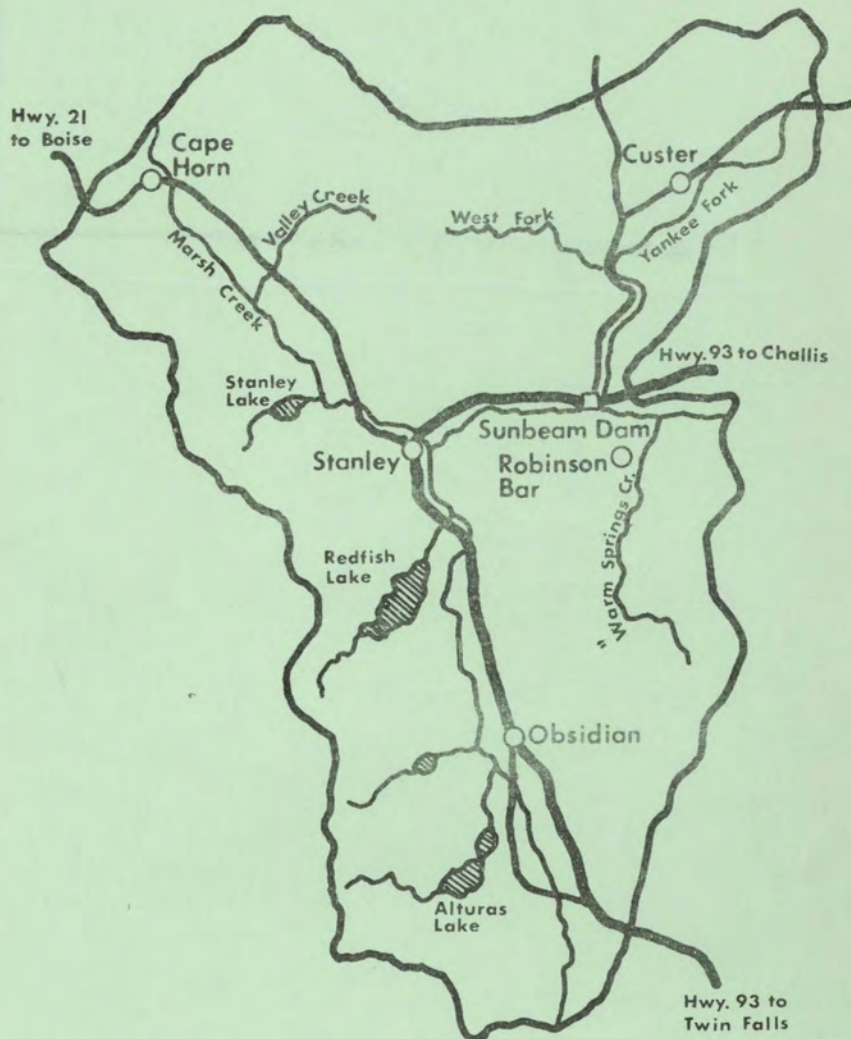


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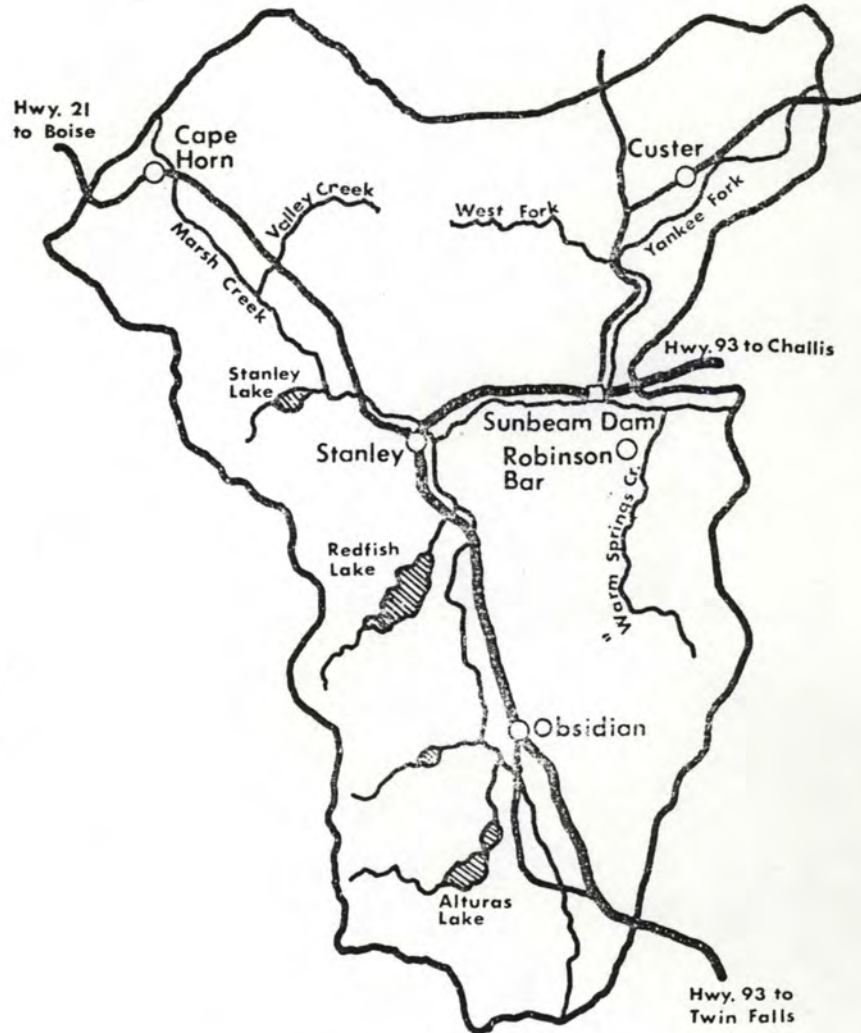
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of Hunters and an Estimate of the Demand
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Dr. E.L. Michalson, Principal Investigator
July 1972 - March 1973

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THE SAWTOOTH AREA OF IDAHO

by

E.L. Michalson

Submitted to

U.S. Forest Service
Region 4
Ogden, Utah

August 1973

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by the United States Forest Service, Region 4, Ogden, Utah.

Water Resources Research Institute
University of Idaho
Moscow, Idaho

C.C. Warnick, Director

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A word of recognition and thanks is expressed to the Recreational Staff in Region 4, USFS, located in Ogden, Utah, who funded the study. Without the help and support of this group there would not have been a study. This group also provided much useful information and some insights which helped the whole study move along, and their patience and understanding has also been appreciated over the time span of the study.

The author wishes to express his appreciation for the efforts of all of the above who were involved in the study.

Finally, the responsibility for all errors, omissions, opinions, and placing of emphasis belongs with the author.

ABSTRACT

The objective of this study was to evaluate hunting activity and its economic impact on the Sawtooth Valley and mountain area in Idaho. The study proceeded with a description of the socio-economic characteristics of the hunters who used the area and continued on to estimate the demand for hunting in the area. The third part of the study dealt with developing managerial strategies for the area.

The hunters were described in terms of the age, sex, education, and income levels. They were divided into residents and non-residents, and they were asked a considerable number of questions concerning their preferences for hunting, facilities, and motivations to hunt. The average hunter was between 30 and 40 years old, was a male, had attended college for a period of time and had an income between \$10,000 and \$14,999.

The second part of the study dealt with estimating the demand for hunting. The equation developed estimated that the average hunting trip consisted of about 6.8 visitor days and cost per visitor day was \$9.78. A demand schedule was developed using this equation which indicated the alternative prices for various levels of use. A further development in this section was that of estimating the resource value of hunting in the Sawtooth area. This resource value was estimated to be \$186,419 in 1971, and the total amount of money hunters spent on the hunting experience in the Sawtooth was \$74,690.

In the third part of the study a number of hunting use projections were made to indicate the possible impacts of hunting in the area. These projections stemmed from the demand equation above, and indicated the expected consequences of changing hunting use patterns in the Sawtooth area.

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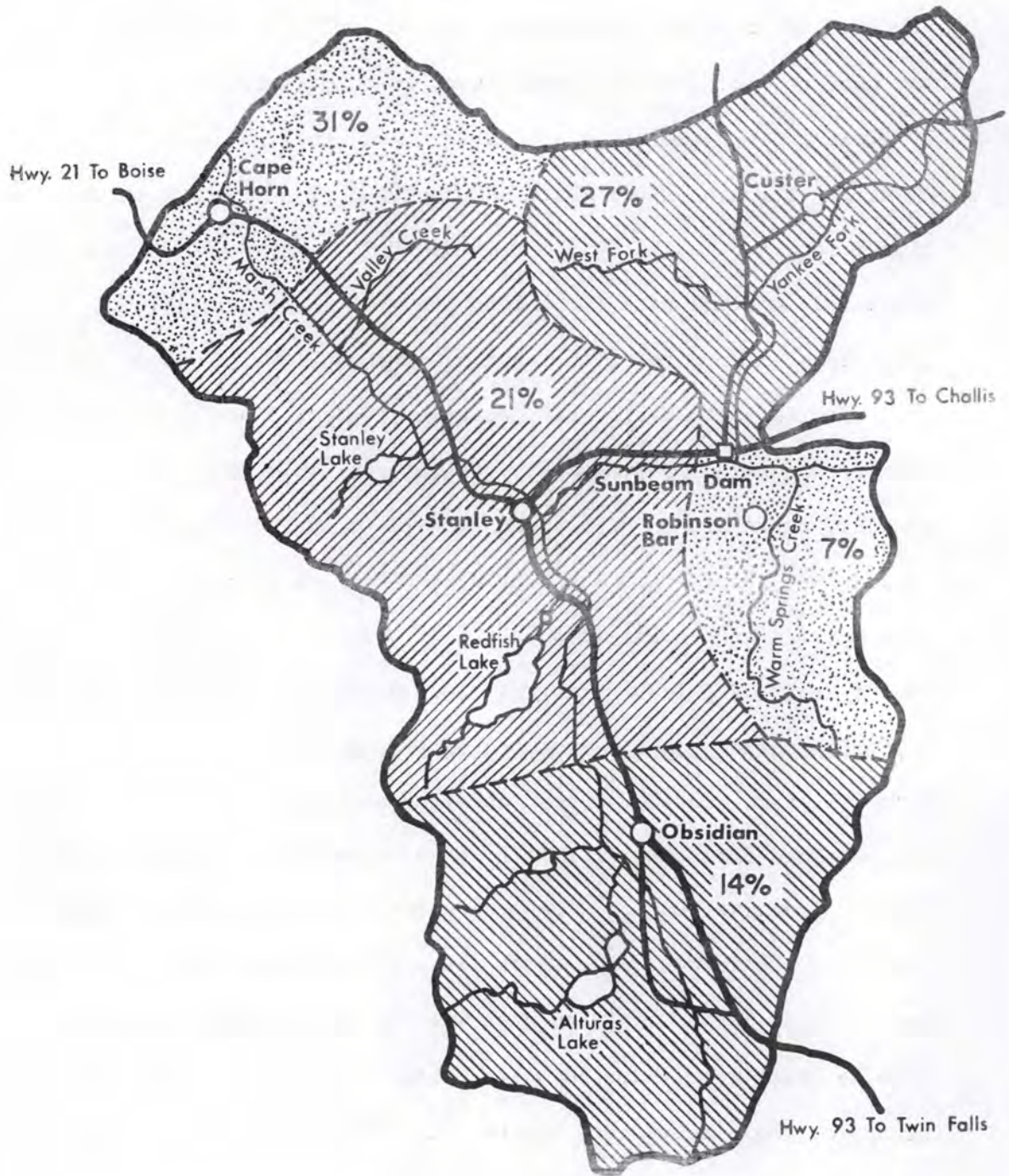
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INTRODUCTION

The purpose of this study was to obtain information to evaluate hunting activity in the Sawtooth area in Idaho. A survey of the hunters who hunted in management area 36 (Sawtooth Valley) in 1971 was made in the spring of 1972. This study was part of an overall continuing study which had the goal of evaluating recreational activity in the Sawtooth area. This study was designed to obtain and analyze data for the purpose of providing managerial guidelines in developing the hunting potential of this area.

The Sawtooth Valley and Mountain area has a variety of recreation resources which presently attract many visitors. Hunting, in general, ranks fairly high as an overall recreational use of the area. Even though the main hunting interest in the area focuses on deer and elk, there was also some goat, bear, and upland bird hunting in the area. The Idaho Fish and Game Department estimated that there were 1113 hunters in the Sawtooth in 1971 and these were divided into 640 deer, 453 elk, 8 goat and 12 bear hunters. This information was obtained from the district fish and game office located in Salmon, Idaho. The distribution of hunting areas in the Sawtooth is shown in Figure 1. There were five major areas of hunting emphasis in management unit 36. The Cape Horn area was the most popular hunting area, with 34 trips reported; the Custer area ranked second, with 30 trips reported; the Stanley area ranked third, with 23 trips reported; the Obsidian area ranked fourth, with 16 trips reported; and the Sunbeam

FIGURE 1: Sawtooth Mountain and Valley Area, Idaho
Management Unit 36
Stanley Basin-Sawtooth Mtn. Area



Dam - Robinson Bar area ranked fifth, with 8 trips reported. The total number of trip locations reported was 1,111. Each location may represent more than one trip to the indicated area.

In addition to the regular hunting season which begins September 12 and ends November 22 each year, there are also archery seasons for deer, elk, as well as bear and goats, with a controlled hunting season on goats. The hunters responding to this survey indicated interest in hunting only deer and elk.

The objectives of this study were to:

1. Obtain socio-economic data on hunters in the area, and to determine the importance of hunting in the valley.
2. Estimate the present demand for hunting, and its value as a resource.
3. Develop management guidelines for future hunting in the area.

The socio-economic evaluation data of the hunters (objective 1) included their state of residence, length of stay, mode of travel and accommodations, estimated personal income, age occupation and level of education achieved. These data provide a profile of these hunters as a group and also insights into what they expect in the area.

The second objective deals with the estimation of demand for hunting using the Clawson technique for estimating the demand for recreation or hunting (1). The purpose of estimating the demand for hunting was partially to determine the relative importance of this activity to the economy of the area and also to estimate its resource values.

The last objective was directed toward making future projections from the data and results of the two preceding objectives. These projections related to the opinions which the hunters expressed in the survey, and the results of the demand analysis. The purpose of these projections was to provide insight into what hunters expect or would like to find in the way of facilities and environment in the area where they hunt.

There is considerable literature on the method of surveying which is used in this study, so much so that only a few studies will be cited. Further, the basic survey is well enough understood by most researchers that it will be left to the reader to look up the details in standard references on surveying and questionnaire building. Literature in the area of estimating the demand for recreation has been dominated by Clawson and Knetsch in their "Economics of Outdoor Recreation" (1). Another important study which also influenced this study was the research done by Wennergren at Utah State University estimating the demand for hunting in Utah (4). The model used in this study heavily relied upon these two studies.

METHODOLOGY

The methodology used in this study consisted of utilizing a mail questionnaire to obtain the basic data and then the development of a statistical model to estimate the demand for hunting in the Sawtooth area. First the questionnaire development will be discussed. The data used in this study were obtained using a questionnaire which included a series of questions concerning the age, social and economic status of the hunter, his experience and the costs incurred in the hunting experience.

The demand estimation methodology will be discussed in considerable detail when the model used is presented later in this report. At this time it is sufficient to indicate that the modifications in the methods used by the Clawson technique were (a) the individual data for each hunter was used to formulate the model used; (b) the zone concept was eliminated from consideration in these models; and (c) the transfer costs used as the basis of estimating the demand for hunting included not only the cost of mileage but also the cost of other items with the exception of food and beverages. This latter consideration assumes that the costs of food and beverages would be the same at home as they would be on a hunting trip.

DATA AND SOURCES

As has been indicated the basic information used in this study came from a mail survey. A questionnaire was sent to hunters in March of 1972 and the return from this first mailing was 87 out of a total of 173 questionnaires mailed. A second follow-up mailing was sent out in May and mailing was 25 out of 86 questionnaires mailed. The total return for both mailings was 126 questionnaires (73 percent) of which 112 questionnaires (65 percent) were useable.

The number of hunters who were mailed questionnaires was 173 or 15.5 percent of the population. Of these, 112 responded which resulted in about a 10 percent overall sampling rate. This rate was considered adequate for the purposes of this study.

The number of questionnaires which originated outside of the State of Idaho were recorded. The distribution of out-of-state or non-resident to resident hunters was:

<u>Residence</u>	<u>N</u>	<u>%</u>
Resident	99	88
Non-resident	13	12
TOTAL	112	100

It is evident that most of the hunters were residents. In Idaho this is unusual for an area within the Salmon River Basin.

This Basin usually has a much higher percentage of non-resident hunters than any other area of the State. The main reason for these findings may be the low quality hunting which is available in the Sawtooth Valley and Mountain area compared to many other areas available in the Salmon River Basin.

INTERPRETATION OF THE SURVEY

The socio-economic data obtained in this survey indicated that the average hunter who used this area was 38 years of age with the range of age varying from 13 to 81 years. The average age of the resident hunter was 37 years, and the non-resident hunter was 47 years of age. The ranges in ages for the residents was from 27 to 75 years, and that for the non-residents was from 13 to 81 years. The distribution by sex for the entire sample was 87 percent male and 11 percent female with 2 percent of the sampling having to response. Of the non-resident distribution, 92 percent was male and 8 percent female. This percentage distribution should not be taken too seriously, because the respondents consisted of 12 men and 1 woman. It is noted, however, that at the present time hunting is a sport largely dominated by males.

The age distribution of resident and non-resident hunters is shown in Figure 2. It is notable that the resident hunters tend to be younger than the non-resident hunters. This should not be too surprising when the costs of Idaho non-resident hunting licenses and transportation and lodging costs are considered. The resident age distribution tended to be normally distributed. The largest groups of the non-residents was in the 30 to 50 year age groups while the largest resident group was in the 20 to 30 year age group.

The non-resident hunter who was older, and likely had more income, uses hunting as a means of getting away from his job, urban or suburban environment, and people. The resident hunter hunts for meat, enjoyment, and the low cost of resident licenses and ease of access.

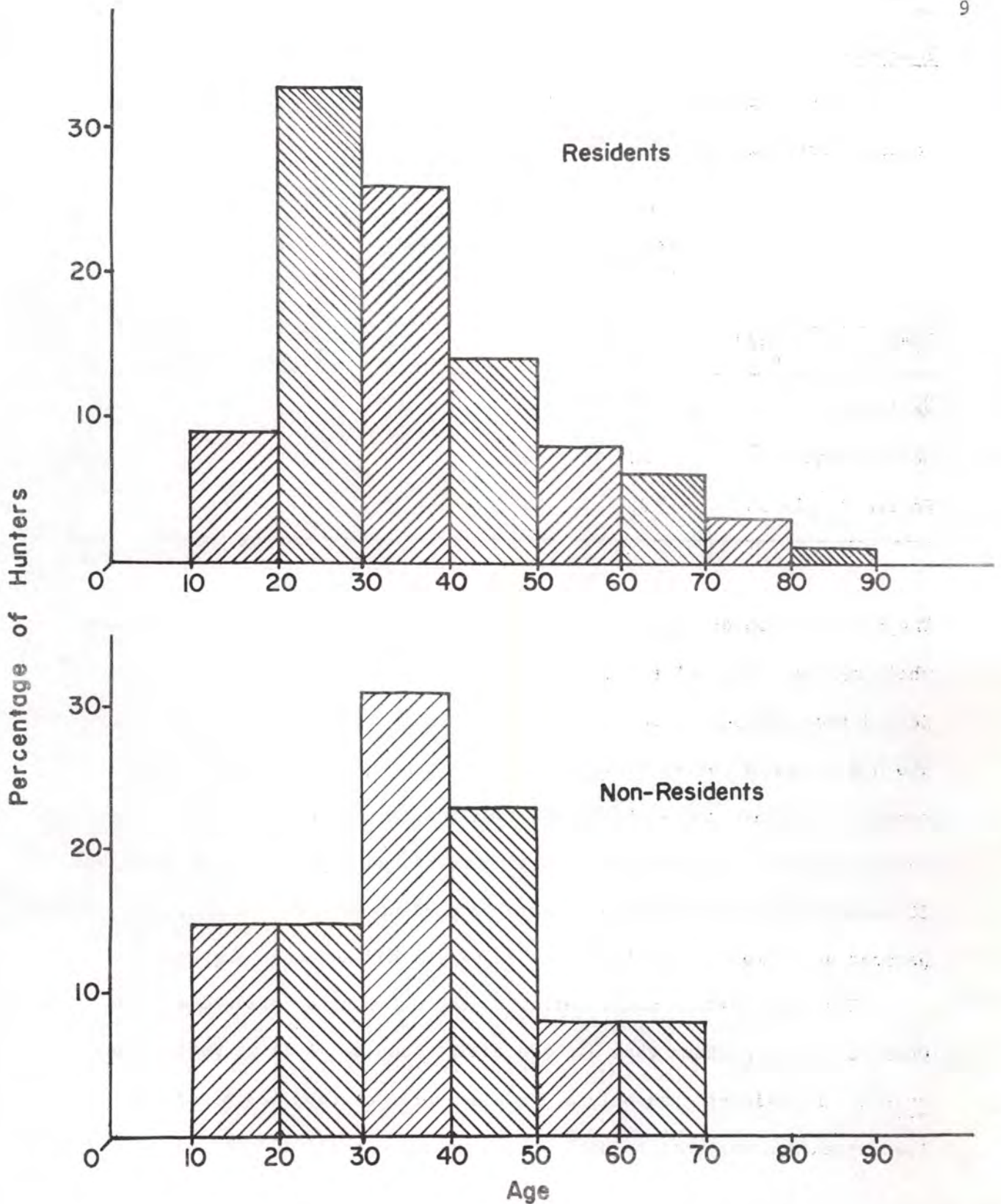


FIGURE 2: Age Distributions of Resident and Non-Resident Hunters in Sawtooth Valley Area, 1971

Education

The educational levels attained by the various groups are shown in Table 1.

Table 1. Educational levels attained by respondents and percentage distribution.

Item	Grade 0-8	Grade 9-12	Some College	College Graduate	Adv. Degree	No Answer
Residents	15	32	30	14	8	2
Non-residents	23	23	46	8	0	0
Entire Sample	15	30	32	13	7	3

The distribution of educational experience was relatively great over the whole sample. Most of the people had at least a high school education. Beyond the high school level there was still a large group and majority who had attended college, with a small percentage who finished graduate school. To break the distribution down for the entire sample into its various components indicated that 15 percent had a grade school education, 30 percent went through high school, 32 percent went to college, 13 percent had completed college, and 7 percent had advanced degrees.

The non-resident distribution on the other hand followed a somewhat different pattern than did the entire sample. A large percentage of the non-residents had only a grade school education (23 percent). The percentage who went to high school was also small (23 percent).

Forty-six percent of the non-residents had attended college work, but only eight percent had completed their college work, and none had gone to graduate school.

A Chi Square Test was used to determine whether there was a significant difference in the education levels of residents and non-residents responses in the survey.¹ The results of this test indicated a Chi Square value of 9.49 with 4 degrees of freedom and this value was significant at the 5 percent level. This result indicated that there was a significant difference between the education levels of residents and non-residents. The residents tended to be better educated than did the non-residents as is indicated in Table 1. This conclusion was also related to the older age of non-resident hunters reported in the survey.

Eight income brackets or categories were used in this study as shown in Table 2. The lower bracket which was an income less than \$6,999 accounted for 34 percent of the total sample. Thirty-four percent of the residents, and 8 percent of the non-residents. The largest income group for both the residents and non-residents was the \$10,000 to \$14,999 group. This group accounted for 25 percent of the

1

The Chi Square test used in this and all succeeding tests was

$$x^2 = \sum_1^N \left[\frac{(O-C)^2}{C} \right]$$

where N = number of classes

O = observed values

and C = calculated values.

total sample, 23 percent of the residents, and 46 percent of the non-residents. The remaining distribution fell mainly in lower income brackets.

Table 2. Income distribution indicated by respondents.

Income	Entire Sample		Residents		Non-residents	
	No.	%	No.	%	No.	%
Less than						
\$5000-6999	25	34	34	34	1	8
7000-9999	24	21	22	22	2	15
10000-14999	29	25	23	23	6	46
15000-19999	11	10	9	9	2	15
20000-24999	1	1	-	-	1	8
25000 plus	6	5	5	5	1	8
No response	8	7	8	8	-	-

Another important factor associated with income is the number of weeks of paid vacation, total annual vacation and the average number of days of paid vacation spent on trips during the year (Table 3).

Table 3. Average number of weeks of paid vacation, total annual vacation, and average number of days of paid vacation spent on trip(s).

Item	Residents	Non-residents	Entire Sample
Paid Vacation (weeks)	1.9	2.2	1.9
Total Vacation (weeks)	3.4	3.4	3.4
Average No. Days Spent on Trip(s)	5.6	4.0	4.2

The distribution of paid vacation, total annual vacation and the average number of days spent on this trip varied somewhat between residents and non-residents. The residents tended to have fewer weeks of paid vacation than did the non-residents, 1.9 weeks compared to 2.2 weeks for non-residents. The total vacation time on the other hand was essentially the same for both groups. The average number of visitor days spent on the hunting trip or trips differed between the residents and non-residents. The residents tended to spend an average of 5.6 days and non-residents 4.0 days. This latter result occurred because the traveling time involved in getting to the Sawtooth Valley and Mountain area is greater for the non-resident than it is for the resident.

One added fact of interest was that there was a large difference between the weeks of paid vacation and the weeks of total vacation for these hunters. Some of this vacation time may come from being layed off between jobs, e.g. construction workers, and some of this time comes from the greater freedom of professional people, e.g. doctors, lawyers, etc., while some of it reflects the time retired

people have for vacation. This latter point is hard to define because many people are retiring earlier, and they define for themselves what is and is not vacation time. Finally, much of the national holiday season occurs during the hunting season - Labor Day, Veterans Day, Columbus Day, Thanksgiving and Christmas.

Occupations

The number of occupations represented among the hunters in the Sawtooth area was relatively large. Eight occupational categories were defined from the total responses and are shown in Table 4. The occupation distribution for the entire sample was 31 percent employed in professional, technical and kindred worker occupations; 15 percent were either students and retired persons or farmers, farm managers, officials, and proprietors; 13 percent craftsmen, foremen and kindred workers; 9 percent clerical and kindred workers; 8 percent operatives and kindred workers; 7 percent housewives; and 2 percent did not answer this question.

The occupations of residents also followed this pattern closely, but that of the non-resident deviated slightly from that of the overall pattern. Among the non-residents, the two largest occupation groups were (a) craftsmen, foremen and kindred workers; and (b) professional, technical and kindred workers. Each of these groups accounted for 33 percent of the total. Clerical and kindred workers accounted for 18 percent of the occupations, and farm managers, officials and proprietors

Table 4. Distribution of Sawtooth Valley and Mountain Hunter Occupations, Fall and Winter, 1971.

Occupations	Residents		Non-residents		Entire Sample	
	No.	%	No.	%	No.	%
Operatives and Kindred Worker	9	9	-	-	9	8
Craftsmen, Farmers & Kindred Workers	11	12	4	22	15	13
Clerical and Kindred Workers	8	8	2	18	10	9
Farmers, Farm Managers, Officials & Proprietors	15	15	1	8	16	15
Professional, Technical & Kindred Workers	30	31	4	33	34	31
Students & Retired	15	15	1	8	16	15
Housewife	8	8	-	-	8	7
No Answer	2	2	-	-	2	2
TOTAL	98	100	12	100	110	100

and students and retired persons accounted for 8 percent each. A Chi Square test indicated that there was no significant difference between occupations of residents and non-residents.

Another factor related to occupations of these hunters was the average number of years they had been engaged in their present occupations. The result of the findings concerning this question reflects a more established person can afford to spend his time hunting. The

average number of years for residents in their occupation was 10.5 years and that for non-residents was 15 years. Both of these averages may seem low, but when the age distribution is examined, the range in years that the resident respondents had been in their occupation varied from 0 to 50 years. Those who reported zero were beginning students and individuals who were beginning new jobs. The range in time for non-residents was narrower - 7 to 25 years.

Trips to the Sawtooth Area in 1971

The number of trips taken into the Sawtooth Valley and Mountain area in 1971 varied between residents and non-residents. The 99 Idaho residents responding to this question made an average of approximately two trips each into the area. Only 6 percent of these trips were made for reasons other than hunting.

The average length of hunting trips to the Sawtooth area varied by the number of trips taken (Table 5) during the hunting season. The non-residents tended to concentrate their time on the first trip and stayed 5.8 days as compared to 4 days for the resident hunters. The average number of days spent by resident hunters was 3.3 days. The pattern of hunting by residents was to spend most of their time on the first trip and then to spend fewer days until the last trip on which the average length of stay increased slightly. This probably reflects the weekend hunting pattern of many resident hunters. In the case of the non-resident after the first trip, the average length of stay was one day each for a total of four trips.

Table 5. Groups length of hunting trip in
Sawtooth Valley and Mountain Area,
1971.

Item		Trips					\bar{x}
		1	2	3	4	5	
Resident	%	98	30	16	9	5	98
	VD	8.0	5.8	3.6	2.8	3.2	6.6
Non-resident	%	12	2	2	1	-	12
	VD	11.6	2.0	2.0	2.0	-	8.8
Combined	%	110	32	18	10	5	110
	VD	8.4	5.6	3.4	2.8	3.2	6.8

NOTE: VD = Visitor Days 1 Visitor Day = 12 hour period.

Table 6. Average size of hunting party,
Sawtooth Area, 1971.

Item	1	2	3	4	5	\bar{x}
Residents	4.0	3.5	3.9	2.7	2.4	3.8
Non-residents	4.8	5.0	5.0	8.0	-	5.0
Combined	4.1	3.6	4.0	3.2	2.4	3.9

The average size of the party is shown in Table 6. The average number of persons per party for residents was 3.8 for all trips. The average number of persons per trip declined from 4.0 to 2.4 between the first and the fifth trip. In the case of the non-resident, the size of the party tended to increase as the number of trips increased. The non-residents average party size per trip was 5.0 persons for four trips. The non-resident party size increased for additional trips and was largest for the last trip.

The composition of the hunting party is shown in Tables 7 and 8. Table 7 shows the distribution of party composition for each of the five trips reported by residents. The distribution was expressed in percentages of party composition for each trip, and an average party composition was also expressed. In the case of resident parties, those composed of friends predominated for all trips. Second were family parties, and third were groups of relatives, and fourth groups of family and friends. The least common party composition was for others which included outfitter and guide parties.

The distribution of party composition by trip for the resident was about the same as that for the overall or average party composition. The family group accounted for 32 percent of all hunting groups in the Sawtooth area. However, there tended to be a relative increase in the no answer group as the number of trips increased. This was not very important, because it represented only one person not answering for each trip and because the number of respondents per trip declined as more trips

Table 7. Percent composition of resident hunting parties in Sawtooth Area, 1971.

Party Composition	Trips					\bar{x}
	1	2	3	4	5	
Family	24	29	32	22	20	25
Friends	31	35	50	45	20	35
Relatives *	12	16	6	11	20	12
Individuals	--	--	--	--	20	1
Family and Friends	8	10	6	11	--	8
Family and Relatives	5	--	--	--	--	3
Friends and Relatives	5	--	--	--	--	3
Family, friends & Relatives	6	6	--	--	--	5
Other **	4	4	--	--	--	3
No Answer	5	--	6	11	20	5
TOTAL	100	100	100	100	100	100

* Relatives other than immediate family

** Refers to organized hunting parties led by outfitters and guides.

Table 8. Percent composition of non-residents hunting parties in Sawtooth area, 1971.

Party Composition	Trips					\bar{x}
	1	2	3	4	5	
Family	15	--	--	--	--	12
Friends	31	--	--	--	--	24
Relatives *	--	--	--	--	--	--
Individuals	--	--	--	--	--	--
Family and Friends	8	--	50	100	--	18
Family and Relatives	--	--	--	--	--	--
Friends and Relatives	--	--	--	--	--	--
Family, Friends & Relatives	8	--	--	--	--	6
Other **	38	100	50	--	--	40
TOTAL	100	100	100	100	--	100

* Relatives other than immediate family.

** Refers to organized hunting parties led by outfitters and guides.

were made. Generally the distribution per trip was reasonably uniform when compared to the overall average. The fifth trip was a special case because of the small number of people who made the trip. For this reason, it is not a very important factor.

Table 8 has the same categories that Table 7 had for purposes of comparison. The fifth trip did not apply because none of the non-residents made a fifth hunting trip. The first thing evident about this table was that the "other" category in Table 8 was relatively more important than it was in Table 7. This reflects that more non-residents tended to use the services of outfitters and guides. A general comparison of the party composition distribution between Table 7 and 8 does show some interesting differences. The average composition of the non-resident party consisted of family, friends and family and friends made up the largest percentage than that for residents. There were no non-resident parties made up of relatives, individuals, family and relatives, or friends and relatives.

Hunting Accomodations

The types and distribution of the accomodations used by hunters in the Sawtooth Valley in 1971 are shown in Table 9 for both residents and non-residents. Again the pattern differences between resident and non-residents stand out. Some similarities are also evident. First, pickup camper rigs tend to be the most common accomodations

used by hunters. Tents and trailers competed as the second most popular type of accommodations. Among residents, the "none" category was quite high. This latter category implies that residents may be day hunting only. Among the non-residents, there were no respondents in this group.

The motel and other category deserve some comment. These two types of accommodations were not very popular among hunters in the basin because they are located in the settled part of the valley.

In the case of the non-resident pickup campers used by most of these hunters with tents as the second most popular accommodation. Trailers, motels, and other were used to a limited extent.

Camp Site Use

Only 25 percent of all hunters indicated that they used a developed camp site while hunting in 1971 (Table 10). Sixty-four percent indicated that they did not use any developed sites, probably because they were unavailable or undesirable. This may indicate that the game was not located in areas where developed campsites are found or that there were people in the area than there are develop campsites.

In comparing resident responses to non-resident responses, the non-resident tended to use the developed campsite more than did the resident. It may be that they were not familiar with the area and used developed campsites as a starting point for their hunts. Even so, the largest percentage of non-resident hunters did not use developed sites.

Table 9. Percentage distribution of accommodations used while hunting in the Sawtooth Valley, 1971.

Type of Accomodation	Residents Trips				
	1	2	3	4	5
Tent	16	20	13	--	--
Camper	34	40	31	26	20
Trailer	23	13	19	12	20
Motel	5	--	--	--	--
Other	8	7	6	12	20
None	11	20	31	50	40
No Answer	3	--	--	--	--
TOTAL	100	100	100	100	100

Type of Accomodation	Non-resident Trips				
	1	2	3	4	5
Tent	30	--	--	--	--
Camper	38	100	100	100	--
Trailer	8	--	--	--	--
Motel	8	--	--	--	--
Other	8	--	--	--	--
None	--	--	--	--	--
No Answer	8	--	--	--	--
TOTAL	100	100	100	100	100

Table 10. Percentage of Sawtooth hunters who used developed campsites, 1971.

Respondents	Yes	No	No Answer
Residents	24	65	11
Non-residents	38	55	8
TOTAL	25	64	10

Table 11. Facilities provided at campsites in Sawtooth area, 1971.

Facilities	Residents	Non-residents	Entire Sample
Fireplace and grill	40	10	50
Toilets	61	11	71
Water	29	7	35
Table	53	18	71
Garbage Cans	24	50	27

The hunters who stopped at developed campgrounds (28) were asked to indicate the types of facilities provided and their use of these facilities. Fifty percent of them reported using fireplaces and grills, 71 percent used toilets, 35 percent used the water supply, 71 percent used the tables and 27 percent used the garbage cans available (Table 11).

There was a considerable deal of difference between the resident and non-resident responses to the facilities question. The non-resident responded more strongly to the desirability of having more facilities than did the resident.

The percentage of hunters who indicated that they would use developed campgrounds in the Sawtooth area is shown in Table 12. Of the entire sample 55 percent said that they would use developed campsites if they were available. This was divided as follows: 52 percent of the residents and 77 percent of the non-residents were interested in more developed camping areas.

Facilities Provided at Campsites

When the respondents were asked what kind of facilities they were mainly interested in toilets and garbage facilities (Table 13). Water, tables and fireplaces came in descending order of preference. Interestingly, the non-resident ranked toilets, tables first, water and garbage facilities second and fireplaces last as opposed to the resident whose pattern was similar to the entire sample pattern.

Table 12. The percentage of hunters who indicated that they would use developed campsites in the Sawtooth Valley and Mountain Area 1971.

	Yes	No	No Answer
Residents	52	34	14
Non-residents	77	12	--
Entire Sample	55	32	13

Table 13. The number of respondents indicating the kinds of facilities desired in developed campgrounds, Sawtooth Area, 1971.

Facilities	Residents	Non-residents	Entire Sample
Fireplaces/grill	8	15	9
Toilets	39	54	40
Water	17	38	19
Tables	14	54	18
Garbage	34	38	34
Other	3	--	3

Table 14. Respondents preferences for camping hunting parties in the Sawtooth Area, 1971.

Preference	Resident	Non-resident	Entire Sample
Away	93	77	90
Close by	1	15	3
Indifferent	1	--	2
No Answer	6	7	5

One reason why both resident and non-resident hunters may not be too interested in fireplaces and grills is that many of them are undoubtedly using their own cooking stove, or camper. Another related factor is that it is also quite easy to build ones own fire ring with stones if the aesthetic and warmth features of a fire are desirable.

The respondents preferences for camping near or far from other hunting parties are also noted (Table 14). The overwhelming desire expressed by the respondents was to camp away from other parties (93 percent of residents and 77 percent of non-residents).

The remainder of the respondents were either in favor of camping close other parties (3 percent for the entire sample) or were indifferent (2 percent of the entire sample). This result indicates that people are looking for a solitary experience, nor do they desire any added competition for game.

Method of Hunting

The method of hunting used in the Sawtooth Valley and Mountain area were varied, but most hunters did their hunting on foot (Table 15). This method was the most popular for both residents and non-residents. There was considerably more variation in hunting methods among residents than among the non-residents. Horse hunting ranked second among residents, combined foot and horse and foot and car hunting ranked third, foot and trail bike ranked fourth, and trail bike hunting ranked last. In the case of the non-residents hunting on foot ranked first, foot and horse and foot and car ranked second, and

Table 15. Methods of hunting used in the Sawtooth area, 1971.

Methods	Residents Trips					\bar{x}
	1	2	3	4	5	
Foot	58	62	69	75	80	61
Horse	20	11	12	--	--	17
Trail Bike	4	3	--	--	--	3
Foot and trail bike	3	3	7	--	--	4
Foot and horse	9	3	--	--	--	6
Foot and car	2	11	12	25	70	6
No Answer	4	7	--	--	--	3
TOTAL	100	100	100	100	100	100

Methods	Non-residents Trips					\bar{x}
	1	2	3	4	5	
Foot	39	100	100	--	--	41
Horse	8	--	--	--	--	6
Trail Bike	8	--	--	--	--	6
Foot and trail bike	--	--	--	--	--	--
Foot and horse	15	--	--	--	--	12
Foot and car	15	--	--	--	--	12
No Answer	15	--	--	100	--	23
TOTAL	100	100	100	100	100	100

hunting on horse and trail bikes were the least used methods of hunting.

As the number of trips increased for both residents and non-residents, the popularity of hunting on foot increased. It was hypothesized that this occurs because the longer one goes without hunting success, the more pressure there is to be successful and thus, result a more intensive hunting method is used.

Average Number of Year Hunted

The average number of year these hunters had hunted previously was also asked in the survey (Table 16). The average for the entire sample was 17.4 years hunting experience, and 6.9 years in the Sawtooth area. There was not a great deal of difference in the average number of years of hunting experience between residents and non-residents. The non-residents had a slightly higher average (19 years) as compared to 17 years for residents. The average number of years hunted in management unit 36 had more hunting experience (7.5 years) as compared to 2 years for non-residents.

Ranked Reasons for Hunting

The most important reasons for hunting according to the respondents are shown in Table 17. Harvesting meat was most important as indicated by an average of 24 percent of the respondents (column 4). The second most important aspect of hunting was the relaxation-

Table 16. Average number of year respondents have hunted big game.

Respondents	Average No. of Years Hunted	Average No. of Years Hunted in Unit 36
Resident	17.2	7.5
Non-resident	19.0	2.0
Entire Sample	17.4	6.9

Table 17. Ranking of the reasons why Sawtooth hunters hunt, 1971.

Reasons	Ranking			Average
	1	2	3	
Meat	38	18	20	24
Trophy	5	2	2	3
Companionship	8	8	5	7
Isolation	3	4	10	6
Observe wildlife	0	6	14	7
Relaxation-change of pace	23	15	25	21
Opportunity to get out	10	25	12	16
Challenge	10	21	12	15
Other	3	1	0	1
TOTAL	100	100	100	100

change of pace (21 percent) which was closely followed by the opportunity to get out and the challenge of hunting categories (16 and 15 percent respectively). Trophy as a reason for hunting ranked lowest of all the categories except the other category. The companionship, isolation and observe wildlife categories ranked quite low (weighted value of 6 and 7 percent), and probably are important to particular individuals who have a special interest or need in these categories.

The respondents were asked to rank the priorities of these categories from 1 to 3. The ranking of these categories was reasonably consistent. There were a few cases where the hunters choices exhibited a different pattern. In the case of the meat category, it was the most important item in the first ranking, slipped to third place as second rank, and then moved back up to second priority in the third rank. If these hunters were consistent they might be expected to maintain meat as the most important reason for hunting, but when a ranking procedure was used, this lack of consistency would be considered not unusual. It was for this reason that the first ranking was the most important.

Average Cost per Hunting Trip

The average cost per trip reported for all hunters was \$69.06 (Table 18). The average cost per trip for residents was \$49.30 and that for non-residents was \$268.21. The difference in cost between non-resident and resident hunters was \$218.91. Considerable variation in cost was also noted among the number of trips taken. The

first trip was the most expensive for both residents and non-residents. Thereafter the cost per trip declined. This decline was gradual for the residents for the three trips following the first and then it showed a slight increase. This follows the pattern of the length of stay per hunting trip. For the non-resident the decline was very abrupt, because the cost of a non-resident hunting license was charged against their first trip, and for the most non-resident the transportation costs were very high. Another important factor was that most of the non-residents hunter's first trip was \$308.75 as compared to a cost of \$25.00 for his second. This low cost second trip is hard to understand and is mostly explained by a break in hunting trips which occurred before the hunter left the area, or a mistake in reporting. A Chi Square test was used to determine if there was a significant difference between resident and non-resident costs for hunting. The Chi Square value with 4 degrees of freedom was 138.61 which was highly significant. This result was expected due to the additional costs for licenses and travel which out-of-state hunters would have.

Table 18. Average cost per trip in Sawtooth area, 1971.

Respondents	Trips					\bar{x}
	1	2	3	4	5	
Residents	57.31	41.96	37.07	10.50	15.50	49.30
Non-residents	308.75	25.00	25.00	--*	--	268.21
Entire Sample	86.60	41.33	36.77	10.50	15.50	69.06

* Information not available.

Distance Traveled Per Trip

The average total mileage traveled by hunters on each trip is indicated in Table 19. The average mileage per trip varied from 539 on the first trip and then declined to 198 on the fourth trip and increasing to 233 for the fifth trip. The average mileage was 452 miles per trip for all trips taken. The mileage traveled by non-resident was much greater (1,804 average miles per trip). The variation in mileage among trips was also interesting in that it was relatively stable for declining from 374 miles on the first trip to 198 on the fourth trip and then increasing to 223 miles on the last trip. This variation can be partially explained on the basis of the location and hunting success for the resident hunters. As the season progresses fewer hunters return possibly due to being successful, due to their lack of success move farther afield to get the game. In the case of the non-resident hunters, the first trip is the most important one and in most cases, the only one. The only cases of two trips with short mileage for second trip occurs when people come to visit relatives or stay at personally owned cabins or a friends cabin. The hunting trip is divided into two parts as a result of the hunters doing something else for a period of time and then returning to hunt.

Table 19. Average mileage traveled by respondents on each trip, 1971.

	1	2	Trip 3	4	5	Average
Residents	374	313	246	198	223	336
Non-residents	966	25	--	--	--	1804
Entire Sample	539	303	246	198	223	452

Evaluation of Hunting Experience

The various ways hunters learned about the hunting experience in the Sawtooth area is shown in Table 20. The most common way for the entire sample was by one relative telling another with the second way being one friend telling another. The third way was the "other" category which involved various methods of finding out such as by word of mouth.

Table 20. Means by which respondents first learned about hunting opportunities in Sawtooth area, 1971.

Means	Resident	Non-resident	Entire Sample
Relative	40	31	38
Friends	34	43	35
Magazine	1	14	2
Newspaper Ad	0	8	1
TV or Radio	0	0	0
Other	25	14	24
TOTAL	100	100	100

However, there was a difference between the means which non-residents and residents learned about hunting in the area. The reports of friends who had hunted in the area were more dominant than relatives among the non-resident hunters. Magazine advertising and other categories ranked third as a source of information and newspaper ads fourth. These last two means were not even mentioned by the residents.

The reasons that the respondents hunted in the Sawtooth area are shown in Table 21. Looking at the entire sample, the most important reason was previous success in the area, followed by the scenic beauty of the area, convenient location, "other" and tradition. When the differences between residents and non-residents were examined, the most important reason given by the non-resident was the scenic beauty of the area. This was followed by convenient location and previous success. These were the only categories considered as important enough to be mentioned by the non-resident hunters.

Table 21. Main reason respondents hunted in Sawtooth area rather than other area, 1971.

Reasons	Resident	Non-resident	Entire Sample
Scenic beauty	26	50	27
Convenient location	18	25	19
Previous success	39	25	38
Tradition	5	0	4
None	0	0	0
Other	12	0	12
TOTAL	100	100	100

Some of the "other" category reasons for respondents to hunt in the area were that the area was open first, people had visited the area previously for other reasons, the guide service used was located in this area, friends had a cabin in the area and other similar reasons.

Rating of Sawtooth Hunting

The respondents were asked to rate the hunting in the Sawtooth area (Table 22). This rating for the entire sample indicated that 2 percent considered of all hunting in the Sawtooth area was the best, 17 percent as very good, 40 percent as good, 28 percent as fair, and 14 percent as poor. Among the non-residents 39 percent indicated hunting as very good, 46 percent as good and 15 percent as poor.

This ranking reflects that the resident's attitude toward hunting in the area was better than the non-resident's attitude. The non-residents did not rank hunting as the "best" whereas 2 percent of the residents did. Only 14 percent of the residents and 39 percent of the non-residents indicated that they ranked hunting as "very good". Thirty-eight percent of the residents, and 46 percent of the non-residents indicated it was "good". Interestingly, 32 percent of the residents indicated that the hunting was only "fair" where none of the non-residents ranked the hunting as only "fair", and lastly 14 percent of the residents and 15 percent of the non-residents ranked it as "poor".

Table 22. Respondents rating of Sawtooth area hunting, 1971.

Rate	Resident	Non-resident	Entire Sample
The Best	2	0	2
Very Good	14	39	17
Good	38	46	40
Fair	32	--	28
Poor	14	15	14
TOTAL	100	100	100

The respondent's impression of the relative crowding in the area is shown in Table 23. The percentage of resident respondents who considered the area too crowded was 45 percent. Fifty-one percent of the residents thought that the area was just about right and a few considered that there were too few or didn't care and/or respond. A large majority of the non-resident indicated that the number of hunters was about right. About 15 percent of the non-residents indicated that there were too few hunters in the area and only 8 percent indicated that they thought there were too many hunters.

The opinions expressed by both the residents and non-residents are consistent with their experience patterns. This implies that for the typical non-resident the area may seem to have too few people, while for the resident the opposite may be the case. The resident may also be unhappy if he finds out-of-state people hunting on his favorite area.

Table 23. Respondents impressions of Sawtooth area relative to number of hunters, 1971.

Condition	Resident	Non-resident	Entire Sample
Too many hunters	45	8	40
About right	51	77	54
Too few hunters	1	15	3
Didn't care	2	--	2
No response	1	--	1
TOTAL	100	100	100

There is some evidence in support of this in the current state law that limits the number of non-resident licenses which may be sold.

National Recreation Area Designation

The question of whether the typical Sawtooth hunter was aware that this area was under consideration for designation as a National Recreation Area is evaluated in Table 24. For the entire sample 82 percent indicated that they were aware, 16 percent indicated they were not and 2 percent did not answer the question. This distribution for the non-resident was 46 percent were aware and 54 percent were not. Only 12 percent of the residents indicated they were not aware of this possibility.

Table 24. Sawtooth area hunters awareness of possible designation of area as a National Recreation Area, 1971.

	Resident	Non-resident	Entire Sample
Aware	86	46	82
Not aware	12	54	16
No answer	2	--	2
TOTAL	100	100	100

In Table 25 the awareness of the impact of such designation was evaluated. Of all the respondents 58 percent indicated that they thought that this designation would have an effect on hunting, 28 percent indicated that it would not have any effect on hunting and 14 percent indicated that they did not know. The residents were more convinced that such designation would have an effect on hunting than were the non-residents (61 percent compared to 31 percent, respectively). The non-residents were more convinced that it would not have an effect (54 to 25 percent) as compared to residents. There was not much difference between these two groups on the "do not know" answer.

Table 25. Sawtooth hunters awareness of the impact of possible NRA Designation on hunting, 1971.

	Residents	Non-residents	Entire Sample
Would affect hunting	61	31	58
Would not affect hunting	25	54	28
Don't know	14	15	14
TOTAL	100	100	100

AN ANALYSIS OF THE DEMAND FOR
HUNTING IN THE SAWTOOTH AREA

The economic importance of hunting in the Sawtooth area will be examined in this section of the report. The analysis will rely upon economic theory and statistical procedures to derive an estimate of the demand for hunting in the area. This estimate of demand will include both resident and non-resident hunters and will be expressed in terms of cost per visitor day.

The model used was a statistical one which estimated the number of visitor days as a function of the miles traveled, cost per visitor day, education level and annual income and with the number of trips made by hunters in 1971. There were a total of 112 hunters which returned the mail questionnaire from which the data used was obtained to derive the demand estimates.

The statistical procedure used was that of multiple regression. Two models were developed: (a) a linear multiple regression and (b) a log transformation of the linear model. In this exposition the linear model was relied upon as the principle model to derive the demand coefficients. This model was chosen because it allows easy manipulation of variables such as income, education, and mileage traveled with only little distortion of the equation. A second reason was related to the fact that the log models did not indicate a great deal of improvement in either the statistics which indicate goodness of fit, not in the parameters estimated by using the log form. The R^2 statistics increased from 0.2041 to 0.3381 between

the non-log and log forms of the equation. Another factor which influenced the choice of the non-log form of the estimating equation was that the log form did not include income as a variable. Finally, time was a factor in that additional runs would be required if the log equations were used.

The variables defined for the model and their average values were:

1. Average number of visitor days per trip	6.76 visitor days
2. Average miles traveled	376.6 miles
3. Total cost per visitor day	\$9.78
4. Income level index	4.21*
5. Education level index	2.84**

* See section on income level

** See section on education level

The average number of visitor days consisted of the total number of 12 hour periods or any part thereof that hunters reported. The miles traveled were estimated in terms of direct routes from each hunter's home to the area. The total cost per visitor day included an arbitrary charge of 7¢ per mile for mileage reported and an estimate of other expenditures reported for the trip. Education level consisted of assigning an index value to educational achievements as shown below:

Educational Level	Index Value
Grade 0-8	1
Grade 9-12	2
Some College	3
College Graduate	4
Advanced Degree	5

The average index value for education in this report was 2.85 which indicated that the median hunter has had at least a high school education. In the case of income levels the coding was done in a manner similar to that for education. There were eight income levels and they were coded as follows:

Income Level	Income Index
\$ 1500	1
3500	2
6000	3
8500	4
12500	5
17500	6
22250	7
25000	8

The income index level was 4.20 which indicates that the median income was slightly more than \$10,000. This index may be somewhat

misleading because the top of the distribution is unknown, but the majority of the responses were less than 8.

The statistical equation used is shown below:

$$Y = 7.16340 + 0.00519X_1 - 0.13860X_2 \\ (0.00083)** (0.03827)** \\ + 0.09645X_3 - 0.49410X_4 \\ (0.25108) (0.32068)*$$

Where Y = Average visitor days per hunting trip

X_1 = Average miles traveled per trip

X_2 = Average total lost per visitor day

X_3 = Average income index

And X_4 = Average education index

The coefficient of multiple correlation statistic was 0.4517 and the coefficient of multiple determination statistic was 0.2041. Both of these values are quite low, but this is not unusual in outdoor recreation studies. The standard error of estimate was 4.5313 and the F test for the equation was 10.577 which was significant at the 1 percent level. The estimated regression coefficients were all significantly different from zero except for the income coefficient. This variable was not eliminated from the equation because income was hypothesized to be an important factor affecting the demand for outdoor recreation.

Another way to look at the equation is to examine the regression equations to determine how much an additional mile, dollar, or changes in the income and education indexes would make in terms of the number of visitor days estimated. The regression coefficients each indicate the effect which a change in an independent variable would have on the dependent variable. As an example, if one more average mile was traveled, the effect would be to add ≈ 0.05 visitor days. If one more average dollar were spent, it would decrease the estimated number of visitor days ≈ 0.14 . If the average income were to be increased one index point, it would increase the estimate of visitor days ≈ 0.10 , and if the index for education were increased one index point, the estimated visitor days would decline 0.49.

Both the average cost per visitor day and education variables had negative signs. The negative coefficient for average total cost per visitor day was expected. What was not entirely expected was that the impact of education would be negative and also significant at the 5 percent level. One possible explanation was that the average education level index was relatively low - 2.84118. If we go back to Table 1, the reasons why this variable was negative may be evident. Only a relatively small percent of all hunters interviewed in this study reported a college degree or advanced degree education level. When the number of trips was taken into account, the data was biased against the higher education levels. In the statistical model, this is reflected in terms of the negative regression coefficient which says that the more education the less the chances of hunting in the Sawtooth area.

The mileage and income level regression coefficients were both positive. In the case of mileage, the implication is that the more miles a hunter travels the longer he stays which seems to be a reasonable conclusion so long as the logic is not carried to an extreme. This conclusion has implications for non-resident hunters who must travel relatively long distances. In the case of income, logic indicates that the more income one has the better his chances of hunting in the Sawtooth area. This latter conclusion reflects the impact of non-resident hunters on the demand equation. It is unfortunate that adequate data which might have provided a significance for the regression coefficient was not available.

The Demand Schedule

A demand schedule was derived for hunting which is shown in Table 26. The demand schedule for hunting was relatively inelastic at low prices and very elastic when the prices increased. The elasticity of demand simply stated measures the impact on consumption that a 1 percent change in price (cost per visitor day in our case) would have an amount of visitor days consumed. Up to the point where the elasticity coefficient is 1.0, an increase in the cost per visitor day would have a relatively small decline (less than 1%) in the number of visitor days which are consumed for hunting. Where the elasticity of demand is greater than 1.0 then the decline in use of visitor days for hunting would be greater than 1.0. The coefficients calculated cover 5.00 increase in

costs and therefore tend to underestimate individual \$1.00 changes in the cost per visitor day but they do reflect the general or average elasticity of the curve.

Table 26. Estimated demand schedule for hunting in the Sawtooth area, 1971. *

Number of Visitor Days	Cost per Visitor Day	Elasticity of Demand**
8.10	\$ 0.00	--
7.60	3.80	0.1
6.90	8.80	0.2
6.20	13.80	0.3
5.50	18.80	0.5
4.80	23.80	0.7
4.20	28.80	1.0
3.40	33.80	1.4
2.80	38.80	1.9
2.00	43.80	3.0
1.40	48.80	4.9
.60	53.80	12.6

* All numbers have been rounded to the nearest tenth.

** The elasticity was estimated using the formula

$$\frac{\frac{\Delta x}{x}}{\frac{\Delta P}{P}} = \frac{\Delta x}{x} \times \frac{P}{\Delta P}$$

Where: Δx is the change in visitor days and
 x is the quantity of visitor days and
 ΔP is the change in the cost per visitor day and P is the cost per visitor day.

If a fee were to be charged for hunting at the present levels of use, the impact on the number of visitor days would be small. The average number of visitor days per hunting trip was estimated to be 6.8.

If a \$5.00 per visitor day fee were imposed this would only reduce the number of visitor days per trip to 6.2. On the other hand if a \$25.00 per visitor day fee were imposed, it would reduce the number of visitor days by more than half to 3.4. Because the elasticity of demand tends to increase over the whole curve, fees may be an effective way to control the number of hunters who use this area. This conclusion depends entirely upon the degree of control desired. This type of regulation of use also discriminates against low income hunters which is an important factor to consider particularly in light of resident hunter incomes which have been discussed previously in this report.

The method used to estimate the resource value for hunting in the Sawtooth was estimated directly from the hunting demand estimate specified in the estimating equation above. The economic value estimate will not be a net value in the sense that it pressures the economic benefits derived by hunters in excess of the actual expenditures involved in the hunting trip. These expenditures are not totally a proper measure of the hunting experience. Hunting like other types of outdoor recreation is defined as a non-market activity; and therefore, the transfer costs are used as a substitute for prices. The concept of consumer surplus was used in this study to develop a net value for the hunting resources in the Sawtooth Valley and Mountain area. The idea of consumer surplus is that consumers would be willing to pay more for the consumption of goods and services than the price which they actually pay. That is they would pay a higher price for a smaller quantity of the goods or

service which they would receive. Because consumers are not charged a higher price, logically then they receive a surplus satisfaction whenever the price which they pay for goods and services is less than the value or utility derived from such goods and services.

The demand curve shown in Figure 3 was derived from the demand equation estimated previously. Its negative slope indicates that consumers will demand more hunting at lower transfer costs (prices) or less at higher transfer costs (prices). The consumer surplus is measured by the area AEB which is the large triangle above the rectangle ABCD. This area under the demand curve measures the net economic value of hunting. The total value of hunting would be measured by the area DEBC; this value is not used in establishing recreational values because the net value of such recreation would be greatly overstated because the cost portion of the value is a transfer cost from one sector of the economy to another. In other words, these recreation or hunting expenditures would normally reappear as expenditures on the other recreational opportunities if they were not spent on hunting. They do not reflect a net economic loss of value to a particular group of recreationists.

The demand curve EB indicates that the willingness to pay includes the area AEB in addition to what they did pay to consume 6.8 visitor days of hunting. The hunters in this sense have received no surplus satisfaction but the aggregate satisfaction would have been the same.

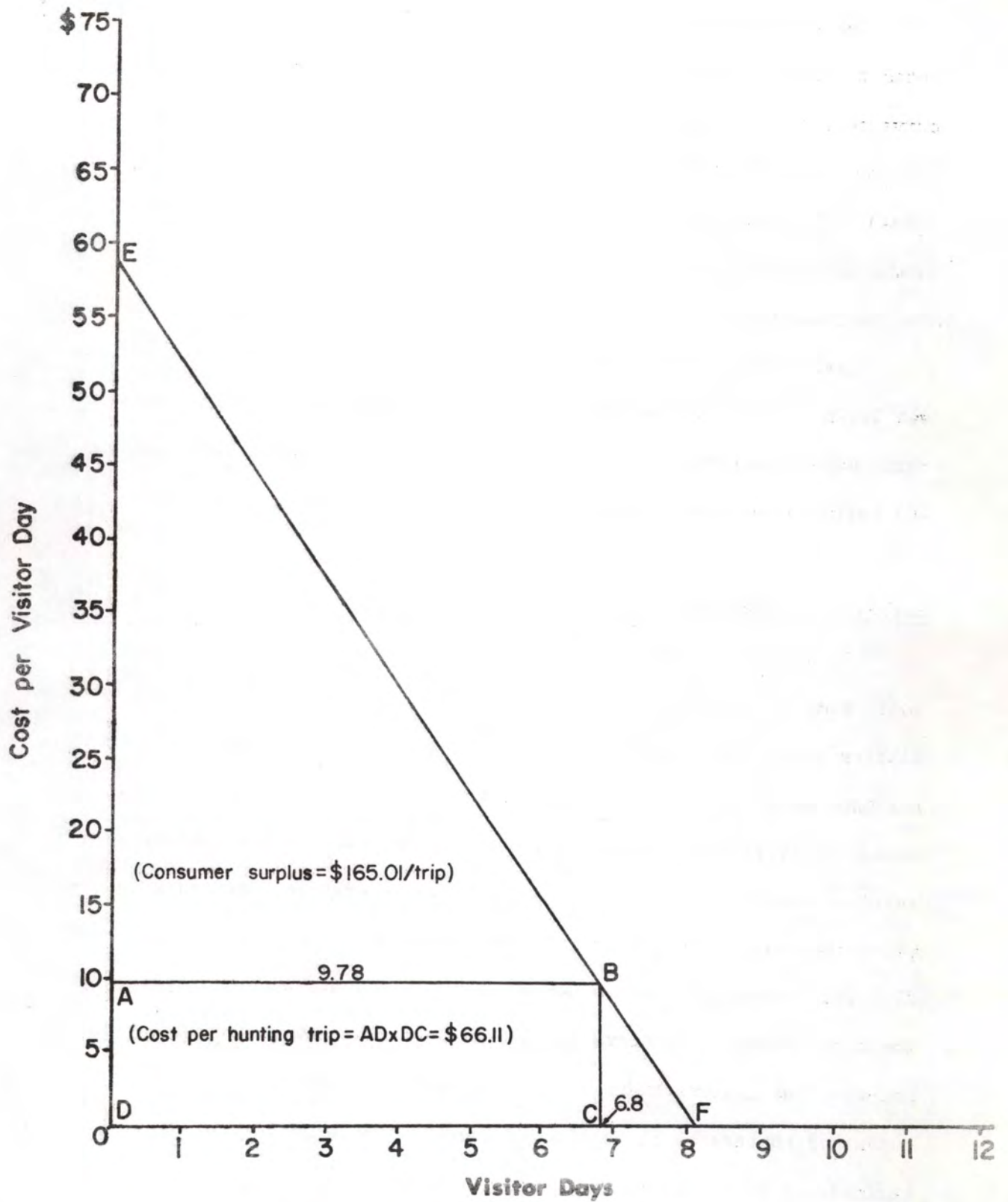


FIGURE 3: Statistical Demand for Hunting in Sawtooth Area, 1971

The assumption which has to be made when consumer surplus is imputed to be the net value of the hunting resource is that the demand curve equates the hunter's marginal cost of obtaining an additional visitor day of hunting with the marginal value or utility derived from additional consumption of hunting. Making this assumption, it becomes possible to proceed to estimating of the net resource value of hunting in the Sawtooth area.

Based on the estimating equation, the average cost per visitor day was \$9.78 and the average number of visitor days was 6.8. The average total expenditure was \$66.10 and the net value of the hunting resource was estimated at \$24.41 per visitor day.

Estimation of Resource Values

In order to estimate the value of the hunting resource in the Sawtooth area, it was necessary in an accurate estimate of the number of visitor days. Information of this type was provided by the Idaho Fish and Game Department and was discussed earlier in this report. Unfortunately, however, the estimate provided did not give a breakdown between resident and non-resident hunters. It was, therefore, necessary to develop these data using the information available and as shown in Table 27. The percentages of residents and non-residents were multiplied by the total number of hunters (1,113) to determine how many resident and non-resident hunters there were. The next step was to multiply the number of hunters by the estimated average length of stay to provide an estimate of the total number of visitor days weighted by the number of

Table 27. Estimated visitor days and consumer surplus value for hunting by residents and non-residents, Sawtooth Valley, 1971.

	Resident	Non-resident	Entire Sample
Population Distribution	88	12	100
Average No. of Days	6.6	8.8	6.8
No. of hunters	981	132	1113
Total No. of visitor days	6475	1162	7637
Consumer Surplus value	\$158055	\$28364	\$186419

residents and non-residents in the sample. The total number of visitor days estimated was 7,637. This was followed by the multiplying the number of visitor days by the average consumer surplus to estimate the resource values,

$$7,637 \times \$24.42 = \$186,419.$$

This value -- \$186,419 -- was the estimated consumer surplus for hunting in 1971. The implication of this value is that it is also the value of the hunting resource in the Sawtooth area -- a net benefit which can be used by resource managers when comparing alternative uses for the area.

This consumer surplus value may grow or decline as hunting grows and declines. It will change with the price level or with increases or decreases of the relative costs of the hunting experience. Its strength is in the fact that the consumer surplus method indicates resource value through resource use by hunters. This conclusion must be tempered by the factor of resource quality and that consumer surplus value assumes the quality that actually existed in 1971. If these quality factors were to change then undoubtedly this would be reflected in the resource value (consumer surplus).

PROJECTIONS OF HUNTING USE

Linear Projections

There are two kinds of projections which can be made based on this model. The first is a linear projection based on a hypothesized rate of growth which would be independent of the statistical model. This can be done by assuming a rate of growth for visitor day use. If it is also assumed that non-resident license fees, quality of area, the availability of game and all other factors remain unchanged, then consumer surplus values can be estimated.

The number of hunters and projected game harvest based on the current success ratio and the assumption that the estimated level of harvest will not deplete the game herds excessively are shown in Table 28.

Table 28. Projected number of hunters and game harvest.

Year	<u>Deer Hunting</u>					
	Rate of Growth					
	3%		6%		9%	
	No. of deer Htrs.	Har.	No. of deer Htrs.	Har.	No. of deer Htrs.	Har.
1971	640	165	640	165	640	165
1975	720	186	807	208	903	214
1980	835	209	1081	279	1390	329
1985	968	242	1447	373	2139	506
1990	1122	281	1936	499	3291	778
1995	1301	326	2591	668	5063	1198
2000	1508	578	3468	894	7790	1843

Year	<u>Elk Hunting</u>					
	No. of elk		No. of elk		No. of elk	
1971	453	134	453	134	453	134
1975	510	151	571	160	639	189
1980	591	175	765	201	984	291
1985	685	203	1024	270	1514	411
1990	794	235	1371	360	2329	689
1995	921	272	1834	483	3584	1060
2000	1068	316	2454	646	5514	1631

This may be a very questionable assumption. Three growth rates for hunting were used, 3, 6, and 9 percent. These rates reflect the impact of various managerial policies for the area. The 1971 base was used in each case as a starting point, and each growth rate was projected to the year 2000.

The projections for deer hunters and deer harvest in 1985 assumed these various growth rates would be: 3%, 968 hunters harvesting 242 deer; 6%, 1447 hunters harvesting 373 deer; 9%, 2139 hunters harvesting 506 deer. In the year 2000 this would grow to 3%, 1508 hunters harvesting 578 deer; 6%, 3468 hunters harvesting 894 deer; 9%, 7790 hunters harvesting 1843 deer.

The projections of elk hunters and elk harvest in 1985 follow the same pattern: 3%, 685 hunters and 203 elk harvested, 6%, 1024 hunters and 270 elk harvested; and 9%, 1514 hunters and 411 elk harvested. In the year 2000 at these rates of growth, the numbers would be: 3%, 1068 hunters and 316 elk; 6%, 2454 hunters and 646 elk; and 9% 5514 hunters and 1631 elk.

The 3 percent growth rates assumes an increase of 1985 of approximately 150 percent in the number of deer hunters and deer harvested. By 2000 this would increase to 246 percent in number of hunters and 350 percent in the number of deer harvested. At the 6% rate the number of hunters was projected to increase 226 percent by 1985 and up to 542 percent by 2000. The deer harvest at this rate of growth was projected at a 226 percent by 1985 and 536 percent 2000. At the 9 percent rate of growth, the number of hunters would increase 334 percent by 1985 and

1230 percent by 2000. The projected number of deer harvested at this rate of growth would be 307 percent in 1985 and 1130 percent by 2000.

For elk hunting these projections were similar. This would be expected because the same rates of growth were used.

The projections as related to the economic impact of hunting are shown in Table 29. All kinds of hunting were lumped into this table which includes visitor days, hunting expenditures and consumer surplus or estimated resource values. The 3 percent rate of growth indicated

Table 29. Projections of future hunting use.

Year	Assumed Rate of Growth								
	3%			6%			9%		
	VD	HE	CS	VD	HE	CS	VD	HE	CS
1971	7637	75	186	7637	75	186	7637	75	186
1975	8598	84	209	9642	94	235	10700	105	263
1980	9968	97	243	12903	126	315	16587	162	405
1985	11552	113	282	17266	169	421	25521	250	663
1990	13391	131	327	23106	226	564	39267	384	958
1995	15524	152	378	30921	302	754	60417	591	1475
2000	17997	176	439	41380	382	1010	92959	909	2269

NOTE: VD=visitor days, HE=hunters expenses; CS=consumer surplus
Table is read in thousands of dollars

that by 1985 the visitor days, expenditures and consumer surplus would increase about 150 percent and by 2000 to more than 220 percent. At the 6 percent growth rate these items would increase 225 percent by 1985 and 530 percent by 2000. At the 9 percent rate they would increase 330 percent by 1985 and to 1240 percent by 2000.

The relative impact of such rates of growth would be impressive if such growth could be sustained in the area under the existing levels of management which are assumed in the analysis. Essentially what this means is that the natural conditions would have to be able to support the deer and elk herds at reproductive and growth levels which would supply an adequate quantity of animals for the harvest rates indicated in Table 28.

Assuming that the above condition exists, Table 29 may be examined to determine the impact of hunting on the local economy of the Sawtooth area. The expenditures for hunting represent the total amount of money that hunters collectively spent on their hunting experience. The rates of growth at 3 percent would grow from \$75,000 per year spent by 1113 hunters to \$113,000 per year in 1985 and \$176,000 in 2000. At the 6 percent rate of growth the annual expenditure in 1985 would be \$169,000 and would grow to \$382,000 in 2000. At the 9 percent growth rate an annual expenditure would be \$250,000 in 1985 and would grow to \$909,000 in 2000.

The consumer surplus values used to estimate the net resource values would grow in a similar way. Measuring from the base of \$186,000 in 1971, and using the 3 percent growth rate, the consumer surplus value would be \$282,000 in 1985 and grow to \$439,000 by 2000. At the 6 percent growth rate, the annual value would be \$421,000 in 1985 and grow to \$1,010,000 in 2000. At the 9 percent level, it would be \$663,000 in 1985 and grow to \$2,269,000 by 2000.

Use Projections Based on Demand Shifters

The second method of making projections considered in this analysis is that of using the demand equation and its demand shifters which were the income and educational variables in the estimating equation. The basic idea is that if the level of an independent variable is changed, then the quantity consumed at a given price would also be changed depending upon the sign of the variable and the magnitude of the change. A graphic example of how this works is shown in Figure 4. The demand curve would shift to the right and up if annual personal income were to increase to the highest level reported in this study which was \$25,000 and over. Assuming that the average cost per visitor day would increase from 6.8 to 7.3 per trip and the total expenditure per trip would increase from \$66.11 to \$70.71 per trip, and the consumer surplus would increase from \$24.41 per visitor day to \$26.11 per visitor day or a total consumer surplus estimated for the area based on an increase in the income level would be \$199,190 compared to \$186,420. The marginal increase was \$14.982 which resulted from the projected higher income level. In light of an increasing average annual income there is a reason to consider this type of change as a potential impact on the Sawtooth area.

The third projection evaluated the potential impact of increased non-resident hunting in the area. As a hypothetical example the number of non-resident hunters was allowed to increase 5 times, and an evaluation was made which took into account the impact of the projected increased number of non-residents and their impact on the average costs, consumer

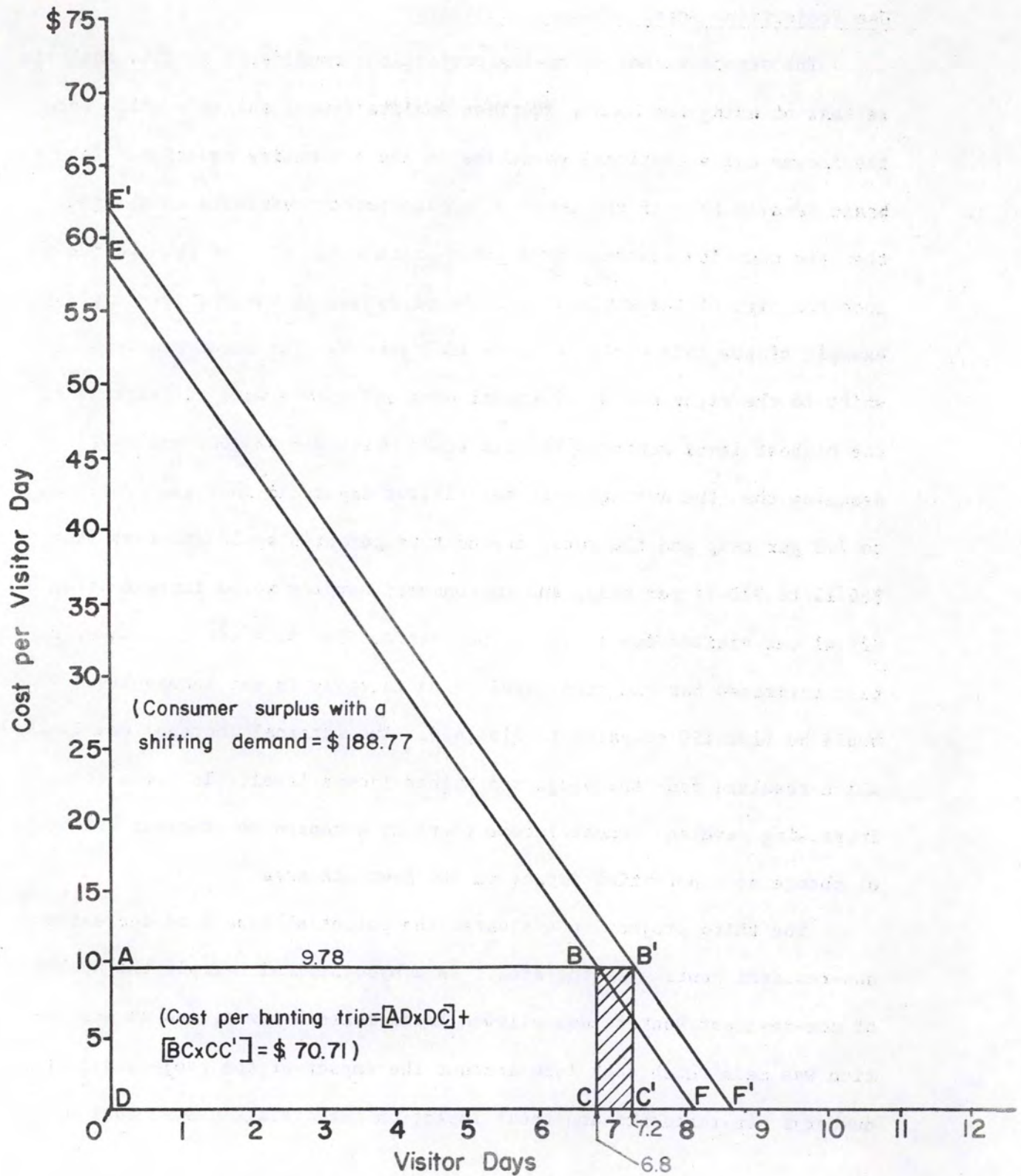


FIGURE 4: Projected Use Based on Increased Non-Resident Hunting in Sawtooth Area

surplus and resource value (Table 30). The estimated visitor days, hunting expenditures, are shown along with the estimated consumer surplus. As the shift to more nonresident use occurs, an increase of 1135 visitor days was projected for non-residents. The estimated consumer surplus declined from \$186,420 to \$155,803 as use was increased.

Table 30. The impact of increased non-resident hunting on resource value, Sawtooth area.

RG	Residents		Non-residents			Entire Sample		
	VD	HE	RG	VD	HE	VD	HE	CS
0	6502	48,056	0	1135	34,595	7,637	74,690	186,420
0	6502	48,056	100	2270	70,597	8,764	118,653	155,803
0	6502	48,056	200	3405	107,802	9,899	155,858	159,686
0	6502	48,056	300	4540	145,916	11,034	193,972	183,738
0	6502	48,056	400	5675	184,778	12,169	232,834	229,575
0	6502	48,056	500	6810	224,390	13,304	272,446	254,967

NOTE: RG=rate of growth; VD=visitor days; HE=Hunters expense; and CS=consumer surplus

As estimated use increased to 9899 visitor days the consumer surplus value increased from \$155,803 at the 8764 visitor day level to \$159,686 and eventually increased to \$254,967 at the 13,304 visitor day use level.

Management Alternatives

Each of the above methods of projecting future use has managerial implications of considerable importance. The rate of hunting use is

allowed to increase depends upon the regulation of the Idaho Fish and Game Department. At the present time the only regulation is that ten percent of the resident hunting licenses determines the number of non-resident hunting licenses which may be sold. This is a gross limit and no attempt is made to apply any regulation to the number of percentage of non-resident who hunt in any area. Given this constraint, it would be possible to see the hunting activity grow substantially in the Sawtooth area.

One very important factor which needs to be pointed out is that the Sawtooth area, game management unit 36, is a summer range area for deer and elk. The winter range is found in game management units 36A and 36B along the major streams in the area. The one possible implication is that game management in the Sawtooth competes with other recreational and non-recreational use in the area. Another implication is that it may be complementary with other recreational uses. If a management decision were made to develop big game hunting of the area to the maximum extent, this would imply that some of the other activities would be curtailed. These activities could be the development of campgrounds to provide facilities for outdoor recreation, development of summer homes and a higher level of use in the primitive areas for other uses than hunting. The extent to which these activities would be curtailed would have to be examined in terms of a detailed study of the summer range, its location, quality and the ecology of the game plus the general condition of the herds. Would the big game species be able to withstand the hunting pressure

projected at the 9 percent growth rate, at the 6 percent rate, or the 3 percent rate? Should the present level of hunting be maintained? What reaction would users have to seeing more game? What are the consequences of increasing hunting use in light of the other activities? There are no simple answers to these questions. However, if a decision were made to develop the hunting in the area, estimates could be made of the expenditures and the resource values generated assuming that a level of saturation of hunting use has not been achieved. This latter assumption is critical in the sense that the estimate made in this study does assume that the quality of the resources involved in the hunting experience do not change. Additional research on these problems is required.

Use Projections Based on Land Availability

Another alternative way to look at the problem would be to equate the density of hunting in the area to the area of land available. The question is how many visitor days or hunters are utilizing a fixed land area. If we are making assumptions concerning the present of the land which can be hunted effectively then a maximum number of hunters and hunting effort can be defined. This has been done in Table 31. The estimated number of hunters, the average acres available to each hunter and hunting density index which was weighted by the average number of visitor days per trip were all considered. The acreage used was estimated using data developed by Rahn and Larson in a study of land characteristics

in the area (3). Estimates of the acreage of land suited to big game hunting was estimated to be 436,198 acres in game management unit 36. The land chosen varied from canyon land to moderately steep slopes as described in the report. A listing by land group from the report is indicated in Table 32.

Table 31. Density of hunting in Sawtooth area and projected impact on future use.

Year	Hunters	Deer Hunt Rates of Growth								
		3%			6%			9%		
		A/H	HDI	Hunters	A/H	HDI	Hunters	A/H	HDI	
1971	1093	399	.944	1093	399	.944	1093	399	.944	
1975	1230	355	.746	1378	316	.593	1542	283	.475	
1980	1426	304	.551	1846	236	.331	2374	184	.200	
1985	1653	264	.413	2471	176	.184	3653	119	.084	
1990	1916	227	.306	3307	131	.102	5620	77	.035	
1995	2222	196	.228	4425	98	.057	8647	50	.015	
2000	2576	169	.170	5922	73	.032	13304	32	.006	

NOTE: A/H=Acres per Hunter; HDI=Hunters Density Index.

Table 32. Estimated acreage of land available for hunting.*

Lands	Acreages
Depositional Lands Group	127,227
Moraine Lands Group	93,164
Strongly Glaciated Lands	72,598
Glaciated Lands Group	59,496
Granitic Glaciated Group	38,128
Granitic Mountain Lands	90,917
	<hr/> 481,530
Less Withdrawals	45,332
Net Acreage	436,198

* Source: Gary N. Rahn and Kermit Larson, "Land Characteristics and Soil and Hydrologic Evaluation for the Sawtooth, White Clouds, Boulder, and Pioneer Mountains," USDA, Forest Service Intermountain Region, March, 1972.

Most of the lands listed in Table 32 were lower elevation lands which support summer range and which were not excessively steep. The purpose of obtaining this estimate of the land area was to develop the hunting density index shown in Table 31. This index relates the number of hunters (projected number of hunters) and the average number of visitor days they hunt (11.6) to the number of acres-days available for hunting during the season. The calculations were:

$$\text{Acres per hunter per day} \times \text{Length of season} = \text{Hunting density index}$$

$$(399) (30)/(1093)(11.6) = 11,970/12,679 = 0.944.$$

The numerator of this ratio indicates the total number of hunting units of 399 acre available per season based on the number of hunters using the area. The denominator indicates the total number of visitor days hunters spent hunting in the area. As this hunting density ratio declines, an increase in the intensity of use is indicated. At the current rate of use, each hunter hypothetically would have 399 acres to hunt on each day of the season. The present maximum attainable use of that would be 11,970 399-acre hunting units. It is the ratio of these hunting units to visitor days that provides the density index. This density index is not a linear function and describes the potential use and undoubtedly overuse which could occur in the area.

If the 3 percent level of increase were selected as a management goal, the hunting index would decline to 0.413 by 1985 and then down to 0.170 by the year 2000. The average hunter had 399 acres per day in 1971 and he would have 264 acres in 1985 which would decline to 169 in 2000. At the 6 percent growth rate the decline would be much faster and by 1985 the hunting density index would decline to 0.184 and the acres available to 176, and by 2000 the density would be 0.032 and the acres available to 100. At the 9 percent rate the density in 1985 would be 0.084 and the acreage 119, and by 2000 the density would be 0.006 and the acreage declined to 32 acres.

At this point it is evident that a criterion is required in order to evaluate the impact of this hunting. At the present time no such criterion exists. It is also obvious that the resource managers goal also would be important. If an attempt is to be made to maximize hunting, the criterion would be different than if development of a larger deer and elk herd were the goal.

Given the present situation with a National Recreation Area in the Sawtooth, hunting would most likely fit into an overall pattern of use if it does not conflict excessively with other recreational uses of the area because of seasonal separation. As such the limits are probably ecological in terms of the carrying capacity of game habitat, and hunting pressure until these factors are more fully understood.

The implications of all the methods for projecting future hunting effort in the Sawtooth area is summarized in Table 33. If any of the percentage rates of growth are considered, it would seem that the 3 percent rate would most likely be chosen because of the lack of information on game management in the area, and because it is the most conservative expansion considered in this study (other possibilities obviously exist). If increasing the resident hunting in the area is chosen as the policy alternative, then the choice would for a more conservative policy relative to increasing hunting. This policy, however, may be the most realistic choice in light of the growth potential of the area given the current status of deer and elk herds which have been increasing in size.

Table 33. Number of hunters using various methods of projections.

Year	Visitor Day Projections			Non-resident hunters Percent Increase	Total Numbers
	3%	6%	9%		
1971	7637	7637	7637	0	7637
1975	8598	9642	10780	100	8764
1980	9965	12903	16587	200	9899
1985	11552	17266	25521	300	11034
1990	13391	23106	39267	400	12169
1995	15524	32921	60417	500	13304
2000	17997	41380	92959	NA	NA

NOTE: NA = Not Applicable

The non-resident growth rate projection might be relatively consistent with future recreational use of the Sawtooth area given its National Recreation Area status. More emphasis will be given to the area by non-residents and this will result in more of them using the area for hunting as well as for other types of outdoor recreation. The policy set for hunting in the Sawtooth must recognize the fragility of the ecology and natural environment in the area, and should carefully evaluate alternatives which would increase the number of people using the area.

SUMMARY AND CONCLUSIONS

The survey of hunters in the Sawtooth area (game management unit 36) was done by mail questionnaire. Approximately 10 percent of the hunters who hunted in the area returned useable questionnaires. Approximately 88 percent of the hunters who responded were residents and 12 percent were non-residents. The average hunter had attended college for some period of time. If a hunter were a non-resident the average age was found to be between 30 and 40, and if the hunter were a resident it ranged between 20 and 30 years of age. Non-residents tended to have more paid vacation time than did the residents. The average resident tended to spend more of his paid vacation time hunting than did the non-resident. The modal income distribution of these hunters was \$10,000 to \$14,999 for the entire sample with a much larger percentage of non-resident in this group than residents. The non-resident income distribution tended to be skewed toward the higher values. Most of these hunters, both residents and non-residents, were professional and technical people. Clerical and students and retired people ranked second among occupations of those who hunted in the area.

The average length of the hunting trip was 6.8 visitor days. The composition of the hunting parties consisted of groups of family members, friends, and relatives for resident hunters and family and friends, and outfitter guide parties for the non-residents. Most of the hunters used either tents, campers or trailers for accommodations while hunting. The average size of the hunting party was about 4 for

all trips (residents) and 5 for all non-residents. There are several important relationships among hunting accommodations, types of facilities that they would like to use and the number of hunters in an area. Most of the hunters that responded to the survey indicated that they use campers and trailers for accommodations, and another relatively large group used tents. These people want a campground to park in or set up their tents in. This implies that the present level of development of camping facilities leaves something to be desired. If the number of hunters were to increase to 13,670 hunters projected at the 9% rate of increase in the year 2000, considerably more effort will have to be done in terms of providing camping facilities. Campground useage should also be evaluated for its potential impact on the ecology of the area.

Although the largest percent of hunters do hunt on foot, a fairly large percent hunt using either horses or cars or a combination of one of these with foot hunting. These two types of mobile hunting tend to be very hard on the land in areas of fragile soils. There are many such areas scattered throughout the Sawtooth area. This type of use needs to be evaluated at present use levels to see whether it results in serious erosion or aesthetic impacts. When future use projections are made, the issue becomes very real, and although more information is needed any increases in foot, mobile, and/or horse hunting must be carefully evaluated before it is permitted. The point is not that these types of hunting should be arbitrarily eliminated, but rather that they may be restricted to particular areas and/or permitted at the present level of activity in an area.

The reasons why the Sawtooth hunter hunts also are important in future evaluation of use for the area. Most of these hunters indicated that meat was the most important part of the hunt, but they also indicated that the change of pace and relaxation along with the opportunity to get out were the second and third ranking reasons with the challenge of hunting ranking fourth. These factors imply both directly and indirectly that hunting success was an important factor in the Sawtooth hunting experience. Large increases in the number of hunters and the attendant pressure on game harvest might change the present success ratio which might cause a loss of hunters over time instead of a constant growth rate. In light of the policy objectives of the resource managers, this could be interpreted as either good or bad depending upon the impact desired.

The reasons why the Sawtooth area was selected as the place to hunt are also revealing on this subject. Previous success hunting in the area was the most important reason, followed by the scenic beauty of the area, and its convenient location. This bears out most of the points made above and also sheds light on the fact that the Sawtooth hunters were looking for more than meat in their hunting experience. The question raised is how many more hunters could utilize this area without destroying the resource. Undoubtedly, quite a few could, but somewhere there is a limit. Future studies of habitat, the ecology of the area and big game need to be made before making specific recommendations on numbers of hunters, but some important interrelationships are being recognized.

Most of the respondents rate the Sawtooth as a "good" to "fair" hunting area which also indicates that there is some concern over the quality of the big game resources.

The means by which these hunters first learned about Sawtooth hunting was from relatives and friends for the most part. The main reason they hunted in this area was mostly due to previous success, scenic beauty and its convenient location. The hunters impressions of the density of hunting in the Sawtooth area were that it was about right, although 40 percent of the hunters thought it was too crowded. Most of these hunters were aware of the potential designation (at the time of the survey, the NRA was still not a reality) of the Sawtooth as an NRA (National Recreation Area).

The second part of the study dealt with an analysis of the demand for hunting. A linear multiple regression model was selected for this purposes an equation which estimated the number of visitor days based on the mileage traveled, the total cost per visitor day, income and levels of hunters responding to the survey. The number of visitor days estimated was 6.8 visitor days and total cost visitor days was \$9.78. On this basis the total cost per trip was estimated to be \$66.11. The resource values developed for this study were based on the consumer surplus concept and this value was estimated to be \$24.41 per visitor day or \$165.01 per trip. The total expenditures of all hunters were also estimated to be \$74,690 and the total consumer surplus or value of hunting estimated for the Sawtooth area was \$186,419.

The first approach was to project future use by assuming various rates of growth in the number of visitor days devoted to hunting in the Sawtooth area. Some managerial alternatives were defined and used to project the number of visitor days that would occur in the future. These projections were then used to determine the impact of growth on hunting, the economy of the area, and resource values. Three interest rates were used - 3%, 6% and 9%. The time period over which these rates of growth were compounded was from 1971 to 2000, 1985 was used as a mid-point to provide perspective. The rate of increase in visitor days for hunting was quite large. The number of visitor days for deer started growing from a base of 165 deer harvested in 1971 and grew to 578 deer in 2000 at the 3 percent rate, 894 deer harvested at the 6 percent rate and 1843 at the 9 percent rate. These magnitudes of increase in the year 2000 for elk begin from the 1971 base harvest of 134 elk to 316 at the 3 percent rate, 646 at the 6 percent rate and 1631 at the 9 percent rate. These rates of growth and magnitude of harvest were assumed to accompany them to maintain the 1971 deer and elk success ratios. This is stunning in light of the pressures which would be put upon the ecosystem of the area at the higher growth rates. It is evident that a three percent rate of growth would be difficult to maintain, and at the six and nine percent rate of growth the quality of the game resources and environment would most likely decline as a direct function of hunting pressure.

The second attempt to project the potential factors affecting growth in the area was related back to the demand equation and the independent variables which would shift demand for this resource. The first variable examined was income which if increased on the average would increase the quantity of visitor days demanded for hunting. If the income variable were shifted to the point where the maximum income level considered in the study was utilized, the quantity of visitor days did increase by about one half a visitor day on the average. The average in hunting expenditures increased from \$66.11 to \$70.71 per trip. The consumer surplus per trip increased for \$24.41 per visitor day to \$26.11. Basically, with the higher income level more visitor days would be consumed by hunters. Unfortunately the data used in this study was not sufficiently precise to explore this relationship more fully. The ranges of income were too limited to fully analyze the potential impact of income on the consumption of visitor days for hunting in the Sawtooth area, but it provides a useful indication of the direction which the demand curve would shift and an approximated indication of how much it would shift in terms of visitor days. As a result the conclusion is that emphasis should be placed on the direction of shift and not its magnitude. More definitive studies need to be done to improve the prediction and provide a better identification of the demand models for the Sawtooth area.

A second more rewarding attempt to evaluate the impact of future use levels was an attempt to evaluate the potential impact of future non-resident use. The procedure followed was to estimate the impact of a shift in the mileage and total cost per visitor day independent

variables. New parameter estimates were developed based on increased mileage traveled and were substituted into the demand equation to estimate the number of visitor days per trip. Basically, the second trip and total cost per visitor day variables were averages for all users. As the number of non-residents increased these averages changed. The estimates for increased non-resident use were based on 100 percent increments of present use and the increase in use was limited to a maximum of 500 percent of present use. The number of visitor days increased from 6 to a maximum of 13,304 with a 500 percent increase in use. The expenditures also kept pace by increasing from \$75,000 to \$272,446, while the consumer surplus value declined with a 100 percent increase in use from \$186,420 to \$155,803 and then slowly recovered with additional 100% increments and eventually increased to \$254,967. The changes in use affect the nature of the demand for these resources. The loss in consumer surplus value reflect the fact that the impact of the total cost per visitor day was more important than was the increased round trip mileage that the hunters traveled.

The last method of projecting the impact of future use was tied to the amount of land available and the projected number of hunters. This procedure recognized that the amount of land is one method of indicating that land is a scarce resource and is one of the factors that may limit future hunting use. The basic results of this approach was measured in terms of hunting density which was defined as the ratio of acre days (the number of acres times 30) to the total number of visitor days of

hunting at various estimated levels of use. The results of this approach were dramatic. Estimates of the hunting density were made for the three levels of future growth used and they indicated at the present time more visitor days are used for hunting than there were hunting units available to arrive at a unity ratio. The ratio declined from 0.944 in 1971 to 0.17 in 2000 at the projected 3 percent growth rate to .032 at the 6 percent rate and to 0.006 at the 9 percent growth rate. On the basis of the availability of space to hunt, public safety becomes a factor. The acres available per hunter per day declined from 399 in 1971 to 169 at the 3 percent growth rate in 2000, to 73 at the 6 percent growth rate and to 32 at the nine percent growth rate. From the standpoint of public safety, less than 100 acres per hunter per day for a whole hunting season would be questionable. If this is imposed as a limit then only the 3 percent rate of growth could be maintained until 2000. A further conclusion is that when the finite nature of the land resources, management of hunting becomes an essential part of management and it must consider the whole ecosystem in the Sawtooth and the related winter range areas.

It was concluded that the 3 percent growth rate might be sustainable until year 2000, therefore, the other approaches were not evaluated using the above technique.

The conclusions drawn by this survey were that most hunters were reasonably satisfied with these hunting experiences in the Sawtooth. Most thought that the area was receiving about the right amount of hunting pressure.

The conclusion in the demand analysis was that each hunting trip consist of about 6.76 visitor days, that the average expenditure was \$66.11 per trip and \$74,690 total expenditure per seasons. The 1971 total consumer surplus estimated for hunting was \$186,420 and this is also the estimated value of hunting in the Sawtooth area. The estimated visitor days total expenditure and resource value (total consumer surplus) for projected growth rates to the year 2000 increased from 17,997 visitor days, total expenditures of \$176,000 and a resource value of \$439,000 which increased at the projected 9 percent rate of growth to 92,959 visitor days, \$909,000 in expenditures and a \$2,269,000 resource value. The most conservative estimate of increased use assumed the present level of resident hunting and allowed the non-resident hunting to increase by 100 percent increments. This shift at the maximum level of increase considered a 500 percent in non-resident hunters increased the number of visitor days 13,304, total expenditures increased \$272,000 and consumer surplus to \$255,000. No time frame was set on this approach.

The management alternative which would allow an increase of up to 500 percent in the number of non-resident hunters would have the smallest impact on hunting in the Sawtooth area because it allows a relatively small increase in the number of hunters. The second most likely managerial approach which could be used would be to limit hunting use to a growth of 3 percent annually. To do either would require some sort of regulation, controlled hunts, permits, lottery, a first come first service basis up to a given number of hunters.

The results of this study shed light upon the value of hunting in the Sawtooth area from the perspective of the use, satisfaction hunters have enjoyed, the economic value which they generated by going to the area, and the estimated resource values estimated by the statistical demand models used. This information should be useful to resource managers as input into their decision making processes as they make decisions relating to competing land uses in the area, and as they attempt to decide how to develop the facilities of the area. The information which is needed to tie the loose pieces together is a study of the deer and elk ecosystems to determine whether it can support the role of growth projected by the methods used in this study. Another way to look at the problem is a need to determine the present big game habitat situation and to develop the management plans which will define whether or not hunting use can be expanded in light of other uses and the development of any necessary management plans for big game.

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