



## Participation and expenditures for hunting, fishing and general rural outdoor recreation in Arizona in 1970

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PARTICIPATION AND EXPENDITURES FOR HUNTING,  
FISHING AND GENERAL RURAL OUTDOOR  
RECREATION IN ARIZONA IN 1970

by

C. Duane Depping

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A Thesis Submitted to the Faculty of the  
DEPARTMENT OF AGRICULTURAL ECONOMICS  
In Partial Fulfillment of the Requirements  
For the Degree of  
MASTER OF SCIENCE  
In the Graduate College  
THE UNIVERSITY OF ARIZONA

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STATEMENT OF AUTHOR

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## ABSTRACT

The primary objective of this study was to estimate expenditures, participation and the socioeconomic characteristics and attitudes associated with rural outdoor recreation in Arizona for 1970. A secondary objective was to compare the results of the 1970 data to the results of the data recorded for a 1965 study. In previous Arizona recreational surveys, no attempt was made to estimate participation and expenditures for general rural outdoor recreation. Consequently, this research, for the first time, estimated total participation and expenditures for general rural outdoor activities by Arizona residents.

To accomplish these objectives required obtaining a random sample drawn from the Arizona resident population and also from a population of nonresident sportsmen. Expenditure data were derived for variable expenses including lodging, additional food and refreshment, transportation and other variable cost items. Activity participation was measured in terms of total household-days afield, man-days afield and household-trips. The results indicated significant increases in participation and expenditures for outdoor recreation activities in 1970 compared to those reported for 1965.

## CHAPTER I

### INTRODUCTION

#### The Problem

The demand for outdoor recreation in Arizona and the United States has been increasing significantly in the recent past and is predicted to increase in the future. The Bureau of Outdoor Recreation (U. S. Department of Interior 1967) predicts that total participation for the United States will increase 160 percent during the period 1965-2000. This projected increase in demand is attributed to socioeconomic factors such as increases in the population, increased per capita incomes, more leisure time, greater consumer mobility, and changes in tastes and preferences. The projected shift in demand would increase requirements for additional recreational facilities and for natural resource planning. Therefore, it is imperative for researchers to analyze changes in socioeconomic factors and the resulting influence that these factors have on the demand for outdoor recreation.

Since rural outdoor activities are land- and water-based, a competitive atmosphere is developed between rural outdoor recreation activities and other interests such as

mining, farming and ranching that are also land- and water-based. Economic values for the alternative interests are determined as their products are sold in competitive markets. Rural outdoor recreation, however, is rarely a product sold in the competitive market. Consequently, it is also imperative for researchers to determine economic values for outdoor recreation that can be compared with values of alternative products from the natural resources. Such an attempt could provide the means from which an efficient allocation of the resources among the competing ends can be made.

#### Purpose and Objectives

In early 1971, the Arizona Game and Fish Department authorized the fourth of a series of surveys on Arizona hunting and fishing covering the year 1970. The earlier surveys were for the years 1956, 1960 and 1965 (Armstrong 1958, Davis 1962, Davis 1967). The general objective of the current survey is to determine the total economic value of benefits assignable to game and fish in Arizona. The research reported herein is a part of the 1970 survey, and conforms to the general purpose of the previous three commissioned surveys to measure the participation and expenditures of sportsmen during 1970 hunting and fishing activities.

In the previous surveys, however, no attempt was made to measure participation and expenditures for other



general rural outdoor recreational activities such as picnicking, hiking and boating. General rural outdoor activities, as with hunting and fishing activities, compete for land- and water-based resources and are a major source of revenue to the state economy. Consequently this research, for the first time, will attempt to measure the participation and expenditures of general rural outdoor activities.

The specific objectives of this study are twofold:

1) Provide a statistical description of the socioeconomic characteristics, attitudes, participation, and gross expenditures associated with rural outdoor recreation in Arizona for 1970.

2) Provide meaningful comparisons between the results of this research and those of the earlier 1965 study (Davis 1967).

#### Theoretical Framework and Past Research on Outdoor Recreation

The research reported herein estimates gross expenditures associated with outdoor recreation. This form of measuring the economic value of a recreational resource has been popular since large figures are generally evident. Therefore, such figures are likely to encourage business activity where the level of profitability is the greatest. In this respect, gross expenditure estimates have been useful in planning various outdoor developments.

Though popular, this method is not without limitations. In the first place, it is not known if the gross expenditure is new or increased expenditure. The purchase of food while on vacation, for example, "replaces food that would otherwise have been bought at the home," (Clawson 1959, pp. 6-7).

In the second place, the impact of the gross expenditure is not entirely felt in the area where the recreation experience occurs. Gas and food expenditures, for instance, which are a part of the total expenditure may have actually been made in an area far from where the actual recreation was experienced. Consequently, this phenomenon diminishes the importance of a gross expenditure as a measure of the actual economic value of a resource to an area.

Furthermore, the gross expenditure method is also a poor approach to determine the most efficient way to allocate resources. This phenomenon is due to "the lack of comparability between gross expenditure data and estimates of gross output in other activities especially other activities related to the same resources," (Clawson 1959, pp. 6-7).

Finally, the initial expenditure is not necessarily the total economic value of an activity. Multiplier effects from the original expenditure may have repercussions throughout the rest of the economy. Moreover, the initial expenditure may not reflect the true expenditure recreators

are willing to make to participate in an activity. It is possible that recreators may be willing to pay more than they presently do in order to participate in outdoor activities. If this be true, then the recreators are actually spending a lower amount (consumers' surplus) than they would normally be willing to spend in order to continue their participation. In this case, the gross expenditure is an underestimate of the true economic value of the activity. Consumers are receiving a surplus amount of satisfaction above the acquisition price and pay nothing for this additional satisfaction. Therefore, the expenditure could have been higher and the actual value of outdoor recreation greater than the expenditure actually made. On the other hand, much double counting usually occurs.

In spite of the above limitations, the gross expenditure values are of some use in indicating total outlays for various types of recreational activities. When compared to previous surveys, these values reveal trends in the growth of recreational expenditures. The figures also have use in establishing income effects of outdoor recreation on residents in the area and, therefore, in determining the effects of local investments in this purpose.

Measurement of the value added by outdoor recreation expenditures is a refinement of the gross expenditure approach. The value added method recognizes that certain

portions of gross expenditures are to be deducted for goods and services utilized in the production of a recreational activity. The net value would be the value added by the industry. Summation of value added by industries will give a reasonable total, whereas a summation of gross business entails a major degree of double counting.

The actual economic value of a recreational resource can be determined by the demand approach to resource valuation. The demand approach to resource valuation attempts to measure consumers' surplus from which the actual value of the resource can be established. The research by Brown, Singh and Castle (1964) is an example of an attempt to determine the economic value of Oregon salmon and steelhead fishing. The demand for the fishing resources was obtained by projecting added costs per day to the total number of days spent fishing. The net economic value was then determined by using the nondiscriminating monopolistic method. The determination of the economic value of hunting, fishing and other general rural outdoor recreational activities is the major objective of the 1970 study, of which this report is a part.

Armstrong (1958) conducted the first research on the economic value of hunting and fishing in Arizona. This study gave a detailed description of gross expenditures of game and fish by species group. Davis (1962, 1967) conducted

similar surveys as to the 1958 study. The Davis surveys, however, not only included statistical descriptions of gross expenditures, but also statistical descriptions of total participation, socioeconomic characteristics and attitudes of hunters and fishermen.

Davis utilized the gross expenditure method based upon the rationale that the recreation experience is worth in total what sportsmen pay for it. Davis argued that the total state income is expanded by initial gross expenditures for hunting and fishing. He also argued that through the multiplier effect of redistribution of income the total gains to the state would be further augmented.

The survey by Fleischmann (1970) is an example of out-of-state research utilizing the gross expenditure approach. This study had the overall objective to determine the total value of big game to the Nevada economy. The estimates of total expenditures obtained would be used to make big game management decisions.

This 1970 Arizona study, while generally following the gross expenditure method used by Davis (1962, 1967) makes several improvements in concept and definition as described in Chapter II and the Appendices.

## CHAPTER II

### RESEARCH PROCEDURE

Information for statistical descriptive purposes were required for the following activities in Arizona by both Arizona residents and nonresidents:

#### Hunting

Big game (antelope, deer, bear, bighorn sheep, elk, javelina and turkey)

Small game (squirrel, rabbit, quail, dove, etc.)

Predator (foxes, coyotes, etc.)

Waterfowl (ducks and geese)

#### Fishing

Cold water (trout)

Warm water (bass, catfish, etc.)

In addition, data concerning resident general rural outdoor recreation activities were required. These activities include picnicking, camping, hiking, swimming, boating, water-skiing, bird watching and snow skiing. (The examples listed are not exhaustive.)

Since current secondary data were not available, it was necessary to generate primary data. Gathering primary data required obtaining a suitable population list from which a sample composed of hunters, fishermen, and general

rural outdoor recreators could be drawn. As it was desired to include nonresidents in the study, two population lists were obtained, one for residents and one for nonresidents. Sample were randomly drawn and questionnaires were mailed to the two samples. Upon return of the questionnaires from the resident sample, it was realized that respondents engaged in hunting and fishing activities over-responded while those engaging only in general rural outdoor activities under-responded, relative to the actual distribution of the population of recreators. Consequently, adjustment factors due to over- and under-responses were computed.

Estimates developed from the samples were expanded to totals for the population. Since the resident sample of hunters and fishermen and general rural outdoor recreators over- and under-responded, respectively, adjustment factors were employed to account for the biases encountered.

As this study desired to compare totals and averages obtained for 1970 outdoor activities with those for 1965, various adjustments were necessary to the 1965 data presented by Davis (1967). Expenditures representing fixed costs were excluded from the Davis study since fixed costs were not estimated for 1970. Furthermore, 1965 total expenditures were increased by the consumer price index to account for inflation over the five-year period. Finally, the 1965 transportation costs per mile used by Davis were

reduced to be commensurate with mileage costs used for 1970. Details of these procedures follow.

#### The Arizona Resident Population List

The objectives of the 1965 study were to estimate total participation, expenditures and other factors applicable only to hunting and fishing in Arizona. Consequently, a population list composed of hunting and fishing license holders was adequate (and efficient) from which to draw a random sample. Duplicate copies of hunting and fishing licenses purchased in Arizona are on record at the Arizona Game and Fish Department. These records composed a population list from which a random sample was drawn for 1965 (Davis 1967).

Adding general rural outdoor recreation activities to the analysis, as well as adding the socioeconomic characteristics of non-recreators, broadly expands the population base from which the random sample must be drawn. The relevant population from which to draw a random sample becomes the total population of the state.

For purposes of this study, the household, as a composite of its elements, was determined to be the rural outdoor recreation consuming unit. The decision to use this definition was based upon the assumption that the household is the decision-making unit. Even though a member of a household can participate in a recreational



activity on his own accord, the person still functions within the general decision-making framework of the household. The household is the basic unit "that finances recreation out of a common household budget, and the decision to participate is presumed to have household sanction," (U. S. Department of Interior 1962, p. 6).

The number of households in Arizona was estimated at 539,845. The Census Bureau gave a preliminary estimate of the total population (1,770,900) and a final estimate (1,772,482), including 1,582 people unaccounted for in the preliminary estimate (U. S. Bureau of the Census 1971a, pp. 4-39). According to the census there were 44,935 people institutionalized and an average of 3.2 people per household (same source). Therefore, a preliminary estimate of the number of households in 1970 first was derived from the census data as:

1,770,900 people minus 44,935  
institutionalized people divided  
by 3.2 people per household equals  
539,364 households.

This preliminary estimate was adjusted upward in proportion to the final population estimate as:

$$\frac{539,364}{1,770,900} = \frac{X}{1,772,482}, \quad X = 539,845 \text{ households in Arizona.}$$

Certain limitations were placed upon the final estimate of households. It was assumed that in order to

participate in rural outdoor activities it was necessary for the household to own a passenger vehicle. If they did not own a passenger vehicle, they would be unlikely to recreate in rural areas or to purchase a hunting and/or a fishing license. For this study, it was estimated that 8.992 percent of the Arizona households did not own a passenger vehicle (U. S. Bureau of the Census 1972a, p. H-22; 1972b, p. H-8), and therefore, would not be included in the effective demand for rural recreational resources. The estimated total number of households less 8.992 percent of the total households, or  $539,845 - 48,543 = 491,302$ , gave the number of households in Arizona with one or more passenger vehicles.

Ideally, a random sample of households would have been drawn from this population of 491,302 households. However, such a population list was not available. The closest approximation to this list was obtained from R. L. Polk and Company of Phoenix, Arizona. Polk and Company is a private firm that sells lists of names and addresses to commercial firms. They estimated, using automobile license registrations, that there were 470,956 households in Arizona in 1970. The difference between 491,302 households and 470,956 households is explained by: (a) Polk and Company do not record registrations of cars past April 30 of any given year, and (b) Polk and Company do not include in their

population list a household which has only a noncommercial pickup truck. (If a household has an automobile and a pickup truck, it is included in the list.) This study assumed that people who did register their passenger vehicle after April 30 and/or have only a half-ton pickup would respond to a questionnaire in the same pattern as did those people included in the Polk and Company household list. Therefore, all estimates for resident totals in this study were adjusted by  $\frac{491,302}{470,956} = 1.0432$  to account for the difference in household estimates.

#### The Arizona Resident Sample

The number of households in Arizona, as estimated by Polk and Company for 1970, are given in Table 1. Figure 1 shows the area of the state covered by the seven management regions established by the Arizona Game and Fish Department. Using Figure 1 and Table 1, the approximate number of households in each region was derived (see Table 2).

Since this study is part of a larger project that is utilizing statistical demand analysis as part of its procedure, approximately equal observations from each region of the state were desired. However, the seven regions are comprised of counties with varying populations. Furthermore, the counties are only approximately contiguous with respect to the regional boundaries. Consequently, to obtain

Table 1. Number of Households in Arizona by County, 1970.<sup>a</sup>

County	Number of Households
Apache	3,173
Cochise	15,032
Coconino	10,332
Gila	7,763
Graham	3,561
Greenlee	2,788
Maricopa	272,039
Mohave	7,026
Navajo	7,259
Pima	95,193
Pinal	15,486
Santa Cruz	4,292
Yavapai	10,371
Yuma	16,641
Total	470,956

a. This list was purchased from R. L. Polk and Company, Phoenix, Arizona.



Figure 1. Arizona Game and Fish Management Regions.

Table 2. Approximate Number of Households in Arizona by  
Arizona Game and Fish Department Management  
Region, 1970.<sup>a</sup>

Regions, Including Counties	Number of Households
1. Pinetop (Apache and Navajo)	10,432
2. Flagstaff (Yavapai and Coconino)	20,703
3. Kingman (Mohave)	7,026
4. Yuma (Yuma)	16,641
5. Phoenix (Maricopa)	272,039
6. Tucson (Pima, Santa Cruz, and Pinal)	114,971
7. Pima (Cochise, Graham, Gila and Greenlee)	29,114
Total	470,956

a. Estimates from Table 1 and Figure 1.

commensurate observations, each area was sampled by a different sampling rate.

Budget restrictions, given the size and cost of the questionnaire, permitted a sample of 15,000 households. Therefore, approximately 2,000 observations were desired from each region, 1,000 questionnaires being reserved for the nonresident sample. Sampling rates for each region were calculated to yield approximately 2,000 households per region based on the estimates of Table 2.

There were two exceptions to the above procedure. In Mohave County, in Region 3, a 28 percent rate was necessary to obtain 2,000 observations. Such a high sampling rate would have flooded the county with questionnaires. Consequently, a lower sampling rate was deemed necessary.

Exception two involved Region 6 encompassing Pima, Santa Cruz and Pinal Counties. Pima has the second highest number of households in the state, whereas Santa Cruz is eleventh. A two percent sampling rate over the whole region would produce approximately the necessary 2,000 observations. However, sampling Santa Cruz at this rate would yield only 84 observations from that county. Assuming a 20 percent response rate to the questionnaire, only 16 responses from Santa Cruz would have been expected. Sixteen responses divided among several rural recreation activities would be too little for effective estimates.

Santa Cruz County is a major supply area for rural outdoor activities in Region 6. Therefore, greater information about Santa Cruz residents closest to the supply area was deemed more important relative to information about residents in Region 6 from farther away. Consequently, the number of observations from Santa Cruz County was increased. Following the initial two percent sampling rate, an additional 200 questionnaires were mailed to Santa Cruz residents whose addresses were randomly drawn from the Nogales telephone directory.

Table 3 shows the sampling rates and the number of questionnaires mailed per management region. Addresses of 14,513 households were drawn from the Polk and Company population list. With the additional addresses drawn from the Nogales telephone directory, 14,713 questionnaires were mailed. The aggregate sampling rate was 14,713 divided by 470,956 equals 3 percent.

#### The Questionnaire

The recreation researcher has two alternatives available for accumulating primary data, direct interviews or mailed questionnaires. The average cost of direct interviews as opposed to mailed questionnaires is far greater. The average cost of a direct interview necessary to obtain the information required for the overall study was estimated at \$30 to \$40. The large number of responses required for



Table 3. Sampling Rates and Number of Questionnaires Mailed per Management Region.

Region	Sampling Rate in Percent	Selected Number of Observations
1	19	1,982
2	10	2,070
3	20	1,405
4	12	1,997
5	1	2,720
6	2	2,499 <sup>a</sup>
7	7	2,040
Total		14,713

a. Includes 200 additional observations for Santa Cruz County.

this study and the imposed budget limitations necessitated the use of mailed questionnaires. While decreased accuracy of responses was expected from mailed questionnaires, the total number of respondents that could be reached due to lower average costs was deemed significant. The average cost of the mailed questionnaire was approximately thirty cents.

As this survey is part of a larger study on recreational demand analysis, a questionnaire was devised to concurrently satisfy requirements of both studies. Realizing a lengthy questionnaire would potentially decrease the response rate, 14 pages (including the cover page) were deemed necessary in order to obtain required information (see Appendix A for copy of questionnaire).

The questionnaire was pre-tested by 100 known Tucson sportsmen randomly drawn from the duplicate licenses on file at the Arizona Game and Fish Department. The pre-test was performed for two reasons: (a) To observe if sportsmen could obtain a high level of completion accuracy, and (b) to estimate an expected response rate. The pre-test was not followed by direct interviews. Inspection of the pre-test responses revealed sufficient completion accuracy and an approximate 25 percent response rate.

The questionnaire was divided into three major areas: (a) socioeconomic characteristics, (b) attitudinal

characteristics toward hunting and fishing, and (c) three sections relating to participation and costs of participation in hunting, fishing and general rural outdoor activities. Socioeconomic characteristics included information concerning age, sex, marital status, education, income, occupation, length of vacation, number of children, and number of days off during a normal work week. Explanations as to why a household did not hunt or fish more frequently composed the section on attitudinal characteristics. Reasons given, for example, included the following: "I am not interested in going," "Feel too old to go," and "Killing wildlife is cruel."

The sections on hunting and fishing inquired about species, areas hunted or fished, total number of trips, and total number of days. A page was included for cost information concerning lodging, food, transportation costs, and other variable expenses. A map showing hunting units was provided by the Arizona Game and Fish Department to assist respondents in recalling units hunted. The general rural outdoor recreation section also inquired about the type of activity, place, total number of days, total number of trips, total number of people and lodging, food, transportation costs and other variable expenses.

Together, the three major areas covered in the questionnaire provided information from which comparisons

concerning participation and expenditures for hunting and fishing could be made with the 1965 Arizona study (Davis 1967). Furthermore, additional information was obtained concerning concerning expenditures and participation for general rural outdoor activities which had not been gathered in the 1965 study.

Questionnaires were mailed to both residents and nonresidents in May, 1971. Four days following the mailings, "follow-up" letters were sent to remind recreators to complete the questionnaires (see Appendix B for sample of letter). Stamped, return-addressed envelopes were provided to simplify and hasten the return of the questionnaires.

As this study encompasses all rural outdoor recreation activities for 1970, there are certain problems with the reliability of the data. These include (1) the recall problem, e.g., (a) did the respondent go to a site in 1969 or 1970, (b) how frequently did the respondent participate in an activity, and (c) what was the total expenditure for a trip; and (2) the double counting problem where, for example, an individual separated a combined fishing and camping trip. Double counting increases the total number of trips, days and expenditures expected from aggregate activities. Inspection of the questionnaires, however, indicated the recall problem was the most severe.

The Resident Response  
Pattern and Response Bias

From the 14,713 questionnaires mailed to residents, 2,985 responses were received. The breakdown of responses by county are shown in Table 4. A check to determine if the response pattern was biased was made as follows.

The Arizona Game and Fish Department requires that a person 14 years and over purchase a license if he is to fish or hunt. The determination of the potential market for the licenses sold in 1970 is relevant to check the response of the sample relative to the population.

There were 491,302 households with 3.2 people per household in 1970. Consequently, there were about 1,572,166 people living in households possessing a passenger vehicle. According to the census, there were approximately 500,000 people under 14 out of a population of 1,770,900 for the 1970 Arizona survey (U. S. Bureau of the Census 1971b, pp. 4-69). Assuming that the distribution of people under 14 was the same as for the corrected population of 1,772,482, the following was true:

$$\frac{Y}{1,772,482} = \frac{500,000}{1,770,900}, Y = 500,372 \text{ people under 14.}$$

Assuming that the distribution of people under 14 was the same for the population of 1,572,166 as for the state as a whole, there were then 443,822 persons under 14 living in

Table 4. Total Responses and Percentage Response Rates by County.

County	Number of Households	Total Responses	Response Rate in Percent
Apache	3,173	113	3.5613
Cochise	15,032	215	1.4303
Coconino	10,332	224	2.1680
Gila	7,763	102	1.3139
Graham	3,561	54	1.5164
Greenlee	2,788	45	1.6141
Maricopa	272,039	517	.1900
Mohave	7,026	286	4.0706
Navajo	7,259	263	3.6231
Pima	95,193	508	.5337
Pinal	15,486	88	.5683
Santa Cruz	4,292	40	.9320
Yavapai	10,371	235	2.2659
Yuma	16,641	295	1.7727
Total	470,956	2,985	.6338

households with at least one passenger vehicle in the household.

$$\frac{500,372}{1,772,482} = \frac{Z}{1,572,166}, \quad Z = 443,822 \text{ people under 14 living in a household with a passenger vehicle.}$$

With 1,572,166 people living in households having a passenger vehicle, and 443,822 persons under 14 years, 1,128,344 people 14 and over constituted the potential market for licenses sold in 1970. The average size of a household owning a passenger vehicle and with people 14 years of age and older was 2.297.

$$\frac{1,128,344}{491,302} = 2.297 \text{ people per household of age 14 and over having a passenger vehicle.}$$

The 2,985 responses received were categorized by activity of the respondents. There were six activity classifications:

- 1) None -- person did no rural outdoor recreating.
- 2) Other -- person participated in general rural outdoor activities only.
- 3) Combination -- person purchased a combination hunting and fishing license.
- 4) Hunt-fish -- person purchased both a hunting license and a fishing license.
- 5) Hunt -- person purchased only a hunting license.
- 6) Fish -- person purchased only a fishing license.

According to the data from the sample, 1,424 fishing licenses, 678 hunting licenses, and 1,062 combination licenses were purchased. From the total number of adjusted households in the sample (Table 5) with 2.297 people per household 14 and older, a total of 7,153 people purchased licenses.

3,114 adjusted number of household responses times 2.297 people per household of age 14 and older equals 7,153 people purchasing licenses.

Estimation of the predicted number of fishing, hunting, and combination license holders from the sample was as follows:

A) Fishing License Holders (F)

$$\frac{F}{1,128,344} = \frac{1,424}{7,153}, \quad F = 224,653$$

B) Hunting License Holders (H)

$$\frac{H}{1,128,344} = \frac{678}{7,153}, \quad H = 110,465$$

C) Combination License Holders (C)

$$\frac{C}{1,128,344} = \frac{1,062}{7,153}, \quad C = 167,559$$

Ideally, the population of potential license holders should have purchased licenses at the same rate as did the sample; however, this was not the case as the discrepancy between the estimated number of licenses from the sample and the actual number of licenses in the population indicates (Table 5). From Table 5, the fishing, hunting and



Table 5. Number of Licenses and Adjustment Factors.

License of Activity	Estimated Number of Licenses from Sample	Actual Number of Licenses <sup>a</sup>	Adjustment Factor Due to over or Underresponse	Household Population Adjustment	Combined Adjustment Factor
Fish	224,653	167,858	.7472	1.0432	.7795
Hunt	110,465	97,152	.8795	1.0432	.9175
Combination	167,559	66,495	.3969	1.0432	.4140
Hunt-fish			.8079	1.0432	.8428
"Other" recreators			1.8184	1.0432	1.8970

a. Source: Arizona Game and Fish Department (1972, p. 29).

combination license holders from the sample over-responded by factors of 1.34, 1.14 and 2.52, respectively. Thus, corresponding adjustment factors to use with their response rates would be 0.7472, 0.8795 and 0.3969, respectively (not including the adjusted household population factor).

Determining the bias factor of the hunt-fish category was more difficult. From the sample there were 299 households who purchased 299 hunting licenses and 357 fishing licenses. Using a weighted average, the adjustment factor due to over-response was obtained.

$$357 \times .7472 \text{ (adjustment factor for fishing)} = 267$$

plus

$$\frac{299}{656} \times .8795 \text{ (adjustment factor for hunting)} = \frac{263}{530}$$

$$530 \div 656 = .8079 \text{ (adjustment factor for hunt-fish)}$$

Once the license category bias factors have been determined, the bias factors of the nonlicense categories can be obtained. Those respondents who did not recreate constituted 17.2 percent of the number of households in the sample (Table 6). According to Cox (1969, p. 25), for a sample of Tucson households, 16 percent did not recreate in rural areas in 1969. Assuming the 16 percent to be correct, the 17.2 percent was accepted since the difference between the two is significant. Consequently, the adjustment

Table 6. Summary of Activities, Number of Households in Sample, and Adjustment Factors.

<u>Column 1</u>	<u>Column 2</u>	<u>Column 3</u>	<u>Column 4</u>	<u>Column 5</u>	<u>Column 6</u>	<u>Column 7</u>
Activity	Number of Households in the Sample	Correction Factor for Over- or Under-response	Column 2 x Column 3	Expected Number of Responses by Activity	Household Population Adjustment (1.0432 x Column 5)	Percent of Total Adjusted Households in the Sample
None	512	1.0000	512	512	534	17.2
Other	782	1.8184		1,422 <sup>a</sup>	1,483	47.6
Combination	725	.3969	288	288	300	9.6
Hunt-fish	229	.8079	185	185	193	6.2
Hunt only	207	.8795	182	182	190	6.1
Fish only	530	.7472	396	396	413	13.3
TOTAL	2,985		1,563	2,985	3,114	100.0

a. Computed as a residual . . . 2,985 total responses minus 1,563 total responses times the correction factor equals 1,422 expected number of responses for "other" recreators.

factor for biasedness pertaining to those who did not recreate was assumed to be 1.0.

Having 35.2 percent of the sample as license holders and 17.2 percent as nonparticipants, 47.6 percent should have participated in other activities. Consequently, instead of 782 responses from the sample engaged in general rural outdoor activities, there should have been 1,422 responses. Therefore,  $1,422/782 = 1.8184$ , indicates an under-response from "other" recreators.

Clearly, combination license holders had the greatest average response rate followed by fish only, hunt-fish, and hunt only. General rural outdoor recreators was the only category under-responding. (See Table 6 for a summary of response patterns.)

#### Adjusting from the Sample to the Population

To represent an approximation of the actual recreational attributes of the population (expenditures, number of days, number of trips, etc.) it is necessary to expand all totals obtained from the sample to those for the population. Ideally, this procedure should only entail the use of simple proportions. However, as indicated in the previous discussion on response patterns, hunting and fishing participants over-responded whereas general rural outdoor participants under-responded to the questionnaire.

Consequently, it was necessary to increase or decrease various responses when expanding from the sample to the population. Thus, estimates within each recreation category were expanded in proportion to one divided by the actual response rate (see Table 4), and then adjusted by the appropriate combined adjustment factor (see Table 5).

Determination of the "total weighted" averages for licensed activities was more complex. Since the license categories over-responded to the questionnaire, it was necessary to perform the following procedure in order to obtain "total weighted averages": (a) multiply the total estimate times the adjustment factor within each license category, (b) sum the results among license categories, and (c) divide the sum obtained in (b) by the total weighted number of days, trips, households, or other appropriate measure.

#### Expenditure Estimation

Expenditures for recreation may be classified as either of two types--fixed costs or variable costs. Fixed costs are long-term expenditures and are based upon the long-run decision to recreate. Once purchased, fixed cost items may be used over and over again. Examples of fixed cost items include boats, trailers, rifles, etc. Variable costs are those expenditures for items have a period of short-lived usefulness. These expenditures are directly

related to the purchase of items associated with the recreational experience. These include expenses such as lodging, additional food expenditures in addition to what would have been spent at home, ammunition, and transportation costs. Only the variable costs are associated with a particular recreation experience and, thus, are useful in determining the value of the recreational resource. Only variable costs are estimated in this study.

The 1965 study by Davis (1967) included both fixed and variable expenditures for total cost determination. Consequently, for purposes of comparison, fixed expenditures were excluded from the 1965 study. Furthermore, the 1965 variable expenditures were adjusted by the "consumer price index" factor 1.231 to account for inflation between the time period 1965 and 1970 (Wakimoto 1972, p. 64).

Respondents were not asked where an expenditure was made, therefore, it was impossible to measure impacts of expenditures upon a particular community. Resident expenditures were presumably all made within the state. Nonresident expenditures (gasoline, for example) may have been made in the state of origin.

Any portion of a day spent in recreation was counted as a full day. Therefore, average cost computations reflect the fact that all portions of days were rounded to full days.

Variable costs were estimated in four categories:

(1) transportation, (2) lodging, (3) other variable items, and (4) additional food. An explanation of the method for determining costs within each category follows.

Transportation costs were computed from estimated distance traveled. Hunting distances were computed from the mapped point of origin to the central portion of the hunting unit. Actual road miles were used. Respondents were not asked total miles traveled per trip, but instead mileages were imputed. Calculating distances to the center of a hunting unit appeared more logical than distances computed from the point of origin to the site itself, particularly for big game hunting where considerable driving within the hunting unit is common. However, this approach is not without limitations. Small game hunters, for example, have a tendency to hunt areas closer to home. Imputing mileages to the center of a hunting unit in this case may bias distances actually traveled.

Fishing distances, however, were computed from the point of origin to the specific site. It was assumed that fishermen do not travel around a site as much as hunters do around a hunting unit. Mileage for general rural outdoor participants was also calculated from the point of origin to the specific site.

Only variable transportation costs per mile were computed. Fixed costs such as insurance and/or depreciation were excluded. The breakdown of variable expenditures per mile as obtained from the U. S. Bureau of the Census (1971c, p. 537), was as follows:

Gas .....	1.73	(cents)
Oil .....	.16	"
Repairs .....	1.52	"
Tires .....	.39	"
Taxes and fees ...	<u>1.35</u>	"
Total/mile ....	5.15	"

An even five cents per mile was assumed for computing mileage costs.

Mileage costs for the 1965 survey were computed at an average of eleven cents per mile (Davis 1967, p. 80). Therefore, 1965 mileage charges were deflated by six cents per mile to be commensurate with the 1970 estimates and allow comparisons.

Since more than one household often share transportation costs, the respondent's share of costs was requested in the questionnaire. Therefore, if his share amounted to only 50 percent, for example, the other 50 percent was not included. Consequently, the cost per mile times the number of miles times the respondent's share of the mileage cost,



times the number of trips constituted transportation costs for each recreational activity.

Variable lodging costs were expenditures for hotel or motel lodging, lodging equipment rentals, and camping fees. Expenditures for camping equipment, trailers, etc., assumed to be fixed costs were excluded. It is recognized that expenditures for items such as "Golden Eagle Stamps" (a special fee to stay in parks) could have sometimes been included under "other" costs by the respondent. Lodging charges were computed as total costs per household, not per person.

Determining food charges was a complex procedure. Only additional food charges over and beyond what would normally be spent at home per day per person was deemed relevant, yet, the respondents were asked to give total food expenditures. The additional expense was computed as the difference between a respondent's estimate of total cost and the estimates given in Table 7 of average daily food expenditures. Table 7 was derived from data obtained by the U. S. Department of Agriculture (1968, pp. 5-7), as described in Appendix C.

Table 7 is broken down by income categories showing expenditures for food per number of people per number of days. Using the \$5,000 to \$9,999 income category as an example, two people for a period of one day would normally

Table 7. Normal At-Home Food Expenditure per Person per Day, by Household Income Category, 1970.<sup>a</sup>

Persons	Days						
	1	2	3	4	5	6	7
Household income under \$5,000							
1	1.54	3.08	4.62	6.16	7.70	9.24	10.78
2	3.08	6.16	9.24	12.32	15.40	18.48	21.56
3	4.62	9.24	13.86	18.48	23.10	27.72	32.34
4	6.16	12.32	18.48	24.64	30.80	36.96	43.12
5	7.70	15.40	23.10	30.80	38.50	36.20	53.90
6	9.24	18.48	27.72	36.96	46.20	55.44	64.68
Household income \$5,000-9,999							
1	1.85	3.70	5.55	7.40	9.25	11.10	12.95
2	3.70	7.40	11.10	14.80	18.50	22.20	25.90
3	5.55	11.10	16.65	22.20	27.75	33.30	38.85
4	7.40	14.80	22.20	29.60	37.00	44.40	51.80
5	9.25	18.50	27.75	37.00	46.25	55.50	64.75
6	11.10	22.20	33.30	44.40	55.50	66.60	77.70
Household income \$10,000-14,999							
1	2.26	4.52	6.78	9.04	11.30	13.56	15.82
2	4.52	9.04	13.56	18.08	22.60	27.12	31.64
3	6.78	13.56	20.34	27.12	33.90	40.68	47.46
4	9.04	18.08	27.12	36.16	45.20	54.24	63.28
5	11.30	22.60	33.90	45.20	56.50	67.80	79.10
6	13.56	27.12	40.68	54.24	67.80	81.36	94.92
Household income \$15,000 & over							
1	3.04	6.08	9.12	12.16	15.20	18.24	21.28
2	6.08	12.16	18.24	24.32	30.40	36.48	42.56
3	9.12	18.24	27.36	36.48	45.60	54.72	63.84
4	12.16	24.32	36.48	48.64	60.80	72.96	85.12
5	15.20	30.40	45.60	60.80	76.00	91.20	106.40
6	18.24	36.48	54.72	72.96	91.20	109.44	127.68

spend \$3.70 for food at home. If these same two individuals spent \$6.00 for food while recreating away from home, then "additional" food charges were recorded as \$2.30.

Contrary to the published explanation on food costs in the 1965 study (Davis 1967), examination of the original interview schedules suggested that the 1965 study did not employ the additional food expenditure approach. Instead, it appeared that a respondent's total expenditure for food was recorded. Consequently, it is believed that 1965 food expenditures were overestimated relative to 1970 food expenditures. To compensate, 1965 food costs were reduced by two-thirds for comparison purposes. Appendix D explains the derivation of this figure.

#### The Nonresident Population List and Sampling Procedure

Sampling the nonresident sportsmen population required a less complicated procedure than necessary for all Arizona residents. Determining a sample population for nonresident sportsmen required obtaining a population list of nonresident sportsmen. Such a list was obtained from the "Alpha License Reports" (Arizona Game and Fish Department 1970) that are published on a monthly basis. The reports list in alphabetical order the license purchaser's name, and provide the class of license, the dealer's name,

and the license number. Nonresidents could be identified from the license class.

The "Alpha License Reports" do not contain one-day and five-day license classifications. Consequently, the reports provided approximately 27,000 nonresident license holders from which a sample could be drawn. (There were approximately 80,000 nonresident licenses, including the one-day and five-day categories.) A sampling rate of about four percent was required to produce the desired sample of 1,000 households.<sup>1/</sup>

Within different months, varying quantities of licenses were sold with varying proportions of resident and nonresident licenses. While "Alpha License Reports" varied in size, sampling at a constant interval provided months and nonresident license purchasers in relative proportion. Combining the 12 reports for 1970, a total of 7,031 pages were obtained. There were approximately 51 names per page which gave 358,581 names in total. Assuming that nonresidents were randomly distributed, one nonresident per every 13 to 14 names was anticipated. Therefore, 250 pages were necessary to randomly draw 1,000 names, or approximately every 28th page. For simplicity, every 25th page

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<sup>1/</sup> Davis selected those license holders every 22 inches in the duplicate licenses on file at the Arizona Game and Fish Department (Davis 1967, pp. 74-75). Consequently, the Davis sampling procedure did include one-day and five-day nonresident license holders.

was selected. The addresses of the randomly-drawn nonresidents were obtained from the duplicate licenses on file at the Arizona Game and Fish Department.

There were 1,053 licenses and 919 households in the sample drawn. Regardless of the number of licenses a household possessed, it would receive only one questionnaire. Consequently, 919 questionnaires were mailed. A 25.57 percent response rate was obtained as 235 households responded to the questionnaire.

From the 235 responses, 199 responses were obtained from three states that border Arizona, California, Nevada and New Mexico. It was clear that these respondents came to Arizona for the purpose of recreating. As to the respondents from the remaining states, it was not clear whether they came merely as tourists and/or to visit relatives or friends. Consequently, a decision was made not to include the respondents from the other states, as it was difficult to apportion their expenditures to hunting and fishing. Table 8 shows the number of households participating in hunting and/or fishing from California, New Mexico and Nevada by license and by activity.

As a result of the low response patterns for waterfowl and predator hunting, the reliability of the data obtained for total participation and expenditures for these activities is questionable.

Table 8. Number of Nonresident Households in the Sample by License Category and Activity.<sup>a</sup>

License Type	Big Game Hunting	Small Game Hunting	Waterfowl Hunting	General Hunting	Cold Water Fishing	Warm Water Fishing
General fish					16	11
General hunt	54	68	8			
Combination	9	10	2		9	4
Colorado River fish					43	27
Predator				1		
Total	63	78	10	1	68	42

a. A household can participate in more than one activity.

Total participation and expenditures for nonresidents based upon only three states, and excluding one-day and five-day licenses, were expected to be low as compared to 1965 estimates encompassing all states and licenses. However, the 1965 study assumed that nonresidents spent equal proportions relative to resident expenditures. This survey, however, recognized that nonresidents could spend more relative to resident expenditures due to greater lengths of stay and higher transportation costs. Actual nonresident expenditure data was obtained. Consequently, the 1965 estimates of total participation and expenditures for nonresidents were determined to be underestimated relative to 1970 estimates.

Since a large portion of nonresident expenditures may not have originated in Arizona, it is difficult to measure the impact of these expenditures on the Arizona economy. Expenditures for items such as ammunition, tackle, film, and some gasoline most likely originated in a nonresident's hometown.

An estimate of response bias could not be made. Therefore, expansion of sample results to represent the nonresident sportsmen population was a straightforward procedure.

## CHAPTER III

### RESULTS

#### Socioeconomic Characteristics of Outdoor Recreators

Socioeconomic variables selected for analysis as possible explanations for differences in participation behavior include age, marital status, size of place of residence, education, occupation, income, number of days off per week, and length of vacation. Tables are provided for both nonresident and resident data. Duplicate tables are given since the resident data pertains to heads of households and includes "other" recreators (general rural outdoor participants), while the nonresident analysis was for sportsmen only.

#### Age of Heads of Households

Tables 9 and 10 give the age distribution of nonresident sportsmen and resident heads of households, respectively. The great majority of sportsmen are in the 35- to 54-age bracket for both residents and nonresidents. Hunters tend to be younger than fishermen.

Table 11 compares the age distributions of hunters and fishermen for 1965 and 1970. Twelve percent of the sportsmen are shown as between the ages of 12-19 for 1965



Table 9. Age Distribution of Nonresident Sportsmen, 1970.<sup>a</sup>

Age	Percent of Sportsmen Who Are:		
	Hunters Only	Fishermen Only	Both Hunters and Fishermen
12-19	2.2	1.4	0.0
20-24	4.3	0.0	2.9
25-34	26.1	4.1	11.8
35-44	26.1	15.1	32.4
45-54	23.9	42.5	29.4
55-64	13.1	26.0	20.6
65 and over	4.3	10.9	2.9
Total	100.0	100.0	100.0

a. Based on a random sample of nonresident license holders.

Table 10. Age Distribution of Arizona Resident Heads of Households, 1970.<sup>a</sup>

Age	Percent of Persons Who Are:					
	All Arizona Heads of Households	Hunt-ers Only	Fish-ermen Only	Both Hunters and Fish-ermen	General Rural Outdoor Recreation Only	Non-Recre-ators
12 - 19	.3	.5	.2	.6	.3	0.0
20 - 24	2.5	6.8	1.2	2.8	2.8	1.1
25 - 34	15.6	23.7	15.0	18.4	17.4	5.8
35 - 44	22.3	26.3	23.7	28.1	23.2	11.7
45 - 54	29.8	26.8	31.1	31.3	29.8	28.3
55 - 64	17.3	10.5	18.5	12.0	16.0	27.1
65 and over	12.2	5.4	10.3	6.8	10.5	26.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

a. Based on a random sample of all households registering a noncommercial vehicle.

Table 11. Age Distribution of Hunters and Fishermen,  
1965 and 1970 Compared.<sup>a</sup>

Age	Percent of Total Hunters and Fishermen	
	1965 <sup>b</sup>	1970
12-19	12.0	.6
20-24	6.6	7.8
25-34	18.7	12.6
35-44	25.8	25.7
45-54	20.5	30.7
55-64	12.4	14.9
65 and over	3.8	7.7
Unknown	.2	0.0

a. Includes resident and nonresident hunters and fishermen.

b. Source: Davis (1967, p. 10).

(Davis 1967, p. 10) while only 0.6 percent are shown in that age group for 1970. A major portion of this difference is due to differences in research procedures. Davis included ages of all license holders, whereas, this study recorded ages of heads of households only.

The age category 25-34 has decreased by 6.1 percentage points while the 45-54 age group has increased by 10.2 percentage points since 1965. These changes suggest the possibility that fewer young people are becoming interested in hunting and fishing. Davis found similar trends between 1960 and 1965 (Davis 1967). He indicates that these changes in age groups could forewarn overall reductions in hunters and fishermen through time.

#### Marital Status of Heads of Households

A description of the marital status of nonresident sportsmen and resident heads of households is given in Tables 12 and 13. Married people appear to participate in hunting and fishing in a greater proportion than they are in the total population. More non-recreators tend to be single. These results are in contrast to those of Sofranko and Nolan (1970) who found that the level of participation for married, licensed sportsmen was lower than for those unmarried.

Table 12. Marital Status of Nonresident Sportsmen, 1970.<sup>a</sup>

Marital Status	Percent of Sportsmen Who Are:		
	Hunters Only	Fishermen Only	Both Hunters and Fishermen
Married	88.0	90.4	94.1
Single	12.0	9.6	5.9
Total	100.0	100.0	100.0

a. Based on a random sample of nonresident license holders.

Table 13. Marital Status of Arizona Resident Heads of Households, 1970.<sup>a</sup>

Marital Status	Percent of Persons Who Are:					
	All Arizona Heads of House- holds	Hunt- ers Only	Fish- ermen Only	Both Hunters and Fish- ermen	General Rural Outdoor Recre- ation Only	Non- Recre- ators
Married	85.3	91.6	91.1	92.0	83.4	77.1
Single	14.7	8.4	8.9	8.0	16.6	22.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

a. Based on a random sample of all households registering a noncommercial vehicle.

### Size of Place of Residence of Households

As shown in Tables 14 and 15, the majority of outdoor recreators reside in communities with a population between 2,500 and 50,000 inhabitants. For residents, those hunters and fishermen residing outside of the two main metropolitan areas participated at a relatively greater rate than those from urban areas.

Nonresident sportsmen tended to reside in large metropolitan areas within their own states of origin. The San Diego and Los Angeles areas of California provided many of the nonresidents who traveled to Arizona to participate in hunting and fishing in 1970.

A high percentage of the non-recreators resided in urban areas. Various reasons were given for this phenomenon. They were: prefer to recreate in cities, prefer to stay indoors, do not enjoy outdoor recreation, feel outdoor recreation is too expensive, and outdoor recreational opportunities are too far away.

### Education of Heads of Households

Tables 16 and 17 give the educational level of attainment of nonresident sportsmen and resident heads of households. The majority of nonresident fishermen had a high school education, or less. Nonresident hunters, and nonresidents who both hunted and fished, tended to attend one or more years of college.

Table 14. Size of Place of Residence of Nonresident Sportsmen, 1970.<sup>a</sup>

Size of Town or City	Percent of Sportsmen Who are:		
	Hunters Only	Fishermen Only	Both Hunters and Fishermen
Less than 2,500	15.2	20.5	8.8
2,500 - 49,999	42.4	41.1	58.8
50,000 and greater	42.4	38.4	32.4
Total	100.0	100.0	100.0

a. Based on a random sample of all nonresident license holders.

Table 15. Size of Place of Residence of Arizona Resident Heads of Households, 1970.<sup>a</sup>

Size of Town or City	Percent of Persons Who Are:					
	All Arizona Heads of House- holds	Hunt- ers Only	Fish- ermen Only	Both Hunters and Fish- ermen	General Rural Outdoor Recre- ation Only	Non- Recre- ators
Less than 2,500	28.2	30.9	31.4	35.1	25.9	24.2
2,500 - 49,999	37.2	40.8	37.2	42.7	34.5	38.3
50,000 and greater	34.6	28.3	31.4	22.2	39.6	37.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

a. Based on a random sample of all households registering a noncommercial vehicle.



Table 16. Education of Nonresident Sportsmen, 1970.<sup>a</sup>

Education in Years	Percent of Sportsmen Who Are:		
	Hunters Only	Fishermen Only	Both Hunters and Fishermen
Elementary (6 or less)	0.0	0.0	0.0
Junior High (7 to 9)	2.2	1.4	2.9
High School (10 to 12)	33.6	61.6	38.2
College (13 to 16)	54.3	30.1	47.1
Graduate and postgraduate (17 or more)	9.9	6.9	11.8
Total	100.0	100.0	100.0

a. Based on a random sample of nonresident license holders.

Table 17. Education of Arizona Resident Heads of Households, 1970.<sup>a</sup>

Education in Years	Percent of Persons Who Are:					
	All Arizona Heads of House- holds	Hunt- ers Only	Fish- ermen Only	Both Hunters and Fish- ermen	General Rural Outdoor Recre- ation Only	Non- Recre- ators
Elementary (6 or less)	2.2	3.1	1.9	1.4	2.0	3.5
Junior High (7 - 9)	10.1	12.5	10.6	9.8	6.8	17.6
High School (10 - 12)	38.3	44.3	40.1	47.2	35.8	33.5
College (13 - 16)	32.2	26.6	31.9	30.4	33.8	31.6
Graduate and post- graduate (17 or more)	17.2	13.5	15.5	11.2	21.6	13.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

a. Based on a random sample of all households registering a noncommercial vehicle.

Nonresidents show a higher percentage of heads of households than residents who have had some college education. Resident respondents, on the other hand, show a higher percentage of heads of households who have had some postgraduate education and who hunted or fished in 1970. Education levels for residents do not differ between hunters and fishermen as they do for nonresidents. Moreover, within an educational level, there is a reasonably constant percentage distribution across all recreation activities as well as for nonresidents.

#### Occupations of Heads of Households

Tables 18 and 19 list the occupations of nonresident sportsmen and resident heads of households, respectively. Nonresident hunters tend to be professional or managerial people or skilled and semi-skilled workers. Nonresident fishermen tend to be professional or managerial people or retired.

Of Arizona residents, skilled or semi-skilled workers did the greatest percentage of both hunting and fishing in Arizona in 1970. However, the proportion of professional or managerial group is quite high.

The greatest percentages of nonresident nonrecreators were those people who are retired or those professional people not having enough time to participate.

Table 18. Occupations of Nonresident Sportsmen, 1970.<sup>a</sup>

Class of Occupation	Percent of Sportsmen Who Are:		
	Hunters Only	Fishermen Only	Both Hunters and Fishermen
Professional or managerial <sup>b</sup>	37.0	41.1	44.1
Clerical or sales	15.2	9.6	11.8
Skilled or semi-skilled <sup>c</sup>	32.6	20.5	32.4
Service <sup>d</sup>	5.4	1.4	2.9
Unskilled or unemployed	0.0	1.4	0.0
Agriculture	3.3	0.0	0.0
Retired	6.5	26.0	8.8
Total	100.0	100.0	100.0

a. Based on a random sample of all nonresident license holders.

b. Includes self-employed and students.

c. Includes craftsmen, operatives, foremen, etc.

d. Service workers as well as policemen, firemen, members of the armed forces, etc.

Table 19. Occupations of Arizona Resident Heads of Households, 1970.<sup>a</sup>

Class of Occupation	Percent of Persons Who Are:					
	All Arizona Heads of Households	Hunt-ers Only	Fish-ermen Only	Both Hunters and Fish-ermen	General Rural Outdoor Recre-ation Only	Non-Recre-ators
Professional or managerial <sup>b</sup>	34.2	27.3	31.1	31.0	39.8	27.1
Clerical or sales	11.0	9.1	12.5	9.6	10.8	12.3
Skilled or semi-skilled <sup>c</sup>	30.3	41.7	33.2	39.2	27.7	22.4
Service <sup>d</sup>	5.3	6.9	3.8	6.1	5.9	3.7
Unskilled or unemployed	2.9	4.3	3.1	2.0	2.7	3.8
Agriculture	1.5	3.7	1.2	2.3	1.0	1.9
Retired	14.8	7.0	15.1	9.8	12.1	28.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

a. Based on a random sample of all households registering a noncommercial vehicle.

b. Includes self-employed and students.

c. Includes craftsmen, operatives, foremen, etc.

d. Service workers as well as policemen, firemen, members of the armed forces, etc.

Table 20 compares the occupational distribution of hunters and fishermen between 1965 and 1970. Remember that the 1970 survey recorded characteristics of household heads while Davis (1967) recorded the responses from the license holder whether a household head or not. When comparing results for hunters and fishermen between 1965 and 1970, the results showed that skilled and semi-skilled workmen continued to have the highest participation rates (Davis 1967, p. 13). According to Davis, these individuals characteristically lead active physical lives. Consequently, they enjoy participating in outdoor physical activities. The proportion of professional people between the time periods has increased more than the clerical and sales and service categories (the proportion of service hunters and fishermen has declined). This does not support the fact that the numbers of people entering sales and service occupations is increasing more rapidly than other occupations. Either more people are entering professional occupations and/or more professional people are hunting and fishing than before.

#### Income of Heads of Households

Tables 21 and 22 give the income bracket before taxes of nonresident sportsmen and resident heads of households, respectively. Nonresident sportsmen show a significantly higher percentage of persons who had incomes over

Table 20. Occupation Distribution of Hunters and Fishermen, 1965 and 1970 Compared.<sup>a</sup>

Class of Occupation	Percent of Total Hunters and Fishermen 1965 <sup>b</sup>	1970
Professional or managerial <sup>c</sup>	23.3	31.8
Clerical or sales	8.5	10.9
Skilled or Semi-skilled <sup>d</sup>	41.9	35.9
Service <sup>e</sup>	9.3	5.1
Unskilled or unemployed	3.2	2.5
Agriculture	4.1	2.0
Retired	9.7	11.8
Total	100.0	100.0

a. Resident and nonresident sportsmen only.

b. Source: Davis (1967, p. 13).

c. Includes self-employed and students.

d. Includes craftsmen, operatives, etc.

e. Service workers as well as policemen, firemen, members of the armed forces, etc.

Table 21. Income Distribution of Nonresident Sportsmen,  
1970.<sup>a</sup>

Income Bracket in Dollars	Percent of Sportsmen Who Are:		
	Hunters Only	Fishermen Only	Both Hunters and Fishermen
0 - 4,999	2.2	11.0	2.9
5 - 9,999	10.9	9.6	11.8
10 - 14,999	28.2	31.5	29.4
15,000 and over	58.7	47.9	55.9
Total	100.0	100.0	100.0

a. Based on a random sample of all nonresident license holders.



Table 22. Income Distribution of Arizona Resident Heads of Households, 1970.<sup>a</sup>

Income Bracket in Dollars	Percent of Persons Who Are:					
	All Arizona Heads of House- holds	Hunt- ers Only	Fish- ermen Only	Both Hunters and Fish- ermen	General Rural Outdoor Recre- ation Only	Non- Recre- ators
0 - 4,999	14.2	14.8	11.5	8.5	11.7	27.8
5 - 9,999	32.7	28.6	34.2	33.2	33.8	29.7
10 - 14,999	31.2	39.2	31.9	34.8	31.9	23.0
15,000 and over	21.9	17.4	22.4	23.5	22.6	19.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

a. Based on a random sample of all households registering a noncommercial vehicle.

\$15,000 than did residents of any category. The majority of resident sportsmen had incomes of between \$5,000 and \$15,000. Within an income bracket there is no pronounced association between a particular type of recreational activity and income for either residents or nonresidents, except that non-recreators generally had lower incomes indicating they had less to spend for outdoor recreation.

#### Number of Days Off per Week of Heads of Households

Represented in Tables 23 and 24 are the distribution of households in terms of the number of days off per week of the household head. With the five-day workweek being the current trend for most occupations, a high percentage of all households, whether sportsmen or not, responded as having two days off per week. A significant proportion of nonresident fishermen have five to seven days off each week. Nonresidents who have more than two days off each week tend to be either hunters only or fishermen only,

Of the residents, fishing is also the preferred activity of persons with five to seven days off. However, 30.4 percent of the non-recreator households responded as having five to seven days off per week.

#### Length of Vacation of Heads of Households

Another important facet to the amount of leisure time available to recreators is the length of vacation.

Table 23. Number of Days Off per Week of Nonresident Sportsmen, 1970.<sup>a</sup>

Number of Days Off	Percent of Sportsmen Who Are:		
	Hunters Only	Fishermen Only	Both Hunters and Fishermen
0 - 2	82.6	65.8	100.0
3 - 4	10.9	6.8	0
5 - 7	6.5	27.4	0
Total	100.0	100.0	100.0

a. Based on a random sample of all nonresident license holders.

Table 24. Number of Days Off per Week of Arizona Resident Heads of Households, 1970.<sup>a</sup>

Number of Days Off	Percent of Persons Who Are:					
	All Arizona Heads of House- holds	Hunt- ers Only	Fish- ermen Only	Both Hunters and Fish- ermen	General Rural Outdoor Recre- ation Only	Non- Recre- ators
0 - 2	82.4	88.5	82.2	87.6	85.5	67.2
3 - 4	2.1	3.1	1.6	2.4	1.9	2.4
5 - 7	15.5	8.4	16.2	10.0	12.6	30.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

a. Based on a random sample of all households registering a noncommercial vehicle.

A summary of the data relative to household vacations is given in Tables 25 and 26. Vacations received could be taken all at once or spread over different time intervals. Furthermore, the data do not indicate that vacations had to be spent in Arizona. Summarizing the data for residents, the more than a month and the two week vacation periods are the most significant in all categories. The data is less consistent for any particular category for nonresident sportsmen. A total of 26.2 percent of all Arizona residents had more than a month vacation. These people tended to be either fishermen, general rural outdoor recreators, or non-recreators, rather than hunters.

Attitudes of Households  
Toward Hunting and Fishing

Various satisfactions such as recreational, aesthetic, associational, economic, intellectual, religious values, and also bodily health are generally given as motivations for hunting and fishing. This study assumes that such motivations exist and, therefore, will not attempt to discuss or describe them further. Rather, a description of the attitudes concerning why households did not hunt and/or fish more often in 1970 will be given.

Nonresident sportsmen (Table 27) reported that factors such as not enough time off, not enough opportunities close by, and too crowded at hunting and fishing sites as

Table 25. Length of Vacation of Nonresident Sportsmen,  
1970.<sup>a,b</sup>

Length of Vacation	Percent of Sportsmen Who Are:		
	Hunters Only	Fishermen Only	Both Hunters and Fishermen
None	0	1.4	0
Less than 1 week	4.3	2.7	5.9
1 week	11.9	4.1	8.8
2 weeks	28.3	24.7	14.7
3 weeks	25.0	16.4	17.6
1 month	12.0	11.0	32.4
More than 1 month <sup>c</sup>	18.5	39.7	20.6
Total	100.0	100.0	100.0

a. Based on a random sample of all nonresident license holders.

b. This does not mean all vacation time was spent in Arizona.

c. It is assumed retired people have more than a month vacation.

Table 26. Length of Vacation of Arizona Resident Heads of Households, 1970.<sup>a,b</sup>

Length of Vacation	Percent of Persons Who Are:					
	All Arizona Heads of Households	Hunt-ers Only	Fish-ermen Only	Both Hunters and Fish-ermen	General Rural Outdoor Recre-ation Only	Non-Recre-ators
None	0	0	0	0	0	0
Less than 1 week	13.8	17.0	8.7	11.0	14.8	16.9
1 week	8.0	9.5	6.8	9.0	8.5	6.3
2 weeks	23.7	27.0	26.2	28.9	22.7	18.4
3 weeks	16.2	15.3	19.2	18.1	16.6	11.3
1 month	12.1	16.4	14.1	13.3	12.0	7.8
More than 1 month <sup>c</sup>	26.2	14.8	25.0	19.7	25.4	39.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

a. Based on a random sample of all households registering a noncommercial vehicle.

b. This does not mean all vacation time was spent in Arizona.

c. It is assumed retired people have more than a month vacation.

Table 27. Nonresident Sportsmen Attitudes about Hunting and Fishing, 1970

Attitudes	Percent of all Nonresident Sportsmen Holding Attitude Toward:	
	Hunting <sup>a</sup>	Fishing <sup>a</sup>
Not interested	7.5	7.5
Family not interested	9.5	5.5
Too old	0.5	0.0
Equipment too expensive	1.5	0.0
Not enough opportunities close by	38.7	28.1
Not enough time off	39.7	37.7
Too crowded at hunting areas	16.6	b
Too crowded at fishing areas	b	14.1
Prefer to stay indoors	0.5	0.5
Not enough money from budget	9.5	6.0
Prefer to recreate in cities	0.0	0.0
Killing wildlife is cruel	4.0	0.0
Animals may become extinct	4.0	1.0
Other (health, etc.)	6.3	4.5

a. A sportsman may hold several attitudes. Therefore, the percentages sum to greater than 100.

b. Not applicable.



significant reasons for not participating more often. As they have already made the decision to travel great distances to hunt and/or fish in Arizona, other factors were relatively insignificant. Economic reasons were not substantial in number since these sportsmen have reasonably high incomes.

Tables 28 and 29 give reasons why resident sportsmen do not participate more often and why non-sportsmen do not hunt and fish at all. Sportsmen reported that not enough opportunities are close by and not enough time off as major factors preventing them from participating more. It was also felt that fishing areas are too crowded. The reasons thus given follow closely those reported by non-resident sportsmen. In contrast to nonresidents, however, the impact of economic restraints was felt more by residents. Furthermore, more resident sportsmen held the beliefs that killing wildlife is cruel and animals may become extinct than did nonresident sportsmen.

Non-sportsmen give the lack of interest as the major factor for not hunting and fishing at all. In addition, however, not enough time off, lack of close opportunities, too crowded at hunting and fishing sites, and economic factors were given as significant reasons as well. More non-sportsmen feel that killing wildlife is cruel and animals may become extinct than do sportsmen. However, the

Table 28. Attitudes about Hunting of Arizona Resident  
Heads of Households, 1970.

Attitude	All Arizona Heads of Households <sup>a</sup>	Percent of Persons Who Are:	
		Sportsmen	Non-sportsmen
Not interested	32.1	13.1	42.9
Family not interested	20.0	13.1	25.4
Too old	5.7	2.8	7.3
Equipment too expensive	9.1	7.8	9.9
Not enough time off	21.9	26.1	19.5
Not enough opportunities close by	35.6	41.1	32.6
Too crowded at hunt- ing areas	4.4	4.7	4.3
Prefer indoors	5.5	1.9	7.6
Not enough money from budget	12.8	13.4	12.5
Prefer to recreate in cities	4.0	1.3	5.5
Killing wildlife cruel	15.8	7.0	20.8
Animals may become extinct	14.7	9.9	17.4
Other (health, etc.)	14.3	11.7	15.8

a. A person may hold several attitudes. Therefore the percentages sum to greater than 100.

Table 29. Attitudes about Fishing of Arizona Resident  
Heads of Households, 1970.

Attitude	All Arizona Heads of Households <sup>a</sup>	Percent of Persons Who Are:	
		Sportsmen	Non-Sportsmen
Not interested	24.7	6.4	35.1
Family not interested	15.1	7.0	19.8
Too old	2.8	1.3	3.8
Equipment too expensive	7.1	5.9	7.8
Not enough time off	23.5	29.4	20.2
Not enough opportunities close by	24.0	30.6	20.2
Too crowded at fish- ing areas	21.6	27.3	18.4
Prefer to stay indoors	4.7	1.5	6.6
Not enough money from budget	12.4	13.0	12.1
Prefer to recreate in cities	3.2	1.0	4.5
Killing wildlife cruel	4.3	.5	6.5
Animals may become extinct	3.6	.7	5.2
Other (health, etc.)	12.6	9.2	14.6

a. A person may hold several attitudes. Therefore the percentages sum to greater than 100.

percentages responding to these beliefs were lower than anticipated, given the current widespread interest in ecology and the environment.

Hunting and Fishing Participation and  
Gross Expenditures in Arizona - 1970

Licenses Purchased

A summary of the number and types of licenses purchased in Arizona for 1970 are given in Table 30. Increases in the numbers and expenditures for all license categories are evident. An estimated 358,512 hunting and fishing licenses were purchased by both residents and nonresidents, not including one-day and five-day license categories. Increases in both nonresident and resident combination licenses represented the most significant changes in sales, 120 percent and 68 percent, respectively. Resident license sales increased 38 percent and nonresident license sales increased 73 percent. The nonresident share of licenses sold has increased from 6.1 percent in 1965 to 7.5 percent in 1970. Households from the nonresident states of California, Nevada and New Mexico accounted for 78 percent of the nonresident sales for 1970.

Including tags and stamps with licenses sold, a total of \$2,900,826 was expended in 1970 (Arizona Game and Fish Department 1972). License sales in the categories detailed in this study accounted for \$1,986,167 or

Table 30. Numbers and Types of Licenses Purchased in Arizona, 1965 and 1970 Compared.

Type of License	1965 <sup>a</sup> Number Bought	1970 <sup>b</sup> Number Bought	Per- cent Change	1965 <sup>a</sup> License Expenditure	1970 <sup>b</sup> License Expenditure	Percent Change
<b>Resident</b>						
General fish	114,104	167,858	+47	\$ 342,312	\$ 503,574	+47
General hunt	86,337	97,152	+13	431,685	485,760	+13
Combination	39,557	66,495	+68	356,013	598,455	+68
Sub-total	239,998	331,505	+38	1,130,010	1,587,789	+47
<b>Nonresident</b>						
General fish	4,092	5,912	+44	36,828	53,208	+44
Colorado River fish	4,419	7,460	+69	44,190	74,600	+69
Combination	844	1,857	+120	21,100	46,425	+120
General hunt	5,730	11,017	+92	114,600	220,340	+92
Predator only	560	761	+36	2,800	3,805	+36
Sub-total	15,645	27,007	+73	219,518	398,378	+81
TOTAL	255,643	358,512	+40	1,349,528	1,986,167	+47

a. Source: Davis (1967, pp. 88-89).

b. Source: Arizona Game and Fish Department (1972, p. 29).

approximately 68 percent of the total. The expenditure of \$1,986,167 also represented 93 percent of the total of \$2,140,415 for licenses alone.

#### Percent of Households Who Hunted and Fished by License Category

Tables 31 to 34 classify by license purchased the percent of nonresident and resident households engaged in various hunting and fishing activities. Nonresident hunters appeared to be attracted more to small game than other hunting activities. Resident hunters, however, appeared to find big game hunting most attractive. Both residents and nonresidents participated more actively in cold water fishing.

#### Resident and Nonresident Expenditures in 1970 Compared with 1965

Nonresident and resident sportsmen spent a combined total of nearly \$40 million in 1970. The figure represents a substantial gain of 80 percent for the period 1965-70. Nonresidents, comprising only 15 percent of the total sportsmen, realized a 209 percent increase in expenditures while resident expenditures rose 67 percent. Fishing expenditures composed a substantial 60 percent of the total outlay in 1970, while hunting expenditures accounted for approximately 40 percent. The percentage increases in hunting expenditures, however, was relatively greater than the

Table 31. Percent of Nonresident Sportsmen Who Hunted for Various Species by License Category in 1970.<sup>a</sup>

License Type	Big Game	Small Game	Water-fowl	General Hunting	All Game
General hunt (004)	42	52	6		100
Combination (006)	43	48	9		100
Predator (012)				100	100
Percent of Total	41	51	7	1	100

a. A household can be included in more than one species group.

Table 32. Percent of Nonresident Sportsmen Who Fished for Various Species by License Category in 1970.<sup>a</sup>

License Type	Cold Water	Warm Water	All Fish
General fish (002)	59	41	100
Combination (006)	69	31	100
Colorado River fish (010)	61	39	100
Percent of Total	61	39	100

a. A household can be included in more than one species group.



Table 33. Percent of Resident Households Who Hunted for Various Species by License Category in 1970.<sup>a</sup>

License Type	Big Game	Small Game	Water-fowl	General Hunting	All Game
Combination	42	38	10	10	100
Hunt-Fish <sup>b</sup>	49	32	8	11	100
General hunting	52	33	4	11	100
Percent of total	47	35	8	10	100

a. A household can be included in one or more species group.

b. Households owning a general hunting license and a general fishing license rather than a combination license.

Table 34. Percent of Resident Households Who Fished for Various Species by License Category in 1970.<sup>a</sup>

License Type	Cold Water	Warm Water	All Fish
Combination	54	46	100
Hunt-Fish <sup>b</sup>	52	48	100
General fishing	55	45	100
Percent of total	54	46	100

a. A household can be included in one or more species group.

b. Households owning a general hunting license and a general fishing license rather than a combination license.

increase in fishing expenditures during the five-year period. The comparative data is summarized in Table 35.

The percentage increase in nonresident expenditures is attributable to different methods of estimation procedures employed in the 1965 and 1970 studies. Nonresident expenditures were underestimated in 1965, giving rise to a greater percentage increase in 1970. Also, in the 1965 survey the recreational unit was the licensed sportsmen. The 1970 study, however, focused upon the household as the recreational unit. Consequently, a portion of the increase in gross expenditures between 1965 and 1970 are attributed to the change in definition of the recreational unit.

#### Expenditures in 1970 Analyzed by Types of Items Purchased

The total expenditure of \$40 million for hunting and fishing is composed of four cost categories: lodging, additional food, other variable items, and transportation expense. These costs are variable costs. All fixed expenditures have been excluded. Expenditures in all categories increased during the five-year period, while the relative percentage share of each cost category remained basically unchanged. Of the nearly \$40 million expended, \$18.1 million was attributed to transportation costs and \$11.9 million was attributed to other variable cost items. Combined, these two major cost categories represented

Table 35. Hunting and Fishing Expenditures in Arizona by Types of Hunting and Fishing, 1965 and 1970 Compared in Terms of 1970 Dollars.

Types of Hunting or Fishing	1965 Expenditures	Percent of Total	1970 Expenditures	Percent of Total	Percent Change 1965-70
<u>Resident</u>					
Hunting					
Big game	\$ 3,490,168	17.2	\$ 6,464,027	19.2	+85
Small game	2,745,173	13.7	5,249,915	15.6	+91
Waterfowl	291,658	1.5	830,668	2.5	+185
General	315,168	1.6	927,305	2.8	+194
Sub-total	6,842,167	34.0	13,471,915	40.1	+97
Fishing					
Cold water	6,627,622	33.0	11,948,680	35.6	+80
Warm water	6,633,177	33.0	8,168,286	24.3	+23
Sub-total	13,260,799	66.0	20,116,966	59.9	+52
TOTAL	20,102,966	100.0	33,588,881	100.0	+67
<u>Nonresident</u>					
Hunting					
Big game	38,819	2.0	701,358	11.7	+1,707
Small game	144,482	7.4	1,326,692	22.1	+818
Waterfowl	6,844	0.4	149,472	2.5	+2,084
General	19,255	1.0	112,455	1.9	+484

Table 35.--continued

Types of Hunting or Fishing	1965 Expenditures	Percent of Total	1970 Expenditures	Percent of Total	Percent Change 1965-70
Sub-total	\$ 209,400	10.8	\$ 2,289,977	38.2	+994
<b>Fishing</b>					
Cold water	1,245,679	63.9	2,091,449	34.8	+68
Warm water	491,661	25.3	1,628,148	27.1	+231
Sub-total	1,737,340	89.2	3,719,597	61.9	+114
TOTAL	1,946,740	100.0	6,009,574	100.1	+209
<b>Resident and nonresident combined</b>					
<b>Hunting</b>					
Big game	3,528,987	16.0	7,165,385	18.1	+103
Small game	2,889,655	13.1	6,576,607	16.6	+128
Waterfowl	298,502	1.4	980,140	2.5	+228
General	334,423	1.5	1,039,760	2.6	+211
Sub-total	7,051,567	32.0	15,761,892	39.8	+124
<b>Fishing</b>					
Cold water	7,873,301	35.7	14,040,129	35.5	+78
Warm water	7,124,838	32.3	9,796,434	24.7	+37
Sub-total	14,998,139	68.0	23,836,563	60.2	+59
TOTAL	22,049,706	100.0	39,598,455	100.0	+80

75.9 percent of the total outlay. Table 36 gives a complete summary of types of hunting and fishing expenditures for both nonresidents and residents.

#### Trips, Days and Average Expenditure for Each Type of Hunting and Fishing

Table 37 summarizes the comparisons between 1965 and 1970 for total household-trips, total household-days, and the average days afield per household. Dramatic increases are noted for predators, waterfowl and cold water fishing household-trips during the five-year period. Warm water fishing increased only slightly while big game and small game trips remained fairly constant. An overall increase of 24 percent in the number of household-trips taken for all hunting and fishing activities occurred. Increases are evident in the total number of household-days afield for all types of game and fishing sports. Household-days afield, however, increased at a lower rate than did trips for cold water fishing, warm water fishing, and waterfowl hunting, but at a slightly higher rate than trips for big game, small game, and predator hunting. The total increase for total days afield was 22 percent.

Comparisons between 1965 and 1970 are not made for average cost per household-trip, per household-day, and per household. Only 1970 data are shown in Table 38. Estimates for 1965 were for a single man while 1970 estimates are for

Table 36. Types of Hunting and Fishing Expenditures in Arizona, 1965 and 1970  
Compared in Terms of 1970 Dollars.

Type of Expenditure	1965		1970		Percent Change 1965-70
	Total Spent	Percent of Total	Total Spent	Percent of Total	
Resident					
Lodging	\$ 2,181,830	10.8	\$ 2,425,969	7.2	+11
Food	4,464,968	22.2	4,999,465	14.9	+12
Other	5,222,372	26.0	10,633,289	31.7	+104
Transportation	8,233,796	41.0	15,530,158	46.2	+89
Sub-total	20,102,966	100.0	33,588,881	100.0	+67
Nonresident					
Lodging	296,429	15.2	1,151,711	19.2	+289
Food	445,767	22.9	989,542	16.5	+122
Other	410,240	21.1	1,286,575	21.3	+214
Transportation	794,304	40.8	2,581,746	43.0	+225
Sub-total	1,946,740	100.0	6,009,574	100.0	+209
Resident and non- resident combined					
Lodging	2,478,259	11.2	3,577,680	9.0	+44
Food	4,910,735	22.3	5,989,007	15.1	+22
Other	5,632,612	25.6	11,919,864	30.1	+112
Transportation	9,028,100	40.9	18,111,904	45.8	+101
TOTAL	22,049,706	100.0	39,598,455	100.0	+80

Table 37. Trips and Days Afield, 1965 and 1970 Compared.<sup>a</sup>

Types Hunting or Fishing	Household- Trips Made <sup>b</sup>		Per- cent Change	Household- Days Afield		Per- cent Change	Average Days Afield per Sporting Household		Per- cent Change
	1965 <sup>c</sup>	1970		1965 <sup>c</sup>	1970		1965 <sup>c</sup>	1970	
<b>Fishing</b>									
Cold water	520,645	903,950	+73.6	1,040,825	1,347,110	+29	8.6	13.6	+58
Warm water	798,560	869,339	+8.9	1,086,085	1,165,199	+7	9.0	14.1	+57
<b>Hunting</b>									
Big game	384,710	388,319	+0.9	532,425	642,474	+21	4.2	7.1	+69
Small game	690,215	687,344	-0.4	660,920	745,362	+13	7.8	10.8	+38
Waterfowl	47,740	107,546	+125.3	54,560	113,402	+108	5.4	7.4	+37
Predator	62,775	152,360	+142.7	64,170	165,420	+158	5.2	8.3	+60
<b>TOTAL</b>	<b>2,504,645</b>	<b>3,108,858</b>	<b>+24.1</b>	<b>3,438,985</b>	<b>4,178,967</b>	<b>+22</b>	<b>d</b>	<b>d</b>	<b>d</b>

a. Includes residents and nonresidents.

b. The actual number of automobile trips are less to the extent that two or more households traveled in the same car.

c. Source: Davis (1967, p. 20-22).

d. Not applicable.



Table 38. Average Costs per Household-Trip, per Household-Day and per Household.<sup>a</sup>

Types of Hunting or Fishing	Average Cost, 1970		
	Per House- hold-Trip	Per House- hold-Day	Per House- hold <sup>b</sup>
	(dollars)		
Fishing			
Cold water	15.53	10.42	141.25
Warm water	11.27	8.41	118.13
Hunting			
Big game	18.45	11.15	79.71
Small game	9.57	8.82	95.13
Waterfowl	9.11	8.64	64.19
Predator	6.82	6.29	52.17
Weighted average	12.74	9.47	c

a. Residents and nonresidents.

b. Total average cost for 1970 for those households that participated in the listed activity.

c. Not applicable.

the number in the household making the trip. Average costs in 1970 for all types of trips were \$12.74 per household-trip and \$9.47 per household-day.

The last column of Table 38 shows the total average cost per year for households participating in particular activities. Households participating in cold water fishing spent more than any other sporting household (\$141.25) as compared to predators (\$52.17), the lowest average expenditure per household. The estimates for average expenditures per household are additive in the sense that a single household could participate in more than one activity, for instance, spending \$141.25 in cold water fishing and \$52.17 in predator hunting.

Participation and Expenditures in 1970  
Detailed for Each Species and for  
General Rural Outdoor Recreation

#### Cold Water Fishing

Trout fishing in Arizona for 1970 attracted nearly 100,000 households to make approximately one million trips and to spend more than 1.3 million days in the field. The average days afield for cold water fishermen rose from 8.6 days in 1965 to 13.6 days in 1970, an increase of 58 percent (Table 37). The average expenditure per cold water fishing household was over \$140. The average number of household-trips taken per household was 9.1 with an average

expenditure of \$15.53 per cold water fishing trip. Table 39 presents data summarizing trout fishing participation and average total costs for 1970.

Cold water fishing expenditures for 1970 totaled slightly over \$14 million (Table 40). This figure represented over 35 percent of the total outlay for all hunting and fishing activities. The 1970 expenditure was an increase of 78 percent over the \$7.9 million expended in 1965. The most significant increase in expenditures was for "other" variable costs; 187 percent during the five-year period. In 1965, nonresident expenditures amounted to 16 percent of the total outlay. In 1970, nonresidents spent 15 percent of the total expenditure, indicating a declining share of the increasing total.

#### Warm Water Fishing

Warm water fishing has not increased as rapidly relative to cold water fishing in participation or in gross expenditures. The number of households competing in this sport was nearly 83,000 as compared to the 100,000 households participating in trout fishing. However, the level of participation in warm water fishing is still on the increase. The number of trips and days have risen 8.9 percent and 7.0 percent, respectively since 1965 (Table 37). An average of \$118 per household was spent by warm water fishermen, less than the amount spent for the year for each

Table 39. Cold Water Fishing, Details on Household Participation and Costs, 1970.

<u>Participation or Cost Item</u>	<u>Resident</u>	<u>Nonresident</u>	<u>All Participants</u>
Number of households	92,204	7,192	99,396
Average people per household	2.5	2.1	2.5
Total household-trips	859,760	44,190	903,950
Average trips per household	9.3	6.1	9.1
Total household-days afield	1,195,870	151,240	1,347,110
Average days per household per year	13.0	21.0	13.6
Average days per household per trip	1.4	3.4	1.5
Total man-days	2,880,821	348,035	3,228,856
Total cost	\$11,948,680.00	\$2,091,449.00	\$14,040,129.00
Average cost per household	129.59	290.80	141.25
Average cost per household- trip	13.90	47.33	15.53
Average cost per household- day	9.99	13.83	10.42
Average cost per man-day	4.15	6.01	4.35

Table 40. Cold Water Fishing, Details on Total Expenditures in Arizona, 1965 and 1970 Compared.

Type of Expenditure	1965	Percent of Total	1970	Percent of Total	Percent Change 1965-70
<b>Resident</b>					
Lodging	\$1,322,652	20.0	\$1,400,502	11.7	+6
Food	1,570,205	23.7	1,364,578	11.4	-13
Other	1,053,663	15.9	3,187,405	26.7	+203
Transportation	2,681,102	40.4	5,996,195	50.2	+124
Total	6,627,622	100.0	11,948,680	100.0	+80
<b>Nonresident</b>					
Lodging	248,711	20.0	387,180	18.5	+56
Food	295,090	23.7	239,632	11.5	-19
Other	198,017	15.9	409,745	19.6	+107
Transportation	503,861	40.4	1,054,892	50.4	+109
Total	1,245,679	100.0	2,091,449	100.0	+68
<b>Resident and non-resident combined</b>					
Lodging	1,571,363	20.0	1,787,682	12.7	+14
Food	1,865,295	23.7	1,604,210	11.4	-14
Other	1,251,680	15.9	3,597,150	25.6	+187
Transportation	3,184,963	40.4	7,051,087	50.3	+121
Total	7,873,301	100.0	14,040,129	100.0	+78

cold water fishing household. The average number of household-trips taken per household was 10.5 trips with an average expenditure made of \$11.27 per warm water fishing trip. This is nearly \$4 less than the average cost per household per cold water fishing trip. The difference is largely attributable to the difference in transportation cost per trip. Table 41 gives in detail the degree of participation and the average costs in this activity for 1970.

Expenditures for the year exceeded \$9.7 million (Table 42) which was 37 percent above the estimated \$7.1 million spent on this sport in 1965. Gains were realized in all types of expenditures except for additional food which declined by 20 percent. Resident expenditures comprised 83.4 percent of the total outlay. The remaining 16.6 percent attributed to nonresidents was an important increase over the 7 percent attributed to nonresidents in 1965.

#### Big Game Hunting

Table 43 gives the extent of big game hunting participation and costs in 1970. Combining nonresidents and residents, nearly 90,000 households pursued deer, elk, bear or antelope during the year. Although a minute gain in trips is evident since 1965, the total number of days afield has increased by 21 percent (Table 37). Moreover, the average number of days afield per household has increased

Table 41. Warm Water Fishing, Details on Household Participation and Costs, 1970.

<u>Participation or Cost Item</u>	<u>Resident</u>	<u>Nonresident</u>	<u>All Participants</u>
Number of households	78,383	4,545	82,928
Average people per household	2.2	2.0	2.2
Total household-trips	847,715	21,624	869,339
Average trips per household	10.8	4.8	10.5
Total household-days afield	1,075,336	89,863	1,165,199
Average days per household per year	13.7	20.1	14.1
Average days per household per trip	1.3	4.2	1.3
Total man-days	2,252,823	171,522	2,424,345
Total cost	\$8,168,286.00	\$1,628,148.00	\$9,796,434.00
Average cost per household	104.21	358.23	118.13
Average cost per household- trip	9.64	75.29	11.27
Average cost per household- day	7.60	18.12	8.41
Average cost per man-day	3.63	9.49	4.04

Table 42. Warm Water Fishing, Details on Total Expenditures in Arizona, 1965 and 1970 Compared.

Type of Expenditure	1965	Percent of Total	1970	Percent of Total	Percent Change 1965-70
<b>Resident</b>					
Lodging	\$ 516,931	7.8	\$ 482,710	5.9	-7
Food	1,626,088	24.5	1,065,296	13.1	-34
Other	1,521,482	22.9	3,310,028	40.5	+118
Transportation	2,968,676	44.8	3,310,252	40.5	+12
<b>Total</b>	<b>6,633,177</b>	<b>100.0</b>	<b>8,168,286</b>	<b>100.0</b>	<b>+23</b>
<b>Nonresident</b>					
Lodging	38,312	7.8	329,640	20.3	+760
Food	120,516	24.5	330,316	20.3	+174
Other	112,813	22.9	412,581	25.3	+266
Transportation	220,020	44.8	555,611	34.1	+153
<b>Total</b>	<b>491,661</b>	<b>100.0</b>	<b>1,628,148</b>	<b>100.0</b>	<b>+231</b>
<b>Resident and non-resident combined</b>					
Lodging	555,243	7.8	812,350	8.3	+46
Food	1,746,604	24.5	1,395,612	14.2	-20
Other	1,634,295	22.9	3,722,609	38.0	+128
Transportation	3,188,696	44.8	3,865,863	39.5	+21
<b>Total</b>	<b>7,124,838</b>	<b>100.0</b>	<b>9,796,434</b>	<b>100.0</b>	<b>+37</b>



Table 43. Big Game Hunting, Details on Household Participation and Costs, 1970.

Participation or Cost Item	Resident	Nonresident	All Participants
Number of households	85,154	4,742	89,896
Average people per household	1.6	1.4	1.6
Total household-trips	379,915	8,404	388,319
Average trips per household	4.5	1.8	4.3
Total household-days afield	609,045	33,429	642,474
Average days per household per year	7.2	7.1	7.1
Average days per household per trip	1.6	4.0	1.7
Total man-days	974,046	46,242	1,020,288
Total cost	\$6,464,027.00	\$701,358.00	\$7,165,385.00
Average cost per household	75.91	147.90	79.71
Average cost per household- trip	17.01	83.46	18.45
Average cost per household- day	10.61	20.98	11.15
Average cost per man-day	6.64	15.17	7.02

69 percent during the same time period (Table 37). Resident big game hunters made an average of 4.5 household-trips in 1970 and spent about \$17 per trip (Table 43). On the other hand, nonresident big game hunters made fewer average trips, yet spent nearly five times the amount per trip (excluding license fees and equipment costs). The difference in cost reflects the greater length of stay afield and the relatively higher transportation and lodging costs undertaken by nonresidents in the pursuit of big game.

In total, nearly \$7.2 million was expended on this sport for the year, a gain of 103 percent (Table 44) over 1965 expenditures. Nearly 10 percent of this total was spent by nonresident sportsmen. Mileage cost represented the major expenditure made by big game hunters in 1970. The percentage change in lodging expense, however, represented the largest proportional change between time periods.

#### Small Game Hunting

As shown in Table 45, a total of 69,000 households participated in small game hunting as compared to the 90,000 households in big game hunting. Small game sportsmen, however, made more trips and spent more days afield than did big game participants. The total number of household-trips declined by 0.4 percent while the total number of household-days rose 13 percent (Table 37). Moreover, the average days afield per household increased 38 percent (Table 37).

Table 44. Big Game Hunting, Details on Total Expenditures in Arizona, 1965 and 1970 Compared.

Type of Expenditure	1965	Percent of Total	1970	Percent of Total	Percent Change 1965-70
<b>Resident</b>					
Lodging	\$ 212,861	6.1	\$ 456,095	7.1	+114
Food	863,166	24.7	1,843,786	28.5	+114
Other	878,049	25.2	1,918,141	29.7	+118
Transportation	1,536,092	44.0	2,246,005	34.7	+46
Total	3,490,168	100.0	6,464,027	100.0	+85
<b>Nonresident</b>					
Lodging	2,367	6.1	82,856	11.8	+3,400
Food	9,600	24.7	161,707	23.1	+1,584
Other	9,767	25.2	180,875	25.8	+1,752
Transportation	17,085	44.0	275,920	39.3	+1,515
Total	38,819	100.0	701,358	100.0	+1,707
<b>Resident and non-resident combined</b>					
Lodging	215,228	6.1	538,951	7.5	+150
Food	872,766	24.7	2,005,493	28.0	+130
Other	887,816	25.2	2,099,016	29.3	+136
Transportation	1,553,177	44.0	2,521,925	35.2	+62
Total	3,528,987	100.0	7,165,385	100.0	+103

Table 45. Small Game Hunting, Details on Household Participation and Costs, 1970.

<u>Participation or Cost Item</u>	<u>Resident</u>	<u>Nonresident</u>	<u>All Participants</u>
Number of households	63,273	5,858	69,131
Average people per household	1.5	1.6	1.5
Total household-trips	660,459	26,885	687,344
Average trips per household	10.4	4.6	9.9
Total household-days afield	692,641	52,721	745,362
Average days per household per year	10.9	9.0	10.8
Average days per household per trip	1.0	2.0	1.1
Total man-days	1,033,915	97,947	1,131,862
Total cost	\$5,249,915.00	\$1,326,692.00	\$6,576,607.00
Average cost per household	82.97	226.48	95.13
Average cost per household- trip	7.95	49.35	9.57
Average cost per household- day	7.58	25.16	8.82
Average cost per man-day	5.08	13.55	5.81

A total of nearly \$6.6 million was expended on the sport in 1970, representing a five-year 128 percent gain (Table 46). Nonresident sportsmen indicated a large interest by spending 20.2 percent of the total figure. In general, small game hunters spent less for food and lodging, but more for transportation than did big game hunters. This pattern was expected since small game participants spent fewer days per trip away from home. However, since they made almost twice as many trips as big game hunters, their mileage expenses represented 54.7 percent of the gross expenditure. The average total cost per household was higher than that for big game hunting which may be a reflection of fewer small game participants. Table 45 indicates average total cost per household as \$95.13. The average number of household-trips taken per household was 9.9 with an average expenditure of \$9.57 per small game hunting trip.

#### Waterfowl Hunting

Total participation and expenditures made in the pursuit of ducks and geese are small when compared to small game and big game hunting activities. Only 15,000 households participated in 1970. However, a 125 percent increase in trips and a 108 percent increase in days are evident during the five-year period (Table 37). Nonresidents spent relatively less per household-trip in this sport than in other hunting activities. This may reflect the relatively shorter distances necessary to travel to waterfowl hunting

Table 46. Small Game Hunting, Details on Total Expenditures in Arizona, 1965 and 1970 Compared.

Type of Expenditure	1965	Percent of Total	1970	Percent of Total	Percent Change 1965-70
<b>Resident</b>					
Lodging	\$ 78,487	2.9	\$ 74,839	1.4	+5
Food	316,135	11.5	533,473	10.2	+69
Other	1,493,077	54.4	1,618,360	30.8	+8
Transportation	857,474	31.2	3,023,243	57.6	+253
Total	2,745,173	100.0	5,249,915	100.0	+91
<b>Nonresident</b>					
Lodging	4,131	2.9	284,735	21.5	+6,793
Food	16,639	11.5	232,406	17.5	+1,297
Other	78,583	54.4	232,857	17.6	+196
Transportation	45,129	31.2	576,694	43.4	+1,178
Total	144,482	100.0	1,326,692	100.0	+818
<b>Resident and non-resident combined</b>					
Lodging	82,618	2.9	359,574	5.6	+335
Food	332,774	11.5	765,879	11.6	+130
Other	1,571,660	54.4	1,851,217	28.1	+18
Transportation	902,603	31.2	3,599,937	54.7	+299
Total	2,889,655	100.0	6,576,607	100.0	+128

sites. The average number of trips per household in 1970 was 7.0 with an average expenditure of \$9.11 made per average waterfowl hunting household-trip (Table 47).

Total expenditures estimated in 1970 were nearly \$1 million as compared to the approximate \$300,000 expended in 1965, a gain of 228 percent (Table 48). All categories of expenditures rose significantly in this period. The data suggest the growing importance of waterfowl hunting relative to other hunting activities.

#### General Hunting

As with waterfowl hunting, general (predator) hunting is on the increase. Increases in this phase of hunting may in part be a result of attempts made by varmint-calling groups to stimulate participation. The number of participating sportsmen was nearly 20,000 in 1970 (Table 49). These sportsmen made over 152,000 trips and spent more than 165,000 days afield, representing substantial increases in participation since 1965 (Table 37). The average total cost per household was \$52.17 for 1970. The \$4.50 representing the average cost per man-day was less than any other hunting per man-day cost.

Expenditures for this sport increased 211 percent between 1965 and 1970 (Table 50). As with most activities, the bulk of the 1970 expenditure was for private transportation which represented 50.4 percent of the total outlay.

Table 47. Waterfowl Hunting, Details on Household Participation and Costs, 1970.

Participation of Cost Item	Resident	Nonresident	All Participants
Number of households	14,509	760	15,269
Average people per household	1.4	1.5	1.4
Total household-trips	102,360	5,186	107,546
Average trips per household	7.1	6.8	7.0
Total household-days afield	105,469	7,933	113,402
Average days per household per year	7.3	10.4	7.4
Average days per household per trip	1.0	1.5	1.1
Total man-days	144,072	14,455	158,527
Total cost	\$830,668.00	\$149,472.00	\$980,140.00
Average cost per household	57.25	196.67	64.19
Average cost per household- trip	8.12	28.82	9.11
Average cost per household- day	7.88	18.84	8.64
Average cost per man-day	5.77	10.34	6.18



Table 48. Waterfowl Hunting, Details on Total Expenditures in Arizona, 1965 and 1970 Compared.

Type of Expenditure	1965	Percent of Total	1970	Percent of Total	Percent Change 1965-70
<b>Resident</b>					
Lodging	\$ 5,591	1.9	\$ 9,210	1.1	+65
Food	39,179	13.4	79,367	9.6	+103
Other	155,998	53.5	300,976	36.2	+93
Transportation	90,890	31.2	441,115	53.1	+385
Total	291,658	100.0	830,668	100.0	+185
<b>Nonresident</b>					
Lodging	133	2.0	7,800	5.2	+5,765
Food	848	12.4	12,986	8.7	+1,431
Other	3,705	54.1	20,767	13.9	+461
Transportation	2,158	31.5	107,919	72.2	+4,901
Total	6,844	100.0	149,472	100.0	+2,084
<b>Resident and non-resident combined</b>					
Lodging	5,724	1.9	17,010	1.7	+197
Food	40,027	13.4	92,353	9.4	+131
Other	159,703	53.5	321,743	32.8	+101
Transportation	93,048	31.2	549,034	56.1	+490
Total	298,502	100.0	980,140	100.0	+228

Table 49. General Hunting, Details on Household Participation and Costs, 1970.

<u>Participation or Cost Item</u>	<u>Resident</u>	<u>Nonresident</u>	<u>All Participants</u>
Number of households	19,334	595	19,929
Average people per household	1.5	1.0	1.4
Total household-trips	151,170	1,190	152,360
Average trips per household	7.8	2.0	7.6
Total household-days afield	162,445	2,975	165,420
Average days per household per year	8.4	5.0	8.3
Average days per household per trip	1.1	2.5	1.1
Total man-days	228,296	2,975	231,271
Total cost	\$927,305.00	\$112,455.00	\$1,039,760.00
Average cost per household	47.96	189.00	52.17
Average cost per household- trip	6.13	94.50	6.82
Average cost per household- day	5.71	37.80	6.29
Average cost per man-day	4.06	37.80	4.50

Table 50. General Hunting, Details on Total Expenditures in Arizona, 1965 and 1970 Compared.

Type of Expenditure	1965	Percent of Total	1970	Percent of Total	Percent Change 1965-70
<b>Resident</b>					
Lodging	\$ 45,308	14.4	\$ 2,613	0.3	-94
Food	50,195	15.9	112,965	12.2	+125
Other	120,103	38.1	298,379	32.2	+148
Transportation	99,562	31.6	513,348	55.4	+416
<b>Total</b>	<b>315,168</b>	<b>100.0</b>	<b>927,305</b>	<b>100.1</b>	<b>+194</b>
<b>Nonresident</b>					
Lodging	2,775	14.4	59,500	52.9	+2,044
Food	3,074	16.0	12,495	11.1	+306
Other	7,355	38.2	29,750	26.5	+304
Transportation	6,051	31.4	10,710	9.5	+77
<b>Total</b>	<b>19,255</b>	<b>100.0</b>	<b>112,455</b>	<b>100.0</b>	<b>+484</b>
<b>Resident and non-resident combined</b>					
Lodging	48,083	14.4	62,113	6.0	+29
Food	53,269	15.9	125,460	12.1	+136
Other	127,458	38.1	328,129	31.6	+157
Transportation	105,613	31.6	524,058	50.4	+396
<b>Total</b>	<b>334,423</b>	<b>100.0</b>	<b>1,039,760</b>	<b>100.1</b>	<b>+211</b>

Relatively little was spent in this sport in the form of lodging expense.

As Davis (1967) indicated for 1965, predator hunting expenditures still represent only a small portion of all funds expended for hunting and fishing. However, the money cost does not adequately reflect the total importance of this activity. With a year-round hunting season for predator game, the hunter can make the fullest use of his time with a minimum effort.

#### General Rural Outdoor Recreation

More than 335,000 households participated in this activity in 1970, comprising over 47 percent of the total resident households. Nearly 3.2 million trips, or an average of approximately ten trips per household, were made--excluding trips made in conjunction with hunting and fishing activities. An average of 3.3 people, or probably the whole family, tend to go on these trips, which tend to be of relatively short duration but average over a day apiece. Table 51 summarizes the extent of general rural outdoor participation and costs for 1970. An average yearly cost of nearly \$120 was spent by a household with an average expense of \$12.64 per household-trip in 1970. The average total cost per man-day of \$2.91 was the lowest per man-day cost of all outdoor activities.

Table 51. General Recreation, Details on Household Participation and Costs, 1970.<sup>a</sup>

Participation or Cost Item	Resident
Number of households	335,998
Average people per household	3.3
Total household-trips	3,180,931
Average trips per household	9.5
Total household-days afield	4,140,825
Average days per household per year	12.3
Average days per household per trip	1.3
Total man-days	13,826,005
Total cost	\$40,198,540.00
Average cost per household	119.64
Average cost per household-trip	12.64
Average cost per household-day	9.71
Average cost per man-day	2.91

a. Resident expenditures only.

In total, some \$40.2 million (Table 52) was expended for this type of activity representing over 50 percent of the total expenditure for all types of outdoor recreation.

Since estimates for general rural outdoor participation and expenditures were not determined in 1965, no comparisons can be made. Furthermore, the expenditure estimates depicted in Table 52 are minimal since nonresident household estimates have been excluded. The different types of activities within general rural outdoor recreation such as boating, hiking or picnicking are not further detailed due to the difficulty in allocating expenditures when a household indicated that it did a variety of activities on one trip. Consequently, expenditure estimates are for the "package" of activities.

Transportation expense, as with hunting and fishing activities, is the greatest single element of expense. The relative percentage share of "other" items is less for general rural outdoor recreation as compared to hunting and fishing. However, the relative importance of lodging expense is greater than for hunting and fishing activities.

Table 52. General Recreation, Details on Total Expenditures in Arizona, 1970.<sup>a</sup>

Type of Expenditure	1970 (dollars)	Percent of Total
Lodging	7,116,695	17.7
Food	5,464,668	13.6
Other	8,224,276	20.5
Transportation	19,392,901	48.2
Total	40,198,540	100.0

a. Resident expenditures only.

## CHAPTER IV

### CONCLUSION

#### Household Participation Patterns

Tables 53 and 54 summarize the data on the percentage of households participating by activity. The greatest percentages of nonresidents came to Arizona to hunt (46.2 percent). However, of the estimated 491,302 households in Arizona assumed eligible to recreate, only 6.1 percent hunted. Slightly over one-third of the households participated in hunting and/or fishing. The majority of outdoor recreators are those engaged in "other" or general rural outdoor activities only. This group composed nearly 50 percent of the total resident households included in the eligible population for this study. Slightly over 17 percent of the households did not participate in any form of outdoor recreation. In total, nearly 83 percent of the resident households, or 406,798 households, participated in some form of outdoor recreation. These figures suggest that outdoor recreation is an important way a majority of Arizona residents choose to spend their leisure time.



Table 53. Percent of Nonresident Sportsmen Participating by Activity in 1970.

Type of Sportsmen	Total Percent
Hunt only	46.2
Fish only	36.7
Hunt and fish	17.1
Total	100.0

Table 54. Percent of Resident Households Participating by Activity in 1970.

Type of Sportsmen or Non-sportsmen	Total Percent
Sportsmen	
Hunt only	6.1
Fish only	13.3
Hunt and fish	15.8
Subtotal	35.2
Non-sportsmen	
Other	47.6
None	17.2
Subtotal	64.8
Total	100.0

Socioeconomic Characteristics  
of Outdoor Recreators

Age of Heads of Households

The largest total percentage of sportsmen is found in the 35-54 age bracket for both residents and nonresidents. Hunters tended to be younger than fishermen. Sportsmen in the older age brackets represented a higher portion of the sample in 1970 than in 1965. This could suggest an overall reduction in the number of hunters and fishermen through time. The largest portion of nonrecreators was found to be 55 years of age and over. These households represented over 50 percent of the total nonrecreators.

Marital Status of Heads of Households

A majority of the nonresident and resident sportsmen are married. Fewer resident "other" recreators and nonrecreators are married than hunters and fishermen. This would indicate that being married does not reduce participation among hunting and fishing activities.

Size of Place of Residence of Households

Many of the nonresident sportsmen tended to reside in large metropolitan areas. California was the largest supplier of sportsmen, particularly from the Los Angeles and San Diego metropolitan areas. More than 37 percent of

the resident sportsmen resided in communities of 2,500 to 50,000 inhabitants. Households living outside the two main Arizona metropolitan areas participated in hunting and fishing in greater proportions than did urban dwellers.

#### Education of Heads of Households

A majority of both nonresidents and residents completed at least 12 years of school or more. Nonresident sportsmen showed a significantly higher portion of persons having had some college education, whereas, residents showed a higher percentage of individuals having had some postgraduate education. Nonrecreators tended to have completed lower levels of education than recreators. In general, the distribution of formal education for residents and nonresidents suggest that participation in outdoor recreation is quite broadly based by educational attainment.

#### Occupation of Heads of Households

Resident skilled or semi-skilled workers participated to a greater extent in hunting and fishing than did other workers. Professional or managerial workers, however, were the most significant participants for nonresident sportsmen. Retired people, representing approximately one-seventh of the total respondents, participated to a greater extent in fishing. The patterns of employment and participation for 1970 tend to indicate a shift away participation

of service workers, including policemen, firemen, armed forces, etc., and sales type of people to the professional and managerial profession groups.

#### Income of Heads of Households

Sportsmen with all sizes of incomes participated in outdoor recreation in 1970. Nonresident sportsmen had a significantly higher percentage of persons with incomes over \$15,000 than did residents. More resident sportsmen, however, were receiving incomes of over \$10,000 than in 1965. Most of the resident and nonresident households received incomes between \$5,000 and \$10,000.

#### Number of Days off Per Week of Heads of Households

A majority of the recreators and nonrecreators had from one to two days off per week. This is a reflection of the current five-day workweek trend. A high portion of nonrecreators also had from five to seven days off per week. Most of the semi-retired and retired people compose this category.

#### Length of Vacation of Heads of Households

The highest portions of sportsmen received more than one month and two weeks vacation, respectively. Few sportsmen received less than two weeks vacation. Fishermen, "other" recreators, and nonrecreators had higher

percentages of people having more than a month vacation than did the remaining groups for residents. Most of these people are retired.

#### Attitudes of Household Respondents

There are basically two reasons given as to why non-resident and resident households did not participate more often in hunting and fishing in 1970. These are: (1) not enough opportunities close by and (2) not enough time off. Residents, more than nonresidents, indicated economic reasons such as: There is not enough money left over from the budget and equipment costs too much. Nonresidents felt that hunting areas are too crowded while both nonresidents and residents felt fishing areas are too crowded. Those who do not hunt and fish reported a lack of interest, killing wildlife is cruel, and animals may become extinct as significant reasons in addition to those given above.

#### Expenditures for Hunting, Fishing, and General Rural Outdoor Recreation in Arizona in 1970

The total expenditures for all types of rural outdoor recreation are given in Table 55. Gross expenditures for the year totaled nearly \$80 million. The figure is a minimal estimate since fixed cost items and the cost of licenses, stamps and tags have been excluded. Furthermore,

Table 55. Summary of Hunting, Fishing and General Rural Outdoor Recreation Variable Expenditures in Arizona for 1970.<sup>a</sup>

Type of Expenditure	Total	Percent of Total
	(dollars)	
Hunting		
Nonresident <sup>b</sup>	2,289,977	2.9
Resident	13,471,915	16.9
Subtotal	15,761,892	19.8
Fishing		
Nonresident <sup>b</sup>	3,719,597	4.7
Resident	20,116,966	25.2
Subtotal	23,836,563	29.9
General Recreation		
Nonresident	c	c
Resident	40,198,540	50.3
Total	79,796,995	100.0

a. Excludes license and fixed equipment costs.

b. Total expenditures by residents of California, Nevada and New Mexico. Eighty-five percent of nonresident hunting and fishing households are from these three states. Expenditures of participants from other states would not be proportional since it is unlikely that transportation expense, the largest portion of variable expenditure, was for the specific purpose of hunting or fishing in Arizona.

c. Not estimated.

expenditures on general rural outdoor recreation by non-residents were not obtainable.

Nonresident expenditures for hunting and fishing would be greater if the expenditure of nonresidents residing in states other than California, Nevada and New Mexico were included. Nearly 85 percent of nonresident hunters and fishermen who recreate in Arizona reside in these three states. The expenditure for nonresident sportsmen who reside in other states has been excluded on the basis of the assumption that they came to Arizona for purposes other than hunting and fishing. As a consequence, it would be difficult and improper to allocate mileage cost (the greatest element of expense) between joint purposes of a trip.

The nonresident expenditure of \$6 million was not necessarily spent in Arizona. Items such as gasoline expense may have been made at the outset of the nonresident's trip at his point of origin.

As a result of the sampling procedure used, one-day and five-day license categories were excluded from this study. Consequently, participation and expenditures for nonresidents are underestimated to the extent that households purchased these licenses and no others.

The expenditures for hunting and fishing, and general rural outdoor recreation each total approximately

\$40 million. Given differences in research procedures between 1965 and 1970, an 80 percent increase in expenditures for hunting and fishing was realized for the five-year period. Transportation expense represented the largest share of total expenditures (47 percent), while lodging expense represented the lowest share (13.4 percent). Table 56 gives the details of types of expenditures in Arizona for 1970.

The total figure of \$80 million is a gross expenditure and is subject to various limitations when used to estimate the value of recreational resources. The gross expenditure is not necessarily the total economic value of an activity. This is true because of multiplier effects of the expenditure throughout the rest of the economy and because the expenditure may not truly reflect what sportsmen are actually willing to pay to participate. If sportsmen are receiving a surplus amount of satisfaction above the price they are actually paying to participate, then the expenditure could have been higher and the real economic value of the resources greater than the amount of expenditure actually made. Conversely, because the estimates are gross expenditures rather than values added, much double counting could occur.



Table 56. Expenditures on Hunting, Fishing, and General Rural Outdoor Recreation in Arizona in 1970, Classified by Type of Expenditure.

Type of Expenditure	Total Expenditure (dollars)	Percent of Total
Lodging	10,694,375	13.4
Food	11,453,675	14.4
Other	20,144,140	25.2
Transportation	37,504,805	47.0
Total	79,796,995	100.0

### Household-Days in Field and Cost Per Day

Households in all type of hunting and fishing spent more days in the field in 1970 than in 1965. The increase was 22 percent for the five-year period. The expenditure per household-day on the average was \$9.47 in 1970. Average costs per household ranged from \$52.17 for general (predator) hunting to \$141.25 for cold water fishing.

Average costs are likely to vary according to the household's residence status and for each recreational activity in which the household participates. Average costs for nonresidents were higher than for residents since they incurred higher transportation costs and had a greater length of stay on each trip.

General rural outdoor recreators in total spent approximately the same number of days in the field as did hunters and fishermen. The average number of days per household was similar to the average number of days per household in fishing activities. Average costs per household and per household-days were \$119.64 and \$9.71, respectively. The average cost per man-day for general rural outdoor recreators was \$2.91, the lowest per man-day cost of all outdoor activities.

### Household-Trips and Average Cost Per Trip

With exception of small game hunting, households made more trips in 1970, increasing from 2.5 million trips

in 1965 to 3.1 million trips in 1970. Average costs per trip ranged from \$6.82 for predators to \$18.45 for big game hunting.

The average cost per household-trip was \$12.64 for general rural outdoor recreation. A similar average number of approximately ten household-trips were taken by households for fishing, small game hunting, and general rural outdoor recreation. Seven to eight household-trips were the average for other types of hunting.

#### Recommendations

Since this research is part of a larger study on recreational demand analysis, the bulk of recommendations to the Arizona Game and Fish Department will be provided in the larger survey. However, based upon the implications of the attitudes of household respondents in this study, the following recommendations to the Arizona Game and Fish Department could be made:

- 1) Consider the construction and stocking of additional localized ponds and major lakes near important urban centers. These new fishing areas should include more personal convenience facilities. These developments could help reduce the feeling that not enough fishing opportunities are close by. Furthermore, the feeling that current fishing areas are too crowded could be reduced by undertaking such projects.

2) Consider the feasibility of developing management projects to preserve land and water-based resources as well as various wildlife species of the state. Initiation of such projects would be in line with ecological beliefs to protect wildlife from becoming extinct and to prevent destruction of other resources from unplanned exploitation.

The first recommendation could be financed through traditional license sale revenues. However, as improved estimates of recreation values are obtained (license fees, entrance fees, et.), these improved estimates may be used to finance additional recreation sites. The second recommendation could be financed through means other than traditional license sale revenues directed to those who are interested in hunting and fishing. Campaigns should be developed and promoted to those who do not purchase game and fish licenses, yet desire the implementation and success of such policies and projects.

#### Critical Appraisal of Descriptive Approach for Predictive Purposes

The major objective of this study was to provide a statistical descriptive analysis of the socioeconomic characteristics, participation levels and gross expenditures relative to outdoor recreation for Arizona in 1970. Though informative, the data developed are static in nature. The challenge for future research is to expand and reorganize

data into a form that will not only describe, but indicate more precisely functional relationships for predictive purposes. Such an effort would entail weighing quantitatively the socioeconomic factors believed to influence outdoor recreational participation.

Participation in various outdoor activities is not only related to the costs involved but also to socioeconomic factors such as income, education, occupation, age and available leisure time. Furthermore, all socioeconomic characteristics are interrelated and may complement or counteract the influence of one another. Income, for instance, is conducive to recreational participation, but lack of available leisure time can counteract this effect. However, due to time and budget limitations imposed upon this particular study, no attempt was made to weigh the net influence of each relevant socioeconomic factor on recreational participation.

Consequently, in order to measure the influence of interrelated socioeconomic characteristics on recreational participation, the researcher should subject the data to factor analysis or regression techniques. Hence, when activity participation in days, for instance, is regressed on socioeconomic variables obtained from a stratified population, the results should indicate the impact that these variables have on recreational participation.

In conclusion, the static nature of descriptive analysis is insufficient for predicting future recreational participation patterns. Additional research for predictive purposes still presents a challenge for resource economists. The other 1970 study, to determine the economic value of outdoor recreational activities, will attempt to weigh the influence of interrelated socioeconomic factors on recreational participation. The derivation of these socioeconomic relationships will assist in the determination and prediction of classic economic demand functions for outdoor recreation which this survey was unable to undertake.

APPENDIX A

THE COVER LETTER AND QUESTIONNAIRE



THE UNIVERSITY OF ARIZONA  
TUCSON, ARIZONA 85721

COLLEGE OF AGRICULTURE  
DEPARTMENT OF AGRICULTURAL ECONOMICS

Dear Arizonan:

As you know, every year there is increased competition for the use of our outdoors for all kinds of recreation activities. As our population and leisure time increases, we may expect even further pressures. You can help insure that we all have the opportunity to enjoy quality outdoor recreation in the future by taking the time now to fill in the enclosed questionnaire.

We are cooperating with the Arizona Game and Fish Department to evaluate just what their services to the public are worth. If we know how much people use and spend on outdoor recreation, hunting, and fishing, the Arizona Game and Fish Department can better plan to provide future services for your use.

Your family is a member of a randomly selected sample of Arizonans or people who have hunted or fished in Arizona. Please complete the questionnaire and return it to us in the enclosed self-addressed envelope. The information will be combined with information from all other people in the sample. The answers you give will be kept strictly confidential.

Don't be frightened by the apparent length of the questionnaire. All parts of it probably won't apply to you and it might give you further satisfaction to recall your 1970 recreational experiences.

Everyone should fill in the white section. The yellow section is only for hunters; the blue section is only for fishermen. If you have both hunted and fished, as well as participated in other outdoor recreation activities, we know that you will want to fill in all sections so that your future recreational needs may be best planned for.

Sincerely,

*William E. Martin*

William E. Martin  
Professor

*Arthur H. Smith*

Arthur H. Smith  
Assistant Economist

WEM/AHS:pt  
enclosures



RECREATION SURVEY - DEPARTMENT OF AGRICULTURAL ECONOMICS  
UNIVERSITY OF ARIZONA; TUCSON, ARIZONA  
in cooperation with ARIZONA GAME AND FISH DEPARTMENT

CONFIDENTIAL

A. General Information

1. Your name \_\_\_\_\_
2. Where is your home? \_\_\_\_\_ town \_\_\_\_\_ county
- 2a. Your age \_\_\_\_\_ 3. Married? \_\_\_\_\_ yes \_\_\_\_\_ no
4. Number of children at home \_\_\_\_\_  
How many are: 5 years and under \_\_\_\_\_ 11 - 15 years \_\_\_\_\_  
6 - 10 years \_\_\_\_\_ 16 yrs. & over \_\_\_\_\_
5. Your occupation \_\_\_\_\_ Wife's occupation \_\_\_\_\_
6. Please circle the days you have off during a normal work week:  
Mon Tues Wed Thurs Fri Sat Sun
7. How long was your vacation period in 1970? (Check one)  
Less than 1 week \_\_\_\_\_ 3 weeks \_\_\_\_\_  
1 week \_\_\_\_\_ 1 month \_\_\_\_\_  
2 weeks \_\_\_\_\_ More than one month \_\_\_\_\_
- 7a. During which month(s) was your 1970 vacation period? [Circle for all or part of month(s)]  
Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec
8. Education: What is the highest year of school you have completed? (Circle one)  
Elementary 1 2 3 4 5 6 7 8  
High School 1 2 3 4  
College 1 2 3 4 5 6 7 8 +
9. Family income before taxes (Check one)  
Under \$4,999 \_\_\_\_\_ \$15,000 - \$19,999 \_\_\_\_\_  
\$5,000 - \$9,999 \_\_\_\_\_ \$20,000 - \$24,999 \_\_\_\_\_  
\$10,000 - \$14,999 \_\_\_\_\_ Over \$25,000 \_\_\_\_\_
10. Place a check in Column 1 for any of the following recreational equipment that you own. If the equipment was purchased at anytime during 1970, please list the actual cost of purchase in Column 2 for that item.

Column 1 (check if owned)

Column 2 (cost if purchased during 1970)

Pickup Camper	_____	_____
Off road vehicle	_____	_____
Tent trailer	_____	_____
Boat, motor, trailer	_____	_____
Camping & hiking equip.	_____	_____
Hunting equipment	_____	_____
Fishing equipment	_____	_____
Special clothing	_____	_____
Hunting dogs	_____	_____

EVERYONE GO TO NEXT PAGE



11. Please locate the type(s) of Arizona hunting and fishing licenses which you purchased for yourself and any members of your family during 1970. Check the number of each type license you purchased in 1970 in the columns across from the license category. If you did not purchase any licenses in 1970, proceed to question 12.

<u>Type of License</u>	Number purchased during 1970			
	1	2	3	4
Resident general fishing . . . . .				
Resident general hunting . . . . .				
Resident hunting and fishing combination . . . . .				
Resident or Non-resident 1 day fishing . . . . .				
Non-resident general fishing . . . . .				
Non-resident general hunting . . . . .				
Non-resident hunting and fishing combination . . . . .				
Non-resident general 5 day fishing . . . . .				
Non-resident Colorado River fishing . . . . .				
Non-resident special predator hunting . . . . .				

12. Which of the following reasons help explain why you and your family do not hunt or fish more? (Answer even if you are a hunter or fisherman.) Place a check in the hunting and/or fishing columns for all reasons that apply.

REASONS	HUNTING	FISHING
a. I am not interested in going . . . . .	_____	_____
b. The family is not interested in going . . . . .	_____	_____
c. Feel too old to go . . . . .	_____	_____
d. Equipment costs too much to go . . . . .	_____	_____
e. Not enough days off a week to go . . . . .	_____	_____
f. Not enough opportunities are close by to go . . . . .	_____	_____
g. Too crowded at hunting areas . . . . .	_____	_____
h. Too crowded at fishing areas . . . . .	_____	_____
i. Prefer to spend leisure time indoors rather than going . . . . .	_____	_____
j. Not enough money from family budget is left over to go . . . . .	_____	_____
k. Prefer to do outdoor recreation in cities rather than going . . . . .	_____	_____
l. Killing wildlife is cruel. . . . .	_____	_____
m. Animals may become extinct . . . . .	_____	_____
n. Other (please describe) . . . . .	_____	_____

EVERYONE GO TO NEXT PAGE



B. TRIPS TO RURAL AREAS IN ARIZONA FOR OUTDOOR RECREATIONAL PURPOSES OTHER THAN HUNTING OR FISHING.

Place a check next to each activity which you and your family participated in for 1970 in a rural area of Arizona.

Day picnicking	_____	Boating	_____
Overnight camping	_____	Waterskiing	_____
Hiking	_____	Birdwatching	_____
Swimming	_____	Snow Skiing	_____

Please fill in the next page with the following types of information: (1) the name of the recreation site (campgrounds, lake, mountain, etc.) for which you or your family made a trip for any purpose other than hunting or fishing during 1970. Also record, (2) the total number of trips you made to that place, and (3) the total number of days you spent at that place during 1970: Include travel time and count any portion of a day as one full day.

For example, let us say you made five trips to Sabino Canyon of one day apiece for picnicking, one trip to Roosevelt Lake for one day for swimming and picnicking, and two trips of two days apiece to the White Mountains near Springerville for overnight camping. Then you would write in:

<u>Place</u>	<u>Total Number of Trips</u>	<u>Total Number of Days</u>
Sabino Canyon	5	5
Roosevelt Lake	1	1
Near Springerville	2	4

PLEASE DO THIS FOR EACH TYPE OF NON-HUNTING OR NON-FISHING TRIP YOU MADE DURING 1970. If on one trip within Arizona you went to more than one place, please give the information for the place which was farthest away from your home for that trip.

Do not include hunting or fishing trips in this section. Record your information for any trip on which you fished in the Blue section, and any trip on which you hunted in the Yellow section, even if you also participated in some of the activities listed above on that trip. This White section is only for picnicking, camping, etc.

EVERYONE GO TO NEXT PAGE





C. COST INFORMATION FOR TRIPS TO RURAL AREAS IN ARIZONA FOR OUTDOOR RECREATIONAL PURPOSES OTHER THAN HUNTING AND FISHING.

Please fill in the following cost categories with the actual amount of money you spent on the items for 1970 for all outdoor recreational trips which were not associated with hunting or fishing.

Fill in the costs for yourself and your family of (Circle One) 1 2 3 4 5 6 other persons. (Circle the number of other family members only if they usually accompanied you on the trip.)

Itemize the expenses you made in 1970 to picnic, camp, etc:

<u>Item</u>	<u>1970 Total Cost</u>
Lodging (motels, hotels, trailer courts, camp fees)	\$ _____
Food and refreshment (including liquor)	\$ _____
Other (boat operating expenses, repellents, lotions, film, etc.)	\$ _____

On an average outdoor outing, do you and your family pay for all of the car expenses? \_\_\_\_\_ yes \_\_\_\_\_ no

If you answered the above "no", what is the average number of non-family people you share car expenses with on the average trip? \_\_\_\_\_ other persons.

HUNTERS GO TO YELLOW SECTION

FISHERMEN GO TO BLUE SECTION

IF YOU ARE BOTH A HUNTER AND A FISHERMAN, GO TO YELLOW SECTION FIRST AND THEN TO THE BLUE SECTION

NON-HUNTERS AND NON-FISHERMEN, RETURN QUESTIONNAIRE

THANK YOU



#### D. HUNTING INFORMATION

Please refer to the map of the hunting areas on the next page, provided by the Arizona Game and Fish Department, to determine which area or areas you hunted the various species of game during 1970. On the page after the map, write (1) the area or areas in which you hunted a particular species, (2) the total number of trips you made to that area, and (3) the total number of days you spent hunting in that particular area for all trips. Include scouting trips and days spent scouting as well as actual hunting trips and hunting days.

For example, let us say you are a deer hunter and went on a hunting trip to the Arizona Strip which lasted two days and you also made two trips of two days each to the St. John's area. Then referring to the hunting map you would write in:

<u>Species</u>	<u>Area(s) hunted</u>	<u>Total no. of trips</u>	<u>Total no. of days</u>
Deer	<u>13</u>	<u>1</u>	<u>2</u>
	<u>2</u>	<u>2</u>	<u>4</u>

PLEASE DO THIS FOR EACH SPECIES YOU HUNTED DURING 1970. If on one trip to one area you hunted more than one species, list the information for only the species which you considered to be the major reason for making the trip. For example, if you hunted for cottontail rabbits and quail in a trip to area 32 for one day and you consider quail to be the major reason for the trip, then give the information for that trip only under quail. PLEASE LOOK AT THE MAP OF THE HUNTING AREAS TO BE SURE THAT THE CORRECT AREA IS BEING RECALLED FOR 1970. Include travel time and count any portion of a day as one full day.

After you have completed the questionnaire, you are welcome to tear out and keep the map for your own reference.



Figure 2. Arizona Game Hunting Areas.



Species	Area(s) Hunted	Total Number of Trips to Area	Total Number of Days Spent on All Trips to this Area*
<u>Big Game</u>			
Antelope	_____	_____	_____
Deer	_____	_____	_____
Elk	_____	_____	_____
Javelina	_____	_____	_____
Turkey	_____	_____	_____
Bighorn Sheep	_____	_____	_____
Bear	_____	_____	_____
<u>Small Game</u>			
Cottontail Rabbits	_____	_____	_____
Dove (Mourning)	_____	_____	_____
Dove (Whitewing)	_____	_____	_____
Quail	_____	_____	_____
Squirrels	_____	_____	_____
<u>Water Fowl</u>			
Ducks	_____	_____	_____
Geese	_____	_____	_____
<u>General Hunting</u>			
All Predators	_____	_____	_____

\*Include travel time and count any portion of a day as one full day.





**E. HUNTING COST INFORMATION:**

Please fill in the following cost categories with the actual amount of money you spent on the items for 1970. There are individual sections for big game, small game, waterfowl, and general hunting. The last two sections are on the next page. If you hunt both big game and small game, give information for each type of game separately in the appropriate section. If you only hunt one type of game, complete the information only for that section.

**1. BIG GAME HUNTING (Antelope, deer, elk, javelina, bighorn sheep, bear, turkey).**

Fill in the costs for yourself and your family of (circle one) 1 2 3 4 5 6 other persons. (Circle the number of other family members only if they usually accompanied you on the trip.)

Itemize the expenses you made in 1970 to hunt big game.

<u>Item</u>	<u>1970 Total Cost</u>
Lodging (Motels, hotels, trailer courts, camp fees)	\$ _____
Food and refreshments (including liquor)	\$ _____
Other (includes ammunition, guides, etc.)	\$ _____

On an average big game hunting trip, do you and your family pay for all of the car expenses? \_\_\_\_\_yes \_\_\_\_\_no

If you answered the above "no", what is the average number of non-family people you share car expenses with on the average big game hunting trip? \_\_\_\_\_ other persons

**2. SMALL GAME HUNTING (Cottontail rabbits, mourning doves, whitewing doves, quail, squirrels)**

Fill in the costs for yourself and your family of (circle one) 1 2 3 4 5 6 other persons. (Circle the number of other family members only if they usually accompanied you on the trip.)

Itemize the expenses you made in 1970 to hunt small game.

<u>Item</u>	<u>1970 Total Cost</u>
Lodging (Motels, hotels, trailer courts, camp fees)	\$ _____
Food and refreshments (including liquor)	\$ _____
Other (includes ammunition, guides, etc.)	\$ _____

On an average small game hunting trip, do you and your family pay for all of the car expenses? \_\_\_\_\_yes \_\_\_\_\_no

If you answered the above "no", what is the average number of non-family people you share car expenses with on the average small game hunting trip? \_\_\_\_\_ other persons



3. WATERFOWL HUNTING (ducks and geese)

Fill in the costs for yourself and your family of (Circle one)  
 1 2 3 4 5 6 other persons. (Circle the number of other family  
 members only if they usually accompanied you on the trip).

Itemize the expenses you made in 1970 to hunt waterfowl:

<u>Item</u>	<u>1970 Total Cost</u>
Lodging (Motels, hotels, trailer courts, camp fees)	\$ _____
Food and refreshment (including liquor)	\$ _____
Other (includes ammunition, guides, etc.)	\$ _____

On an average waterfowl hunting trip, do you and your family pay  
 for all of the car expenses? \_\_\_\_\_ yes \_\_\_\_\_ no

If you answered the above "no", what is the average number of non-  
family people you share car expenses with on the average big game  
 hunting trip? \_\_\_\_\_ other persons

4. GENERAL GAME (all predators including coyotes, jackrabbits, prairie  
 dogs, etc.)

Fill in the costs for yourself and your family of (circle one)  
 1 2 3 4 5 6 other persons. (Circle the number of other family  
 members only if they usually accompanied you on the trip.)

Itemize the expenses you made in 1970 to hunt general game:

<u>Item</u>	<u>1970 Total Cost</u>
Lodging (Motels, hotels, trailer courts, camp fees)	\$ _____
Food and refreshments (including liquor)	\$ _____
Other (includes ammunition, guides, etc.)	\$ _____

On an average general game hunting trip, do you and your family pay  
 for all of the car expenses? \_\_\_\_\_ yes \_\_\_\_\_ no

If you answered the above "no", what is the average number of non-  
family people you share car expenses with on the average general  
 game hunting trip? \_\_\_\_\_ other persons

FISHERMEN GO TO BLUE SECTION

NON-FISHERMEN RETURN QUESTIONNAIRE

THANK YOU







C. FISHING COST INFORMATION

Please fill in the following cost categories with the actual amount of money you spent on the items for 1970. If you fish for both cold water and warm water fish, give information for each type of fish separately in the appropriate section. If you fish for only one type of fish, complete the information only for that section.

1. COLD WATER FISHING (trout)

Fill in the costs for yourself and your family of (circle one) 1 2 3 4 5 6 other persons. (Circle the number of other family members only if they usually accompanied you on the trip.)

Itemize the expenses you made in 1970 for cold water fishing.

<u>Item</u>	<u>1970 Total Cost</u>
Lodging (Motels, hotels, trailer courts, camp fees)	\$ _____
Food and refreshments (including liquor)	\$ _____
Other (bait, tackle, lures, boat operating expenses, etc.)	\$ _____

On an average cold water fishing trip, do you and your family pay for all of the car expenses? \_\_\_\_\_ yes \_\_\_\_\_ no

If you answered the above "no", what is the average number of non-family people you share car expenses with on the average cold water fishing trip? \_\_\_\_\_ other persons

2. WARM WATER FISHING (bass, catfish, crappie, etc.)

Fill in the costs for yourself and your family of (circle one) 1 2 3 4 5 6 other persons. (Circle the number of other family members only if they usually accompanied you on the trip.)

Itemize the expenses you made in 1970 for warm water fishing.

<u>Item</u>	<u>1970 Total Cost</u>
Lodging (Motels, hotels, trailer courts, camp fees)	\$ _____
Food and refreshments (including liquor)	\$ _____
Other (bait, tackle, lures, boat operating expenses, etc.)	\$ _____

On an average warm water fishing trip, do you and your family pay for all of the car expenses? \_\_\_\_\_ yes \_\_\_\_\_ no

If you answered the above "no", what is the average number of non-family people you share car expenses with on the average warm water fishing trip? \_\_\_\_\_ other persons

FISHERMEN RETURN QUESTIONNAIRE

THANK YOU

APPENDIX B

FOLLOW-UP LETTER TO QUESTIONNAIRE



THE UNIVERSITY OF ARIZONA  
TUCSON, ARIZONA 85721

COLLEGE OF AGRICULTURE  
DEPARTMENT OF AGRICULTURAL ECONOMICS

Dear Arizonan:

A few days ago you received a questionnaire from us relating to the value to you of outdoor recreation, hunting, and fishing in Arizona.

If you have already completed and returned this important questionnaire, we thank you very much for your cooperation. The information you gave will be of great help in evaluating the importance of outdoor recreation, hunting, and fishing to Arizonans.

If you have not yet completed the questionnaire, we sincerely hope that you can do so in the very near future. Everyone's cooperation is badly needed.

Thank you very much.

Sincerely,

*William E. Martin*  
William E. Martin  
Professor

*Arthur H. Smith*  
Arthur H. Smith  
Assistant Economist

WEM/AHS:pt

APPENDIX C

1970 ADDITIONAL FOOD EXPENDITURE COMPUTATION



The procedure explained below comprises the derivation of Table 7 (Chapter 2). The goal is to obtain additional food cost per person per day per income class.

Knowledge of how much money a family of varying size and income would have spent for food at home was obtained from the U. S. Department of Agriculture (1968, pp. 5-7). The data are summarized in Table 57. Expenditures were also made for food purchased away from home. The figures spent on food away from home (same source) are also summarized in Table 57.

The data for expenditures on food away from home do not indicate whether or not the expenditures were made for rural outdoor recreation. Therefore, the away-from-home charges were converted into home expenditures by assuming that households spend twice as much for food when away from home as food food at home. First, a four percent sales tax was assumed and deducted from the expenditures away from home. Then, the results were divided by one-half as away-from-home charges are twice as great as at home charges. To adjust 1965 to 1970 prices, the results were increased by the consumer price index factor for food of 1.217, and the four percent sales tax was added back on. The procedure thus far is summarized in Table 58.

The next objective was to determine the cost of meals per day per person at home for 1970. Since the

Table 57. Food Expenditures per Week at Home and Away from Home, per Income Class, 1970.

Gross Income Before Taxes(\$)	Expenditure per Week at Home	Expenditure per Week Away from Home
	(dollars)	
Under 1,000	17.71	4.02
1,000 - 1,999	13.51	1.54
2,000 - 2,999	21.91	2.43
3,000 - 3,999	23.87	3.09
4,000 - 4,999	28.46	5.20
5,000 - 5,999	28.26	5.04
6,000 - 6,999	34.38	7.22
7,000 - 7,999	34.08	8.00
8,000 - 8,999	34.70	8.06
9,000 - 9,000	32.44	8.17
10,000 - 14,999	36.48	12.89
15,000 and over	50.09	19.11

Table 58. Procedure to Compute Adjusted Food Expenditures per Week per Income Class, 1970.<sup>a</sup>

1	2	3	4	5	6	7	8	9	10
Income Class in Dollars	Expend- itures Away From Home per Week <sup>b</sup>	Four Percent Tax on Column 2	Column 2 Less Column 3	Column 4 Divided by One-half	Expend- iture at Home per Week <sup>b</sup>	Column 6 Plus Column 5	Column 7 Times Con- sumer Price Index of 1.217	Four Percent Tax on Column 8	Column 9 Plus Column 8 Equals Adjusted Expend- iture per Week
Under 1,000	4.02	.1608	3.8592	1.929	17.71	19.64	23.90	.96	24.86
1,000 - 1,999	1.54	.0616	1.4784	.739	13.51	14.25	17.34	.69	18.03
2,000 - 2,999	2.43	.0972	2.3328	1.166	21.91	23.08	28.09	1.12	29.21
3,000 - 3,999	3.09	.1236	2.9664	1.483	23.87	25.35	30.85	1.23	32.08
4,000 - 4,999	5.20	.2080	4.9920	2.496	28.46	30.96	37.68	1.51	39.19
5,000 - 5,999	5.04	.2016	4.8384	2.419	28.26	30.68	37.34	1.49	38.83
6,000 - 6,999	7.22	.2888	6.9312	3.465	34.38	37.84	46.05	1.84	47.89
7,000 - 7,999	8.00	.3200	7.6800	3.840	34.08	37.92	46.15	1.85	48.00
8,000 - 8,999	8.06	.3224	7.7376	3.868	34.70	38.57	46.94	1.88	48.82
9,000 - 9,999	8.17	.3268	7.7432	3.871	32.44	36.31	44.19	1.77	45.96
10,000 - 14,999	12.89	.5156	12.4744	6.237	36.48	42.72	51.99	2.08	54.07
15,000 and over	19.11	.7644	18.3456	9.172	50.09	59.26	72.12	2.88	75.00

a. Away-from-home food expenditures are converted into the equivalent of at-home food expenditures.

b. Source: United States Department of Agriculture (1968, pp. 5-7).

income categories for this study do not correspond with those obtained from the U. S. Department of Agriculture (1968, pp. 5-7), an adjustment was imperative. The adjustment was to weight the percent of income distribution of households (same source) so as to correspond with income categories in this study.

The adjusted expenditure per week was divided by the size of households to obtain expenditures per week per person. These results were, in turn, divided by seven (seven days in a week) to obtain expenditures per person per day. The results thus far were multiplied by the weighted average of each income category. The summation of these results gave the expenditure per day per person for the adjusted income categories. The procedure is summarized in Table 59.

Therefore, the data outlined in Table 60 was found to be true for the meal cost per person per day at home, as corresponding to the income categories for this survey.

Data were not available for the higher income categories. Consequently, an assumption was made to have the charges remain constant for income categories above \$15,000. Two other implicit assumptions concerning the results include: (a) expenditures for children were commensurate with adults, and (b) the population distribution of people in households remained the same in 1970 as in 1965.

Table 59. Procedure to Compute Expenditures per Person per Day per Adjusted Income Class, 1970.

1	2	3	4	5	6	7	8
Income Class in Dollars	Percent of Total Households	Weighted Average of Income Categories in Percent	Size of Households per Income Class <sup>a</sup>	Adjusted Expenditure per Week <sup>b</sup>	Expenditure per Person (Column 5-Column 4)	Expenditure per Person per Day	Column 7 Times Weighted Average of Income Category (Column 3)
Under 1,000	3.0	7.79	2.17	\$24.86	\$11.46	\$1.64	\$ .1277
1,000 - 1,999	9.2	23.90	1.71	18.03	10.54	1.51	.3608
2,000 - 2,999	7.9	20.52	2.78	29.21	10.51	1.50	.3078
3,000 - 3,999	8.8	22.85	2.92	32.08	10.99	1.57	.3587
4,000 - 4,999	9.6	24.94	3.58	39.19	10.95	1.56	.3890
Total under 5,000	38.5	100.00					1.5440
5,000 - 5,999	14.6	30.67	3.16	38.83	12.29	1.76	.5397
6,000 - 6,999	10.2	21.43	3.89	47.89	12.31	1.76	.3771
7,000 - 7,999	8.8	18.49	3.51	48.00	13.68	1.95	.3605
8,000 - 8,999	7.3	15.34	3.74	48.82	13.05	1.86	.2853
9,000 - 9,999	6.7	14.07	3.20	45.96	14.36	2.05	.2884
Total 5,000 - 9,999	47.6	100.00					1.8510
10,000 - 14,999	10.0	100.0	3.29	54.07	15.81	2.26	2.26
15,000 and over	3.9	100.0	3.39	75.00	21.25	3.04	3.04

a. Source: United States Department of Agriculture (1968, pp. 5-7).

b. See Column 10, Table 57.

Table 60. Expenditure per Day, per Person at Home, for  
Adjusted Income Categories, 1970.

<u>Gross Income (\$)</u>	<u>Meal Cost per Day per Person</u> (dollars)
Under 4,999	1.54
5,000 - 9,999	1.85
10,000 - 14,999	2.26
15,000 - 19,999	3.04
20,000 - 24,999	3.04
25,000 and over	3.04

APPENDIX D

1965 FOOD EXPENDITURE ADJUSTMENT

The following procedure to adjust 1965 food expenditures to be comparable to 1970 estimates involved two assumptions: (a) the same number of people went on a trip in 1965 as in 1970, and (b) the length of a trip in days in 1965 was the same as for 1970 for a comparable distance traveled.

The adjustment was as follows:

1965 food expenditure = \$12,088,760

1965 household-trips = 2,504,645

1970 food expenditure = 5,989,007

1970 household-trips = 3,108,858

1965 average cost per household-trip =  $\frac{12,088,760}{2,504,645}$  = \$4.83

Adjusted for inflation \$4.83 (1.231) = 5.95

1970 average cost per household-trip =  $\frac{\$ 5,989,007}{3,108,858}$  = 1.93

Percentage decrease in expenditure per household-trip =  $\frac{\$1.93}{5.95}$  = 32.4 percent

Therefore, for purposes of comparison with 1970, 1965 food expenditures were reduced by approximately two-thirds.



APPENDIX E

PARTICIPATION AND EXPENDITURES FOR ALL  
TYPES OF HUNTING AND FISHING  
DETAILED BY LICENSE CATEGORY FOR 1970

Table 61. Cold Water Fishing Participation by License in 1970.

License Type	Number of Households	Average People per Household	Household Trips	Average Trips per Household	Household Days	Average Days per Household	Average Days per Trip	Man-Days
<b>Resident</b>								
Combination	31,744	2.5	302,613	9.5	425,604	13.4	1.4	1,016,917
Hunt-fish	19,015	2.4	141,346	7.4	187,087	9.8	1.3	456,747
General fish	41,445	2.5	415,801	10.0	583,179	14.1	1.4	1,407,157
Sub-total	92,204	2.5	859,760	9.3	1,195,870	13.0	1.4	2,880,821
<b>Nonresident</b>								
General fish	2,843	2.0	22,389	7.9	51,175	18.0	2.3	122,252
Combination	768	3.1	6,060	7.9	11,949	15.6	2.0	41,055
Colorado River fish	3,581	2.2	15,741	4.4	88,116	24.6	5.6	184,728
Sub-total	7,192	2.1	44,190	6.1	151,240	21.0	3.4	348,035
All participants	99,396	2.5	903,950	9.1	1,347,110	13.6	1.5	3,228,856

Table 62. Cold Water Fishing, Details of Costs by License, 1970.

License Type	Total Cost	Average Cost per Household	Average Cost per Household-Trip	Average Cost per Household-Day	Average Cost per Man-Day
<b>Resident</b>					
Combination	\$ 4,589,679	\$144.58	\$15.17	\$10.78	\$4.51
Hunt-fish	2,020,856	106.28	14.30	10.80	4.42
General fish	5,338,145	128.80	12.84	9.15	3.79
Sub-total	11,948,680	129.59	13.90	9.99	4.15
<b>Nonresident</b>					
General fish	682,338	240.01	30.48	13.33	5.58
Combination	106,521	138.70	17.58	8.91	2.59
Colorado River fish	1,302,590	363.75	82.75	14.78	7.05
Sub-total	2,091,449	290.80	47.33	13.83	6.01
All participants	14,040,129	141.25	15.53	10.42	4.35

Table 63. Warm Water Fishing Participation by License in 1970.

License Type	Number of Households	Average People per Household	Household Trips	Average Trips per Household	Household Days	Average Days per Household	Average Days per Trip	Man-Days
<b>Resident</b>								
Combination	26,519	2.2	258,393	9.7	353,756	13.3	1.4	758,654
Hunt-fish	17,552	2.3	206,234	11.7	257,693	14.7	1.2	524,827
General fish	34,312	2.2	383,088	11.2	463,887	13.5	1.2	969,342
Sub-total	78,383	2.2	847,715	10.8	1,075,336	13.7	1.3	2,252,823
<b>Nonresident</b>								
General fish	1,955	1.9	9,951	5.1	37,315	19.1	3.8	58,283
Colorado River fish	341	2.1	4,011	11.8	10,072	29.5	2.5	86,950
Combination	2,249	2.5	7,662	3.4	42,476	18.9	5.5	26,289
Sub-total	4,545	2.0	21,624	4.8	89,863	20.1	4.2	171,522
All participants	82,928	2.2	869,339	10.5	1,165,199	14.1	1.3	2,424,345

Table 64. Warm Water Fishing, Details of Costs by License, 1970.

License Type	Total Cost	Average Cost per Household	Average Cost per Household-Trip	Average Cost per Household-Day	Average Cost per Man-Day
<b>Resident</b>					
Combination	\$9,796,434	\$111.68	\$ 11.46	\$ 8.37	\$ 3.90
Hunt-fish	1,781,646	101.51	8.64	6.91	3.39
General fish	3,424,917	99.82	8.94	7.38	3.53
Sub-total	8,168,286	104.21	9.64	7.60	3.63
<b>Nonresident</b>					
General fish	368,889	188.69	37.07	9.89	6.33
Combination	256,999	753.66	64.07	25.52	9.78
Colorado River fish	1,002,260	445.65	130.81	23.60	11.53
Sub-total	1,628,148	358.23	75.29	18.12	9.49
All participants	9,796,434	118.13	11.27	8.41	4.04

Table 65. Big Game Hunting Participation by License in 1970.

License Type	Number of House-holds	Average People per House-hold	House-hold-Trips	Average Trips per House-hold	House-hold-Days	Average Days per House-hold	Average Days per Trip	Man-Days
<b>Resident</b>								
Combination	33,834	1.7	170,607	5.0	278,445	8.2	1.6	487,394
Hunt-fish	25,264	1.4	112,757	4.5	176,582	7.0	1.6	266,336
General hunt	26,056	1.4	96,551	3.7	154,018	5.9	1.6	220,316
Sub-total	85,154	1.6	379,915	4.5	609,045	7.2	1.6	974,046
<b>Nonresident</b>								
General hunt	3,974	1.3	6,697	1.7	28,479	7.2	4.3	34,293
Combination	768	1.9	1,707	2.2	4,950	6.4	2.9	11,949
Sub-total	4,742	1.4	8,404	1.8	33,429	7.1	4.0	46,242
All participants	89,896	1.6	388,319	4.3	642,474	7.1	1.7	1,020,288

Table 66. Big Game Hunting, Details of Costs by License, 1970.

License Type	Total Cost	Average Cost per Household	Average Cost per Household-Trip	Average Cost per Household-Day	Average Cost per Man-Day
<b>Resident</b>					
Combination	\$3,137,819	\$ 92.74	\$18.39	\$11.27	\$ 6.44
Hunt-fish	1,915,146	75.81	16.98	10.85	7.19
General hunt	1,411,062	54.15	14.61	9.16	6.40
Sub-total	6,464,027	75.91	17.01	10.61	6.64
<b>Nonresident</b>					
General hunt	571,792	143.88	85.38	20.08	16.67
Combination	129,566	168.71	79.90	26.17	10.84
Sub-total	701,358	147.90	83.46	20.98	15.17
All participants	7,165,385	79.71	18.45	11.15	7.02

Table 67. Small Game Hunting Participation by License in 1970.

License Type	Number of Households	Average People per Household	Household-Trips	Average Trips per Household	Household-Days	Average Days per Household	Average Days per Trip	Man-Days
<b>Resident</b>								
Combination	30,307	1.6	335,206	11.1	355,715	11.7	1.1	571,718
Hunt-fish	16,754	1.4	174,854	10.4	178,710	10.7	1.0	241,737
General hunt	16,212	1.4	150,399	9.3	158,216	9.8	1.1	220,460
Sub-total	63,273	1.5	660,459	10.4	692,641	10.9	1.0	1,033,915
<b>Nonresident</b>								
General hunt	5,004	1.6	18,692	3.7	39,150	7.8	2.1	66,452
Combination	854	2.0	8,193	9.6	13,571	15.9	1.7	31,495
Sub-total	5,858	1.6	26,885	4.6	52,721	9.0	2.0	97,947
<b>All participants</b>	<b>69,131</b>	<b>1.5</b>	<b>687,344</b>	<b>9.9</b>	<b>745,362</b>	<b>10.8</b>	<b>1.1</b>	<b>1,131,862</b>



Table 68. Small Game Hunting, Details of Costs by License, 1970.

<u>License Type</u>	<u>Total Cost</u>	<u>Average Cost per Household</u>	<u>Average Cost per Household- Trip</u>	<u>Average Cost per Household- Day</u>	<u>Average Cost per Man-Day</u>
<b>Resident</b>					
Combination	\$2,798,758	\$ 92.35	\$ 8.35	\$ 7.87	\$ 4.90
Hunt-fish	1,469,436	87.71	8.40	8.22	6.08
General hunt	981,721	60.56	6.53	6.20	4.45
Sub-total	5,249,915	82.97	7.95	7.58	5.08
<b>Nonresident</b>					
General hunt	1,099,652	219.75	58.83	28.09	16.55
Combination	227,040	265.85	27.71	16.73	7.21
Sub-total	1,326,692	226.48	49.35	25.16	13.55
All participants	6,576,607	95.13	9.57	8.82	5.81

Table 69. Waterfowl Hunting Participation by License in 1970.

License Type	Number of House-holds	Average People per House-hold	House-hold-Trips	Average Trips per House-hold	House-hold-Days	Average Days per House-hold	Average Days per Trip	Man-Days
<b>Resident</b>								
Combination	8,360	1.4	59,765	7.1	61,920	7.4	1.0	86,153
Hunt-fish	4,122	1.4	35,503	8.6	36,167	8.8	1.0	48,799
General hunt	2,027	1.5	7,092	3.5	7,382	3.6	1.0	9,120
Sub-total	14,509	1.4	102,360	7.1	105,469	7.3	1.0	144,072
<b>Nonresident</b>								
General hunt	589	1.4	2,796	4.7	5,372	9.1	1.9	7,285
Combination	171	2.0	2,390	14.0	2,561	15.0	1.1	7,170
Sub-total	760	1.5	5,186	6.8	7,933	10.4	1.5	14,455
All participants	15,269	1.4	107,546	7.0	113,402	7.4	1.1	158,527

Table 70. Waterfowl Hunting, Details of Costs by License, 1970.

License Type	Total Cost	Average Cost per Household	Average Cost per Household-Trip	Average Cost per Household-Day	Average Cost per Man-Day
<b>Resident</b>					
Combination	\$465,970	\$ 55.74	\$ 7.80	\$ 7.53	\$ 5.41
Hunt-fish	301,441	73.13	8.49	8.33	6.18
General hunt	63,257	31.21	8.92	8.57	6.94
Sub-total	830,668	57.25	8.12	7.88	5.77
<b>Nonresidents</b>					
General hunt	130,695	221.89	46.74	24.33	17.94
Combination	18,777	109.81	7.86	7.33	2.62
Sub-total	149,472	196.67	28.82	18.84	10.34
All participants	980,140	64.19	9.11	8.64	6.18

Table 71. General Hunting Participation by License in 1970.

License Type	Number of House-holds	Average People per House hold	House-hold-Trips	Average Trips per House-hold	House-hold-Days	Average Days per House-hold	Average Days per Trip	Man-Days
<b>Resident</b>								
Combination	7,838	1.5	68,256	8.7	72,567	9.3	1.1	117,636
Hunt-fish	5,851	1.3	49,331	8.4	50,794	8.7	1.0	61,299
General hunt	5,645	1.4	33,583	5.9	39,084	6.9	1.2	49,361
Sub-total	19,334	1.5	151,170	7.8	162,445	8.4	1.1	228,296
<b>Nonresident</b>								
Predator	595	1.0	1,190	2.0	2,975	5.0	2.5	2,975
All participants	19,929	1.4	152,360	7.6	165,420	8.3	1.1	231,271

Table 72. General Hunting, Details of Costs by License, 1970.

License Type	Total Cost	Average Cost per Household	Average Cost per Household-Trip	Average Cost per Household-Day	Average Cost per Man-Day
<b>Resident</b>					
Combination	\$ 419,464	\$ 53.52	\$ 6.15	\$ 5.78	\$ 3.57
Hunt-fish	270,590	46.25	5.49	5.33	4.41
General hunt	237,251	42.03	7.06	6.07	4.81
Sub-total	927,305	47.96	6.13	5.71	4.06
<b>Nonresident</b>					
Predator	112,455	189.00	94.50	37.80	37.80
All participants	1,039,760	52.17	6.82	6.29	4.50

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