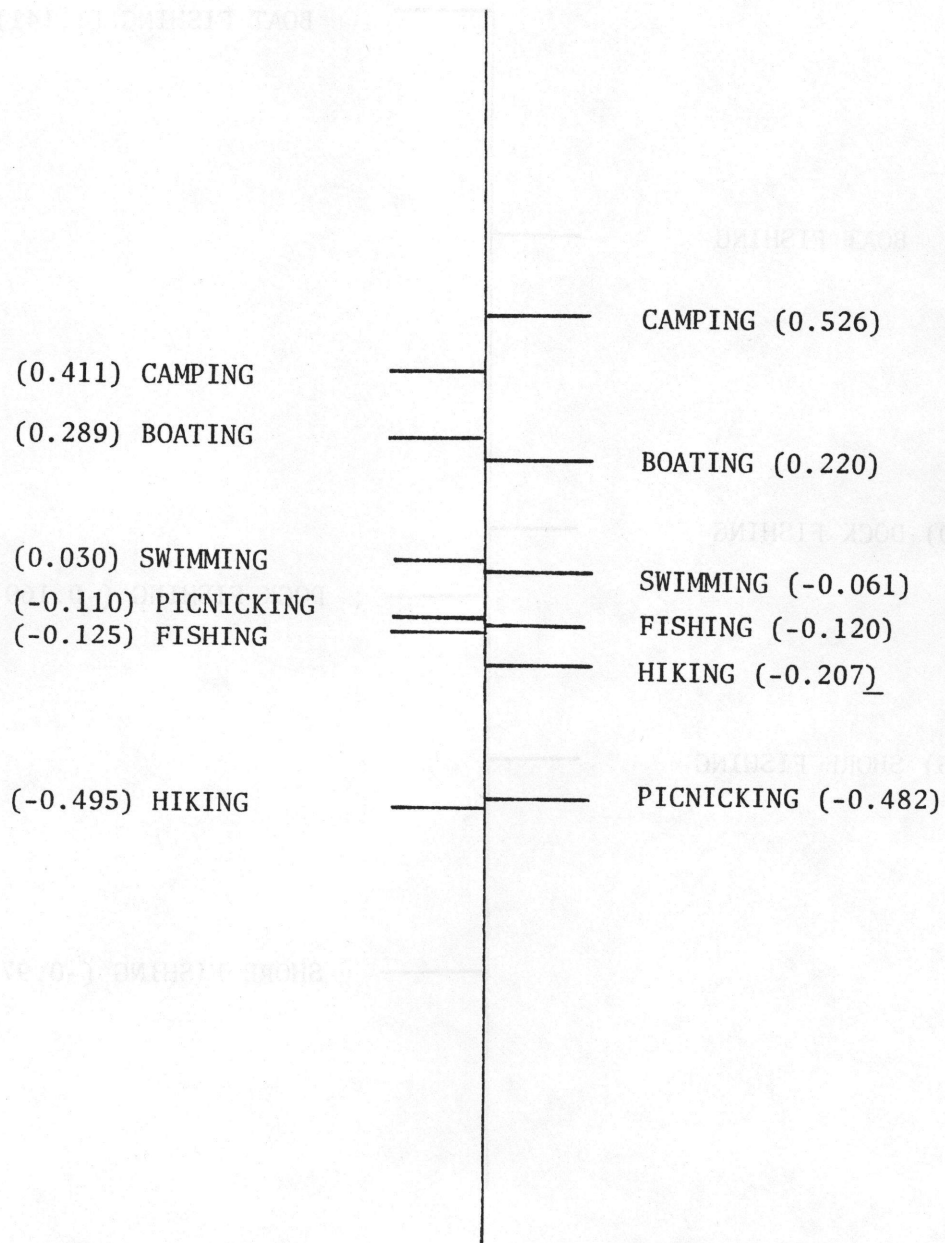


Figure 6
 PREFERENCE SCALE FOR
 BOAT FISHING, SHORE FISHING, AND DOCK FISHING
 Head of Party Respondents
 Standardized or Z-Score Means
 Corrected for Length of Stay Bias

All Respondents

Participation in Both
 Activities of the Pair

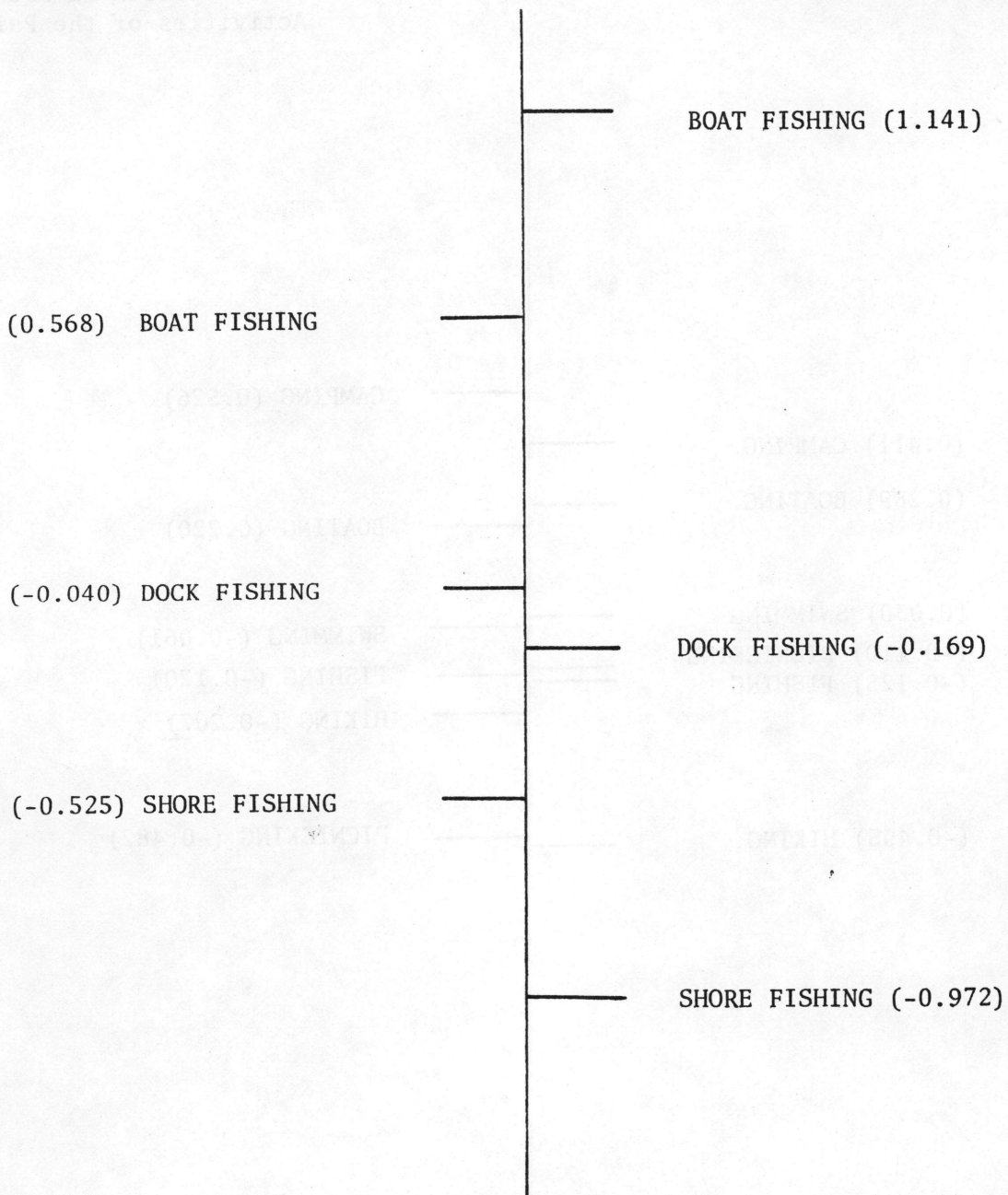


Figure 7
PREFERENCE SCALE FOR
CANOEING, MOTORBOATING, AND SAILBOATING
Head of Party Respondents
Standardized or Z-Score Means

All Respondents

(0.561) MOTORBOATING

(-0.243) CANOEING

(-0.318) SAILBOATING

The set of activities canoeing, motorboating, and sailboating was not compared since only one respondent had participated in both canoeing and sailboating. (The respondent matrix is given in Table 10, Figure 7 has the all respondents scale.)

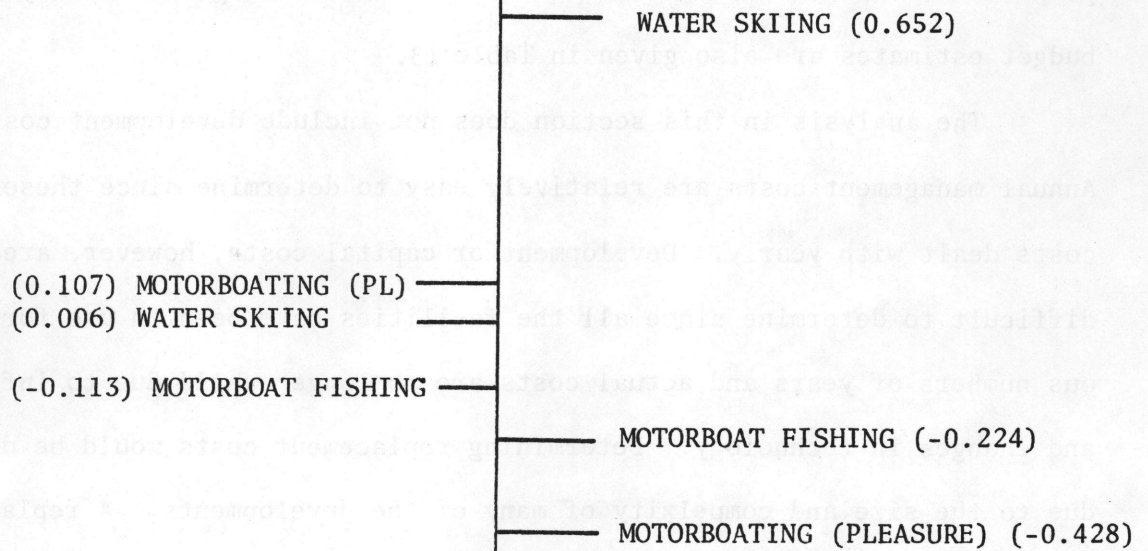
A comparison of the activity set motorboating, waterskiing, and motorboat fishing between all respondents and those who participated in both activities shows a complete reversal in rankings. For all respondents, the relative values were close together. Motorboating (pleasure) was first and motorboat fishing was last with scale values of .107 and -.113 respectively. For participation in both activities the relative values were further apart and waterskiing ranked first and motorboating for pleasure ranked last with scale values of .652 and -.428 respectively. (Figure 8 contains the preference scales.)

An analysis of these two scales leads to two conclusions. One is that those who participate have different values than those that do not. The other is that the all respondents scale may be an indicator of latent demand. Or, if participation occurs in one of the pairs, then the all respondent scale is an indication of preference.

Figure 8
 PREFERENCE SCALE FOR
 WATER SKIING, MOTORBOATING FISHING, AND MOTORBOATING (PLEASURE)
 Head of Party Respondents
 Standardized or Z-Score Means
 Corrected for Length of Stay Bias

All Respondents

Participation in Both
Activities of the Pair



PREFERENCE-COST RATIO ANALYSIS

One of the objectives of the study is to compare the preferences for various activities with the costs of providing each activity area to develop preference/cost ratios. The manager of Heyburn State Park, Wayne Waters, provided the annual costs of management. The budget and the expenses are not kept by activities or by activity areas so he estimated the percentage of the total budget that is spent on providing each activity area. His estimates are given in Table 13. Winter use is minimal and most of the staff's winter work is toward preparing the park for the next summer season's use. Therefore, the total annual budget is used as the dollar amount.

The manager estimated that 35 percent of his budget went for overhead, or expenses that could not be allocated to any one specific activity area. The author allocated this overhead expense to each activity area in proportion to that area's share of the rest of the budget. The adjusted budget estimates are also given in Table 13.

The analysis in this section does not include development costs. Annual management costs are relatively easy to determine since these are costs dealt with yearly. Development or capital costs, however, are more difficult to determine since all the facilities have been in use for various numbers of years and actual costs are no longer valid due to inflation and changes in technology. Determining replacement costs would be difficult due to the size and complexity of many of the developments. A replacement development to serve the same function may be built differently or use different materials, with different annual management costs, and still be just as effective. Also some developments may not be replaced since desired recreation opportunities change over time. It is realized for long range planning and budgeting it would be valuable to calculate preference/cost

Table 13

MANAGEMENT COSTS

Activity Area	Percentage	Adjusted ¹ Percentage
Campgrounds	38	58.5
Hiking Trails	1	1.5
Picnic Areas	15	23.1
Boating and Fishing Facilities (Boat ramps and docks)	4	6.1
Swimming Beaches	7	10.8
Overhead	35	----
	100	100.0

¹ The adjusted percentage reflects the overhead expenses being prorated to each activity area in proportion to its share of the remainder of the budget.

The preference-cost ratios were computed by dividing the sum of the proportion values for each activity, converted to a percentage of the total sum of proportions for that set of items, by the percentage of management costs allocated to each activity area. Preference cost ratios were only developed for the set of the six activities: fishing, boating, swimming, hiking, camping and picnicking.

Not all activities could have preference-cost ratios developed since some activity areas are used for several activities. The best example of this situation is the use of boat ramps and docks by waterskiers, motorboat fishermen, and pleasure motorboaters. It would be extremely difficult, if not impossible, to allocate the costs of providing the docks and ramps among the three activities.

Problems arose in determining the preference-cost ratios for the activities boating and fishing since they both utilize, to some degree, the same activity area facilities of boat ramps and docks. It was decided to

evenly divide the cost of boat ramps and docks between the activities fishing and boating.

Five matrices of cost-effectiveness ratios are computed. Two matrices are for all 403 respondents, separated by corrected and uncorrected for length of stay bias. Two are for heads of party respondents only, separated by all head of party respondents and by participation in both activities of the pair. The last matrix is for head of party respondents and participation in both activities of the pair, but is based on the percentage of respondents giving that activity preference rather than proportions of respondents as in the other four matrices. (These five individual matrices are found in Tables 14 through 16.)

Since the first four of the cost-effectiveness matrices are by proportions the ratios were weighted by multiplying the activity ratio by the number of participants in that activity. This permits the ranking and ratios to be viewed two separate ways. The author believes the weighted ratio approach is better since it includes the effect of the amount of participation.

The cost-effectiveness ratios only changed in relatively small amounts between matrices. On the weighted ratio matrices the rankings were the same on all but one matrix.

The weighted ratio ranking is, in decreasing amount, boating, hiking, fishing, swimming, picnicking, and camping. This ranking sequence also holds for the respondent percentage matrix. The one exception is for the matrix all head of party respondents. Here the activities fishing and hiking change places with fishing being ranked second and hiking third. The unweighted ratio ranking for all the matrices except the respondent percentages matrix is hiking, boating, fishing, swimming, picnicking and camping.

Table 14a
 PREFERENCE-COST RATIOS
 All Respondents
 Corrected for Length of Stay Bias

Activity	Preference Percentage	Cost Percentage	Ratio	Rank	Number of Participants	Weighted Ratio	Rank
Fishing	13.22	3.05 ¹	4.33	3	130	563	3
Boating	19.93	3.05 ¹	6.53	2	124	810	1
Swimming	17.85	10.8	1.65	4	135	223	4
Hiking	12.39	1.5	8.26	1	75	620	2
Camping	22.31	58.5	.38	6	152	58	6
Picnicking	14.30	23.1	.62	5	127	79	5

¹Costs of boat ramps and docks were evenly split between fishing and boating.

Preference percentages are from Appendix D.

Table 14b

PREFERENCE-COST RATIOS

All Respondents

Uncorrected for Length of Stay Bias

Activity	Preference Percentage	Cost Percentage	Ratio	Rank	Number of Participants	Weighted Ratio	Rank
Fishing	14.36	3.05 ¹	4.71	3	130	612	3
Boating	20.20	3.05 ¹	6.62	2	124	821	1
Swimming	17.28	10.8	1.60	4	135	216	4
Hiking	12.54	1.5	8.36	1	75	627	2
Camping	22.75	58.5	0.39	6	152	59	6
Picnicking	12.87	23.1	0.56	5	127	71	5

¹Costs of boat ramps and docks were evenly split between fishing and boating.

Preference percentages are from Appendix D.

Table 15a

PREFERENCE-COST RATIOS

Heads of Party Respondents

Corrected for Length of Stay Bias

Activity	Preference Percentage	Cost Percentage	Ratio	Rank	Number of Participants	Weighted Ratio	Rank
Fishing	15.03	3.05 ¹	4.93	3	130	641	2
Boating	20.37	3.05 ¹	6.68	2	124	828	1
Swimming	17.13	10.8	1.59	4	135	215	4
Hiking	10.52	1.5	7.01	1	75	526	3
Camping	21.75	58.5	0.37	6	152	56	6
Picnicking	15.21	23.1	0.66	5	127	84	5

¹Costs of boat ramps and docks were evenly split between fishing and boating.

Table 15b

PREFERENCE-COST RATIOS

Heads of Party Respondents

Uncorrected for Length of Stay Bias

Activity	Preference Percentage	Cost Percentage	Ratio	Rank	Number of Participants	Weighted Ratio	Rank
Fishing	15.40	3.05 ¹	5.05	3	130	656	3
Boating	19.31	3.05 ¹	6.33	2	124	785	1
Swimming	16.00	10.8	1.48	4	135	200	4
Hiking	14.02	1.5	0.35	1	75	701	2
Camping	23.03	58.5	0.39	6	152	59	6
Picnicking	12.21	23.1	0.53	5	127	67	5

¹Costs of boat ramps and docks were evenly split between fishing and boating.

Preference percentages are from Appendix D.

Table 16

PREFERENCE-COST RATIOS
 Heads of Party Respondent Percentages
 Corrected for Length of Stay Bias

Activity	Preference Percentage	Cost Percentage	Ratio	Rank
Fishing	15.85	3.05 ¹	5.20	3
Boating	20.66	3.05 ¹	6.77	1
Swimming	18.65	10.8	1.73	4
Hiking	7.90	1.5	5.27	2
Camping	23.13	58.5	0.39	6
Picnicking	13.83	23.1	0.60	5

Respondent percentages are from Table 9.

¹Costs of boat ramps and docks were evenly split between fishing and boating.

CONCLUSIONS

The two objectives of this study are to measure the relative value of each activity and to determine the preference-cost ratios for selected activities. The relative values provide a measure of the distance between activities of a set along a preference scale. The preference-cost ratios identify where unequal resource allocations are occurring. Whether or not the preferences and/or the resource allocations can be "improved" is another question. These scale values and ratios do not necessarily identify what steps should be taken to increase/decrease preferences or to change resource allocations to more equals, nor do these scale and ratio values give any indication of what is the best "equitable" level of resource allocation.

A resource allocation system that results in equal preference/cost ratios may not be a management objective. The park manager, through personal choice or because of legislative, Idaho Park and Recreation Board, or departmental directives may need to provide a certain quality or level of maintenance and operations for a given activity area. If this is the case then this study can help provide a measure of the cost of this decision.

If, however, the goal of the agency is to maximize total visitor value at some given cost level then it would be logical to allocate budget and land resources in such a way as to result in the highest total value. This highest total value for an activity can be defined as the preference/cost ratio times the number of participants in that activity. For the entire park, the highest total value would be that combination of the preference/cost ratios times the number of participants, summed over all activities, that gives the greatest total.

This goal of maximizing total visitor value at a given cost level could be achieved by manipulating the resource allocations to each activity or by changing the preferences of users. But this is expected to be more complicated than a single budget change.

Each potential change in preference and/or reallocation of funds between activity areas needs to be examined as to its cause and its possible effects. For example, a low preference scale value for a particular activity may be due to park rules which inhibit it, lack of developments, lack of maintenance funds, overcrowding, or lack of interest by visitors. Allocating more management money to that activity may or may not change its preference scale value although it may lead to a more equitable distribution of funds based on preference/cost ratios. Unfortunately, it is outside the scope of this study to identify and analyze the factors that affect preference values and fund allocations.

The most efficient activities, in terms of preference/cost ratios, were the activities hiking, boating, and fishing. The least efficient were swimming, picnicking and camping. The management implications of these results are numerous. The obvious one is that camping requires more management costs per unit of satisfaction than does hiking, and a more equitable allocation of management funds would be to take some funds away from camping and give it to hiking. But it does not necessarily follow that the preferences for either activity would remain the same if a different allocation was made. Any one of a number of new possible preference patterns might emerge. Some would enhance the preference cost ratios while others would make the ratios more unbalanced. These results do not tell you what might happen if a different allocation of funds were made.

The paired comparison scale values and the preference cost ratios reflect the facilities and developments currently available at Heyburn State Park. They do not necessarily reflect the preferences or preference/cost ratios that may exist if new developments were added or if some developments or facilities were removed. If changes were made it would require another study to measure the effect, if any, in preferences, in the preference/cost ratios, and in total visitor value.

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Appendix A

HEAD OF THE GROUP QUESTIONNAIRE

RECREATION PREFERENCES OF VISITORS AT HEYBURN STATE PARK -
LAKE COEUR D'ALENE

Summer, 1977

Wildland Recreation Management
College of Forestry, Wildlife and Range Sciences
University of Idaho

The purpose of this survey is to better understand the preferences of visitors toward recreational activities in the Heyburn State Park area. We are asking you to provide some basic information that will help the park managers provide you with more enjoyable visits in the future. It is important to answer all the questions. Only summaries of the data will be published.

Thank you for the few minutes of your time to complete the questionnaire.

1. What activities have you participated in or plan to participate in while you are visiting the area? (check all that apply)
 - a. CAMPING
 - b. HIKING
 - c. PICNICKING
 - d. SWIMMING
 - e. FISHING
 - (1) DOCK FISHING
 - (2) BOAT FISHING
 - (3) SHORE FISHING
 - f. BOATING
 - (1) WATER SKIING
 - (2) CANOEING
 - (3) SAILBOATING
 - (4) MOTORBOATING
 - g. NATURE STUDY
 - h. OTHER (please specify) _____
2. Was the Heyburn State Park area your destination or were you passing through?
 - DESTINATION
 - PASSING THROUGH
3. How many miles did you travel to get here (one way travel) _____

4. How long would you estimate your visit will last?

- LESS THAN 3 HOURS
- 3-6 HOURS
- 6-12 HOURS BUT LESS THAN ONE NIGHT
- 12-18 HOURS BUT LESS THAN ONE NIGHT
- 1 NIGHT
- 2 NIGHTS
- 3 NIGHTS
- MORE THAN 3 NIGHTS - PLEASE SPECIFY HOW MANY _____

5. How many people are in your group? (include yourself) _____

6. What category best describes your group?

- INDIVIDUAL
- IMMEDIATE FAMILY ONLY
- FRIENDS
- FAMILY AND FRIENDS
- FAMILY AND RELATIVES
- FAMILY, FRIENDS AND RELATIVES
- ORGANIZED GROUP (SUCH AS OFFICE PICNIC, SCOUT TROOP, CHURCH GROUP)

7. Considering this area (Lake Coeur d'Alene - Heyburn State Park), look at each of the following pairs of activities and pick the one activity in each pair that give you greater enjoyment or that you think you would enjoy more if you were ever to participate in both activities at Heyburn State Park.

- LAND-BASED RECREATION
- WATER-BASED RECREATION

- FISHING
- BOATING

- SWIMMING
- FISHING

- BOATING
- HIKING

- SWIMMING
- CAMPING

- FISHING
- PICNICKING

- HIKING
- SWIMMING

- BOATING
- CAMPING

- PICNICKING
- HIKING

CAMPING
 FISHING

 BOATING
 SWIMMING

 HIKING
 FISHING

 CAMPING
 PICNICKING

 HIKING
 CAMPING

 PICNICKING
 BOATING

 SWIMMING
 PICNICKING

 BOAT FISHING
 SHORE FISHING

 DOCK FISHING
 SHORE FISHING

 BOAT FISHING
 DOCK FISHING

 CANOEING
 MOTORBOATING

 CANOEING
 SAILBOATING

 SAILBOATING
 MOTORBOATING

 WATER SKIING
 MOTORBOATING (PLEASURE)

 MOTORBOAT FISHING
 MOTORBOATING (PLEASURE)

 WATER SKIING
 MOTORBOAT FISHING

8. How much would you be willing to pay per party per day to enjoy each of the following activity areas in Heyburn State Park as they presently exist? Assume no tax dollars or user fees are used to provide the areas. (Please give a dollar value. This is simply a hypothetical question and will not be used to establish user fees.)

CAMPGROUNDS	\$ _____/PARTY/DAY
HIKING TRAILS	\$ _____/PARTY/DAY
PICNIC AREAS	\$ _____/PARTY/DAY
FISHING AREAS	\$ _____/PARTY/DAY
BOATING FACILITIES	\$ _____/PARTY/DAY
SWIMMING BEACH	\$ _____/PARTY/DAY

9. Do you have a cabin lease here at Heyburn?

YES
 NO

10. If so, do you occupy the cabin year-round?

YES
 NO

11. What is your age? _____

12. What is your sex?

MALE
 FEMALE

13. What was the approximate total yearly income before taxes of your family in 1976?

<input type="checkbox"/> \$0 - 2,999	<input type="checkbox"/> \$25,000 - 29,999
<input type="checkbox"/> 3,000 - 4,999	<input type="checkbox"/> 30,000 - 34,999
<input type="checkbox"/> 5,000 - 9,999	<input type="checkbox"/> 35,000 - 39,999
<input type="checkbox"/> 10,000 - 14,999	<input type="checkbox"/> 40,000 - 44,999
<input type="checkbox"/> 15,000 - 19,999	<input type="checkbox"/> 45,000 - 49,999
<input type="checkbox"/> 20,000 - 24,999	<input type="checkbox"/> over 50,000

14. What is the highest level of education you have completed?

NO FORMAL EDUCATION
 ELEMENTARY
 SOME HIGH SCHOOL
 HIGH SCHOOL GRADUATE
 SOME COLLEGE OR VOCATIONAL EDUCATION
 COLLEGE DEGREE
 WORKING ON ADVANCED DEGREE
 ADVANCED DEGREE (M.A., PH.D., M.D., ETC.)

Appendix B

MEMBERS OF THE GROUP
QUESTIONNAIRE

RECREATION PREFERENCES OF VISITORS AT
HEYBURN STATE PARK

Summer, 1977

Wildland Recreation Management
College of Forestry, Wildlife and Range Sciences
University of Idaho

As a member of your family or group outing we would like to know your preferences toward some outdoor recreational activities. This information will help the park managers provide you with more enjoyable visits in the future.

Thank you for the few minutes of your time to complete this short questionnaire.

1. Considering this area, look at each of the following pairs of activities and pick the one activity in each pair that would give you greater enjoyment in participation.

 LAND-BASED RECREATION
 WATER-BASED RECREATION

 FISHING
 BOATING

 SWIMMING
 FISHING

 BOATING
 HIKING

 SWIMMING
 CAMPING

 FISHING
 PICNICKING

 HIKING
 SWIMMING

 BOATING
 CAMPING

 PICNICKING
 HIKING

CAMPING
 FISHING

BOATING
 SWIMMING

HIKING
 FISHING

CAMPING
 PICNICKING

HIKING
 CAMPING

PICNICKING
 BOATING

SWIMMING
 PICNICKING

BOAT FISHING
 SHORE FISHING

DOCK FISHING
 SHORE FISHING

BOAT FISHING
 DOCK FISHING

CANOEING
 MOTORBOATING

CANOEING
 SAILBOATING

SAILBOATING
 MOTORBOATING

WATER SKIING
 MOTORBOATING (PLEASURE)

MOTORBOAT FISHING
 MOTORBOATING (PLEASURE)

WATER SKIING
 MOTORBOAT FISHING

2. What is your age? _____

3. What is your sex?

MALE
 FEMALE

Appendix C
 SURVEY DATES, SAMPLING AREA, AND
 NUMBER OF QUESTIONNAIRES COLLECTED

Date	Location	Number of Questionnaires
May 29, 1977	Boat Ramps and Docks	23
May 30, 1977	Picnic Areas	15
June 4, 1977	Boat Ramps and Docks	7
June 5, 1977	Campgrounds	15
June 10, 1977	Rocky Point Picnic and Swimming Area	11
June 12, 1977	Campgrounds	12
June 19, 1977	Picnic Areas	12
June 23, 1977	Boat Ramps and Docks	1
June 26, 1977	Rocky Point Picnic and Swimming Area	14
June 27, 1977	Rocky Point Picnic and Swimming Area	8
July 4, 1977	Picnic Areas	14
July 7, 1977	Campgrounds	19
July 9, 1977	Boat Ramps and Docks	6
July 16, 1977	Campgrounds	40
July 22, 1977	Picnic Areas	2
July 26, 1977	Rocky Point Picnic and Swimming Area	2
July 28, 1977	Boat Ramps and Docks	4
July 30, 1977	Rocky Point Picnic and Swimming Area	21
August 3, 1977	Picnic Areas	1
August 4, 1977	Campgrounds	31
August 5, 1977	Rocky Point Picnic and Swimming Area	18
August 7, 1977	Campgrounds	8
August 11, 1977	Boat Ramps and Docks	3
August 12, 1977	Picnic Areas	7
August 13, 1977	Rocky Point Picnic and Swimming Area	31
August 14, 1977	Boat Ramps and Docks	24
August 20, 1977	Boat Ramps and Docks	9
August 28, 1977	Rocky Point Picnic and Swimming Area	1
September 3, 1977	Picnic Areas	7
September 4, 1977	Campgrounds	37
TOTAL		403

SURVEY DATA SWIMMING AREA AND
NUMBER OF QUESTIONNAIRES CONTACTED

Number of Questionnaires	Swimming Area	Date
13	East Range and Dock	May 22, 1977
12	Picnic Area	May 30, 1977
7	East Range and Dock	June 4, 1977
12	Campground	June 5, 1977
17	Rocky Point Picnic and Swimming Area	June 10, 1977
12	Campground	June 11, 1977
12	Picnic Area	June 12, 1977
7	East Range and Dock	June 23, 1977
14	Rocky Point Picnic and Swimming Area	June 24, 1977
8	Rocky Point Picnic and Swimming Area	June 27, 1977
11	Picnic Area	July 4, 1977
12	Campground	July 7, 1977
6	East Range and Dock	July 9, 1977
20	Campground	July 10, 1977
7	Picnic Area	July 11, 1977
7	Rocky Point Picnic and Swimming Area	July 26, 1977
4	East Range and Dock	July 27, 1977
21	Rocky Point Picnic and Swimming Area	July 30, 1977
1	Picnic Area	August 2, 1977
21	Campground	August 4, 1977
14	Rocky Point Picnic and Swimming Area	August 20, 1977
8	Campground	August 21, 1977
7	East Range and Dock	August 22, 1977
7	Picnic Area	August 24, 1977
21	Rocky Point Picnic and Swimming Area	August 25, 1977
24	East Range and Dock	August 27, 1977
20	East Range and Dock	August 30, 1977
14	Rocky Point Picnic and Swimming Area	September 8, 1977
7	Picnic Area	September 1, 1977
11	Campground	September 4, 1977

Table D-1

PROPORTION MATRIX FOR THE ACTIVITIES

FISHING, BOATING, SWIMMING, HIKING, CAMPING AND PICNICKING

Corrected for Length of Stay Bias

	Fishing	Boating	Swimming	Hiking	Camping	Picnicking
Fishing	-	.572	.664	.487	.691	.603
Boating	.428	-	.417	.341	.531	.312
Swimming	.336	.583	-	.377	.672	.355
Hiking	.513	.659	.623	-	.764	.582
Camping	.309	.487	.328	.236	-	.293
Picnicking	.397	.688	.645	.418	.707	-
TOTAL	1.983	2.989	2.677	1.859	3.347	2.145
MEAN	.397	.598	.535	.372	.669	.429
PERCENTAGE OF THE GRAND TOTAL (Sum of all columns)	13.22	19.93	17.85	12.39	22.31	14.30

Table D-2

PROPORTION MATRIX FOR THE ACTIVITIES
 FISHING, BOATING, SWIMMING, HIKING, CAMPING, AND PICNICKING
 Uncorrected for Length of Stay Bias

	Fishing	Boating	Swimming	Hiking	Camping	Picnicking
Fishing	-	.555	.624	.455	.684	.528
Boating	.445	-	.393	.331	.526	.275
Swimming	.376	.607	-	.396	.684	.345
Hiking	.545	.669	.604	-	.755	.545
Camping	.316	.474	.316	.245	-	.237
Picnicking	.472	.725	.655	.455	.763	-
TOTAL	2.154	3.030	2.592	1.882	3.412	1.930
MEAN	.431	.606	.518	.376	.682	.386
PERCENTAGE OF THE GRAND TOTAL (Sum of all columns)	14.36	20.20	17.28	12.54	22.75	12.87

Table D-3
 PROPORTION MATRIX FOR THE ACTIVITIES
 CANOEING, MOTORBOATING, AND SAILBOATING
 Corrected for Length of Stay Bias

	Canoeing	Motorboating	Sailboating
Canoeing	-	.684 (231)	.993 (215)
Motorboating	.316 (231)	-	.308 (226)
Sailboating	.507 (215)	.692 (226)	-
TOTAL	.823	1.376	.801
MEAN	.412	.688	.401

The value in parenthesis is the number of respondents.

Table D-4
 PROPORTION MATRIX FOR THE ACTIVITIES
 CANOEING, MOTORBOATING, AND SAILBOATING
 Uncorrected for Length of Stay Bias

	Canoeing	Motorboating	Sailboating
Canoeing	-	.704 (375)	.507 (345)
Motorboating	.296 (375)	-	.278 (367)
Sailboating	.493 (345)	.722 (367)	-
TOTAL	.789	1.429	.785
MEAN	.394	.713	.392

The value in parenthesis is the number of respondents.

Table D-5
 PROPORTION MATRIX FOR THE ACTIVITIES
 WATER SKIING, MOTORBOAT FISHING, AND MOTORBOATING (PLEASURE)
 Corrected for Length of Stay Bias

	Water Skiing	Motorboat Fishing	Motorboating (Pleasure)
Water Skiing	-	.430 (229)	.444 (224)
Motorboat Fishing	.570 (229)	-	.601 (229)
Motorboating (Pleasure)	.556 (224)	.399 (299)	-
<hr/>			
TOTAL	1.126	.829	1.045
MEAN	.563	.415	.523

The value in parenthesis is the number of respondents.

Table D-6
 PROPORTION MATRIX FOR THE ACTIVITIES
 WATER SKIING, MOTORBOAT FISHING, AND MOTORBOATING (PLEASURE)
 Uncorrected for Length of Stay Bias

	Water Skiing	Motorboat Fishing	Motorboating (Pleasure)
Water Skiing	-	.446 (373)	.464 (364)
Motorboat Fishing	.554 (372)	-	.582 (371)
Mororboating (Pleasure)	.536 (364)	.418 (371)	-
<hr/>			
TOTAL	1.090	.864	1.046
MEAN	.545	.432	.523

The value in parenthesis is the number of respondents.

Table D-7
 PROPORTION MATRIX FOR THE ACTIVITIES
 BOAT FISHING, SHORE FISHING, AND DOCK FISHING
 Corrected for Length of Stay Bias

	Boat Fishing	Shore Fishing	Dock Fishing
Boat Fishing	-	.276 (231)	.285 (231)
Shore Fishing	.724 (231)	-	.205 (228)
Dock Fishing	.715 (231)	.295 (228)	-
<hr/>			
TOTAL	1.439	.571	.990
MEAN	.720	.286	.495

The value in parenthesis is the number of respondents.

Table D-8
 PROPORTION MATRIX FOR THE ACTIVITIES
 BOAT FISHING, SHORE FISHING, AND DOCK FISHING
 Uncorrected for Length of Stay Bias

	Boat Fishing	Shore Fishing	Dock Fishing
Boat Fishing	-	.248 (375)	.270 (374)
Shore Fishing	.752 (375)	-	.687 (367)
Dock Fishing	.730 (374)	.313 (367)	-
<hr/>			
TOTAL	1.482	.561	.957
MEAN	.741	.280	.478

The value in parenthesis is the number of respondents.

Table D-9

PROPORTION MATRIX FOR THE ACTIVITIES
 FISHING, BOATING, SWIMMING, HIKING, CAMPING, AND PICNICKING

Heads of Parties

Corrected for Length of Stay Bias

	Fishing	Boating	Swimming	Hiking	Camping	Picnicking
Fishing	-	.517	.592	.434	.639	.564
Boating	.483	-	.379	.273	.521	.289
Swimming	.408	.621	-	.358	.637	.668
Hiking	.566	.727	.642	-	.819	.353
Camping	.361	.479	.363	.181	-	-
Picnicking	.436	.711	.593	.332	.647	-
TOTAL	2.254	3.055	2.569	1.578	3.263	2.281
MEAN	0.451	0.611	0.514	0.316	0.653	0.456
PERCENTAGE OF THE GRAND TOTAL (Sum of all columns)	15.03	20.37	17.13	10.52	21.75	15.21

Activities may or may not have been participated in.

Table D-10
 PROPORTION MATRIX FOR THE ACTIVITIES
 CANOEING, MOTORBOATING, AND SAILBOATING
 Heads of Parties
 Corrected for Length of Stay Bias

	Canoeing	Motorboating	Sailboating
Canoeing	-	.702	.485
Motorboating	0.298	-	.277
Sailboating	.515	.723	-
TOTAL	0.813	1.425	0.762
MEAN	0.407	0.713	0.381

Table D-11
 PROPORTION MATRIX FOR THE ACTIVITIES
 WATER SKIING, MOTORBOAT FISHING, AND MOTORBOATING (PLEASURE)
 Heads of Parties
 Corrected for Length of Stay Bias

	Water Skiing	Motorboat Fishing	Motorboating (Pleasure)
Water Skiing	-	.478	.515
Motorboat Fishing	.522	-	.568
Motorboating (Pleasure)	.484	.432	-
TOTAL	1.006	0.910	1.083
MEAN	0.503	0.455	0.542

Table D-12
 PROPORTION MATRIX FOR THE ACTIVITIES
 BOAT FISHING, SHORF FISHING, AND DOCK FISHING
 Heads of Parties
 Corrected for Length of Stay Bias

	Boat Fishing	Shore Fishing	Dock Fishing
Boat Fishing	-	.278	.291
Shore Fishing	.722	-	.681
Dock Fishing	.708	.319	-
	TOTAL	0.597	0.972
	MEAN	0.299	0.486

Table D-13

PROPORTION MATRIX FOR THE ACTIVITIES

FISHING, BOATING, SWIMMING, HIKING, CAMPING, AND PICNICKING

Participation in Both Activities of the Pair

Head of Party Respondents

Corrected for Length of Stay Bias

	Fishing	Boating	Swimming	Hiking	Camping	Picnicking
Fishing	-	.454	.564	.600	.569	.500
Boating	.546	-	.380	.422	.557	.198
Swimming	.436	.620	-	.431	.763	.350
Hiking	.400	.578	.569	-	.711	.639
Camping	.431	.443	.237	.289	-	.145
Picnicking	.500	.802	.650	.361	.855	-
TOTAL	2.313	2.897	2.400	2.103	3.455	1.832
MEAN	0.463	0.579	0.48	0.42	0.691	0.366
PERCENTAGE OF THE GRAND TOTAL (Sum of all columns)	15.40	19.31	16.00	14.02	23.03	12.21

Table D-14
 PROPORTION MATRIX FOR THE ACTIVITIES
 CANOEING, MOTORBOATING, AND SAILBOATING
 Participating in Both Activities of the Pair
 Head of Party Respondents
 Corrected for Length of Stay Bias

	Canoeing	Motorboating	Sailboating
Canoeing	-	.669	.000
Motorboating	.331	-	.697
Sailboating	1.00	.303	-
	-----	-----	-----
TOTAL	1.331	.972	.697
MEAN	0.666	0.486	.348

Table D-15
 PROPORTION MATRIX FOR THE ACTIVITIES
 WATERSKIING, MOTORBOAT FISHING, AND MOTORBOATING (PLEASURE)
 Participation in Both Activities of the Pair
 Head of Party Respondents
 Corrected for Length of Stay Bias

	Water Skiing	Motorboat Fishing	Motorboating (Pleasure)
Water Skiing	-	.248	.266
Motorboat Fishing	.752	-	.411
Motorboating (Pleasure)	.734	.589	-
	-----	-----	-----
TOTAL	1.486	.837	.677
MEAN	.743	.419	.339

Table D-16

PROPORTION MATRIX FOR THE ACTIVITIES
 BOAT FISHING, SHORE FISHING, AND DOCK FISHING
 Participation in Both Activities of the Pair
 Head of Party Respondents
 Corrected for Length of Stay Bias

	Boat Fishing	Shore Fishing	Dock Fishing
Boat Fishing	-	.082	.192
Shore Fishing	.918	-	.707
Dock Fishing	.808	.293	-
	-----	-----	-----
TOTAL	1.726	.375	.899
MEAN	0.863	0.188	0.450

TABLE 1
 PROPORTION OF BOATS IN THE FLEET
 BOAT FISHING, SHORE FISHING AND BOON FISHING
 (Percentage of total boats in the fleet)
 (Based on 1971 data)
 (Continued on page 2)

Category	1971	1972	1973	1974	1975
Boat Fishing	58.1	57.2	56.3	55.4	54.5
Shore Fishing	31.2	32.1	33.0	33.9	34.8
Boon Fishing	10.7	10.7	10.7	10.7	10.7
TOTAL	100.0	100.0	100.0	100.0	100.0

Table E-1

STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 FISHING, BOATING, SWIMMING, HIKING, CAMPING, AND PICNICKING
 Corrected for Length of Stay Bias

	Fishing	Boating	Swimming	Hiking	Camping	Picnicking
Fishing	0	.181	.423	-.032	.498	.261
Boating	-.181	0	-.209	-.409	.030	-.489
Swimming	-.423	.209	0	-.313	.447	-.372
Hiking	.032	.409	.313	0	.717	.206
Camping	-.498	-.030	-.447	-.717	0	-.544
Picnicking	-.261	.489	.372	-.206	.544	0
TOTAL	-1.331	1.258	.452	-1.677	2.236	-0.938
MEAN	-.266	.252	.090	-.355	.447	-.188

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-2
 STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 FISHING, BOATING, SWIMMING, HIKING, CAMPING, AND PICNICKING
 Uncorrected for Length of Stay Bias

	Fishing	Boating	Swimming	Hiking	Camping	Picnicking
Fishing	0	.138	.318	-.113	.481	.075
Boating	-.138	0	-.266	-.439	-.063	-.598
Swimming	-.318	.266	0	-.266	.481	-.399
Hiking	.113	.439	.266	0	.690	.113
Camping	-.481	-.063	-.481	-.690	0	-.722
Picnicking	-.075	.598	.399	-.113	.722	0
TOTAL	-.899	1.378	.236	-1.621	2.437	-1.531
MEAN	-.150	.230	.039	-.270	.406	-.255

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-3
 STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 CANOEING, MOTORBOATING, AND SAILBOATING
 Corrected for Length of Stay Bias

	Canoeing	Motorboating	Sailboating
Canoeing	0	.478	-.017
Motorboating	-.478	0	-.501
Sailboating	.017	.501	0
<hr/>			
TOTAL	-.461	.979	-.518
MEAN	-.231	.490	-.259

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-4
 STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 CANOEING, MOTORBOATING, AND SAILBOATING
 Uncorrected for Length of Stay Bias

	Canoeing	Motorboating	Sailboating
Canoeing	0	.538	.013
Motorboating	-.538	0	-.538
Sailboating	-.013	.583	0
<hr/>			
TOTAL	-.551	1.121	-.570
MEAN	-.184	.374	-.190

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-5
 STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 WATER SKIING, MOTORBOAT FISHING, AND MOTORBOATING (PLEASURE)
 Corrected for Length of Stay Bias

	Water Skiing	Motorboat Fishing	Motorboating (Pleasure)
Water Skiing	0	-.176	-.141
Motorboat Fishing	.176	0	.256
Motorboating (Pleasure)	.141	-.256	0
<hr/>			
TOTAL	.317	-.432	.115
MEAN	.159	-.216	.058

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-6
 STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 WATER SKIING, MOTORBOAT FISHING, AND MOTORBOATING (PLEASURE)
 Uncorrected for Length of Stay Bias

	Water Skiing	Motorboat Fishing	Motorboating (Pleasure)
Water Skiing	0	-.138	-.088
Motorboat Fishing	.138	0	.202
Motorboating (Pleasure)	.088	-.202	0
<hr/>			
TOTAL	.226	-.340	.114
MEAN	.075	-.113	.038

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-7
 STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 BOAT FISHING, SHORE FISHING, AND DOCK FISHING
 Corrected for Length of Stay Bias

	Boat Fishing	Shore Fishing	Dock Fishing
Boat Fishing	0	-.594	-.568
Shore Fishing	.594	0	.539
Dock Fishing	.568	-.539	0
<hr/>			
TOTAL	1.162	-1.133	-.029
MEAN	.581	-.567	-.015

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-8
 STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 BOAT FISHING, SHORE FISHING, AND DOCK FISHING
 Uncorrected for Length of Stay Bias

	Boat Fishing	Shore Fishing	Dock Fishing
Boat Fishing	0	-.675	-.613
Shore Fishing	.675	0	.482
Dock Fishing	.613	-.482	0
<hr/>			
TOTAL	1.288	-1.157	-.131
MEAN	.429	-.386	-.044

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-9
 STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 FISHING, BOATING, SWIMMING, HIKING, CAMPING, AND PICNICKING
 Heads of Parties
 Corrected for Length of Stay Bias

	Fishing	Boating	Swimming	Hiking	Camping	Picnicking
Fishing	0	.038	.228	-.164	.358	.164
Boating	-.038	0	-.306	-.598	.050	-.553
Swimming	-.228	.306	0	-.358	.358	-.228
Hiking	.164	.598	.358	0	.915	.440
Camping	-.358	-.050	-.358	-.915	0	-.372
Picnicking	-.164	.553	.228	-.440	.372	0
TOTAL	-0.624	1.445	-.150	-2.475	2.053	-0.549
MEAN	-0.125	0.289	0.030	-0.495	0.411	0.110

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B of Fundamental Statistics in Psychology and Education by Buildord and Fruchter.

Table E-10
STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
CANOEING, MOTORBOATING, AND SAILBOATING

Heads of Parties
Corrected for Length of Stay Bias

	Canoeing	Motorboating	Sailboating
Canoeing	0	.524	-.038
Motorboating	-.524	0	-.598
Sailboating	.038	.598	0
TOTAL	-0.486	1.122	-0.636
MEAN	-0.243	0.561	-0.318

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-11
STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
WATER SKIING, MOTORBOAT FISHING, AND MOTORBOATING (PLEASURE)
Heads of Parties
Corrected for Length of Stay Bias

	Water Skiing	Motorboat Fishing	Motorboating (Pleasure)
Water Skiing	0	-.050	.038
Motorboat Fishing	.050	0	.176
Motorboating (Pleasure)	-.038	-.176	0
TOTAL	0.012	-0.226	0.214
MEAN	.006	-0.113	0.107

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-12
 STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 BOAT FISHING, SHORE FISHING, AND DOCK FISHING
 Heads of Parties
 Corrected for Length of Stay Bias

	Boat Fishing	Shore Fishing	Dock Fishing
Boat Fishing	0	-.583	-.553
Shore Fishing	.583	0	.468
Dock Fishing	.553	-.468	0
TOTAL	1.136	-1.051	-0.080
MEAN	0.568	-0.525	-0.040

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-13

STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
 FISHING, BOATING, SWIMMING, HIKING, CAMPING, AND PICNICKING
 Participation in Both Activities
 Head of Party Respondents
 Corrected for Length of Stay Bias

	Fishing	Boating	Swimming	Hiking	Camping	Picnicking
Fishing	0	-.113	-.164	.253	.176	0
Boating	.113	0	-.306	-.202	.138	-.842
Swimming	-.164	.306	0	-.176	.723	-.385
Hiking	-.253	.202	.176	0	.533	.359
Camping	-.176	-.138	-.723	-.553	0	-1.058
Picnicking	0	.842	.385	-.359	1.058	0
TOTAL	-0.480	1.099	-0.304	-1.037	2.628	-1.926
MEAN	-0.120	0.220	-0.061	-0.207	.526	-0.482

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-14

STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES
WATER SKIING, MOTORBOAT FISHING, AND MOTORBOATING (PLEASURE)

Participation in Both Activities

Head of Party Respondents

Corrected for Length of Stay Bias

	Water Skiing	Motorboat Fishing	Motorboating (Pleasure)
Water Skiing	0	-.675	-.628
Motorboat Fishing	.675	0	-.227
Motorboating (Pleasure)	.628	.227	0
TOTAL	1.303	-.448	-.855
MEAN	0.652	-0.224	-.428

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.

Table E-15

STANDARDIZED VALUE MATRIX (Z-SCORES) FOR THE ACTIVITIES

BOAT FISHING, SHORE FISHING, AND DOCK FISHING

Participation in Both Activities

Corrected for Length of Stay Bias

	Dock Fishing	Shore Fishing	Dock Fishing
Boat Fishing	0	-1.405	-.877
Shore Fishing	1.405	0	.539
Dock Fishing	.877	.539	0
TOTAL	2.282	-1.944	-0.338
MEAN	1.141	-0.972	-0.169

Proportions are rounded to the nearest 5 thousandth (.005) before standardized values are taken from Table C, Appendix B, of Fundamental Statistics in Psychology and Education by Guilford and Fruchter.