

**CORDOVA: A 1988 UPDATE ON
RESOURCE HARVESTS AND USES**

by

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ABSTRACT

This report summarizes the findings of research conducted by the Division of Subsistence of the Alaska Department of Fish and Game in Cordova, a community of Prince William Sound, southcentral Alaska. Cordova had a population of 2,282 in 1990. The primary purpose of the research was to document noncommercial harvests and uses of wild fish, game, and plant resources by Cordova residents in 1988. Most data were collected through interviews with a stratified, randomly-selected sample of 101 households using a standard survey instrument. In addition to resource harvest and use data, information on demography, cash employment, monetary income, and household expenses was also collected. The research was conducted in February 1989, and updates a similar study undertaken by the division in Cordova pertaining to 1985.

The research found that, overall, Cordova households used over 100 different wild food resources in 1988. On average, households used 14.3 different kinds of wild resources and harvested 9.7 kinds during 1988. Almost every interviewed household (97.8 percent) used wild resources in the study year, 88.7 percent harvested resources, 88.4 percent gave resources to other households, and 91.0 percent reported receiving resources from other households. Based on the survey results, it is estimated that 79.7 percent of Cordova's population, including people of almost all ages, participated in noncommercial resource harvesting activities in 1988.

Cordova residents' per capita harvest of resources increased from 163.8 pounds in the 1985 study to 233.8 pounds in 1988. Marine resources dominated the wild food harvest in 1988 as they had in 1985, with non-salmon fish harvests accounting for 91.4 pounds per person for 39.1 percent of the harvest, followed by salmon at 59.3 pounds (25.4 percent), big game at 50.2 pounds (21.5 percent), marine invertebrates with 21.8 pounds (9.3 percent), wild plants with 5.6 pounds (2.4 percent), birds and eggs at 4.7 pounds (2.0 percent), and marine mammals with 0.8 pounds (0.3 percent).

As measured in numbers of fish harvested, rod and reel catches accounted for 52.6 percent of Cordova's salmon harvest for home use in 1988. Salmon removed from commercial catches were also a significant source of home use salmon, contributing 44.9 percent of the total. Subsistence nets provided 2.5 percent of Cordova's harvest of salmon for home use in 1988. Based on survey findings, it is estimated

that Cordova residents harvested about 20,000 salmon for home use by these three methods. While this represents a significant source of food for the community, this catch is just 0.134 percent of the total salmon harvest of 15,000,000 fish in Prince William Sound in 1988. Commercial catches accounted for about 99.6 percent of this take.

Cordova's noncommercial harvests of fish, game, and wild plants in both 1985 and 1988, as measured in pounds useable weight per person, were lower than the two villages in Prince William Sound for which there are harvest data, Chenega Bay and Tatitlek, and lower than other isolated Alaska Native villages in southwest and southcentral Alaska. However, Cordova's harvests were similar or higher than other communities of southern Alaska which share many of its demographic and economic characteristics, such as Sitka and Kodiak City. Furthermore, Cordova's wild resource harvests in both 1985 and 1988 were much higher than more urbanized places such as Kenai or Homer, suggesting a more significant role for noncommercial harvesting activities in Cordova than in these other Alaska communities.

The results of the household survey regarding monetary employment in Cordova in 1988 corroborated the findings pertaining to 1985. Again, the dominance of commercial fishing in Cordova's cash economy was documented. Over half (55.4 percent) of the surveyed households contained at least one commercial fisherman. Commercial fishing accounted for 31.6 percent of all jobs in the community in 1988, and 38.1 percent of all employed adults were employed as commercial fishermen. Commercial fishing provided well over half (58.6 percent) of Cordova's earned income in the study year. Other important employer types in Cordova included government (19.7 percent of all jobs), services (13.5 percent), and retail trade (11.9 percent).

The report concludes that the study findings, combined with those from 1985, demonstrate the continuing importance of hunting, noncommercial fishing, and gathering for the people of Cordova. Levels of harvest are relatively high, involve a large majority of the community's population, and are diverse. Resource sharing patterns are strong in the community. Comparisons of the findings for the two study years (1985 and 1988) suggest that this pattern of harvest and use of wild foods in Cordova is relatively stable. None of the comparisons suggested a diminishing role for noncommercial fishing, hunting, and gathering in the community's way of life through the 1980s.

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CHAPTER ONE: BACKGROUND

Cordova, a community with about 2,282 residents in 1990, is located near the mouth of the Copper River in southcentral Alaska. As shown by research conducted by the Division of Subsistence of the Alaska Department of Fish and Game (Stratton 1989), Cordova residents harvest and utilize the wild resources of Prince William Sound and the Copper River Delta for subsistence purposes. In 1985, Cordova households harvested an average of 164 pounds per person of wild foods for home use. The purpose of this report is to present the findings of a second division study in Cordova pertaining to 1988 which updates this earlier research. It should be noted that the fieldwork portion of this project ended before the *Exxon Valdez* oil spill occurred in Prince William Sound on March 24, 1989. Like the 1985 study, it provides a picture of subsistence use patterns in a pre-spill year.

The project originated in the fall of 1988 when staff of the United States Forest Service, Chugach National Forest, requested that the Division of Subsistence collect information about Cordova residents' subsistence use areas, particularly in the Big Islands, Port Gravina, and Copper River Delta areas. The Forest Service (USFS) has been drafting resource management plans for these areas within the Prince William Sound region. The division agreed to gather this information as part of a systematic household survey. The Forest Service provided funding for the project, and collaborated with the division in defining the goals and objectives of the research.

PURPOSES AND OBJECTIVES

The goals and objectives of the research in Cordova were described in an agreement between the division and the Forest Service. One major purpose of the project was to collect and present updated information on resource harvests and uses for a sample of Cordova households through a household survey. Specific research objectives included the following for the 1988 study year:

- 1) estimates of annual harvest levels by species in numbers of animals (or other appropriate units) and pounds usable weight;
 - 2) information about distribution and exchange of wild resources;
 - 3) demographic information, including age, sex, and household composition;
 - 4) data on cash employment and income;
 - 5) descriptions of gear types and other harvest technologies used by active hunters and fishers;
- and
- 6) an overview of transportation methods employed for resource harvesting.

A second purpose was to compare the above information with the 1985 findings. To accomplish this, data were collected in a manner similar to that of the earlier research (see below). The information gathered to meet these first two purposes is presented in this report.

A third purpose was to collect information on areas used for hunting, fishing, and gathering by Cordova residents. This added a mapping component to the research. By agreement with Forest Service, the field maps collected were provided to the Forest Service for their entry into a GIS system for compilation.

DATA GATHERING METHODS

Household Survey

A household survey instrument was designed (Appendix A) based on a previous survey used in 1986 (Stratton 1989). The 1988 survey was expanded to collect species-specific data regarding waterfowl harvests. It was also more detailed in recording monetary income information. A section on household expenses was added.

The Cordova study area (Fig. 1) was identical to the one identified for the 1985 study. It included the area within the Cordova city limits, as well as residents along the Copper River Highway,

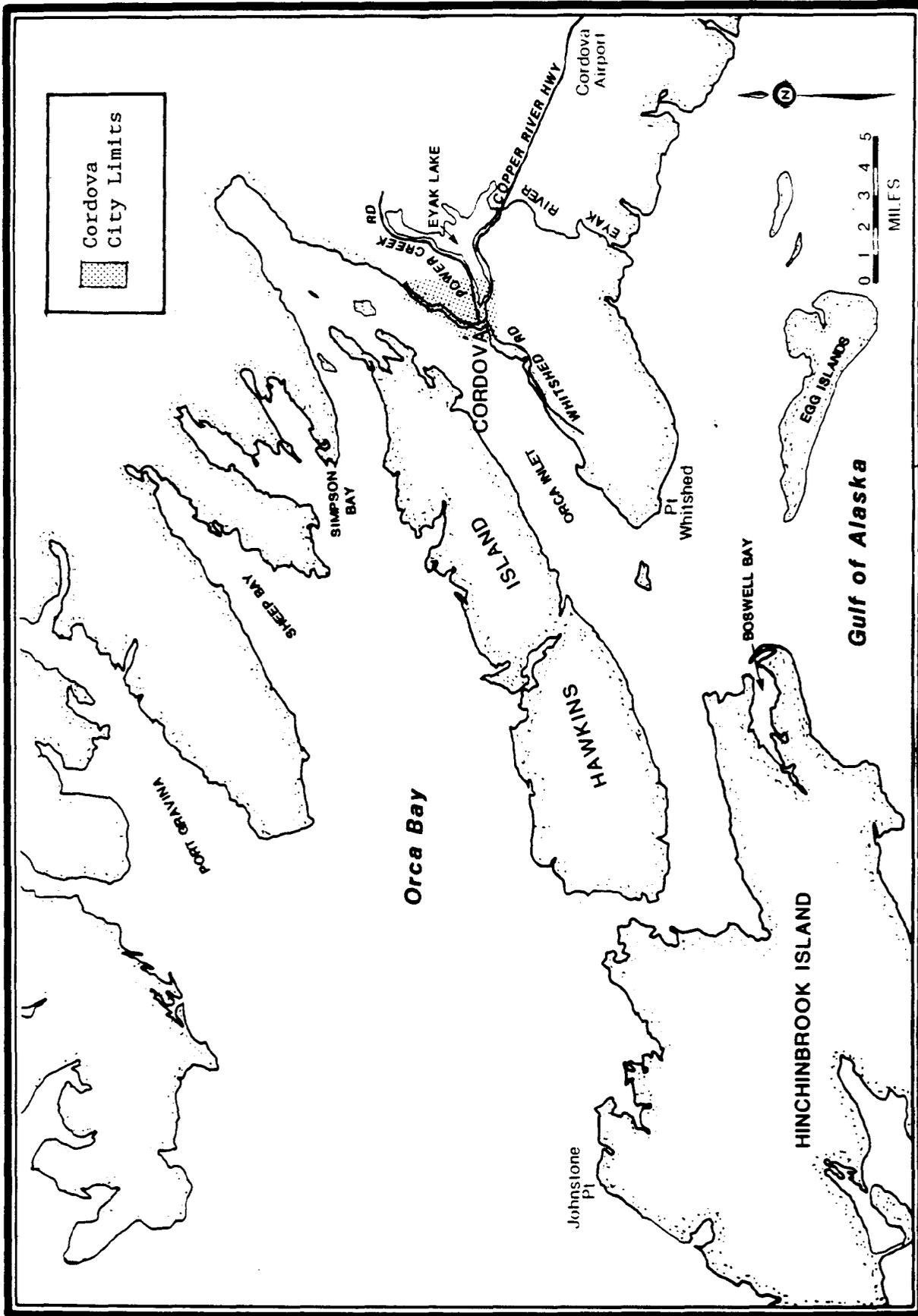


Figure 1. Cordova Study Area

Power Creek Road, and Whiteshed Road outside of the city, residents living on boats in the harbor, and people living on and across Orca Inlet, both on the mainland, and on Hinchinbrook and Hawkins islands.

A stratified random sample was selected for interviewing. First, a listing of all households was compiled, using Department of Fish and Game harvest ticket records, the current Commercial Fisheries Entry Commission permit listing, subsistence salmon permit data, furbearer sealing records, and the phone book. The composite list, which was edited by knowledgeable local residents, contained 1,205 households. These households were organized into three strata. Based on high harvesting patterns displayed by households reporting furbearer harvests in the 1986 survey, all known furbearer harvesting households were included in the highest strata (13 households). Households which, according to department records, harvested black bear, deer, goat, moose, subsistence salmon, or held a salmon limited entry permit were placed in the medium strata (665 households). Households with no record of resource harvests listed above were put in the low strata (527 households). Because sportfish harvests are not reported, the low strata included households who engaged in sport fishing.

The actual number of households in each strata was modified after the survey was conducted, based on the proportion of households selected by the random draw which were found to have moved away or were not year-round residents. The high percentage of households that were not available for an interview, which in many cases meant they were out of town, reflects many residents' pattern of winter travel. It was sometimes difficult to determine which of these households were year-round residents on vacation, and which were strictly summer residents. Researchers tried to identify the residency patterns of out-of-town households by contacting their neighbors, friends, or other knowledgeable people. The initial number of households on each strata list, the target goal, and the actual number of households surveyed are reported in Table 1. The "revised estimated households" line, with a total of 872 households refers to year-round households in Cordova, and excludes seasonal households and households which have moved (Table 1).

TABLE 1. CORDOVA 1988 SURVEY SAMPLES AND PARTICIPATION.

	Low	STRATA Medium	High	Total Households
Estimated Households	527	665	13	1,205
Interview Goal (number)	20	70	10	100
Households Interviewed	20	71	10	101
Unavailable for Interview ^a	8	20	3	31
Non-Participating	8	7	0	15
Vacant or Seasonal Households ^b	16	34	0	50
Total Households Attempted Contact	52	132	13	197
Vacancy Rate (percent) ^c	30.8%	25.8%	0	25.4%
Revised Estimated Households ^d	365	494	13	872
Percentage of Households Interviewed	5.48	14.38	76.92	11.59

^a Year-round households who were out-of-town or otherwise unavailable during the interviewing period.

^b Seasonal households are households which maintain a permanent domicile elsewhere where they spend the majority of their time.

^c The number of vacant and seasonal households divided by the total households attempted to contact.

^d Calculated by multiplying the estimated number of households by one minus the vacancy rate.

Mapping

Five resources or resource categories were selected for mapping resource use areas (Appendix B). These were deer, moose, waterfowl, intertidal resources, and salmon. The respondents from each randomly selected household recorded areas their household had ever used to hunt or harvest the resources while living in Cordova on maps at the 1:250,000 scale. In addition, deer hunters were asked to specify areas they most frequently used for deer hunting or harvesting. As agreed upon with the U. S. Forest Service, mapped information was collected on the following USGS quadrangles:

Anchorage
Blying Sound
Cordova

Middleton Island
Seward
Valdez

The researchers made note of any areas used by respondents not covered by the quadrangles, but did not map them.

Personnel

Four researchers were trained and supervised by a Subsistence Resource Specialist II (Stratton). All researchers were familiar with the Cordova area, the Copper River Delta, and Prince William Sound. Household surveys and mapping interviews were conducted between February 2 and March 9, 1989. Interviews averaged between 60 and 90 minutes in length. To increase awareness of the project and encourage cooperation, a paid announcement appeared on the cable television scanner station, a news release was printed in the Cordova Times, and the local radio station aired a Public Service Announcement about the project.

Data Analysis

The researchers coded their household surveys for computer tabulation. Data coding and entry were independently verified. The data were then tabulated and analyzed using the Statistical Package for the Social Sciences. Harvest quantities in numbers, buckets, or other reporting units were converted to pounds useable weight using standard factors (Appendix C). Data were organized into standard tables for inclusion in the division's Community Profile Database (Paige et al. 1991).

CHAPTER TWO: OVERVIEW OF THE COMMUNITY

NATURAL ENVIRONMENT AND HISTORY

The community of Cordova lies on Orca Inlet on the eastern edge of Prince William Sound (Figure 2). To the west of Cordova is the Copper River Delta. For a description of the area, its climate, and natural resources, see Stratton (1989).

The earliest documented inhabitants of the Prince William Sound and Copper River Delta region were the Eyak Indians and Chugach Eskimos. Europeans first explored the area in the late eighteenth century. Much of the development of the area was a result of commercialization of the natural resources. The Russians came into the area for the fur trade, especially sea otter pelts. In the late nineteenth century, commercial fishing and mining-related industries developed. Stratton (1989) includes a more detailed summary of the history of the area and a bibliography.

SOCIOECONOMIC PROFILE, 1988

Community Description

Cordova reported a population of 2,282 at the time of the 1990 census. The household survey estimated the population at 2,407, or 872 households in 1989, which may have included households that were seasonal, and would not have been included in the April 1990 census. The Cordova population has been fairly stable throughout the 1980s (Table 2).

The community itself is much the same physically and economically as in 1985 (Stratton 1989). There have been fluctuations in the number of air taxi services; operational fish processors, and smaller stores. However, no substantial changes in industry or services occurred between 1985 and 1989.

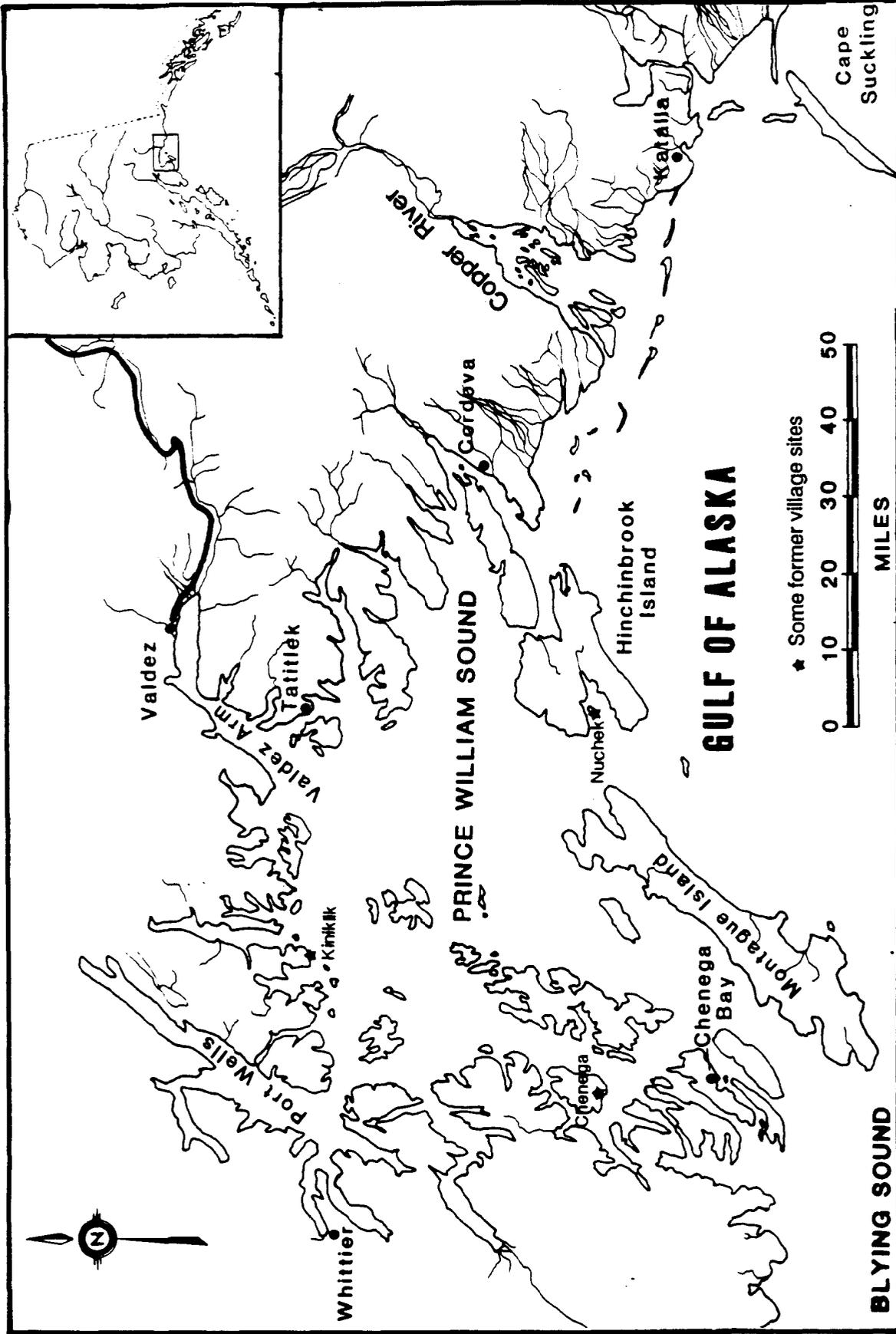


Figure 2. Communities of Prince William Sound, Northern Gulf of Alaska

TABLE 2. POPULATION OF PRINCE WILLIAM SOUND, 1818-1990

Community	1818	1834	1880	1900	1910	1920	1929	1939	1950	1960	1970	1980	1985	1990
Chenega	--	--	80	67	--	--	90	95	91	--	0	0	60	94
Cordova	--	--	--	1,152	955	980	938	1,165	1,128	1,164	2,241 ^a	2,307 ^a	2,282 ^a	2,282 ^a
Ellamar	--	--	--	98	106	--	46	23	--	--	--	--	--	5 ^b
Eyak	117	150	117	22	--	320	366	365	--	--	--	47 ^c	44 ^c	172 ^c
Katalla	--	--	--	--	--	84	44	23	--	--	--	--	--	--
Kaniklik	--	--	54	52	32 ^d	8 ^e	0	0	0	0	0	0	0	0
Latouche	--	--	--	--	--	505	339	40	--	--	--	--	--	3 ^b
Nuchek	--	--	145	65	30 ^d	11 ^e	0	0	0	0	0	0	0	0
Tatitlek	--	--	90	68	156	187	70	75	89	96	111	68	112	119
Valdez	--	--	--	--	810	466	442	529	554	555	1,005	3,079	3,271	4,068
Whittier	--	--	0	0	0	0	--	--	627	809	130	198	344	243
Totals	--	--	486	274	2,278	2,642	2,331	2,111	2,549	2,588	2,410	5,633	6,097	6,986

Sources: Alaska Department of Fish and Game 1985; Alaska Department of Labor 1987; Alaska Department of Labor 1991:123; Birket-Smith and de Laguna 1938:24; de Laguna 1956:256; Hassen 1978:198; United States 1990 Census.

- a includes entire Cordova census subarea
- b researcher estimate
- c included in Cordova total also
- d 1909 population
- e 1916 population
- no information available

Demography

The average household size of 2.76 persons (Table 3) for surveyed households was applied to the estimated 872 households and expanded, projecting a population of 2,407 for Cordova in 1989. The average age was 28.4 years, representing a range from 0.1 to 81.0 years old, only slightly lower than in the 1985 survey, which reported an average age of 30.3 years, with a range from less than one year to 84 years. The median age was 31.0 years. Compared to 1985, the population profile (Table 4, Figure 3) shows an increase in the younger age brackets. The combined age brackets from 0 to 9 years accounted for 23.0 percent of the population in 1988, compared with 18.8 percent in 1985.

Composition of Cordova's population was typical of Alaska's overall in that there were more males (53.8 percent) than females (46.2 percent). This was also similar to findings for 1985. The community's population was 10.0 percent Alaska Native in 1989 according to survey findings. The U.S. Census for 1990 estimated that 10.5 percent of the Cordova Census Subarea was American Indian, Eskimo, or Aleut (Alaska Department of Labor 1991).

The research found that the average length of residency in Cordova for the surveyed population was 12.7 years, compared to 13.5 years in 1985. For household heads and spouses, the average length of residency was 16.3 years in 1988 (Table 3), about the same as 16.9 years for the 1985 sample.

As shown in Table 3, more than one third (35.1 percent) of the survey population was born in Cordova. (Respondents were asked to give the residence of each household member's parents when the household member was born. Thus, if a person was born in an Anchorage hospital, for example, but his/her parents were domiciled in Cordova at the time, birthplace would be recorded as Cordova.) Small percentages of the population had been born in other Prince William sound communities (1.0 percent) or other Alaska communities (6.0 percent). The majority of the population (57.9 percent) had moved to Cordova from other states; a few were from other countries.

In an attempt to identify the extent of residents' winter travel, households were asked if they had an extended absence from Cordova in 1988, defined as six weeks or longer. Almost twelve percent (11.9) of

Table 3. Demographic Characteristics of Sampled Households, Cordova, 1988.

Characteristic	1988
Sampled Households	101
Number of Households in the Community	872
Percent of Households Sampled	11.6%
Average Household Size	2.76
Minimum	1
Maximum	9
Estimated Community Population	2407.4
Average Age in Years, Sample Population	28.4
Minimum	1.0
Maximum	81.0
Median	31.0
Average Length of Residency in Years	
Household Head and Spouse	16.3
Minimum	1.0
Maximum	71.0
Sample Population	12.7
Minimum	1.0
Maximum	71.0
Percent Male	53.8%
Percent Female	46.2%
Percent Alaska Native	
Household Head or Spouse	9.8%
Sample Population	10.0%
Residence of Parents When Born	
Cordova	35.1%
Other Prince William Sound Communities	1.0%
Other Alaska Communities	6.0%
Outside Alaska	57.9%
Percentages of Households Reporting Extended Absence	11.9%
Length of Absence in Months	
Mean	2.9
Minimum	1.5
Maximum	6.0
Median	2.5

Figure 3. Population Profile, Cordova, 1988

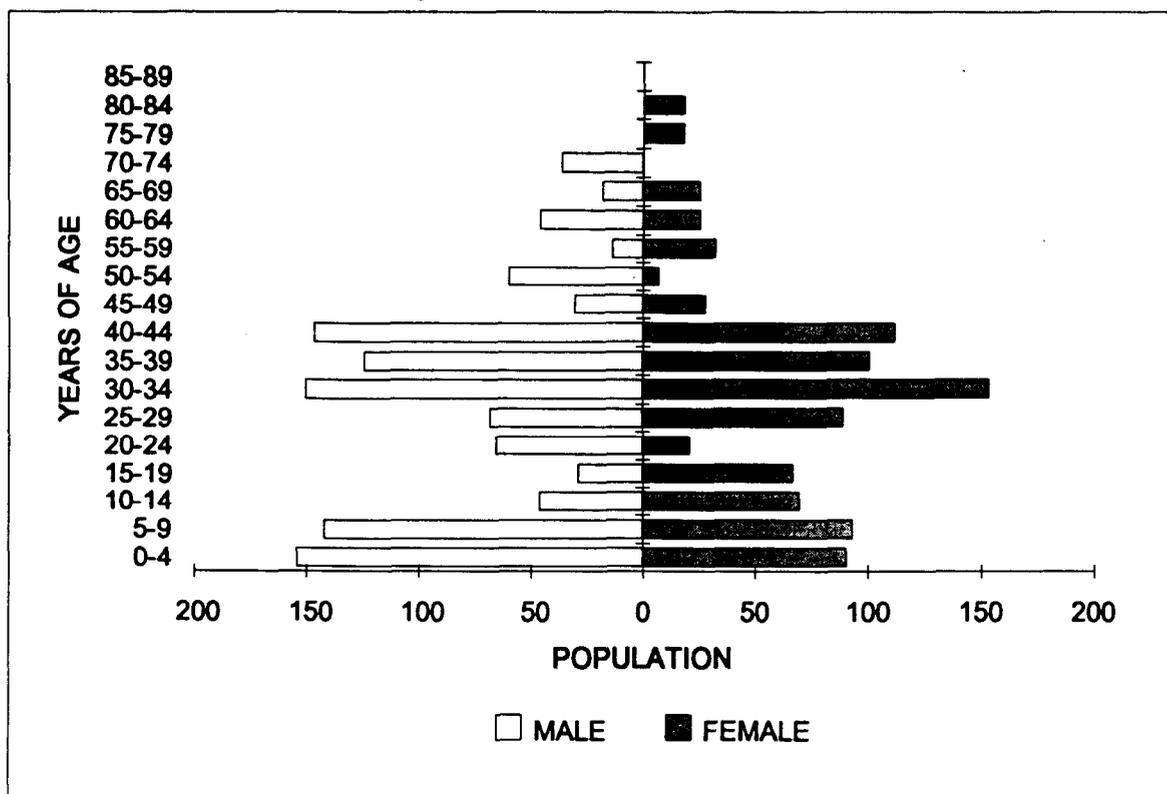


TABLE 4. POPULATION PROFILE, CORDOVA, 1988

AGE	MALE			FEMALE			TOTAL		
	NUMBER#	PERCENT	CUM. PERCENT	NUMBER#	PERCENT	CUM. PERCENT	NUMBER#	PERCENT	CUM. PERCENT
0-4	154	13.6%	13.6%	90	9.5%	9.5%	245	11.7%	11.7%
5-9	142	12.5%	26.0%	93	9.8%	19.4%	236	11.3%	23.0%
10-14	46	4.0%	30.1%	70	7.3%	26.7%	116	5.5%	28.5%
15-19	29	2.6%	32.6%	67	7.0%	33.7%	96	4.6%	33.1%
20-24	66	5.8%	38.4%	21	2.2%	35.9%	87	4.1%	37.3%
25-29	68	6.0%	44.4%	89	9.4%	45.3%	157	7.5%	44.8%
30-34	150	13.2%	57.6%	153	16.2%	61.5%	304	14.5%	59.4%
35-39	124	10.9%	68.5%	100	10.6%	72.0%	225	10.8%	70.1%
40-44	147	12.9%	81.4%	112	11.8%	83.8%	258	12.4%	82.5%
45-49	30	2.7%	84.0%	28	2.9%	86.7%	58	2.8%	85.3%
50-54	60	5.3%	89.3%	7	0.7%	87.5%	67	3.2%	88.5%
55-59	14	1.2%	90.5%	32	3.4%	90.8%	46	2.2%	90.7%
60-64	46	4.0%	94.6%	25	2.7%	93.5%	71	3.4%	94.1%
65-69	18	1.6%	96.2%	25	2.7%	96.2%	43	2.1%	96.2%
70-74	37	3.2%	99.4%	0	0.0%	96.2%	37	1.7%	97.9%
75-79	7	0.6%	100.0%	18	1.9%	98.1%	25	1.2%	99.1%
80-84	0	0.0%	100.0%	18	1.9%	100.0%	18	0.9%	100.0%
85-89	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%
Missing	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%
TOTAL	1139	100.0%		950	100.0%		2089	100.0%	

Number of individuals is based upon sampled households.

the households reported extended absences, ranging from 1.5 months to 6 months, with an average absence of 2.9 months, and a median of 2.5 months for these households (Table 3).

Employment and Local Economy

Table 5 reports the cash employment characteristics of adults in the sampled households. Of the 209 adults, 167 (80.0 percent) held a total of 244 jobs in 1988 (1.5 jobs per employed adult). The mean number of months employed for these individuals was 9.4 months. Less than half (48.5 percent) worked year-round (12 months per year). Household heads had a slightly longer mean length of employment at 9.7 months. As also shown in Table 5, there was at least one employed person in 94 of the 101 interviewed households (93.1 percent). On average, 2.6 jobs were held within each household in 1988.

Table 6 and Figure 4 report employment by occupational category in Cordova. Commercial fishing was by far the most common occupation among sampled Cordova residents in 1988, accounting for 31.6 percent of the jobs and 38.1 percent of the employed adults. About 55.4 percent of the households contained at least one commercial fishermen. Service occupations were the second most common type with 9.8 percent of the jobs and 11.6 percent of the employed adults. Teachers, librarians and counselors were third with 8.2 percent of the jobs, followed by construction (7.8 percent), transportation (6.6 percent), and sales (6.1 percent).

As shown in Table 7 and Figure 5, as an employer type, commercial fishing also dominated employment in Cordova in 1988. This employer category accounted for 31.6 percent of the jobs. Well over half of the households (55.4 percent) had people employed in the commercial fishing industry. Also, 38.1 percent of the surveyed employed people worked in this industry. Government employment, when federal, state, local, and Native government positions are grouped together, was the second largest employer, accounting for 19.7 percent of the jobs held by those surveyed. The service category was third, providing 13.5 percent of the jobs, followed by retail trade with 11.9 percent.

Table 5. Employment Characteristics of Cordova, 1988.

ADULTS		
Total		209
Employed	Number	167
	Percent	80%
Jobs	Number	244
	Mean	1.5
	Minimum	1.0
	Maximum	6.0
Months employed	Mean	9.4
	Minimum	1.0
	Maximum	12.0
% Employed Year-Round		48.5%
HOUSEHOLDS		
Sampled		101
Employed		94
Jobs per Household	Mean	2.6
	Minimum	1.0
	Maximum	8.0
Employed adults per Household	Mean	1.8
	Minimum	1.0
	Maximum	4.0
HOUSEHOLD HEADS		
# of Months Employed	Mean	9.7
	Minimum	1.0
	Maximum	12.0

Source: AK. Dept. of Fish and Game, Division of Subsistence,
Household Survey, 1988/89

Table 6. Employment by Occupational Category, Cordova, 1988.

	Cordova					
	Jobs n = 244		Households n = 94		People n = 167	
	Number	Percent	Number	Percent	Number	Percent
Executive, Administrative, Managerial	10	4.1%	9	9.6%	10	6.0%
Natural Scientists & Mathematicians	7	2.9%	5	5.3%	6	3.6%
Soc. Scientists, Soc. Workers, Relig Workers, & Lawyers	1	0.4%	1	1.1%	1	0.6%
Teachers, Librarians & Counselors	20	8.2%	15	16.0%	18	10.8%
Health Diagnosing & Treating Practitioners	1	0.4%	1	1.1%	1	0.6%
Reg. Nurses, Pharmacists, Dietitians, Therapists, & PAs	6	2.5%	5	5.3%	5	3.0%
Writers, Artists, Entertainers & Athletes	5	2.0%	5	5.3%	5	3.0%
Technologists & Technicians, Except Health	3	1.2%	3	3.2%	3	1.8%
Marketing and Sales	15	6.1%	12	12.8%	14	8.4%
Administrative Support including Clerical	14	5.7%	13	13.8%	13	7.8%
Service Occupations	24	9.8%	18	19.1%	22	13.2%
Agricultural, Forestry & Fishing	81	33.2%	59	62.8%	7	4.9%
Commercial Fishing	77	31.6%	56	59.6%	72	43.1%
Hunters/Trappers	4	1.6%	3	3.2%	3	1.8%
Mechanics & Repairs	8	3.3%	6	6.4%	6	3.6%
Construction & Extractive	19	7.8%	18	19.1%	18	10.8%
Precision Production	2	0.8%	2	2.1%	2	1.2%
Production Working	11	4.5%	10	10.6%	11	6.6%
Transportation & Material Moving	16	6.6%	16	17.0%	16	9.6%
Military	1	0.4%	1	1.1%	1	0.6%

Source, AK. Dept. of Fish and Game, Division of Subsistence, Household Survey, 1988/89

Figure 4. Percent of Jobs by Occupational Type
Cordova, 1988

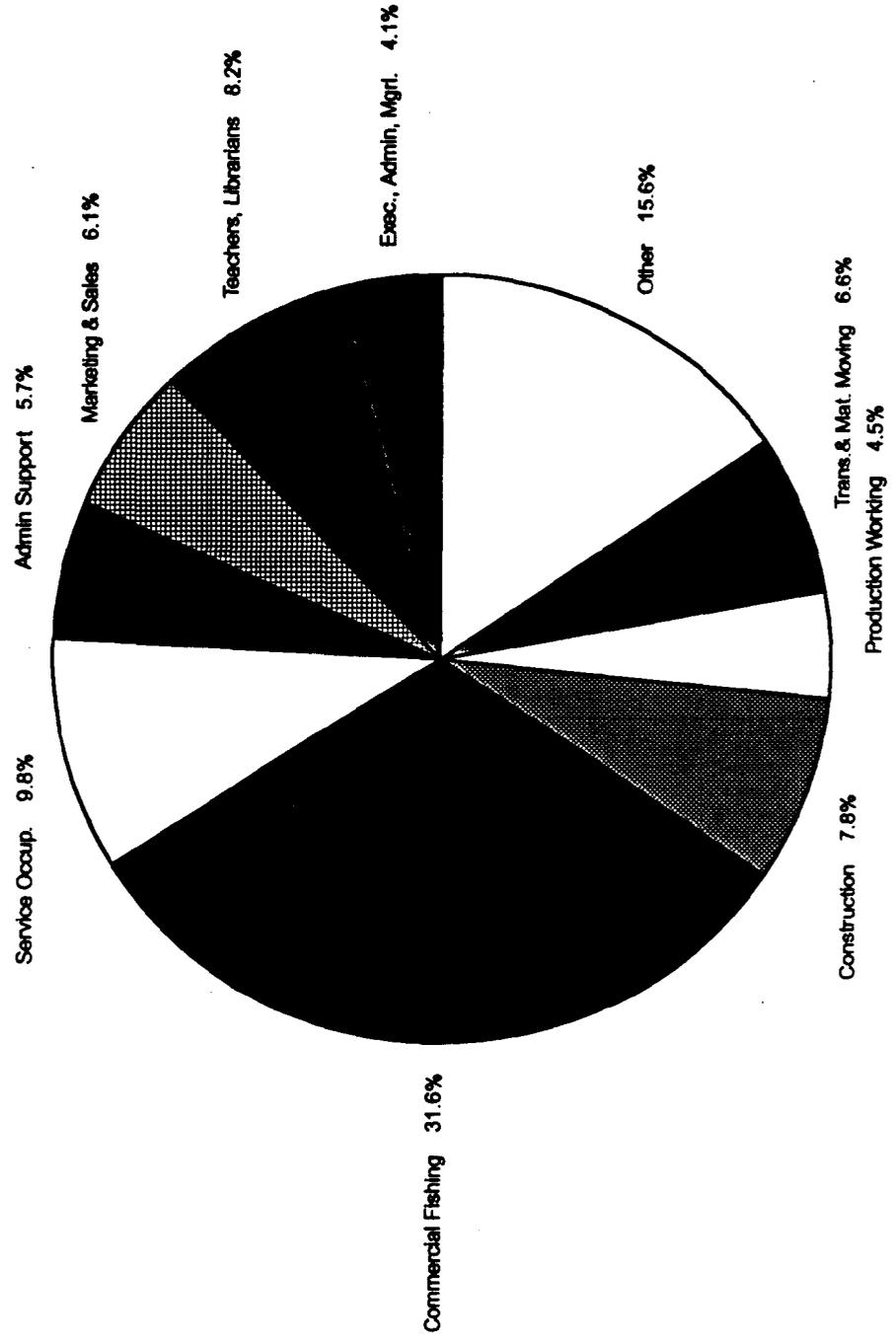
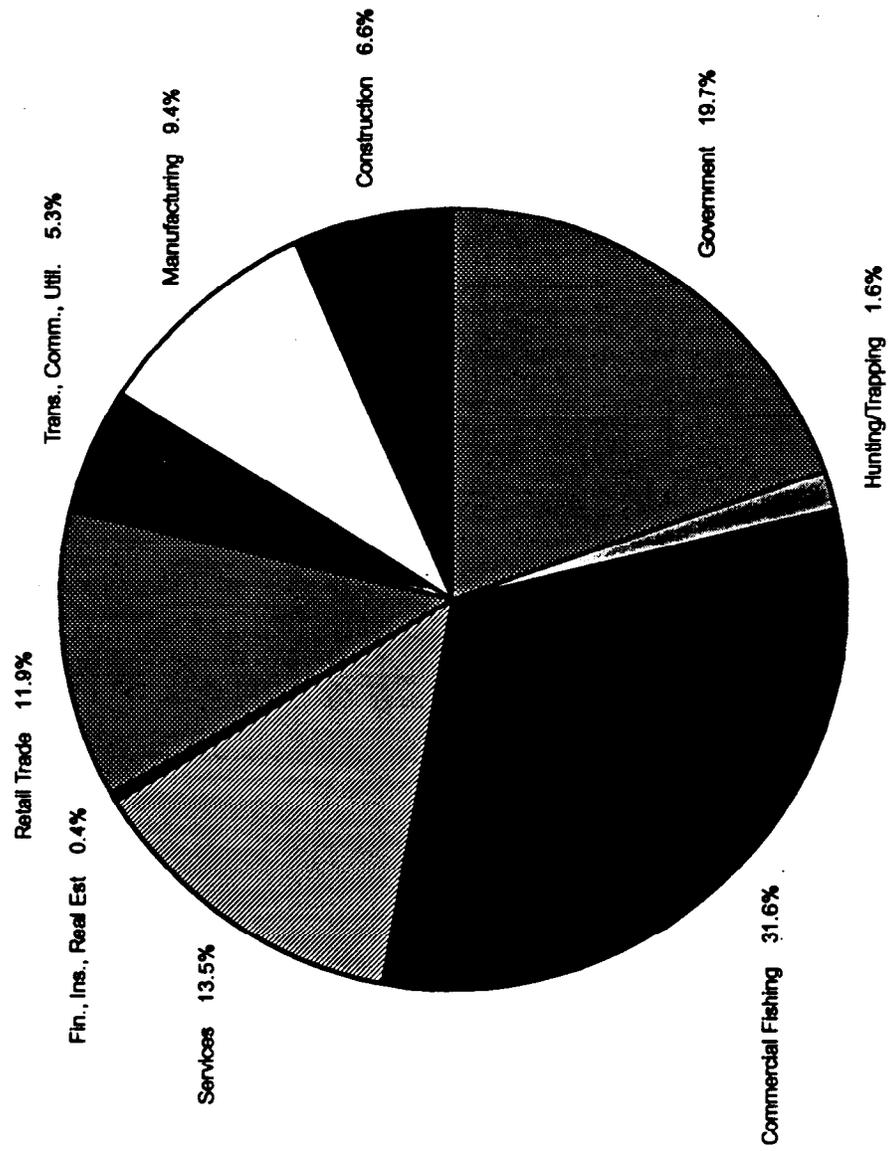


Table 7. Employment by Employer Category, Cordova, 1988.

	Regional Totals							
	Jobs		Households		People			
	n = 244	n = 94	n = 167	#	%	#	%	
Mining	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Construction	16	6.6%	14	14.9%	15	9.0%	15	9.0%
Manufacturing	23	9.4%	18	19.1%	22	13.2%	22	13.2%
Transportation, Communications, Utilities	13	5.3%	12	12.8%	13	7.8%	13	7.8%
Wholesale Trade	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Retail Trade	29	11.9%	22	23.4%	25	15.0%	25	15.0%
Finance, Insurance, Real Estate	1	0.4%	1	1.1%	1	0.6%	1	0.6%
Services	33	13.5%	29	30.9%	32	19.2%	32	19.2%
Agriculture, Forestry and Fishing	81	33.2%	59	62.8%	75	44.9%	75	44.9%
Commercial Fishing	77	31.6%	56	59.6%	72	43.1%	72	43.1%
Hunting/Trapping	4	1.6%	3	3.2%	3	1.8%	3	1.8%
Government	48	19.7%	42	44.7%	45	26.9%	45	26.9%
Federal	6	2.5%	6	6.4%	6	3.6%	6	3.6%
State	16	6.6%	14	14.9%	15	9.0%	15	9.0%
Local	26	10.7%	22	23.4%	24	14.4%	24	14.4%
Non-Education	15	6.1%	13	13.8%	14	8.4%	14	8.4%
Education	11	4.5%	9	9.6%	10	6.0%	10	6.0%

Source: Division of Subsistence, Alaska Department of Fish and Game, Household Survey, 1990.

Figure 5. Jobs by Employer Type,
Cordova, 1988



Cost of Living

The survey recorded estimates of monthly expenditures for household utilities and food in Cordova in 1988. Food and housing were the largest expenditures (Table 8). Food cost an average of \$450.80 a month per household, 31.9 percent of the estimated household expenditures (Figure 6). Housing costs averaged \$529.84 monthly, 37.5 percent of the total. Table 8 also shows a two-year average of Tatitlek households' expenditures for comparative purposes. Tatitlek is a Prince William Sound village of 108 people lying 40 miles northwest of Cordova. Cordova residents spent more, on average, on heating fuel, transportation fuel, housing, water and propane than did Tatitlek residents. More Cordova residents used heating oil, compared with the more prevalent use of wood for heat in Tatitlek. Cordova residents were more likely to have motor vehicles and use them for errands, hunting, and fishing than Tatitlek, while transportation fuel expenditures for Tatitlek residents were largely for skiffs and boats for hunting and fishing. Expenditures were lower for food, electricity and telephone for Cordova residents than for Tatitlek households.

To put Cordova expenditures in perspective, researchers conducted a 104 item market basket survey in mid-February 1989 in both full-service grocery stores in Cordova, and in an Anchorage grocery store. As had been true in the February 1986 Market Basket Survey, the two Cordova stores had totals on the survey that were close, 3.1 percent or \$8.47 apart, on a tally of over \$250. For comparisons, the two Cordova grocery stores' prices were averaged. Appendix C lists the market basket items, the average Cordova prices, and the results of the Anchorage market basket survey. Table 9 presents a summary of the survey and comparisons between the communities. Cordova food prices overall were 25 percent higher than Anchorage, very similar to the market basket survey with an almost identical list in 1986. The one major difference between the two years was in dairy prices. The smaller differences recorded in 1989 are attributable to a state of Alaska price subsidy of dairy products in 1989 that lowered fresh dairy prices from earlier levels. Aside from dairy items, fresh fruits and vegetables displayed the largest differential in both years, 37.9 percent in 1989, and 33.7 percent in 1986.

TABLE 8. TATITLEK AND CORDOVA AVERAGE MONTHLY HOUSEHOLD EXPENSES

Expense	Tatitlek 2 Year Average	Cordova 1988	Cordova 1988 (Percent)
Heating Fuel	\$ 67.15	\$ 120.18	8.5
Transportation Fuel	53.28	82.14	5.8
Housing	109.12	529.84	37.5
Food	574.32	450.80	31.9
Water	10.72	28.69	2.0
Electricity	121.86	91.30	6.5
Telephone	82.43	64.38	4.6
Propane	<u>14.26</u>	<u>46.33</u>	<u>3.3</u>
Monthly Average	1,033.14	1,413.66	100.0
Annual Average	\$12,399.12	\$16,963.95	

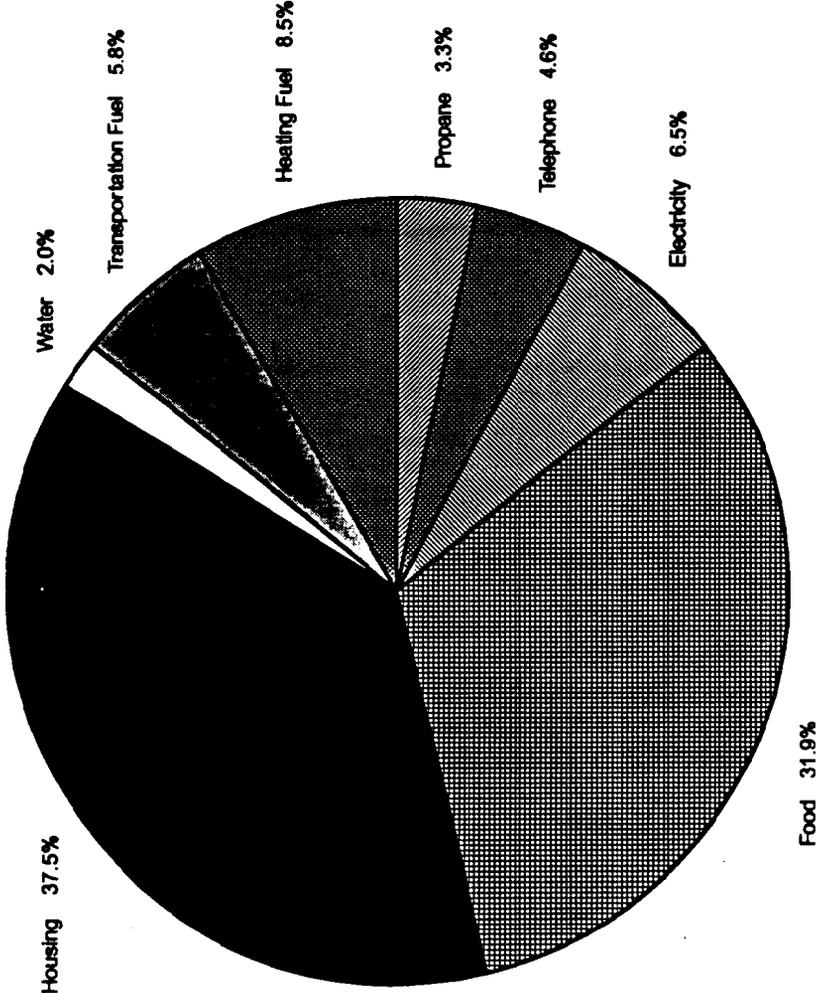
Source: Division of Subsistence, Alaska Department of Fish and Game Household Surveys 1988 and 1989.

TABLE 9. CORDOVA AND ANCHORAGE MARKET BASKET SURVEY, FEBRUARY 1986 AND FEBRUARY 1989.

Category	Number of Items	Anchorage 1989	Cordova 1989	Percent Difference 1989	Percent Difference 1986
Dairy	9	\$ 19.15	\$ 22.82	+19.2	+38.1
Meat & Fish	20	67.66	75.76	+12.0	+17.3
Fruits and Vegetables					
Fresh	21	20.40	28.14	+37.9	+33.7
Canned, Frozen & Dried	27	35.75	46.13	+29.0	+23.5
Misc. & Staples	<u>27</u>	<u>71.20</u>	<u>95.51</u>	<u>+34.1</u>	<u>+26.6</u>
Total	104	\$214.16	\$268.36	+25.3	+25.6

Sources: Stratton 1989:53; Division of Subsistence, Alaska Department of Fish and Game Market Basket Survey, February 1989.

Figure 6. Mean Monthly Expenses
Cordova, 1988



Income

Table 10 reports mean household monetary incomes for the sampled Cordova households in 1988. The mean household total income was \$65,193. Of this, \$60,512 (92.8 percent) derived from jobs, while \$4,681 (7.2 percent) was from other sources (see below). Commercial fishing provided by far the largest portion of the earned income in the community in the study year. Mean income from commercial fishing was \$35,453 for all households in the community, for 58.6 percent of earned income and 54.4 percent of all income. Mean income from all other jobs was \$25,059 per household.

As shown in Table 11, 97 of the 101 households reported cash income from sources other than employment. Alaska Permanent Fund dividends contributed an average of \$1,959 per household, 41.9 percent of the household mean of \$4,681 from non-employment sources, and 3.0 percent of the mean total household income. Pensions and retirement benefits contributed the second highest amount to the mean household income among non-employment sources, at \$1,003 per household.

Table 12 puts Cordova federal income tax return information in perspective. The five year average for Cordova from 1981 through 1985 was \$20,560 per return. This was 57 percent higher than Tatitlek's five year average of \$13,148, but 19 percent lower than the Anchorage average of \$24,457, and 35 percent below the average for Valdez of \$27,897.

Table 10. Mean Household Income, Cordova, 1988.

Income Source	Mean Household Income
All Sources	\$65,193
Earned Income	\$60,512
Agriculture, Forestry, Fishing	\$35,484
Agriculture	\$0
Forestry	\$0
Fishing, Hunting, Trapping	\$35,484
Commercial Fishing	\$35,453
Hunting/Trapping	\$31
Mining	\$0
Construction	\$3,620
Manufacturing	\$3,321
Cannery	\$2,774
Other Manufacturing	\$547
Transportation, Communication, and Utilities	\$1,932
Wholesale Trade	\$0
Retail Trade	\$2,315
Finance, Insurance, and Real Estate	\$40
Services	\$3,185
Government	\$10,615
Federal	\$1,322
State	\$2,922
Local	\$6,371
Local Gov't	\$4,276
Local Education	\$2,094
Other Income	\$4,681

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1988.

Table 11. Other Income Sources, Cordova, 1988.

Income Source	Number of Households Sampled	Number of Households Reporting Other Income	Mean # of Other Income Sources	Households Receiving Income From Source	Percent of Households Earning Income From Source	Amount Received By all Households From Source	Community Household Mean
Cordova	101	97	1.43				\$4,681
Adult Public Assistance				7	6.9%	\$4,062,838	\$111
Pension/Retirement				8	7.9%	\$96,579	\$1,003
Longevity Bonus				4	4.0%	\$874,656	\$251
Social Security Income				*	*	\$219,000	*
Energy Assistance				*	*	*	*
Food Stamps				*	*	*	*
Corporation Dividend				*	*	*	*
Interest Dividend				93	92.1%	\$288,885	\$331
Disability				10	9.9%	\$26,467	\$30
Permanent Fund Dividend				8	7.9%	\$1,689,212	\$1,959
Investments/Stocks/Bonds				*	*	*	*

* Data suppressed for confidentiality reasons.

Source: Ak. Dept. of Fish and Game, Div. of Subsistence, Household Survey, 1988/89.

TABLE 12. MEAN INCOME PER INCOME TAX RETURN BY COMMUNITY, 1981-1985

<u>Community</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>Mean 1981-85</u>
Anchorage	23,043	23,590	24,393	25,406	25,855	24,457
Valdez	27,582	27,587	27,213	28,635	28,468	27,897
Cordova	22,353	19,296	18,345	20,465	22,340	20,560
Tatitlek	20,103	13,504	11,337	9,686	11,111	13,148

Source: Alaska Department of Revenue n.d.

CHAPTER THREE: USE OF NATURAL RESOURCES, 1988

The purpose of this chapter is to describe the resource harvests and uses of the sampled Cordova households in 1988. With a per capita take for home use of 233.8 pounds of wild foods in 1988, these harvests were substantial. Also, participation in resource uses was almost universal; 97.9 percent of the households reported using at least one resource in 1988. As is discussed below, the community's residents harvested and utilized an array of marine and terrestrial resources, and sharing of resources was also widespread.

SPECIES HARVESTED

Table 13 lists the species that surveyed households reported harvesting or using in 1988. Respondents reported using over 100 (119) different resources. Twenty-six (21.8 percent) were finfish; 26 (21.8 percent) were varieties of birds and eggs, primarily waterfowl; 21 (17.6 percent) were marine invertebrates; 23 (19.3 percent) were types of vegetation, including berries, plants, and seaweed; 20 (16.8 percent) were land mammal species; and 3 (2.5 percent) were marine mammals. There were a larger number of resources reported in the 1989 survey than in 1986, in part because duck species were asked individually in the second survey, and grouped together in the 1986 survey. A few resources that were used by a few households in 1985, such as sheep, whitefish, tom cod, and wolf eel were not used in 1988, while species used by 1989 households included resources such as abalone and walrus which were harvested or received from other regions.

As reported in Table 14, Cordova households used an average of 14.3 resources, with individual household uses ranging from 0 resources to 43 kinds. Households attempted to harvest an average of 12 varieties of resources, and were successful in harvesting a mean of 9.7 resources. Surveyed households received an average of 6.1 resources, and gave away five resources. Sharing was reflected in the higher number of resources used than harvested. A chart depicting seasons of harvest is included in the earlier report (Stratton 1989:59).

TABLE 13. RESOURCES USED OR HARVESTED BY CORDOVA RESIDENTS IN 1988

Resource	Scientific Name	Percentage of households using in 1988
Finfish	—	95.0
Salmon: Chinook	<i>Oncorhynchus tshawytscha</i>	65.2
Sockeye	<i>O. nerka</i>	76.1
Pink	<i>O. gorbuscha</i>	16.3
Chum	<i>O. keta</i>	17.3
Coho	<i>O. kisutch</i>	77.4
Cod, Black	<i>Anoplopoma fimbria</i>	28.8
Cod, Gray	<i>Gadus macrocephalus</i>	13.6
Dolly Varden	<i>Salvelinus malma</i>	30.4
Eulachon/Smelt	<i>Thaleichthys pacificus</i>	21.7
Flounder ^a	<i>Hippolossoides elassodon</i> ; <i>Platichthys stellatus</i>	12.5
Grayling, Arctic	<i>Thymallus arcticus</i>	6.1
Greenling	<i>Hexagrammos sp</i>	7.0
Halibut	<i>Hippoglossus stenolepsis</i>	87.2
Herring	<i>Clupea pallasii</i>	27.7
Lingcod	<i>Ophiodon elongatus</i>	19.2
Rockfish, Red	<i>Sebastes ruberrimus</i>	46.4
Rockfish, Black	<i>Sebastes melanops</i>	22.2
Sculpin	<i>Hemilepidotus sp.</i>	0.8
Salmon Shark	<i>Lamna ditropis</i>	0.8
Sole ^a : Butter & Lemon	<i>Isopsetta isolepsis</i> <i>Pleuronectes quadrituberculatus</i>	1.6
Steelhead	<i>Salmo Gairdneri</i>	3.2
Sturgeon, White	<i>Acipenser transmontanus</i>	2.5
Trout, Cutthroat	<i>Salmo clarkii</i>	32.4
Trout, Rainbow	<i>Salmo gairdneri</i>	3.8
Marine Invertebrates	—	86.7
Abalone	<i>Haliotis kamtschatkana</i>	2.2
Chitons ^a : Red & Black	<i>Cryptochiton stelleri</i> <i>Katharina tunicata</i>	0.1
Clams ^a : Butter Razor	<i>Saxidomus giganteus</i> <i>Siliqua patula</i>	0.9 60.6
Other:		26.1
Gaper	<i>Tresus capax</i>	
Littleneck	<i>Protothaca staminea</i> ; <i>Tapes japonica</i>	
Surf	<i>Spisula polynyma</i>	
Cockles	<i>Clinocardium nuttallii</i>	4.6
Crab: Dungeness King ^a	<i>Cancer magister</i> <i>Paralithodes camtschatica</i> ; <i>P. platypus</i> ; <i>Lithodes aequispina</i>	64.3 32.5
Tanner	<i>Chionoecetes bairdi</i>	26.1

^aAlthough multiple species or subspecies are listed, the survey combined some resources together.

TABLE 13. RESOURCES USED OR HARVESTED BY CORDOVA RESIDENTS IN 1988, cont.

Resource	Scientific Name	Percentage of households using in 1988	
Marine Invertebrates (cont.)			
Limpets	<i>Acmaeidae</i> sp.	0.1	
Mussels	<i>Mytilus edulis</i>	9.5	
Octopus	<i>Octopus dofleini</i>	17.4	
Scallops	<i>Pecten caurinus</i>	5.0	
Squid	<i>Beryteuthis magister</i>	3.7	
Shrimp	<i>Pandalus</i> sp.	49.0	
Big Game	—	80.4	
Black Bear	<i>Ursus americanus</i>	4.9	
Brown Bear	<i>Ursus arctos</i>	0.9	
Caribou	<i>Rangifer tarandus</i>	2.4	
Sitka Black-tailed Deer	<i>Odocoileus hemionus sitkensis</i>	72.9	
Elk	<i>Cervus canadensis roosevelti</i>	0.8	
Mountain Goat	<i>Oreamnos americanus</i>	2.5	
Moose	<i>Alces alces</i>	52.3	
Small Game/Furbearers	—	25.0	
Beaver	<i>Castor canadensis</i>	3.9	
Coyote	<i>Canis latrans</i>	0.6	
Land Otter	<i>Lutra canadensis</i>	2.6	
Marten	<i>Martes americana</i>	5.5	
Mink	<i>Mustela vison</i>	7.1	
Muskrat	<i>Ondatra zibethica</i>	1.2	
Porcupine	<i>Erethizon dorsatum</i>	0.4	
Snowshoe Hare ^a	<i>Lepus americanus</i>	18.2	
& European Rabbit ^a	<i>Oryctolagus cuniculus</i> var.		
Weasel	<i>Mustela erminea</i> & <i>rixosa</i>	4.9	
Wolf	<i>Canis lupus</i>	3.2	
Wolverine	<i>Gulo gulo</i>	0.3	
Marine Mammals	—	9.0	
Seal, Harbor	<i>Phoca vitulina richardsi</i>	6.9	
Sea Otter	<i>Enhydra lutris</i>	2.9	
Walrus	<i>Odobenus romarus divergens</i>	0.8	
Wildfowl and Eggs	—	45.3	
Sandhill Crane	<i>Grus canadensis</i>	3.2	
Ducks:	American Wigeon	<i>Anas americana</i>	17.9
	Bufflehead	<i>Bucephala albeola</i>	4.3
	Canvasback	<i>Aythya valisineria</i>	0.8
	Common Eider ^a	<i>Somateria</i> sp.	0.8
	& King Eider ^a	<i>S. spectabilis</i>	
	Gadwall	<i>Anas strepera</i>	2.4

^aAlthough multiple species or subspecies are listed, the survey combined some resources together.

TABLE 13. RESOURCES USED OR HARVESTED BY CORDOVA RESIDENTS IN 1988, cont.

Resource	Scientific Name	Percentage of households using in 1988
Ducks, cont:		
Goldeneye	<i>Bucephala</i> sp.	3.0
Mallard	<i>Anas platyrhynchos platyrhynchos</i>	28.0
Merganser	<i>Mergus merganser americanis</i>	2.5
Oldsquaw	<i>Clangula hyemalis</i>	0.9
Pintail	<i>Anas acuta acuta</i>	17.3
Scaup ^a , Greater & Scaup ^a , Lesser Scoter ^a	<i>Aythya marila mariloides</i> <i>Aythya affinis</i> <i>Oidemia nigra</i> & <i>Melanitta</i> sp.	0.1
Shoveler	<i>Anas clypeata</i>	1.6
Teal, Green-winged	<i>Anas crecca carolinensis</i>	3.5
Dusky Canada Geese	<i>Branta canadensis occidentalis</i>	17.0
White-fronted Geese	<i>Anser albifrons frontalis</i>	21.2
Snow Geese	<i>Anser c. caeruliscens</i>	1.7
Grouse, Spruce	<i>Canachites canadensis</i>	0.8
Ptarmigan	<i>Lagopus</i> sp.	14.2
Snipe	<i>Capella gallinago</i>	12.0
Seagull ^a (Eggs)	<i>Larus hyperboreus</i> ; <i>Larus canus</i>	0.8
Plants and Berries^b	—	66.2
Berries		66.2
Blueberry	<i>Vaccinium ovalifolium</i> ; <i>V. alaskensis</i>	
Cranberry, Lowbush	<i>V. vitusidaea</i>	
Cranberry, Highbush	<i>Viburnum edule</i>	
Crowberry	<i>Empetrum nigrum</i>	
Currant	<i>Ribes</i> sp.	
Nagoonberry	<i>Rubus arcticus</i>	
Salmonberry	<i>Rubus spectabilis</i>	
Seaweed with Herring Roe	<i>Fucus</i> sp.	10.5
Seaweed, Laminaria	<i>Porphyran laciniata</i>	4.5
Other Plants/Mushrooms		15.2
Fireweed	<i>Epilobium angustifolium</i>	
Fiddlehead Fern	<i>Matteuccia Struthiopteris pennsylvanica</i>	
Goosetongue	<i>Plantago maritima</i>	
Mushrooms:		
Angel's Wings	<i>Pleurotus porrigens</i>	
Chanterelles	<i>Cantharellus cibarius</i>	
Nettle	<i>Urtica lyalli</i>	
Oregon Crab Apple	<i>Malus fusca</i>	
Indian Rice	<i>Fritillaria camschatcensis</i>	
Sage	<i>Artemisia</i> sp.	
Sourdock (Wild Rhubarb)	<i>Rumex arcticus</i>	
Wild Celery	<i>Heracleum lanatum</i>	
Yarrow	<i>Achillea borealis</i>	
Wood	—	37.8

^aAlthough multiple species or subspecies are listed, the survey combined some resources together.

^bExcept for seaweed, plants and vegetation where grouped together as a harvest activity.

TABLE 14. CHARACTERISTICS OF RESOURCE HARVEST AND USE, CORDOVA, 1988.

Number of Households in Sample	101
Mean Number of Resources Used Per Household	14.3
Range	0-43
Median	12
Mean Number of Resources Attempted to Harvest Per Household	12.0
Range	0-42
Median	8
Mean Number of Resources Harvested Per Household	9.7
Range	0-41
Median	7
Mean Number of Resources Received Per Household	6.1
Range	0-23
Median	5
Mean Number of Resources Given Away Per Household	5.0
Range	0-27
Median	2
Mean Household Harvest, Pounds	645.4
Range	0-2,901.1
Per Capita Harvest, Pounds	233.8
Percent of Households Using Any Resource	97.9
Percent of Households Attempting To Harvest Any Resource	91.6
Percent of Households Harvesting Any Resource	88.7
Percent of Households Receiving Any Resource	91.0
Percent of Households Giving Away Any Resource	88.4
Participation in Subsistence Activities, Household Members:	
Hunted	30.4%
Fished (finfish and marine invertebrates)	61.0%
Trapped	3.4%
Gathered Plants	63.7%
Any Activity	79.7%

Source: Division of Subsistence, Alaska Department of Fish and Game Household Survey 1989.

HOUSEHOLD PARTICIPATION

Community and households' resource patterns are reflected not only in the quantities of resources harvested, but also in the number of households that participated in the harvest and use of natural resources and the number of people participating in harvesting activities. Because some activities require special equipment or particular skills, some resources were harvested by a small number of hunters or fishers, but shared with other households in the community. The survey asked which household members participated in harvesting activities, whether anyone in the household harvested or attempted to harvest each resource, and if anyone in the household had received a resource, used it, or given it away.

Resource Use

Almost all Cordova households (97.9 percent) used at least one wild resource during 1988 (see Table 14). With respect to household members of all ages, 79.7 percent participated in some harvesting activities. Berry picking and other plant gathering was the most widely engaged in activity, with 63.7 percent of the household members participating, followed by fishing and marine invertebrate gathering (61 percent), then hunting (30.4 percent), and trapping (3.4 percent).

Ninety-five percent of the surveyed households used salmon during 1988 (Table 15). Coho salmon was used by the most households (77.4 percent), followed by sockeye (76.1 percent) and chinook (65.2 percent). Halibut was used by 87.2 percent of the households.

Marine invertebrates were used by most households (86.7 percent) (Table 15). Seventy-two percent used crab. Dungeness crab was prominent among the crab species, with 64.3 percent reporting using it. Over half of those surveyed used clams (63.6 percent), most commonly razor clams (60.6 percent). More than one fourth of the respondents reported using shrimp (49 percent), king crab (32.5 percent), and tanner crab (26.1 percent).

Table 15. Estimated Harvest and Use of Fish, Game and Plant Resources, in Prince William Sound for the Community of Cordova, 1988.

Number of Households Sampled: 101 Estimated Number of People in Community: 2407
 Number of Households in Community: 872 Type of Sample: Population Estimate-stratified random

Resource Name	Percentage of Households				Pounds Harvested			Amount Harvested		95% Conf. Limit (+/-)		
	Use	Att	Harv	Recy	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest	Percapita
All Resources	97.9	91.6	88.7	91.0	88.4	562,762.34	645.37	233.76			25.90%	24.90%
Fish	95.0	84.6	80.9	88.2	85.4	362,856.30	416.12	150.72			33.50%	33.00%
Salmon	95.0	81.7	79.3	53.6	75.3	142,766.55	163.72	59.30	20,027.15	22.97	23.00%	19.90%
Chum Salmon	17.3	15.2	13.6	3.7	7.4	7,497.08	8.60	3.11	1,201.45	1.38	108.80%	107.70%
Coho Salmon	77.4	70.9	68.5	21.9	53.4	77,784.28	89.20	32.31	10,582.90	12.14	29.30%	27.70%
Chinook Salmon	65.2	42.9	37.3	36.3	34.2	30,883.69	35.42	12.83	1,566.06	1.83	35.50%	34.00%
Pink Salmon	16.3	16.2	14.6	1.7	5.8	3,854.63	4.42	1.60	1,523.57	1.75	87.50%	86.80%
Sockeye Salmon	76.1	54.7	47.7	37.8	41.5	22,746.86	26.09	9.45	5,123.17	5.88	27.20%	27.80%
Unknown Salmon	0.8	0.0	0.0	0.8	0.8	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Non-Salmon Fish	88.9	77.4	70.8	59.3	60.1	220,089.74	252.40	91.42			49.00%	49.00%
Grayling	6.1	6.1	6.1	0.0	0.0	334.76	0.38	0.14	478.26	0.55	97.10%	97.20%
Sturgeon	2.5	0.8	0.8	1.7	2.4	104.37	0.12	0.04	104.37 lbs	0.12	183.60%	185.70%
Cod	43.7	29.8	29.8	19.3	23.5	15,892.21	18.23	6.60	5,369.23	6.16	62.30%	62.50%
Black Cod	28.8	13.5	12.7	16.2	11.4	7,343.36	8.42	3.05	2,368.83	2.72	111.70%	110.40%
Gray Cod	13.6	10.4	10.4	3.2	7.7	3,594.12	4.12	1.49	1,123.16	1.29	70.80%	70.40%
Lingcod	19.2	15.2	15.2	6.9	4.8	4,103.31	4.71	1.70	1,025.83	1.18	93.50%	91.20%
Greenling	7.0	7.0	7.0	0.8	5.3	851.41	0.98	0.35	851.41	0.98	142.30%	147.30%
Kelp Greenling	7.0	7.0	7.0	0.8	5.3	851.41	0.98	0.35	851.41	0.98	142.30%	147.30%
Flounder	12.5	12.5	12.5	2.1	0.9	2,601.10	2.98	1.08	867.03	0.99	104.90%	100.00%
Sole	1.6	1.6	1.6	0.0	0.0	222.65	0.26	0.09	111.32	0.13	144.50%	141.10%
Halibut	87.2	63.9	54.8	47.2	49.3	138,921.74	159.31	57.71	138,921.74 lbs	159.31	63.80%	64.70%
Herring	27.7	25.3	24.5	5.9	9.1	17,340.83	19.89	7.20	2,890.14 gal	3.31	98.10%	95.20%
Herring Roe	7.0	0.8	0.8	6.2	0.8	48.70	0.06	0.02	6.96 gal	0.01	183.60%	183.10%
Roe on Kelp	10.5	4.1	4.1	6.4	3.3	609.71	0.70	0.25	87.10 gal	0.10	98.00%	97.80%
Rockfish	51.7	31.8	31.0	27.5	21.9	26,703.66	30.62	11.09	8,678.70	9.95	48.90%	43.90%
Black Rockfish	22.2	19.0	18.2	5.6	12.2	4,806.69	5.51	2.00	3,204.46	3.67	77.50%	76.50%
Red Rockfish	46.4	27.3	26.5	26.7	17.4	16,394.19	18.80	6.81	4,098.55	4.70	45.80%	45.70%
Unknown Rockfish	7.4	7.4	7.4	1.6	5.3	5,502.79	6.31	2.29	1,375.70	1.58	100.30%	97.40%
Sculpin	0.8	0.8	0.8	0.0	0.0	83.49	0.10	0.03	166.99	0.19	183.60%	183.90%

Table 15. Estimated Harvest and Use of Fish, Game and Plant Resources, in Prince William Sound for the Community of Cordova, 1988. (Continued)

Resource Name	Percentage of Households				Pounds Harvested			Amount Harvested		95% Conf. Limit (+/-)		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total	Mean HH	Harvest	Per capita
Smelt	21.7	16.1	15.0	8.5	10.2	1,889.45	2.17	0.78	561.37 gal	0.67	50.70%	49.70%
Eulachon	21.7	16.1	15.0	8.5	10.2	1,889.45	2.17	0.78	561.37 gal	0.67	50.70%	49.70%
Shark	0.8	0.8	0.8	0.0	0.0	62.62	0.07	0.03	6.96	0.01	183.60%	185.70%
Trout and Char	45.2	45.1	40.7	8.5	12.8	15,274.43	17.53	6.34	10,910.31	12.51	37.70%	36.60%
Char (general)	30.4	29.6	27.5	3.7	6.1	6,580.72	7.55	2.73	4,700.51	5.39	65.50%	64.50%
Dolly Varden	30.4	29.6	27.5	3.7	6.1	6,580.72	7.55	2.73	4,700.51	5.39	65.50%	64.50%
Trout	36.1	35.4	32.4	7.7	8.3	8,693.71	9.97	3.61	6,209.80	7.12	32.60%	32.00%
Cutthroat Trout	32.4	34.6	29.5	6.1	7.5	8,362.75	9.59	3.47	5,973.39	6.85	33.60%	33.10%
Rainbow Trout	3.8	3.8	3.0	0.8	0.0	282.26	0.32	0.12	201.62	0.23	175.10%	169.80%
Steelhead	3.2	1.6	1.6	1.6	0.8	46.70	0.06	0.02	34.79	0.04	131.50%	133.20%
Game	80.4	60.3	45.4	60.7	33.2	120,767.38	136.49	50.16	1,593.05	1.82	29.10%	29.00%
Big Game	80.4	59.5	42.2	59.9	32.2	117,756.70	135.04	48.91	1,593.05	1.82	28.60%	29.00%
Black Bear	4.8	7.8	2.0	2.8	3.2	890.77	1.02	0.37	17.82	0.02	101.20%	100.80%
Brown Bear	0.9	4.9	0.9	0.0	0.0	6.50	0.01	0.00	6.26	0.01	155.40%	98.00%
Caribou	2.4	0.0	0.0	2.4	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Deer	72.9	56.2	39.4	43.7	25.8	62,528.26	71.71	25.97	1,447.41	1.66	30.30%	29.30%
Elk	0.8	0.8	0.8	0.0	0.8	2,783.10	3.19	1.16	6.96	0.01	183.60%	184.80%
Goat	2.5	1.1	0.9	1.6	0.9	598.69	0.69	0.25	8.26	0.01	155.40%	155.00%
Moose	52.3	21.5	10.0	43.4	10.0	50,949.36	58.43	21.16	94.35	0.11	48.50%	48.80%
Small Game/Furbearer	25.0	23.7	21.3	4.8	3.8	3,010.68	3.45	1.25	84.26	0.10	63.90%	63.00%
Beaver	3.9	2.2	2.2	1.9	0.9	56.88	0.07	0.02	84.26	0.10	89.30%	74.80%
Coyote	0.6	1.7	0.6	0.0	0.0	0.00	0.00	0.00	9.10	0.01	45.60%	0.00%
Hare	18.2	19.8	17.4	0.8	1.6	2,944.71	3.38	1.22	1,472.35	1.69	65.30%	64.40%
Land Otter	2.6	4.9	2.6	0.0	0.0	0.00	0.00	0.00	60.33	0.07	63.90%	0.00%
Lynx	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Marten	5.5	6.6	5.5	0.0	0.0	0.00	0.00	0.00	287.76	0.31	74.30%	0.00%
Mink	7.1	7.1	7.1	0.0	0.9	0.00	0.00	0.00	513.62	0.59	72.50%	0.00%
Muskrat	1.2	0.4	0.4	0.8	0.0	0.00	0.00	0.00	7.80	0.01	63.50%	0.00%
Porcupine	0.4	0.4	0.4	0.0	0.1	9.10	0.01	0.00	15.60	0.02	54.00%	85.80%
Weasel	4.9	4.9	4.9	0.0	0.1	0.00	0.00	0.00	154.68	0.18	66.00%	0.00%

Table 15. Estimated Harvest and Use of Fish, Game and Plant Resources, in Prince William Sound for the Community of Cordova, 1988. (Continued)

Resource Name	Percentage of Households			Pounds Harvested			Amount Harvested			95% Conf. Limit (+/-)		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest	Percapita
Wolf	3.2	1.4	1.1	2.1	0.1	0.00	0.00	0.00	12.16	0.01	109.60%	0.00%
Wolverine	0.3	1.8	0.3	0.0	0.0	0.00	0.00	0.00	5.20	0.01	72.80%	0.00%
Marine Mammals	9.0	3.2	3.2	6.6	2.4	1,948.17	2.23	0.81			110.30%	111.20%
Seal	6.8	3.2	3.2	4.5	2.4	1,948.17	2.23	0.81	69.58	0.06	105.80%	111.20%
Harbor Seal	6.8	3.2	3.2	4.5	2.4	1,948.17	2.23	0.81	69.58	0.06	105.80%	111.20%
Walrus	0.8	0.0	0.0	0.8	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Sea Lion	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Sea Otter	2.9	0.0	0.0	2.9	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Birds and Eggs	45.3	37.4	35.1	16.5	14.0	11,277.49	12.93	4.68			36.80%	34.70%
Birds	45.3	37.4	35.1	16.5	14.0	11,252.44	12.90	4.67	10,951.34	12.56	34.10%	34.80%
Upland Game Birds	18.8	17.5	16.8	2.9	1.7	1,413.56	1.62	0.59	2,019.37	2.32	80.40%	76.00%
Grouse	14.2	12.9	12.1	2.1	1.6	563.28	0.65	0.23	804.68	0.92	75.20%	73.00%
Partridge	12.0	13.6	11.2	0.8	0.9	850.28	0.98	0.35	1,214.69	1.39	118.50%	113.90%
Migratory Birds	40.8	30.9	28.5	15.7	13.2	9,538.89	11.28	4.09	8,931.97	10.24	36.20%	37.30%
Waterfowl	40.8	30.9	28.5	15.7	13.2	9,317.05	10.68	3.87	8,535.38	9.79	35.20%	36.40%
Ducks	36.3	29.3	27.7	10.3	10.7	5,783.27	6.63	2.40	7,522.22	8.63	35.40%	34.50%
Elder	0.8	0.9	0.8	0.0	0.0	66.79	0.08	0.03	41.75	0.05	183.80%	182.20%
Scoter	1.6	1.6	1.6	0.0	0.8	100.19	0.11	0.04	111.32	0.13	133.00%	131.10%
Goldeneye	3.0	3.1	3.0	0.0	0.0	154.08	0.18	0.06	182.60	0.22	100.50%	98.80%
Bufflehead	4.3	4.4	4.3	0.0	0.0	69.91	0.08	0.03	174.79	0.20	90.20%	88.10%
Merganser	2.5	2.5	2.5	0.0	0.8	149.46	0.17	0.06	249.11	0.29	154.20%	153.80%
Scaup	0.1	0.1	0.1	0.0	0.0	1.17	0.00	0.00	1.30	0.00	95.30%	92.10%
Mallard	28.0	25.3	25.1	3.7	8.3	3,014.26	3.46	1.25	3,014.26	3.46	38.90%	37.60%
Pintail	17.3	14.6	14.5	2.9	3.5	699.51	0.80	0.29	874.39	1.00	51.10%	50.20%
Wigeon	17.9	17.9	17.9	0.8	6.7	879.89	1.01	0.37	1,256.99	1.44	44.80%	43.00%
Teal	17.0	17.2	17.0	0.8	5.7	394.32	0.45	0.16	1,314.41	1.51	42.20%	42.50%
Gadwall	2.4	2.4	2.4	0.0	0.0	77.93	0.09	0.03	97.41	0.11	135.50%	134.10%
Oldsquaw	0.9	0.9	0.9	0.0	0.0	12.17	0.01	0.01	15.22	0.02	168.10%	166.80%
Shoveler	3.5	3.5	3.5	0.0	0.0	54.50	0.06	0.02	49.55	0.06	80.70%	82.80%
Carvasback	0.8	0.8	0.8	0.0	0.0	7.65	0.01	0.00	6.96	0.01	183.80%	183.90%
Ducks, Unknown	5.6	3.5	1.9	4.5	0.1	101.41	0.12	0.04	122.18	0.14	157.90%	157.70%
Geese	22.0	19.7	16.6	7.0	4.1	3,533.79	4.05	1.47	1,013.16	1.16	61.10%	57.60%

Table 15. Estimated Harvest and Use of Fish, Game and Plant Resources, in Prince William Sound for the Community of Cordova, 1988. (Continued)

Resource Name	Percentage of Households			Pounds Harvested			Amount Harvested			95% Conf. Limit (+/-)		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest	Percapita
Snow Geese	0.8	0.8	0.8	0.0	0.8	80.01	0.09	0.03	34.79	0.04	183.60%	182.20%
Whitefronted Geese	1.7	1.9	1.7	0.0	0.8	136.71	0.16	0.06	56.96	0.07	130.00%	128.50%
Canada Geese (Dusky)	21.2	18.8	16.8	6.2	4.1	3,317.07	3.80	1.38	921.41	1.06	56.40%	54.70%
Geese, Unknown	0.8	0.8	0.0	0.8	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Crane	3.2	4.8	3.2	0.0	0.0	487.04	0.56	0.20	48.70	0.06	99.90%	99.70%
Shorebirds	0.8	0.8	0.8	0.8	0.8	34.79	0.04	0.01	347.89	0.40	183.60%	183.10%
Shipe	0.8	0.8	0.8	0.8	0.8	34.79	0.04	0.01	347.89	0.40	183.60%	183.10%
Eggs	0.8	0.8	0.8	0.0	0.8	25.05	0.03	0.01	83.49	0.10	183.60%	183.10%
Seabird Eggs	0.8	0.8	0.8	0.0	0.8	25.05	0.03	0.01	83.49	0.10	183.60%	183.10%
Gull Eggs	0.8	0.8	0.8	0.0	0.8	25.05	0.03	0.01	83.49	0.10	183.60%	183.10%
Waterfowl Eggs	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Duck Eggs	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Marine Invertebrates	86.7	53.5	53.4	72.8	37.9	52,464.52	60.17	21.79	91.25 gal	0.10	72.10%	70.30%
Abalone	2.2	2.2	2.1	0.1	2.1	385.00	0.42	0.15	10,908.94 gal	12.51	192.90%	191.50%
Clams	63.6	38.2	38.0	43.3	23.3	32,728.81	37.53	13.59	347.89 gal	0.40	97.20%	94.40%
Butter Clams	0.9	0.8	0.8	0.1	0.8	1,043.86	1.20	0.43	9,174.32 gal	10.52	183.60%	183.90%
Razor Clams	60.6	34.4	33.4	42.4	19.6	27,522.95	31.56	11.43	1,386.73 gal	1.59	100.40%	97.50%
Unknown Clams	26.1	18.5	18.5	10.9	8.6	4,160.19	4.77	1.73	7,437.14	8.53	51.80%	62.40%
Crabs	72.8	30.5	30.5	55.4	22.4	9,054.01	10.38	3.76	3,887.72	4.46	44.80%	45.80%
Dungeness Crab	64.3	25.7	25.7	48.0	14.6	2,721.40	3.12	1.13	933.61	1.07	112.60%	110.00%
King Crab	32.5	7.0	7.0	25.6	7.0	2,147.31	2.46	0.89	2,615.81	3.00	78.80%	79.60%
Tanner Crab	26.1	8.6	8.6	17.6	5.7	4,185.28	4.80	1.74	25.76 gal	0.03	115.40%	116.90%
Cockles	4.6	3.8	3.8	0.8	0.0	77.28	0.09	0.03	54.75 lbs	0.06	192.90%	191.50%
Scallops	5.0	2.1	2.1	5.0	0.8	54.75	0.06	0.02	177.31 gal	0.20	106.90%	111.10%
Mussels	9.5	9.5	9.5	0.0	0.0	285.96	0.31	0.11	0.08 gal	0.00	95.30%	85.80%
Chitons	0.1	0.1	0.1	0.0	0.0	0.33	0.00	0.00	820.99	0.94	76.00%	76.10%
Octopus	17.4	12.6	12.6	4.8	7.2	3,283.96	3.77	1.36	6,361.63 lbs	7.30	48.40%	49.90%
Shrimp	49.0	19.6	18.8	36.4	14.2	6,361.63	7.30	2.64	0.08 gal	0.00	95.30%	85.80%
Limpets	0.1	0.1	0.1	0.0	0.0	0.12	0.00	0.00	68.67	0.08	156.00%	151.50%
Squid	3.7	3.7	3.7	0.0	0.0	274.66	0.31	0.11	3,240.07 gal	3.72	31.20%	28.00%
Plants and Berries	66.2	63.8	63.8	24.4	25.1	13,448.49	15.42	5.59	488.20 qts	0.56	70.10%	68.70%
Berries	66.2	63.8	63.8	23.6	23.5	12,980.29	14.86	5.38	391.37 gal	0.45	164.10%	0.00%
Other Edible Plants	15.2	14.4	14.4	1.6	3.2	488.20	0.56	0.20	1,573.17 crd	1.80	50.20%	0.00%
Seaweed/Kelp (Non-food)	4.5	2.4	2.4	2.1	0.0	0.00	0.00	0.00				
Wood	37.8	37.8	37.8	2.5	12.3	0.00	0.00	0.00				

Over 80 percent (80.4 percent) of the surveyed Cordova households used game resources in 1988 (Table 15). Deer was the most commonly used, at 72.9 percent, followed by moose at 52.3 percent. Wildfowl, especially waterfowl, were used by almost half the survey respondents (45.3 percent).

Wild plants were used by 66.2 percent of the Cordova households surveyed, primarily berries (66.2 percent). Additionally, wood for heating was used by 37.8 percent of the households (Table 15).

Harvest and Attempt to Harvest

Overall, 91.6 percent of the interviewed households in Cordova attempted to harvest at least one resource in 1988, and 88.7 percent were successful (Table 14). Finfish were among the most widely attempted and harvested resources with 81.7 percent of the surveyed households fishing for salmon (Table 15). Seventy-nine percent were successful. About 64 percent fished for halibut, and 54.8 percent caught halibut.

More than half of the surveyed households hunted big game in 1988 (59.5 percent) (Table 15). About 42 percent were successful. Thirty-nine percent harvested deer, and 10.0 percent took moose. Hare, which included wild European rabbits on Middleton Island, were harvested by 17.4 percent. More than one-fourth of the households (27.7 percent) took ducks. Fewer (16.6 percent) took geese.

All of the Cordova households which undertook harvests of wild plants were successful. Over half the households gathered berries. Wood cutting was also widely practiced, with 37.8 percent of the households participating (Table 15).

Giving and Receiving Wild Foods

The prevalence of sharing of resources in Cordova was documented in the survey. Eighty-eight percent of the households shared resources with others, and 91 percent reported receiving resources from other households the 1988 (Table 14). Three-fourths (75.3 percent) of the Cordova households surveyed in 1989 gave salmon to other households. More than half (53.6 percent) indicated they had received salmon.

Coho salmon was the species most often given away (53.4 percent of the households), followed by sockeye salmon (41.5 percent) and chinook (34.2 percent). Sockeye was most often received (by 37.8 percent of the households), followed by chinook (36.3 percent) and coho salmon (21.9 percent). Almost half of the households gave away halibut (49.3 percent) and 47.2 percent received it.

Game resources were also shared, though fewer households reported giving game resources to others, because fewer households harvested them. Deer meat was given away to other households by 25.8 percent of the households, and received by 43.7 percent. All moose harvesting households (10.0 percent) shared moose meat with others, while 43.4 percent reported receiving moose meat (Table 15).

Marine invertebrates were similarly given away by fewer households (37.9 percent) than those receiving them (72.9 percent) in Cordova in 1988 (Table 15). Crab and clams were the most widely shared. Twenty-two percent of the households gave crab to others, and 55.4 percent received crab. Dungeness crab were received by 48.0 percent of the households, king by 25.6 percent, and tanner by 17.6 percent.

Wild plants were not as widely shared as some other resource categories in Cordova. Although over half the households harvested berries, less than one-fourth (23.5 percent) gave berries or berry products to others, and similarly, 23.6 percent reported receiving berries. Wood appeared to be an individual household activity and product. While 37.8 percent of the households cut wood, 12.3 percent shared wood with others, and only 2.5 percent reported receiving it (Table 15).

Comparison of Study Years

Overall, participation and utilization rates for sampled Cordova households in 1988 were very similar to those documented for 1985 during previous research (Stratton 1989). Differences were likely related to resource availability. Black cod, crabs (particularly Dungeness crab) and octopus were used and harvested by more households in 1988, while use and harvest of hare and berries were down. Appendix D shows participation rates for 1985, which have been revised slightly from those reported in the 1985 survey report (Stratton 1989:62-65).

ESTIMATED HARVEST QUANTITIES

Quantities of resources harvested were recorded on surveys predominantly in numbers of the individual resource. Where appropriate, resource quantities were reported in other units. For example, clams and other marine invertebrates were reported in gallons, and several resources including halibut, shrimp, and plants were recorded in pounds useable weight. Standard conversion factors were used for harvest units (Appendix E). Total pounds and numbers of resources harvested were expanded to provide an estimate of the entire community harvest. A revised summary of harvest data from the 1985 Cordova survey is presented in Appendix D. That data set was updated when more precise conversion factors became available, so that the 1985 and 1988 data sets would be comparable.

Overall, Cordova households' non-commercial harvest levels were higher in 1988 than in 1985. The per capita harvest for all resources increased 42.7 percent, from 163.8 pounds in 1985 to 233.8 pounds in 1988. This difference was statistically significant at the .05 level (Table 16). The most noticeable increase was in the harvest of non-salmon finfish, which went from 36.8 pounds per capita in 1985 to 91.4 pounds in 1988, an increase of 54.6 pounds or 148.4 percent (Table 17; Fig. 7). This difference was also significant at the .05 level (Table 16). Within this category, harvests of halibut increased notably, as did rockfish harvests. Other increases were in marine invertebrates, game, birds and eggs, and vegetation, but only the increase in harvests of birds had statistical significance. Minor decreases in per capita harvests were recorded in salmon and marine mammals, but neither change was of statistical significance (Fig. 7).

The substantial increase in non-salmon finfish harvests in 1988 resulted in a much different composition of the harvest compared to that of 1985 (Table 17; Figure 8). Where salmon had comprised 38.0 percent of the harvest in 1985, followed by game (26.9 percent) and other finfish (22.5 percent), in 1988, other finfish accounted for 39.1 percent of the harvest, followed by salmon (25.4 percent) and game (21.5 percent).

TABLE 16. STATISTICAL SIGNIFICANCE OF DIFFERENCES IN PER CAPITA HARVEST LEVELS, CORDOVA, 1985 AND 1988

<u>Resource Category</u>	<u>Per Capita Harvests, Lbs</u>		<u>Significance¹</u>	
	<u>1985 (n = 206)</u>	<u>1988 (n = 101)</u>	<u>Student's T-Test</u>	<u>Mann Whitney U Test</u>
Salmon	62.3	59.3	0.753	0.077
Non-salmon Fish	36.8	91.4	0.026*	0.003**
Marine Invertebrates	12.5	21.8	0.280	0.065
Big Game	41.6	48.9	0.410	0.025*
Small Game	2.4	1.3	0.416	0.131
Marine Mammals	1.0	0.8	0.839	0.077
Birds and Eggs	1.7	4.7	0.004**	0.004**
Wild Plants	5.5	5.6	0.922	0.773
TOTAL	163.8	233.8	0.047*	0.027*

¹ * = significant at the .05 level; ** = significant at the .01 level

TABLE 17. COMPOSITION OF CORDOVA RESOURCE HARVESTS, 1985 AND 1989

Resource Category	1985			1988			Per Capita Percent Change
	Harvest in Lbs	Per Capita Harvest	Percent	Harvest in Lbs	Per Capita Harvest	Percent	
Salmon	141,095	62.3	38.0	142,767	59.3	25.4	-4.8
Non-Salmon							
Finfish	83,295	36.8	22.5	220,090	91.4	39.1	+148.4
Game	99,579	44.0	26.9	120,767	50.2	21.5	+14.1
Marine Mammals	2,337	1.0	0.6	1,948	0.8	0.3	-20.0
Birds and Eggs	3,907	1.7	1.0	11,278	4.7	2.0	+176.5
Marine							
Invertebrates	28,379	12.5	7.6	52,465	21.8	9.3	+74.4
Vegetation	12,360	5.5	3.4	13,448	5.6	2.4	+1.8
Total	370,953^a	163.8	100.0	562,762^a	233.8	100.0	+42.7

^a Columns do not precisely sum because of rounding.

Source: Division of Subsistence, Alaska Department of Fish and Game Household Survey 1989.

Figure 7. Comparison of Per Capita Harvests by Resource Category, Cordova, 1985 and 1988

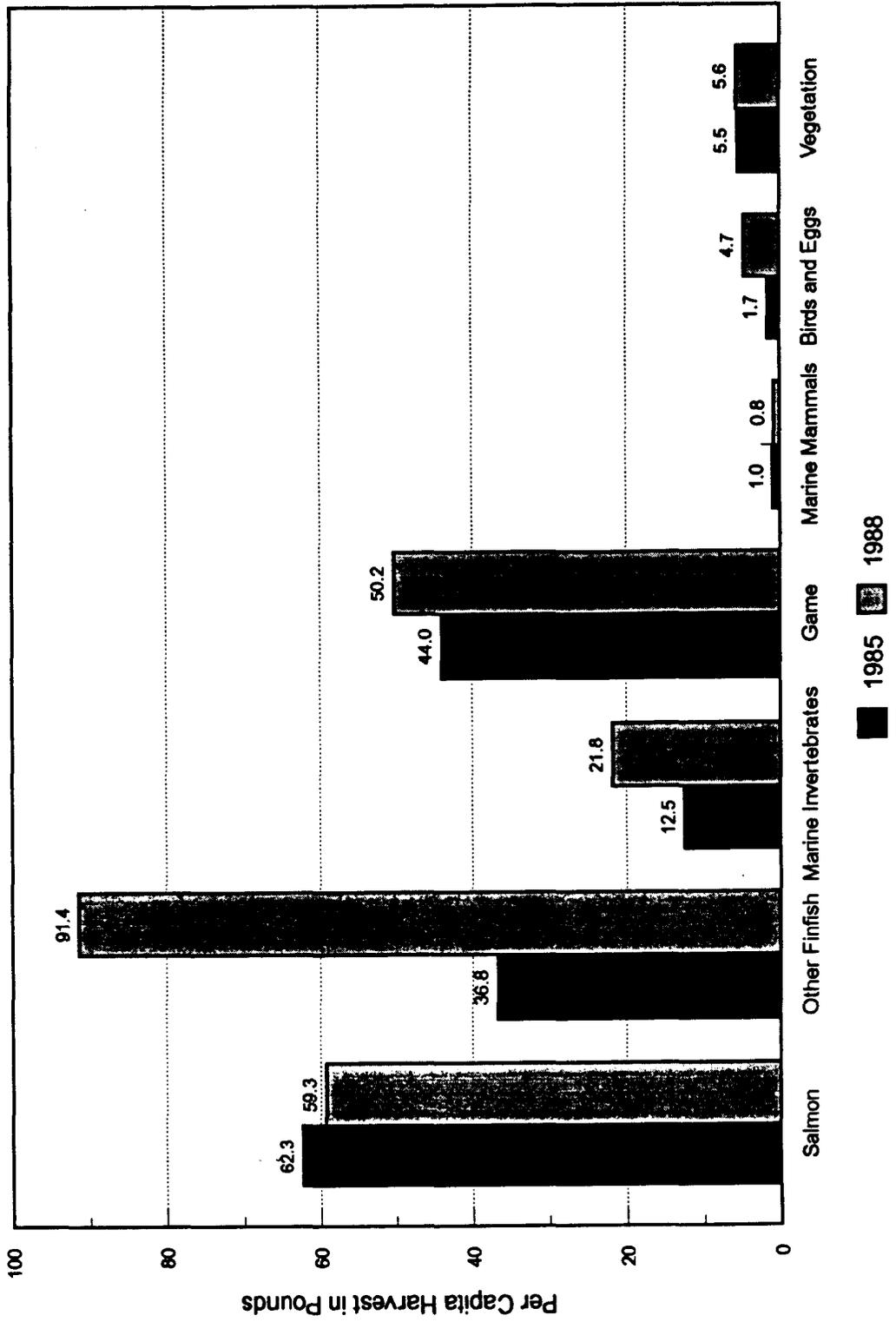
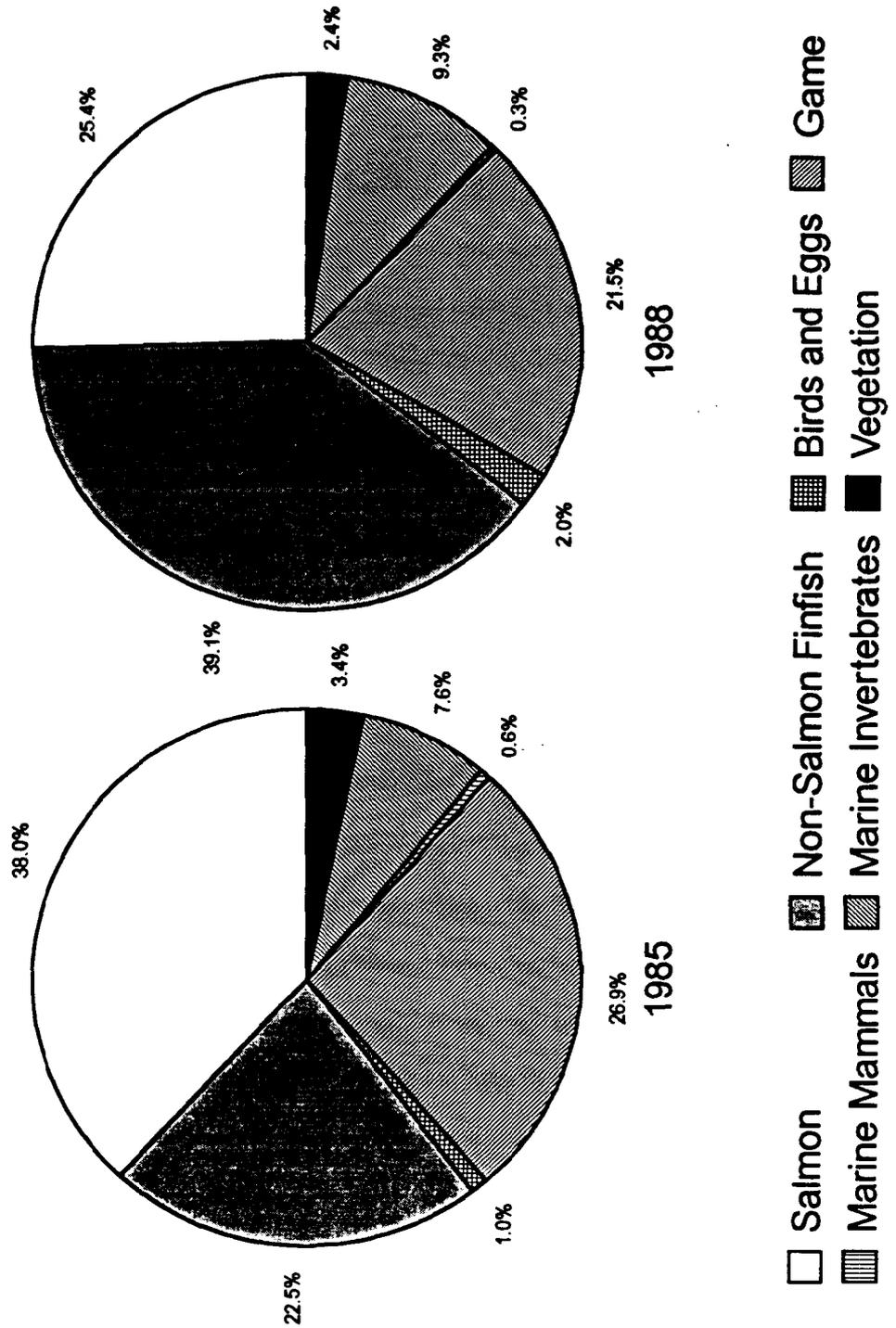


Figure 8. Harvest Composition by Resource Category, Cordova, 1985 and 1988



Salmon

Although the percentage of the overall harvest constituted by salmon went down in 1988, the per capita harvest of 59.3 pounds was very close to the 1985 per capita take of 62.3 pounds. As shown in Table 18, Table 19, and Figure 9, 51.6 percent of the Cordova household salmon harvest for home use as measured in pounds was taken with rod and reel. As measured in numbers of fish, rod and reel catches accounted for 52.6 percent of the harvest. Interviewed Cordova households obtained 44.9 percent of their salmon for home use by removing fish from their commercial catches. Subsistence nets accounted for 2.6 percent of the harvest of salmon as measured in pounds, and 2.5 percent as measured in numbers of fish (Table 19, Fig. 9).

The rod and reel salmon harvest by surveyed Cordova households was almost entirely coho salmon (89.9 percent by weight). Chinook, pink, and sockeye salmon combined comprised 10 percent of the rod and reel salmon harvest (Table 19). Enhancement efforts to support the Cordova Silver Salmon Derby have increased the coho run, making them more available in the immediate Cordova area.

Salmon brought home from Cordova households' commercial harvests included chinook (40.6 percent by weight), sockeye (29.3 percent), coho (16.5 percent) and chum salmon (10.9 percent). This reflects a preference for chinook, sockeye, and coho salmon over pink and chum, and suggests that the salmon brought home from commercial catches came mostly from the Copper River Flats commercial gill net fishery. This is the commercial fishery for these species occurring closest to Cordova. Ninety-five percent of the chum salmon harvest for home use was brought home from commercial takes. The majority of chinook salmon (85.9 percent) and sockeye (84.2 percent) also came from commercial harvests (Table 19).

Harvests with subsistence nets were similarly divided between chinook (43.0 percent), sockeye (37.6 percent) and coho (19.5 percent) (Table 19). Although subsistence salmon fishing is permitted throughout Prince William Sound area, most Cordova residents with subsistence salmon permits fished the Copper River Flats with gill nets in 1988. Although a 1988 regulatory change allowed commercial fishermen to participate in subsistence fisheries for the first time since 1961, the subsistence salmon

TABLE 18. SALMON HARVESTS BY GEARTYPE, CORDOVA, 1988

Salmon Species	Removed From Commercial Catch				Subsistence Methods				Rod and Reel				All Methods			
	Harvest		%	Resource ^a	Harvest		%	Resource ^a	Harvest		%	Resource ^a	Total Harvest		%	Resource ^a
	No.	Lbs			No.	Lbs			No.	Lbs			No.	Lbs		
Chinook Salmon	1,371	26,526	85.9		82	1,582	5.1		143	2,776	9.0		1,596	30,884	8.0	21.6
Sockeye Salmon	4,313	19,150	84.2		311	1,382	6.1		499	2,215	9.7		5,123	22,747	25.6	15.9
Chum Salmon	1,147	7,155	95.4		0	0	0.0		55	342	4.6		1,201	7,497	6.0	5.3
Pink Salmon	697	1,764	45.8		0	0	0.0		826	2,091	54.3		1,524	3,855	7.6	2.7
Coho Salmon	1,468	10,789	13.9		97	716	0.9		9,018	66,280	85.2		10,583	77,784	52.8	54.5
All Salmon	8,996	65,384	44.9		490	3,680	2.5		10,541	73,704	52.6		20,027	142,767	100.0	100.0

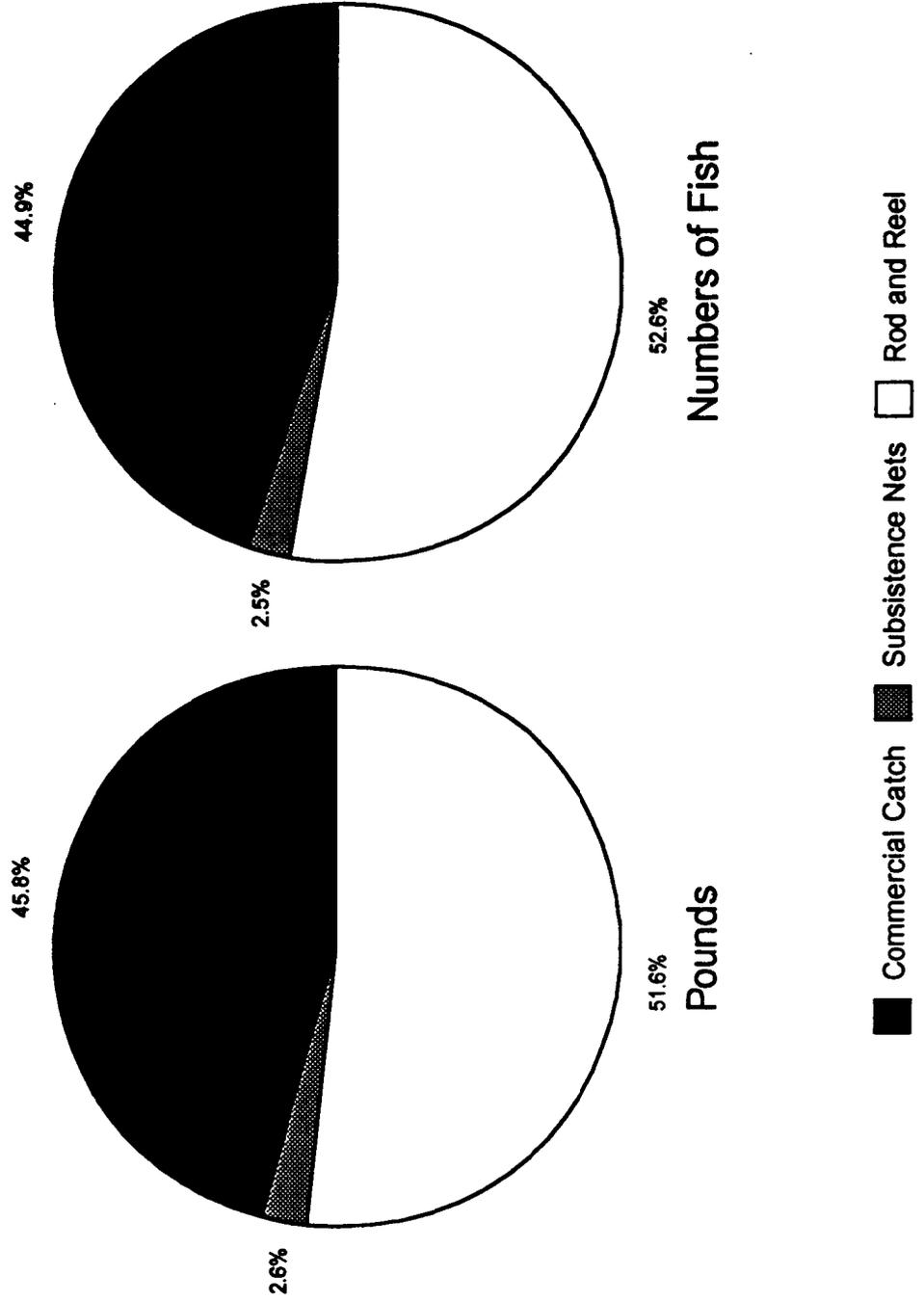
^a This percentage is based upon number of salmon.

Source: Division of Subsistence Household Survey 1989.

Table 19. Percentages of Salmon Harvest By Resource, Geartype, and Salmon Total Harvest, Cordova, 1988

Resource	Percent Base	Removed from Commercial Catch		Subsistence Methods						Rod and Reel		Any Method	
		No.	Lbs.	Net		Other		Subsistence Gear Any Method		No.	Lbs.	No.	Lbs.
				No.	Lbs.	No.	Lbs.	No.	Lbs.				
Salmon	total	44.92	45.80	1.95	1.98	0.50	0.60	2.45	2.58	52.63	51.63		
Chum Salmon	geartype	12.75	10.94	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.46		
	resource total	95.44	95.44	0.00	0.00	0.00	0.00	0.00	0.00	4.56	4.56	6.00	5.25
Coho Salmon	geartype	16.32	16.50	7.13	7.24	69.57	59.88	19.86	19.46	85.55	89.93		
	resource total	13.87	13.87	0.26	0.26	0.66	0.66	0.92	0.92	85.21	85.21	52.84	54.48
Chinook Salmon	geartype	15.24	40.57	17.37	46.44	13.91	31.53	16.67	42.98	1.36	3.77		
	resource total	85.89	85.89	4.25	4.25	0.87	0.87	5.12	5.12	8.99	8.99	7.97	21.63
Pink Salmon	geartype	7.75	2.70	0.00	0.00	0.00	0.00	0.00	0.00	7.84	2.84		
	resource total	45.75	45.75	0.00	0.00	0.00	0.00	0.00	0.00	54.25	54.25	7.61	2.70
Sockeye Salmon	geartype	47.95	29.28	75.50	46.32	16.51	8.59	63.47	37.56	4.73	3.01		
	resource total	84.19	84.19	5.75	5.75	0.32	0.32	6.08	6.08	9.74	9.74	25.58	15.93
		21.54	13.41	1.47	0.92	0.08	0.05	1.55	0.97	2.49	1.55		

Figure 9. Composition of Salmon Harvest
by Gear Type, Cordova, 1988



regulations in place in 1988 were still fairly restrictive, putting subsistence fishers in direct competition with commercial fishermen (see Stratton 1989). Table 20 summarizes subsistence salmon fishing seasons and bag limit regulations since statehood.

Coho salmon provided the largest portion of the salmon harvest in Cordova in 1988 (Fig. 10). Also, more households fished for cohos (70.9 percent) than any other type of salmon (Table 15). Composition of the salmon harvest was remarkably consistent between the two harvest years. In both years, coho salmon dominated the salmon harvest, followed by chinook and sockeye. Pink and chum harvests were relatively small in both 1985 and 1988.

The dominance of coho, chinook, and sockeye salmon in Cordova's home use harvests contrasted with the relative abundance of species, and the species taken in largest quantities in the commercial harvests of the Prince William Sound area. As shown in Table 21, pink and chum salmon made up the bulk of the commercial catch in 1988. Rod and reel harvests reported from the statewide sport fish harvest survey show angler interest in coho salmon in the Cordova area, although respondents to this statewide survey (which includes nonlocal sportfishermen as well as residents of Cordova) took more pink salmon in the sport fishery (Mills 1989). Compared with the 1985 sport harvest survey, angler harvests of all but pink salmon increased, with the largest increases in sport harvests of chum (345 percent), coho salmon (66 percent), and sockeye (65 percent).

As also shown in Table 21, in 1988, commercial fisheries accounted for 99.567 percent of the total salmon catch in the Prince William Sound area. Sport harvests made up 0.421 percent and subsistence harvests as reported on returned permits represented just 0.012 percent. Cordova residents' salmon harvests for home use, as recorded in the household surveys conducted by the division, represent 0.134 percent of the total Prince William Sound area salmon harvests in 1988 (Table 21). Very similar relationships between commercial, sport, subsistence, and Cordova's home use harvests of salmon were documented for 1985 in an earlier division study (Stratton 1989:95-97).

TABLE 20. PRINCE WILLIAM SOUND/COPPER RIVER SUBSISTENCE SALMON FISHING REGULATION SUMMARY 1960-1990

Year/District	Open Areas	Season	Gear Type	Bag Limit	Additional Requirements
1960/PWS Copper River/ Bering River	Areas open commercially	During commercial openers	Commercial gear type	100 salmon	Must have permit from ADF&G
1961/PWS	Same	Same	Same	Same	Added stipulation that commercial salmon permit holder could not hold a subsistence permit.
1962/CR	Same	Same	Same	10 kings, 25 reds, 25 cohos	One permit per person per year.
1964/CR	Same	Same	Same	5 kings, 10 reds 10 cohos	
1974/PWS & CR	Same	Same	Gillnets ltd to 50 fathoms	10 salmon annually	One permit per house- hold per year
1976/PWS & CR	Same	Same	pole and line not considered subsistence		
1981/PWS & CR	Same	Same	Same	15 salmon for household of 1 30 salmon for household of 2 10 salmon for each additional person No more than 5 kings per permit.	
1988	Same	Same	Same	Same	Commercial fishermen allowed permits.

Figure 10. Composition of Salmon Harvest
by Species, Cordova, 1988

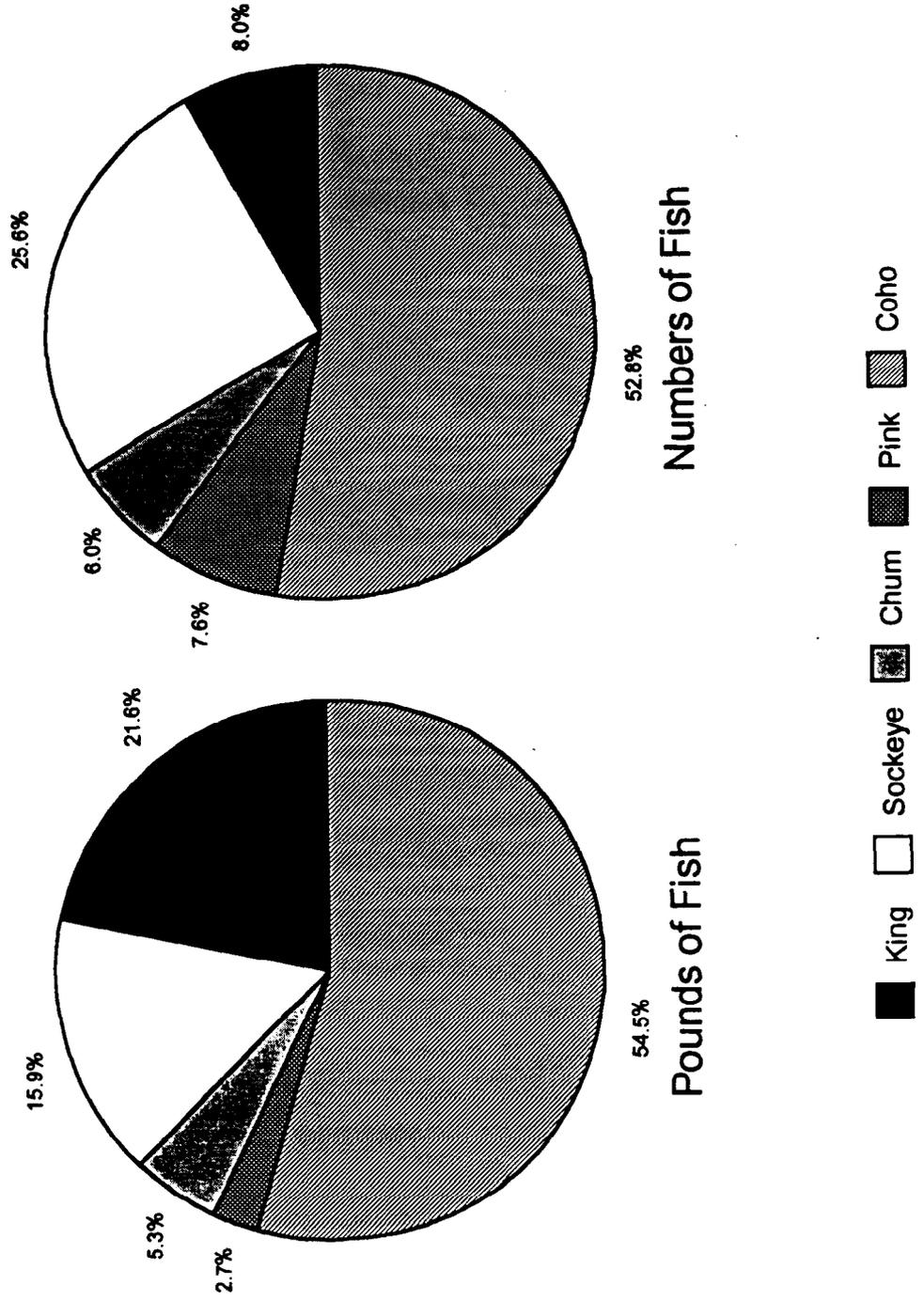


TABLE 21. PRINCE WILLIAM SOUND/COPPER RIVER 1988 SALMON HARVEST SUMMARY

Species	Reported Harvests in Numbers of Salmon			Total	Cordova ^d
	Commercial ^a	Sport ^b	Subsistence ^c		
Chinook	31,797	443	64	32,304	1,596
Sockeye	767,674	4,783	537	772,994	5,123
Chum	1,843,317	7,237	502	1,851,056	1,201
Pink	11,820,121	31,470	456	11,852,047	1,524
Coho	477,816	19,262	306	497,384	10,583
Total	14,940,725	63,195	1,865	15,005,785	20,027
Percentage	99.567%	0.421%	0.012%		0.134%

^a Source: Brady et al. 1990:34 (commercial fish ticket returns)

^b Source: Mills 1989:24-29 (statewide sportfish survey)

^c Includes harvests reported by subsistence permit holders for the Prince William Sound, Copper River Flats, Tatitlek, and Southwestern districts. (Source: Brady et al. 1990:128-130.) It should be noted that the estimated salmon harvest for Tatitlek for 1988 based upon household surveys was 97 chinook, 1,179 sockeye, 793 chum, 1,469 pink, and 1,451 coho, for a total of 4,989 salmon. This includes salmon removed from commercial harvests (21 percent of all salmon), taken with rod and reel (0.7 percent), and harvested with subsistence methods (78.3 percent). Thus, reported harvests from the permit system severely underestimated Tatitlek's harvest for home use in 1988 (Stratton 1988:92-96). Substituting the survey data for Tatitlek for the permit data would result in a slightly larger estimate for the total number of salmon harvested in Prince William Sound in 1988, but would not significantly change the percent of this total taken by commercial, sport, and subsistence fisheries.

^d Total take by Cordova residents for home use by all methods (removal from commercial catches, rod and reel, and subsistence methods) based upon the Division of Subsistence household survey. Some of this harvest, especially fish removed from commercial catches for home use, may not be accounted for in the harvest ticket and permit records.

Other Finfish

In 1988, halibut accounted for 63.2 percent of Cordova's "other finfish" harvest at 57.8 pounds per capita. Thirteen percent of the halibut harvest was brought home from commercial fishing activities (Table 22). Over three fourths of the surveyed households (87.1 percent) used halibut. Almost half of the households reported giving and receiving halibut. Herring was quantitatively the second largest other finfish harvest at 7.2 pounds per capita, but was only harvested by 24.4 percent of the households and used by 27.6 percent. Red rockfish, locally called snapper, was the third largest harvest, at 6.8 pounds per capita, and was harvested by 26.4 percent of the households, and used by almost half (46.3 percent). Eighty-one percent of the red rockfish harvest by weight was taken incidental to other fishing activities, primarily commercial and subsistence halibut fishing. Other finfish used by at least one fourth of the surveyed households were black cod (28.8 percent), cutthroat trout (32.3 percent) and Dolly Varden (30.4 percent).

Table 22 shows which species of finfish and marine invertebrates were taken for home use using both commercial and non-commercial gear in 1988. In total, 130,650 pounds of fish and marine invertebrates were removed from commercial catches for home use in Cordova in 1988. This represents 23.2 percent of the wild food by weight used by Cordova residents. The contribution of the commercial fishery to the households' food supply varied by species. All of the steelhead harvest was bycatch in commercial fisheries. All of the reported roe-on-kelp harvest, which occurs almost entirely in the north eastern Prince William Sound at least 40 miles by water from Cordova, was brought home from the commercial roe-on-kelp harvest. Eighty-nine percent of the black cod came from commercial harvests, either incidental to other groundfish fisheries, such as halibut, or brought home directly from the commercial black cod fishery. Also, 75 percent of the lingcod harvest was bycatch from other commercial bottomfish fisheries.

Table 22. Harvests Removed from Commercial Catches for Home Use, Cordova, 1988

Resource	Removed From Catch		Percent of	
	Amount	Pounds	Species Harvest (lbs)	Community Harvest (lbs)
All Resources		130,649.80		23.22
Fish		107,726.18	29.69	19.14
Salmon	8,995.46	65,383.46	45.80	11.62
Chum Salmon	1,146.70	7,155.44	95.44	1.27
Coho Salmon	1,467.87	10,788.86	13.87	1.92
Chinook Salmon	1,370.85	26,526.04	85.89	4.71
Pink Salmon	697.07	1,763.60	45.75	0.31
Sockeye Salmon	4,312.96	19,149.52	84.19	3.40
Non-Salmon Fish		42,342.72	19.24	7.52
Cod	3,191.26	10,616.16	66.80	1.89
Black Cod	2,113.22	6,550.98	89.21	1.16
Gray Cod	308.74	987.97	27.49	0.18
Lingcod	769.30	3,077.21	74.99	0.55
Flounder	69.58	208.73	8.02	0.04
Halibut		18,700.56	13.46	3.32
Herring	765.26 gal	4,591.56	26.48	0.82
Roe on Kelp	87.10 gal	609.71	100.00	0.11
Rockfish	1,871.30	7,485.18	28.03	1.33
Red Rockfish	1,226.16	4,904.65	29.92	0.87
Unknown Rockfish	645.13	2,580.54	46.90	0.46
Shark	6.96	62.62	100.00	0.01
Trout and Char	48.70	68.19	0.45	0.01
Char (general)	13.92	19.48	0.30	0.00
Dolly Varden	13.92	19.48	0.30	0.00
Trout	34.79	48.70	0.56	0.01
Steelhead	34.79	48.70	100.00	0.01
Marine Invertebrates		22,923.62	43.69	4.07
Clams	4,562.50 gal	13,687.50	41.82	2.43
Razor Clams	4,562.50 gal	13,687.50	49.73	2.43
Crabs	5,410.91	6,631.17	73.24	1.18
Dungeness Crab	2,684.10	1,878.87	69.04	0.33
King Crab	556.30	1,279.49	59.59	0.23
Tanner Crab	2,170.51	3,472.82	82.98	0.62
Octopus	285.27	1,141.07	34.75	0.20
Shrimp		1,217.04	19.13	0.22
Squid	61.71	246.83	89.87	0.04

Marine Invertebrates

Marine invertebrates contributed 9.3 percent of Cordova's total resource harvest in 1988, for a per capita harvest of 21.8 pounds (Table 15). Over half the surveyed households participated in harvesting intertidal and shellfish resources. Razor clams comprised 52.5 percent of the marine invertebrate harvest, at 11.4 pounds per capita. Half of the razor clam harvest was brought back from a commercial razor clam harvesting area (Table 22).

All crab species collectively constituted 17.3 percent of the marine invertebrates at 3.8 pounds per capita. Tanner crab made up almost half of the crab harvest. The majority of the crab harvest was brought home from commercial harvesting activities (Table 22). Also, some crab were taken incidentally in other fisheries, for example in salmon gill nets or on longlines. Sixty-nine percent of the Dungeness crab harvest was caught incidentally in other commercial fisheries.

Shrimp was the third major component of the marine invertebrate harvest in Cordova in 1988, after razor clams and crab. This resource comprised 12.1 percent of the marine invertebrate harvest, at 2.6 pounds per capita (Table 15). Shrimp were harvested by relatively few households (18.8 percent), but shared liberally, with 36.4 percent of the households reporting receiving shrimp.

The fairly low percentage of the shrimp harvest reportedly brought home from commercial catches (19.1 percent) reflects two facets of the shrimp harvest. Some local shrimp fishermen bring their commercial catch into town and sell it on the street, which is how many local people acquire fresh shrimp. Purchased shrimp were not included in the survey data. The specialized gear, shrimp pots and a large enough boat to pull pots, also are a factor. That so much of the shrimp taken noncommercially were by relatively few households (18.8 percent) is a consequence of the specialized equipment. The substantial sharing of shrimp suggests that shrimp are fairly abundant near Cordova.

Octopus were taken during low tides from under rocks and caught in pots and on longlines. Thirty-five percent of the octopus harvest for home use was reported as incidental to commercial tanner crab fishing. Ninety percent of the squid harvested were reported as bycatch.

Game

In 1988, Cordova residents harvested 120,767.4 pounds of game (50.2 pounds per capita), representing 21.5 percent of Cordova's total wild resource harvest (Table 15). Just over half (51.8 percent) of the game harvest was deer meat, at 26.0 pounds per capita. Moose was second, contributing 42.2 percent of the game harvest and 21.2 pounds per capita. Hares, which included both local snowshoe hare and European rabbits which inhabit Middleton Island, were a distant third, at 2.5 percent of the game harvest, and 1.2 pounds per capita.

Marine Mammals

As in 1985, marine mammal harvests contributed a comparatively small volume to Cordova's overall food harvest, about 1,948 pounds for the community ((0.8 lbs per capita) (Table 15). Harbor seals were the primary marine mammal harvested. Marine mammals harvests are much lower per capita in Cordova than other Prince William Sound communities such as Tatitlek and Chenega Bay for at least two reasons. A much smaller percentage of Cordova's residents hunt marine mammals, as eligibility is limited to Alaska Natives. Only 10 percent of Cordova's population was Alaska Native according to estimates based on the survey. Also, seals were not abundant in Orca Inlet, requiring Cordova residents to travel much further in order to take seals.

Birds and Eggs

By weight, two percent of Cordova's wild resource harvest in 1988 was birds and eggs, about 11,277 pounds (4.7 lbs per capita) (Table 15). Waterfowl comprised 82.6 percent of the bird harvest, of which two thirds were ducks and one third were geese. Ducks were harvested by 27.7 percent of the households and used by 36.3 percent. Mallards were the most frequently harvested ducks (by 25.1 percent of the households) and accounted for over half of the duck harvest by weight (1.3 lbs per capita),

followed by widgeon (0.4 lbs per capita), and pintail ducks (0.3 lbs per capita). Geese, almost entirely Canada geese, were harvested by 16.6 percent of the households, and supplied 1.4 lbs per capita of the total harvest.

Reported egg harvests were very low. As harvests of migratory bird eggs and sea bird eggs are not currently legal activities, the low number of households reporting use or harvest was not unanticipated. Statutory prohibitions against harvesting gull eggs may have inhibited some households from reporting their harvests during the survey, resulting in an underestimate of the total community take.

Wild Plants

Cordova residents harvested about 13,448.5 pounds of plans and berries (5.6 lbs per capita), which accounted for 2.4 percent of the total wild food harvest in 1988 (Table 15). Almost all of the edible vegetation gathered (96.4 percent) was berries, predominantly salmonberries and blueberries. A listing of berries picked in 1988 is provided in Table 13. Berries provided 5.4 pounds per capita. Other plants contributed 0.2 pounds per capita. Seaweed used by sampled Cordova households was harvested in southeast Alaska and brought from there to Cordova for use.

Cordova residents used about 1,573 cords of wood in 1988. Wood was used to heat homes and for smoking wild foods. It was not included in the per capita harvest summary. The mean harvest was 1.8 cords per household.

EQUIPMENT USED

Highway vehicles were used for resource harvesting activities in 1988 by three quarters of the surveyed Cordova households (Table 23). Highway vehicles, including both cars and trucks, were typically used to access fishing, vegetation gathering, and hunting sites. Other transportation modes many surveyed households utilized were skiffs (57.6 percent) and commercial fishing boats (47.6 percent), both of which were used for hunting and fishing. Airplanes, employed by 26.5 percent of the respondents, were

TABLE 23. PERCENTAGE OF HOUSEHOLDS USING VEHICLE TYPES FOR RESOURCE ACTIVITY, CORDOVA 1988

Resource Activity	Air Plane	Air Boat	Skiff ^a	Pleasure Boat ^b	Comm Boat	Canoe/Raft	ATV	Snow Machine	Hwy Vehicle	Motor Home	ANY VEHICLE ^c
Hunting	22.6	10.2	28.6	8.7	38.5	8.7	13.0	2.9	25.6	0.8	61.0
Deer	14.5	0.0	23.4	8.6	36.1	6.2	9.5	0.0	9.1	0.0	55.6
Moose	8.2	10.2	4.4	0.0	4.9	2.5	2.0	0.0	5.2	0.8	21.4
Bear	3.0	0.0	1.5	0.3	3.0	0.0	1.5	0.0	0.9	0.0	6.1
Hare	0.0	0.0	0.0	0.0	0.0	0.0	2.9	2.1	8.5	0.0	11.5
Trapping	1.5	0.0	1.0	0.1	3.8	0.9	1.6	1.0	3.2	0.0	8.0
Waterfowl	4.1	9.6	27.6	0.0	18.6	7.1	11.4	0.0	25.7	1.3	46.8
Fishing	0.8	1.5	41.2	18.7	24.9	12.9	2.3	0.0	47.0	5.0	72.8
Salmon	0.8	1.5	25.2	6.2	9.4	6.0	0.0	0.0	21.8	0.0	46.4
Bottomfish	0.0	0.0	9.7	12.0	16.8	2.9	0.0	0.0	2.1	0.0	33.3
Trout	0.0	0.0	8.2	0.0	0.0	3.9	1.5	0.0	10.4	0.0	19.3
Shellfish	9.4	0.0	8.9	1.5	17.8	0.0	1.5	0.0	0.0	2.1	30.6
Clams	9.4	0.0	8.9	1.5	9.9	0.0	1.5	0.0	0.0	2.1	25.9
Shrimp	0.0	0.0	0.0	0.0	15.3	0.0	0.0	0.0	0.0	0.0	15.3
Marine Mammals	0.0	0.0	1.4	0.0	1.4	0.0	0.0	0.0	0.0	0.0	2.8
Wild Plants	4.4	0.0	3.6	0.0	3.6	3.6	1.5	0.8	29.2	0.0	36.9
Berries	4.4	0.0	2.9	0.0	2.9	3.6	0.0	0.0	26.7	0.0	32.7
Wood	0.0	0.0	2.7	0.0	0.0	0.0	2.7	1.3	15.8	0.0	18.6
Any Activity	26.5	14.1	57.6	23.5	47.6	23.4	18.9	5.5	75.7	5.0	85.0

^aA small, motorized open craft, usually 16 ft or shorter.

^bA motorized boat, with cabin and usually with sleeping facilities.

^cSummary lines include activities not reported in table.

Source: Division of Subsistence, Alaska Department of Fish and Game, Household Survey 1989.

primarily used for transportation for hunting and clam digging. "Pleasure boats," defined as motorized boats with cabins, were used by 23.5 percent of the households. Non-motorized water craft such as canoes, rafts and kayaks were used by 23.4 percent of those surveyed, largely for fishing.

Households often mentioned using a commercial fishing boat for hunting (38.5 percent of the households). Skiffs were the second most utilized mode of transportation for hunting (28.6 percent), followed by highway vehicles (25.6 percent) and airplanes (22.6 percent). Deer hunters were most likely to use a commercial fishing boat (36.1 percent) or a skiff (23.4 percent). The most common modes of transportation for moose hunting households were airboats (10.2 percent) and airplanes (8.2 percent). Highway vehicles were the main vehicle associated with hare hunting. Skiffs and highway vehicles were used by most waterfowl hunting households.

Highway vehicles were used by more households for fishing (47 percent) than skiffs (41.2 percent), or commercial fishing boats (24.9 percent). Salmon fishing was pursued using skiffs (25.2 percent). Angling for trout and salmon occurred on the Copper River Delta and on the Eyak River, in areas accessible by highway vehicle. Shellfish gathering activities were different, with commercial fishing boats dominant (17.8 percent of the households).

Many households gathered vegetation without using any vehicle. Twenty-seven percent of the surveyed households used a highway vehicle. Highway vehicles were also the choice of transportation for wood gathering households (15.8 percent).

All-terrain vehicles (ATVs) were used by 18.9 percent of the surveyed households in conjunction with deer hunting and waterfowl hunting. Snowmachines were used by a few households for hunting and wood cutting. A few respondents used motorhomes to travel to fishing sites.

CHAPTER FOUR: DISCUSSION AND CONCLUSIONS

GENERAL SUMMARY

This report has summarized the results of research concerning levels of harvest and use of wild resources in Cordova in 1988. The report has also compared these study findings with similar data from 1985. The results indicate that Cordova experienced little change in its demographic characteristics and in resource harvest characteristics between the two study years. Cordova households continued to use and harvest wild resources at substantial levels. Variations between harvest levels for most resource categories between the two study years were slight, with a few notable exceptions. Most significantly, there was an increase in the per capita harvest of fish other than salmon. This in turn, combined with relative stability in other harvest levels, resulted in a significantly higher total per capita resource harvest of 233.8 pounds in 1988, compared with 163.8 pounds in 1985. It is not known if this difference is part of a typical variation from year to year in harvest levels or is an indication of a trend towards higher levels of resource harvest in the community.

In 1988, as in 1985, Cordova households continued to harvest and use a notable range of wild foods. In both years, marine resources predominated. In 1988, almost three quarters of the per capita harvest (74.1 percent) was derived from marine resources, including salmon, other finfish, marine mammals, and marine invertebrates. Because of larger harvests, fish other than salmon grew in its relative contribution to the total community resource harvest, from 22.5 percent in 1985 to 39.1 percent in 1988.

Employment patterns in Cordova in 1988, like resource harvest patterns, also showed continuity with 1985. Much cash employment also centered on marine resources. Commercial fishing and the commercial fishing industry dominated the jobs available and provided much of the income in the community.

COMPARISONS WITH OTHER COMMUNITIES

As shown in Table 24 and Figure 11, recorded per capita harvests of wild resources for Cordova (163.8 lbs, 233.8 lbs) have been lower than those of two other Prince William Sound communities for which harvest data are available, Chenega Bay (308.8 lbs, 374.2 lbs) and Tatitlek (351.7 lbs, 643.5 lbs). Chenega Bay and Tatitlek are small, predominantly Alaska Native villages with relatively low cash incomes as well as very long traditions of wild resource use (Stratton and Chisum 1986; Stratton 1990). Cordova demonstrated a similar pattern of reliance on marine resources, although finfish excluding salmon comprised a somewhat higher percentage of the community's food supply. Comparable harvest data are not available for Valdez and Whittier, the other two Prince William Sound communities.¹

As shown in Figure 11, in terms of resource harvests for home uses, Cordova ranks higher than or at the same level as a number of other coastal communities of southern Alaska. Cordova's 1988 per capita harvest of 233.8 pounds was notably above recent measurements for Homer (93.8 pounds), Kenai (37.9 pounds), Kodiak City (147.2 pounds), Sitka (146.3 pounds), Petersburg (200.3 pounds), and Wrangell (164.2 pounds).

It is interesting to note that Kodiak City exhibits a similar relationship in terms of level of resource harvests with the villages of Kodiak Island (such as Ouzinkie, Larsen Bay, and Old Harbor), as does Cordova with the outlying villages of Chenega Bay and Tatitlek. A similar relationship may obtain between Chignik Bay and the more remote villages of Chignik Lake, Perryville, and Ivanof Bay (see Morris 1987). Like Cordova, Kodiak City and Chignik Bay have more culturally mixed populations, relatively larger incomes, and more cash employment opportunities than these other communities. On the other hand, all three places retain an orientation towards marine resources through involvement in subsistence fisheries, commercial fisheries, and fish processing. Also, all three have substantial, indigenous Alaska Native populations with cultural traditions associated with subsistence uses of wild resources. These shared

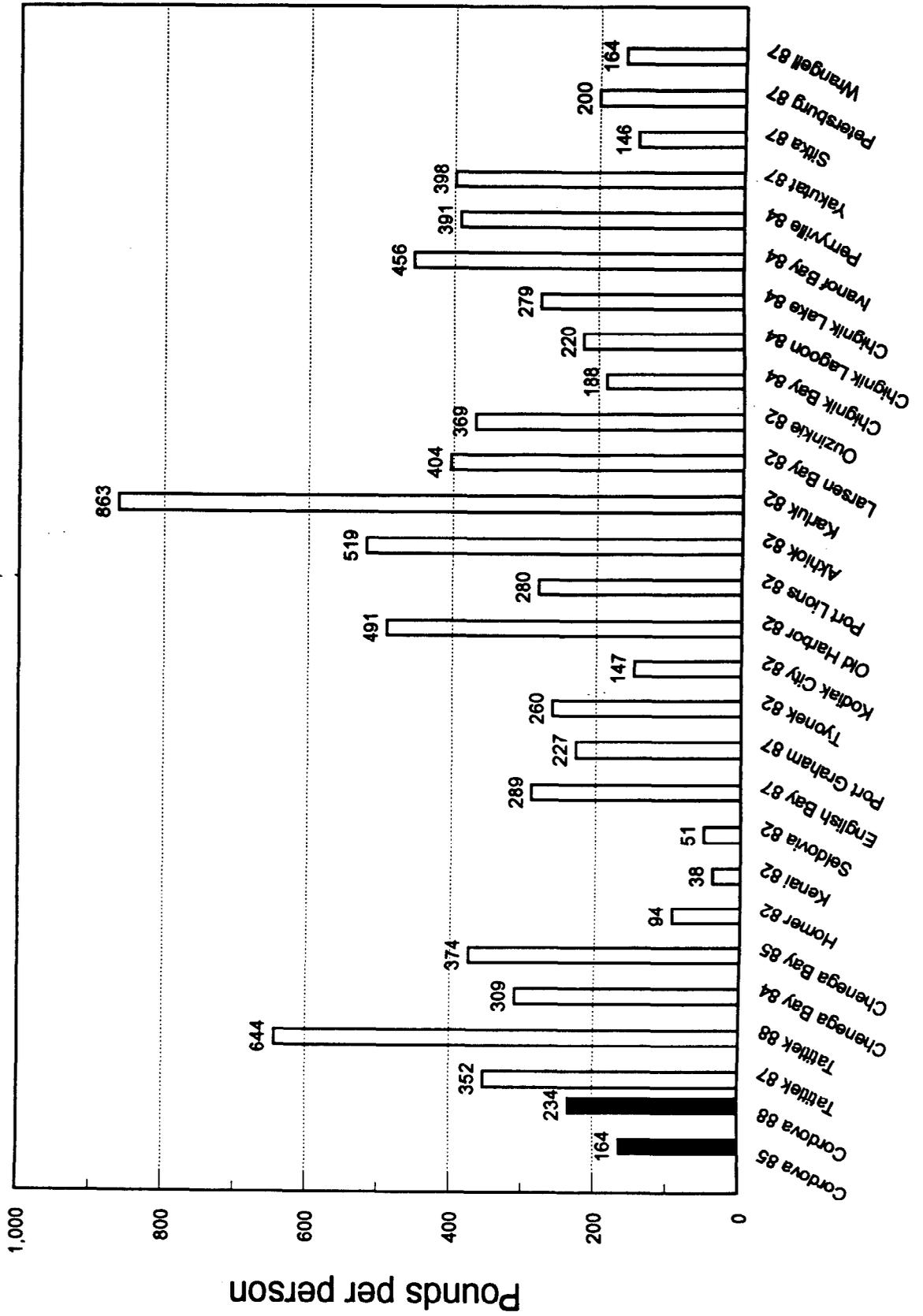
¹ In 1990, the division administered systematic household harvest surveys in Whittier, and in 1991, similar research was conducted in Valdez. The results of these studies were not available at the time this report was completed, but these results will be reported in future Division of Subsistence technical papers.

TABLE 24. WILD RESOURCE HARVESTS IN SELECTED ALASKA COMMUNITIES

<u>Community</u>	<u>1990 Population</u>	<u>Study Year</u>	<u>Harvest, Pounds Per Capita</u>
<i>Prince William Sound</i>			
Chenega Bay	94	1985/86	374.2
Cordova	2,282	1988	233.8
Tatitlek	119	1988/89	643.5
<i>Southeast Alaska</i>			
Petersburg	3,207	1987	200.3
Sitka	8,588	1987	146.3
Wrangell	2,479	1987	164.2
Yakutat	534	1987	398.1
<i>Cook Inlet</i>			
English Bay	158	1987	288.8
Homer	3,660	1982	93.8
Kenai	6,327	1982	37.9
Ninilchik	456	1982	85.5
Port Graham	166	1987	227.4
Seldovia	316	1982	50.7
Tyonek	154	1982/83	259.9
<i>Kodiak Island Borough</i>			
Akhiok	77	1982/83	519.5
Karluk	71	1982/83	863.2
Kodiak City	6,365	1982/83	147.2
Larsen Bay	147	1982/83	403.5
Old Harbor	284	1982/83	491.1
Ouzinkie	209	1982/83	369.1
Port Lions	222	1982/83	279.8
<i>Alaska Peninsula</i>			
Egegik	122	1984	384.3
Pilot Point	53	1986/87	383.7
Port Heiden	119	1986/87	407.6
<i>Chignik Area</i>			
Chignik Bay	188	1984	187.9
Chignik Lagoon	53	1984	220.2
Chignik Lake	133	1984	279.0
Ivanof Bay	35	1984	455.6
Perryville	108	1984	391.2

Sources: Fall 1990, Fall and Morris 1987, Stanek 1991, Stratton 1990, Paige et al. 1991, Alaska Department of Labor 1991

Figure 11. Comparison of Per Capita Harvests in Various Communities.



characteristics suggest that while harvest levels in communities such as Cordova, Kodiak City, and Chignik Bay may be lower than those of more isolated villages, their populations continue to value and use wild resources. Their harvest levels, levels of participation in hunting and fishing, and range of resources used, remain substantially higher than more urbanized and industrialized places such as Kenai, Homer, or Anchorage.

In summary, the findings of the research conducted by the Division of Subsistence in Cordova for 1988, combined with the results of the study pertaining to 1985, provide substantial evidence of the continuing important role of hunting, noncommercial fishing, and gathering for the people of Cordova. Levels of production are relatively large, involve a large majority of the community's population, and are diverse. Resource sharing patterns are strong within the community. The two years' comparisons suggest that this pattern of harvest and use of wild foods in Cordova is relatively stable across years. None of the comparisons suggested a diminishing role for noncommercial fishing, hunting, and gathering in the community's way of life through the 1980s.

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CORDOVA RESOURCE USE AND MAPPING STUDY, 1989

HOUSEHOLD ID# _____ Date _____ Interviewer _____

The purpose of this survey is to gather information about the fish and game resource activities of your household from January through December 1988. When we ask "Did you use a resource?" we mean did your family harvest it, eat it, serve it, or otherwise use it in your home.

1. HOUSEHOLD INFORMATION

ID #	M/F	BIRTHDATE MM/DD/YY	RESIDENCE OF PARENT WHEN YOU WERE BORN	YEAR YOU MOVED TO CORDOVA	PLACE YOU MOVED FROM	ETHNICITY	LENGTH OF EXTENDED ABSENCE IN 1988
1							
HEAD							
2							
SPOUSE							
3							
4							
5							
6							
7							
8							
9							

2. Using Person's I.D. #'s from the table above, indicate which household members participated in harvesting activities during 1988.

Hunting _____ Fishing (incl clams, etc) _____ Plant Gathering _____
 Trapping _____ Held 1988 Sport Fish license _____

3. COMMERCIAL FISHING Did members of your household participate in commercial fishing during 1988? YES _____ NO _____
 If YES, please complete the following table (lbs reflect dressed weight):

SPECIES	FISHED		LOCATION	GEAR TYPE	NUMBER REMOVED		ID #'S OF FISHERMEN
	YES	NO			HOME USE	GAVE AWAY	
CHINOOK (11501)							
SOCKEYE (11701)							
CHUM (11201)							
PINK (11601)							
COHO (11401)							
HERRING (12451)					gal	gal	
ROE ON KELP(12511)				xxx	gal	gal	
KING CRAB (47221)				xxx			
DUNGENESS (47211)				xxx			
TANNER (47231)				xxx			
SHRIMP (47261)				xxx	lbs	lbs	
BLACK COD (12261)				xxx			
GRAY COD (12271)				xxx			
FLOUNDER (12311)				xxx			
HALIBUT (12401)				xxx	lbs	lbs	
GROUND FISH(12941)				xxx			
RAZOR CLAMS(47171)				xxx	gal	gal	
SCALLOPS (47551)				xxx	lbs	lbs	
OTHER (Specify)							

4. NON-COMMERCIAL FISHING

A. Did your household have a CR/PWS subsistence salmon fishing permit in 1988? YES _____ NO _____

B. Did your household try to harvest or use salmon in 1988? YES _____ NO _____

If YES, please complete the following table:

SPECIES	USED		TRIED HARVEST		NO. HARVESTED BY GEAR TYPE			RECEIVED		GAVE AWAY	
	YES	NO	YES	NO	SUBS NET	ROD & REEL	OTHER	YES	NO	YES	NO
CHINOOK (11502)											
SOCKEYE (11702)											
CHUM (11102)											
PINK (11602)											
COHO (11402)											
SIM unk (11000)											

5. Did your household try to harvest or use any other fish in 1988? YES _____ NO _____

If YES, please complete the following table (lbs reflect dressed weight):

SPECIES	USED		TRIED HARVEST		NUMBER HARVESTED BY GEAR TYPE			RECEIVED		GAVE AWAY		
	YES	NO	YES	NO	SUBS NET	ROD & REEL	HANDLINE	OTHER	YES	NO	YES	NO
HOOLIGAN/SMELT(12750)					gal	gal	gal	gal				
HERRING (12452)					gal	gal	gal	gal				
HERRING ROE (12500)					gal	gal	gal	gal				
ROE-ON-KELP (12512)					xxxxxx	xxxxxxx	xxxxxxx	gal				
FLOUNDER (12312)												
HALIBUT (12402)					lbs	lbs	lbs	lbs				
RAINBOW (12860)												
CUTTHROUT (12840)												
GRAYLING (12350)												

5. (cont.)

SPECIES	USED		TRIED HARVEST		NUMBER HARVESTED BY GEAR TYPE			RECEIVED		GAVE AWAY		
	YES	NO	YES	NO	SUBS NET	ROD & REEL	HANDLINE	OTHER	YES	NO	YES	NO
DOLLY VARDEN (12830)												
LING COD (12280)												
BLACK COD (12262)												
GRAY COD (12272)												
RED ROCKFISH (12620)												
BLACK ROCKFISH(12630)												
GROUND FISH (12942)												
GREENLING (12770)												
SOLE (12322)												
STURGEON (12180)					lbs	lbs	lbs	lbs				
OTHER (Specify)												

6. Did your household try to harvest or use any type of marine invertebrate or intertidal resource in 1988?
 YES ___ NO ___? If YES, please complete the table below:

SPECIES	USED		TRIED HARVEST		NUMBER HARVESTED	RECEIVED		GAVE AWAY	
	YES	NO	YES	NO		YES	NO	YES	NO
RAZOR CLAMS (47172)					gal				
OTHER CLAMS (47150)					gal				
COCKLES (47300)					gal				
CHITON (47400)					gal				
MUSSELS (47450)					gal				
OCTOPUS (47500)									

6. cont.

SPECIES	USED		TRIED HARVEST		NUMBER HARVESTED	RECEIVED		GAVE AWAY	
	YES	NO	YES	NO		YES	NO	YES	NO
SHRIMP (47662)					lbs				
KING CRAB (47222)									
DUNGENESS CRAB(47212)									
TANNER CRAB (47232)									
SCALLOPS (47552)					lbs				
OTHER									

7. LAND MAMMALS

Did your household try to harvest or use game in 1988? YES _____ NO _____
 If YES, please complete the following table:

SPECIES	USED		TRIED HARVEST		NUMBER HARVESTED FOR FOOD FOR FUR	LBS USED ¹	RECEIVED		GAVE AWAY	
	YES	NO	YES	NO			YES	NO	YES	NO
BROWN BEAR (23150)										
BLACK BEAR (23100)										
DEER (23250)					XXXXX	XXXXX				
GOAT (23350)					XXXXX	XXXXX				
MOOSE (23400)					XXXXX	XXXXX				
HARE (24200)					XXXXX	XXXXX				
PORCUPINE (24550)										
OTHER										

¹ Lbs bear meat salvaged by harvester.

8. MARINE MAMMALS

Did your household try to harvest or use marine mammals or marine mammal products during 1988? YES ___ NO ___
 If YES, please complete the table below:

SPECIES	USED		TRIED HARVEST		NUMBER HARVESTED	LBS USED FOR FOOD ¹	PORTIONS USED ²	RECEIVED		GAVE AWAY	
	YES	NO	YES	NO				YES	NO	YES	NO
HARBOR SEAL (35430)											
SEA LION (35300)											
SEA OTTER (35350)											
OTHER (Specify)											

9. FURBEARERS Did anyone in your household try to harvest or use furbearers during 1988? YES ___ NO ___
 If YES, please complete the following table:

SPECIES	USED		TRIED HARVEST		NUMBER HARVESTED	NUMBER USED FOOD	RECEIVED		GAVE AWAY		NUMBER SOLD	AVERAGE PRICE
	YES	NO	YES	NO			YES	NO	YES	NO		
BEAVER (24100)												
COYOTE (24150)						XXXXXXX						
LAND OTTER (24250)						XXXXXXX						
LYNX (24300)												
MARTEN (24400)						XXXXXXX						
MINK (24450)						XXXXXXX						
MUSKRAT (24500)												
WEASEL (24650)						XXXXXXX						
WOLVERINE (24750)						XXXXXXX						
WOLF (24700)						XXXXXXX						

10. BIRDS

Did your household try to harvest or use birds during 1988? YES ___ NO ___ If YES, please complete table below:

SPECIES	USED		TRIED HARVEST		NUMBER HARVESTED	RECEIVED		GAVE AWAY	
	YES	NO	YES	NO		YES	NO	YES	NO
PTARMIGAN (46450)									
GROUSE (46400)									
CANADA GEESE (46320)									
OTHER GEESE:									
SANDHILL CRANE(46100)									
BUFFLEHEAD (49100)									
EIDER (49120)									
GOLDENEYE (49140)									
MALLARD (49160)									
MERGANSER (49170)									
OLDSQUAW (49180)									
PINTAIL (49190)									
SCOTER (49200)									
TEAL (49260)									
WIGEON (49270)									
DUCKS UNKNOWN(49300)									
OTHER									
GULL EGGS (46250)									
DUCK EGGS (46220)									

11. PLANTS

Did your household harvest or use wild plants in 1988? YES _____ NO _____

If YES, please complete table below:

SPECIES	USED		TRIED HARVEST		AMOUNT HARVESTED	RECEIVED		GAVE AWAY	
	YES	NO	YES	NO		YES	NO	YES	NO
BERRIES (48050)					gal				
PLANTS (48100)					qts				
SEAWEED (48150)					gal				
FIREWOOD (48250)					cords				

12. EQUIPMENT

Did your household own any of the following equipment, or use it for hunting or fishing in 1988?

TYPE OF EQUIPMENT	NUMBER OWNED (0 if only used)	RESOURCE ACTIVITIES IN 1988 FOR WHICH EQUIPMENT WAS USED
Airplane		
Airboat		
Skiff (under 18 ft)		
Pleasure craft		
Commercial Boat		
Non-motorized boat		
3 wheeler/ATV		
Snowmachine		
Highway vehicle		

13. EMPLOYMENT HISTORY

Please complete the following information for all jobs held by the employed adult household members listed in question 1 during the calendar year 1988.

ID# FROM Q. #1	JOB TITLE*	EMPLOYER	LOCATION	WHICH MONTHS WORKED IN YEAR	HOURS WORKED PER WEEK	INCOME
				J F M A M J J A S O N D		
				J F M A M J J A S O N D		
				J F M A M J J A S O N D		
				J F M A M J J A S O N D		
				J F M A M J J A S O N D		
				J F M A M J J A S O N D		
				J F M A M J J A S O N D		
				J F M A M J J A S O N D		

* For those not employed, please specify Retired, Unemployed, Disabled, Student, Homemaker

14. Other Income Sources (Check all that apply and indicate amount)

Social Security \$ _____ Pension/Retirement \$ _____ Longevity Bonus \$ _____
 Adult Public Asst \$ _____ Disability \$ _____ Energy Assistance \$ _____
 AFDC \$ _____ Food Stamps \$ _____ Perm Fund Dividend \$ _____
 Corp Dividend \$ _____ Other \$ _____

15. Please estimate your monthly household expenses.

_____ Heating fuel _____ Transportation fuel _____ Water _____ Housing
 _____ Food _____ Electricity _____ Phone _____ Propane _____

16. COMMENTS, QUESTIONS, CONCERNS

Do you have any questions or concerns regarding hunting, fishing, or Forest Service? If Yes, record below (and on back side of page if necessary). If not, begin mapping session.

17. Interviewer's log of maps and resources associated with interview. Check all that apply.

QUAD	DEER - EVER	DEER - FRE	MOOSE	WATERFOWL	INVERTEBRATES	SALMON
ANCHORAGE						
BLYING SOUND						
CORDOVA						
MIDDLETON ISLAND						
SEWARD						
VALDEZ						

**APPENDIX B
MAPPING METHODOLOGY**

Preparation before interview: have primary mylar quad (Cordova) prepared with an overlay, with the corresponding paper map available. It will not register, but can assist the R in recognizing features. Also have overlays prepared for adjacent quads. Maps produced during the interview are as important as the survey form. Lines on the maps will be digitized, straight from the maps you turn in. Therefore, consistent rules and accuracy are essential.

<u>Color code</u>	<u>Alpha Code</u>	<u>Resource Category</u>
Green:	A	Deer, ever used
Red:	B	Deer, most frequently used
Brown:	C	Moose, ever used
Blue:	D	Waterfowl, ever used
Purple:	E	Intertidal, ever used
Orange:	F	Salmon, ever used

1. When you begin the session, add tick marks to the map, and interview number to the legend.
2. Do not map something not included in the categories above.
3. Be sure that R takes into account roads, coastlines, elevation, slope, and vegetation when drawing lines.
4. When identifying a coastal resource area, use the coastline as a boundary and connect a single line to the coastline in two and only two places. Mark the area with the alpha code in the appropriate color to show on which side of the line the harvest area is located. Example 2.
5. If the area is too narrow to accurately show with an oblong shape, draw a single line and annotate: "buffered line". A buffered line denotes a resource harvest area that is 400 yards or less in polygon width. If the respondent gives the distance, write the distance on the map. If the line falls directly on the coastline (for example, a marine invertebrate gathering area), draw two short lines perpendicular to the coast on either end of the coastal area and annotate: "buffered line for (alpha code for map category)" (Example 3). When a line touches a coastline it denotes the high tide coast line and does not include the intertidal zone. It is possible to have a buffered point.
6. If two or more resources are harvested in exactly the same area, draw the area in one pen color and annotate "also (alpha code for map category)" in the appropriate color (Example 5).
7. If the area encompasses an entire island or lake, place the appropriate alpha code in the middle of the feature (Example 4).
8. If the harvest area includes a set of small islands, draw a single polygon around the islands and annotate: "land for (alpha code for map category)" "water for (alpha code)" or "buffered coastline for (alpha code)" as appropriate (Example 6).
9. Polygons that involve two maps should be left open, carefully matched and annotated "continues" on each map (Example 7). Edge match carefully after the interview, important since .25 inches corresponds to 1 mile.
10. To represent road hunting, draw a line down the road, add "road" to the notations.

11. If a color pen is lost, use a black pen.

12. Be sure mylar does not remain wet when rolled or stacked; mylar welds to itself when wet.

The respondent is the best person to draw lines. However, you will need to train the respondent to be specific and to be accurate. Use the map demonstration card. If the respondent starts to draw a large circle only loosely related to any geographic features immediately say, "can you be more specific?". Encourage the respondent to carefully draw lines, giving him/her the mapping rules as needed. Erase mistakes and make corrections immediately. Prompt R: "are there any other areas where your household harvests (map category)?"

After the interview, be sure that the legend block is filled out completely and that each line is clear and properly annotated. Be sure lines connect with map features (e.g. coastlines) where they are supposed to. Completely erase mistakes so that they are not treated as good data.

Definition of Map Categories

Deer:

Ever used: Areas used by a household member for hunting Sitka Blacktail Deer in Prince William Sound during the time they have lived in the community. Includes harvests that take place from a commercial fishing boat.

Most frequently used: Areas within the first polygons that have been used by a household member more frequently than all the other areas. If patterns have changed, most recent pattern.

Moose: same.

Waterfowl: Areas used for all species of waterfowl, including all varieties of ducks, geese, and including eggs

Marine Invertebrates: Areas used for non-commercial fishing for crab, shrimp, and scallops, for non-commercial gathering of all varieties of clams, cockles, chitons, octopus, sea urchins and cucumbers, and mussels. It also includes fish eggs. Does not include digging for commercial bait.

Salmon: Areas used by a household member for non-commercial fishing for any species of salmon during the time they have lived in Cordova.

APPENDIX C. MARKET BASKET SURVEY, FEBRUARY 1989

Item ^a	Cordova ^b	Anchorage
<i>Dairy:</i>		
Milk, fresh, half gallon	\$2.44	\$1.85
Milk, evaporated, 12 oz	.86	.69
Milk, dry, 8 qts.	4.83	4.59
Cheese, cottage, 1 lb	1.59	1.09
Cheese, American, 1 lb	3.92	3.15
Ice Cream, half gallon	3.04	2.99
Eggs, large, dozen	2.04	1.35
Margerine, 1 lb	1.39	.99
Butter, 1 lb	2.71	2.45
<i>Meat & Fish:</i>		
Top Round Steak, 1 lb	3.84	3.89
Sirloin Steak, 1 lb	4.99	4.59
T-Bone Steak, 1 lb	4.94	3.99
Chuck Roast, 1 lb	2.99	2.69
Sirloin Tip Roast, 1 lb	3.19	3.29
Ground Beef, lean, 1 lb	2.14	1.59
Pork Chops, 1 lb	3.24	2.99
Pork Loin, 1 lb	3.99	3.59
Spareribs, 1 lb	2.74	2.59
Pork Sausage, 1 lb	1.99	1.89
Ham, cured, 3 lbs	10.14	9.99
Bacon, 1 lb	2.89	2.49
Lamb chops, 1 lb	6.49	6.99
Cube steak, 1 lb	3.99	3.29
Bologna, 12 oz	2.58	2.19
Hot Dogs, 1 lb	3.24	2.49
Turkey, 1 lb	1.64	1.59
Fried Chicken, Frozen, 28 oz	5.47	3.55
Fish, Frozen Breaded, 12.25 oz	4.05	2.99
Tuna, canned, 6 oz	1.22	.99
<i>Fruit & Vegetables, Fresh:</i>		
Oranges, 1 lb	1.19	.79
Grapefruit, 1 lb	.845	.45
Orange Juice, 32 oz	2.64	1.89
Tomatos, 1 lb	2.09	1.49
Cabbage, red, 1 lb	.84	.69
Celery, 1 lb	1.04	.79
Green peppers, 1 lb	1.44	.49
Cucumbers, 1 lb	1.34	1.04
Lettuce, Iceberg, 1 lb	.94	1.29
Onions, yellow, 1 lb	.74	.39
Danish Squash, 1 lb	.94	.79

^aStore brands were used where possible.

^bPrices from two stores averaged.

Item ^a	Cordova ^b	Anchorage
Cauliflower, 1 lb	1.14	.69
Russet Potatos, 1 lb	.89	.69
Broccoli, 1 lb	\$1.14	\$.99
Delicious Apples, 1 lb	1.14	.59
Bananas, 1 lb	1.09	.79
Cantalope, 1 lb	1.64	1.19
Carrots, 2 lbs	1.79	1.29
Grapes, 1 lb	2.44	1.79
Nectarines, 1 lb	1.69	1.49
D'anjou Pears, 1 lb	1.14	.79
<i>Fruit & Vegetables, Canned, Dried, & Frozen:</i>		
Kidney Beans, canned, 15 oz	.87	.69
Lentils, dried, 1 lb	1.11	.79
Peanut Butter, 18 oz	3.33	2.75
Orange Juice, canned, 46 oz	2.98	2.49
Grapefruit Juice, canned, 46 oz	2.46	1.79
Orange Juice, frozen, 12 oz	2.28	1.59
Tomatos, canned, 14 oz	.89	.69
Tomato Juice, canned, 46 oz	1.92	1.39
Beets, canned, 16oz.	.98	.69
Corn, canned, 17 oz	1.05	.75
Peas, canned, 17 oz	1.16	.75
Spinach, canned, 15 oz	1.07	.75
Pickles, Dill, 22 oz	1.89	1.29
Green beans, canned 16 oz	1.07	.75
Pork and beans, canned, 16 oz	.96	.65
Vegetable Soup, canned, 10 3/4 oz	.84	.65
Vegetable Juice, canned, 46 oz	2.20	1.59
Applesauce, 15 oz	1.02	.79
Fruit Cocktail, canned, 17 oz	1.43	.99
Peaches, canned, 16 oz	1.41	.99
Pears, canned, 16 oz	1.31	.99
Pineapple, canned, 20 oz	1.62	1.19
Apple Juice, 1 gallon	3.36	3.49
Grape Juice, canned, 46 oz	2.93	2.39
Pineapple Juice, canned, 46 oz	2.50	1.99
Peas, frozen, 1 lb	1.535	1.29
Cauliflower, frozen, 1 lb	1.955	1.59
<i>Staples:</i>		
Coffee, 26 oz	8.39	6.79
White flour, 10 lbs	5.39	3.49
Cake mix, 18.25 oz	1.97	1.19
Biscuit mix, 60 oz	4.14	2.89
Oatmeal, 18 oz	2.23	1.75
Raisin Bran, 20 oz	4.055	2.94
Cornmeal, 40 oz	2.51	1.99
Rice, 28 oz	3.42	2.89

^aStore brands were used where possible.

^bPrices from two stores averaged.

Item ^a	Cordova ^b	Anchorage
Spaghetti, 22 oz	1.82	1.39
White Bread, 24 oz	2.14	1.99
Whole grain bread, 24 oz	2.49	2.19
Crackers, soda, 16 oz	\$1.99	\$1.39
Cookies, Chocolate Chip, 12 oz	2.82	2.39
Sweetrolls, 8 oz	2.005	1.79
Frozen Pie, 2 lb 14 oz	6.49	4.69
Chicken Noodle Soup 19 oz	1.92	1.49
Mushroom Soup, 10 3/4 oz	.80	.59
Shortening, 3 lb	4.97	3.29
Vegetable Oil, 1 gallon	10.03	8.29
Mayonnaise, 1 qt	3.43	2.49
Sugar, white, 5 lbs	3.34	2.69
Sugar, brown, 2 lb	1.92	1.59
Pancake Syrup, 36 oz	5.31	3.99
Jam, 18 oz	2.12	1.79
Gelatin, 6 oz	1.19	.85
Popsicles, 21 oz	4.43	2.79
Candy, 1 lb	4.19	1.59

^aStore brands were used where possible.

^bPrices from two stores averaged.

APPENDIX D. ESTIMATED HARVEST AND USE OF FISH, GAME, AND PLANT RESOURCES, CORDOVA, 1985 (REVISED)

Resource Name	Percentage of Households:				AMOUNT HARVESTED		POUNDS HARVESTED		95% Conf. Int. % +/-		
	Use	Att	Hrv	Rec	Give	Total	Hh Mean	Total		Hh Mean	Per Capita
All Resources	99.5	92.2	90.8	92.7	77.7	--	--	370,953	434.9	163.8	14%
Fish	93.2	86.9	81.1	78.6	70.4	--	--	224,390	263.1	99.1	17%
Salmon	73.3	83	72.3	58.7	60.7	20,205	23.7	141,095	165.4	62.3	18%
King Salmon	35	51.9	30.1	31.6	25.2	1,696	2	34,052	39.9	15	31%
Sockeye Salmon	43.7	58.7	43.7	37.9	41.3	7,704	9	33,591	39.4	14.8	24%
Chum Salmon	4.4	47.1	8.7	2.9	4.4	605	0.7	4,069	4.8	1.8	51%
Pink Salmon	14.1	53.9	16.5	6.3	9.2	1,673	2	4,146	4.9	1.8	41%
Coho Salmon	59.7	78.6	59.2	31.6	43.7	8,528	10	65,237	76.5	28.8	22%
Unknown Salmon	0.5	0	0	1	0.5	0	0	0	0	0	
Non-Salmon Fish	87.4	75.7	66	65	48.1	--	--	83,295	97.7	36.8	21%
Black Cod	11.7	5.8	4.4	10.7	5.3	468	0.5	1,450	1.7	0.6	93%
Gray Cod	6.3	5.8	4.9	2.9	1.5	977	1.1	3,131	3.7	1.4	113%
Ling Cod	12.1	11.2	10.7	1.9	1.5	331	0.4	1,322	1.6	0.6	49%
Tom Cod	0.5	2.4	0.5	0	0	12	0.01	9	0.01	0	175%
Greenling	4.9	5.8	4.9	0	0	298	0.3	299	0.4	0.1	78%
Flounder	5.3	5.8	4.9	0.5	0	348	0.4	1,041	1.2	0.5	74%
Sole	4.4	4.4	3.4	1	0	286	0.3	572	0.7	0.3	88%
Hallibut	69.9	48.1	36.4	51	31.6	--	--	36,534	42.8	16.1	29%
Herring	24.8	24.3	19.9	8.3	8.3	2,330 gal	--	13,981	16.4	6.2	53%
Herring Roe	3.9	0.5	0.5	3.4	0	8	0.01 gal	60	0.1	0.03	175%
Roe on Kelp	0	5.8	1	0	0.5	128 gal	0.2 gal	896	1.1	0.4	165%
Sac Roe	0	19.9	1.9	0	1	290 gal	0.3 gal	2,030	2.4	0.9	136%
Black Rockfish	13.6	13.6	11.7	1.9	3.9	1,609	1.9	2,414	2.8	1.1	45%
Red Rockfish	26.7	18.4	15.5	12.6	5.3	1,569	1.8	6,278	7.4	2.8	71%
Smelt/Eulachon	28.6	18.9	17	15.5	12.6	894	1	3,131	3.7	1.4	37%
Shark	1	0	0	1	0	0	0	0	0	0	
Skate	0.5	0.5	0.5	0	0	4	0.005	0	0	0	175%
Sturgeon	2.9	1	1	2.4	1.5	--	--	452	0.5	0.2	143%
Whitefish	1.5	1.5	1.5	0	0	58	0.1	51	0.1	0.02	98%
Grayling	1.5	1.5	1	0.5	0	75	0.1	51	0.1	0.02	144%
Dolly Varden	26.7	40.3	25.2	3.4	5.8	4,271	5	5,990	7	2.6	69%

APPENDIX D. ESTIMATED HARVEST AND USE OF FISH, GAME, AND PLANT RESOURCES, CORDOVA, 1985 (REVISED) (Continued)

Resource Name	Percentage of Households:				AMOUNT HARVESTED		POUNDS HARVESTED			95% Cont. Int. % +/-	
	Use	Att	Hrv	Rec	Give	Total	Hh Mean	Total	Hh Mean		Per Capita
Trout	26.2	39.8	26.2	2.4	5.3	2,340	2.7	3,276	3.8	1.5	32%
Steelhead	1.9	1.5	1.5	0.5	0.5	37	0.03	154	0.2	0.1	124%
Unknown Fish	1.5	1.5	1	0.5	0	-	-	179	0.2	0.1	163%
Marine Invertebrates	80.1	46.1	43.7	70.9	33.5	-	-	28,379	33.3	12.5	34%
Clams	56.8	31.1	29.1	36.9	17.5	4,698 gal	5.5 gal	14,092	16.5	6.2	29%
Butter Clams	8.7	8.3	7.3	2.4	2.4	495 gal	0.6 gal	1,484	1.7	0.7	58%
Razor Clams	54.4	27.2	25.7	35.9	17	3,923 gal	4.6 gal	11,771	13.3	5.2	32%
Other Clams	9.2	6.3	5.8	4.4	1	281 gal	0.3 gal	844	1	0.4	57%
Cockles	2.4	3.4	2.4	0	0	65 gal	0.1 gal	196	0.2	0.1	138%
Mussels	3.4	3.4	2.9	0.5	0.5	61 gal	0.1 gal	94	0.1	0.04	88%
Crabs	59.2	22.3	17.5	53.4	17	7,503	8.8	7,771	9.1	3.4	58%
Dungeness	45.6	18.9	15	37.7	14.6	4,969	5.8	3,480	4.1	1.5	40%
King Crab	22.3	3.4	2.9	20.4	3.4	340	0.4	785	0.9	0.4	90%
Tanner Crab	22.3	6.8	3.9	19.9	3.4	2,195	2.6	3,514	4.2	1.6	145%
Gumboots (chitons)	1.5	1	1	0.5	0.5	25	0.03	102	0.1	0.1	144%
Octopus	7.3	3.9	2.9	4.9	0.5	62	0.1	247	0.3	0.1	98%
Scallops	1	1	0.5	0.5	0.5	-	-	60	0.1	0.03	98%
Sea Cucumber	1.5	1.5	1.5	0	0	62	0.1	9	0.01	0	138%
Shrimp	27.7	11.7	11.2	22.8	13.1	-	-	5,809	6.8	2.6	74%
Game	81.1	59.7	48.1	65	32	-	-	99,579	116.7	44	21%
Big Game	79.6	53.4	38.3	63.1	27.7	-	-	94,129	110.4	41.6	22%
Black Bear	6.3	7.3	2.9	4.4	1.5	25	0.03	1,442	1.7	0.6	68%
Brown Bear	2.4	5.8	1.9	1	0.5	17	0.02	2,482	2.9	1.1	82%
Caribou	3.9	0.5	0	3.9	0	0	0	0	0	0	
Deer	64.1	49.5	31.1	40.8	20.4	903	1.1	38,998	45.7	17.2	25%
Goat	5.8	3.9	1.5	4.4	0.5	12	0.01	904	1.1	0.4	100%
Moose	50	27.7	11.2	38.8	11.2	93	0.1	50,310	59	22.2	33%
Sheep	1	0	0	1	0	0	0	0	0	0	

APPENDIX D. ESTIMATED HARVEST AND USE OF FISH, GAME, AND PLANT RESOURCES, CORDOVA, 1985 (REVISED) (Continued)

Resource Name	Percentage of Households:				AMOUNT HARVESTED		POUNDS HARVESTED		95% Conf. Int. % +/-		
	Use	Att	Hrv	Rec	Give	Total	Hh Mean	Total		Hh Mean	Per Capita
Small Game/Furbearers	30.1	30.6	25.2	9.7	7.8	2,812	3.3	5,451	6.4	2.4	34%
Beaver	1.5	1	1	0.5	0	75	0.1	648	0.8	0.3	120%
Coyote	1	1	1	0	0	12	0.01	0	0	0	133%
Hare	29.6	30.1	24.8	8.7	7.8	2,381	2.8	4,760	5.6	2.1	37%
Land Otter	1.5	1	1	0.5	0	17	0.02	0	0	0	129%
Lynx	0	0.5	0.5	0	0	4	0.005	17	0.02	0.01	175%
Marten	1	2.4	1.5	0	0	170	0.2	0	0	0	122%
Mink	1.9	1.9	1.9	0	0	91	0.1	0	0	0	106%
Muskrat	1	1.5	1	0	0	33	0.04	17	0.02	0.01	109%
Porcupine	0.5	1	0	0.5	0	0	0	0	0	0	104%
Weasel	1	1.5	1.5	0	0	25	0.03	0	0	0	104%
Wolf	0	1	0	0	0	0	0	0	0	0	175%
Wolverine	0	0.5	0.5	0	0	4	0.005	0	0	0	175%
Marine Mammals	7.3	1	1	6.3	1.5	41	0.05	2,337	2.7	1	156%
Harbor Seal	7.3	1	1	6.3	1.5	29	0.03	1,092	1.3	0.5	148%
Sea Lion	2.4	0.5	0.5	1.9	1	12	0.01	1,245	1.5	0.6	175%
Birds	42.2	43.7	34.5	12.6	7.3	--	--	3,907	4.6	1.7	38%
Sandhill Crane	1	1.9	0.5	0.5	0	12	0.01	128	0.2	0.1	175%
Grouse	16	18	14.6	2.4	2.4	729	0.9	512	0.6	0.2	40%
Ptarmigan	7.3	11.2	6.3	1	1.5	439	0.5	307	0.4	0.1	68%
Waterfowl	32	31.6	24.3	11.7	3.4	2,468	2.9	2,678	3.1	1.2	34%
Ducks	27.7	28.6	22.8	8.7	2.9	2,224	2.6	1,723	2	0.8	35%
Mallard	20.9	23.3	16	6.3	0.5	896	1	887	1	0.4	34%
Pintail	4.9	17.5	4.4	1	0	145	0.2	119	0.1	0.1	62%
Wigeon	5.8	17	5.8	1	1.5	269	0.3	188	0.2	0.1	57%
Teal	13.1	20.9	11.2	2.4	0.5	443	0.5	136	0.2	0.1	41%
Ducks, Misc	5.3	11.7	5.3	1.5	1	480	0.6	401	0.5	0.2	86%
Geese	11.7	19.9	7.3	4.4	0.5	232	0.3	836	1	0.4	59%
Seagull Eggs	2.4	2.9	2.4	0	1	1,358	1.6	409	0.5	0.2	112%
Plants and Berries	84.5	76.7	76.2	34	23.8	--	--	12,360	14.5	5.5	18%
Berries	77.7	66	66.5	30.6	19.9	2,983 gal	2.5 gal	11,933	14	5.3	18%
Plants/Mushrooms	18.4	18	18	0.5	1	--	--	435	0.5	0.2	36%
Wood	46.1	44.2	43.2	4.9	4.9	1,810 cds	2.1 cds	0	0	0	22%

Source: Division of Subsistence, Alaska Department of Fish and Game, Household Survey 1989.

APPENDIX E

CONVERSION FACTORS FOR WILD NATURAL RESOURCES

Quantities of resources harvested and used were recorded at the time of the survey predominantly in numbers of fish and game. Exceptions to this were berries and many invertebrates, which were usually reported in quarts or gallons. A number of sources were consulted to establish conversion factors, so that resource harvests could be tabulated in pounds.

In all cases, the conversion weights are expressed in pounds, and are intended to reflect usable weights. Skins and hides of furbearers, big game animals, and marine mammals were not included in the usable weight. Resources used for bait to harvest other consumable fish for home use were considered usable. Resources harvested strictly for use as garden fertilizer were excluded.

Conversion weights for the five species of salmon found in Prince William Sound and the Copper River were computed by obtaining live weights from commercial fishery data (Brady et al. 1990:37; Randall et al. 1986:114-116). For king, sockeye, and silver salmon, weights were taken from the Copper River-Bering River district. Weights from the Prince William Sound district were used for pink and chum salmon. Then, a usable weight factor based on Sea Grant research (Crapo et al. 1988) was applied. Because weight information is available for each year, there are separate salmon conversion factors for the two study years. For the remaining species, there is a single conversion weight, derived from the best available source, or a figure from a similar area was used. For crab, a usable weight of 30 percent of live weight was applied.

Species	1985 usable weight	1988 usable weight
King Salmon	20.08	19.27
Sockeye Salmon	4.36	4.44
Pink Salmon	2.48	2.53
Chum Salmon	6.73	6.24
Silver Salmon	7.65	7.35

Resource	Usable weight	Source
Cod, Black	3.1	Bracken 1986
Cod, Gray	3.2	Subsistence Division file data
Cod, Ling	4.0	Mills and Firman 1986
Greenling, Kelp	1.0	Subsistence Division file data
Dolly Varden	1.4	Subsistence Division file data
Flounder	3.0	Subsistence Division file data
Grayling	.7	Behnke 1982
Herring	6.0/gal	Subsistence Division file data
Herring Roe-on-Kelp	7.0/gal	Brady 1985
Rockfish, Black	1.5	Subsistence Division file data
Rockfish, Red	4.0	Researcher Estimate
Sculpin	.5	Subsistence Division file data
Smelt/Eulachon	3.5/gal	Subsistence Division file data
Sole	2.0	Researcher Estimate
Steelhead	1.4	Subsistence Division file data
Trout, Rainbow and Cutthroat	1.4	Subsistence Division file data

Marine Invertebrates:

Abalone	4.0/gal	Subsistence Division file data
Chitons (Gumboots)	4.0/gal	Subsistence Division file data
Clams, Razor	3.0/gal	Subsistence Division file data
Other Clams, Cockles, Mussels	3.0/gal	Subsistence Division file data
Crab, Dungeness	.7	Subsistence Division file data
Crab, King	2.3	Subsistence Division file data
Crab, Tanner	1.6	Subsistence Division file data
Limpets	1.5/gal	Subsistence Division file data
Octopus	4.0	KANA 1983
Squid	4.0	Researcher Estimate

Game/Furbearers:

Black Bear	58.0	Miller 1983
Brown Bear	150.0	Subsistence Division file data
Deer	43.2	Subsistence Division file data
Elk	225.0	Subsistence Division file data
Mountain Goat	72.5	Subsistence Division file data
Hare	2.0	Subsistence Division file data
Moose	540.0	Subsistence Division file data
Beaver	8.75	Whitman 1983
Muskrat	.5	Whitman 1983

Marine Mammals:

Harbor Seal	37.8	Pitcher and Calkins 1979
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Resource	Usable weight	Source
<i>Birds:</i>		
Waterfowl: Based upon the average of the mean live weights of the male and female of each species as reported by Bellrose (1976), multiplied by a standard factor of .4.		
Sandhill Crane	10.0	
<i>Ducks:</i>		
Bufflehead	.4	
Canvasback	1.1	
Eiders	1.6	
Gadwall	.8	
Goldeneye	.8	
Mallard	1.0	
Merganser	.6	
Oldsquaw	.8	
Pintail	.8	
Scaup	.9	
Scoter	.9	
Shoveler	1.1	
Teal	.3	
Wigeon	.7	
Unknown	.83	
<i>Geese:</i>		
Canada Geese, Dusky	3.6	
Snow Geese	2.3	
White-fronted Geese	2.4	
Other Geese	2.23	
Eggs	.3	Subsistence Division file data
Grouse and Ptarmigan	.7	Subsistence Division file data
<i>Vegetation:</i>		
Berries	4.0/gal	Stratton & Georgette 1984
Plants	1.0/quart	Subsistence Division file data

