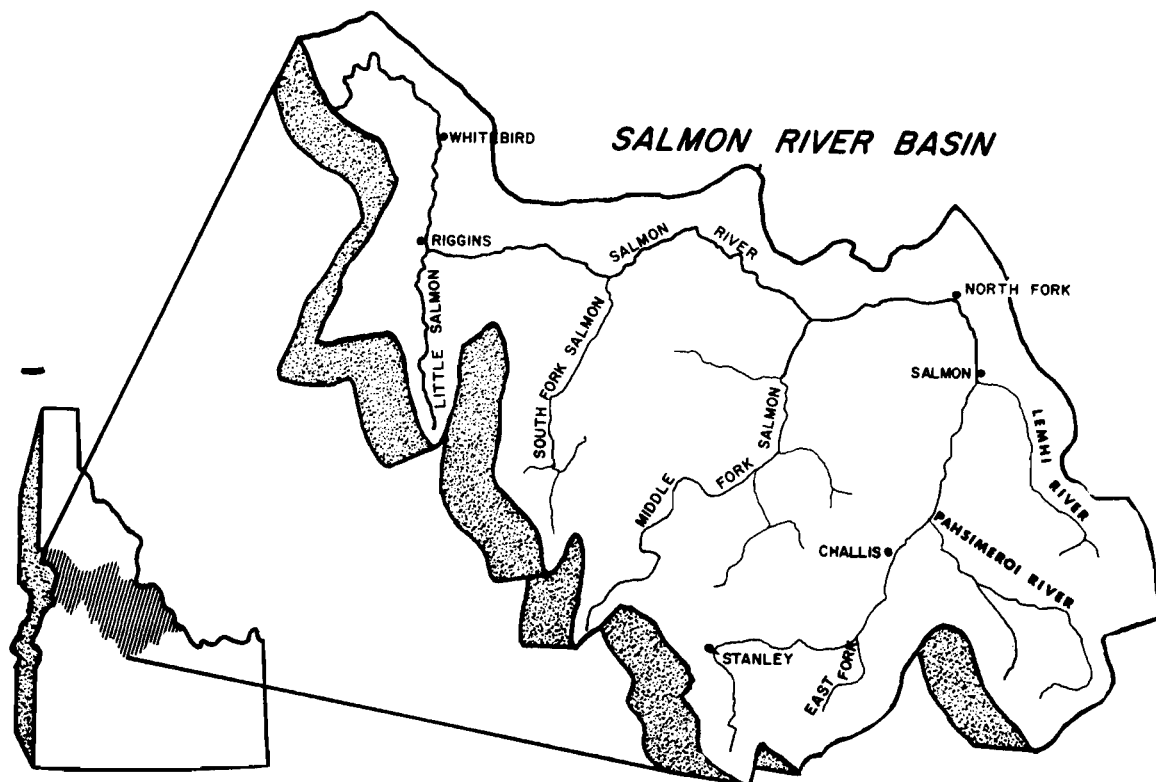


A Methodology Study To Develop Evaluation Criteria For Wild And Scenic Rivers



Report of

A Socio-Economic Analysis of Hunting in Salmon River Basin Subproject

by
Douglas Gordon

Water Resources Research Institute
University of Idaho
Moscow, Idaho
April, 1971

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ACKNOWLEDGEMENTS

I would like to express my appreciation for the constructive criticisms of Mr. Errol Nielson, Big Game Supervisor, Idaho Fish and Game Department, and Mr. Wayne T. Haas, Idaho Water Resource Board. Dr. E. L. Michalson, Mr. Harold Hafterson, Mr. John Herbst, and Mr. Larry Kirkland of the Scenic Rivers Study Unit also critically reviewed the manuscript and provided many worthwhile comments.

This study was supported under a Title I Matching Grant from the Office of Water Resources Research and the Idaho Water Resource Board.

TABLE OF CONTENTS

	Page
Acknowledgements	ii
List of Tables	iv
List of Figures	iv
Preface.	1
Introduction	6
Methods	8
Results	10
Sociological Factors	11
Age	11
Sex	11
Occupation	12
Income	12
Education	13
Population Center.	14
Metropolitan Area	14
Management Questions.	15
Salmon River Basin Hunting	15
Reasons for Hunting.	15
Number of Days Hunting	17
Game Species	18
Hunting Opportunity.	19
License System	19
Development of Area.	20
Number of People	20
Facilities	21
Access	22
Vacations.	22
Economic Analysis	23
Assumptions and Limitations of Study	24
Effort and Expenditure Estimates	25
Hunter Distribution.	30
Relationship of Hunting to Development Alternatives.	30
Significance of the Survey	33
Conclusions.	36
Appendix	38
Literature Cited	44

LIST OF FIGURES

	Page
Figure 1. Salmon River Basin	9
Figure 2. Idaho Fish and Game Management Units within the Salmon River Basin, and the five most heavily utilized by elk and deer hunters in 1969	31

LIST OF TABLES

Table 1. The percentages of respondents in each age class by entire sample and residence.	11
Table 2. The percentages of male and female respondents by entire sample and residence.	12
Table 3. The percentages of respondents in each occupation class by entire sample and residence.	12
Table 4. The percentages of respondents in each income class by entire sample and residence.	13
Table 5. The percentages of respondents in each education class by entire sample and residence.	13
Table 6. The percentages of respondents in each population center class by entire sample and residence	14
Table 7. The percentages of respondents living in each metropolitan area by entire sample and residence. . . .	14
Table 8. The percentages of respondents who previously hunted in Idaho, made their first trip to the Basin, had hunted previously in the Basin, listed hunting as the main reason for their visit, average number of trips in 1969, average number of previous Basin hunting trips, average number of years big game hunting, and average number of years big game hunting in Idaho by entire sample and residence	16
Table 9. The percentages of respondents ranking each category number one and the percentage of trophy hunters who would shoot an animal for meat by entire sample and residence	17

Table 10.	The average number of days respondents spent, or would spend, hunting big game and birds in the Salmon River Basin by entire sample and residence. . . .	18
Table 11.	The percentages of respondents who indicated they were hunting a particular game species by entire sample and residence	18
Table 12.	The percentages of respondents rating each category on hunting opportunity by entire sample and residence	19
Table 13.	The percentages of respondents expressing dissatisfaction with 1969 Idaho hunting regulation categories by entire sample and residence.	19
Table 14.	The percentages of respondents answering each category on development of the Salmon River Basin by entire sample and residence	20
Table 15.	The percentages of respondents who answered each category on number of people seen in the Basin by entire sample and residence	20
Table 16.	The percentages of respondents answering each category on facilities by entire sample and residence.	21
Table 17.	The percentages of respondents answering each category on access by entire sample and residence.	22
Table 18.	The percentages of respondents answering each vacation category by entire sample and residence.	23
Table 19.	Estimated total and non-resident deer and elk kill and approximate number of elk and deer hunters in the Basin by Game Management Unit	26
Table 20.	Estimated average and total expenditure made by residents in 1969 for each category associated with hunting	27
Table 21.	Estimated average and total expenditures by non-residents in 1969 for each category associated with hunting	28
Table 22.	The percentages of respondents who spent 100, 75, 50, 25, or 0 percent of their trip expenses in the Salmon River Basin.	29
Table 23.	The total expenditures, expenditures in Idaho, and expenditures in the Salmon River Basin in 1969 by resident and non-resident hunters.	29

PREFACE

Public Law 90-542, which passed the Congress of the U.S., October 2, 1968, provided for a National Wild and Scenic Rivers System. The purpose of the law is to protect for the enjoyment and benefit of the people of the United States certain rivers which in conjunction with lands bordering the waters possess outstandingly scenic, recreational, fish and wildlife, geologic land forms, and other desirable features.

Two categories of rivers are specified by the Act. "Instant Rivers" were authorized for immediate inclusion in the National Wild and Scenic Rivers System. The Middle Fork of the Salmon River and the Middle Fork of the Clearwater River were the two "instant" rivers located in Idaho. The second category, "study rivers", included rivers which are to be studied for possible inclusion in the Wild and Scenic Rivers System. Idaho study rivers include the main stems of the Bruneau, St. Joe, Priest, and Moyie rivers, and the Salmon River from North Fork to its confluence with the Snake River.

In addition to the two types of wild and scenic rivers specified by the Act, it is also possible to add other rivers to the Wild and Scenic Rivers System. The first of these ways is specified in section 2a of the Act which permits rivers that are designated by state legislatures as wild and scenic rivers. These rivers have to be permanently established and meet other conditions of the act, after which they can become part of the National Wild and Scenic Rivers System. The second way a river can be included in the System is through section 5d of the Act which indicates that in all planning for land use and development by Federal Agencies that they will consider the potential of all rivers under study for wild and scenic river status.

The Act specifies three classes of wild rivers: wild, scenic, and recreational. A "wild river" refers to a river free from impoundments, with non-polluted water and essentially primitive shorelines, and accessible only by trail. A "scenic river" is free from impoundments with shorelines and watersheds still essentially primitive and undeveloped but which is accessible in places by roads. A "recreational river" is readily accessible by roads and/or railroads, may have development along the shorelines and may have undergone some impoundment or diversion in the past. Public Law 90-542 specifies a ten-year time limit on classification studies during which studies and recommendations on the disposition of "study rivers" are to be made to Congress.

There is little valid criteria available for evaluating rivers for inclusion in the National Wild and Scenic Rivers System. For this reason the Water Resources Research Institute at the University of Idaho has organized a Scenic Rivers Study Unit for the purpose of developing methodology to evaluate wild rivers. The goal of this study is to establish criteria which can be used to identify and evaluate the economic, aesthetic, scenic and other values of wild rivers.

The Salmon River in Idaho has been selected as the primary study river on which to develop evaluation criteria. The Salmon originates in central Idaho and flows about 410 miles generally through precipitous undeveloped canyon country and discharges into the Snake River 49 miles above Lewiston. The average annual discharge of the Salmon River at its mouth is approximately 8,000,000 acre feet.

The portion of the Salmon from its mouth to the town of North Fork has been designated as a "study river" in the Act. However, for the methodology study the entire Salmon drainage basin is being studied. There are two

reasons for this. First, because any economic development--impoundments, diversions, mining, paper, industry, logging, etc.,--would affect the main stem wild river section. Second, because of the way much census data is reported it is more meaningful to include all the activities in the river basin and adjacent counties. The hydrologic basin unit (the Salmon drainage basin) was used for some portions of the Idaho Economic Base Study for Water Requirements (1969) and in the Idaho Water Resources Inventory (1968).

The purpose of the methodology study is to develop information pertinent to decision-making and planning as it pertains to the selection, use, and management of wild and scenic rivers. The methodology study has four broad objectives:

1. Inventory present quantities and qualities of natural resources in the river basin area, and estimate future quantities and qualities of these resources, establishing values in both situations.
2. Identify, describe, and quantify, where possible, benefits from scenic beauty, personal enrichment, and other intangible and/or aesthetic experiences derived from the river.
3. Develop a series of models to evaluate or determine resource use patterns consistent with a wild river system, and the resource use pattern which would exist under various levels of development in the river basin area.
4. Present recommendations for alternative resource uses for the river basin, area, restrictions if classification is applicable, and describe the economic and social ramifications of each of the alternatives considered.

The plan for the methodology study is to divide the research into a series of subprojects, each covering an important activity related to the river. These subprojects consist of 15 resource and service functions:

1. Forest and range resources
2. Minerals
3. Outdoor recreation
4. Commercial fisheries
5. Irrigation
6. Water for municipal and industrial use
7. Water quality control
8. Hydroelectric power
9. Flood control
10. Navigation
11. Transportation and access
12. Anthropology
13. History
14. Agriculture
15. Hunting

Each of these 15 resource and service functions will be examined on an individual basis at their present level of development and at projected levels of development.

Once the above subprojects have been completed, a series of models will be developed to estimate costs and benefits for each of the resources included in the subprojects. This will permit comparisons of potential costs and benefits of alternative resource uses. A technique will be developed to extend the analysis to the years 2000 and 2020 consistent with the time projections of the Columbia-North Pacific Region Comprehensive Framework Study.

It is at this stage of the analysis that one purpose of the methodology study will be realized. This purpose is to make an economic evaluation of the Salmon River in its present state. The evaluation will be made consistent with the present levels of resource use indicated by the subprojects. This evaluation at the current level of resource use will then be compared with simulated levels of development on the river, and within the river basin area. At this stage of the analysis it will be

possible to include in the study certain general considerations such as population, and economic growth, and the potential demand for recreation, electricity, timber, minerals and other resources in the area in the future.

Two general evaluations of the river resource base can then be made. First, the current and projected levels of economic activity based on the status quo, (1969). Second, a determination of the benefits foregone, (if this turns out to be the case) as a result of maintaining the river in its natural free-flowing state. Efforts will be made throughout the study to identify and quantify the aesthetic and personal enhancement values which the Wild and Scenic Rivers Act indicated an expressed national desire to protect and conserve.

A SOCIO-ECONOMIC ANALYSIS OF HUNTING IN THE SALMON RIVER BASIN

INTRODUCTION

The Salmon River Basin abounds with wildlife. Elk and deer can be hunted almost anywhere within its boundaries. Trophy bighorn sheep and mountain goat may be pursued among the high mountain ranges within the basin. Antelope and bear may also be taken in many areas. For the bird hunter, there is excellent chukar hunting besides grouse and pheasants. In the fall, ducks and geese are abundant. Also, wild turkeys have been successfully introduced and there are now controlled hunts in several management units.

In alternate use debates concerning the utilization of natural resources, economic evaluations and benefit cost analyses may form an important basis for decision making. Values for wildlife resources should be available that can be used for comparison with conflicting demands. To help optimize present and future benefits, resource managers should also know how, and by whom, the wildlife resources are presently being utilized as well as the attitude and desires of the hunting public.

With these considerations in mind, we conducted a limited scale interview survey in the Salmon River Basin during the 1969 hunting season. The specific objectives of this subproject were to assess; (1) the gross annual expenditures associated with Basin hunting, (2) the distribution of hunting effort within the Basin by resident and non-resident hunters, and (3) the behavior, preferences, and opinions of hunters who utilized Basin wildlife resources.

It should be noted that an in-depth socio-economic survey of hunting in Idaho is presently being conducted by the University of Idaho. The Salmon River Basin will be one of the management units used for analytical purposes. The results of this study should provide a much more comprehensive picture of the nature and value of hunting in the Basin.

METHODS

A personal interview survey was conducted by Idaho Water Resources Research Institute personnel in the Salmon River Basin (Figure 1) during the 1969 hunting season. Due to the nature of the access roads in the Basin, hunter interviewing was concentrated in three regions: (1) the Whitebird-Riggins area which included sampling in Units 13, 14 and 18, (2) the North Fork to the Mouth of the Middlefork of the Salmon which included sampling in Units 20-A, 21, 26, 28, and 30, and (3) the southern region of the Basin which included sampling in Units 27-A, 34, 36, 36-A and 36-B. The majority of interviews were obtained from the southern region of the Basin, particularly in Units 34 and 36-B.

The Idaho Fish and Game Department provided estimates of the numbers of deer and elk hunters, and the deer and elk kill in the Basin. These estimates were calculated from hunter kill cards and a hunter questionnaire distributed by the Department.

Institute personnel designed and field tested a questionnaire (Appendix I) to provide data pertaining to the specific objectives of the subproject.

To obtain a broad background of sociological data about each respondent, we requested the hunters age, sex, occupation, place of residence, amount of annual vacation time, approximate family income, locality and population size of area of residence, and level of education.

To provide a basis for making meaningful comparisons with management oriented questions, we reduced each of the major sociological

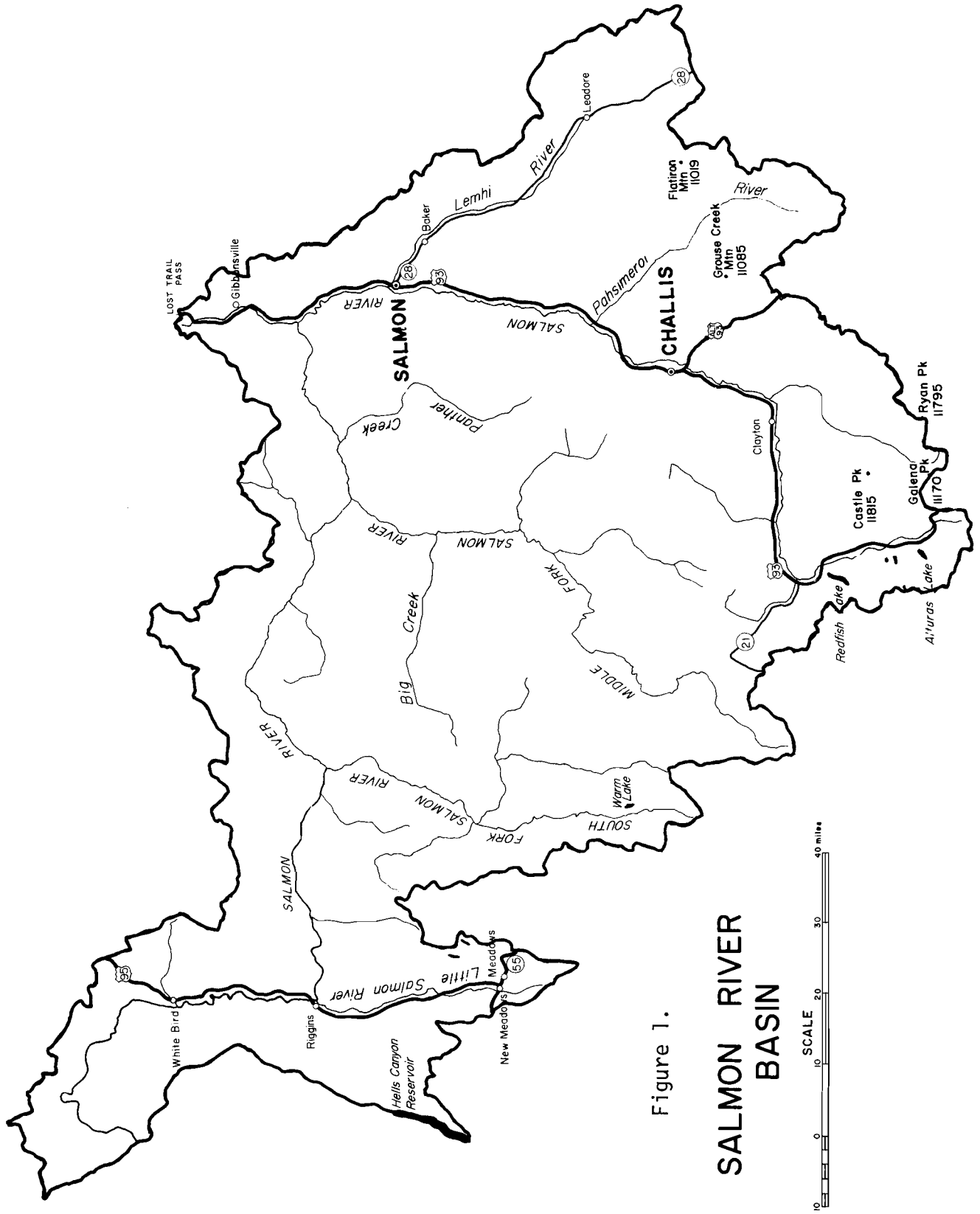
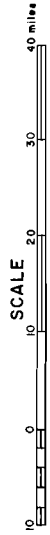


Figure 1.

SALMON RIVER BASIN



categories into separate classes. We classified hunter age as; under 19, 20-29, 30-39, 40-49, 50-59, and 60 or over; sex as male or female; and occupation as student, housewife, retired, professional, blue collar, farmer, or businessman.

Residents were classified as to which county they resided in; non-residents as to their state of residence; location of residence as city center, suburb of city, rural - not on a farm, rural - on a farm, or other; and population of their metropolitan areas as under 5,000, 5-10,000, 10-25,000, 25-100,000, 100-1,000,000, and over 1,000,000.

Incomes were classified as; under 2,999, 3,000-4,999, 5,000-6,999, 7,000-9,999, 10,000-14,999, 15,000-19,999, 20,000-24,999, or 25,000 and over. Education levels were classed on the basis of having completed; grade 0-8, 9-12, some college, college graduate, or a post-graduate degree.

A number of management oriented questions were designed to assess hunter preferences, behavior, and opinions. Also, questions were structured to assess gross expenditures by hunters on a trip total, in Idaho, and in Basin basis.

RESULTS

A total of 125 hunters were interviewed, 71 residents (57%) - and 54 non-residents (43%), of which 118 gave usable expenditures information. The results are presented by entire sample, resident and non-resident classes. The opinion and preference results refer to the entire Basin and were not analysed by specific areas within the Basin.

Sociological Factors

This section presents background information pertaining to the sociological makeup of the hunter population utilizing the resources of the Salmon River Basin.

Age

Relatively few hunters in the under 20 or over 60 age classes hunted in the Basin (Table 1). The percentage of hunters in each of the remaining age classes did not differ much. There were slightly more non-resident hunters in the older age classes.

Table 1. The percentage of respondents in each age class by entire sample and residence.

	Age Class:					
	<u>0-19</u>	<u>20-29</u>	<u>30-39</u>	<u>40-49</u>	<u>50-59</u>	<u>60 or over</u>
Entire Sample	2.4	28.2	21.0	24.2	19.4	4.8
Resident	1.4	32.9	21.4	22.9	18.6	2.9
Non-Resident	3.7	22.2	20.4	25.9	20.4	7.4

Sex

The great majority (98.4%) of the hunters utilizing the Basin were male (Table 2). We sampled no female non-resident hunters.

Table 2. The percentage of male and female respondents by entire sample and residence

	<u>Percentage of male and female respondents</u>	
	<u>Males</u>	<u>Females</u>
Entire Sample	98.4	1.6
Resident	97.1	2.9
Non-Resident	100.00	0

Occupation

Blue collar workers made up over half (52.4%) of the Basin hunting population (Table 3). Professionals were the next most numerous group. We found more retired non-resident than resident hunters.

Table 3. The percentages of respondents in each occupation class by entire sample and residence

	<u>Occupation Group:</u>					
	<u>Student</u>	<u>Retired</u>	<u>Professional</u>	<u>Blue Collar</u>	<u>Farmer</u>	<u>Businessman</u>
Entire Sample	4.8	5.6	23.4	52.4	6.5	4.8
Resident	7.1	1.4	21.4	54.3	7.1	4.3
Non-Resident	1.9	11.1	25.9	50.0	5.6	5.6

Income

Approximately two thirds of the respondents listed their incomes as in the \$7-10,000 or \$10-15,000 classes (Table 4). Considerably more non-residents than residents fell within the higher income brackets.

Table 4. The percentages of respondents in each income class by entire sample and residence.

	Income Group (1,000's)							
	<u>Under 3</u>	<u>3-5</u>	<u>5-7</u>	<u>7-10</u>	<u>10-15</u>	<u>15-20</u>	<u>20-25</u>	<u>Over 25</u>
Entire Sample	0.8	6.5	11.3	33.9	33.1	8.9	0.8	1.6
Resident	0	7.1	15.7	35.7	30.0	5.7	0	0
Non-Resident	1.9	5.6	5.6	31.5	37.0	13.0	1.9	3.7

Education

Over 60% of the sample had completed some high school while approximately one quarter (24%) had completed some college (Table 5). The relative education levels of resident and non-resident hunters did not differ significantly.

Table 5. The percentages of respondents in each education class by entire sample and residence.

	Education Class:				
	<u>Grade 0-8</u>	<u>Grade 9-12</u>	<u>Some College</u>	<u>College Graduate</u>	<u>Post Graduate Degree</u>
Entire Sample	4.0	60.5	24.2	7.3	2.4
Resident	4.3	57.1	25.7	8.6	1.4
Non-Resident	3.7	64.8	22.2	5.6	3.7

Population Center

The sample was relatively evenly distributed between population center classes from under 5,000 to 1,000,000 (Table 6). Considerably more non-resident hunters resided in areas of higher populations.

Table 6. The percentages of respondents in each population center class by entire sample and residence.

	Population Group ('000's):					
	<u>Under 5</u>	<u>5-10</u>	<u>10-25</u>	<u>25-100</u>	<u>100-1000</u>	<u>Over 1000</u>
Entire Sample	21.0	16.1	15.3	25.0	12.1	4.0
Resident	27.1	18.6	20.0	22.9	4.3	-
Non-Resident	13.0	13.0	9.3	27.8	22.2	9.3

Metropolitan Area

About 40% of the hunters classed themselves as living in a suburb (Table 7). Considerably more residents than non-residents lived in a rural environment.

Table 7. The percentages of respondents living in each metropolitan area by entire sample and residence.

	Percentage in each Metropolitan Area:				
	<u>City Center</u>	<u>Suburb</u>	<u>Rural- Not Farm</u>	<u>Rural- Farm</u>	<u>Other</u>
Entire Sample	27	40	11	11	9
Resident	27	30	16	13	13
Non-Resident	28	54	4	7	5

Management Questions

This section presents information pertaining to the management oriented questions in our survey. The results are given by entire sample and residence.

Salmon River Basin Hunting

We found that the average respondent had hunted big game a total 17.1 years, and of that time had hunted in Idaho 8.4 years (Table 8). Residents and non-residents differed little in the total time spent hunting big game, but non-residents had spent only an average of 1.2 years hunting in Idaho while residents had spent an average of 13.9 years.

Over 95% of the resident hunters and half (50%) of the non-residents had hunted in Idaho previously. Over two thirds of the residents (70.0%) and about one-third of the non-residents (38.9%) had hunted previously in the Salmon River Basin. Residents averaged 7.8 previous hunting trips to the basin, while non-residents averaged 1.5 hunts.

Well over 90% of both the residents and non-residents listed hunting as the main reason for their visit to the Basin.

Reasons for Hunting

When asked to rate the relative importance of a number of categories associated with hunting in Idaho, approximately 60% ranked pleasure and excitement of hunting as the most important (Table 9). The desire for a trophy animal and need and desire for game meat rated quite low in comparison with other categories.

Table 8. The percentages of respondents who previously hunted in Idaho, made their first trip to the Basin, had hunted previously in the Basin, listed hunting as the main reason for their visit, average number of trips in 1969, average number of previous Basin hunting trips, average number of years big game hunting, and average number of years big game hunting in Idaho by entire sample and residence.

	Percentage Previously Hunted in Idaho	Percentage First Trip to Basin	Percentage Previously Hunted in Basin	Percentage Hunting Main reason for Visit	Average No. Trips to Basin in 1969	Average No. Previous Hunting Trips to Basin	Average No. Years Big Game Hunting	Average No. Years Big Game Hunting in Idaho
Entire Sample	75.8	37.9	56.5	94.4	1.2	5.1	17.4	8.4
Resident	95.7	21.4	70.0	92.9	1.9	7.8	18.5	13.9
Non-Resident	50.0	59.3	38.9	96.3	0.3	1.5	15.9	1.2

Far more trophy hunting non-residents than residents (61% vs 30%) indicated they would consider taking an animal for meat if the end of the hunt was approaching and no trophy animal had been seen.

Table 9. The percentages of respondents ranking each category number one and the percentages of trophy hunters who would shoot an animal for meat by entire sample and residence.

	Percentages Ranking Each Category No. 1.						% Trophy Hunters who would take meat
	Scenic Beauty	Desire for Trophy	Isolation	Desire or need for meat	Pleasure and Excitement	Outdoor Experience	
Entire Sample	45	21	24	24	60	32	44
Resident	54	16	21	30	60	39	30
Non-Resident	41	28	28	17	59	24	61

Number of Days Hunting

The average resident indicated he had spent or will have spent, a total of 8.3 days hunting big game in the Basin (Table 10). The average non-resident said that he had spent or would spend a considerably longer period of time, a total of 12.4 days. Residents and non-residents indicated they would spend 1 or 2 days bird hunting during 1969 in the Basin.

Table 10. The average number of days respondents spent, or would spend, hunting big game and birds in the Salmon River Basin by entire sample and residence.

	Number of Days Hunting:					
	Big Game			Birds		
	Spent	Will Spend	Total	Spent	Will Spend	Total
Entire Sample	4.4	5.7	10.1	0.4	1.4	1.8
Resident	2.8	5.5	8.3	0.4	1.7	2.1
Non-Resident	6.4	6.0	12.4	0.3	1.0	1.3

Game Species

A large majority (87.1%) of the respondents indicated they came to hunt a particular species of game in the Basin (Table 11). About 12.9% were interested only in deer, 25.8% in elk, and 37.9% in both deer and elk. More non-residents came primarily for elk, while more residents were interested in the combination of deer and elk.

Table 11. The percentages of respondents who indicated they were hunting a particular game species by entire sample and residence.

	Percentages Hunting for:					
	Particular Species	Deer	Elk	Deer & Elk	Other Big Game	Other Than Big Game
Entire Sample	87.1	12.9	25.8	37.9	8.9	2.4
Resident	92.6	13.0	20.4	48.1	5.6	1.9
Non-Resident	82.9	12.9	30.0	30.0	11.4	2.9

Hunting Opportunity

When asked to express an opinion about hunting opportunities in Idaho, almost two thirds (62%) of the respondents rated it as either the very best or very good (Table 12). Only 7% rated hunting opportunities as poor.

Table 12. The percentages of respondents rating each category on hunting opportunity by entire sample and residence.

	<u>Percentages Ranking Each Category (Big Game)</u>				
	<u>Very Best</u>	<u>Very Good</u>	<u>Good</u>	<u>Poor</u>	<u>No Opinion</u>
Entire Sample	29	33	27	7	5
Resident	27	39	29	4	1
Non-Resident	32	26	24	9	9

License System

Most hunters expressed satisfaction with Idaho's present system of licensing, fees, seasons, permits, and bag limits (Table 13). The highest level of dissatisfaction was with permit hunts.

Table 13. The percentages of respondents expressing dissatisfaction with 1969 Idaho hunting regulation categories by entire sample and residence.

	<u>Percentages Rating Each Segment "Unsatisfactory"</u>				
	<u>License & Tags</u>	<u>License Fees</u>	<u>Permit Hunts</u>	<u>Bags</u>	<u>Seasons</u>
Entire Sample	7	9	11	2	6
Resident	7	6	19	3	10
Non-Resident	6	13	2	-	-

Development of Area

Over three quarters (77.4%) of the hunters sampled felt that the Salmon River Basin should be left essentially as it is (Table 14). Approximately 20% thought that the area should be to some extent developed more fully.

Table 14. The percentages of respondents answering each category on development of the Salmon River Basin by entire sample and residence.

	Percentages that Wanted Basin:				
	Left as is	Some Recreation Development	Some Recreation and Industrial Development	Fully Developed	No Opinion
Entire Sample	77	14	4	2	2
Resident	76	16	6	1	1
Non-Resident	80	11	2	4	4

Number of People

With regards to the number of people the respondents saw in the Basin, about two thirds (68%) described the situation as "just right" (Table 15). More residents than non-residents (20% vs 9%) thought the area too crowded.

Table 15. The percentages of respondents who answered each category on number of people seen in the Basin by entire sample and residence.

	Percentages That Thought Basin Was:			
	Too Crowded	Just Right	Not Used Enough	No Opinion
Entire Sample	15	68	7	11
Resident	20	63	7	10
Non-Resident	9	74	6	11

Facilities

When questioned about area facilities, a significant majority of respondents (66%) wanted more litter disposal, followed by more access trails (41%), campgrounds (34%), and parking or pulloff areas (30%) (Table 16). More respondents wanted fewer lodges or cabins and outfitters and guides than any of the other categories. Other than for litter disposal, 40% or more of the hunters favored no change from the present facilities.

Table 16. The percentages of respondents answering each category on facilities by entire sample and residence.

	Percentages Wanting: - MORE					
	Parking or Pull Off Areas	Lodges or Cabins	Outfitters and Guides	Camp Grounds	Litter Disposal	Access Trails
Entire Sample	30	6	7	34	66	41
Resident	30	1	7	33	71	39
Non-Resident	30	11	7	35	59	44
	- LESS					
Entire Sample	4	20	16	7	2	4
Resident	4	26	17	7	-	6
Non-Resident	4	13	15	6	4	2
	- NO CHANGE					
Entire Sample	52	51	42	48	18	40
Resident	53	50	44	54	17	41
Non-Resident	50	52	39	39	19	39

Access

On the question of improving access, respondents reinforced the general feeling that further development should not take place in the Basin (Table 17). A significant majority of hunters would not like to see road quality improved, new roads developed, or, most emphatically, new airfields. However, few hunters would like to see present access restricted. Opinions were about equally divided on the question of whether or not motor vehicles should be restricted to roads (40% vs 37%).

Table 17. The percentages of respondents answering each category on access by entire sample and residence.

	Percentages that would like to see:									
	Road Quality Improved		New Roads Developed		Access Restricted		More Airfields		Vehicles Restricted to Roads	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Entire Sample	37	49	28	57	19	53	2	55	40	37
Resident	39	51	24	63	23	50	1	60	40	36
Non-Resident	35	46	33	48	15	57	4	48	41	39

Vacations

The average resident hunter indicated he had 2.2 weeks of annual vacation while the non-resident said he had 3.4 weeks (Table 18). Only about one third (34%) of the residents indicated they were hunting in the Basin on vacation time, while 81.5% of the non-residents said their trip was part of their vacation.

Table 18. The percentages of respondents answering each vacation category by entire sample and residence.

	Average Number of Weeks	Vacation		
		Trip Part of Annual Vacation		
		Yes	No	No Answer
Entire Sample	4.5	54.8	30.6	14.5
Resident	2.2	34.3	45.7	20.0
Non-Resident	7.5	81.5	11.1	7.4

Economic Analysis

The conceptual problems involved in estimating the value of hunting resources are complex and are generally related to the difficulties encountered when trying to estimate the value of outdoor recreation. Lerner (1963), Brown et. al. (1964), Seckler (1966) Clawson and Knetsch (1966), and others have thoroughly reviewed the uses and abuses of the procedures and techniques used in evaluating outdoor recreation. Therefore, they will not be discussed in depth in this paper.

An economic evaluation of the hunting resources of the Salmon River Basin was made on the basis of expenditures by resident and non-resident hunters. Because of the small sample size no attempt was made to estimate net values by the Clawson technique of simulating demand curves based on distance zones.

A word of caution should be given on how the "value" associated with these expenditures should be interpreted. As Clawson and Knetsch (1966) point out, "Estimates of gross recreation expenditures are very popular in many quarters. For one thing, such estimates are likely

to yield large figures which give the impression of a large and profitable tourist-recreation business. Indeed, this is often one of their chief purposes." This method assumes that somehow total expenditures measure the economic value of recreation.

It is true that hunting recreation is valued by the user at least as highly as other things that could have been bought with the same money. On the other hand, if the resource were abolished most of the money would be redirected to other goods and services and the loss from the shift would not be total expenditures but some amount not measurable with the total expenditures method (Brown et. al., 1964).

Gross expenditures, however, can prove very useful in estimating trends in demand. Also, they can provide estimates of new money coming into the State (or regions such as the Salmon River Basin within State boundaries), as well as providing estimates of the turnover of dollars within the State associated with hunting.

Assumptions and Limitations of the Study

There are a number assumptions and limitations associated with the estimates of gross expenditures of our survey.

The respondent was asked to estimate the total cost for the trip, thus it was assumed that the expenses listed include those up to the time of the interview plus an estimate of the expenses that would be incurred during the remainder of the trip.

For the 26 game management units in the Salmon River Basin (Figure 2), 1969 estimates of deer and elk kill and numbers of hunters were calculated from hunter kill cards and hunter questionnaires

distributed by the Idaho Fish and Game Department. Since we selectively sampled for non-residents, we estimated the relative percentages of resident and non-resident Basin hunters on the basis of Fish and Game Department kill success data. The assumption was made that residents and non-residents had an identical success ratio. In the Basin, it was estimated that non-residents killed 14% of the deer and 13% of the elk. The kill percentages were averaged to obtain an estimate of 13.5% non-resident and 86.5% resident hunters utilizing the Basin in 1969.

Total expenditures were calculated by taking the per trip average expenditures and multiplying by the total number of hunters as estimated by the Fish and Game Department. However, both our questionnaire and Department check station data indicated that many hunters, particularly residents, made two or more trips to the Basin. Thus total expenditures are probably considerably underestimated.

Only those hunters accessible by road were interviewed. Many non-resident hunters packed or flew into remote areas with licensed guides and were not included in the sample. The average expenses of these hunters would probably be considerably higher than those estimated from our sample.

Effort and Expenditure Estimates

An estimated 42,437 deer and 17,305 elk hunters, or a total of 59,754 sportsmen, hunted in the Salmon River Basin in 1969 (Table 19). They killed an estimated 18,016 deer and 4,317 elk. The statewide hunter success based on tags issued was 43% for deer and 20% for elk. The Basin success was very close to the state average with 42.5% for deer and 20% for elk.

Table 19. Estimated total and non-resident deer and elk kill and approximate number of elk and deer hunters in the Basin by Game Management Unit.

Management Unit	Projected from Hunter Questionnaire and Hunter Card:					
	Total Deer Kill	Non-Res. Deer Kill	Total Elk Kill	Non-Res. Elk Kill	Approx. No. Deer Hunters	Approx. No. Elk Hunters
13	1023	43	23	4	2379	115
14	687	53	76	14	1597	380
18	782	64	73	11	1693	365
19	460	73	212	38	1069	1060
19A	315	56	80	8	732	400
20	188	42	438	102	437	2190
20A	248	60	322	78	576	1610
21	843	112	369	45	1960	1845
21A	644	81	186	23	1497	930
23	722	47	106	12	1679	530
25	290	27	133	20	674	665
26	712	139	212	40	1655	1060
27	1133	199	183	35	2634	915
27A	570	100	176	29	1325	880
28	1002	97	329	39	2330	1645
29	956	114	5	-	2223	25
30	949	137	46	4	2206	230
30A	382	97	7	-	888	35
34	276	25	196	10	620	980
36	867	84	166	16	2016	830
36A	1724	312	13	2	4009	65
36B	2474	396	110	11	5753	550
37	202	28	Closed	-	469	-
37A	867	123	Closed	-	2016	-
TOTAL	18016	2509	3461	541	42437	17305

An estimated \$3,379,000 was expended in 1969 by resident hunters, of which \$3,340,000 was spent in Idaho, on hunting associated with the Salmon River Basin (Table 20). The average resident expended a total of \$65.37, of which \$64.62 was spent in Idaho, on each hunting trip to the Basin. Transportation costs, which were calculated on the basis of \$.07 per mile, were the largest single expense item followed by recreational supplies, then food and beverages. Residents spent very little for lodging, guide services, rental of gear, or other incidental expenses.

Table 20. Estimated average and total expenditures made by residents in 1969 for each category associated with hunting.

Resident Expenditures	Ave. for Trip (\$)	Ave. in Idaho(\$)	Total Trip (\$) Expenditures	Total Expenditures in Idaho (\$)
Fares	.95	.95	49,000	49,000
Transportation	27.63	27.06	1,428,000	1,399,000
Lodging	.63	.63	33,000	33,000
Food and Beverages	14.89	14.71	770,000	760,000
Guides and Outfitters	.16	.16	8,000	8,000
Hunting Supplies	17.35	17.35	897,000	897,000
Equipment Rentals	1.59	1.59	82,000	82,000
Other Expense	2.17	2.17	112,000	112,000
TOTAL	65.37	64.62	3,379,000	3,340,000

An estimated \$2,776,000 was expended in 1969 by non-resident hunters, of which \$2,192,000 was spent in Idaho, on hunting associated with the Salmon River Basin (Table 21). The average non-resident expended \$344.13, of which 271.72 was spent in Idaho, on each hunting trip to the Basin. Again, transportation costs were the largest single expense item. The cost of non-resident licenses and fees were listed under "other expense". In 1969 a non-resident could purchase a \$25.00 license to hunt deer, or a \$100.00 combination license that entitled him to hunt all legal species of game in Idaho (with the appropriate tags and permits). For both residents and non-residents, the fee for the following tags were: elk - \$3.00, deer - \$2.00, mountain goat - \$10.00, mountain sheep - \$10.00, and antelope - \$5.00.

For non-residents, food and beverages and hunting supplies were significant items, although only about half the cost was spent in Idaho. Outfitters and guide expenses also made a substantial contribution to average expenditures even though this estimate, as explained previously, is a minimum figure. Relatively little was spent on lodging and equipment rentals.

Table 21. Estimated average and total expenditures by non-residents in 1969 for each category associated with hunting.

Non-Resident Expenditures	Ave. for Trip (\$)	Ave. in Idaho (\$)	Total Trip (\$)	Total Expenditures in Idaho (\$)
Fares	8.18	-	66,000	-
Transportation	138.84	108.05	1,120,000	872,000
Lodging	8.32	5.49	67,000	44,000
Food and Beverages	34.22	18.73	276,000	151,000
Guides and Outfitters	30.55	30.55	246,000	246,000
Hunting Supplies	26.84	11.86	217,000	96,000
Equipment Rentals	3.96	3.82	32,000	31,000
Other Expense	93.22	93.22	752,000	752,000
TOTAL	344.13	271.72	2,776,000	2,192,000

Respondents were asked to estimate what percentage of their trip costs were spent in the Salmon River Basin (Table 22). Considerably more residents than non-resident (16% vs 2%) did not reply. A substantial number of hunters (46.7%) spent 25% or less of their trip costs within the Basin.

Table 22. The percentages of respondents who spent 100, 75, 50, 25, or 0 percent of their trip expenses in the Salmon River Basin.

	Percentage of Total Cost Spent in Basin					No Answer
	100	75	50	25	0	
Entire Sample	8.9	12.9	21.8	29.8	16.9	9.7
Resident	12.9	4.3	18.6	27.1	21.4	15.7
Non-Resident	3.7	24.1	25.9	33.3	11.1	1.9

A summary of total expenditures, expenditures in Idaho, and expenditures in the Salmon River Basin associated with hunting is given for residents and non-residents (Table 23). By relating percentages of total cost spent in the Basin to total expenditures, we estimated that more than two and a quarter million dollars was spent in 1969 by hunters in the Basin. This represents a considerable input into the regional economy. Non-residents spent more than residents in the Basin.

Table 23. Estimated total expenditures, expenditures in Idaho, and expenditures in the Salmon River Basin in 1969 by resident and non-resident hunters.

Expenditures	Total (\$)	In Idaho (\$)	In Basin (\$)
Resident	3,378,779	3,340,014	1,087,844
Non-Resident	2,776,097	2,191,965	1,195,431
TOTAL	6,154,876	5,531,979	2,283,275

Hunter Distribution

Idaho Fish and Game Department information indicates that both the elk hunting pressure and elk kill are centered in the north central region of the Basin on both sides of Salmon River (Figure 2). The areas of high concentration of deer hunters and deer kill are dispersed throughout the Basin. With the exception of Unit 28, the more heavily utilized deer and elk areas do not overlap.

The numbers of elk and deer hunters in a unit correlated well with the total kill in each unit. For example, the 5 units with the most elk and deer hunters also had the most elk and deer killed in them (Table 19). Also, the distribution of resident and non-resident hunters (based on kill information) did not seem to differ much within the Basin.

Relationship of Hunting to Development Alternatives

A primary objective of the Wild Rivers Methodology Study is to assess the impact of development alternatives in the Salmon River Basin, and to describe the economic and social ramifications of each of the alternatives considered.

How then might changes in the status quo effect Basin wildlife resources? Any dam construction on the Salmon or its tributaries for power, navigation, and/or flood control could significantly reduce the availability of critical winter range for a number of game species. Also, the necessary roads to construction sites would increase the accessibility to many now remote areas. The opening of new mining claims, and particularly making available new regions for logging, would also significantly increase access.

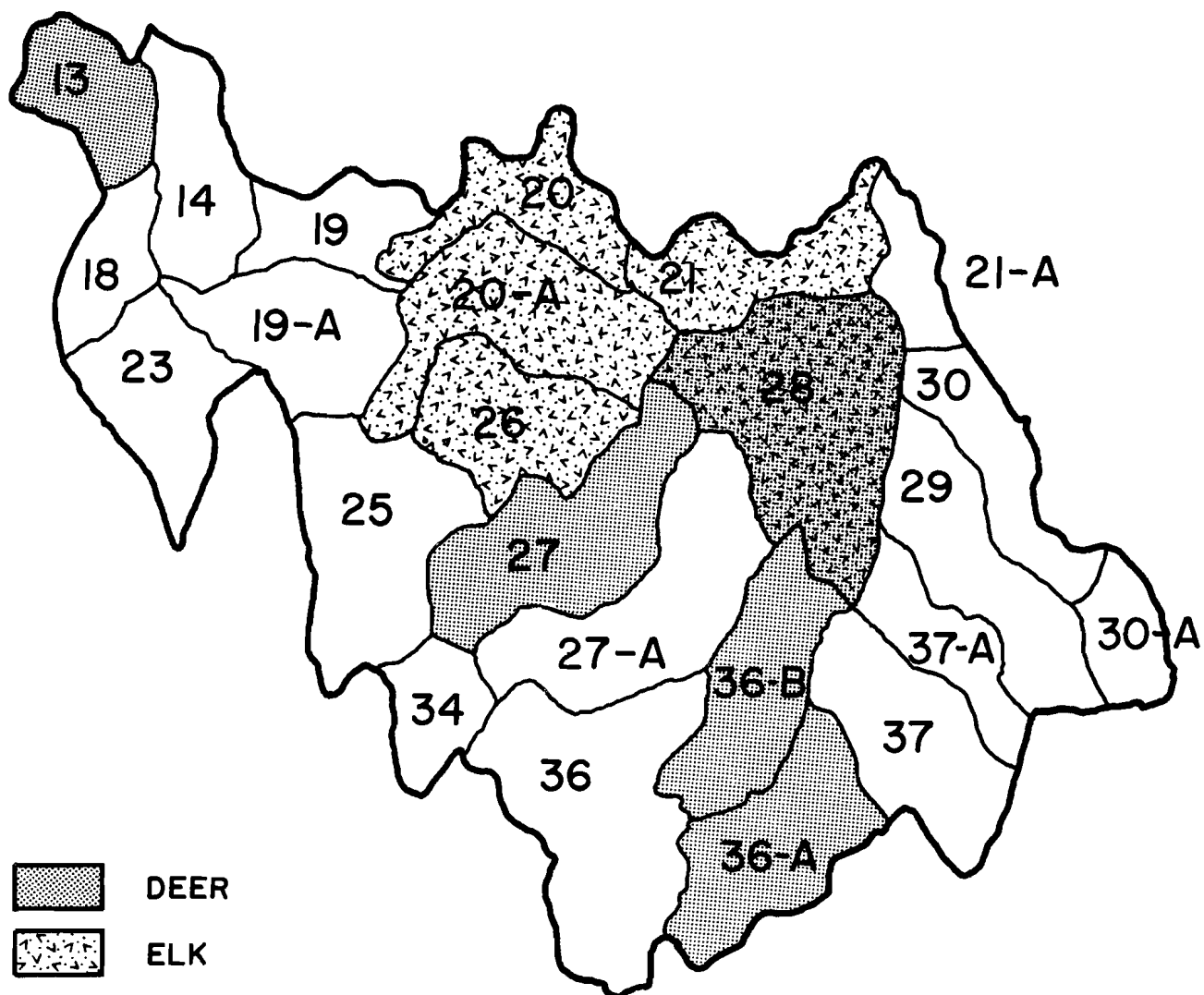


Figure 2. Idaho Fish and Game Management Units within the Salmon River Basin, and the five most heavily utilized by elk and deer hunters in 1969.

The question of accessibility is a key issue in the management of game populations. With regards to the Basin, at this point in time there are many areas that can only be reached by plane, a long back pack, or with horses. The game populations in these regions are presently hunted only by avid outdoorsmen and clients of outfitters and guides, thus it is probable that many of these populations are not being harvested at maximum sustained yield levels. These remote areas can also provide a sanctuary for heavily hunted herds, and provide seed stock for over harvested regions.

A number of questions come to mind related to accessibility that require much further research to answer. What, for example, would be the effects on the habits and harvest of game animals resulting from increased access associated with further development in the Basin? What would be the effect on the numbers and types of hunters utilizing the Basin? What would be the effect on the guiding industry? What would be the economic impact on the Basin and the State?

Big game management provides excellent reasons for the validity of the Basin-wide approach of methodology study. Suppose, for example, that a dam was built on the Lemhi River, which is not being considered for wild river status, to divert water for irrigation. Suppose also that this dam resulted in the reduction of critical range for the area deer herds and a related reduction in deer population size. What then would be the effects on hunter distribution? Would hunting pressure be shifted to other areas of the Basin, to other areas of Idaho? Would the same number of hunters hunt for reduced numbers of deer, or would there be an overall reduction in hunting pressure? All of these alternatives could have significant effects within the Basin.

A shift in hunting pressure could potentially affect game herds in any other region of the Basin. If pressure was shifted to other regions of Idaho, or if there was a reduction in the total number of hunters, there would be an economic loss to the Basin and/or the State. If the same number of hunters hunted for reduced numbers of game, then the level of satisfaction with the resource would in all probability be sharply reduced. Conversely, increased access to presently under-harvested herds could considerably increase the number of hunters in the Basin, and thus have a significant positive economic impact.

The relationships between hunting pressure, accessibility, and game population form an intricate web. The state of the art of evaluating these interrelationships is still in its infancy. We can say that connections exist, but we can only make educated guesses as to their nature and order of magnitude. It would seem that the Salmon River Basin would be an ideal test area to conduct further research into this important area.

Significance of the Survey

With a population density of only 0.7 persons per square mile, the Salmon River Basin is one of the most sparsely populated areas in the United States (Peebles, 1970). The estimated 1970 population of the Basin was only 9,204. Thus there can be little doubt that an annual invasion of hunters totaling more than 6 times the entire population of the Basin has some significant impact within the region.

Perhaps the most significant aspect of our pilot survey is that it illustrates the economic significance of hunting to the Basin. We

estimated that over 2 1/4 million dollars was spent in the Basin by hunters in 1969. This is a substantial sum considering there were less than 10,000 residents, let alone commercial establishments, in the entire Basin. Non-residents alone brought an estimated 2.2 million dollars into Idaho of which 1.2 million was spent in the Basin. Some of the non-resident expenditures obviously went toward the purchase of licenses, and as such very little of the total went to enterprises within the Basin. However, license expenditures still represented a net gain for Idaho. Resident Idaho hunters spent over 1 million dollars in the Basin, which in itself is a considerable sum.

It is quite clear that the development or non-development of wildlife resources could have a very significant impact upon the economy of the Salmon River Basin.

The survey has shed a little light in another area concerning the optimum allocation of resources. From the study, resource managers can gain some understanding of the preferences and behavior of hunters utilizing the Basin and can thus relate these to the possible consequences of alternative development levels.

Well over half of the respondents (56.5%) had hunted in the Basin previously. The great majority (94.4%) indicated that hunting was the main reason for their trip to the Basin. Respondents had also made an average of 5 previous hunting trips to the Basin. Most hunters (87.1%) were after a particular game species. These results indicate that the Salmon River Basin presently has high quality resources that are very attractive to hunters.

What do hunters think about present hunting conditions in Idaho and in the Basin? Approximately two thirds (62.1%) rated hunting in Idaho

as either very good or the very best. Only 6.5% thought hunting was poor. With regards to the numbers of people in the Basin, most hunters (67.7%) thought that the level was about right, only 15.3% thought the area was too crowded, and some (6.5%) even felt the area not used enough. There was also a very high level of satisfaction with the present system of licenses, fees, permits, limits, and timing and length of seasons as structured by the Idaho Fish and Game Department.

There was a strong feeling among the respondents (79.4%) that the Basin should be left essentially as it is with little or no additional recreational development. Less than 20% thought that any more development of any kind should be undertaken. Supporting this general feeling, the majority of respondents favored no change in the number of parking or pull off areas, lodges and cabins, outfitters and guides, and campgrounds or related facilities. Only better litter disposal and more access trails received a majority endorsement. Similarity on the question of access, the majority of respondents did not want to see the quality of existing roads improved, new access roads developed, or more airfields. Also, a majority felt that all motorized vehicles should be restricted to roads. Over half the respondents, however, felt that access to some existing roads should not be restricted.

Relatively few hunters ranked the desire for a trophy animal or desire or need for game meat as the most important aspect of their hunt. The pleasure and excitement of hunting rated highest followed by scenic beauty. These results suggest that the esthetics of the hunting experience may be more important to the hunter than killing game. The question arises, are there any important qualities of the Basin pertaining to the hunting experience that should be considered when development alternatives are discussed?

There will undoubtedly be increasing and conflicting demands for the abundant and diverse resources of the Salmon River Basin. Decisions will have to be made pertaining to the question of "how can these resources be managed to provide optimum benefits?"

Inherent in this question are several critical factors. First, how will benefits be defined, in terms of Basin and/or State economics, or satisfaction of recreation oriented resource users. Although these objectives are not necessarily mutually exclusive, they could very easily provide a basis for numerous conflicts. Second, how will "optimum" be defined? Within sound environmental constraints, should resource use be oriented to providing a maximum flow of dollars into the Basin and State and a maximum turnover of dollars within the State, or to providing maximum satisfaction to resource users, or to a balance between these alternatives. This type of survey should be of value in the decision making process.

Conclusions

1. Hunter expenditures associated with the wildlife resources of the Salmon River Basin are economically significant to the Basin and to Idaho.
2. Any development effecting wildlife resources, such as loss of winter range due to dam construction, could have a very substantial impact upon the economy of the Basin.
3. The Basin presently has high quality resources that are attractive to hunters.

4. A very significant majority of hunters felt that the Basin should be left essentially as it is with little or no additional development.

5. Little can be said without considerable further research about the relationships between hunting pressure, accessibility, and game populations.

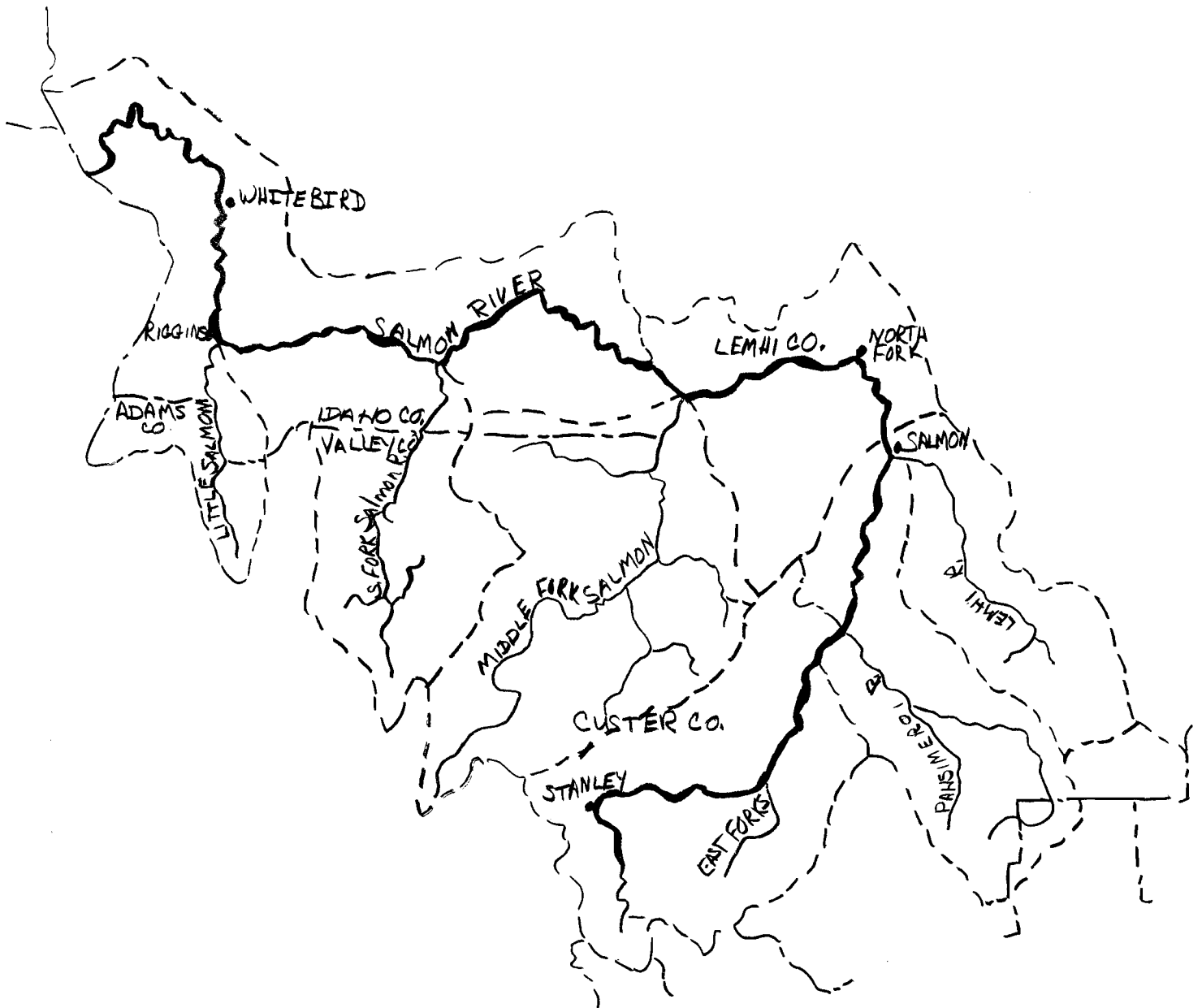
6. Hunter effort and expenditure information should prove useful in the assessment of the impact of alternative levels of development within the Basin, and in the optimization of Basin resource allocation.

APPENDIX

QUESTIONNAIRE ON USER OPINIONS OF HUNTING IN
IDAHO'S SALMON RIVER BASIN

The Salmon River has been designated by Congress for possible inclusion into the Nation's Wild and Scenic River System. For this reason, a study of the value and use of Idaho's Salmon River Basin is being conducted by the Idaho Water Resources Research Institute. This questionnaire is primarily designed to assess hunter preferences, behavior, and opinions regarding the Salmon River Basin.

Your personal opinion will be important in determining the type and extent of future development and use of the Salmon River area. Please assist us by answering this questionnaire as carefully as you can. Individual replies remain confidential, and any information you give us will not be used for any other purpose.



1. Is this your first trip (for any reason) to the Salmon River Basin? (See map on cover)
Yes _____ No _____

If NO, how many trips have you made to this area in 1969? _____ In previous years? _____

Have you ever hunted in Idaho previous to 1969? Yes _____ No _____. If YES, how many years? _____

In the Salmon River Basin? Yes _____ No _____. If YES, how many times _____.

2. How many years have you hunted big game? _____

3. Please rank from 1-6 the relative importance you place on the following with regards to your hunting in Idaho. Give a rank of 1 to the category you feel is most important through to 6 for the category you feel is the least important.

	<u>Rank 1-6</u>
Scenic Beauty	_____
Desire for a Trophy Animal	_____
Isolation	_____
Desire or Need for Game Meat	_____
Pleasure and Excitement of Hunting	_____
General Outdoor Experience	_____
Other (Please List _____)	_____

4. Is hunting in this part of the Salmon River Basin the main reason for your trip?
Yes _____ No _____

If NO, what was the main reason for your trip? (Please List) _____

5. During 1969 in Idaho Salmon River Basin, how many days:

	<u>Big Game</u>	<u>Birds</u>
Have you spent hunting	_____	_____
Will you spend hunting	_____	_____

6. While hunting in Idaho, are you primarily after a particular game species?
Yes _____ No _____. If YES, which: Big Game Species _____
Game Bird Species _____

7. If you are primarily a trophy hunter, would you consider taking an animal for meat if the end of the hunt is approaching and you have not taken or seen any trophy animals?
Yes _____ No _____ No Opinion _____

8. What do you think of the opportunities in Idaho for hunting the following:

	<u>Big Game</u>	<u>Birds</u>
The Very Best	_____	_____
Very Good	_____	_____
Good	_____	_____
Poor	_____	_____
No Opinion	_____	_____

9. What big game animals have you killed (if any) in Idaho in 1969? (Please list type and number killed.) _____

10. Do you feel that for the following the present system used in Idaho is:

	<u>Excellent</u>	<u>Satisfactory</u>	<u>Unsatisfactory</u>
Licenses and tags	_____	_____	_____
License fees	_____	_____	_____
Permit hunts	_____	_____	_____
Bag limits	_____	_____	_____
Timing and length of seasons	_____	_____	_____

11. One of the goals of this study is to ascertain visitor's feelings toward development in the Salmon River area. Would you MOST prefer that this area of the Salmon River Basin: (Please check one)

- A. _____ Be left essentially as it is with little or no additional recreational development.
- B. _____ Be more fully developed for recreation. This might include large scale resort development and expanded camping recreation facilities, more roads, and improved access.
- C. _____ Be developed for both recreational and industrial-agricultural use. This might include some construction for both irrigation and power, and controlled timber harvest and mining.
- D. _____ Be developed to its full industrial and agricultural potential. This would include the building of dams and roads to provide for irrigation, power, and reservoir associated recreation, timber harvest, and mining.
- E. _____ No opinion.

12. With regards to the number of people you saw in this section of the Salmon River Basin, would you describe the area as:

Too crowded _____ Not used enough _____
 Just right _____ No opinion _____

13. Based on your experience in this area, would you like to see:

	<u>More</u>	<u>Less</u>	<u>No Change</u>	<u>No Opinion</u>
Parking or pull off areas	_____	_____	_____	_____
Lodges and/or cabins	_____	_____	_____	_____
Outfitters and guides	_____	_____	_____	_____
Campgrounds and related facilities	_____	_____	_____	_____
Litter disposal	_____	_____	_____	_____
Access trails	_____	_____	_____	_____
Other	_____	_____	_____	_____

14. With regard to access to this area of the Salmon River Basin, would you like to see:

	<u>Yes</u>	<u>No</u>	<u>No Opinion</u>
The quality of existing roads improved	_____	_____	_____
New access roads developed	_____	_____	_____
Access to some existing roads restricted	_____	_____	_____
More airfields	_____	_____	_____
All motorized vehicles restricted to roads	_____	_____	_____
Other	_____	_____	_____

15. Did you fish in this area of the Salmon River Basin? Yes _____ No _____. Will you fish? Yes _____ No _____

Please give the approximate number of species of fish you caught and then rank your satisfaction with the following types of fishing on the river:

	<u>Number of Fish</u>	<u>Excellent</u>	<u>Satisfactory</u>	<u>Unsatisfactory</u>	<u>No Opinion</u>
Trout	_____	_____	_____	_____	_____
Salmon	_____	_____	_____	_____	_____
Steelhead	_____	_____	_____	_____	_____
Dolly Varden	_____	_____	_____	_____	_____
Other species	_____	_____	_____	_____	_____

16. How many are in your group? Males _____ Females _____ No. 18 and under - Boys _____ Girls _____

17. Are you a resident of Idaho? Yes _____ No _____

If yes, what town? _____ County? _____

If no, what is your state (or Nation) of residence? _____ Town? _____

What is your age? _____ Sex? _____ Occupation? _____

Relation to head of family? _____

Are you a member of an outdoor recreation organization? Yes _____ No _____

If yes, which? _____

18. How many weeks vacation do you have each year? _____ Is this trip part of your annual vacation time? Yes _____ No _____

19. Please indicate the category that best describes the location where you presently live and the population of your metropolitan area.

City Center	_____	Under 5,000	_____
Suburb of City	_____	5,000-10,000	_____
Rural - not on a farm	_____	10,000-25,000	_____
Rural - on a farm	_____	25,000-100,000	_____
Other (please specify)	_____	100,000-1,000,000	_____
_____	_____	Over 1,000,000	_____

20. What was the approximate total yearly income of your family in 1968?

Under 2,999 _____	10,000-14,999 _____
3,000-4,999 _____	15,000-19,999 _____
5,000-6,999 _____	20,000-24,999 _____
7,000-9,999 _____	25,000 & over _____

21. What is the highest level of education you completed?

Grade 0-8 _____	College Graduate _____
Grade 9-12 _____	Post-graduate degree _____
Some College _____	

22. How many miles was your family car driven on this trip? _____

Did you come directly here? Yes _____ No _____

If you traveled as a group in your family car to get to the river, how much of the transportation costs were paid to you by non-family members of the group? _____

23. This question deals with the costs of your hunting trip and is particularly important. Please fill in the costs of YOUR visit only, even if you paid another person's expenses as well as your own, or if your expenses were paid by someone else or an expense account. (Please enter 0 where no costs were incurred.)

	<u>Total for Trip</u>	<u>Amount Spent In Idaho</u>
Train, plane, or bus fares	_____	_____
Transportation (gas, repairs, etc.)	_____	_____
Lodging (Motels, campground fees, etc.)	_____	_____
Food and Beverages	_____	_____
Guide and outfitters fees	_____	_____
Hunting and fishing supplies	_____	_____
Rental of any equipment used on trip (Excluding outfitters fees)	_____	_____
Other	_____	_____

24. Please estimate the percentage of total cost of your trip that you spent in the Salmon River Basin (Please check one). 100% _____ 75% _____ 50% _____ 25% _____ 0% _____.

Interviewer _____ Date _____ Time _____

Location _____

Weather _____ Temperature _____

Type of Vehicle(s) _____

River Condition _____ Road Condition _____

Important Comments: _____

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