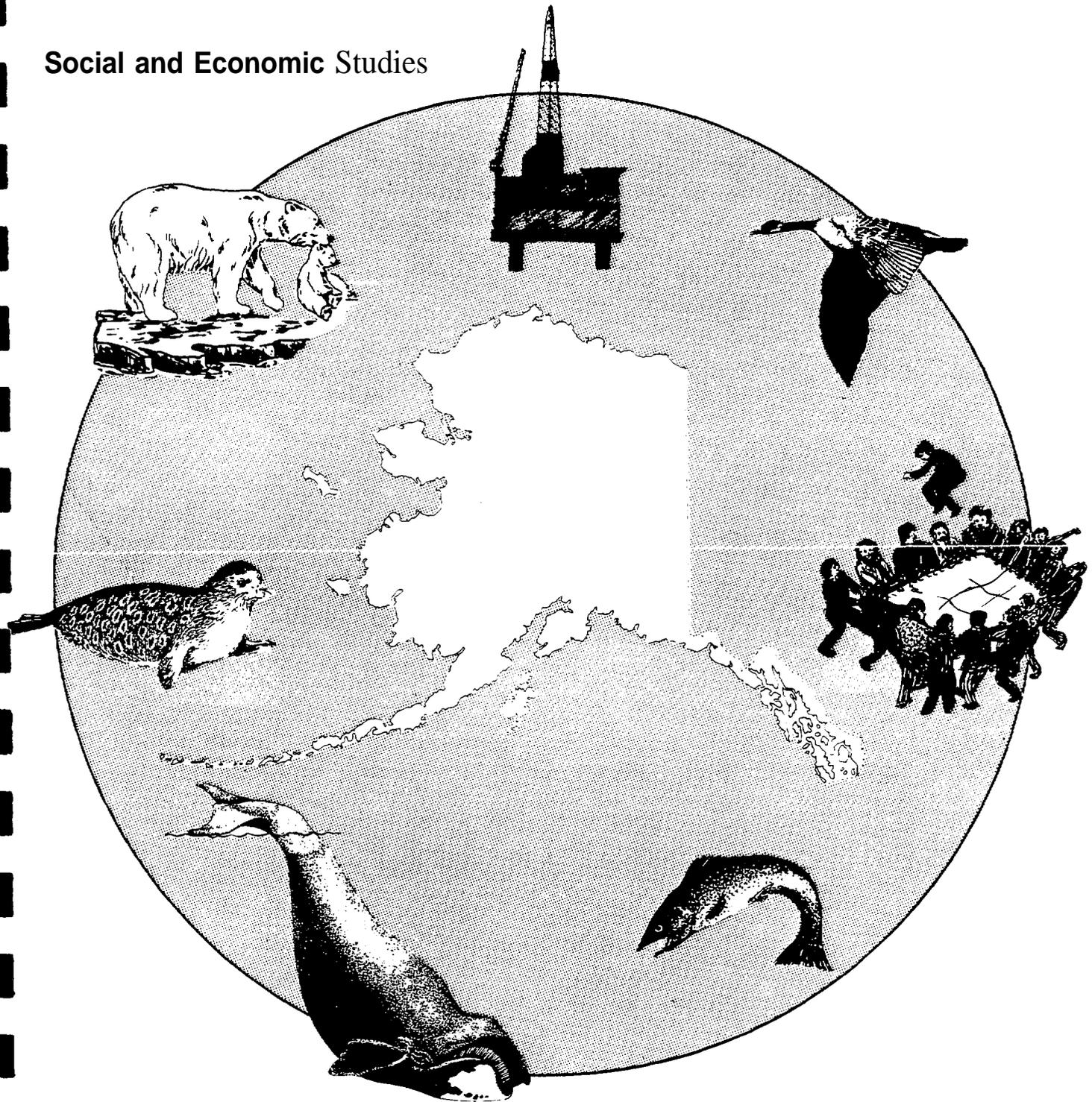




North Slope Subsistence Study Barrow 1988

OCS Study
MMS 89-0077

Social and Economic Studies



U. S.- Department of the Interior
Minerals Management Service
Alaska Outer Continental Shelf Region

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BARROW, 1988

Submitted To

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Prepared By

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with

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Alaska OCS Environmental Studies Program

North Slope Subsistence Study - Barrow, 1988

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INTRODUCTION

The North Slope Subsistence Study, sponsored by the Minerals Management Service (MMS), is a three year study of Barrow and Wainwright residents' subsistence harvests. The major focus of the study is to collect harvest and location data for species used in these communities in a manner that accurately represents total community harvests. This interim report is the second of three annual reports on the findings of the Barrow research. The first year of Barrow data collection began on April 1, 1987 and continued through March 31, 1988. Throughout the report, this time period is referred to as "Year One." The second year of Barrow data collection began on April 1, 1988 and continued through March 31, 1989. Throughout the report, this time period is referred to as "Year Two." The data presented in this interim report will be revised in subsequent reports as new or corrected information is gathered in the course of ongoing data collection. The reader is referred to the final year three report which will incorporate all three year's data.

During the first year of data collection, the North Slope Borough (NSB) provided both technical (e.g., Geographic Information Systems [GIS] mapping) and financial (e.g., local research assistants [RAs] were hired through the NSB Mayor's Job Program) support for this project. During Year Two, the NSB has continued this support and also provided supplemental funding for data collection and analysis. This additional funding has made possible the continuous field presence in both Wainwright and Barrow, added to the scope of work SRB&A personnel was able to accomplish, and facilitated the data collection and analysis.

PURPOSE OF THE PROJECT

When completed, this study will describe community subsistence harvest data and the extent both offshore and onshore areas were used by Barrow and Wainwright residents during the study period. This report specifically presents results from the first and second years of data collection in Barrow.

STUDY APPROACH

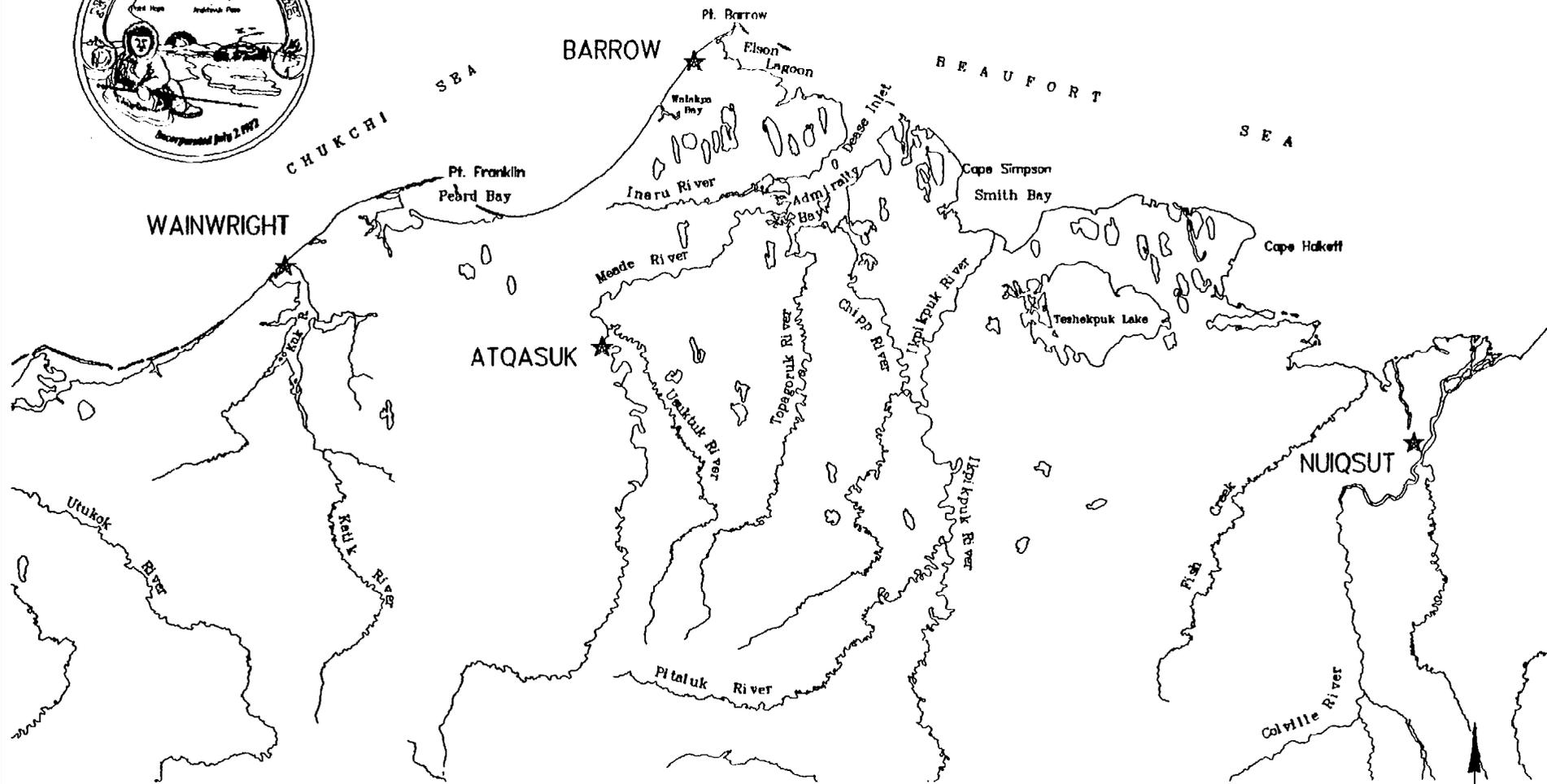
Essential to the study approach is the multi-year nature of the data collection effort. Two aspects of subsistence harvest patterns demonstrate the importance of this long-term approach. First, the areas used by Inupiat hunters vary seasonally according to resource distribution patterns and hunter access. Second, harvest patterns vary from year to year due to environmental conditions, the population status of the targeted resources, as well as due to social, economic, and cultural influences. The comparisons of Year One and Year Two results demonstrate the variability of harvest levels from year to year.

A second essential element of the study approach in Barrow is the application of stratified sampling techniques to increase the representation of active hunters within the sample while ensuring that study results are representative of the community as a whole. Subsistence harvest patterns differ among families within the same community due to varying socioeconomic circumstances, the location of fixed camps, and the experience and knowledge of family members. The stratified sampling approach employed in this study captures most of the variation in harvest patterns by including a majority of the households that account for most of the community's harvest (see Stephen R. Braund and Associates [SRB&A] and Institute of Social and Economic Research [ISER] 1988 - Appendix for a detailed discussion of the Barrow data collection methodology).

THE STUDY AREA

The community of Barrow is situated on the Chukchi Sea coast approximately 7.5 miles southwest of Point Barrow, the most northerly point in the United States (Map 1). In 1988 Barrow's population of 3,223 people lived in 988 households (North Slope Borough Planning Department, 1989). The unique marine environment near Barrow provides local residents with excellent hunting opportunities for most of the mammals, birds, and fish that inhabit or migrate through the Arctic region. The mixing of the Chukchi Sea and Beaufort Sea currents in the vicinity of the point results in areas of open water almost year around, providing access to marine mammals. Even in mid-winter, ringed seals are usually available at open pools in close proximity to Barrow. Beginning in

MAP 1 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO THE STUDY AREA



Map Production: North Slope Borough GIS
Date: June 27, 1989

March or April, a channel of open water -- an open lead -- forms within three to 10 miles from shore. Local residents hunt in this marine "river" rich in migrating resources: bowhead whales, beluga whales, walrus, bearded seal, ringed seal and eiders. During the Arctic summer, onshore winds and shifting currents periodically bring the moving pack ice and the associated walrus, bearded seals and ringed seals to within hunting range of Barrow residents.

Hunters travel along the coast in either direction from Barrow, traditionally hunting as far as Wainwright to the west and the Colville River delta to the east (Pedersen 1979). In 1988 Barrow residents' coastal cabins and camp sites were situated westerly to Peard Bay and easterly to Cape Simpson, Smith Bay, and the Teshekpuk Lake area. Hunters ranged throughout the coastal area, both in search of marine mammals and while traveling to camps and cabins. Experienced ocean travelers ventured out from the coast to a distance of 25 to 30 miles, primarily in search of the bowhead whale during its fall migration and while hunting for walrus and bearded seal in the summer.

Barrow residents also traveled extensively to inland cabins and numerous other traditional hunting and fishing sites. Four major rivers and numerous streams and lakes can be reached within four to eight hours by boat or snowmachine, providing access to the inland fish, caribou, bird and plant resources. For example, the Meade River is a four hour snowmachine or boat trip from Barrow. Peard Bay, Atkasuk, the central portion of the Chipp and Ikpikuk rivers, and Teshekpuk Lake can all be reached from Barrow in less than a day. Seasonal conditions can drastically alter travel times and an intimate knowledge of the environment is required to safely and successfully exploit the inland areas. During the study the most experienced hunters traveled by snowmachine over 150 miles to the headwaters of the Meade and Ikpikuk rivers in search of furbearers inhabiting the more mountainous terrain.

The most significant characteristic of the study area to a community dependent on local food resources is the diversity of species that can be harvested. As this report details, fish, fowl, marine mammal and terrestrial mammal species are all available to local residents, with a variety of species available from each group. Only in the case of terrestrial mammals is one species -- caribou -- the single major food source that is consistently harvested in large

numbers. Though most species are usually abundant at some period of the year, the presence of any one species during favorable harvest conditions is unpredictable. Successful harvests usually result from knowing where to intercept the resources as they migrate, and from being there at the right time. A few days delay in a hunting trip, adverse weather conditions, or equipment problems can mean missing the bulk of the migration and thus having a smaller harvest or missing out altogether. For some species like grayling, geese, and walrus to name only a few, to miss the migration means a year-long wait until the next harvest opportunity.

As in all the North Slope villages, there are members of many Barrow families who grew up out on the land. They have an intimate knowledge of the areas where their parents taught them how to catch the food they needed to survive. Those individuals continue to use the same areas, now teaching their children and their grandchildren when, where, and how to successfully harvest the available resources. Some of that information pertaining to the Barrow area has been published in other reports and conveys a sense of what the land, ocean, and resources mean to the local residents (see for example: Arundale and Schneider 1987; Carnahan 1979; Hoffman, Libbey, and Spearman 1988; Ivie and Schneider 1988; Kisautaq (Leona Okakok) 1981; Nelson 1979; Nelson 1981; North Slope Borough 1980; Pedersen, Libbey, and Schneider 1979; Schneider and Libbey 1979; Schneider, Pedersen, and Libbey 1980).

DIFFERENCES BETWEEN ANNUAL PROJECT REPORTS

The Year One report presents results of the first year of data collection in the form of tables, figures, maps, and accompanying textual interpretations. The report also describes the basis for harvest estimates and an extensive description of the sampling and data collection methods used in this study. The purpose of the Year Two report is principally to document ongoing data collection efforts and supply additional information (e.g., differences by household in harvest levels and the status of major fauna resources). The report contains three types of data: revised Year One results, Year Two results, and cumulative summaries. Since these data sets are interim results in a three year study, the Year Two report contains limited discussion concerning each individual data set. Differences in harvest levels from year

to year were a principal reason for adopting a multi-year study design. however, the Year Two report does contain comparisons of Year One and Year Two data. It is expected that the Year Three report will not only contain extensive documentation of harvest levels and locations by year, but also a more generalized set of conclusions on both harvest levels and locations.

FORMAT OF THIS REPORT

The purpose of this Year Two report is to present the subsistence harvest data collected for Barrow during the first two years of fieldwork. Following this introduction, the second section of the report (Overview of Barrow Demography and Household Characteristics) presents results from a recent census of Barrow households (North Slope Borough Planning Department, 1989). The third section of the report (Harvest Estimates for Major Resource Categories) summarizes Barrow harvest activities, including community and household harvest levels and land use patterns for the major resource categories, presenting both revised Year One estimates, and Year Two estimates as well as a cumulative summary and highlights of differences in harvest levels. Section four (Area Extent of Subsistence Land Use) compares Year One and Year Two harvest sites. The fifth section (Locally Harvested Renewable Resources) presents the Year Two harvest data and maps for each major species or species group, again reporting data from both years. Section Six (Household Differences in Species Harvest Levels) contains several comparisons of overall or Species-specific harvest levels among households in the study. Section Seven (Status of Major Faunal Populations) presents a report on the biological status of subsistence resources and is followed by references cited in this report. Finally an appendix contains the conversion factors used in the study and detail on Year Two whale harvests.

OVERVIEW OF BARROW DEMOGRAPHY
AND HOUSEHOLD CHARACTERISTICS

The North Slope Borough Planning Department recently completed a major census project of the Barrow population. It is therefore possible to accurately describe Barrow population and household characteristics. In 1988, 3,223 people resided in Barrow (see Table 1). Of this population, 1,822 (56 percent) were Inupiat. The remainder of the population was primarily white (25 percent of the total population). Smaller minority populations included Filipino (5 percent), other Alaska Natives (2 percent), blacks (1.5 percent), Hispanics (1 percent), and Orientals (1 percent).

Forty percent of the 1988 Barrow Inupiat population was under the age of 16. Both sexes were represented evenly in the Inupiat population with the exception that Inupiat females outnumbered Inupiat males in the 26-39, 4-15, and 66 and over age categories. The non-Inupiat population was disproportionately male (57 percent) and middle-aged, with 36 percent of the population 26 to 39 years old.

Five hundred and twenty-three of the 988 Barrow households in 1988 were headed by an Inupiat or someone married to an Inupiat (see Table 2). An average of almost four people (3.89) lived in each Inupiat household. Due to the larger size of most Inupiat households, non-Inupiat households constituted a larger proportion of all Barrow households (47 percent) than the non-Inupiat population constituted of the total Barrow population (39 percent),

Inupiat and non-Inupiat employment characteristics contrast similarly to Inupiat and non-Inupiat population characteristics. On average, Inupiat residents 16 or older were employed 6.8 months annually compared with 10 months for non-Inupiat.

TABLE 1: 1988 BARRON' POPULATION CHARACTERISTICS

	<u>Inupiat</u>			<u>Other</u>			<u>Total</u>	%
	<u>Male</u>	<u>Female</u>	<u>Both</u>	<u>Male</u>	<u>Female</u>	<u>Both</u>		
<u>Age</u>								
Under 4	127	131	258	59	37	96	354	12%
4-8	126	131	257	45	36	81	338	11%
9-15	103	113	216	60	47	107	323	11%
16-17	31	35	66	16	12	28	94	3%
18-25	127	126	253	56	64	120	373	12%
26-39	181	225	406	242	180	422	828	28%
40-59	124	120	244	177	121	296	542	18.0%
60-65	25	20	45	11	7	18	63	2%
66 and up	<u>32</u>	<u>45</u>	<u>77</u>	<u>6</u>	<u>3</u>	<u>9</u>	<u>86</u>	3%
Subtotal	876	946	1,822	672	507	1,179	3,001	100%
Number of missing observations:							<u>222</u>	
Total population:							3,223	

Source: North Slope Borough Planning Department, 1989

Stephen R. Braund & Associates, 1989

TABLE 2: 1988 BARRON' HOUSEHOLD CHARACTERISTICS BY ETHNICITY

	<u>NUMBER OF HOUSEHOLDS</u>	<u>PERCENTAGE OF HOUSEHOLDS</u>	<u>MEAN HOUSEHOLD SIZE</u>	<u>MEAN NO. MONTHS EMPLOYED PER INDIVIDUAL</u>
Inupiat	523	53.3%	3.89	6.8
Non-Inupiat	465	47%	2.48	10.0
Overall	988	100%	3.23	8.2

Source: North Slope Borough Planning Department, 1989

Stephen R. Braund & Associates, 1989

HARVEST ESTIMATES FOR MAJOR RESOURCE CATEGORIES

The study findings for Year One (April 1, 1987 through March 31, 1988), and Year Two (April 1, 1988 through March 31, 1989) are summarized in this section. Throughout this report findings for the two years will be presented separately and as a cumulative average of harvest activity. The section begins with a review of harvest data collection procedures.

REVIEW OF HARVEST DATA COLLECTION PROCEDURES

Ideally, a study of this nature would observe the resource harvest activities of every village resident. This approach was not practical in Barrow, the home of over 3,000 people. Instead, the study team is tracking the harvest activities of a sample of over 100 households that statistically represent all households in Barrow.

All study results presented in this report are based on a sample of 110 Barrow households. These households constitute 74 percent of 149 households initially selected for the study in 1987 and reflect only those households for which harvest data are available for both study years (see Table 3). The sample of 110 Barrow households was selected from all houses in the community. The chance each household had of being selected varied. To ensure that study results are as reliable as possible, the study team assigned each Barrow household to one of seven sampling groups (strata) then varied the chances of selection for the sample based on the household's level of harvest activity.

Forty-one of the 48 households containing whaling captains and other highly active harvesters (stratum one) are included in the combined Year One/Year Two study results. This reflects a response rate among the most highly active harvesters of 85 percent. The response rate for households reporting in 1985 that virtually all their family's food came from hunting, fishing, and gathering (stratum two) is 68 percent. The response rate for households reporting that half their food came from family subsistence activities is

TABLE 3: SAMPLING CHARACTERISTICS -
BARROW, YEARS ONE & TWO

<u>STRATA</u>	<u>NUMBER OF HOUSEHOLDS</u>			<u>RESPONSE RATE</u>	<u>YEAR 1-2 SAMPLE WEIGHT</u>
	<u>IN BARROW</u>	<u>IN ORIGINAL SAMPLE</u>	<u>IN BOTH STUDY YEARS</u>		
1	48	48	41	85/0	1.171
2	45	22	15	68%	3.000
3	67	17	13	76%	5,154
4	85	13	8	62/0	10.625
5	222	17	13	76%	17.077
6	360	9	6	67/0	60.000
7	<u>110</u>	<u>19</u>	<u>14</u>	74%	7.857
TOTALS	937	140	110		

Source: Stephen R. Braund & Associates, 1989

76 percent. The response rates within the less active subsistence strata are 62 percent, 76 percent, 67 percent, and 74 percent respectively. The predominately lower response rates in strata two through seven reflect the fact that households in these strata are more mobile and were dropped from the sample because they moved from Barrow.

To properly estimate harvest activities for the community as a whole it is necessary to take into account the probability each household had of being selected and the response rate within each strata. Each sample household is assigned a sample weight equal to the total number of households in the community assigned to the household's sampling stratum divided by the actual number of sample households in the same sampling stratum. Thus, for example, the sample weight assigned to households in the first stratum is 48 divided by 41, or 1.171. The reader can confirm that application of the sample weights yields estimates which pertain to all Barrow households by multiplying the sample weights reported in Table 3 by the number of sample households in each stratum. The result in each case is the total number of households in the stratum. Note that the total number of households eligible for selection in 1987 was 937 and that the total number of households enumerated in the North Slope Borough's 1988 census was 988. The difference (51) corresponds to the net increase in the number of Barrow households since 1985, the time of the last Barrow census.

Although the sample design employed yields more reliable results than a comparably sized simple random sample, the results are still subject to sampling error. That is, the community harvest amounts for each species are estimates that vary somewhat according to the specific households that happened to be selected. Although it is not possible to tell exactly what the actual community harvest amounts are from a single sample of households, it is possible to calculate the range of possible sampling errors at a specified level of confidence (in this study 95 percent). This range, or confidence interval, differs for each type of harvest. Confidence intervals are reported with all harvest estimate tables in this report.

Harvest estimates may also vary from actual harvest amounts due to errors in reporting, errors in recording, and errors introduced with the use of average weights in the conversion of the number harvested to the amount of edible pounds harvested. Errors in reporting were minimized through repeated contacts

with respondents over the course of the year; however, the level of reporting errors may differ between Year One and Year Two. Harvest estimates in Year Two may contain fewer reporting errors due to the fact that household contacts are now familiar with the type of information requested and know that they will be asked to recall this information. Harvest estimates in Year Two may, on the other hand, reflect a downward reporting bias. Although every attempt has been made to minimize the reporting burden on household contacts, it is reasonable to expect that household contacts may be increasingly reluctant to mention harvest activities when they know that a complete report of the activity involves a significant effort on their part. Comparisons of Year One and Year Two data suggest that a downward reporting bias may have occurred in Year Two, although other factors may also account for differences in harvest levels and are also discussed,

Errors in recording harvest activity were minimized with application of rules and definitions by trained research assistants and through a review of each report by an on-site field coordinator. The conversion weights applied are primarily those produced by the Alaska Department of Fish and Game (A DF&G) Division of Subsistence from data collected in Nuiqsut and Kaktovik, both North Slope villages (A DF&G n.d.). These weights, representing edible pounds harvested, allow comparisons between the data presented in this report and other AD F&G research. Also, weights are more conducive than numbers for comparing the relative contribution of each resource to the total community harvest.

REVISION OF YEAR ONE ESTIMATES

Repeated contacts with sample households occasionally reveal errors or gaps in past harvest reports. Field staff maintained a file of Year One harvest report corrections which have been incorporated in the data file to produce revised estimates for Year One. The net effect of these revisions is to increase the total edible pounds harvested by 7.5 percent in Year One from that reported in MMS Technical Report 133 (SRB&A and ISER 1988). Net increases by major resource category ranged from five percent for marine mammals to 12.5 percent for birds. The total edible pounds of both terrestrial mammals and fish increased by just under 10 percent.

The major adjustments made in the marine mammals category were an increase of 13 walrus and an increase of 55 ringed seal. The estimated harvest of polar bears increased from eight to 10. In the terrestrial mammal category, the estimated total harvest of caribou increased from 1,492 to 1,643 (a 10 percent increase). The largest change in the fish category resulted from a dropped digit in data processing. Correction of this error increased the estimated number of capelin harvested from 335 to 3,351. Other fish species requiring substantial adjustments included humpback whitefish (350/0 increase, partially due to greater specificity in reporting of whitefish), least cisco (20 percent increase), arctic grayling (26 percent increase) and burbot (19 percent increase). Bird species requiring adjustments included white-fronted geese (17 percent increase), and eiders (nine percent increase).

Tables 4 and 6 and Figures 1 and 3 replace the comparable harvest activity tables and figures contained in the Barrow Year One report.

DIFFERENCES BETWEEN YEAR ONE AND YEAR TWO ESTIMATES

The differences between Year One and Year Two harvest estimates are best discussed by individual species. However, a comparison of the data summarized by major resource category establishes a useful context within which to examine the more detailed results.

Year Two harvest estimates are lower in every major resource category. In percentage terms these reported decreases between Year One and Year Two range from 30 percent for fish to less than one percent for birds. Table 5 presents the Year Two data for the major resource categories; Table 7 and Figure 4 present the Year Two harvest data by month. The marine mammal harvest of 329,296 edible pounds compares to the Year One reported harvest of 345,156 edible pounds (a 4.5 percent decrease). The reported harvest in edible pounds of terrestrial mammals decreased from 218,657 to 190,459 (a 13 percent decrease). Total edible pounds of fish reported decreased from 68,969 to 48,661 while total edible pounds of birds stayed virtually the same.

Comparison of Figures 1 and 2 shows that the relative importance of major resource categories in Year Two is quite similar to that observed in Year One.

TABLE 4: TOTAL HARVEST ESTIMATES BY MAJOR RESOURCE CATEGORY - ALL BARROW HOUSEHOLDS, YEAR ONE REVISED (1)

RESOURCE	CONVERSION FACTOR (2) (Edible Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL EDIBLE POUNDS HARVESTED	PERCENT OF ALL BARROW HOUSEHOLDS HARVESTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	EDIBLE POUNDS HARVESTED	PER HOUSEHOLD	PER CAPITA			STANDARD DEVIATION (lbs)	SAMPLING ERROR AT 95% (lbs)	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN
Marine Mammals (3,4)	n/a	n/a	345,156	368	114.4	53%	38.2%	35	68	300	436	18%
Terrestrial Mammals	n/a	n/a	218,657	233	72.5	33%	29.4%	32	62	171	296	27%
Fish	n/a	n/a	68,969	74	22.9	11%	32.6%	9	18	55	92	25%
Birds	n/a	n/a	21,613	23	7.2	3%	33.7%	6	11	12	34	47%
Other Resources	n/a	n/a	286	0.3	0.1	**	3.1%	0	1	0	1	171%
Total (3)	n/a	n/a	654,680	699	217.1	100%	53.777	55	107	592	806	15%

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

(3) Bowhead harvest does not contribute to the sampling error for marine mammals since the bowhead harvest is based on a complete count.

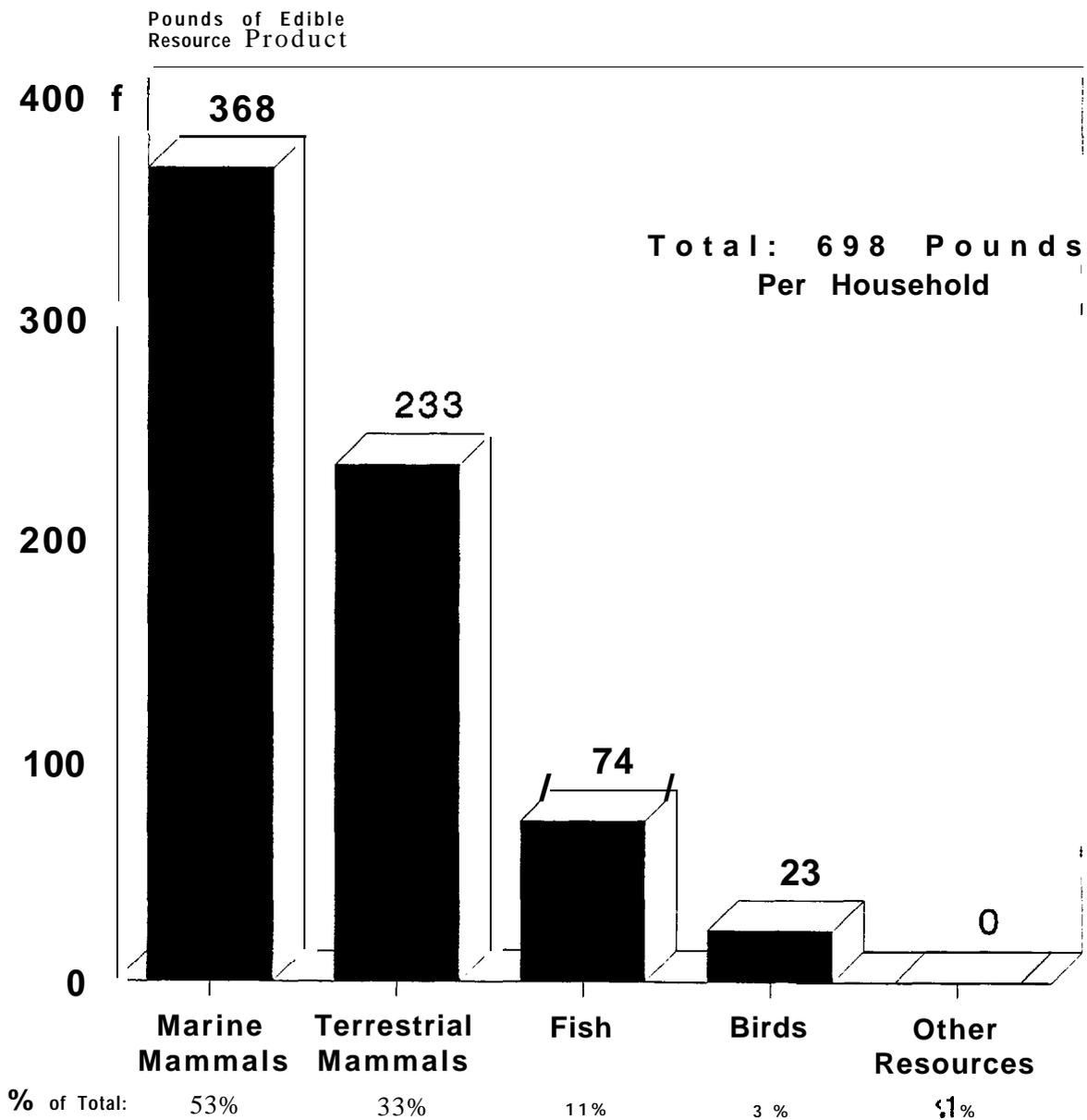
(4) The percent of Barrow households harvesting bowhead represents the percent of Barrow households receiving crew member shares at the whale harvest site, as extrapolated from the sample households,

** represents less than .1 percent

n/a means not applicable

Source: Stephen R. Braund & Associates, 1989

Figure 1: Harvest Amounts By Major Resource Category
All Barrow Households, Year One Revised



(Mean Edible Pounds Per Household)

Source: Stephen R. Braund & Assoc., 1989

TABLE 5: TOTAL HARVEST ESTIMATES BY MAJOR RESOURCE CATEGORY - ALL BARROW HOUSEHOLDS, YEAR TWO (1)

RESOURCE	CONVERSION	AVERAGE POUNDS				PERCENT OF TOTAL EDIBLE POUNDS HARVESTED	PERCENT OF ALL BARROW HRVSTING RESOURCE	SAMPLING STATISTICS				
	FACTOR (2) (Edible Weight Per Resource in lbs)	COMMUNITY TOTALS		HARVESTED				STANDARD DEVIATION (lbs)	SAMPLING ERROR AT 95% (lbs)	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN
Marine Mammals (3)	n/a	n/a	329,296	351	109.2	56%	43.1%	16	31	320	382	9%
Terrestrial Mammals	n/a	n/a	190,459	203	63.1	32%	25.2%	33	65	138	268	32%
Fish	n/a	n/a	48,661	52	16.1	8%	17.5%	5	10	42	62	19%
Birds	n/a	n/a	21,434	23	7.1	4%	31.7%	4	7	16	30	30%
Other Resources	n/a	n/a	36	0.04	0.0	**	1.9%	0	0	0	0	181%
Total (3)	n/a	n/a	589,901	630	195.6	100%	53.1%	43	85	545	714	13%

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

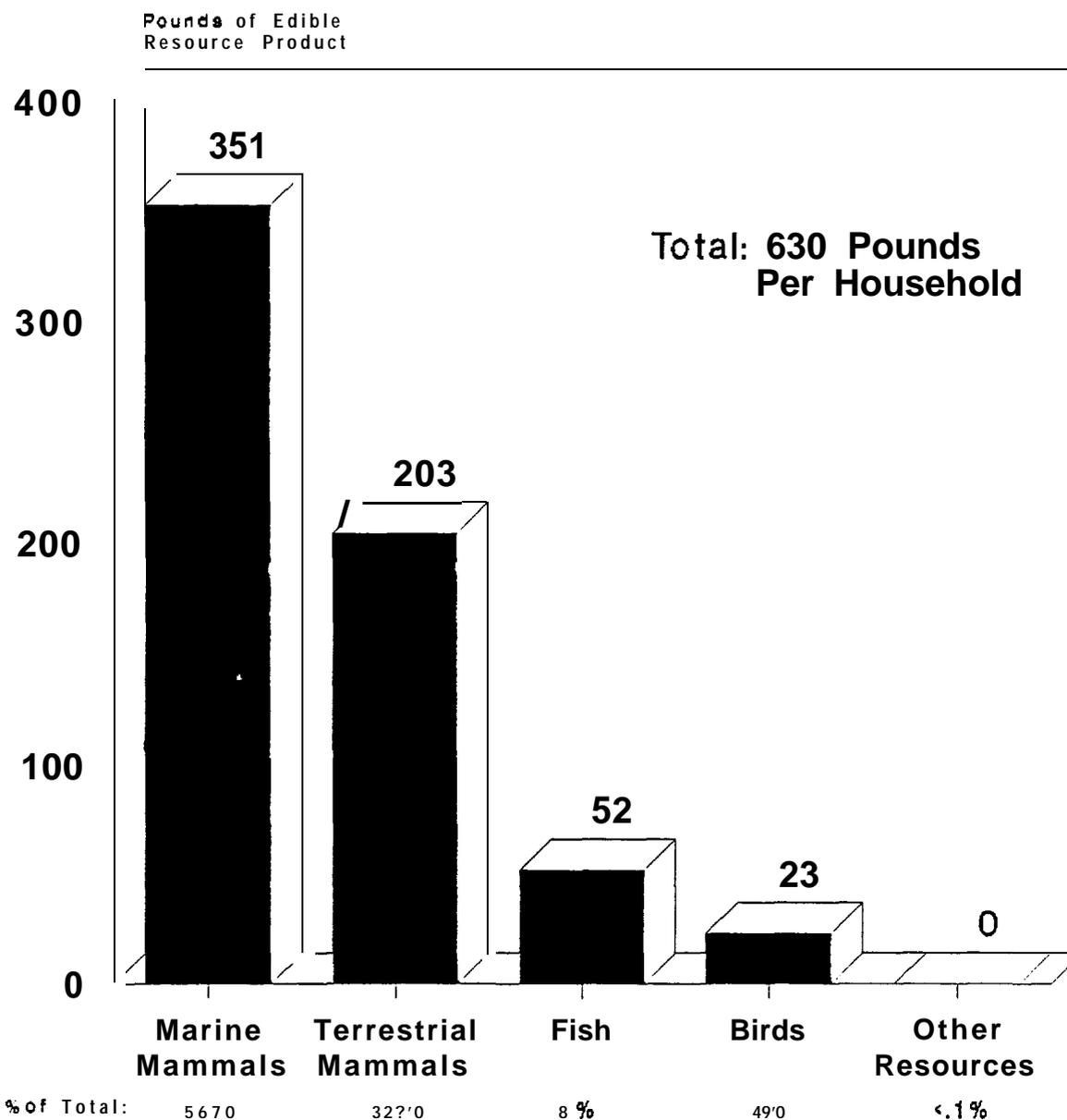
(3) Bowhead harvest does not contribute to the sampling error for marine mammals since the bowhead harvest is based on a complete count.

** represents less than .1 percent

n/a means not applicable

Source: Stephen R. Braund & Associates, 1989

Figure 2: Harvest Amounts By Major Resource Category
All Barrow Households, Year Two



(Mean Edible Pounds Per Household)

Source: Stephen R. Braund & Assoc., 1989

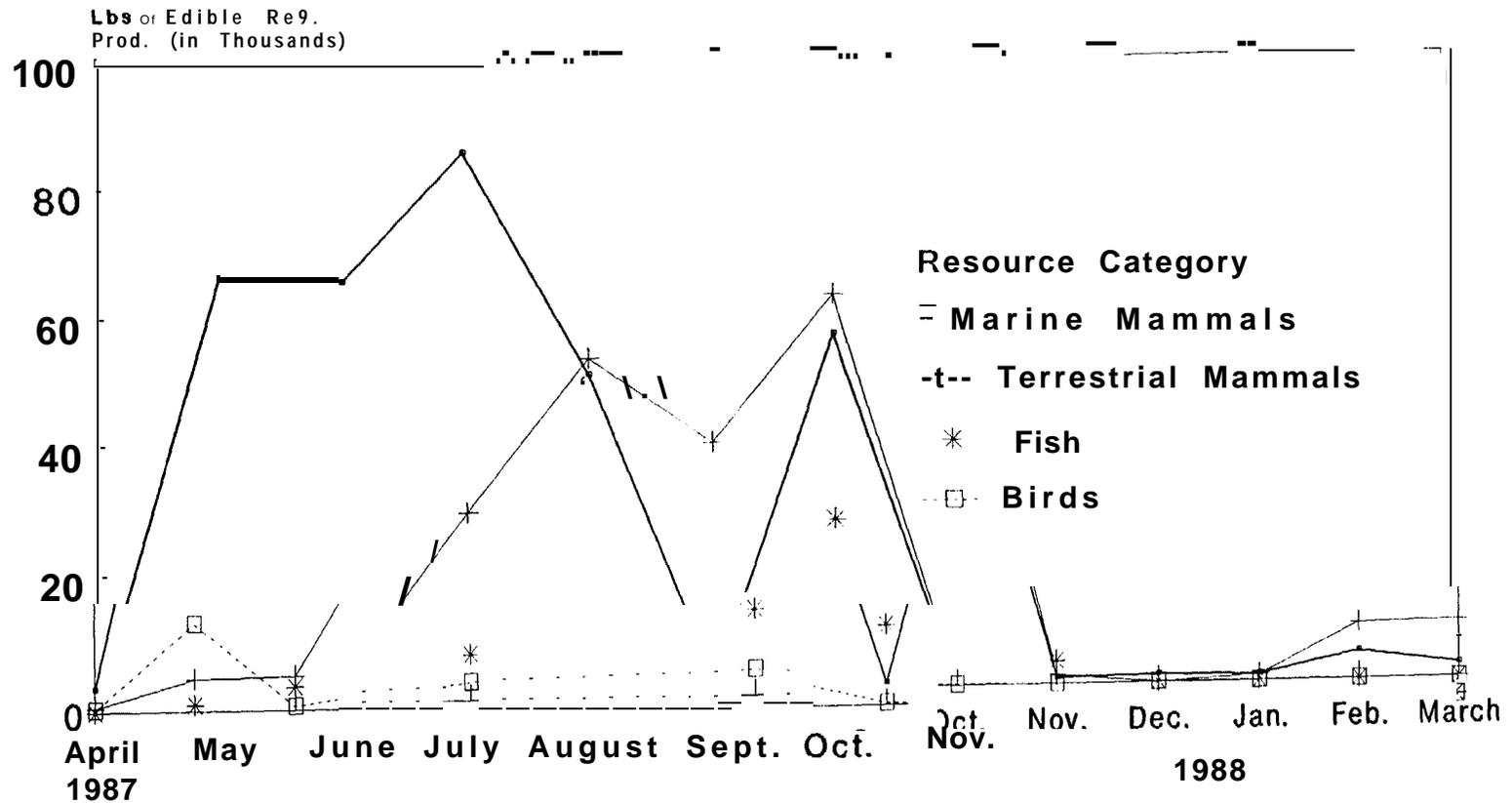
TABLE 6: MONTHLY HARVESTS BY MAJOR RESOURCE CATEGORY - BARROW, YEAR ONE REVISED
(Pounds of Edible Resource Product)

MAJOR RESOURCE CATEGORY	TOTALS *****											
	1987						1988					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Marine Mammals	3,561	67,303	66,454	86,137	51,493	3,381	57,373	896	1,183	994	4,210	2,173
Terrestrial Mammals	685	4,915	5,180	30,254	53,986	40,611	63,449	1,250	0	822	8,566	8,880
Fish	0	938	3,574	7,006	13,175	12,232	28,534	3,438	0	0	0	67
birds	380	13,417	621	2,780	4,038	265	108	0	0	0	0	0
Total	4,626	86,573	75,830	126,177	122,693	56,489	149,463	5,583	1,183	1,816	12,776	11,120

MAJOR RESOURCE CATEGORY	PERCENTS *****											
	1987						1988					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Marine Mammals	1%	19%	19%	25%	15%	1%	17%	0%	0%	0%	1%	1% = 100%
Terrestrial Mammals	0%	2%	2%	14%	25%	19%	29%	1%	0%	0%	4%	4% = 100%
Fish	0%	1%	5%	10%	19%	18%	41%	5%	0%	0%	0%	0% = 100%
Birds	2%	62%	3%	13%	19%	1%	0%	0%	0%	0%	0%	0% = 100%
All Resources Combined	1%	13%	12%	19%	19%	9%	23%	1%	0%	0%	2%	2% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 3: Monthly Harvest by
Major Resource Category
All Barrow Households, Year One Revised



Source: Stephen R. Braund & Assoc., 1989

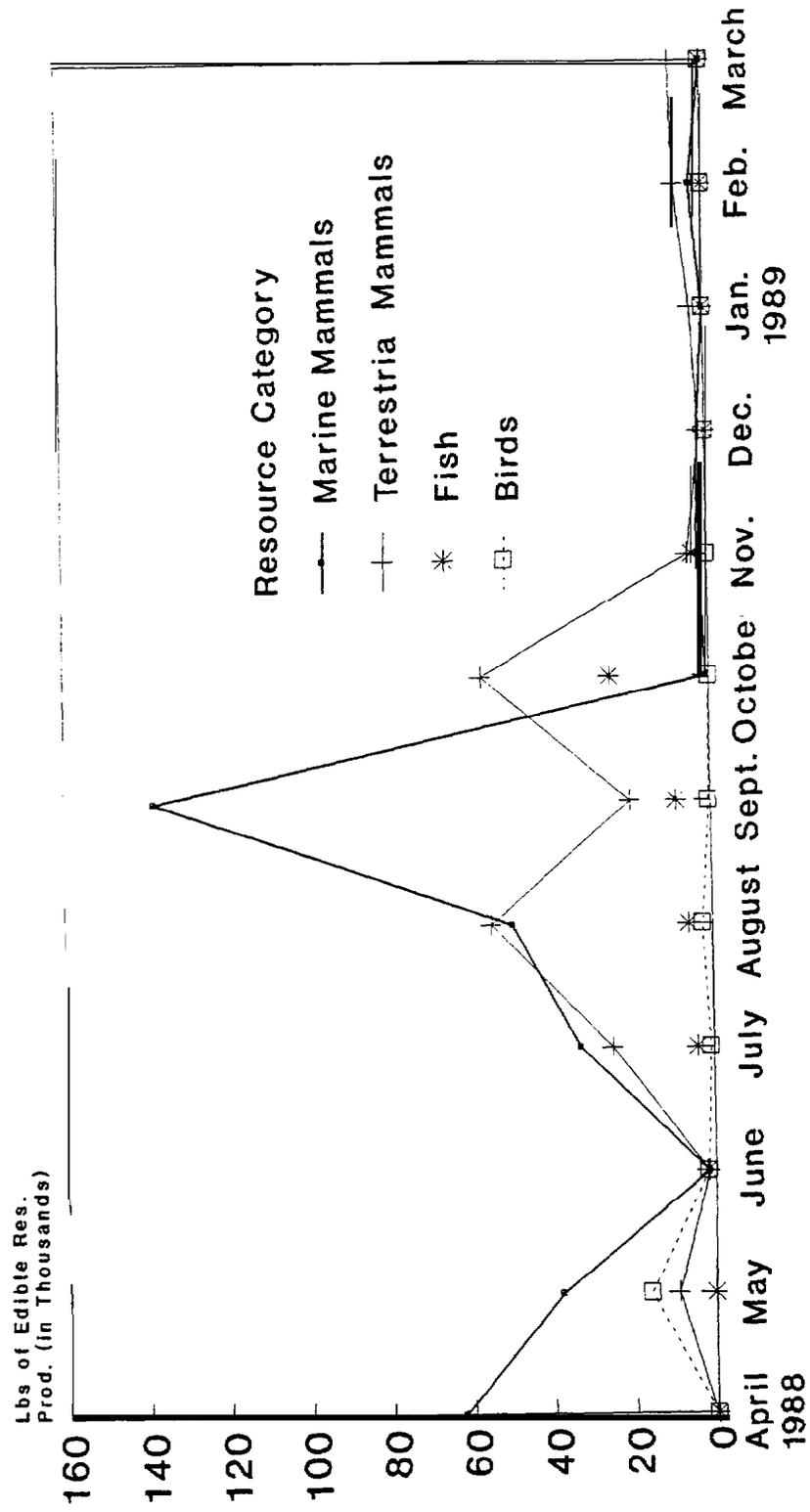
TABLE 7: MONTHLY HARVESTS BY MAJOR RESOURCE CATEGORY - BARROW, YEAR TWO
(Pounds of Edible Resource Product)

MAJOR RESOURCE CATEGORY	TOTALS *****											
	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Marine Mammals	62,250	37,759	1,377	32,684	49,372	137,778	659	2,276	2,010	126	3,006	0
Terrestrial Mammals	137	9,166	1,562	24,883	54,505	19,747	56,249	4,562	1,541	3,185	6,906	7,787
Fish	12	136	2,020	4,056	5,901	8,458	24,475	3,478	0	0	144	0
Birds	5	15,981	1,717	734	2,498	450	39	0	0	0	0	10
Total	62,404	63,042	6,676	62,358	112,276	166,433	81,421	10,316	3,551	3,311	10,056	7,797

MAJOR RESOURCE CATEGORY	PERCENTS *****											
	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Marine Mammals	19%	11%	0%	10%	15%	42%	0%	1%	1%	0%	1%	0% = 100%
Terrestrial Mammals	0%	5%	1%	13%	29%	10%	30%	2%	1%	2%	4%	4% = 100%
Fish	0%	0%	4%	8%	12%	17%	50%	7%	0%	0%	0%	0% = 10CM
Birds	0%	75%	8%	3%	12%	2%	0%	0%	0%	0%	0%	0% = 100%
All Resources Combined	11%	11%	1%	11%	19%	28%	14%	2%	1%	1%	2%	1% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 4: Monthly Harvest By
Major Resource Category
All Barrow Households, Year Two



Source: Stephen R. Braund & Assoc., 1989

Marine mammals continued to account for over half of the total edible pounds harvested (56 percent in Year Two vs. 53 percent in Year One). Terrestrial mammals accounted for a third of the total in both years, and fish accounted for slightly less of the total in Year Two than in Year One (eight percent vs. 11 percent).

A comparison of Tables 4 and 5 shows that the percentage of households successfully harvesting at least some amount of a subsistence resource was identical in Years One and Two (53 percent). Participation rates varied by major resource category, however, with a slight reported increase in the percentage of households harvesting marine mammals (43 percent vs. 38 percent), a slight decline in the percentage harvesting terrestrial mammals (25 vs. 29 percent), a major decline in the percentage of households successfully harvesting fish (17 percent vs. 33 percent), and slight declines in the percentage of households harvesting birds (32 percent vs. 34 percent) and other resources (two percent vs. three percent).

At least at the level of the major resource categories, declines in harvest levels in one category between Year One and Year Two were not accompanied by increases in harvest levels in another category. Superficially, these findings appear inconsistent with the expectation that households will deliberately seek to compensate for variations in harvest due to environmental conditions or other factors outside their control. One cannot assume, however, that good hunting conditions in one resource category will occur in the same year as poor hunting conditions in another resource category, providing the opportunity for such compensation. In other words, a year in which hunting conditions are generally good may be just as likely to occur as a year of generally bad conditions. As mentioned earlier, a downward reporting bias in Year Two may also account in part for the generally observed lower harvest estimates.

The differences between revised Year One and Year Two estimates may primarily reflect the aggregate effect of small gaps and omissions in Year Two reporting that may be filled at a later time. As discussed above, the revised Year One harvest estimate of total edible pounds harvested is 7.5 percent higher than the original estimate. The Year Two comparable estimate is only 3.3 percent lower than the initial Year One estimate while it is 10 percent lower than the revised Year One estimate. The research team believes that the best estimates

of Year One (i.e., revised Year One) and Year Two harvest activity should be the basis for comparisons between the two years. The fact that the study team identified correctable reporting errors and omissions for Year One, however, leads the study team to expect to encounter similar errors and omissions in Year Two. It is therefore advisable to note differences while waiting for final harvest estimates before attempting to draw conclusions about variations in annual harvest activity. In any event, the reported harvests for Years One and Two in Barrow are fairly similar (i.e., less than a five percent difference).

CUMULATIVE AVERAGE HARVEST ESTIMATES

While comparing harvest estimates for individual years is useful as a means of understanding variability in harvest levels, developing a harvest activity profile that transcends any particular year is also useful. Tables 8 and 9 and Figures 5 and 6 present average (mean) estimates of each type provided on an annual basis. All columns in the Year One and Year Two combined tables are means of the two years of data. These results are of interest primarily as a demonstration of how multi-year harvest data can be used to develop cumulative averages. The Year Three report will present three year cumulative means as the basis for a discussion of average harvest activity.

As Burch (1985) notes, anomalies are a part of the normal annual cycle of subsistence harvesting in any Alaskan village. Extreme variations in harvest amounts can occur in any year and are a fact of life in the Arctic. In that sense, an "average harvest" for any North Slope village is a misnomer, an entity not nearly so stable as "average income" or "average age" for example. Therefore, average harvest amounts should be used in conjunction with the range of observed actual harvest amounts, as well as in terms of the contextual information (e. g., weather, social and cultural activities, employment opportunities).

TABLE 8: AVERAGE HARVEST ESTIMATES BY MAJOR RESOURCE CATEGORY - ALL BARROW HOUSEHOLDS, YEARS ONE & TWO (1)

RESOURCE	CONVERSION	COMMUNITY TOTALS				AVERAGE POUNDS HARVESTED		PERCENT		SAMPLING STATISTICS			
	FACTOR (2) (Edible Weight Per Resource in lbs)	NUMBER HARVESTED	EDIBLE POUNDS HARVESTED	PER HOUSEHOLD	PER CAPITA	PERCENT OF TOTAL EDIBLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	STANDARD DEVIATION (lbs)	SAMPLING ERROR AT 95% (lbs)	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN	
Marine Mammals (3,4)	n/a	n/a	337,225	360	111.8	54%	40.7%	20	40	320	399	11%	
Terrestrial Mammals	n/a	n/a	204,547	218	67.8	33%	27.3%	35	69	150	287	31%	
Fish	n/a	n/a	58,825	63	19.5	9%	25.1%	6	12	50	75	20%	
Birds	n/a	n/a	21,523	23	7.1	3%	32.8%	4	8	15	31	35%	
Other Resources	n/a	n/a	161	0.2	0.1	**	2.5%	0	0	0	0	172%	
Total (3)	n/a	n/a	622,280	664	206.3	100%	53.4%	42	83	581	747	13%	

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

(3) Bowhead harvest does not contribute to the sampling error for marine mammals since the bowhead harvest is based on a complete count.

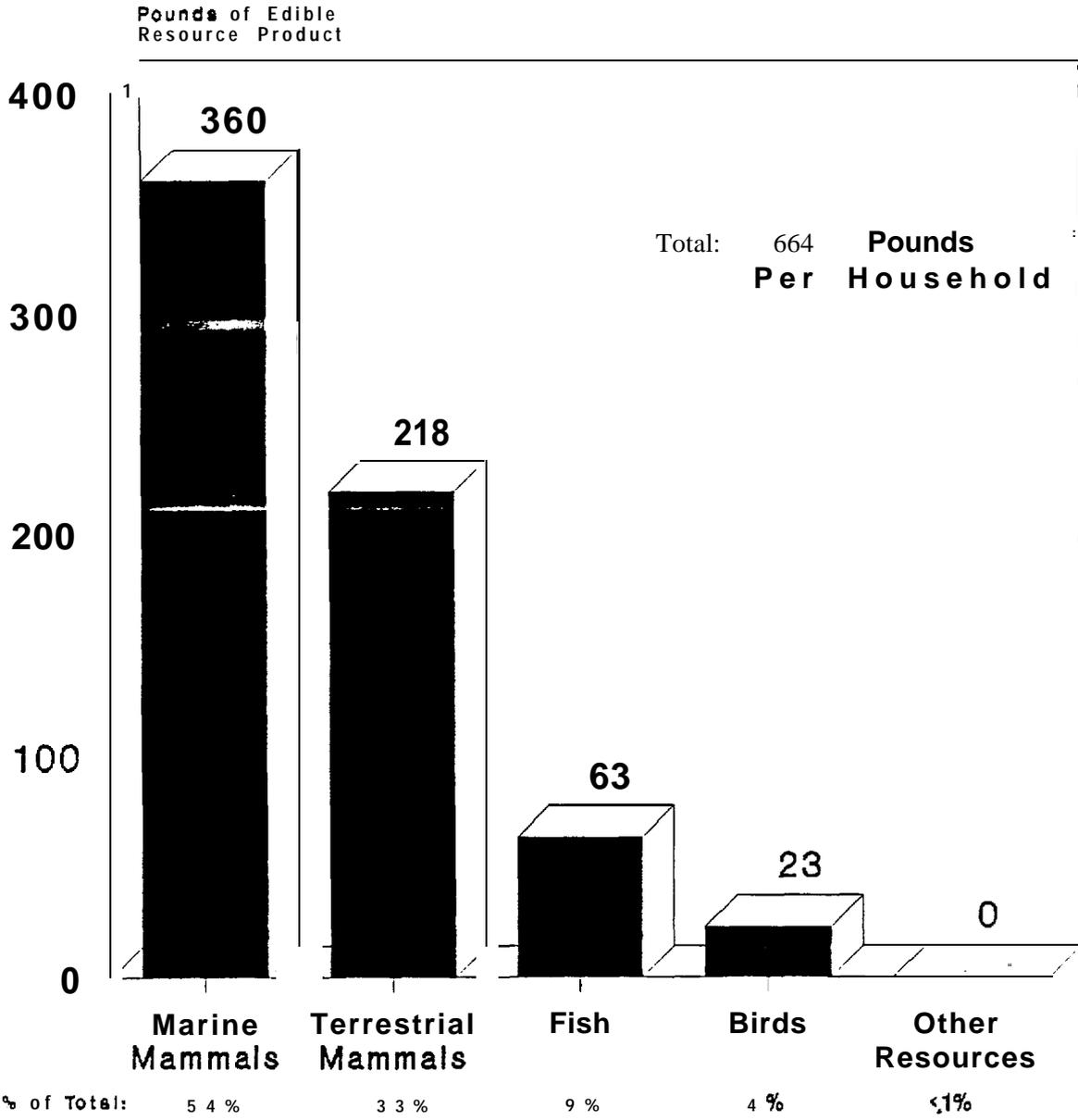
(4) The percent of Barrow households harvesting bowhead represents the percent of Barrow households receiving crew member shares at the whale harvest site, as extrapolated from the sample households.

** represents less than .1 percent

n/a means not applicable

Source: Stephen R. Braund & Associates, 1989

**Figure 5: Harvest Amounts By
Major Resource Category
All Barrow Households, Years One & Two**



(Mean Edible Pounds Per Household)

Source: Stephen R. Braund & Assoc., 1989

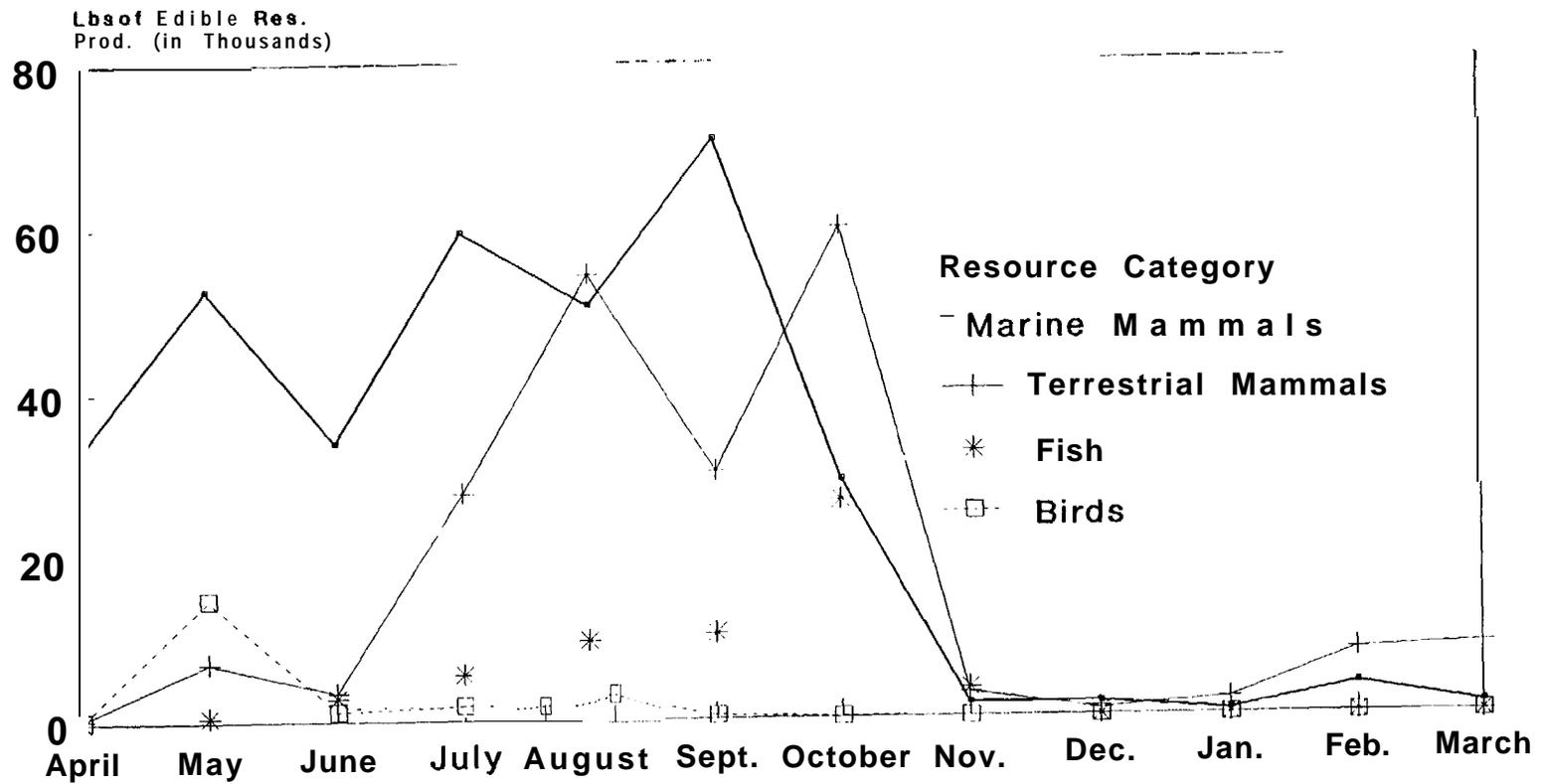
TABLE 9: AVERAGE MONTHLY HARVESTS BY MAJOR RESOURCE CATEGORY - BARROW, YEARS ONE & TWO
(Pounds of Edible Resource Product)

MAJOR RESOURCE CATEGORY	TOTALS											
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Marine Mammals	32,905	52,531	33,916	59,411	50,433	70,579	29,016	1,586	1,597	560	3,608	1,086
Terrestrial Mammals	411	7,040	3,371	27,573	54,246	30,179	59,875	2,906	771	2,004	7,736	8,334
Fish	6	537	2,797	5,531	9,538	10,345	26,507	3,458	0	0	72	33
Birds	193	14,699	1,170	1,757	3,268	357	74	0	0	0	0	5
Total	33,515	74,808	41,254	94,272	117,484	111,461	115,471	7,950	2,367	2,564	11,416	9,459

MAJOR RESOURCE CATEGORY	PERCENTS											
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Marine Mammals	10%	16%	10%	18%	15%	21%	9%	0%	0%	0%	1%	0% = 100%
Terrestrial Mammals	0%	3%	2%	13%	27%	15%	29%	1%	0%	1%	4%	4% = 100%
Fish	0%	1%	5%	9%	16%	18%	45%	6%	0%	0%	0%	0% = 100%
Birds	1%	68%	5%	8%	15%	2%	0%	0%	0%	0%	0%	0% = 100%
All Resources Combined	5%	12%	7%	15%	19%	18%	19%	1%	0%	0%	2%	2% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 6: Monthly Harvest by Major Resource Category, All Barrow Households Years One and Two



Source: Stephen R. Braund & Assoc., 1989

AREAL EXTENT OF SUBSISTENCE LAND USE

REVIEW OF MAP COLLECTION PROCEDURES

The data presented on all maps in the report only include the locations of successful harvests by the sample households and do not include the total area hunted nor the areas transited to reach hunting locations. During harvest discussions with study households, the hunter marked on a 1:250,000 scale map the location where each harvest occurred. These points were transferred along with a harvest entry identification number to aggregate maps of the same scale, thereby reducing the number of maps which had to be electronically registered to digitize the harvest sites. The North Slope Borough Planning Department Geographic Information System Office in Anchorage was responsible for digitizing the harvest data and for the production of all maps included in this report. Check plots of the digitized harvest sites were checked against the maps used to digitize the data and corrections to the digitized database were made as necessary.

On most of the maps in this report, individual harvest locations are depicted by a shaded circle. Each circle represents an actual harvest site surrounded by a two mile buffer. Overlapping circles form larger shaded areas. The two mile buffer serves three purposes. First, the depiction of harvest sites with a two mile buffer reflects an intent to include at least the immediate hunting area. Second, the use of a buffer also accounts for possible errors in reporting the exact location of harvest sites. Respondents reported the location of fish sites, for example, with certainty because those sites were identified easily by the geographic features of the lake or river. Other harvest sites with distinct geographic features were reported with a high degree of accuracy as well, evidenced by the respondent's ease and confidence in mapping the location. Harvests of marine mammals or birds from bents offshore, for example, or of caribou out in the open tundra, were reported typically as an approximate location but recorded as one point on the map representing his best estimate of the exact harvest site. The lack of geographic landmarks reduced the precision with which the hunter could locate his harvest site on a map. Third, the buffer is used to enhance the visual effectiveness of the data presented on the maps, particularly where distinct categories of data must be differentiated.

Also illustrated on several of the maps is a dashed line that represents the area used during the lifetime of 20 Barrow harvesters interviewed in the late 1970s. The data were collected for the University of Alaska Fairbanks Cooperative Park Studies Unit and the NSB (Pedersen 1979) and later entered into the NSB Geographic Information System (GIS). These perimeter data are included to demonstrate how the area used in two single years is not inclusive of the areas used by community members over time. Geographic features are not named on maps displaying harvest data since the combination of geographic features and harvest data on the same map would be difficult to interpret.

These maps currently indicate where one or more harvest events occurred. On the individual resource group maps, these harvest events pertain to an individual species or species group harvested at that site. However, on maps displaying harvest location data on a more general level (for example Map 2), a harvest site may represent one harvest event during which one animal was harvested, or it could represent any number and variety of animals harvested on different dates and by different households, all in the same location. Hence, as presented in this report, the harvest sites do not represent the number of kills or the pounds of edible resource product harvested at each site.

The approach taken in reporting harvest location data differs from that of harvest amounts in three ways. First, map data are reported for all sample households providing information in either Year One or Year Two. Estimates of community harvest amounts are based on reports from only households who participated in both study years. Second, map data are not weighted to take into account different probabilities of selection and different response rates as in the case of harvest amounts. Third, map data for Year One and Year Two have been combined as a cumulative total rather than as a cumulative average.

The basis for all three differences in how data on harvest locations and amounts are reported is the greater variability in harvest locations. Individual harvesters tend to hunt and fish in different locations. They become familiar with different areas and establish camp or cabin sites. When returning to the same area year after year, thereby preserving differences in hunting and fishing locations.

The reliability of harvest location estimates is subject to the same principles of sampling theory as the reliability of harvest amount estimates. In both

instances, reliability is a function of the variability in the characteristics (i.e. harvest location or harvest amount) and of the size of the sample. Since the location of harvest activities is more variable than the amount harvested, the reliability of harvest location data is lower. The reliability of harvest amount estimates is sufficiently high to support the calculation of average harvest amounts. In the case of harvest locations, however, the variability is great enough to preclude the construction of meaningful averages, or measures which purport to show "typical" or "usual" harvest locations. The research team therefore decided to restrict the reporting of map data in the Year One and Year Two reports to a graphic representation of the actual harvest sites reported by household contacts (i.e., the "raw" data). The reader can easily draw interim conclusions about the areas most heavily used for harvest activities by visually identifying those areas with the highest concentration of reported harvest sites.

SUBSISTENCE HARVEST SITES: YEARS ONE AND TWO

Map 2 illustrates the harvest locations of members of 118 sample households for the harvest of all species either in Year One or Year Two. Comparing this cumulative harvest map with the harvest locations just in Year Two (see Map 3) it is evident that the general harvest pattern in the two years is quite similar (maps depicting harvest locations for just Year One are contained in the Year One report). The significance of Pedersen's (1979) lifetime community harvest area line is demonstrated by the correspondence of almost all the most remote harvest locations with the lifetime boundary. Furbearer hunting along the southern part of the line and fishing on the Colville River near Nuiqsut are examples of the close correspondence between the two sets of data (see Maps 4 through 5). It should also be noted that the lifetime line is not an impenetrable boundary as can be seen from the occasional harvest outside the lifetime line. One apparent increase in the subsistence use area is the greater extent of marine mammal hunting offshore from Barrow, on both the Chukchi and Beaufort sea sides of Point Barrow.

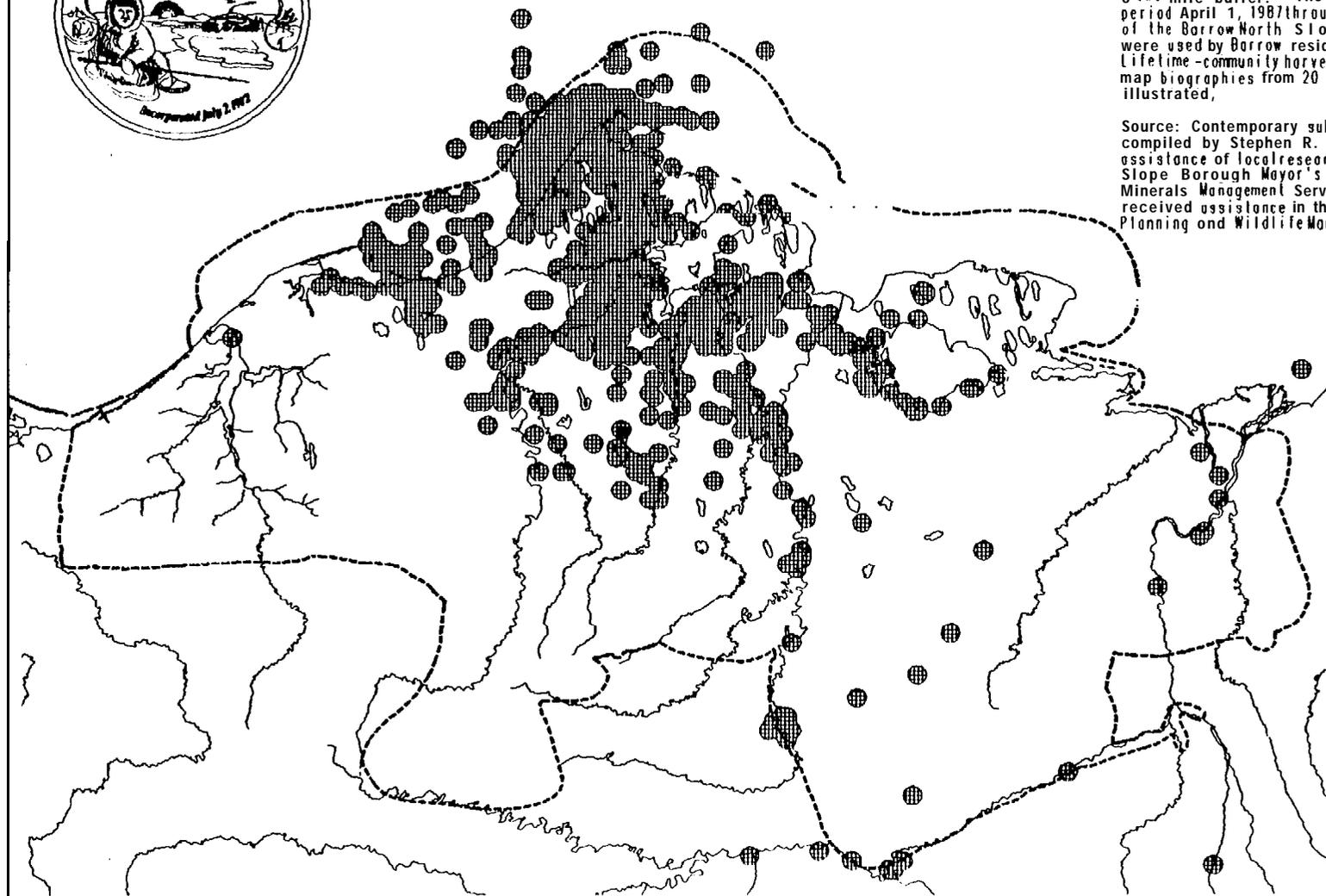
Inland areas where successful harvests were not recorded by study participants are most apparent in the vicinity of the other area villages. Barrow hunters for the most part did not tend to hunt around Wainwright, south of Atkasuk, or in the Nuiqsut area. Exceptions are illustrated by the Barrow harvest sites

MAP 2
 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
 SUBSISTENCE HARVEST SITES, 1987-1989



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989. Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study. Lifetime community harvest areas, collected in the form of map biographies from 20 households (Pedersen 1979), are also illustrated.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SRBA) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SRBA is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION

 Lifetime community land use (Pedersen 1979).

 All Species Harvested
 Caribou, Moose
 Brown Bear, Fox
 Wolverine, Seals
 Walrus, Polar Bear
 Bowhead Whale
 Geese, Eiders
 Other Ducks
 Ptarmigan
 fish, Water

Map Production: North Slope Borough GIS 25 0 25 50 75 100 125

Date: June 26, 1989

MILES



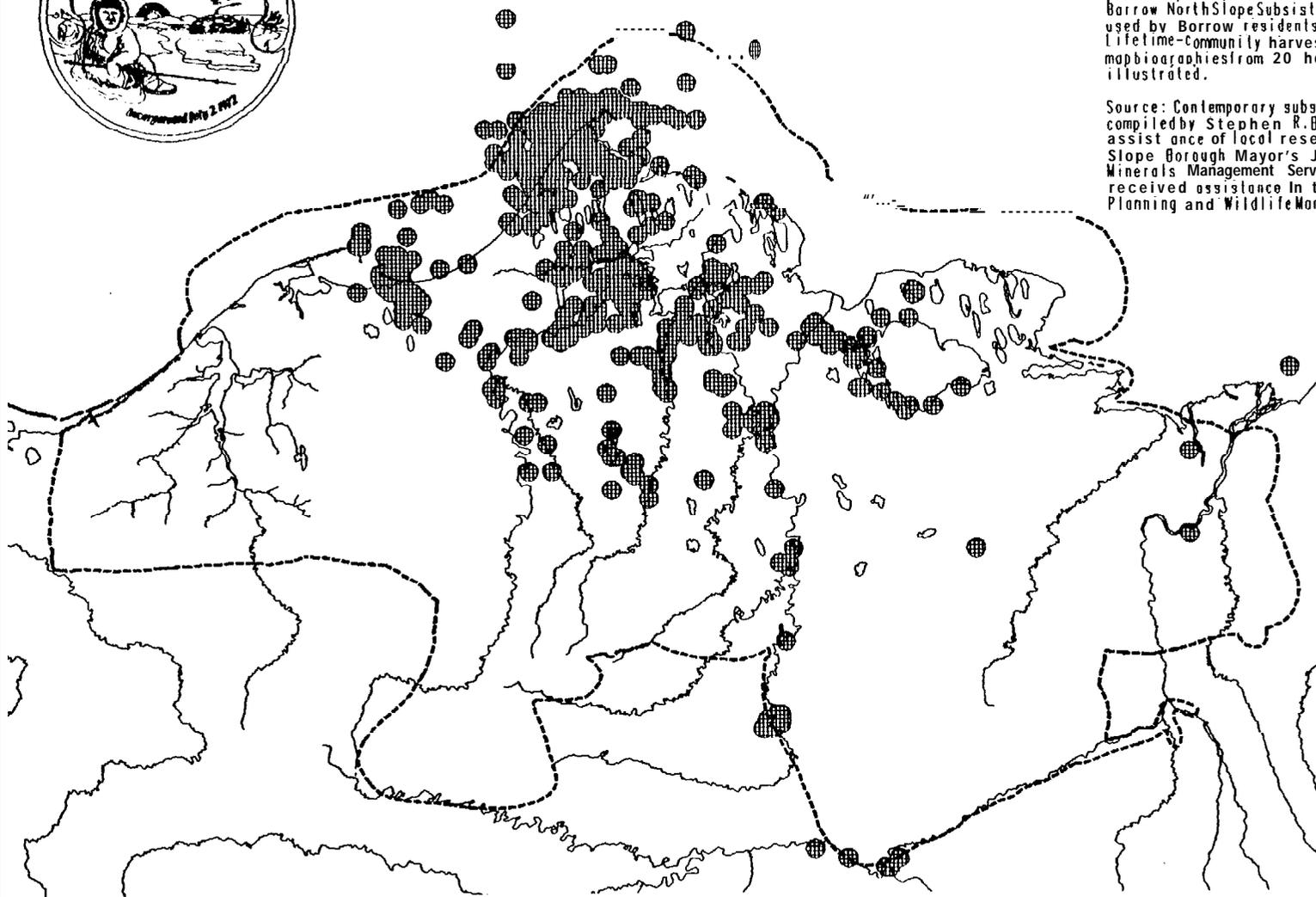
MAP 3

NORTH SLOPE SUBSISTENCE--STUDY - BARROW: YEAR TWO SUBSISTENCE HARVEST SITES, 1988-1989



This map depicts approximate subsistence harvest sites used by 118 of our households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1988, through March 31, 1989: Year Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study. Lifetime-community harvest areas, collected in the form of map biographies from 20 households (Pedersen 1979), are also illustrated.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, US Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION



Lifetime community land use (Pedersen 1979).



All Species Harvested

Caribou, Moose
Brown Bear, Fox
Wolverine, Seals
Walrus, Polar Bear
Bowhead Whale
Geese, Eiders
Other Ducks
Ptarmigan
fish, Water

Map Production: North Slope Borough GIS 25

Date: June 26, 1989

0 25 50 75 100 125

MILES

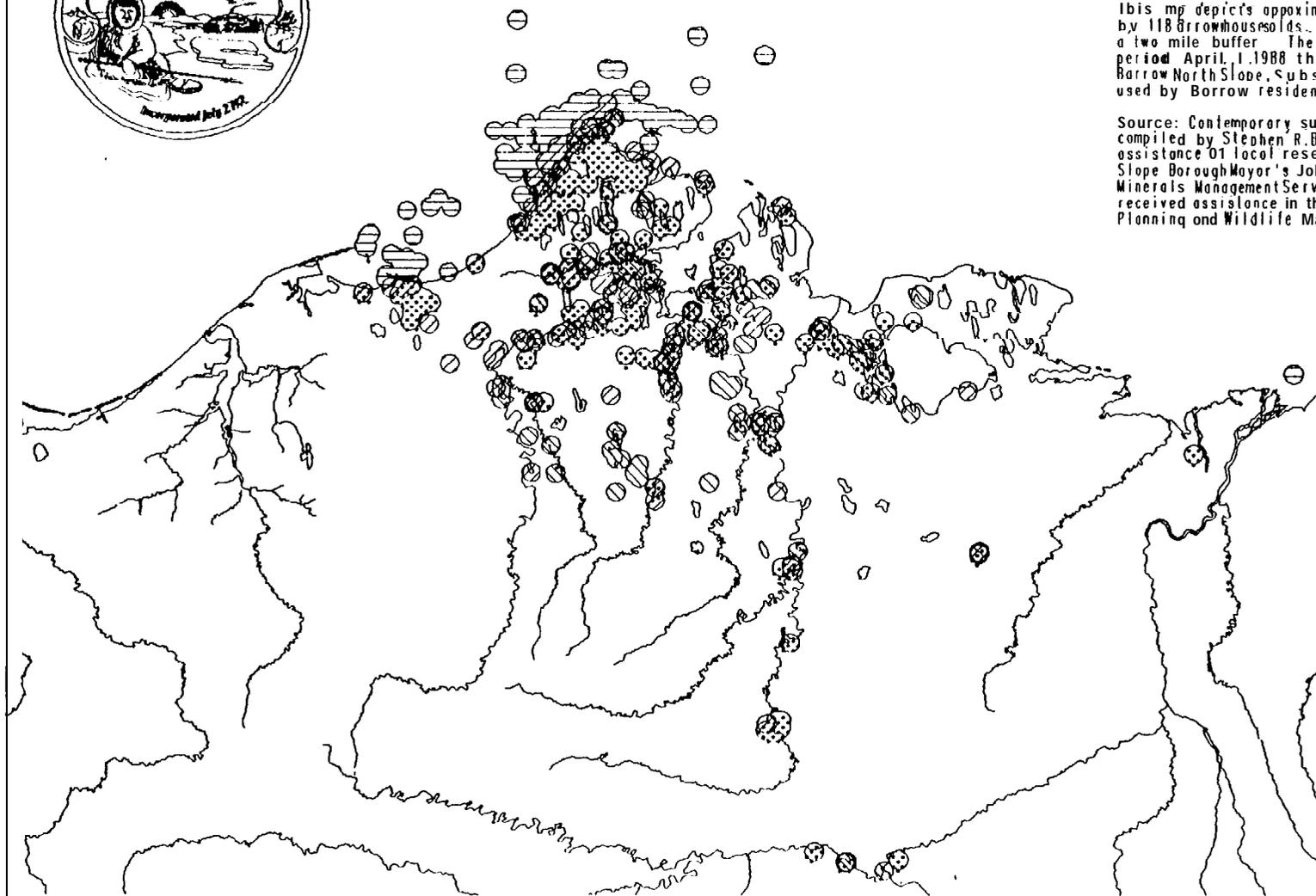


MAP 4
 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
 SUBSISTENCE HARVEST SITES BY MAJOR RESOURCE CATEGORY



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989; Year Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION

-  Marine Mammals
(Bowhead whale, seals, walrus, polar bear)
-  Terrestrial Mammals
(Caribou, moose, brown bear, fox, wolverine)
-  Fish
(Whitefish, other freshwater fish, salmon, other coastal fish)
-  Birds
(Eiders, geese, ptarmigan)

Map Production: North Slope Borough GIS

Date: June 26, 1989



MAP 5 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO SUBSISTENCE HARVEST SITES BY MAJOR RESOURCE CATEGORY:

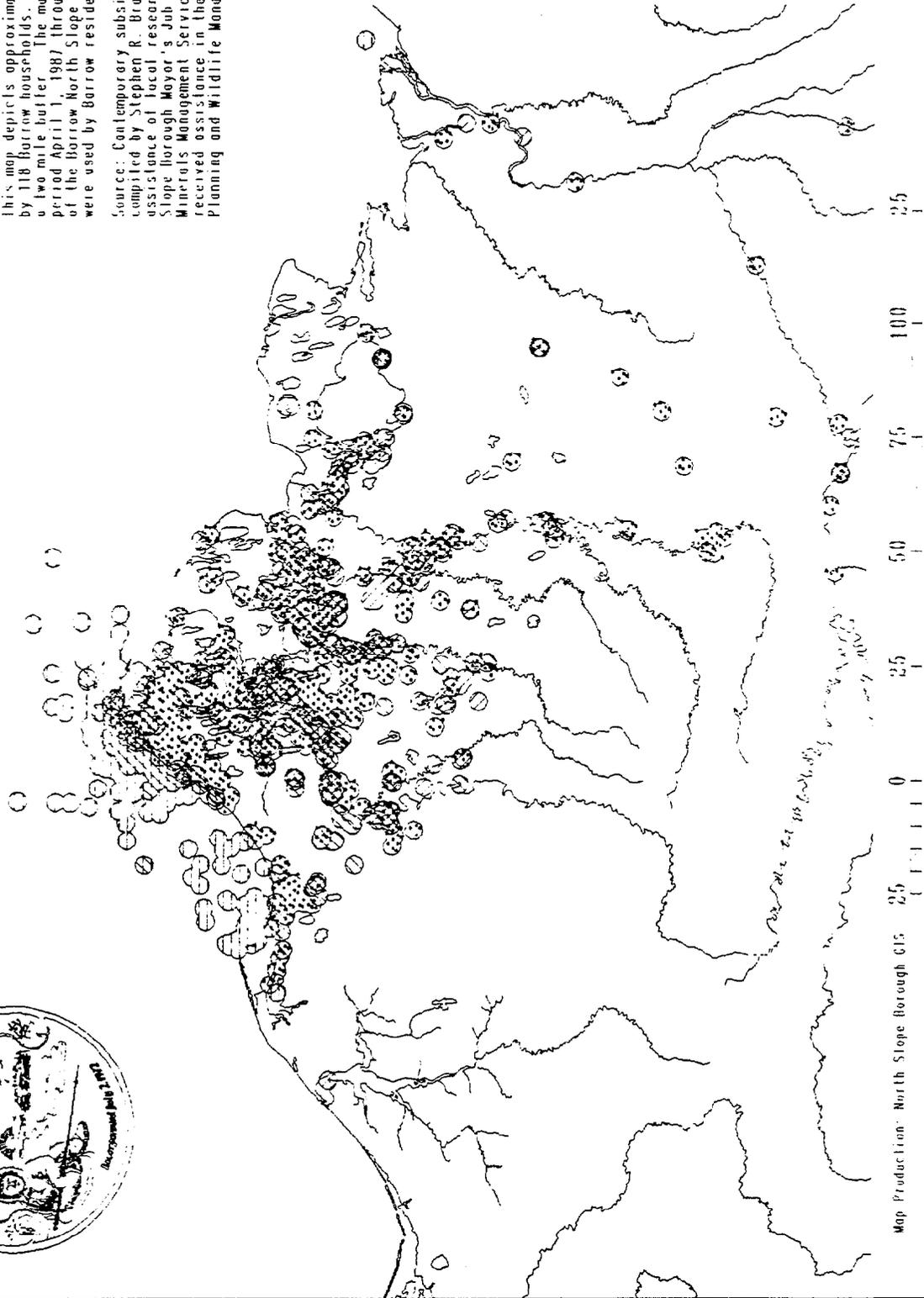


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989. Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

-  Marine Mammals (Bowhead whale, sea walrus, polar bear)
-  Terrestrial Mammals (Caribou, moose, brown bear, fox, wolverine)
-  Fish (Whitefish, other freshwater fish, salmon, other coastal fish)
-  Birds (Geese, eiders, other ducks, ptarmigan)



Map Production: North Slope Borough GIS 25 0 25 50 75 100 25
Date: June 25, 1989

near those villages. Another example is the report by the Wainwright subsistence study field coordinator of one Barrow hunter (not participating in this study) who harvested polar bear and furbearers southwest of Wainwright. Barrow residents with relatives in the villages were especially likely to hunt or fish during visits with their relatives. These maps do not represent harvests by residents of other villages.

Another traditional use area where harvests did not occur during the first two years of this study is the marine environment east of Barrow to approximately Cape Halkett. The Admiralty Bay, Cape Simpson, and Smith Bay areas were used intensively for travel to subsistence harvest sites rather than as harvest areas. Locally known as important spotted seal, polar bear, and beluga hunting locations, harvests in those areas did not occur by the study participants during the first two years of the study.

FIXED CABIN SITES

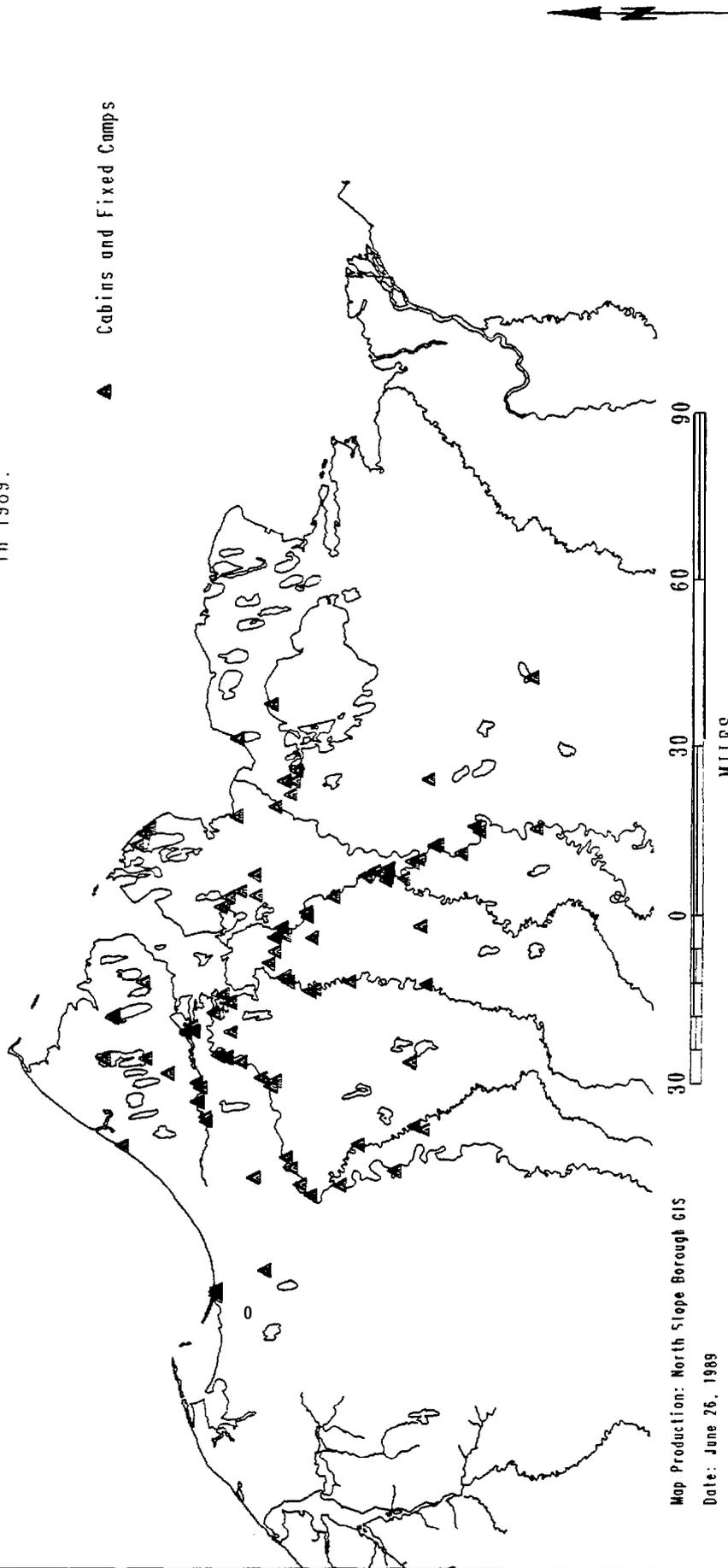
The locations of most of the cabins owned by Barrow residents are shown on Map 6. Cabin and Fixed Camp Locations. These sites represent only those locations where a cabin is standing and by no means represent all the camping sites used by Barrow families. Most families visit their cabins each year and the area within the vicinity of the cabin is often the focus of most of their subsistence activities. When viewed in relation to Maps 2 through 5, the cabin locations closely correspond with most of the successful harvest locations.

MAP 6 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO CABIN AND FIXED CAMP LOCATIONS



This map displays the locations of fixed hunting and fishing camps used by Barrow residents. The locations of many temporary subsistence camps are not shown.

Source: Data compiled by Worl and Smythe (986) and updated by the North Slope Borough Planning Dept (men) in 1989.



LOCALLY HARVESTED RENEWABLE RESOURCES

The principal objectives of the Barrow Subsistence Study are to produce species-specific estimates of harvest locations and harvest amounts. The preceding two sections provided a useful background against which these detailed estimates can be presented. The purpose of this section is: (1) to present species-specific harvest amount estimates in three ways - (a) revised Year One estimates, (b) Year Two estimates, and (c) Year One/Year Two cumulative averages; and (2) to present species-specific harvest location estimates in two ways: (a) Year Two harvest sites, and (b) Combined Year One, Year Two harvest sites.

This section begins by identifying the species harvested by sample households in either Year One or Year Two. The section continues with an overview of seasonal activities, focusing on differences between Year One and Year Two. The main body of the section is devoted to a presentation of harvest amount and harvest location data. This presentation is accompanied by a discussion of the differences between Year One and Year Two harvest activity.

SPECIES HARVESTED IN YEAR ONE OR YEAR TWO

Species recorded in either Year One or in Year Two are displayed in Table 10. Beluga whale and ribbon seal are examples of species that are known to have been harvested by Barrow residents historically, but were not harvested in either Year One or Year Two by the sample households nor by other Barrow households (fieldwork for this study).

In some instances, the researchers were not able to record each successful subsistence harvest by individual species. This problem occurred most commonly for those species harvested in mixed groups (e.g., various species of birds or fish). The recording of marine and terrestrial mammals, on the other hand, was more accurate. The harvest of these larger animals was more memorable for most people, and respondents had no problem distinguishing one from the other.

TABLE 10: SPECIES HARVESTED BY BARROW STUDY SAMPLE
APRIL 1987- MARCH 1989

<u>Species</u>	<u>Iñupiaq Name</u>	<u>Scientific Name</u>
Marine Mammals		
Bearded seal	Ugruk	Erignathus barbatus
Ringed seal	Natchiq	Phoca hispida
Spotted seal	Qasigiaq	Phoca largha
Bowhead whale	Agviq	Balaena mysticetus
Polar bear	Nanuq	Ursus maritimus
Walrus	Aiviq	Odobenus rosmarus
Terrestrial Mammals		
Caribou	Tuttu	Rangifer tarandus
Moose	Tuttuvak	Alces alces
Brown bear	Aklaq	Ursus arctos
Dall sheep	Imnaiq	Ovis dalli
Arctic fox (Blue)	Tigiganniaq	Alopex lagopus
Red fox (Cross, Silver)	Kayuqtuq	Vulpes fulva
Porcupine	Qinaġluk	Erethizon dorsatum
Ground squirrel	Siksrik	Spermophilus parryii
Wolverine	Qavvik	Gulo gulo
Fish		
Salmon (non-specified)		
Chum salmon	Iqalugruaq	Oncorhynchus keta
Pink (humpback) salmon	Amaqtuuq	Oncorhynchus gorbuscha
Silver (coho) salmon	Iqalugruaq	Oncorhynchus kisutch
King (chinook) salmon		Oncorhynchus tshawytscha
\\ Whitefish (non-specified)		
Round whitefish	Aanaakliq	Prosopium cylindraceum
Broad whitefish	Aanaakliq	Coregonus nasus
River caught	Aanaakliq	Coregonus nasus
Lake caught	Aanaakliq	Coregonus nasus
Humpback whitefish	Pikuktuuq	Coregonus clupeaformis
Least cisco	Iqalusaaq	Coregonus sardinella
Bering, Arctic cisco	Qaaktaq	Coregonus autumnalis
Other Freshwater Fish		
Arctic grayling	Sulukpaugaq	Thymallus arcticus
Arctic char	Iqalukpik	Salvelinus alpinus
Burbot (Ling cod)	Tittaaliq	Lota Iota
Lake trout	Iqaluaqpak	Salvelinus namaycush
Northern pike	Siulik	Esox lucius
Other Coastal Fish		
Capelin	Pagmaksraq	Mallotus villosus
Rainbow smelt	Iñhuaġniq	Osmerus mordax
Arctic cod	Iqalugaq	Boreogadus saida
Tom cod	Uugaq	Eleginus gracilis

TABLE 10 (cont.): SPECIES HARVESTED BY BARROW STUDY SAMPLE.
APRIL 1987- MARCH 1989

<u>Species</u>	<u>Iñupiaq Name</u>	<u>Scientific Name</u>
Birds		
Eider (non-specified)		
Common eider	Amauligruaq	Somateria mollissima
King eider	Qiqalik	Somateria spectabilis
Spectacle eider	Tuutalluk	Somateria fischeri
Other Ducks (non-specified)	Qaugak	
Goose (non-specified)	Nigliq	
Brant	Niglingaq	Branta bernicla n.
White-fronted goose	Niglivialuk	Anser al bifrons
Snow goose	Kaḡuq	
Canada goose	Iqsraḡutilik	
Ptarmigan (non-specified)	Aqargiq	Lagopus sp.
Willow ptarmigan	Nasaullik	Lagopus lagopus
Other Resources		
Berries (non-specified)		
Blueberry	Asiaq	Vaccinium uliginosum
Cranberry	Kimmigḡaq	Vaccinium vitis-idaea
Salmonberry	Aqpik	Rubus spectabilis
Bird Eggs (non-specified)	Mannik	
Eider eggs		
Greens' Roots (non-specified)		
Wild rhubarb	Qugulliq	Oxyric digyna
Water		
Fresh water	Imiq	
Fresh water ice	Sikutaq	
Sea ice	Siku	

As mentioned above, beluga whale and ribbon seal are notably absent from the list of marine mammals that have been harvested commonly in the past but are not known to have been harvested by any Barrow residents in Year One or Year Two. Wolves, one of the most desirable fur bearers available to Barrow residents, have reportedly been scarce in the areas where they are usually hunted. Hunters scouting the foothills north of the Colville River have reported a scarcity of tracks during the past two years. One hunter followed tracks south to the cliffs above the Colville, then turned back, unable to find a safe route down to the river. It is likely that perhaps one or two wolves were harvested by Barrow residents during the first two years of the study; however, no harvests were reported by participating households. Some of the smaller fur bearers (e. g., marmot and ermine) were also absent from the harvest reports and were likely harvested in very small numbers if at all.

The fish species harvested include essentially all species available to Barrow residents except sculpin and black fish. Arctic and Bering cisco are grouped together for this study and, in fact, differentiation of the two is often difficult without dissecting the fish.

A variety of bird species available to Barrow residents were not recorded in Year One or Year Two. Respondents often noted duck, eider, and geese harvests at a generic level, e.g., "eiders" or "geese." Further probing sometimes led to a finer level of distinction between species, but often the species breakdown was a best guess. Of the six or more duck species (other than eiders), none was recorded individually, but rather generically as a "duck" harvest. Other unrecorded species included loons, owls, swans, and cranes.

Resources presented in Table 10 in the "other species" category elicited the least specific responses. Harvest of these species was often forgotten unless the researcher specifically asked about them. Greens, roots and berries were often harvested and consumed while at inland camps.

THE SEASONAL ROUND

The following month by month report of subsistence activities documents Barrow residents' annual subsistence cycle from April 1, 1988 through March 31, 1989. This general description of the yearly cycle or "seasonal round" emphasizes environmental, social, and cultural factors that affected or were otherwise related - on a community level - to Barrow's subsistence harvest activities during Year Two of the study. The descriptions highlight the month's major subsistence activities, point out any significant or unusual environmental conditions that may have affected hunting that month, and offer comparisons with the respective month in Year One,

APRIL

This was the time for final preparations for whaling. New bearded seal (ugruk) skins were sewn on the umiak frames. Ice cellars were cleaned out and fresh snow placed inside. Trail building also began in earnest as crews decided where they would like to locate their camps during the spring bowhead whale migration. At least five trail systems extended out from major landmarks and traditional camping areas along the coast, from Walakpa Bay 15 miles south of Barrow to off of Pt. Barrow 10 miles to the north.

The ice remained closed during the the first two weeks of April. When it did open at mid-month the lead was about four miles from shore. Most crews went out about the 23rd, a few days later than last year. On April 24, the Jonathan Aiken crew landed the first Barrow whale of the season. The next day four whales were landed. On the 26th the lead edge began to close and the camps moved back from the lead. On the 28th a crack in the ice began to widen only one-half mile from shore. The lead edge became established there when a large ice pan broke off and floated out that evening. Crews began reestablishing their camps along the new lead edge the next day. The lead was so close to town that the crews traveled away from town at least ten miles up or down the coast to make camp. According to one whaling captain, "town is too noisy."

MAY

Three whales were harvested in early May. The whaling season ended for some crews on May 6 when the last whale in Barrow's spring quota was harvested. However, a strike was received from Kivalina at mid-month and approximately one-half of the crews reestablished camps on the ice. The brief two day whale hunt proved unsuccessful. A few crews had maintained their camps on the ice throughout the first half of the month. Eiders and seals were harvested at this time. Successful crews especially were attempting to harvest extra subsistence foods to serve at the Nalukataq celebrations in June.

Travel conditions were not favorable the second week of May. Blowing snow and average wind speeds of 25 m.p. h. with gusts to 35. limited travel. About mid-month many families began traveling to camps to hunt waterfowl and to get ready for fishing. The major rivers stayed frozen through May and the travel conditions remained favorable, though moderate winds and fog persisted through the end of the month. The more popular waterfowl hunting locations were primarily along the Inaru River and lower section of the Meade River.

P t a r m i g a n were also harvested at camp. Harvest of caribou was uncommon. Although a few were harvested to provide food for camp, most hunters refrained from taking caribou later in the month as fawning time neared. One hunter also reported that the caribou hair falls out very easy this time of year and is impossible to keep out of the meat when butchering the animal. Two polar bears that wandered close to town were also harvested this month.

Late in the month successful crews began hosting their "bring UP the boat" celebrations. Usually held on the beaches in front of town or on the cliffs near the old village site, it was a time for the successful crew to again share their good fortune of a successful hunt. The crews usually served a special treat of mikigaq on these occasions, a delicacy of fermented whale meat and maktak. Fresh eider, goose, and caribou sou P were also served at these celebrations, as well as Eskimo donuts, fruit, tea, and cake.

JUNE

Geese and duck hunting continued in early June. Wind, blowing snow, and migration patterns significantly affected harvest success from one location to another. As the snow receded in the warmer inland areas, families moved their camps closer and closer to Barrow. Though white-fronted geese were the most common variety harvested, one hunter reported seeing many more brant than usual this year.

Seals were harvested during June. Early in the month most hunters traveled to the lead edge by snowmachine, while others walked out to the lead that remained within a half mile of shore. By mid-month the ice melted near shore preventing easy access to the lead from town. A common practice was for hunters to pull their boats behind snowmachines down the coast for 10 miles or so to an easier point of access to the open lead.

A few whaling crews continued whaling until mid-month but the transferred strikes remained unused. In the previous year a whale was harvested in mid-June, nearly a month and a half later than the final whale harvest of spring season.

Some caribou hunting occurred during the month, primarily from fish camps or marine mammal hunting camps. Fresh fish was a welcome addition to the local diet and was supplied primarily by families that traditionally supply fish to all who need them this time of year. The Teshekpuk Lake and Chipp River areas produced a significant amount of these early season fish.

By mid-month the eight successful crews and their families and friends were devoting their free time to preparations for Nalukataq. Shares of whale were cut into smaller pieces, fish were cut in sections, and caribou and ducks were prepared for soups, all intended for distribution at the community-wide feast. New parkas and parka-covers were sewn and the blankets for the blanket-toss were prepared from the boat skins of the successful crews.

The two Nalukataq celebrations took place on June 27 and June 28. Four crews served the people each day. Everyone seemed to be in town for the celebrations and the soon-to-follow Independence Day holiday.

The temperatures were very similar in Years One and Two, averaging in the mid-30°s for June, with the high for the month falling on the 28th in both years: 49° in Year One and 54° in Year Two. The winds were more moderate in Year Two. It is also important to note that there were eight "heavyfog" days in Year Two, twice as many as there were in June of Year One.

JULY

On July 5 and 6 the shorefast ice floated out, opening up the boatlaunching areas in front of town. That corresponded very closely with the date the ice floated out last summer. Boating from town began in earnest on July 6. Many bearded seal or ugruk harvests were reported.

Ice conditions favorable for boating in the ocean came to an abrupt end during the evening of July 13. The wind began blowing from the southwest on the 13th and pushed the pack ice tight against the shore. The ice remained against shore through the end of the month. The wind was more often out of the west and southwest in Year Two, blowing westerly or southwesterly almost consistently from July 14 through August 3. July was also extremely foggy in Year Two, with heavy fog recorded for 19 days during the month.

The same winds that blew the ice in to the beach on the Chukchi side of Point Barrow carried the ice out of Elson Lagoon. The lagoon was relatively ice free on July 14 and that signaled the beginning of boating to inland camps. Hunters also began hunting for bearded seal in Elson Lagoon and in the vicinity of the barrier islands east of Point Barrow in the Beaufort Sea. Occasionally hunters ventured into the Chukchi side of the point; however, one experienced ocean hunter reported that with all the ice and the fast current, travel on that side was dangerous unless other conditions (e. g., wind, visibility) were just right. With the foggy conditions most of the month, visibility was seldom favorable for boating among swiftly moving ice floes.

With the opening of Elson Lagoon, the area river systems became accessible to families who wanted to boat to fish camp. Whitefish (broad and humpback) were the major species harvested during the month. Some families also set nets near Point Barrow on the lagoon side of the point. Whitefish, arctic cisco, arctic

char, silver salmon, and chum salmon were being caught there by mid-month. Families were also occupying their cabins or setting up camp at the "Shooting Station" or Pigniq at the base of Point Barrow. Many families enjoyed staying out there, away from the noise of town. One study participant wistful]]' wanted to move his office to Pigniq.

Eiders were flying back over the point toward the west and harvests took place primarily at Pigniq. The hunters were often young boys 7 to 15 years old, some of whom were just learning how to shoot.

Caribou were very near town. One elder reported driving out the Gaswell road and seeing 5,000 caribou from the road.

AUGUST

In early August south and southeast winds finally blew the ice off shore in front of town. On August 5th, for the first time since mid-July, bearded seal and walrus hunting crews could launch boats from the beaches near town. A portion of the ice pack was blown back to within sight of shore and hunting conditions remained excellent throughout the week with fairly calm winds. Some of the first walrus harvests of the year occurred during that first weekend of August.

Activities mirrored July to a major extent; however there was much more boating and marine mammal harvests were more common. Those with free time or with time off from work traveled to fish camps for fish and caribou. Others took weekend trips as often as possible. This was the time for travel, as boating had been limited for many in July and school would be starting at the end of this month.

Caribou were available in most areas though usually not taken in large numbers. However, there were exceptions. One family took home 14 caribou for the ice cellar after finding themselves surrounded by thousands of caribou, with room in their boat, and unsure if they would have the time or the opportunity to catch caribou in the fall. A few families were disappointed in not harvesting any caribou during week-long boating trips.

Fishing continued inland at camps and at Pigniq, although catches tapered off at Pigniq as the month progressed. Fishing was slow at some of the camps. Many families related that high water conditions were moving grass and other debris downstream, causing them to pull their nets to prevent them from being fouled. These high water conditions were similar to last year.

Eiders were harvested as they traveled on their westerly migration back over Barrow. A few families gathered greens at camp. The berry season was again poor. It has been three years since a good berry season, according to one person who likes to pick berries near the Meade River. A similar report was given by a family that picks berries in the Teshekpuk area.

School started a little earlier this year, on the 18th of August.

SEPTEMBER

Boating continued this month until about the 18th. By that time ice had blown in and piled up against the grounded offshore ice to the extent that all passage to open ocean had been blocked. Open water remained in the 300 yard area between shore and ice and seal hunting continued from smallboats or near shore through the end of the month.

Barrow whaling crews harvested three whales this month, successfully using all three of their allocated fall strikes. The first was harvested on September 15 and two were harvested on Saturday, September 17. Two males and one female were harvested, all in the 48 to 51 foot range. Over 40 boats participated in pulling in the two whales on the 17th. The ocean was calm and the ice floes scattered during the successful whaling period. The day after the last harvest the wind grounded the ice on shore and conditions favorable to fall whaling were absent for the rest of the season.

Fall fishing under the ice and related caribou hunting began as snow conditions improved during mid-month. Many families were observed going out shortly after the whale harvests. Grayling tend to school and swim downstream in mid- to late September, earlier than the whitefish species. Families that know of these good grayling fishing locations were eager to get out as soon as travel

conditions permitted. Flying to fish camp was more common during this time of year since neither boating or snowmachine travel conditions were favorable.

Caribou were taken in larger numbers this month; the rut was approaching and the meat of the older bulls would soon become inedible.

The lakes and rivers froze earlier than usual and five families who had boated to their camps were forced to break through ice to get out to open water. Some were able to make it back to Barrow while others had to charter a plane to get back and would retrieve their boats this winter. Although the early freeze-up made boat travel more difficult, fishermen were able to take advantage of the situation and set their nets under the ice earlier than expected.

OCTOBER

Fishing and caribou hunting were the primary subsistence activities this month. Families traveled extensively to inland cabins and camps.

In addition to jigging for grayling and burbot, one to four nets were commonly set by a family under the ice in rivers and lakes near their camp. Once in place, the nets were usually checked once or twice daily and left at the same location until the family broke camp or until they caught a sufficient amount of fish. As two households related after their fall fishing trip, once they had sufficient amounts of fish they left their nets in place for other families who wanted to fish.

In October caribou hunters traveled out from camp by snowmachine as far as the weather, the daylight, their equipment and fuel, and their navigation skills permitted, or as far as necessary to successfully catch caribou. Many people reported caribou being scarce near their camps on the lower Meade, Topagoruk, and Chipp rivers. Although caribou were present, and at times abundant in the vicinity of Barrow during the month, many of the active harvesters were inland at fishing sites and family camp sites. Since caribou were more scarce in those inland locations this year, total harvests for the month were less than in Year One.

A few individuals were jigging for the small arctic cod in the the tidal cracks just in front of town. These are a popular fish that were not caught in very large numbers during the first year of the study.

The snow cover was much deeper this year than last. This had both favorable and unfavorable ramifications for snowmachine travel. On the favorable side, travel was at times much faster this year. Rough stretches of ground were well covered and very few detours were required. More miles could be covered in a day. However, the deep snow conditions also presented significant problems:

- o Deep snow is harder on the machine. Rubber belts burn up quickly especially when pulling a heavy load. One key informant reported burning up three belts on a day trip and then had to abandon his sled and load of caribou when it became apparent he would not otherwise make it home before dark.
- o Gas consumption is much greater in deep snow. Trips were more expensive and reports of running out of gas were more common this year.
- o Deep snow hides drop-offs and ditches. Though snow machine travel is always a dangerous endeavor in the Arctic, accidents to traveling hunters caused by snow covered hazards this year included a broken collarbone and a broken leg.

The wind and temperature were favorable for hunting and traveling most of the month though white-out conditions became more common near month's end. It was cooler this year than last, with an average monthly temperature of 2^o compared with 22^o the year before, Cold temperatures however are not nearly such a limiting factor to subsistence activity levels as are wind, visibility, and ice conditions.

Out on the ice, an open lead formed less than one mile out from town on October 23. These were very favorable conditions for seal hunting as hunters did not have to venture very far out during this time of unstable ice conditions.

Though not a subsistence activity, the Barrow gray whale rescue - Operation Breakthrough - likely had a significant influence on mid- to late-October subsistence harvest activities. The whales were discovered on October 7 and the local rescue effort began in earnest on October 16. From that date until the whales eventually escaped the ice on October 28, the local commitment of manpower was extensive. At least 30 people, mostly men, were employed full-time through the Mayor's Job Program on the rescue effort.

NOVEMBER

Most families had moved from their camps back to town by mid-month

Caribou remained in the vicinity of Barrow throughout the month and harvests of caribou during November were triple that of the same month in Year One.

Conditions were very good for fishing arctic cod along the shoreline in front of Barrow. A combination of ice conditions and availability of fish made this fishery much more productive than last year. At least two families traveled to the Admiralty Bay area to fish for arctic cisco.

The last ten days of November especially provided favorable seal hunting conditions, with very moderate wind conditions and an open lead within a mile of town. It was an hour's walk to the edge of the lead according to one hunter. The Thanksgiving holiday also provided extra time for hunting during the favorable conditions for those who wanted fresh seal meat for their families. One pair of hunters harvested seven seals in one day during this period. Other reported harvests varied from zero to one or two seals per hunter.

November was characterized by lower than average temperatures, usually in the -15° F to -20° F range. Wind speeds remained moderate most of the month. One exception was on the 8th when wind speeds to 35 miles per hour pushed the windchill to -65° F.

Thanksgiving was the major community event during the month and was a significant occasion for the distribution of subsistence foods. Pre-holiday preparations included cutting up whale meat and maktak, cutting fish, rooking caribou soup, and preparing fruit and donuts. The successful whaling crews and successful fishermen delivered their boxes of whale and fish to the churches early Thanksgiving morning. By noon the churches were full. At 1:30 the food distribution began. Servers continued to walk by for the next three hours with soups and other foods to eat at the church, as well as with whale and fish for each household to take home. Approximately 40 pounds of whale and a few

pounds of fish were distributed to each of the families present at the churches. Those with larger families received more.

A portion of the day before Thanksgiving was set aside for a North Slope Borough potluck dinner and the day after Thanksgiving was a North Slope Borough holiday.

DECEMBER

Caribou remained in the vicinity of Barrow in December, though the harvest of caribou remained relatively low. Hunters perceived the condition of the animals to be not as favorable as in other times of the year. Seal hunting and fox trapping were other subsistence activities in December. All the successful whaling crews distributed whale and other foods at the churches during Christmas. Some of the crews were busy in early December already boxing up the food to be distributed during Christmas.

Community games and competitions were held during the period between Christmas and New Years.

Similar to last year, temperatures plummeted near month's end, the low hitting -42°F on the 24th. Wind speeds increased during this same period as well. Although temperatures increased to -21°F on Christmas day, wind speeds increased to 37 m.p.h. giving a resultant windchill of -80°F . Fog and blowing snow were common throughout the month.

JANUARY

The Kiviq or Messenger Feast, held during three days in early January was the most significant subsistence related community activity during January. Many people from all the North Slope villages visited Barrow for the recently revived traditional celebration, held for the second year in Barrow. Last year was the first time the gathering had been held since the early 1900s. A community potluck and the exchange of subsistence items (e.g., ivory, furs, crafts) and subsistence foods were important aspects of the event. Woolley &

Okakok (1989) provide an excellent overview of this year's event as well as describing its historical context. As described in the beginning of their paper:

Kivgiq consists of three days of Inupiat dancing, singing, story and joke telling, trading, bartering, and socializing, all of which reinforce North Slope Inupiat unity. Kivgiq brings North Slope villagers together in Barrow for the event, helping to strengthen kinship and partnerships. Kivgiq fosters traditional values such as sharing, spiritual guidance, storytelling, respect for elders and gratefulness for local game animals. Kivgiq promotes leadership qualities. Kivgiq is a celebration of living the Inupiaq way (Woolley and Okakok 1989: 1)

Bitter cold persisted the last three weeks of January. The National Weather Service in Barrow recorded -50° F on January 24 with winds to 21 miles per hour, taking the wind chill factor to below -100° F. Temperatures remained in the -50° F range for the rest of the week. The monthly average temperature for the month (-24° F) was -14° F the previous year. Hunting effort, primarily targeted on seals, was very limited during the month. Fox trapping also continued near town.

Because of low temperatures, most air travel to the villages was grounded for close to two weeks except for emergency medical flights. An extreme high pressure settled over the state at the end of the month, grounding even large jets for a few days. Shipments of food, supplies, and equipment to the villages were very limited during the last two weeks of the month. Travelers to the villages became stranded in Barrow and Barrow residents traveling home from Fairbanks and Anchorage were stranded in those cities.

FEBRUARY

Extremely strong winds blew on February 25, 27 and 28. Drifting snow closed all the roads on those days. This major storm piled blocks of ice the size of houses up onto the beach to height of 20 feet or higher. Many reported that it was the first time they had seen ice piled that high on the beach so

extensively, stretching from Point Barrow all the way to Skull Cliffs. The trail systems developed by seal hunters out through the ice pack were totally demolished. Travel away from town during the end of February was at a minimum.

Prior to the storm, seal hunters had some success in periodically open stretches of water, usually on the Beaufort Sea side of Point Barrow. The best seal hunting appeared to be around mid-month. After the storms, the Beaufort Sea side of Point Barrow was entirely open water, a phenomenon seldom if ever witnessed at this time of year by current Barrow residents. The open area refroze within the week in a very smooth condition. Seals could be seen sunning themselves out in the middle of the large open flat area, though most attempts at harvesting them were reportedly unsuccessful. The smooth area of ice provided easy access out to the Beaufort side of the point, while the Chukchi side was basically inaccessible without major trail work.

Trapping and hunting of furbearers (i.e., fox, wolverine, and wol~'es), caribou hunting, and polar bear hunting occurred during the month. Furbearer hunters made extended trips to inland camps located 100 miles or more from Barrow. The first whaling boat umiag frame of the season was covered with bearded seal skins on February 24. One of the women who sews the skins related that crews are covering their boats earlier these days.

MARCH

Rough ice conditions and a lack of open water appeared to curtail seal harvests during the month. Many polar bears were sighted in an area 30 miles northeast of Pt. Barrow but harvests were few. In one instance, a hunter was alone and knew he could only handle a smaller bear by himself, but could see only very big bears. Another hunter wanted to select only a bear with clean fur. Each one he began stalking, however, was soiled with blood and oil from the carcasses on which they had been feeding. The extreme winds in late February caused a continuous stretch of rubble ice in front of town between the shore and the open lead. The open lead was about seven miles from town. A few crews began building trails out through the rubble near town, while others were exploring the smoother ice conditions to the south out from Walakpa Bay and even further south.

At least 12 hunters traveled inland in search of wolverine and wolves. Reportedly there were few tracks to be seen and fewer wolverine were harvested were less than last year. No wolves were reported harvested by the study participants. Hunters reported good travel conditions in the foothills because of the deep snow; the large drifts facilitating the crossing of rivers and ravines. Closer to town the solid drifts, which were like cement according to one hunter, led to an increase in travel times,

Caribou were harvested near the Meade and Inaru rivers. Those who traveled further inland reported a scarcity of caribou.

Other whaling activities continued: sewing the bearded seal skins together, stretching the skins over the boat frames, building sleds and preparing other equipment.

The annual Alaska Eskimo Whaling Commission convention was held this month in Barrow, March 8 through 11. The 1989 bowhead whale quota of 41 landed whales was allocated among the nine whaling villages. Barrow received a quota of 14 whales landed, an increase of three over last year.

In summary, the following list highlights the key subsistence-related dates and events for Year Two. Also listed are the many events and holidays that indirectly influenced harvest patterns. With full-time employment a reality for many heads of households, subsistence activities were often coordinated to coincide with long weekends and national holidays. Other local celebrations, such as Nalukataq, also affected subsistence activities. Successful whaling crews were especially active after whaling, expending extra effort hunting caribou, eiders, and geese to serve at the feast. By the week prior to Nalukataq, however, the crews and their families were no longer hunting but were occupied preparing food and dividing the whale for distribution at the celebration. Barrow families would also adjust their harvest patterns (e. g., return from their camps or delay their departure) so that they might participate in events and holidays such as Nalukataq, Fourth of July games, and Thanksgiving.

<u>DATE</u>	<u>ACTIVITY OR EVENT</u>
April 3	Easter.
April 14	Open lead develops for the first time during the month, approximately four miles from shore.
April 15-17	Barrow Spring Carnival (<u>Piuraagiaqta</u>).
April 18	Gambell: First whale harvest of the 1988 season.
April 18	NSB bowhead whale census crew established camp on the ice.
April 22	First whaling crews go out.
April 24	Whale harvest, Barrow's first whale of the season.
April 25	Four whales harvested by Barrow crews.
April 26	Lead closes for a few days.
April 28	New lead develops only a half mile from shore.
May 2	Whale harvest, Barrow's sixth whale.
May 4	Whale harvest, Barrow's seventh whale.
May 6	Whale harvest, Barrow's eighth whale and last whale in Barrow's spring quota.
May 7	Most whaling crews move off ice today.
May 8	Mother's Day.
May 16	International Whaling Convention begins in New Zealand.
May 17-18	Barrow whalers receive two strikes from other villages, strikes are taken unsuccessfully.
May 20	Barrow high school graduation.
May 26	School out for the summer.
May 31	AEWC announces IWC yearly bowhead whale quota for 1989-91, 44 strikes, with 41 landed per year. Barrow's allocation is 14 landed.
June 7	Whale strike transferred to Barrow.
June 14-18	Elders/Youth Conference held in Barrow.
June 28-29	Nalukataq celebration both days.
July 2-4	4th of July games.
July 7-13	Shore ice moved offshore, winds fairly calm, good ugruk hunting conditions.
July 14	Ice moved in against beach at Barrow - through end of month, focus of marine mammal hunting effort moves to Beaufort side of Point Barrow.
July 18	Open water in Dease Inlet allows boating to inland camps.
July 19-24	International Eskimo-Indian Olympics in Fairbanks.
August 3	Shore ice in front of town finally moving out.
August 5	Good walrus hunting.
August 18	School starts in Barrow.
September (early)	Rivers begin freezing.
September 15	Whale harvest, Barrow's 9th whale of the season and first fall whale of the year.
September 17	Two whales harvested, Barrow's 10th and 11th whales.
September 20	Grounded ice offshore blocks boat passage to the ocean for the season.

<u>DATE</u>	<u>ACTIVITY OR EVENT</u>
October 7	Trapped gray whales discovered off Pt. Barrow.
October 12	News men start arriving in Barrow to cover gray whale story.
October 13-15	North and Northwest Mayor's Conference in Barrow'.
October (mid)	Caribou rutting time begins.
October 17	Gray whale rescue operation begins.
October 19-22	Alaska Federation of Natives annual meeting begins in Fairbanks.
October 26	Russian ice breakers arrive off of Barrow.
October 28	Gray whales swim free.
October (late)	Arctic cod fishing in front of Barrow.
October 31	Halloween.
November 8	High winds, 40 + m.p.h.
November 18	Sun sets in Barrow for 65 days.
November 24	Thanksgiving
November (late)	Wolf and wolverine hunting begins.
December 25	Christmas. Major storm, blowing snow and winds to 35 m.p.h.
December 26-31	Christmas games.
January 1-3	Messenger Feast(Kivgiq) in Barrow,
January 22	First sunrise of the year in Barrow.
January	Extremely cold temperatures during last three weeks of January. Flights to villages limited mainly to emergencies.
February 12	Snow storm, 6 to 8 inches.
February 20	NSB holiday.
February 25	Severe wind storm, peak gusts to 74 m.p.h. Ice conditions totally altered, ice piled high all along the beach and extremely rough ice conditions result.
February 27-28	High winds again with gusts to 50 m.p.h.
March 8-11	Alaska Eskimo Whaling Commission annual meeting in Barrow.
March 26	Easter.

MARINE MAMMALS

Comparison of Year One and Year Two

The variability in Barrow harvest amounts from Year One to Year Two is most clearly demonstrated by the marine mammal harvests. There are differences in harvest amounts for each of the six species. These differences can be seen by comparing Tables 11 and 12 and Figures 7 and 8. The most substantial difference between Year One and Year Two was the harvest of five more bowhead whales in Year Two. The amount of edible meat, maktak, and blubber increased accordingly by almost 50,000 pounds during Year Two.

Though ice conditions, current, weather, and species availability play a role in whale hunting as they do in the harvest of other species, the bowhead whale quota imposed by the international Whaling Commission has been a major influence on the number of whales harvested each year. During Year One the original quota was nine struck whales for Barrow, while in Year Two the quota was 11 strikes. The Allocation of unused strikes by the AEWC was also a factor in the total Barrow harvest. In Year Two three fall whale strikes were allocated to Barrow, all of them used successfully.

The estimated number of polar bear harvests also increased, from the 10 harvested in Year One to 12 harvested in Year Two. There were reportedly many more polar bears in the vicinity of Barrow during the second year of the study.

The harvest of spotted seal increased slightly. The estimated harvest numbers were very small for both years primarily because the meat of these seals is not usually eaten, though it was often used for dog food when dog teams were common in Barrow. Their skins are desirable for crafts, as demonstrated by one study participant's excitement over her son's harvest of a "beautiful" spotted Seal skin. Another factor in the low harvest numbers is that spotted seals were usually scarce in the area where most of the marine mammal harvests took place. People traveling by boat reported seeing large numbers of spotted seals in both Admiralty Bay and Smith Bay.

TABLE 11: HARVEST ESTIMATES FOR MARINE MAMMALS - ALL BARROW HOUSEHOLDS, YEAR ONE REVISED (1)

RESOURCE	CONVERSION	COMMUNITY TOTALS				AVERAGE POUNDS		PERCENT	PERCENT	SAMPLING STATISTICS			
	FACTOR (2)	EDIBLE		HARVESTED		OF TOTAL	OF ALL			STANDARD	LOW	HIGH	SAMPLING
	(Edible	NUMBER	POUNDS	PER	PER	EDIBLE	HSEHOLDS	DEVIATION	ESTIMATE	ESTIMATE	ERROR		
	Weight	HARVESTED	HARVESTED	HOUSEHOLD	CAPITA	POUNDS	HRVSTING	(lbs)	(Mean lbs/	(Mean lbs/	AS %		
	Per					HARVESTED	RESOURCE		Household)	Household)	OF MEAN		
	Resource								95%				
	in lbs)								(lbs)				
Total Marine Mammals	n/a	n/a	345,156	368	114.4	52.7%	38.2%	35	68	300.4	436.3	18%	
Bowhead (3,4)	26,375.6	7	184,629	197	61.2	28.2%	27.2%	0	0	197.0	197.0	0%	
Walrus	772.0	117	90,420	96.5	30.0	13.8%	11.8%	27	52	44.3	148.7	54%	
Bearded Sea 1	176.0	259	45,507	48.6	15.1	7.0%	23.7%	9	18	30.3	66.8	38%	
Total Ring. & Spot. Seal	42.0	466	19,555	20.9	6.5	3.0%	14.4%	5	9	11.4	30.3	45%	
Ringed Seal	42.0	463	19,456	20.8	6.5	3.0%	14.4%	5	9	11.3	30.2	45%	
Spotted Seal	42.0	2	98	0.1	*	**	0.2%	0	0	0.1	0.2	52%	
Polar Bear	496.0	10	5,045	5.4	1.7	0.8%	0.8%	3	6	0.0	10.9	103%	

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

(3) Bowhead harvest does not contribute to the sampling error for marine mammals since the bowhead harvest is based on a complete count.

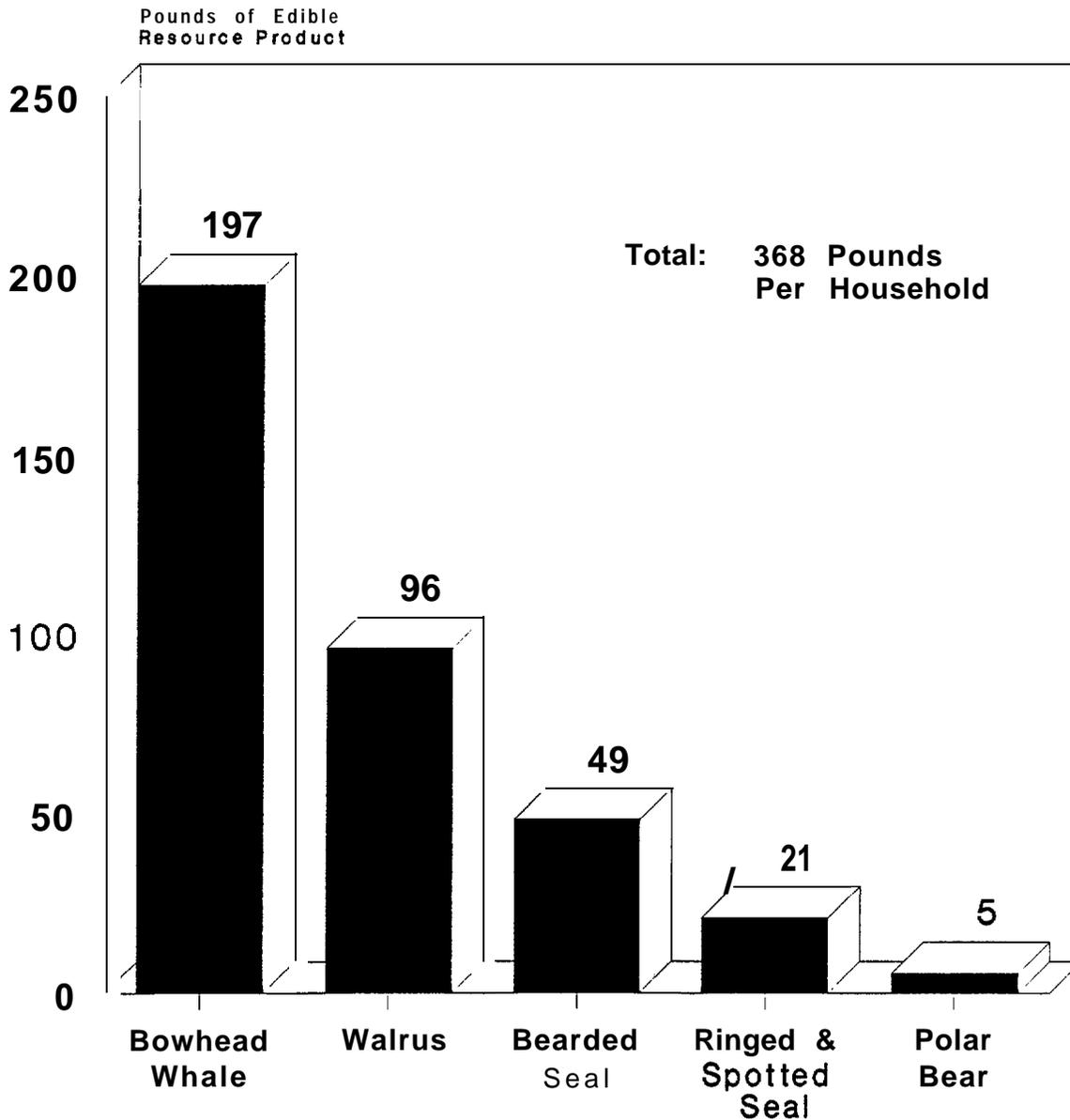
(4) The percent of Barrow households harvesting bowhead represents the percent of Barrow households receiving crew member shares at the whale harvest site, as extrapolated from the sample households.

* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Figure 7: Harvest of Marine Mammals
 All Barrow Households, Year One, Revised
 (Mean Edible Pounds Per Household)



% of Marine Mammals:	53%	26%	13%	6%	1%
	Bowhead Whale	Walrus	Bearded Seal	Ringed & Spotted Seal	Polar Bear

Source: Stephen R. Braund & Assoc., 1989

TABLE 12: HARVEST ESTIMATES FOR MARINE MAMMALS - ALL BARROW HOUSEHOLDS, YEAR TWO (1)

RESOURCE	CONVERSION FACTOR (2) (Edible Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL EDIBLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	EDIBLE POUNDS HARVESTED	PER HOUSEHOLD	PER CAPITA			STANDARD DEVIATION (lbs)	SAMPLING ERROR AT 95% (lbs)	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN
Total Marine Mammals	n/a	n/a	329,296	351	109.2	55.8%	43.1%	16	31	320.4	382.4	9%
Bowhead (3,4)	21,218.3	11	233,401	249	77.4	39.6%	37.5%	0	0	249.1	249.1	0%
Walrus	772.0	58	44,828	47.8	14.9	7.6%	6.1%	9	17	31.1	64.6	35%
Bearded Seal	176.0	167	29,427	31.4	9.8	5.0%	10.0%	10	19	12.2	50.6	61%
Total Ring. & Spot. Seal	42.0	369	15,500	16.5	5.1	2.6%	10.0%	3	7	9.7	23.4	41%
Ringed Seal	42.0	365	15,336	16.4	5.1	2.6%	10.0%	3	7	9.5	23.2	42%
Spotted Seal	42.0	4	148	0.2	*	**	0.2%	0	0	0.1	0.2	55%
Polar Bear	496.0	12	6,157	6.6	2.0	1.0%	1.7%	1	2	4.7	8.4	28%

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

(3) Bowhead harvest does not contribute to the sampling error for marine mammals since the bowhead harvest is based on a complete count.

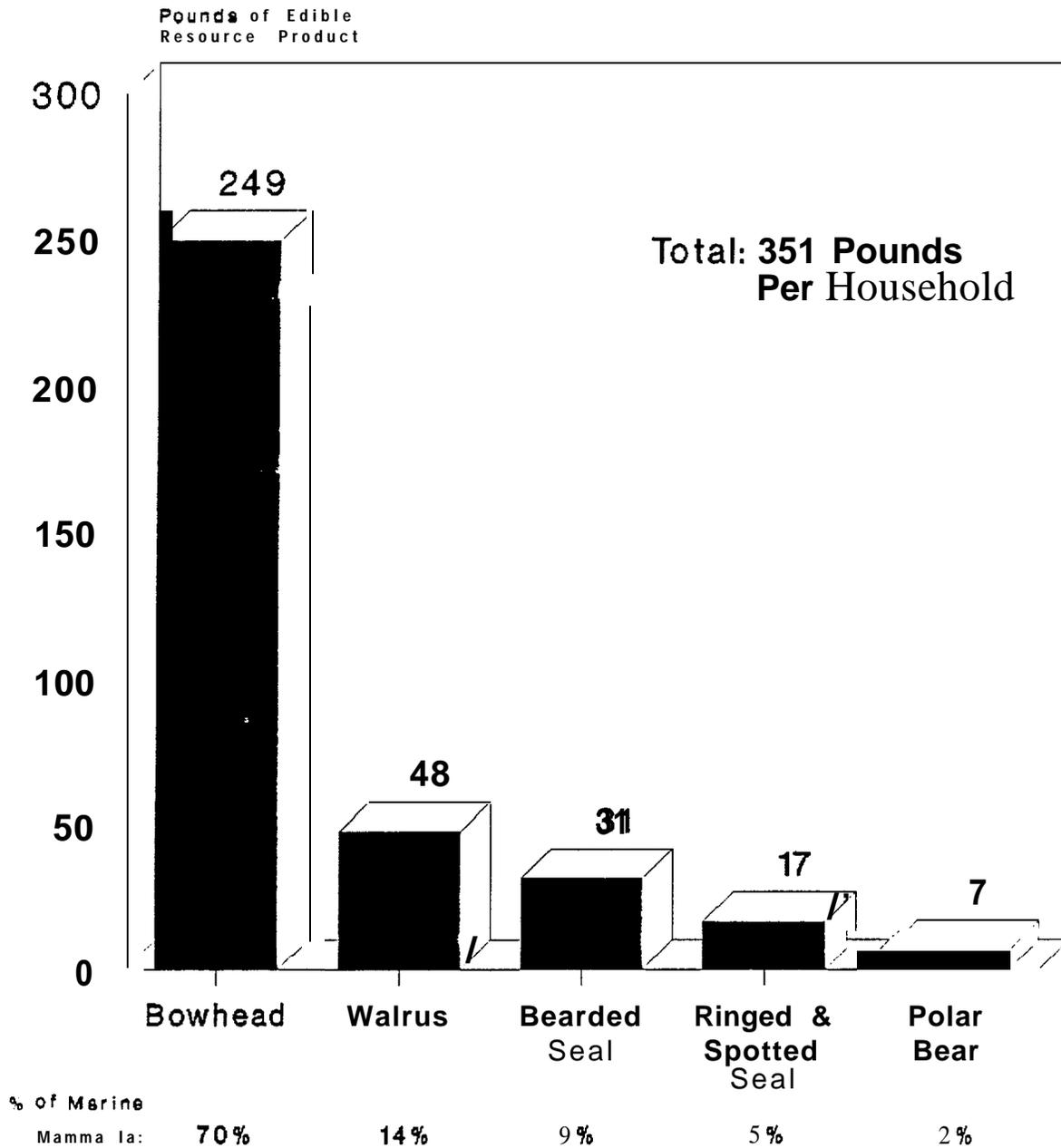
(4) The percent of Barrow households harvesting bowhead represents the percent of Barrow households receiving crew member shares at the whale harvest site, as extrapolated from the sample households.

* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Figure 8: Harvest of Marine Mammals
 All Barrow Households, Year Two
 (Mean Edible Pounds Per Household)



Source: Stephen R. Braund & Assoc., 1989

The harvest of walrus, bearded seal, and ringed seal declined in Year Two. Approximately half as many walrus were harvested in Year Two, while the estimated harvest of bearded seal declined by one third (35 percent). The estimated harvest of ringed seals declined by 98 animals or about 20 percent.

The decline in walrus, bearded seal, and ringed seal harvests was due primarily to the relatively poor boating conditions during July and early August of Year Two. Walrus harvests are usually associated with moving pack ice; however, the ice moved in against the beach in early July and remained there until early August, denying Barrow hunters access to the pack ice for approximately half the walrus hunting season in Year Two.

The monthly variation between years is illustrated in Tables 13 through 16 and in Figures 9 and 10. That the harvest of bearded seal was lower than average, or at least less than was desired by the hunters, was evidenced in the shortage of bearded seal skins for covering umiaq frames. Although the trading and sharing of bearded seal skins between crews occurred, obtaining the six or seven skins necessary to cover a boat was more difficult than usual. At least two crews had to forego replacing the skins on their boat when they could not obtain enough to do the job. The skins are usually replaced every third year. Another feature of the 1988 summer marine mammal harvest was that it happened late in the season. As can be seen in Figures 9 and 10, the July walrus harvest that occurred in Year One did not occur in Year Two. According to one key informant, his aged walrus meat did not acquire the right taste in 1988 because it was harvested too late (mid-August) to benefit from the warmer days of July.

The principal focus of marine mammal harvest activity was within a 15 mile ocean radius of Barrow. Additional harvest areas occurred along the coast southwest of Barrow to Peard Bay and seaward to a distance of 35 miles (Maps 7, 9, 10, 13, and 14). Maps 8, 11 and 12 depict marine mammals harvest sites for both Years One and Two. As is evident from the maps of seasonal marine mammal harvest locations (Maps 13 and 14), Year Two harvests occurred more often on the Beaufort Sea side of Point Barrow than was the case in Year One. The easternmost site depicted on Map 7 but not visible on Map 9 represents a ringed seal harvested during Year Two. The grounded ice on the beach in Barrow was the primary cause of change in harvest locations and the decline in harvest

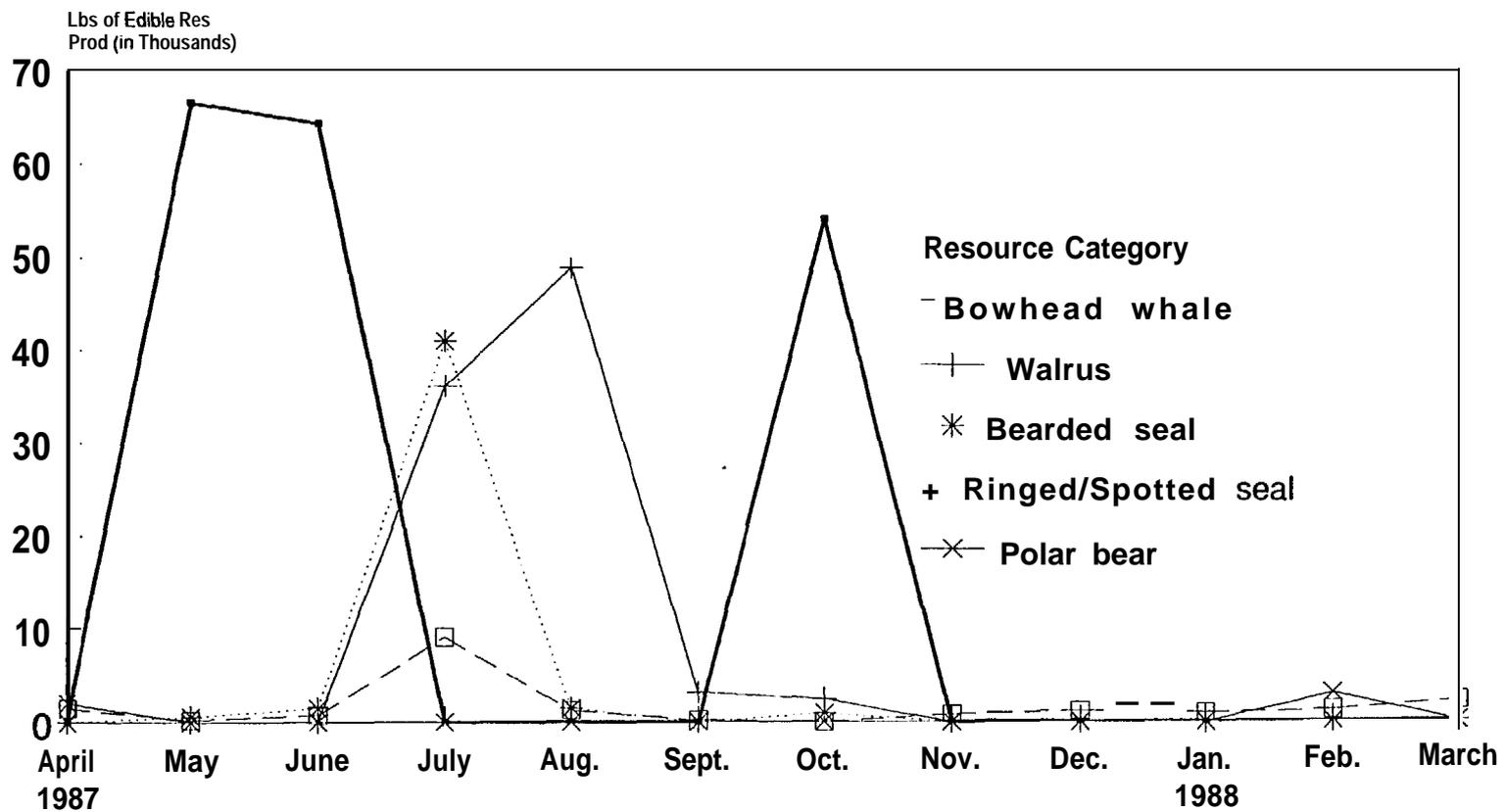
TABLE 13: MARINE MAMMAL HARVEST BY SPECIES AND MONTH - EARROW, YEAR ONE REVISED
(Pounds of Edible Resource Product)

SPECIES	TOTALS *****											
	1987						1988					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	0	66,439	64,213	0	0	0	53,977	0	0	0	0	0
Walrus	0	0	0	36,067	48,730	3,164	2,461	0	0	0	0	0
Bearded Sea 1	0	618	1,484	40,920	1,509	0	935	41	0	0	0	0
Polar Bear	2,069	0	0	0	0	0	0	0	0	0	2,976	0
Total Ring. & Spot. Seal	1,492	246	757	9,150	1,255	216	0	854	1,183	994	1,234	2,173
Ringed Seal	1,492	246	757	9,150	1,156	216	0	854	1,183	994	1,234	2,173
Spotted Seal	0	0	0	0	98	0	0	0	0	0	0	0
All Marine Mammals	3,561	67,303	66,454	86,137	51,493	3,381	57,373	896	1,183	994	4,210	2,173

SPECIES	PERCENTS *****											
	1987						1988					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	0%	36%	35%	0%	0%	0%	29%	0%	0%	0%	0%	0% = 100%
Walrus	0%	0%	0%	40%	54%	3%	3%	0%	0%	0%	0%	0% = 100%
Bearded Seal	0%	1%	3%	90%	3%	0%	2%	0%	0%	0%	0%	0% = 100%
Polar Bear	41%	0%	0%	0%	0%	0%	0%	0%	0%	0%	59%	0% = 100%
Total Ring. & Spot. Seal	8%	1%	4%	47%	6%	1%	0%	4%	6%	5%	6%	11% = 100%
Ringed Seal	8%	1%	4%	47%	6%	1%	0%	4%	6%	5%	6%	11% = 100%
Spotted Seal	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
All Marine Mammals	1%	19%	19%	25%	15%	1%	17%	0%	0%	0%	1%	1% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 9: Monthly Harvest of
Marine Mammals
All Barrow Households, Year One Revised



Source: Stephen R. Braund & Assoc., 1989

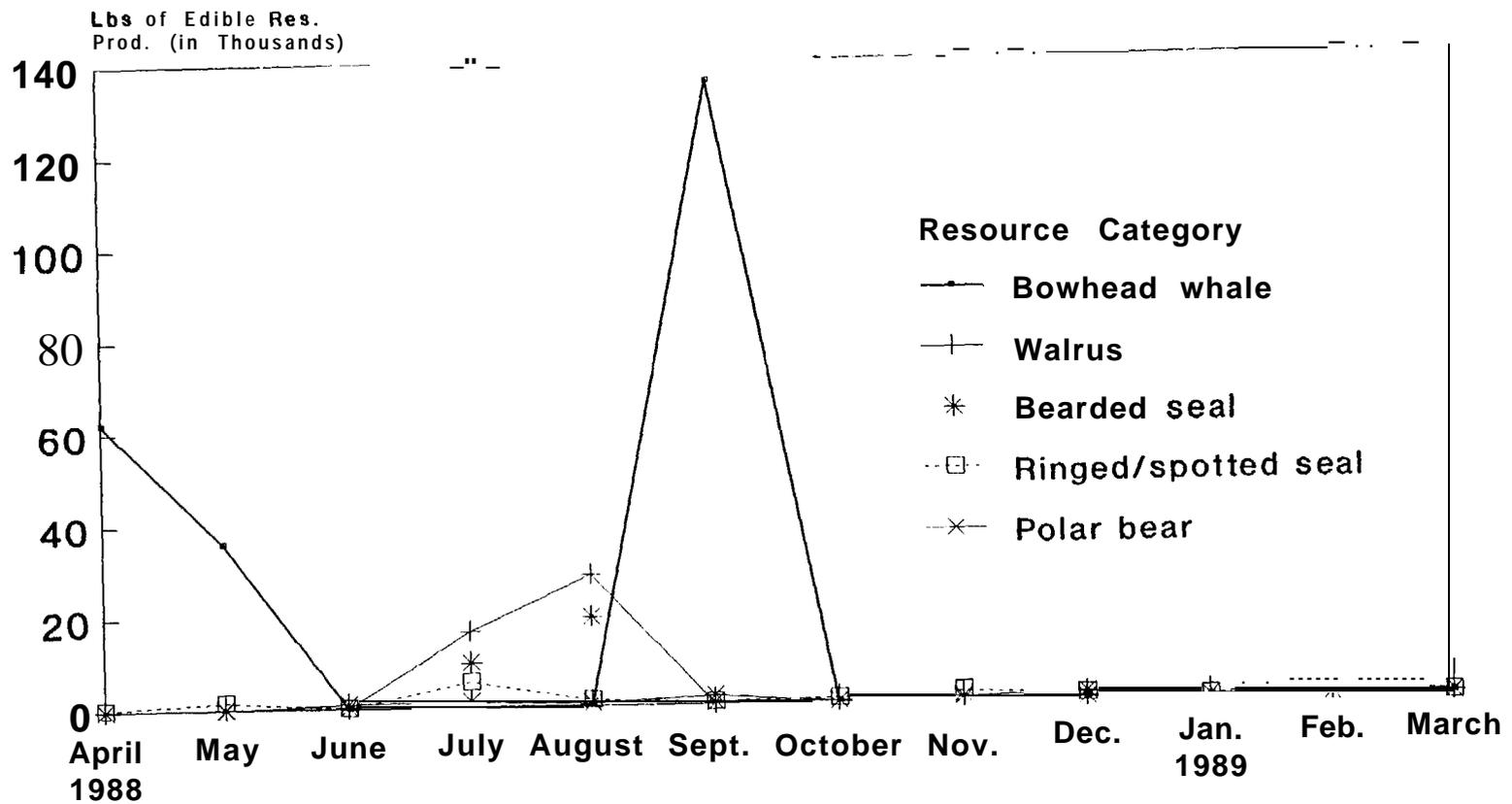
TABLE 14: MARINE MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEAR TWO
(Pounds of Edible Resource Product)

SPECIES	TOTALS *****											
	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	62,004	36,037	0	0	0	135,360	0	0	0	0	0	0
Walrus	0	0	0	16,446	28,383	0	0	0	0	0	0	0
Bearded Seal	0	82	309	9,567	19,159	309	0	0	0	0	0	0
Polar Bear	0	0	871	1,220	581	1,742	0	581	1,162	0	0	0
Total Ring. & Spot. Seal	246	1,640	197	5,451	1,249	367	659	1,695	848	126	3,006	0
Ringed Seal	246	1,640	197	5,353	1,200	367	659	1,695	848	126	3,006	0
Spotted Seal	0	0	0	98	49	0	0	0	0	0	0	0
All Marine Mammals	62,250	37,759	1,377	32,684	49,372	137,778	659	2,276	2,010	126	3,006	0

SPECIES	PERCENTS *****											
	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	27%	15%	0%	0%	0%	58%	0%	0%	0%	0%	0%	0% = 100%
Walrus	0%	0%	0%	37%	63%	0%	0%	0%	0%	0%	0%	0% = 100%
Bearded Seal	0%	0%	1%	33%	65%	1%	0%	0%	0%	0%	0%	0% = 100%
Polar Bear	0%	0%	14%	20%	9%	28%	0%	9%	19%	0%	0%	0% = 100%
Total Ring. & Spot. Seal	2%	11%	1%	35%	8%	2%	4%	11%	5%	1%	19%	0% = 100%
Ringed Seal	2%	11%	1%	35%	8%	2%	4%	11%	6%	1%	20%	0% = 100%
Spotted Seal	0%	0%	0%	67%	33%	0%	0%	0%	0%	0%	0%	0% = 100%
All Marine Mammals	19%	11%	0%	10%	15%	42%	0%	1%	1%	0%	1%	0% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 10: Monthly Harvest of Marine Mammals
All Barrow Households, Year Two



Source: Stephen R. Braund & Assoc., 1989

TABLE 15: MARINE MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Number Harvested) ' "

SPECIES	1987							1988				
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale		4	1				2					
Walrus				47	63	4	3					
Bearded Seal		4	8	233	9		5	0				
Polar Bear	4										6	
Total Ring. & Spot. Seal	36	6	18	218	30	5	0	20	28	24	29	52
Ringed Seal	36	6	18	218	28	5		20	28	24	29	52
Spotted Seal					2							

Source: Stephen R. Braund & Associates, 1989

TABLE 16: MARINE MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEAR TWO
(Number Harvested)

SPECIES	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Oec.	Jan.	Feb.	March
Bowhead Whale	5	3	0	0	0	3	0	0	0	0	0	0
Walrus	0	0	0	21	37	0	0	0	0	0	0	0
Bearded Seal	0	0	2	54	109	2	0	0	0	0	0	0
Polar Bear	0	0	2	2	1	4	0	1	2	0	0	0
Total Ring. & Spot. Seal	6	39	5	130	30	9	16	40	20	3	72	0
Ringed Seal	6	39	5	127	29	9	16	40	20	3	72	0
Spotted Seal	0	0	0	2	1	0	0	0	0	0	0	0

Source: Stephen R. Braund & Associates, 1989

MAP 7 NOR H SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO MARINE MAMMAL HARVEST SITES - ALL SPECIES

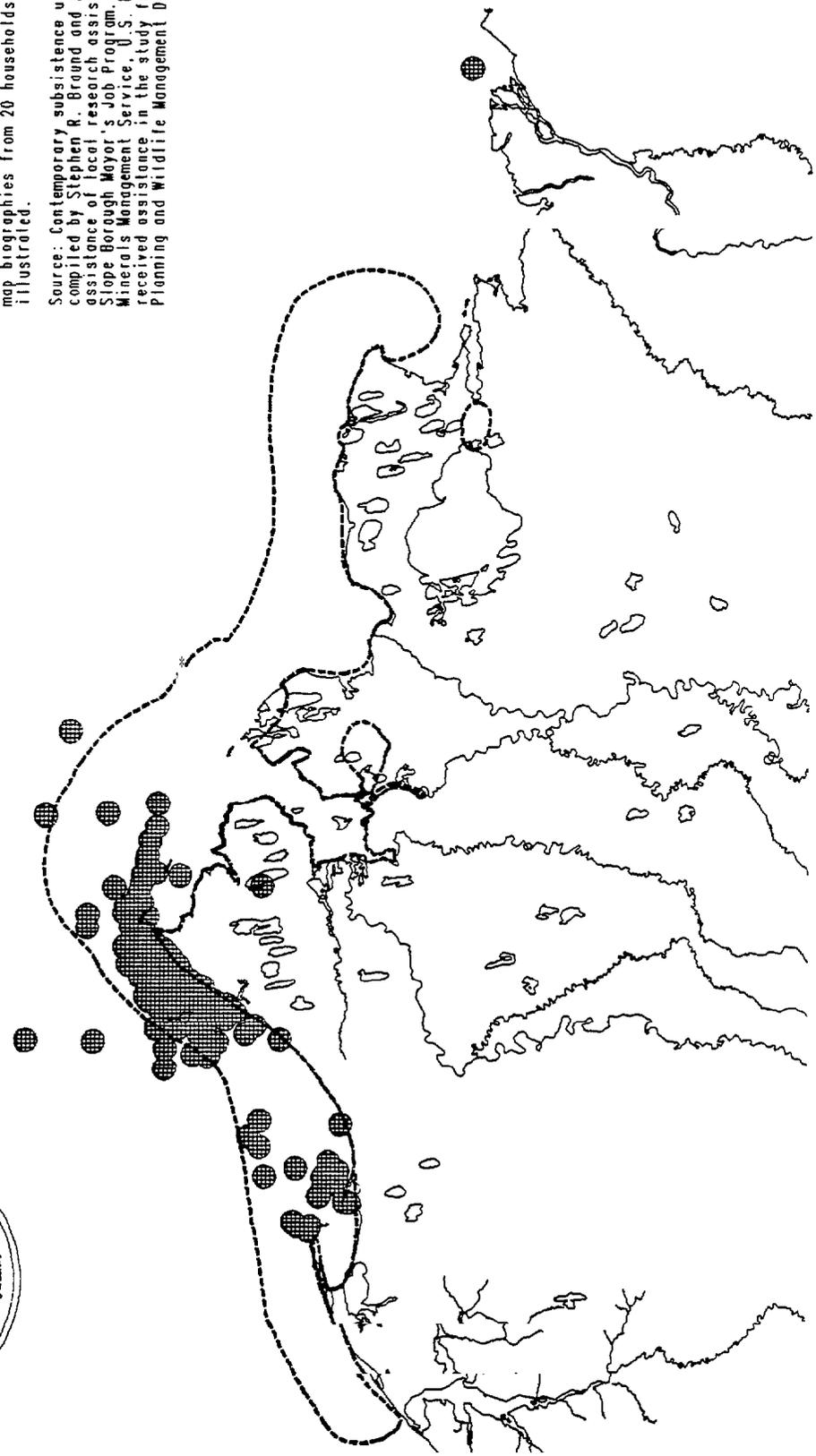


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989. Year two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study. Lifetime-community harvest areas, collected in the form of map biographies from 20 households (Pedersen 1979), are also illustrated.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

INFORMATION

-  Lifetime community land use (Pedersen 1979).
-  Marine Mammals
 - Bowhead whale
 - Bearded seal
 - Ringed seal
 - Spotted seal
 - Walrus
 - Polar bear



Map Production: North Slope Borough GIS
Date: June 26, 1989

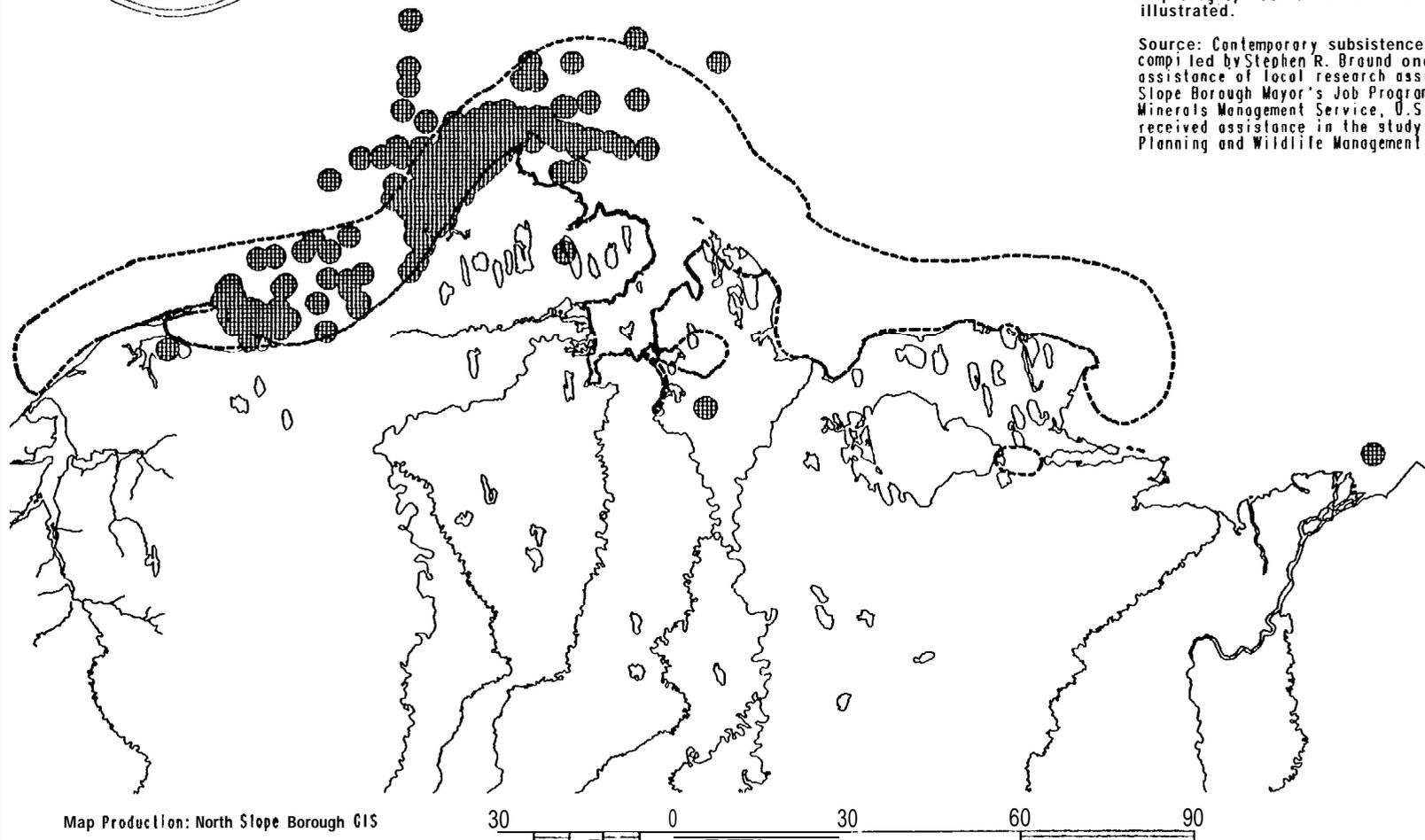
MAP 8

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
 MARINE MAMMAL HARVEST SITES - ALL SPECIES: YEARS ONE AND TWO



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study. Lifetime community harvest areas, collected in the form of map biographies from 20 households (Pedersen 1979), are also illustrated.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SRB&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SRB&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION

-  Lifetime community land use (Pedersen 1979).
-  Marine Mammals
 - Bowhead whale
 - Bearded seal
 - Ringed seal
 - Spotted seal
 - Walrus
 - Polar bear



Map Production: North Slope Borough GIS

Date: June 26, 1989

MILES

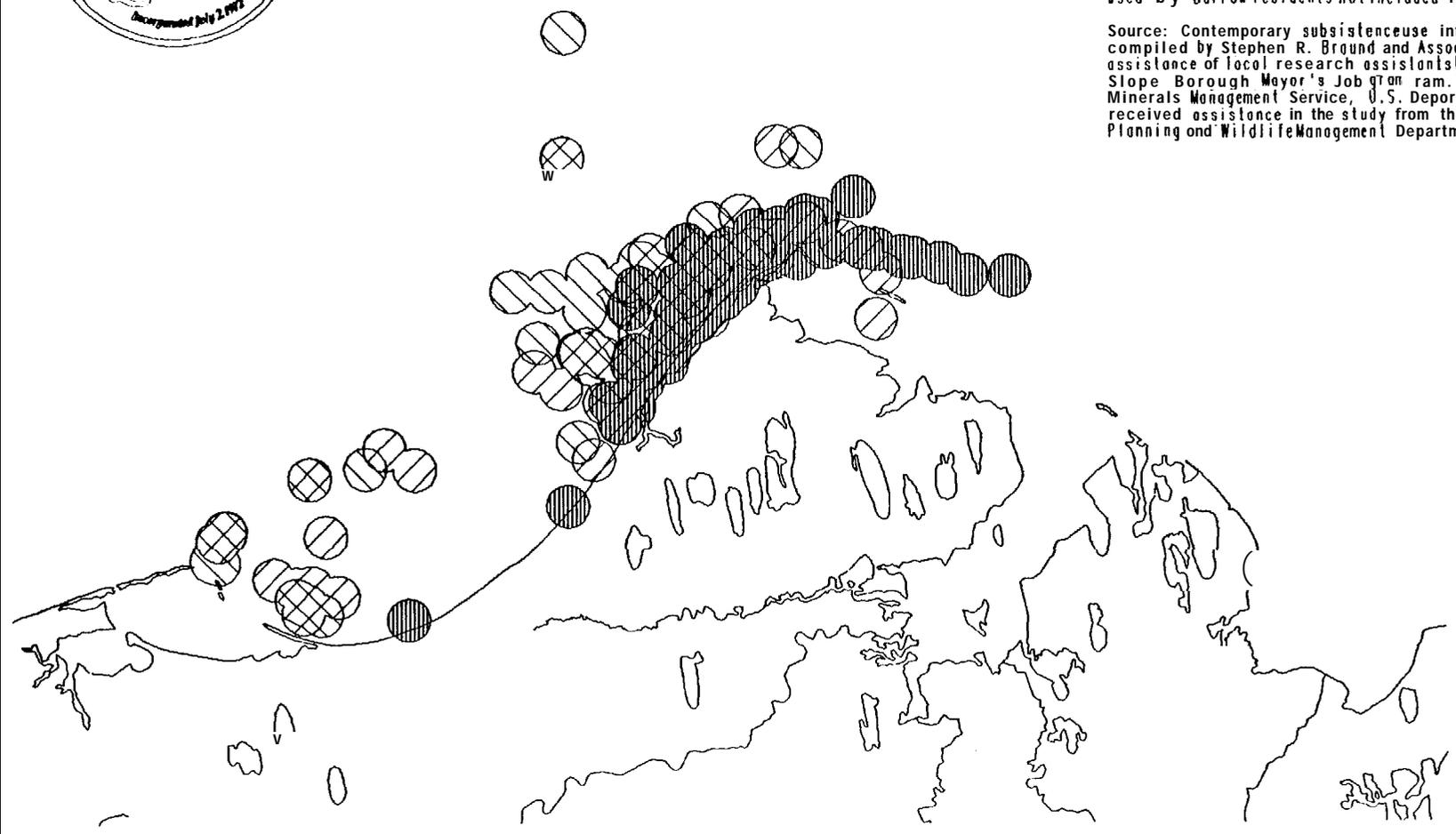
MAP 9

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
MARINE MAMMAL HARVEST SITES BY SPECIES:
WALRUS AND SEALS



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989: Year Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION

-  Walrus
-  Bearded seal
-  Ringed and spotted seals

Map Production: North Slope Borough GIS
Date: June 26, 1989



MAP TO

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO

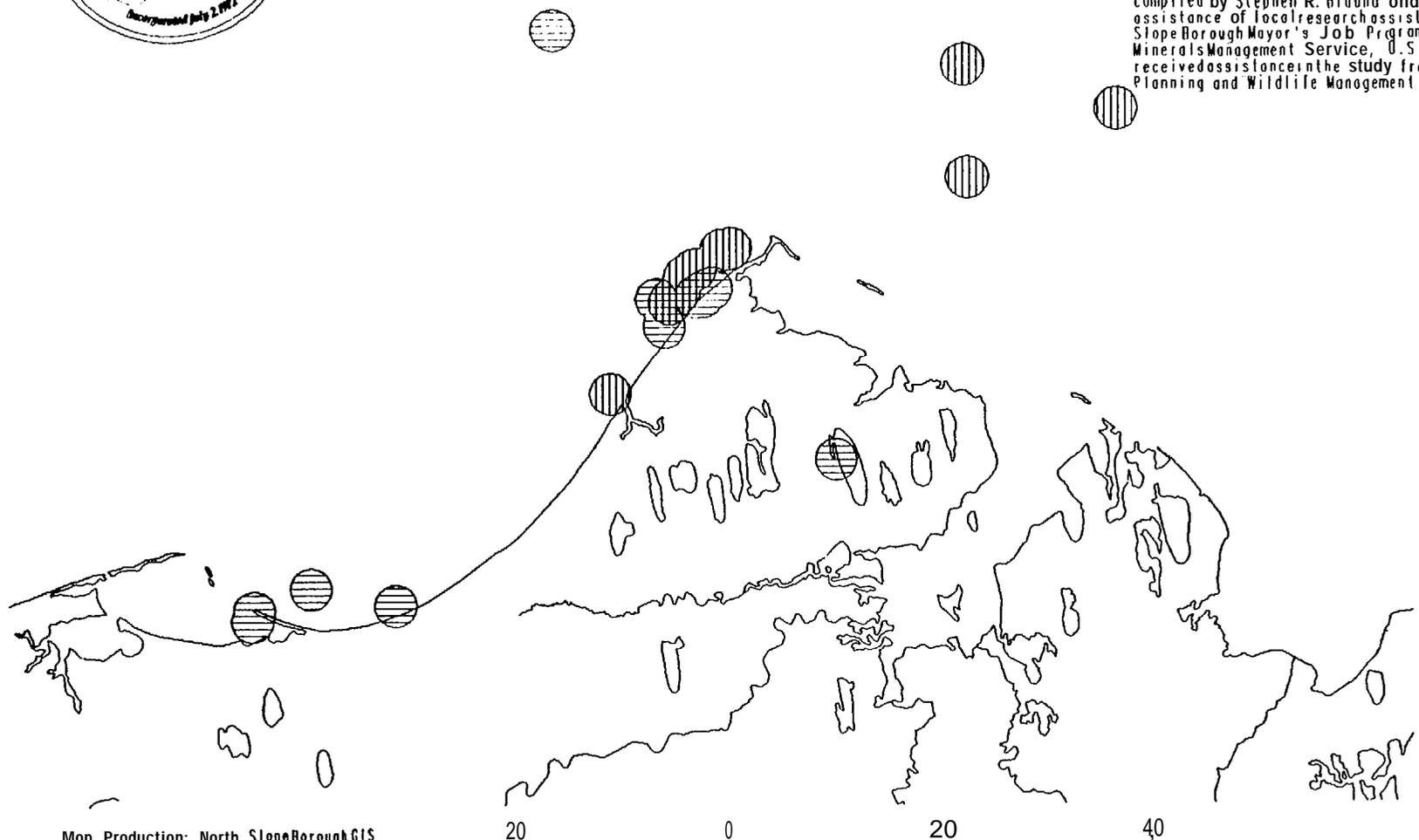
MARINE MAMMAL HARVEST SITES BY SPECIES:

BOWHEAD WHALE AND POLAR BEAR



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two-mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989: Year Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION

-  Bowhead Whale
-  Polar Bear

Map Production: North Slope Borough GIS

Date: June 26, 1989

MILES

MAP 11
NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
MARINE MAMMAL HARVEST SITES BY SPECIES, YEARS ONE AND TWO:
WALRUS AND SEALS

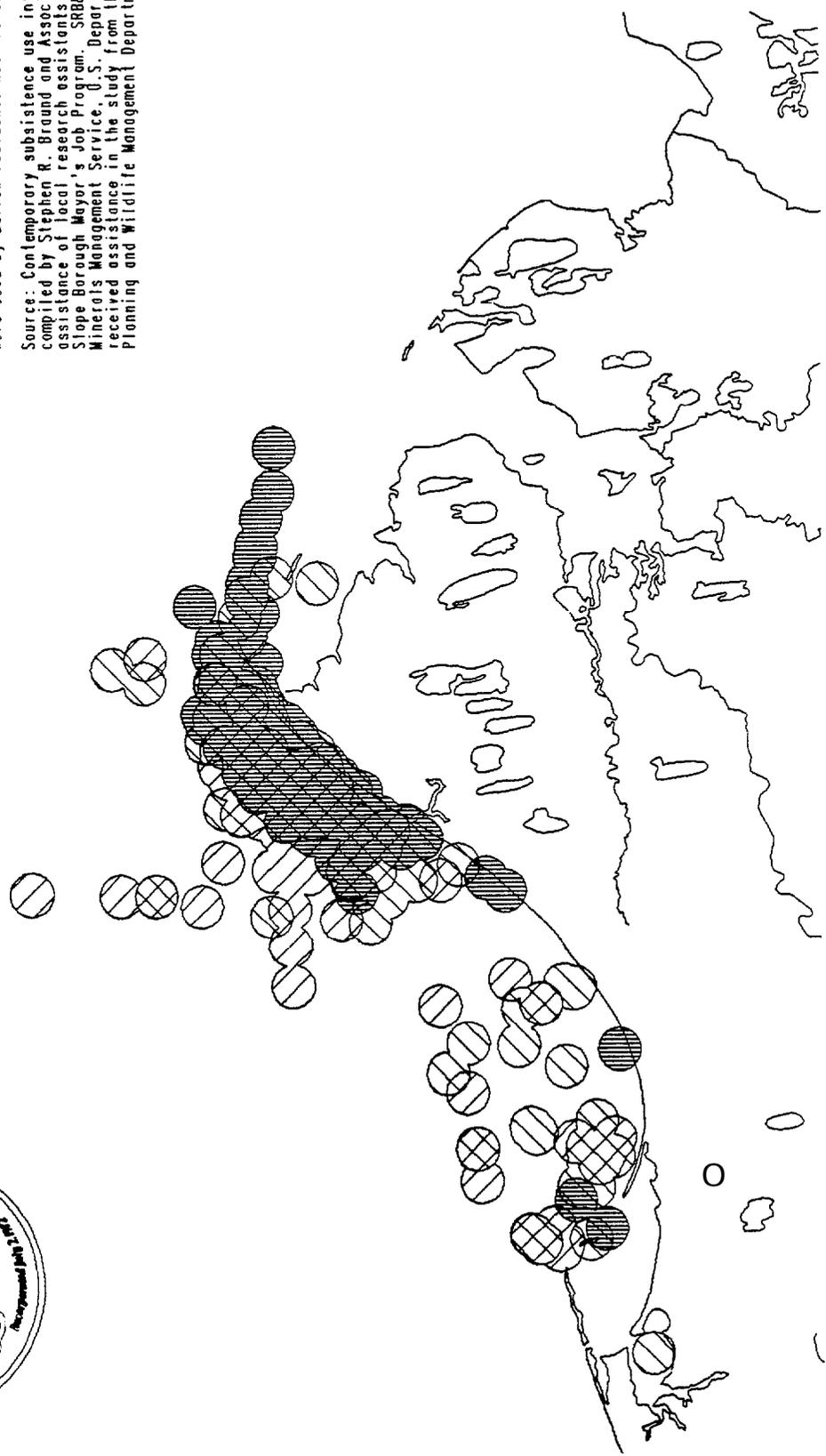


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two-mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

-  Walrus
-  Bearded seal
-  Ringed and spotted seals



Map Production: North Slope Borough GIS
 Date: June 26, 1989

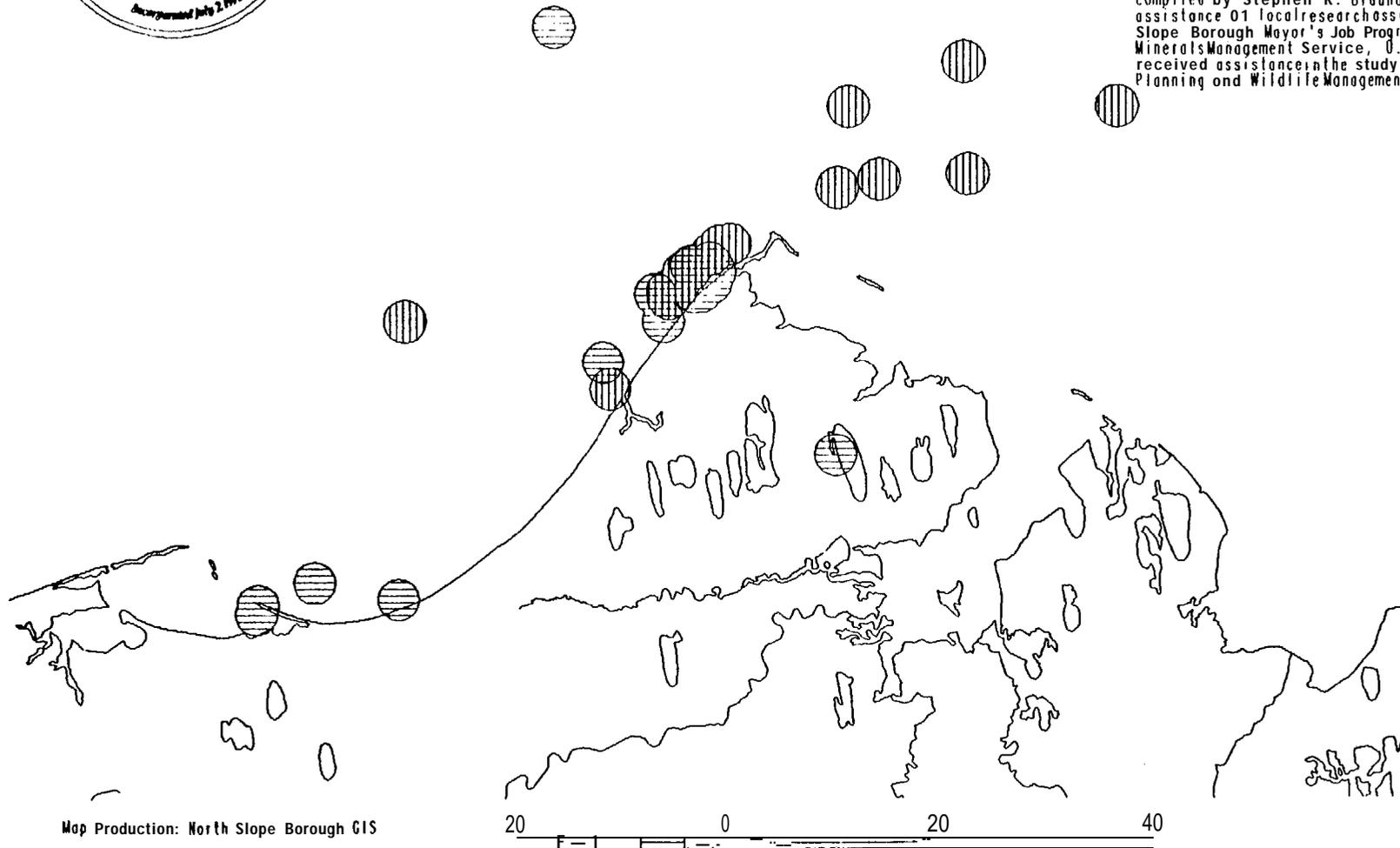
MAP 12

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
MARINE MAMMAL HARVEST SITES BY SPECIES, YEARS ONE AND TWO:
BOWHEAD WHALE AND POLAR BEAR



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two-mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989. Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SRBA) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SRBA is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION

-  Bowhead Whale
-  Polar Bear



Map Production: North Slope Borough GIS
Date: June 26, 1989

20 0 20 40
MILES

MAP 13 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO MARINE MAMMAL HARVEST SITES BY SEASON

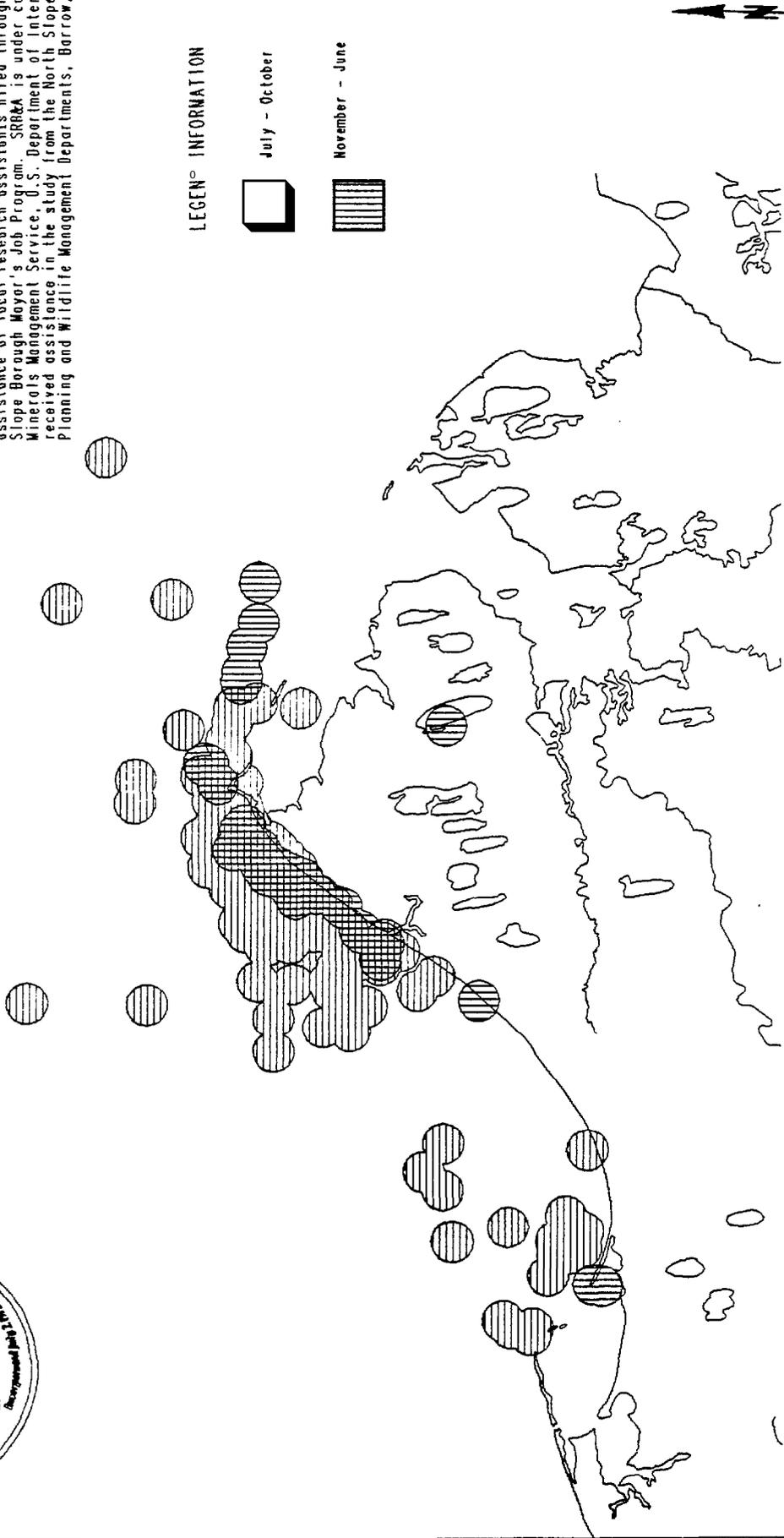


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989. Year two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

-  July - October
-  November - June



Map Production: North Slope Borough GIS
Date: June 26, 1989

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO

MARINE MAMMAL HARVEST SITES BY SEASON, YEARS ONE AND TWO

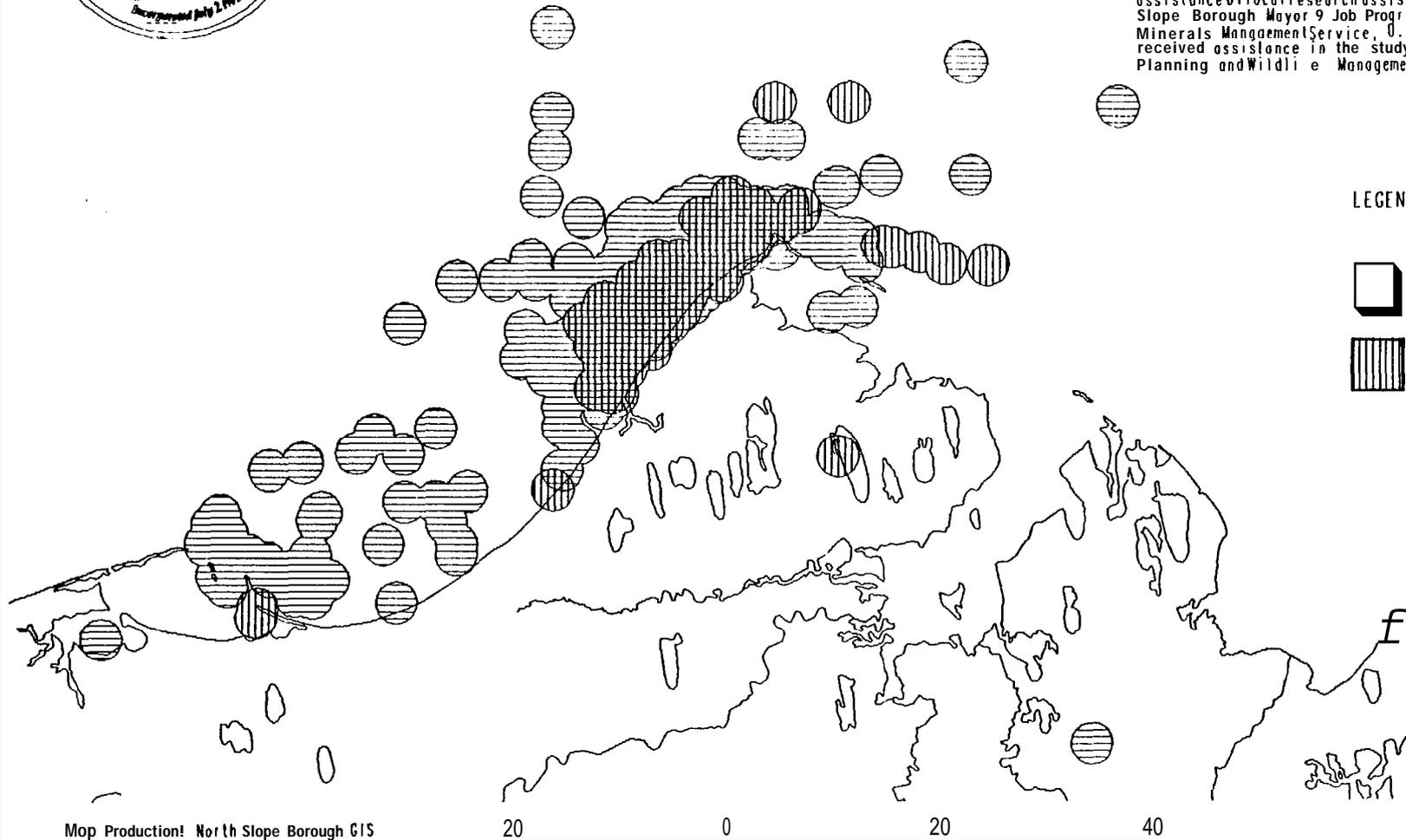


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

-  July - October
-  November - June



Map Production! North Slope Borough GIS

Date: June 26, 1989

MILES

numbers in Year Two. The ice was troublesome for a number of reasons: it blocked passage to the more productive areas in the Chukchi Sea; it prevented hunters from reaching the moving pack ice that many of the marine mammals are associated with; and its almost constant presence in July discouraged hunters from ranging over a wider area of the ocean. In addition, the current tends to be faster near the point according to one of the hunters. Since the only route to the ocean was out around the point in July, the moving ice made boat travel even riskier.

Tables 17, 18, and 19 and Figures 11 and 12 illustrate the average harvest for the two years of study combined. Marine mammals comprised 54 percent of the average Barrow harvest. Bowhead was approximately one-third of the average community harvest (33.6 percent), walrus 10.9 percent, bearded seal six percent, and ringed seal approximately three percent (2.8 percent) of the average harvest.

TABLE 17: AVERAGE HARVEST ESTIMATES FOR MARINE MAMMALS - ALL BARROW HOUSEHOLDS, YEARS ONE & TWO (1)

RESOURCE	CONVERSION	AVERAGE POUNDS				PERCENT		SAMPLING STATISTICS					
	FACTOR (2)	COMMUNITY TOTALS		HARVESTED		OF TOTAL	OF ALL	SAMPLING			LOW	HIGH	SAMPLING
	(Edible	=====		=====		EDIBLE	HSEHOLDS	STANDARO	ERROR AT	ESTIMATE	ESTIMATE	ERROR	
	Weight	NUMBER	EDIBLE	PER	PER	POUNDS	HRVSTING	DEVIATION	95%	(Mean 1 bs/	(Mean lbs/	AS %	
Per	HARVESTED	POUNDS	HOUSEHOLD	CAPITA	HARVESTED	RESOURCE	(lbs)	(lbs)	Household)	Household)	OF MEAN		
Resource	in lbs)												
Total Marine Mammals	n/a	n/a	337,225	359.9	111.8	54.2%	40.7%	20	40	320.3	399.5	11%	
Bowhead (3,4)	11,612.0	9	209,015	223.1	69.3	33.6%	32.4%	0	0	223.1	223.1	0%	
Walrus	772.0	88	67,623	72.2	22.4	10.9%	9.0%	14	27	44.8	99.5	38%	
Bearded Seal	176.0	213	37,467	40.0	12.4	6.0%	16.9%	14	27	12.6	67.3	68%	
Total Ring. & Spot. Seal	42.0	417	17,519	18.7	5.8	2.8%	12.2%	4	8	10.9	26.5	42%	
Ringed Seal	42.0	414	17,396	18.6	5.8	2.8%	12.2%	4	8	10.7	26.4	42%	
Spotted Seal	42.0	3	123	0.1	*	**	0.2%	0	0	0.1	0.2	38%	
Polar Bear	496.0	11	5,600	6.0	1.9	0.9%	1.3%	1	3	3.0	8.9	49%	

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

(3) Bowhead harvest does not contribute to the sampling error for marine mammals since the bowhead harvest is based on a complete count.

(4) The percent of Barrow households harvesting bowhead represents the percent of Barrow households receiving crew member shares at the whale harvest site, as extrapolated from the sample households.

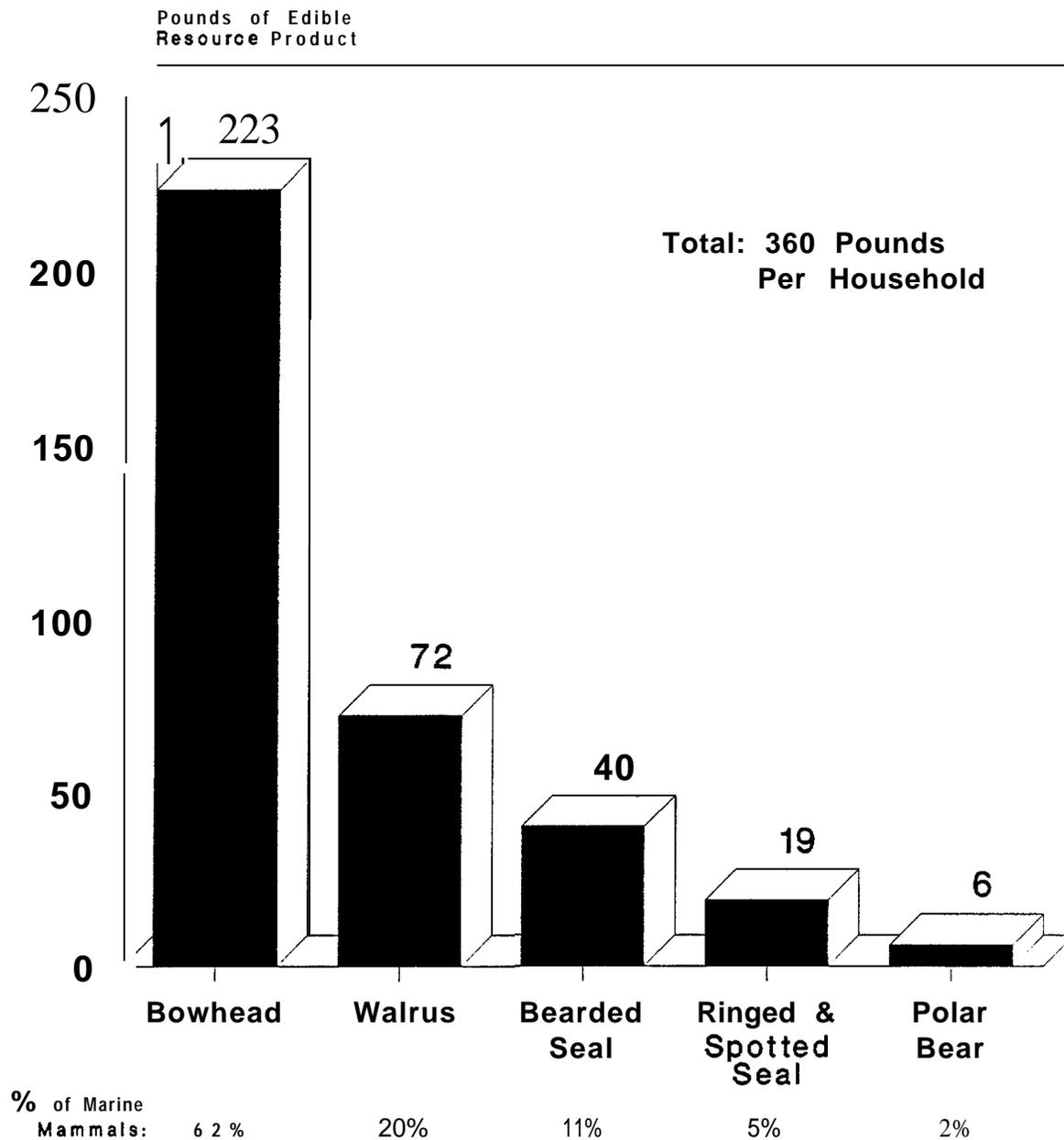
* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Source: Stephen R. Braund & Associates, 1989

Figure 11: Harvest of Marine Mammals
 All Barrow Households, Years One & Two
 (Mean Edible Pounds Per Household)



Source: Stephen R. Braund & Assoc., 1989

TABLE 18: AVERAGE MARINE MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEARS ONE & TWO
(Pounds of Edible Resource Product)

TOTALS
****'k*

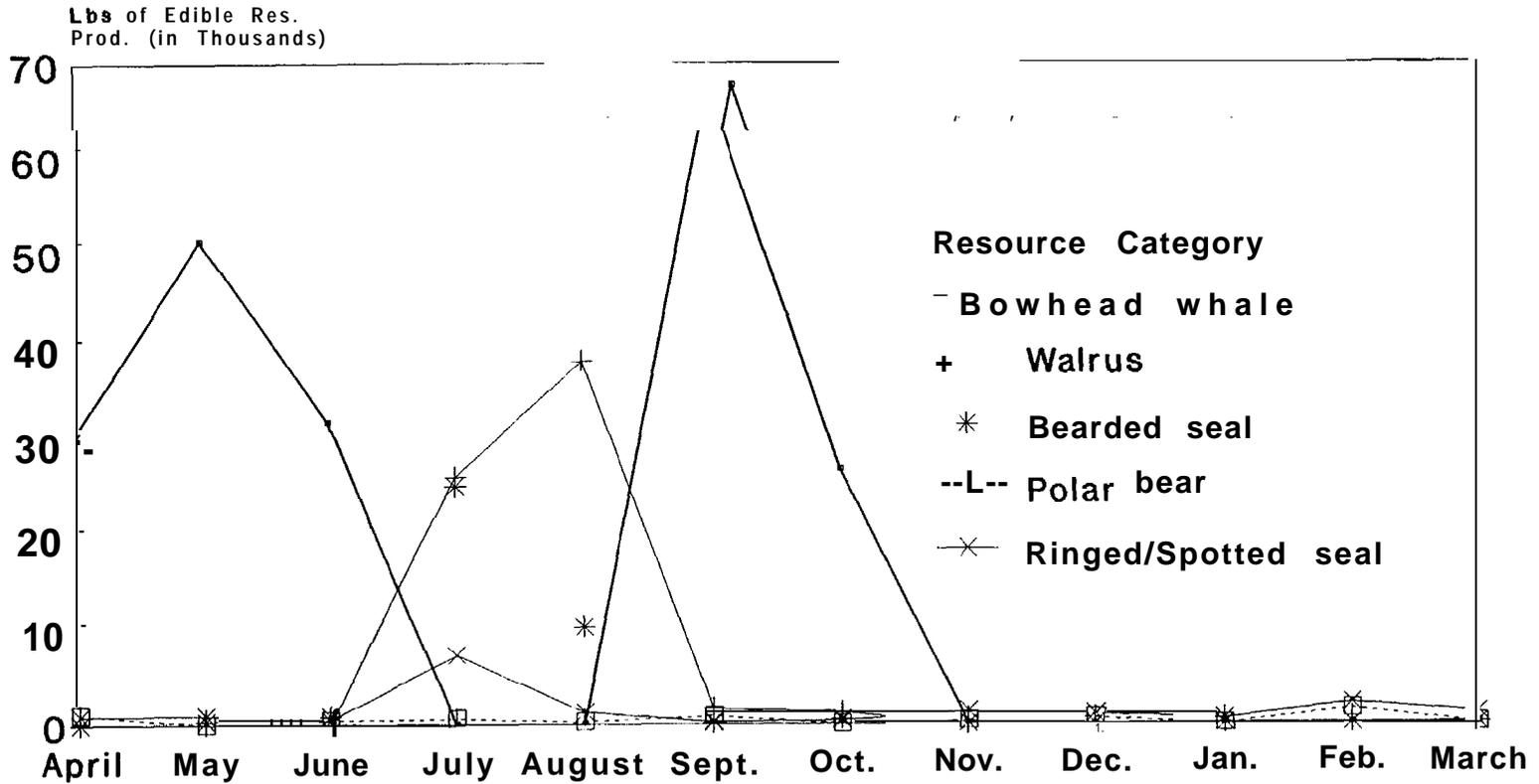
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Uha le	31,002	51,238	32,107	0	0	67,680	26,989	0	0	0	0	0
Walrus	0	0	0	26,256	38,556	1,582	1,230	0	0	0	0	0
Bearded Sea l	0	350	897	25,244	10,334	155	468	21	0	0	0	0
Polar Bear	1,034	0	436	610	290	871	0	290	581	0	1,488	0
Total Ring. & Spot. Seal	869	943	477	7,301	1,252	292	330	1,275	1,016	560	2,120	1,086
Ringed Seal	869	943	477	7,252	1,178	292	330	1,275	1,016	560	2,120	1,086
Spotted Seal	0	0	0	49	74	0	0	0	0	0	0	0
All Marine Mammals	32,905	52,531	33,916	59,411	50,433	70,579	29,016	1,586	1,597	560	3,608	1,086

PERCENTS

SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	15%	25%	15%	0%	0%	32%	1377	0%	0%	0%	0%	0% = 100%
Walrus	0%	0%	0%	39%	57%	2%	2%	0%	0%	0%	0%	0% = 100%
Bearded Sea l	0%	1%	2%	67%	28%	0%	1%	0%	0%	0%	0%	0% = 100%
Polar Bear	18%	0%	8%	11%	5%	16??	0%	5%	10%	0%	27%	0% = 100%
Total Ring. & Spot. Seal	5%	5%	3%	42%	7%	2%	2%	7%	6%	3%	17A	6% = 100%
Ringed Seal	5%	5%	3%	42%	7%	2%	2%	7%	6%	3%	12%	6% = 100%
Spotted Seal	0%	0%	0%	40%	60%	0%	0%	0%	0%	0%	0%	0% = 100%
All Marine Mammals	10%	16%	10%	18%	15%	21%	9%	0%	0%	0%	1%	0% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 12: Monthly Harvest of Marine Mammals, All Barrow Households Years One and Two



- 80 -

Source: Stephen R. Braund & Assoc., 1989

TABLE 19: AVERAGE MARINE MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEARS ONE & TWO
(Number Harvested)

SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	3	4	1	0	0	0	3	0	0	0	0	0
Walrus	0	0	0	34	50	2	2	0	0	0	0	0
Bearded Seal	0	2	5	143	59	1	3	0	0	0	0	0
Polar Bear	2	0	1	1	1	2	0	1	1	0	3	0
Total Ring. & Spot. Seal	21	22	11	174	30	7	8	30	24	13	50	26
Ringed Seal	21	22	11	173	28	7	8	30	24	13	50	26
Spotted Seal	0	0	0	1	2	0	0	0	0	0	0	0

•
0 0

Source: Stephen R. Braund & Associates, 1989

TERRESTRIAL MAMMALS

Terrestrial mammals contributed one-third (218,657 pounds) of the total edible pounds harvested by Barrow residents in Year One (Table 20). In terms of total pounds, slightly less (approximately 13 percent) was harvested in Year Two though the contribution of terrestrial mammals to the total community harvest remained at just under one-third (Table 21). The harvest of terrestrial mammals provided an average of 233 pounds per Barrow household in Year One and 203 pounds in Year Two, with over 99 percent of the harvest consisting of caribou and moose. Approximately 25 percent of all Barrow households participated in harvesting a terrestrial mammal, down from 29 percent the previous year.

The considerable contribution of caribou to the total harvest is evident in Figures 13 and 14. Caribou was the most important terrestrial mammal harvested by Barrow residents and was the only terrestrial mammal harvested by many families. Caribou harvest amounts were very similar during the first two years of the study (see Tables 20 and 21 and Figures 13 and 14). Caribou composed 28 percent of the total community harvest of all species in Year Two, while it was just over 29 percent of the total harvest in Year One. Over 85 percent of the terrestrial mammal harvest was caribou in each year.

Community participation in caribou harvest activities was also very similar, with approximately 24 percent of all Barrow households participated in harvesting an estimated 1,403 caribou in Year Two and 26 percent of all households harvested 1,643 caribou the year before. In Year Two that amount was equal to approximately 175 pounds of caribou per household and 54 pounds for every resident in the community. The community harvested approximately 240 more caribou in Year One, or approximately 30 more pounds per household. Averaged over the entire community for both years, approximately 1.6 caribou were harvested per household. Finally, also represented in Tables 20 and 21, the sampling error for caribou data was 32 percent in Year Two, similar to that in Year One (29 percent).

Moose was the next most important terrestrial resource harvested, though providing only four percent of the total community harvest and approximately 12 percent of the total weight of all the terrestrial mammals harvested in each

TABLE 20: HARVEST ESTIMATES FOR TERRESTRIAL MAMMALS - ALL BARROW HOUSEHOLDS, YEAR ONE REVISED (1)

RESOURCE	CONVERSION	AVERAGE POUNDS				PERCENT OF TOTAL EDIBLE POUNDS HARVESTED	PERCENT OF ALL BARROW HOUSEHOLDS HARVESTING RESOURCE	STANDARD DEVIATION (lbs)	SAMPLING STATISTICS			
	FACTOR (2)	COMMUNITY TOTALS		HARVESTED					SAMPLING ERROR AT 95%	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN
	(Edible Weight Per Resource in lbs)	NUMBER HARVESTED	EDIBLE POUNDS HARVESTED	PER HOUSEHOLD	PER CAPITA							
Total Terrestrial Mammals	n/a	n/a	218,657	233	72.5	33.4%	29.4%	32	62	171.17	295.54	27%
Caribou	117.0	1,643	192,229	205.2	63.7	29.4%	25.5%	31	60	145.28	265.03	29%
Moose	500.0	50	25,198	26.9	8.4	3.8%	5.6%	12	24	2.49	51.29	91%
Dall Sheep	99.0	11	1,052	1.1	0.3	0.2%	1.1%	1	2	0.00	3.22	187%
Brown Bear	100.0	1	117	0.1	*	**	0.1%	0	0	0.03	0.22	75%
Other Terrestrial Mammals		29	61	0.1	*	**	0.7%	0	0	0.00	0.16	14VA
Porcupine	10.0	5	52	0.1	*	**	0.6%	0	0	0.00	0.15	176%
Ground Squirrel	0.4	23	10	0.01	*	**	0.1%	0	0	0.00	0.02	75%
Wolverine	n/a	4	n/a	n/a	n/a	n/a	0.4%	n/a	n/a	n/a	n/a	n/a
Arctic Fox (Blue)	n/a	177	n/a	n/a	n/a	n/a	2.4%	n/a	n/a	n/a	n/a	n/a
Red Fox (Cross, Silver)	n/a	8	n/a	n/a	n/a	n/a	0.1%	n/a	n/a	n/a	n/a	n/a

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

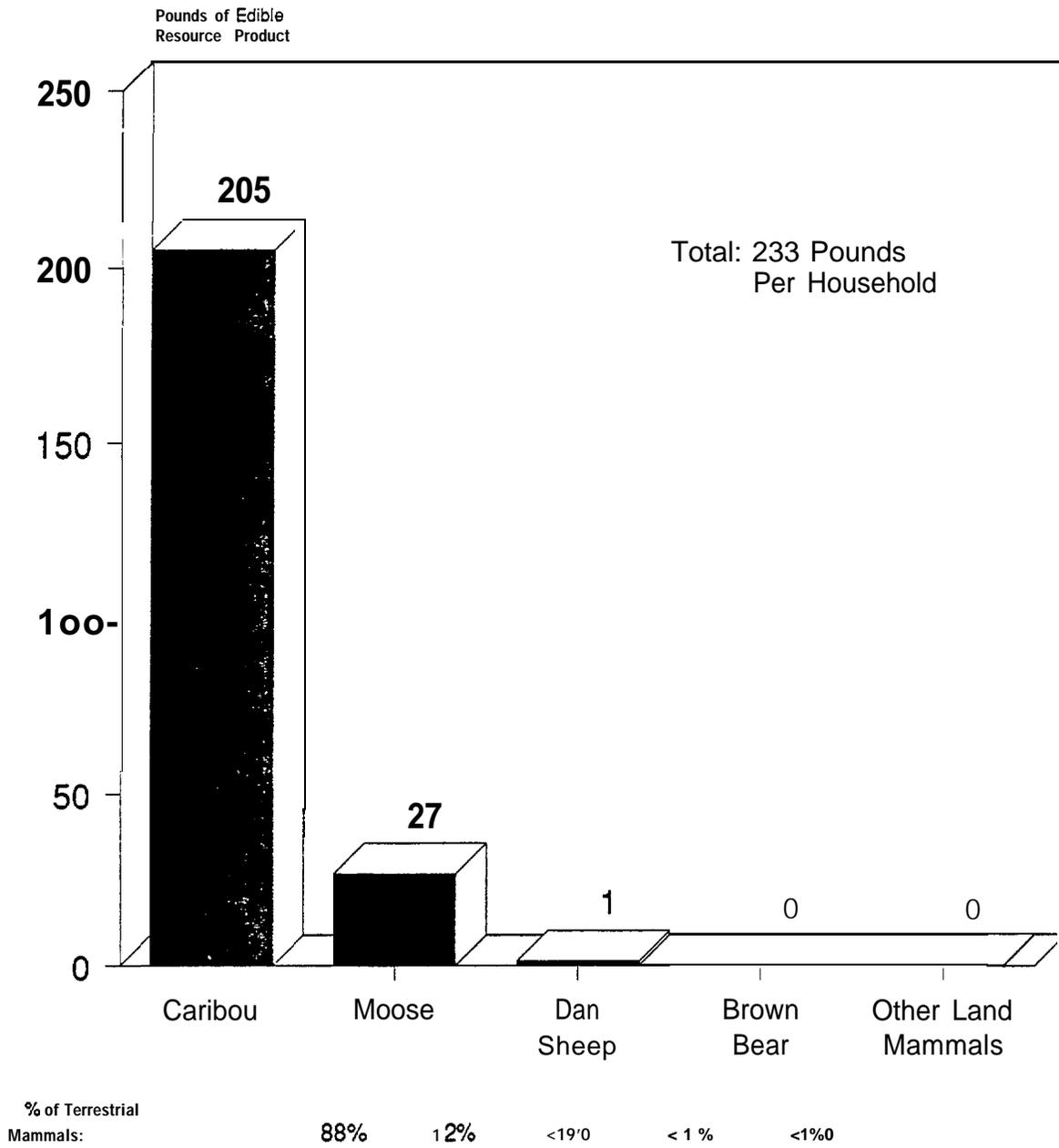
(2) See Table A-4 for sources of conversion factors.

* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Figure 13: Harvest of Terrestrial Mammals
 All Barrow Households, Year One Revised
 (Mean Edible Pounds Per Household)



Source: Stephen R. Braund & Assoc., 1989

TABLE 21: HARVEST ESTIMATES FOR TERRESTRIAL MAMMALS - ALL BARROW HOUSEHOLDS, YEAR TWO (1)

RESOURCE	CONVERSION	AVERAGE POUNDS				SAMPLING STATISTICS						
	FACTOR (2)	COMMUNITY	TOTALS	HARVESTED		PERCENT	PERCENT	SAMPLING STATISTICS				
	(Edible	=====	=====	=====	=====	OF TOTAL	OF ALL	STANDARD	SAMPLING	LOW	HIGH	SAMPLING
	Weight	=====	=====	=====	=====	EDIBLE	HSEHOLDS	DEVIATION	ERROR AT	ESTIMATE	ESTIMATE	ERROR
Per	Resource	EDIBLE	PER	PER	EDIBLE	HRVSTING	(lbs)	95%	(Mean lbs/	(Mean lbs/	AS %	
Resource	in lbs)	POUNDS	HOUSEHOLD	CAPITA	POUNDS	RESOURCE		(lbs)	Household)	Household)	OF MEAN	
	HARVESTED	HARVESTED			HARVESTED							
Total Terrestrial Mammals	n/a	n/a	190,459	203.3	63.1	32.3%	25.2%	33	65	138.26	268.27	32%
Caribou	117.0	1,403	164,162	175.2	54.4	27.8%	24.4%	29	57	118.48	231.92	32%
Moose	500.0	50	25,128	26.8	8.3	4.3%	4.0%	19	36	0.00	63.12	135%
Brown Bear	100.0	1	117	0.1	*	**	0.1%	0	0	0.03	0.22	75%
Dall Sheep	99.0	11	1,052	1.1	0.3	0.2%	1.1%	1	2	0.00	3.22	186%
Wolverine	n/a	2	n/a	n/a	n/a	n/a	0.2%	n/a	n/a	n/a	n/a	n/a
Arctic Fox (Blue)	n/a	131	n/a	n/a	n/a	n/a	0.4%	n/a	n/a	n/a	n/a	n/a
Red Fox (Cross, Silver)	n/a	4	n/a	n/a	n/a	n/a	0.1%	n/a	n/a	n/a	n/a	n/a

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

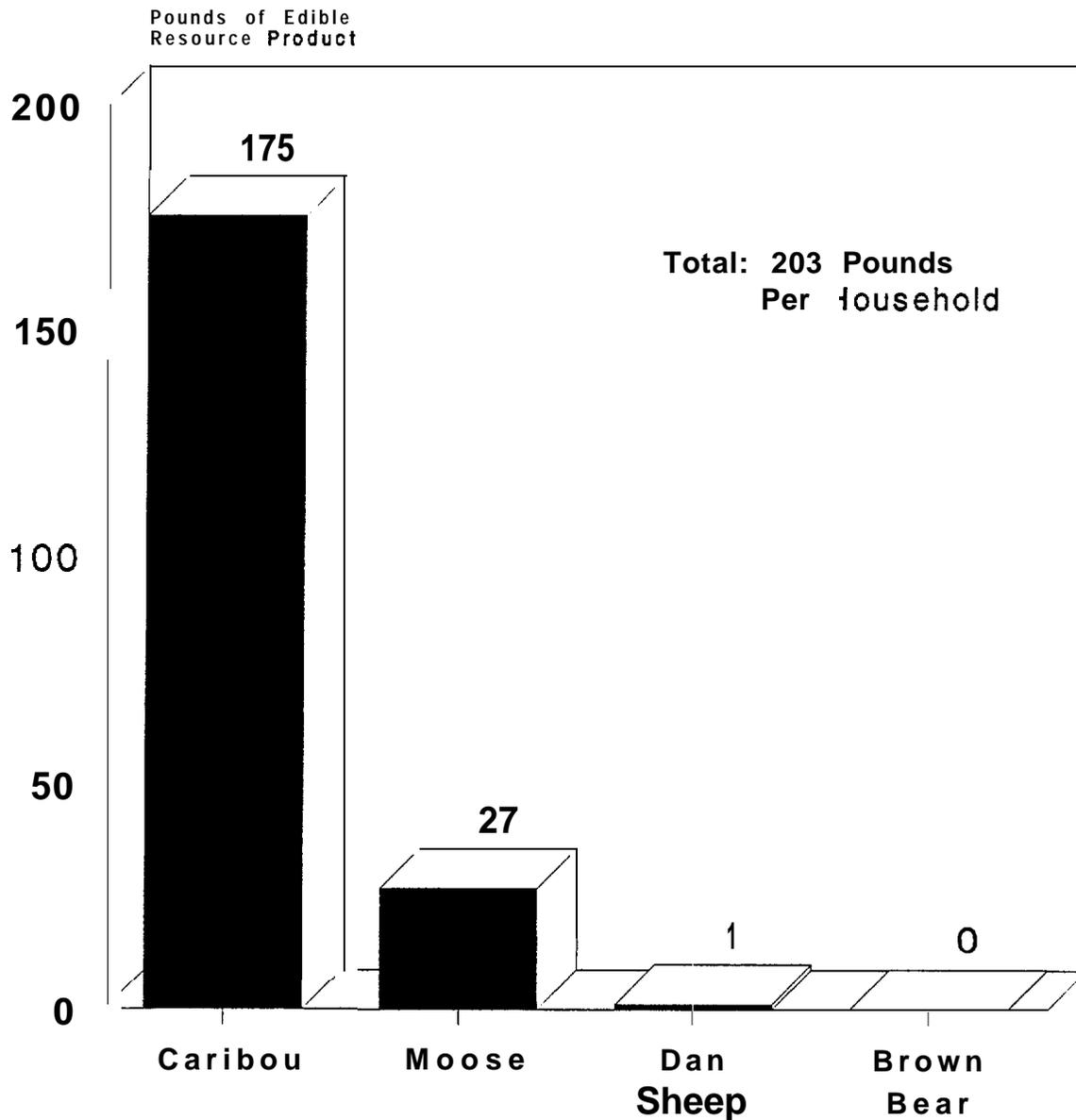
(2) See Table A-4 for sources of conversion factors.

* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Figure 14: Terrestrial Mammal Harvest
 All Barrow Households, Year Two
 (Mean Edible Pounds Per Household)



% of Terrestrial Mammals:	86%	13%	1%	<1%
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Source: Stephen R. Braund & Assoc., 1989

year. The estimated number of moose harvested was identical in each year; however, the estimated harvest of 50 animals per year by Barrow residents is considered by the study team to be a high estimate rather than an average. The high sampling error for moose means that chance may play a large role in the observed moose harvest; another sample of households could have yielded a much different result. The best available estimate, however, is that moose harvests provided an average of 27 pounds of meat per household in each year.

Other edible species harvested in both years were brown bear and Dall sheep. The contribution of these species together was less than one percent of the harvest of terrestrial mammals during Year One. With the exception of caribou, the other terrestrial mammal species are harvested in such low numbers and by so few households that the estimate of the total amount harvested is statistically less reliable (evident in the increased sampling error as a percentage of the mean in Table 20 and 21).

Furbearers do not contribute to the edible harvest of the community. The number of animals harvested are presented in the tables. Total harvests were less for each fur bearer in Year Two, with one-half as many wolverine and red fox (cross and silver fox) harvested in the second year. Arctic fox harvests were down by approximately one-quarter. Though there was apparently no scarcity of Arctic fox, one of the Year One trappers in the study decided not to trap in Year Two. Employment and personal commitments were the major influences on his decision. In general there appeared to be less trapping by community members in Year Two. There was a scarcity of wolverine and wolf in the areas used by Barrow hunters during both years of the study. Though the study households have not reported taking a wolf in either year, there was a report of at least one wolf taken in Year Two by a Barrow hunter.

As illustrated in Tables 22 through 25 and Figures 15 and 16, caribou were harvested during every month in Year Two. The peak harvest months were August and October, just as in Year One. Together those months accounted for 58 percent of the harvest, or about 810 animals in Year Two,

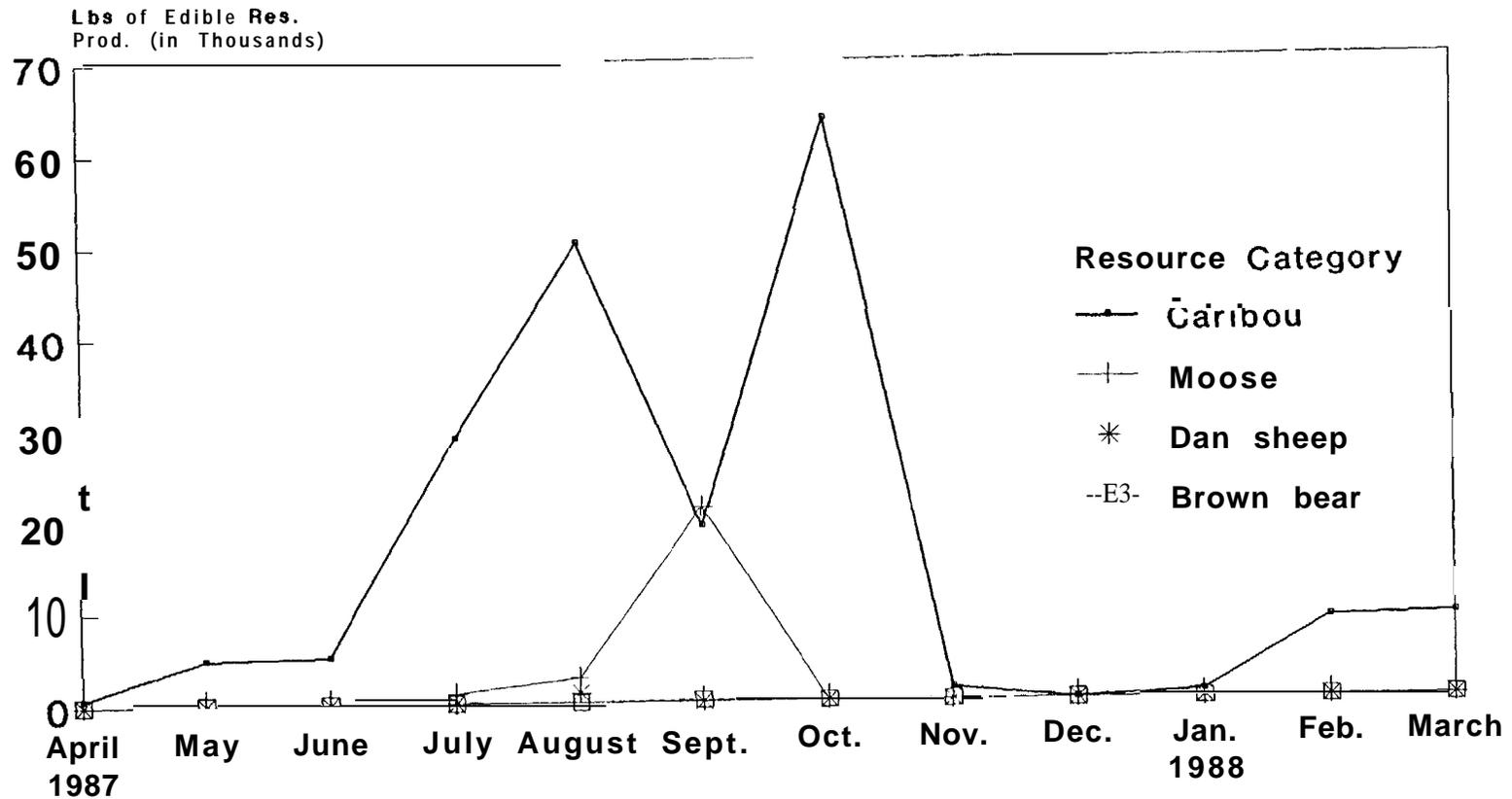
TABLE 22: TERRESTRIAL MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Pounds of Edible Resource Product)

SPECIES	TOTALS *****											
	1987						1988					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	685	4,915	5,180	29,083	50,182	19,219	63,449	1,250	0	822	8,566	8,880
Moose	0	0	0	1,171	2,753	21,275	0	0	0	0	0	0
Brown Bear	0	0	0	0	0	117	0	0	0	0	0	0
Dall Sheep	0	0	0	0	1,052	0	0	0	0	0	0	0
All Terrestrial Mammals (excluding furbearers)	685	4,915	5,180	30,254	53,986	40,611	63,449	1,250	0	822	8,566	8,880

SPECIES	PERCENTS *****											
	1987						1988					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	0%	3%	3%	15%	26%	10%	33%	1%	0%	0%	4%	5% = 100%
Moose	0%	0%	0%	5%	11%	84%	0%	0%	0%	0%	0%	0% = 100%
Brown Bear	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0% = 100%
Dall Sheep	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
All Terrestrial Mammals (excluding furbearers)	0%	2%	2%	14%	25%	19%	29%	1%	0%	0%	4%	4% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 15: Monthly Harvest of
Terrestrial Mammals
All Barrow Households, Year One Revised



Source: Stephen R. Braund & Assoc., 1989

TABLE 23: TERRESTRIAL MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEAR TWO
(Pounds of Edible Resource Product)

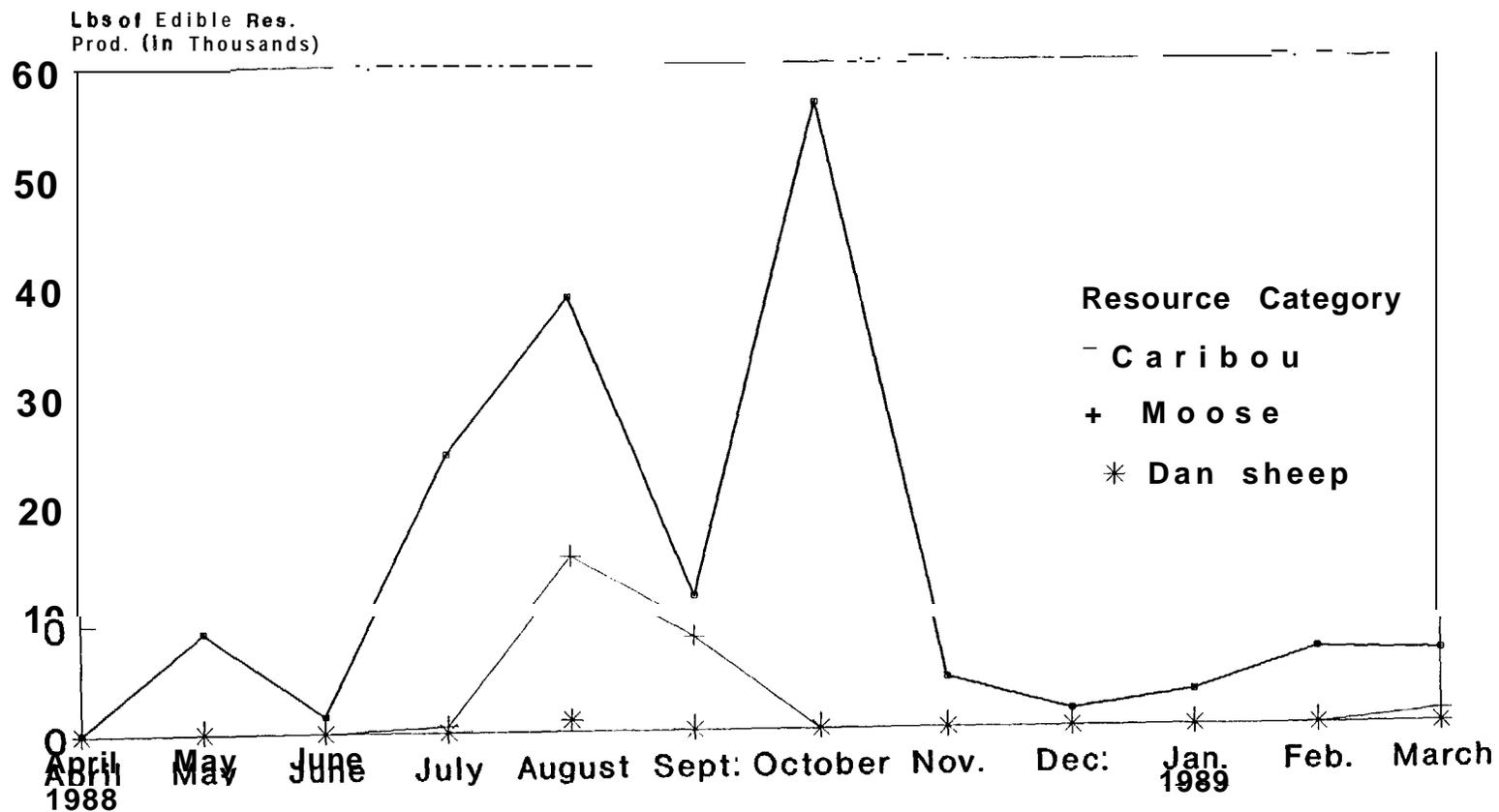
SPECIES	TOTALS *****											
	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	137	9,166	1,562	24,298	38,620	11,092	56,249	4,562	1,541	3,185	6,906	6,616
Moose	0	0	0	585	14,833	8,538	0	0	0	0	0	1,171
Brown Bear	0	0	0	0	0	117	0	0	0	0	0	0
Dall Sheep	0	0	0	0	1,052	0	0	0	0	0	0	0
All Terrestrial Mammals (excluding furbearers)	137	9,166	1,562	24,883	54,505	19,747	56,249	4,562	1,541	3,185	6,906	7,787

SPECIES	PERCENTS *****											
	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	0%	6%	1%	15%	24%	7%	34%	3%	1%	2%	4%	4% = 100%
Moose	0%	0%	0%	2%	59%	34%	0%	0%	0%	0%	0%	5% = 100%
Brown Bear	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0% = 100%
Dall Sheep	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
All Terrestrial Mammals (excluding furbearers)	0%	5%	1%	13%	29%	10%	30%	2%	1%	2%	4%	4% = 100%

Source: Stephen R. Braund & Associates, 1989

W
O

Figure 16: Monthly Harvest of Terrestrial Mammals
All Barrow Households, Year Two



Note: 117 lbs. of brown bear were harvested in September but do not appear on this chart due to scale.

Source: Stephen R. Braund & Assoc., 1989

TABLE 24: TERRESTRIAL MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Number Harvested)

SPECIES	TOTALS *****											
	1987						1988					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	6	42	44	249	429	164	542	11	7	73	76	
Moose				2	6	43						
Brown Bear						1						
Dall sheep					11							
Arctic Fox (Blue)						1		85	37	34	19	
Red Fox (Cross, Silver)											8	
Wolverine							1				2	

Source: Stephen R. Braund & Associates, 1989

TABLE 25: TERRESTRIAL MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEAR TWO
(Number Harvested)

SPECIES	TOTALS *****											
	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	1.17	80.3	13.35	207.68	330.09	94.8	480.76	38.99	13.17	27.22	59.03	56.55
Moose	0	0	0	1.17	29.67	17.08	0	0	0	0	0	2.34
Brown Bear	0	0	0	0	0	1.17	0	0	0	0	0	0
Dall Sheep	0	0	0	0	10.63	0	0	0	0	0	0	0
Arctic Fox (Blue)	1.17	0	0	0	0	0	0	15.22	40.99	40.99	25.76	7.03
Red Fox (Cross, Silver)	0	0	0	0	0	0	0	0	0	0	0	3.51
Wolverine	0	0	0	0	0	0	0	0	0	0	0	2.34

Source: Stephen R. Braund & Associates, 1989

In Year Two, caribou harvests were less during the peak harvest months, but were greater during some of the other months in Year Two, specifically in November through January and in May. The increase during the winter months may have been influenced by a number of factors. Some families harvested less caribou in October than they had planned on, primarily because there were reportedly low numbers of caribou in the vicinity of many of the fall fishing camps. The gray whale rescue also kept many hunters occupied during the second half of October. Also significant in Year Two were the relatively large numbers of caribou over-wintering in the vicinity of Barrow.

In both years, caribou harvests increased noticeably in February and March as compared with the three preceding winter months. February and March were the months to put fresh meat on the table, obtain caribou for consumption at whaling camp, and provide for families who had depleted their subsistence foods supply. As represented by the data, relatively little caribou hunting occurred in April, most energy during that month being devoted to preparations for whaling.

September was the principal moose harvesting month in Year One with 84 percent of the harvest. August appears to be the primary month in Year Two; however, the majority of those moose were harvested on hunting trips that began in late August, with the actual harvest taking place in early September. Moose that wandered near summer fish camps earlier in the season were also sometimes harvested. Residents have reported seeing moose closer to Barrow in recent years. The brown bear harvest took place in September and the Dan sheep were harvested in August, 100 percent of those species being harvested in the respective months in both years. Porcupine and ground squirrel harvests were recorded only in Year One, in October and July respectively.

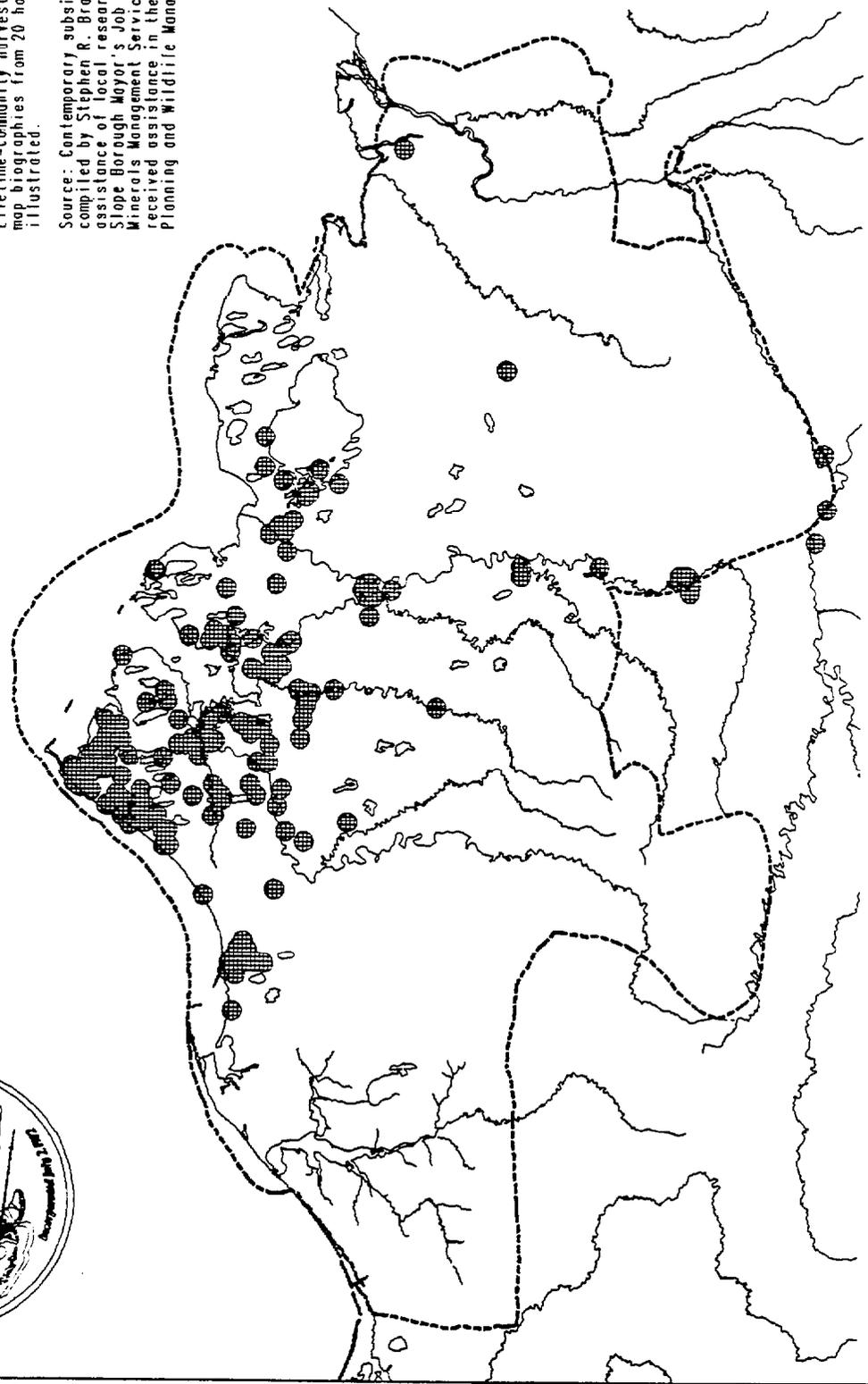
Terrestrial mammal harvest sites in Year Two were spread throughout the central portion of the lifetime community harvest area (Map 15). The majority of sites were within 80 miles of Barrow. The compilation of Year One and Year Two sites illustrates a similar pattern (Map 16). The general area from Peard Bay to Teshekpuk Lake and south to the central portion of the Ikpikpuk River encompasses the majority of terrestrial mammal harvest locations recorded for this study.

MAP 15 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO TERRESTRIAL MAMMAL HARVEST SITES - ALL SPECIES



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two-mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989. Year two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study. Lifetime-community harvest areas, collected in the form of map biographies from 20 households (Pedersen 1979), are also illustrated.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND



Lifetime community land use (Pedersen 1979).



- Terrestrial Mammals
- Caribou
 - Moose
 - Brown bear
 - Fox
 - Wolverine

Map Production: North Slope Borough GIS
Date: June 26, 1989

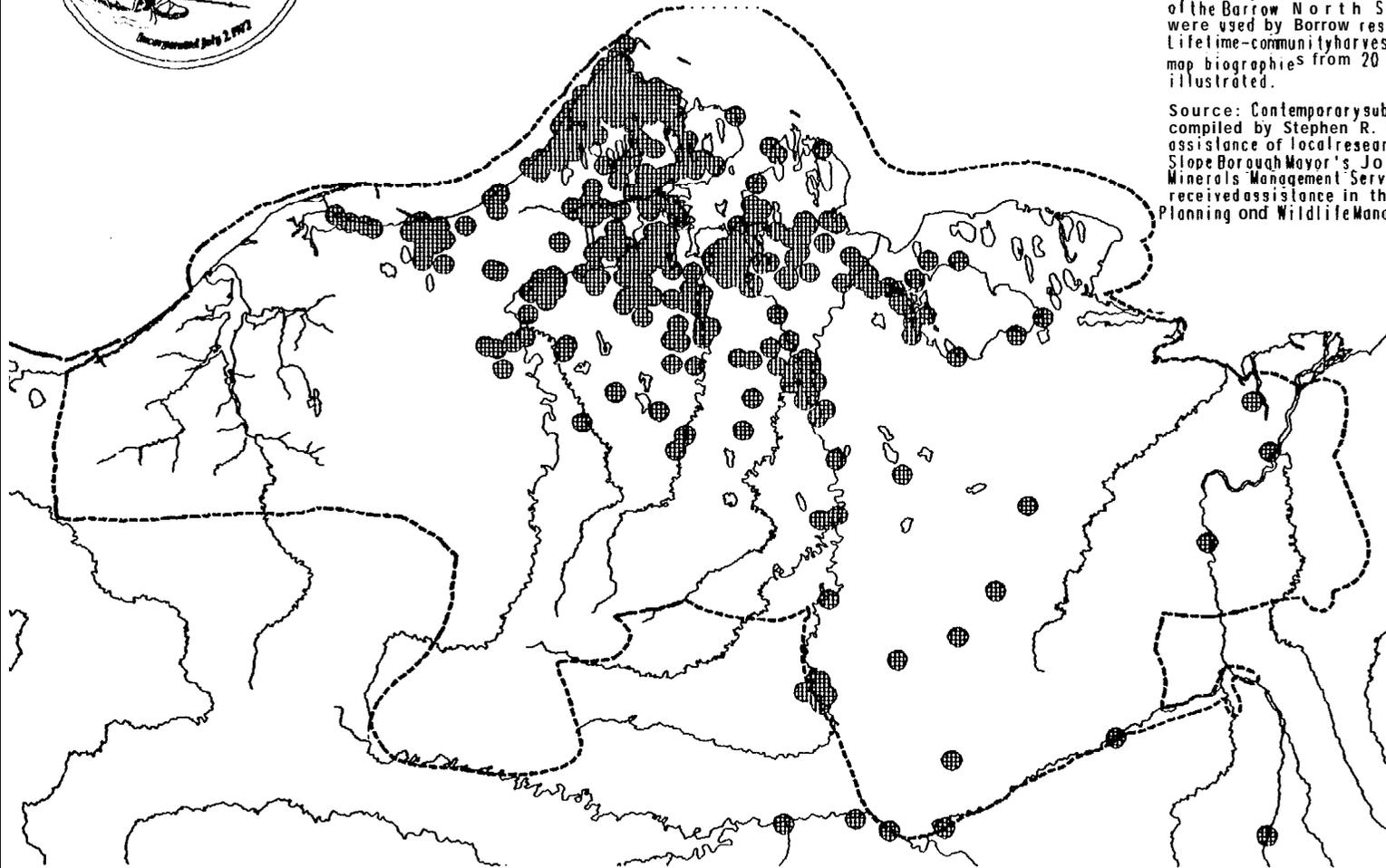
MILES

MAP 16
 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
 TERRESTRIAL MAMMAL HARVEST SITES - ALL SPECIES:
 YEARS ONE AND TWO



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two-mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study. Lifetime-community harvest areas, collected in the form of map biographies from 20 households (Pedersen 1979), are also illustrated.

Source: Contemporary subsistence use information gathered compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION

 Lifetime community load use (Pedersen 1979)

 Terrestrial Mammals
 - Caribou
 - Moose
 - Brown bear
 - Fox
 - Wolverine
 - Porcupine
 - Ground squirrel



Map Production: North Slope Borough GIS 25

Date: June 26, 1989

0 25 50 75 100 125

MILES

The most distant terrestrial harvest locations were moose, fox and wolverine (Maps 17 and 18). Moose harvests were the most distant from Barrow, with the exception of harvest of sheep near Kaktovik by Barrow residents (not illustrated). The moose harvest events on the Colville river documented for this study were all taken during fly-in hunting trips. Hunters chartered out of Barrow in late August or early September and either established a camp near a landing site or floated downstream in search of moose. The additional moose harvest sites along the Colville River indicate that moose harvest locations were more dispersed along the Colville during Year One. Moose harvests did occur closer to Barrow, on the Ikpikpuk River in Year Two and on the Meade River in Year One.

Fox, wolverine and brown bear were harvested in the upper portion of the Ikpikpuk drainage, all during snowmachine trips from Barrow. One of the most distant hunting areas accessed overland by Barrow residents is represented by those harvest sites located in the upper Ikpikpuk drainage. Use of that area is limited to the November through April time period, although boat trips that far upstream have taken place in the recent past during high water periods.

Fox harvests were not prevalent during the first two years of the study. Fox harvest locations were both among the closest and the most distant harvest locations from the village, occurring along traplines maintained from Barrow or taken incidental to wolverine and wolf hunting far inland. Cross and silver varieties of the red fox were more likely taken at the inland locations, while the arctic fox was predominant near Barrow.

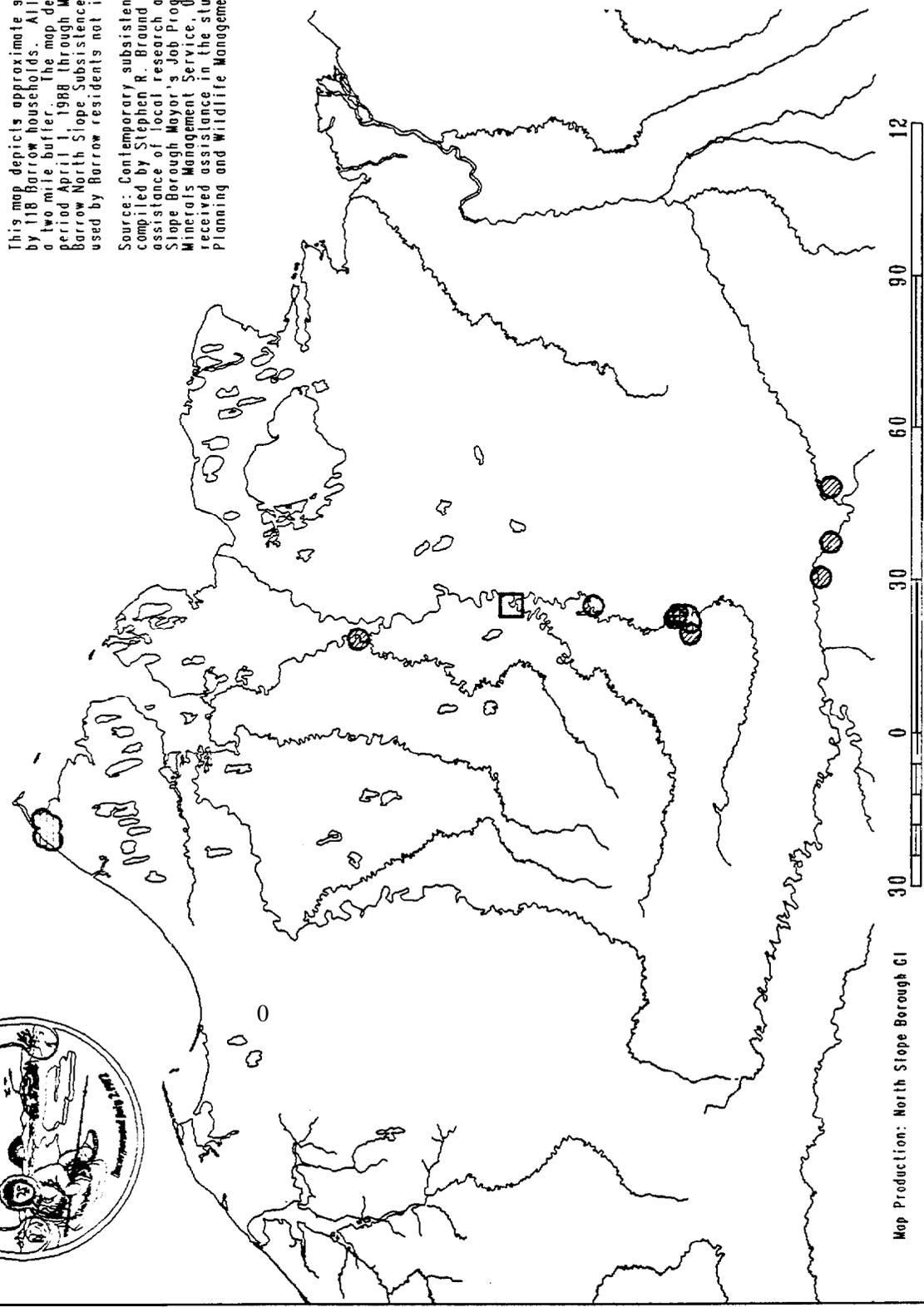
Caribou harvest sites by season for Year Two (Map 19) and for the first two years of the study (Map 20) reveal a few major characteristics of caribou hunting by Barrow residents. The overall pattern has been that caribou harvests varied by location not only according to the animals' presence or absence, but also in relation to what other harvest activities were taking place. The seasonal differences in harvest locations also reflect to a major extent the mode of transportation during that time of year.

MAP 7 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO TERRESTRIAL MAMMAL HARVEST SITES BY SPECIES (EXCLUDING CARIBOU)



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989; Year Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION

	Moose
	F. x - Arctic - Red
	Wolverine
	Brown Bear

Map Production: North Slope Borough CI
Date: June 26, 1989

MAP 18 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO TERRESTRIAL MAMMAL HARVEST SITES BY SPECIES (EXCLUDING CARIBOU): YEARS ONE AND TWO

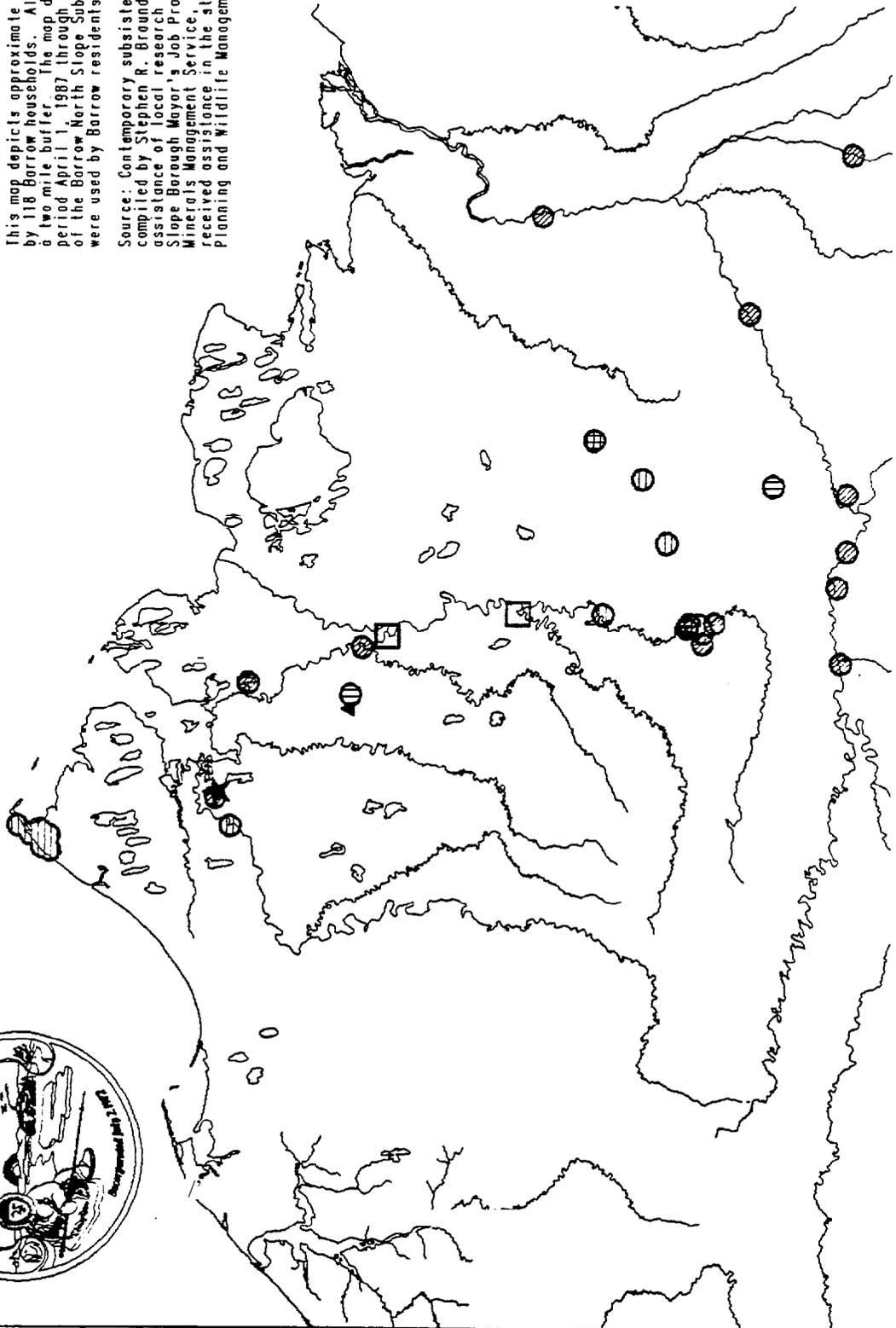


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

- Moose
- Fox
- Arctic
- Red
- Wolverine
- Brown bear
- Porcupine
- Ground squirrel



Map Production: North Slope Borough GIS

Date: June 26, 1989

MAP 19 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO CARIBOU HARVEST SITES BY SEASON

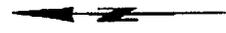
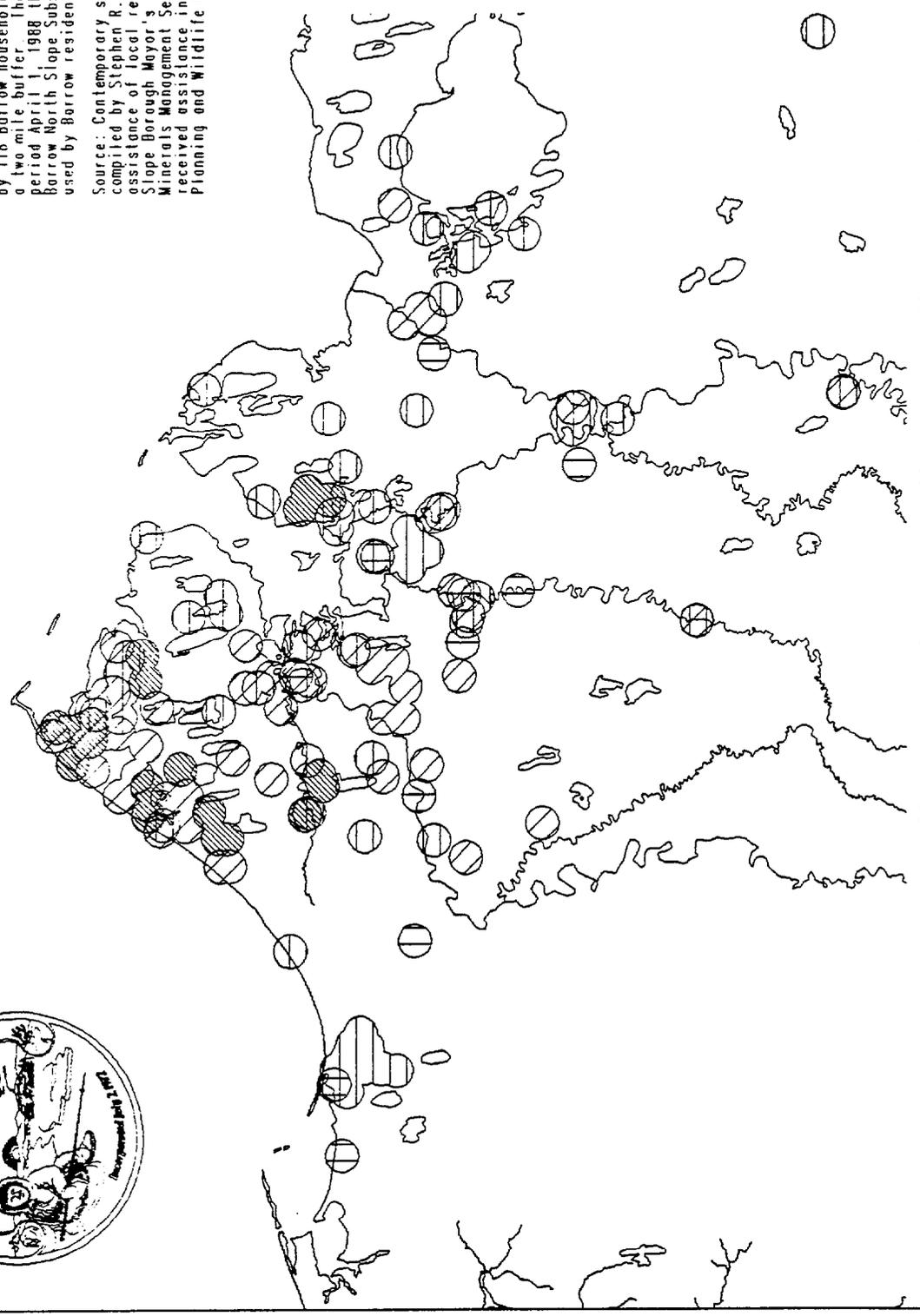


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989. Year two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Brand and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

-  April, May, June 1988
-  July, August, September 1988
-  October, November 1988
-  December 1988, January, February, March 1989



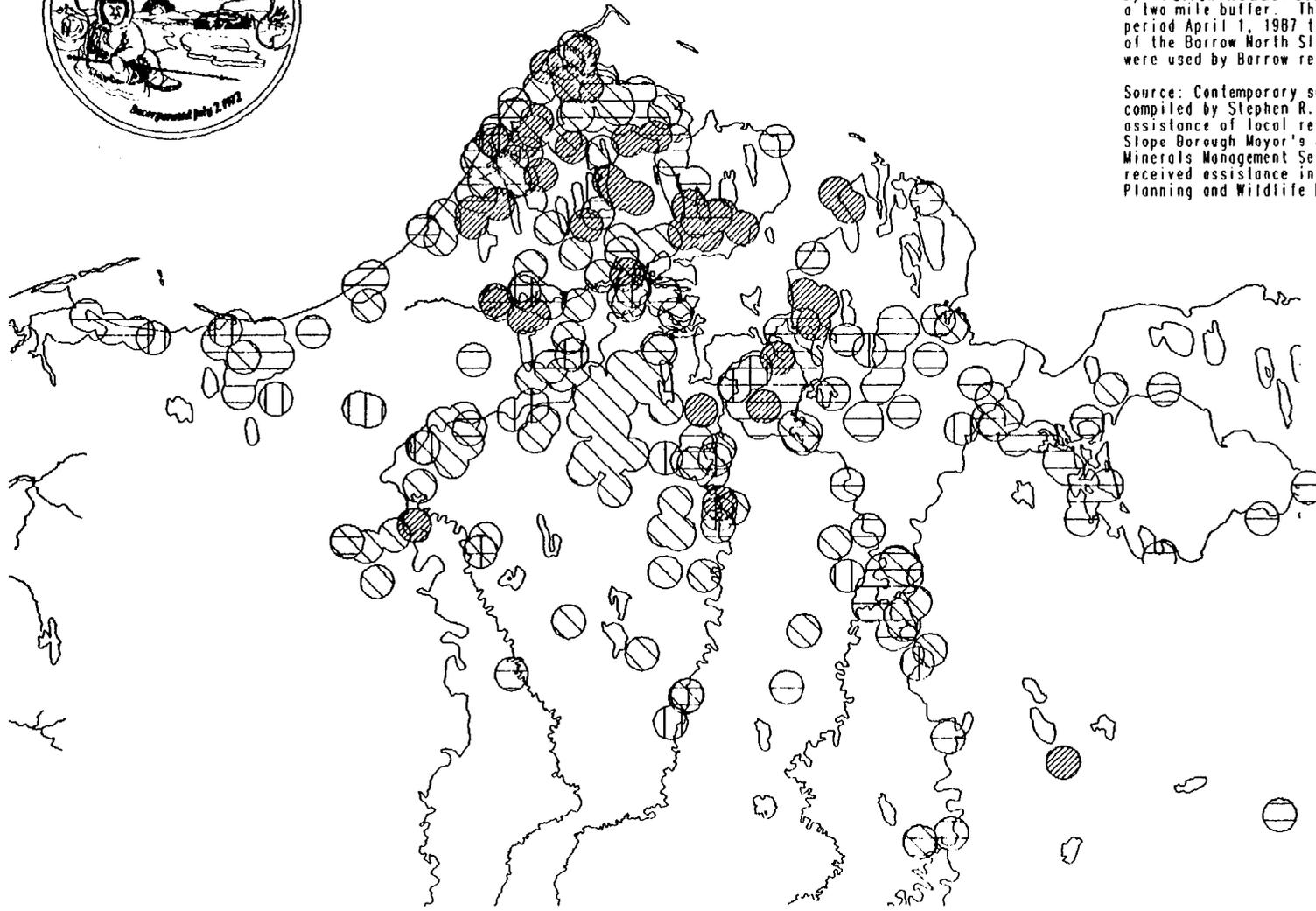
Map Production: North Slope Borough GIS
Date: June 26, 1989

MAP 20
 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
 CARIBOU HARVEST SITES BY SEASON, YEARS ONE AND TWO



This map depicts approximate subsistence harvest sites used by 18 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SRB&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SRB&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION

-  April, May, June 1988
-  July, August, September 1988
-  October, November 1988
-  December 1988, January, February, March 1989

Map Production: North Slope Borough GIS

Date: June 26, 1989



Fieldwork for this study has found that the spring season (April, May, and June) was characterized primarily by spring whaling, waterfowl hunting (primarily eiders and the arctic variety of the white-fronted geese), and preparations for Nalukatuq. Caribou are not intensively pursued this time of year both because the quality of the meat is not as good as other times and because fawning takes place in early June. Caribou hunting at this time was for fresh food while at camp and for soup to serve at Nalukatuq.

Travel during this time was by snowmachine. In April the harvests were sometimes incidental to the chore of hauling fuel, building materials, and other supplies to inland fish camps. The trips were usually of short duration as hunters were out to harvest fresh food for whaling camp and were eager to get back to help with the whaling preparations. In May and June, harvests were more associated with inland camps, either while goose hunting or at fish camp. Spring harvest sites were not clustered as in other seasons, rather there were a few scattered sites.

During the summer months of July, August, and September, caribou were hunted mainly- from boats. Maps 19 and 20 reflect coastal harvest locations extending from Point Franklin to Cape Simpson. Boat-based caribou harvests are also evident around Admiralty Bay, Teshekpuk Lake, and along all the major drainages in the area. Additional summer caribou harvests took place in the vicinity of Barrow, where walking, three-wheelers, or trucks were the usual modes of travel.

October and November were fall fishing months and travel was primarily by snowmachine, although some boat travel did occur associated with fall whaling. Harvest sites are present throughout the general area, many associated with fall fishing camps and cabins. One apparent difference in Year Two was an increase in caribou harvest sites southwest of Barrow along the coast. Caribou were much more prevalent in that area during Year Two. Additional harvests occurred near Nuiqsut in November of Year One, not illustrated on this map.

At the end of the study year, from December through March, caribou were harvested mainly in the vicinity of Barrow. An increase in harvest locations

southwest of Barrow is evident when comparing Maps 19 and 20. Hunters traveling specifically to harvest caribou rarely ranged south of the Meade River. In these months during Year Two, those ranging far inland in search of wolverine and wolf reported seeing virtually no caribou after they were south of the Admiralty Bay area. By March, greater numbers of people were traveling to their camps to deliver supplies for the summer or to retrieve fish stored in ice cellars. Occasionally caribou were harvested on those trips, though again, caribou harvests beyond Admiralty Bay were rare during this period of Year Two.

Map 21, which presents fixed cabin sites and all caribou harvest sites, illustrates that both types of land use correspond very closely. The most significant information conveyed in the cabin site overlay has to do with the representativeness of the mapped harvest data collected for this study. Caribou harvests occurred in the vicinity of most cabin sites, indicating that the locations are representative of most harvest areas used during the period of the study. If every Barrow household's caribou harvest sites were mapped, the total harvest area likely would not expand significantly; however, the intensity of use, as represented by individual harvest locations, would undoubtedly increase considerably.

Tables 26 through 28 and Figures 17 and 18 provide the average terrestrial mammal harvest estimates for the two years of data. As a whole the resource group provided almost one-third (32.9 percent) of the total average community harvest. Caribou provided 87 percent of the terrestrial mammal harvest, with an average harvest of 1,523 animals a year (Table 26 and Figure 17). On the average, caribou were harvested every month of the year by Barrow residents, with August and October providing 59 percent of the harvest (Table 27). Approximately 379 caribou were harvested in August and 512 in October (Table 28).

Figure 18 graphically portrays the yearly round of terrestrial mammal harvest activities, highlighting the most important species: caribou, moose, and sheep. The noticeable drop in caribou harvests during September likely was due to two major factors, one environmental, the other cultural. On the one hand, travel conditions were not conducive to caribou hunting in September. Boating

MAP 21
NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
FIXED CABIN SITES AND CARIBOU HARVEST SITES
YEARS ONE AND TWO



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989. Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

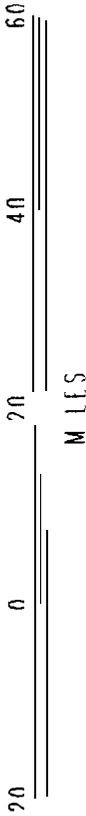
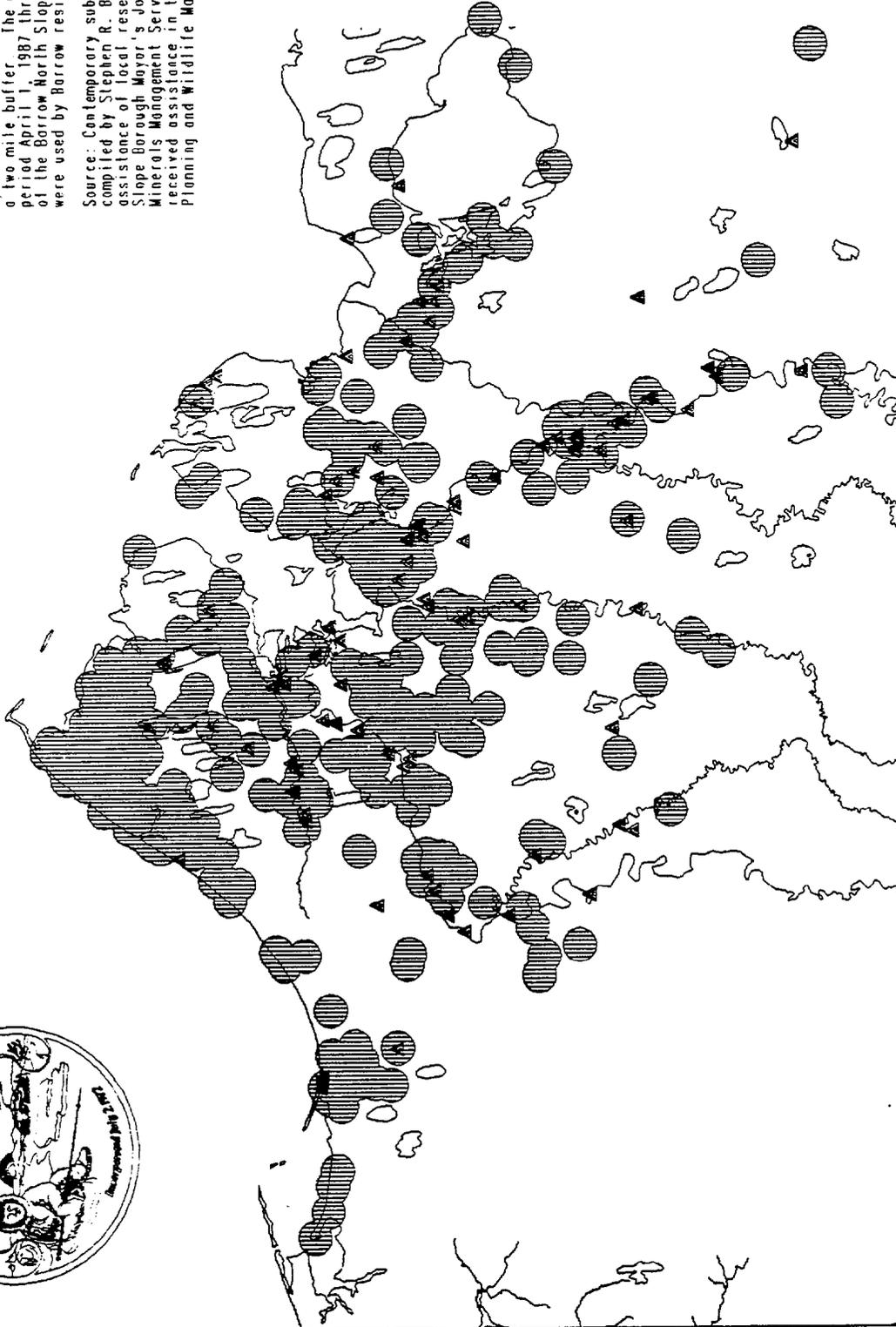
Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

Caribou harvest locations



Fixed camps and cabins (Maril & Saythe 1986)



Map Production: North Slope Borough GIS
 Date: June 26, 1989

TABLE 26: AVERAGE HARVEST ESTIMATES FOR TERRESTRIAL MAMMALS - ALL BARROW HOUSEHOLDS, YEARS ONE & TWO (1)

RESOURCE	CONVERSION	AVERAGE POUNDS				PERCENT OF TOTAL EDIBLE POUNDS HARVESTED	PERCENT OF ALL BARROW HOUSEHOLDS HARVESTING RESOURCE	SAMPLING STATISTICS				
	FACTOR (2)	COMMUNITY TOTALS		HARVESTED				STANDARD DEVIATION (lbs)	SAMPLING ERROR AT 95%	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN
	(Edible Weight Per Resource in lbs)	NUMBER HARVESTED	EDIBLE POUNDS HARVESTED	PER HOUSEHOLD	PER CAPITA							
Total Terrestrial Mammals	n/a	n/a	204,558	218.3	67.8	32.9%	27.3%	35	69	149.72	286.91	31%
Caribou	117.0	1,523	178,195	190.2	59.1	28.6%	25.0%	27	52	138.15	242.20	27%
Moose	500.0	50	25,163	26.9	8.3	4.0%	4.8%	14	27	0.00	54.31	102%
Dan Sheep	99.0	11	1,052	1.1	0.3	0.2%	0.6%	1	1	0.08	2.17	93%
Brown Bear	100.0	1	117	0.1	*	*	0.6%	0	0	0.06	0.19	52%
Other Terrestrial Mammals		14	31	0.03	*	**	0.5%	0	0	0.00	0.08	14EW
Porcupine	10.0	3	26	0.03	*	**	0.5%	1	1	0.00	1.07	3806%
Ground Squirrel	0.4	12	5	0.01	*	**	0.1%	0	0	0.00	0.01	75%
Wolverine	n/a	3	n/a	n/a	n/a	n/a	0.3%	n/a	n/a	n/a	n/a	n/a
Arctic Fox (Blue)	n/a	160	n/a	n/a	n/a	n/a	1.4%	n/a	n/a	n/a	n/a	n/a
Red Fox (Cross, Silver)	n/a	6	n/a	n/a	n/a	n/a	0.1%	n/a	n/a	n/a	n/a	n/a

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

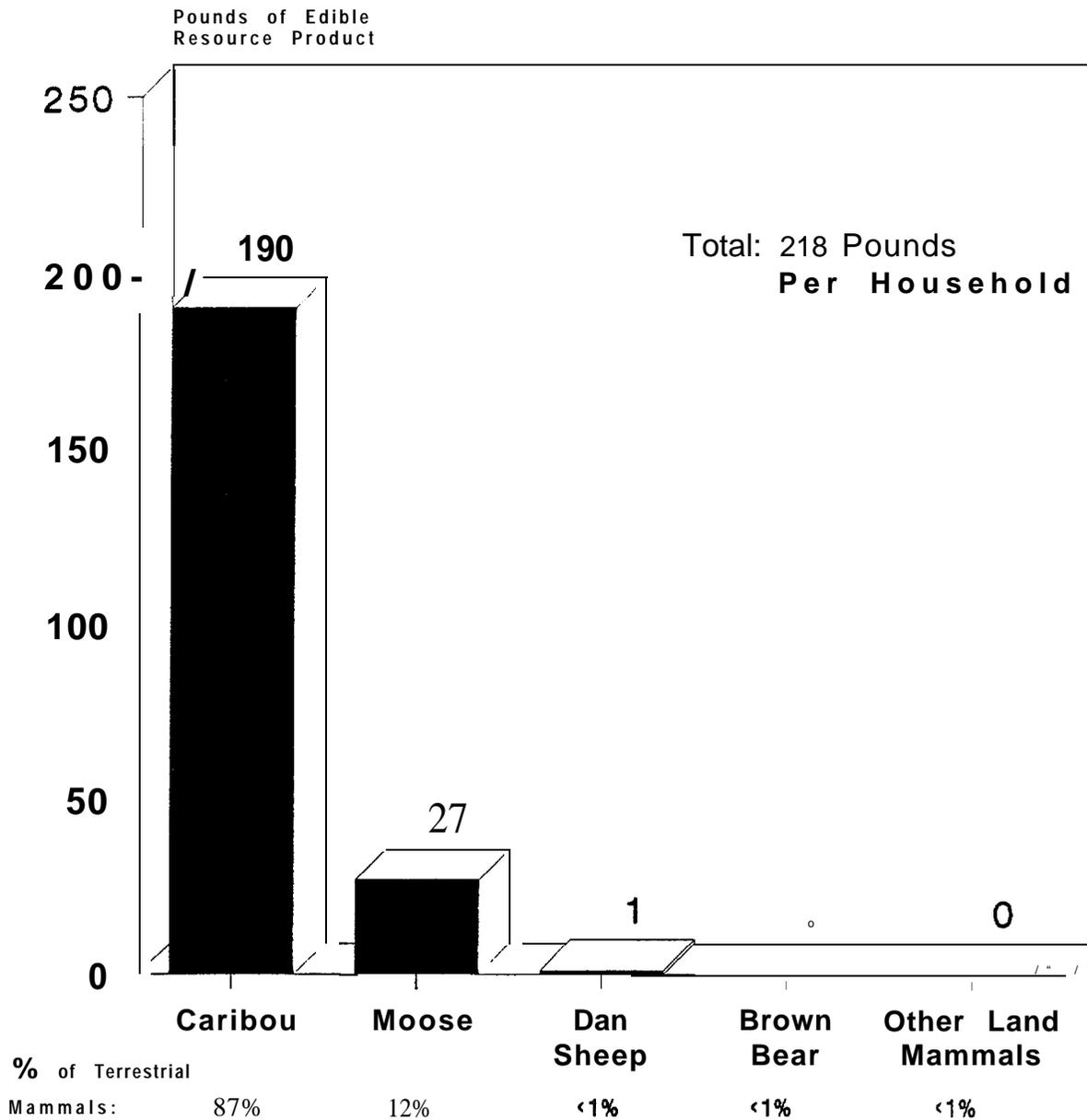
(2) See Table A-4 for sources of conversion factors.

* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Figure 17: Harvest of Terrestrial Mammal
 All Barrow Households, Years One & Two
 (Mean Edible Pounds Per Household)



Source: Stephen R. Braund & Assoc., 1989

TABLE 27: AVERAGE TERRESTRIAL MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEARS ONE & TWO
(Pounds of Edible Resource Product)

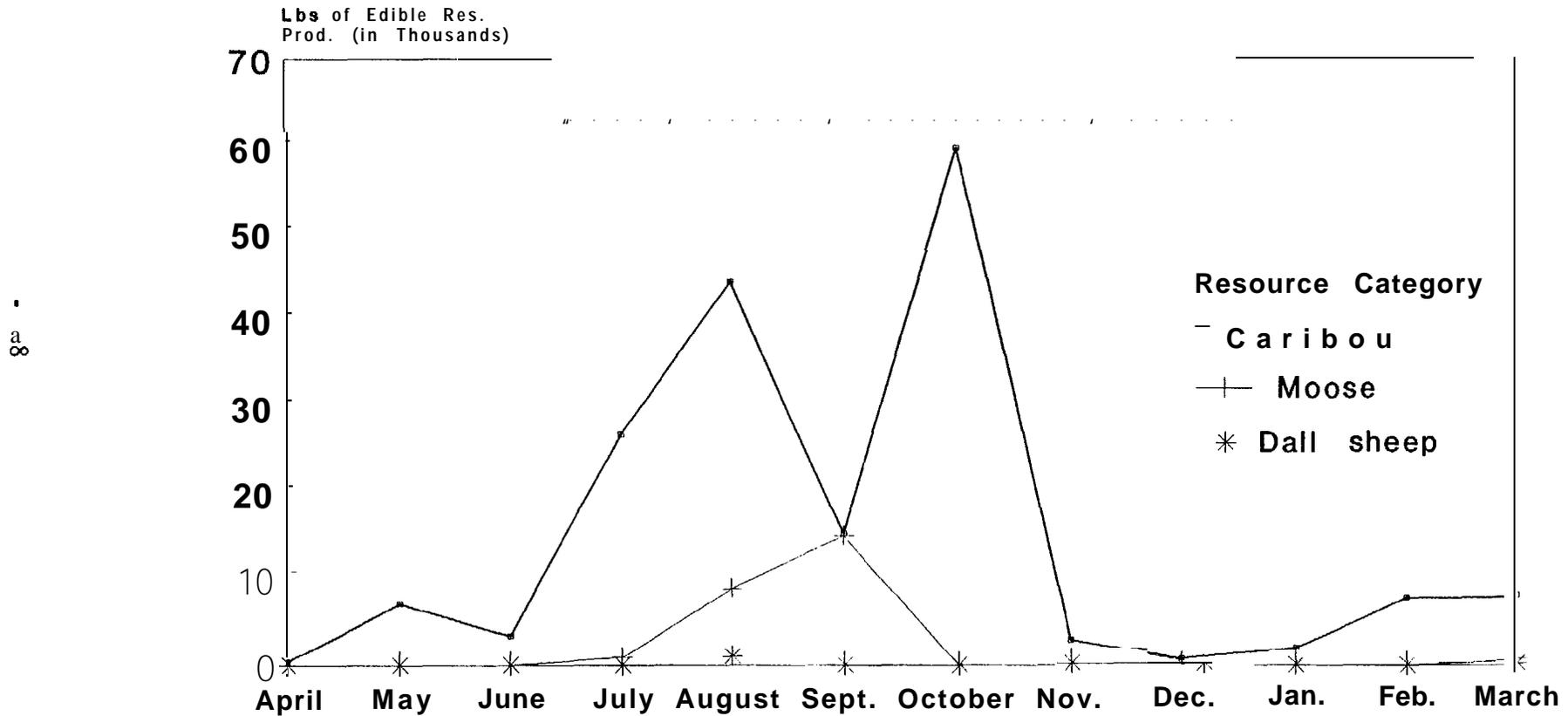
TOTALS												

SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	411	7,040	3,371	26,691	44,401	15,155	59,849	2,906	771	2,004	7,736	7,748
Moose	0	0	0	878	8,793	14,907	0	0	0	0	0	586
Brown bear	0	0	0	0	0	117	0	0	0	0	0	0
Dall sheep	0	0	0	0	1,052	0	0	0	0	0	0	0
Other Terrestrial Mammals	0	0	0	4	0	0	26	0	0	0	0	0
Porcupine	0	0	0	0	0	0	26	0	0	0	0	0
Ground squirrel	0	0	0	4	0	0	0	0	0	0	0	0
All Terrestrial Mammals (excluding furbearers)	411	7,040	3,371	27,573	54,246	30,179	59,875	2,906	771	2,004	7,736	8,334

SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	0%	4%	2%	15%	25%	9%	34%	2%	0%	1%	4%	4% = 100%
Moose	0%	0%	0%	3%	35%	59%	0%	0%	0%	0%	0%	2% = 100%
Brown bear	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0% = 100%
Dall sheep	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
Other Terrestrial Mammals	0%	0%	0%	100%	0%	0%	100%	0%	0%	0%	0%	0% = 100%
Porcupine	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0% = 100%
Ground squirrel	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
All Terrestrial Mammals (excluding furbearers)	0%	3%	2%	13%	27%	15%	29%	1%	0%	1%	4%	4% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 18: Monthly Harvest of Terrestrial Mammals, All Barrow Households, Years One and Two



Note: Brown bear, porcupine, and ground squirrel do not appear due to scale.

Source: Stephen R. Braund & Assoc., 1989

TABLE 28: AVERAGE TERRESTRIAL MAMMAL HARVEST BY SPECIES AND MONTH - BARROW, YEARS ONE & TWO
(Number Harvested)

TOTALS

SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	4	61	29	228	379	130	512	25	7	17	66	66
Moose	0	0	0	2	18	30	0	0	0	0	0	1
Brown Bear	0	0	0	0	0	1	0	0	0	0	0	0
Dall Sheep	0	0	0	0	11	0	0	0	0	0	0	0
Other Terrestrial Mammals	0	0	0	11	0	0	3	0	0	0	0	0
Porcupine	0	0	0	0	0	0	3	0	0	0	0	0
Ground Squirrel	0	0	0	11	0	0	0	0	0	0	0	0
Arctic Fox (Blue)	1	0	0	0	0	1	0	50	20	39	30	13
Red Fox (Cross, Silver)	0	0	0	0	0	0	0	0	0	0	0	6
Wolverine	0	0	0	0	0	0	1	0	0	0	0	2

Source: Stephen R. Braund & Associates, 1989

was questionable due to variable ice conditions on the ocean and the possibility of freeze up on the rivers and lakes. In other words, a hunter may get out there by boat, but may have to walk back. Secondly, fall whaling takes place in September. Many of the hunters used available free time to go boating in hopes of intercepting the westward migration of a bowhead whale. Most families anticipated October as the time they would attempt to get enough caribou for the winter.

Moose hunting was primarily in September, corresponding with the state imposed moose hunting season for this area. Similarly, sheep hunting by the study participants, always in the mountains south of Kaktovik, occurred in August as soon as the season opened.

FISH

A total of 48,661 pounds of fish were harvested by Barrow fishermen in Year Two, an estimated 20,308 pounds less than in Year One (compare Tables 29 and 30 and Figures 19 and 20). In both years, the majority of the catch was composed of whitefish, contributing 78 percent of the fish harvest in Year Two compared with 77 percent in Year One. Within the whitefish species, the broad whitefish were the primary species caught by the study participants. Together, the two broad whitefish varieties (river caught and lake caught) contributed 74 percent of the total whitefish catch and 58 percent of the total fish catch overall. Another whitefish species, least cisco, contributed the next largest amount to the total catch (7,040 pounds). Grayling was the next most important species in terms of total catch, with 6,466 pounds harvested. Burbot and arctic cod were also important species, each contributing approximately 1,500 pounds to the Year Two fish harvest.

In comparing the Year One and Year Two harvests, the total harvest estimate was lower for Year Two by 29 percent. A reduction in catch was recorded across almost all species, exceptions being broad whitefish (river), least cisco, arctic char, arctic cod, and tomcod. Neither arctic cod nor tomcod was harvested by the study households in Year One. Capelin, rainbow smelt, and northern pike were two species harvested by the study households during Year One that were not reported in Year Two. Of these five species that were present in one year though not the other, each made a relative minor contribution to the total community harvest (less than .1 percent of the harvest) with the exception of arctic cod in Year Two (.3 percent of the harvest).

One reason for the decline in estimated fish harvest from the first year to the next is evident from a comparison of the percent of all Barrow households harvesting resources (column eight) in Tables 29 and 30. According to data collected for this study, 33 percent of all households reported fish harvests in Year One, while only 18 percent reported fish harvests in Year Two. Participation in fishing may have remained as high as in Year Two even though the success rate evidently declined. For example, many households reported zero fish harvests during boating trips upriver in August.

TABLE 29: HARVEST ESTIMATES FOR FISH - ALL BARROW HOUSEHOLDS, YEAR ONE REVISED (1)

RESOURCE	CONVERSION	AVERAGE POUNDS				SAMPLING STATISTICS						
	FACTOR (2)	COMMUNITY	TOTALS	HARVESTED		PERCENT	PERCENT	SAMPLING STATISTICS				
	(Edible Weight Per Resource in lbs)	NUMBER HARVESTED	EDIBLE POUNDS HARVESTED	PER HOUSE HOLD	PER CAPITA	OF TOTAL EDIBLE POUNDS HARVESTED	OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	STANDARD DEVIATION (lbs)	SAMPLING ERROR AT 95% (lbs)	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN
Total Fish	n/a	n/a	68,969	74	22.9	10.5%	32.6%	9	18	55.29	91.92	25%
Total Whitefish		27,945	53,154	56.73	17.6	8.1%	21.1%	7	14	43.02	70.44	24%
Whitefish (non-specif.)	2.0	5,176	10,352	11.05	3.4	1.6%	3.7%	1	2	8.81	13.29	20%
Round Whitefish	1.0	2,080	2,079	2.22	0.7	0.3%	7.4%	1	1	1.12	3.32	50%
Broad Whitefish (River)	2.5	9,272	23,181	24.74	7.7	3.5%	10.5%	5	9	15.35	34.13	38%
Broad Whitefish (Lake)	3.4	1,191	4,049	4.32	1.3	0.6%	1.5%	1	2	2.03	6.61	53%
Humpback whitefish	2.5	2,179	5,446	5.81	1.8	0.8%	5.2%	3	5	0.81	10.82	86%
Least cisco	1.0	6,770	6,770	7.22	2.2	1.0%	3.1%	2	4	3.48	10.97	52%
Bering, Arctic cisco	1.0	1,278	1,278	1.36	0.4	0.2%	0.4%	0	1	0.64	2.09	53%
Total Other Frshwter Fish		12,996	14,091	15.04	4.7	2.2%	15.4%	4	7	7.90	22.18	47%
Arctic grayling	0.8	11,826	9,461	10.10	3.1	1.4%	12.9%	2	5	5.41	14.79	46%
Arctic char	2.8	37	103	0.11	*	**	2.7%	0	0	0.00	0.22	10?4
Burbot (Ling cod)	4.0	1,029	4,115	4.39	1.4	0.6%	6.9%	2	3	1.39	7.39	68%
Northern pike	2.3	2	5	0.01	*	**	0.2%	0	0	0.00	0.01	53%
Lake trout	4.0	102	408	0.43	0.1	0.1%	0.6%	0	0	0.23	0.64	48%
Total Salmon		171	1,025	1.09	0.3	0.2%	2.2%	0	1	0.39	1.80	65%
Salmon (non-specified)	6.1	64	393	0.42	0.1	0.1%	0.2%	0	0	0.19	0.65	54%
Chum (Dog) salmon	6.1	5	31	0.03	*	**	0.6%	0	0	0.00	0.09	17CA
Pink (Humpback) salmon	3.1	17	53	0.06	*	**	0.4%	0	0	0.02	0.09	68%
Silver (Coho) salmon	6.0	81	485	0.52	0.2	0.1%	1.1%	0	1	0.00	1.17	12@4
King (Chinook) salmon	18.0	4	63	0.07	*	**	0.1%	0	0	0.02	0.12	75%
Total Other Coastal Fish		3,494	699	0.75	*	**	6.8%	1	1	0.00	1.99	167%
Cape[in	0.2	3,351	67D	0.72	*	**	6.7%	1	1	0.00	1.96	174%
Rainbow smelt	0.2	143	28	0.03	*	**	0.2%	0	0	0.01	0.05	55%

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

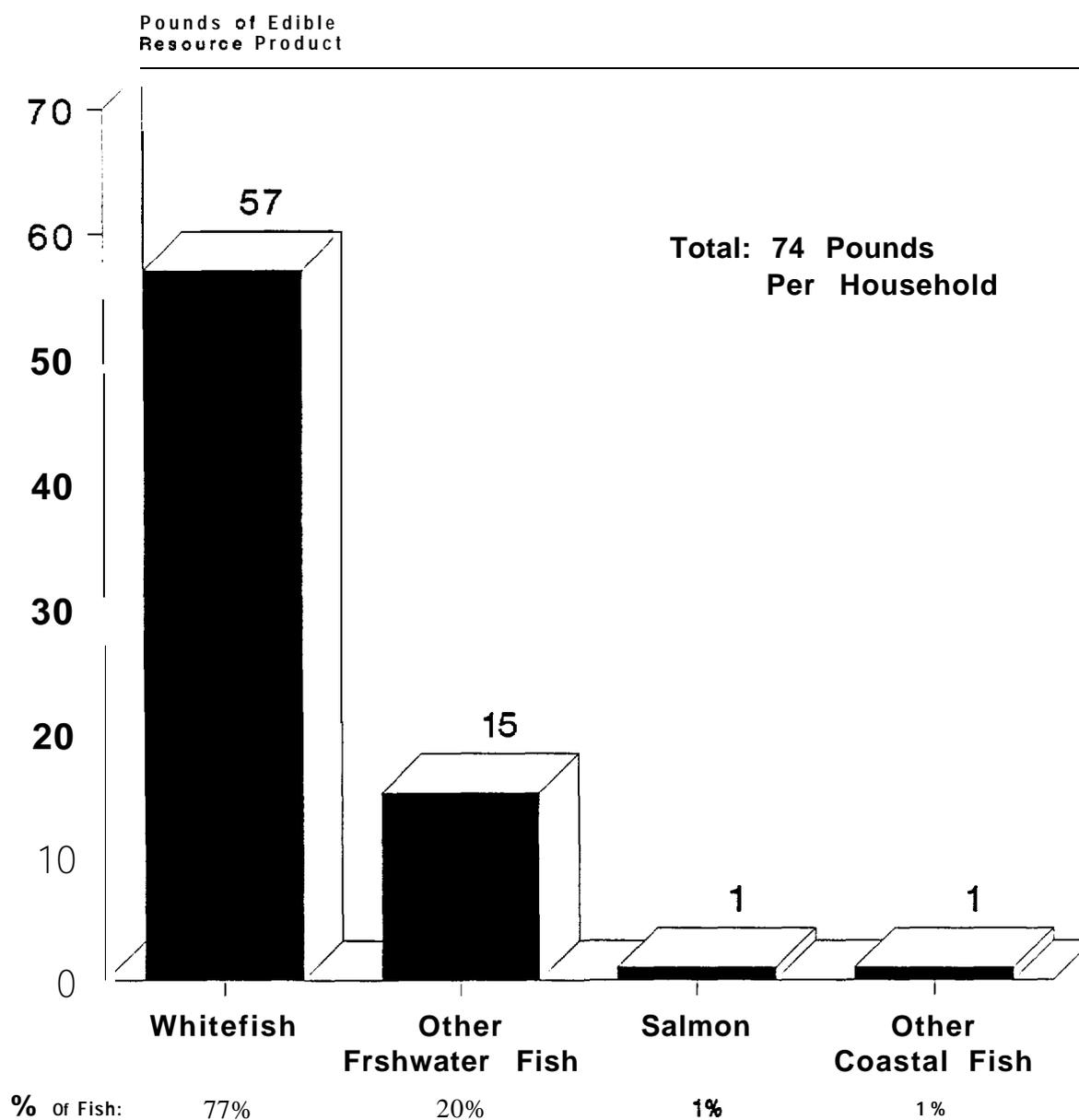
* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Source: Stephen R. Braund & Associates, 1989

Figure 19: Harvest of Fish
 All Barrow Households, Year One Revised
 (Mean Edible Pounds Per Household)



Source: Stephen R. Braund & Assoc., 1989

TABLE 30: HARVEST ESTIMATES FOR FISH - ALL BARROW HOUSEHOLDS, YEAR TWO (1)

RESOURCE	CONVERSION	AVERAGE POUNDS				SAMPLING STATISTICS						
	FACTOR (2)	COMMUNITY TOTALS		HARVESTED		PERCENT	OF ALL	SAMPLING STATISTICS				
	(Edible Weight Per Resource in lbs)	=====		=====		OF TOTAL	BARROW	STANDARD	SAMPLING	LOW	HIGH	SAMPLING
		NUMBER	EDIBLE POUNDS	PER HOUSEHOLD	PER CAPITA	EDIBLE POUNDS HARVESTED	HSEHOLDS HRVSTING RESOURCE	DEVIATION (lbs)	ERROR AT 95%	ESTIMATE (Mean 1 bs/ Household)	ESTIMATE (Mean lbs/ Household)	ERROR AS % OF MEAN
Total Fish	n/a	n/a	48,661	51.93	16.1	8.2%	17.5%	5	10	42.02	61.85	19%
Total Whitefish		19,499	38,028	40.58	12.6	6.4%	12.2%	4	8	32.46	48.71	20%
Whitefish (unspecified)	2.0	150	300	0.32	0.1	0.1%	0.2%	0	0	0.32	0.32	0%
Round Whitefish	1.0	704	704	0.75	0.2	0.1%	0.2%	0	1	0.19	1.31	75%
Broad Whitefish (River)	2.5	10,075	25,187	26.88	8.4	4.3%	10.6%	3	6	20.98	32.78	22%
Broad Whitefish (Lake)	3.4	926	3,126	3.34	1.0	0.5%	1.5%	1	1	2.05	4.62	39%
Humpback whitefish	2.5	612	1,530	1.63	0.5	0.3%	4.1%	0	1	0.93	2.33	43%
Least cisco	1.0	7,040	7,040	7.51	2.3	1.2%	5.6%	2	4	3.30	11.72	56%
Bering, Arctic cisco	1.0	142	142	0.15	0.0	0.0%	1.8%	0	0	0.05	0.25	64%
Total Other Freshwater Fish		8,598	8,427	8.99	2.8	1.4%	13.1%	2	3	5.65	12.33	37%
Arctic grayling	0.8	8,083	6,466	6.90	2.1	1.1%	10.3%	1	2	4.40	9.40	36%
Arctic char	2.8	82	229	0.24	*	**	1.2%	0	0	0.09	0.40	64%
Burbot(Ling cod)	4.0	362	1,447	1.54	0.5	0.2%	6.1%	0	1	0.73	2.36	53%
Lake trout	4.0	71	285	0.30	0.1	0.0%	0.9%	0	0	0.12	0.49	60%
Total Salmon		78	479	0.51	0.2	0.1%	0.7%	0	0	0.18	0.84	64%
Salmon (non-specified)	6.1	3	18	0.02	0.0	0.0%	0.3%	0	0	0.00	0.13	583%
Chum (Dog) salmon	6.1	5	29	0.03	*	**	0.1%	0	0	0.01	0.05	75%
Pink (Humpback) salmon	3.1	1	4	0.00	*	*	0.1%	0	0	0.00	0.01	74%
Silver (Coho) salmon	6.0	68	408	0.43	0.1	0.1%	0.4%	0	0	0.15	0.72	66%
King (Chinook) salmon	18.0	1	21	0.02	*	**	0.1%	0	0	0.01	0.04	75%
Total Other Coastal Fish		7,923	1,721	1.84	*	**	1.5%	1	1	0.73	2.95	60%
Arctic cod	0.2	7,753	1,551	1.65	0.5	0.3%	0.4%	1	1	0.60	2.71	64%
Tomcod	1.0	170	170	0.18	0.1	0.0%	1.1%	0	0	0.00	0.52	187%

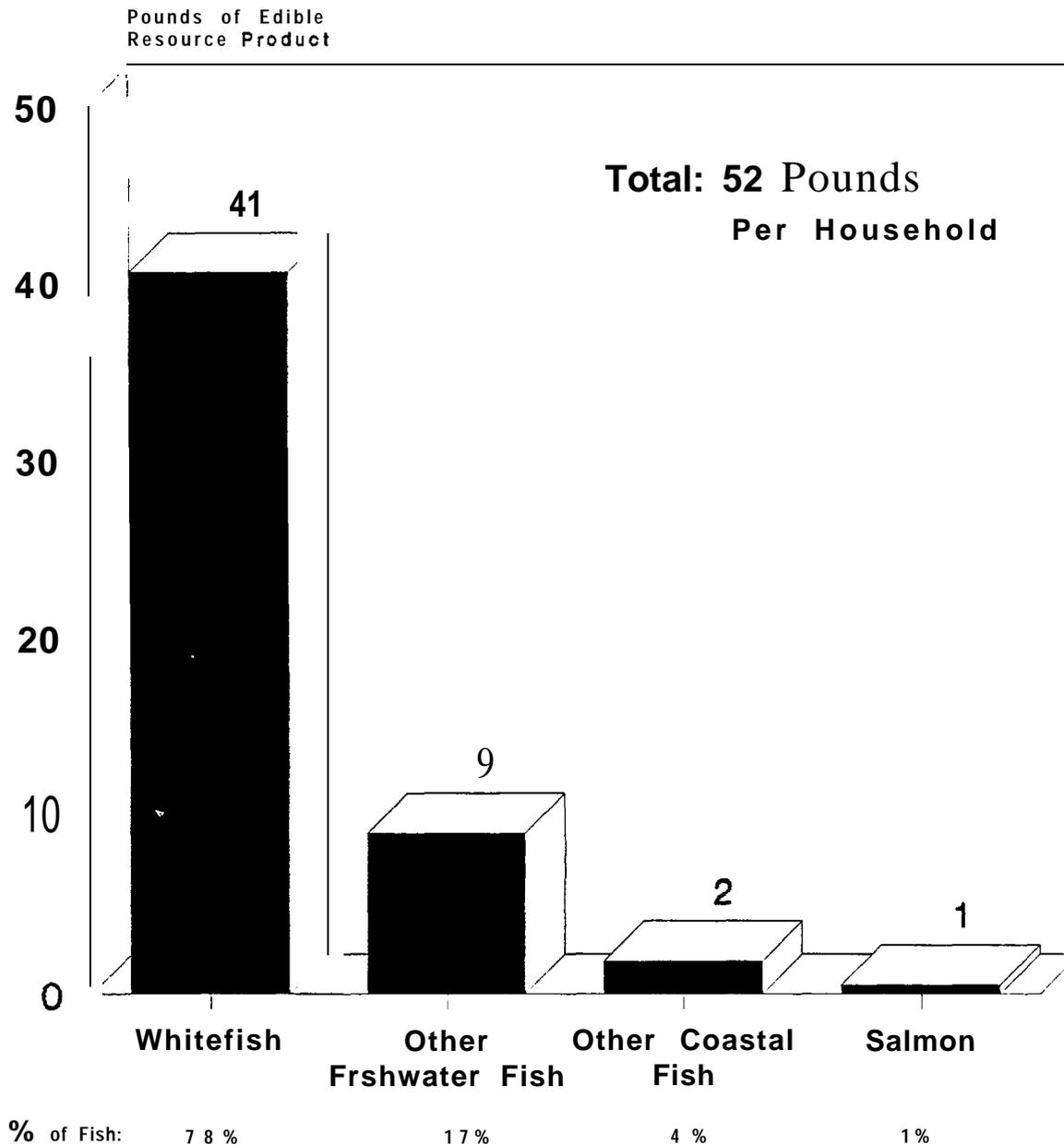
(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

- represents less than .1 pound
- ** represents less than .1 percent
- n/a means not applicable

Source: Stephen R. Braund & Associates, 1989

Figure 20: Harvest of Fish
 All Barrow Households, Year Two
 (Mean Edible Pounds Per Household)



Source: Stephen R. Braund & Assoc., 1989

Unsuccessful harvest trips are not represented in the data. Weather, ice conditions, water levels, travel conditions, employment Opportunities, and work-related responsibilities may all have contributed to a decline in the total fish harvest from Year One to Year Two. In terms of ice conditions, travel to fish camps by boat was made somewhat more difficult by the presence of shore ice during most of July. In August and early September, some families reported water levels were too high for good fishing, and that they pulled their nets often to avoid floating debris. September is also a month when planes are commonly used to travel to fish camps. This year, however, local flight services experienced many equipment problems and planes were unavailable for part of the month.

The whale rescue effort might have influenced fish harvests in October. At least 20 to 30 men were employed (through the Mayor's Job Program) for the rescue during the second half of the month. In addition, many NSB full-time employees remained on the the job during the entire rescue effort, putting in long days and working weekends. Some employees were directing the crews on the ice, others were guiding and generally watching over the more than 100 journalists who descended on the town, while other NSB employees were glued to their phones fielding the avalanche of phone calls coming into the Borough 24 hours a day from all over the world.

The data in Tables 31 through 34 and in Figures 21 and 22 illustrate the month by month catch for each species. A comparison of Years One and Two indicates that the monthly distribution of the harvest was similar between years. Though the catch was distributed primarily across seven months, May through November, a significant portion of fish were caught in October: 50 percent in Year Two and 41 percent in Year One.

Whitefish were harvested May through November. The peak harvest was in October both years when an almost identical amount was caught: 19,611 pounds in Year Two and 19,788 pounds in Year One. The majority of the grayling harvest was caught in September and October. A major difference between the two study years was that less than half as many grayling were caught in October of Year Two than in October of Year One. Salmon were recorded only in July and August in Year Two, while a few were caught in May and June during Year One.

TABLE 31: FISH HARVEST BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Pounds of Edible Resource Product)

SPECIES	TOTALS *****											
	1987					1988						
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0	527	3,251	6,759	10,830	8,577	19,788	3,424	0	0	0	0
Whitefish (non-specified)	0	234	1,003	4,266	2,202	2,459	187	0	0	0	0	0
Round Whitefish	0	0	703	0	300	342	714	21	0	0	0	0
Broad Whitefish (River)	0	293	1,171	2,117	7,660	2,799	6,456	2,686	0	0	0	0
Broad Whitefish (Lake)	0	0	0	0	0	1,354	1,979	717	0	0	0	0
Humpback whitefish	0	0	375	375	610	1,560	2,526	0	0	0	0	0
Least cisco	0	0	0	0	59	15	6,696	0	0	0	0	0
Bering, Arctic cisco	0	0	0	1	0	47	1,230	0	0	0	0	0
Total Other Freshwater Fish	0	376	253	198	805	3,656	8,737	14	0	0	0	48
Arctic grayling	0	0	253	198	777	2,686	5,546	0	0	0	0	0
Arctic char	0	48	0	0	23	29	3	0	0	0	0	0
Burbot (Ling cod)	0	328	0	0	5	936	2,798	0	0	0	0	48
Lake trout	0	0	0	0	0	5	389	14	0	0	0	0
Total Salmon	0	35	70	49	870	0	0	0	0	0	0	0
Salmon (non-specified)	0	0	0	0	393	0	0	0	0	0	0	0
Chum (Dog) salmon	0	0	0	0	31	0	0	0	0	0	0	0
Pink (Humpback) salmon	0	0	0	0	53	0	0	0	0	0	0	0
Silver (Coho) salmon	0	35	70	49	330	0	0	0	0	0	0	0
King (Chinook) salmon	0	0	0	0	63	0	0	0	0	0	0	0
Total Other Coastal Fish	0	0	0	0	670	0	10	0	0	0	0	19
Capelin	0	0	0	0	670	0	0	0	0	0	0	0
Rainbow Smelt	0	0	0	0	0	0	10	0	0	0	0	19
Sculpin	0	0	0	0	0	0	0	0	0	0	0	0
Tom cod	0	0	0	0	0	0	0	0	0	0	0	0
Arctic cod	0	0	0	0	0	0	0	0	0	0	0	0
All Fish Species	0	938	3,574	7,006	13,175	12,232	28,534	3,438	0	0	0	67

(Continued on next page)

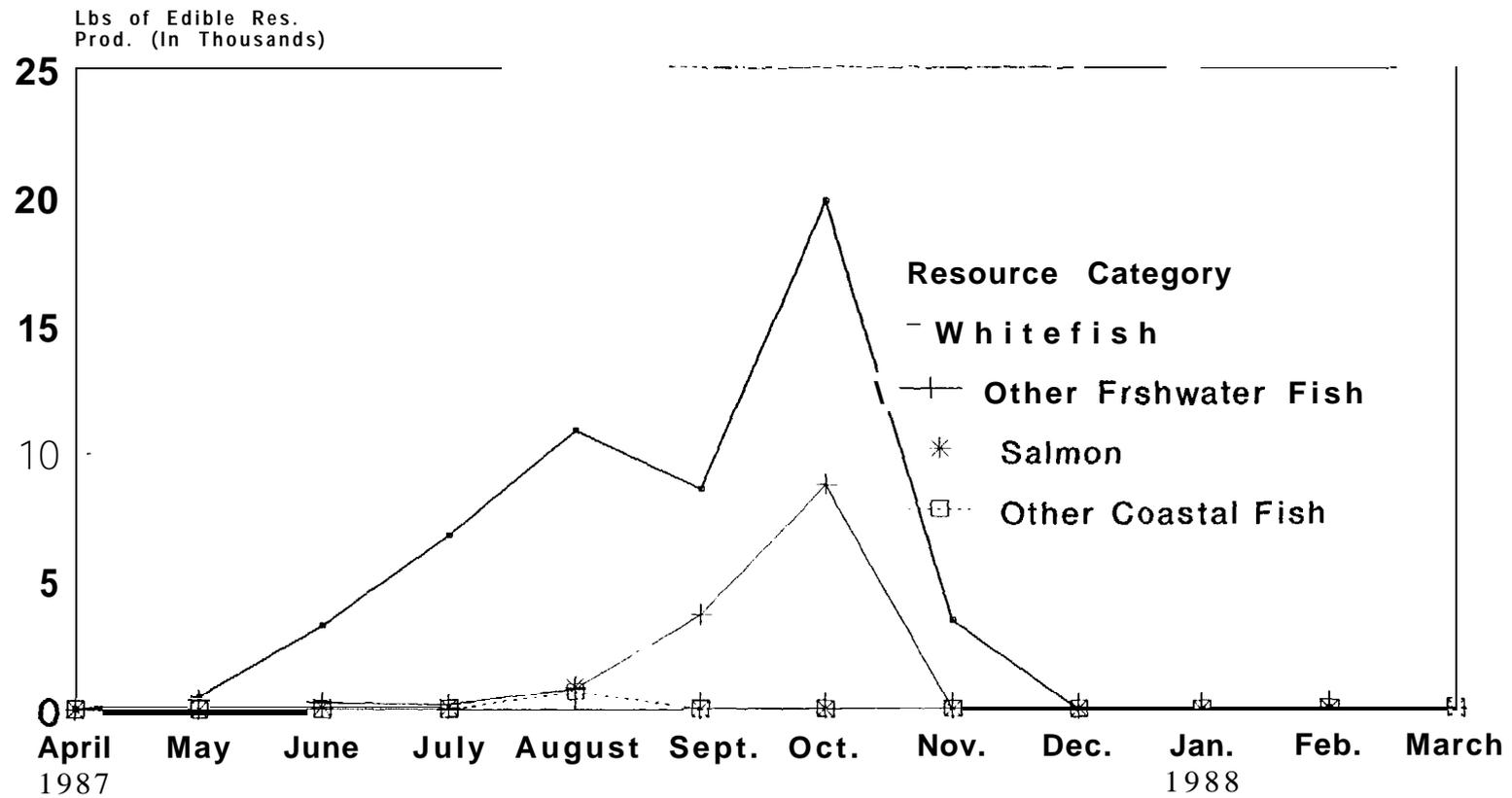
TABLE 31, CONT INUED: FISH HARVEST BY SPECIES AND MONTH - BARROW , YEAR ONE REVISED
(Pounds of Edible Resource Product)

SPECIES	PERCENTS *****											
	1987						1988					
	Apr i 1	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0%	1%	6%	13%	20%	16%	37%	6%	0%	0%	0%	0% □ 1 00%
Whitefish (non-specified)	0%	2%	10%	41%	21%	24%	2%	0%	0%	0%	0%	0% □ 100%
Round Whitefish	0%	0%	34%	0%	14%	16%	34%	1%	0%	0%	0%	0% = 10CM
Broad Whitefish (River)	0%	1%	5%	9%	33%	12%	28%	12%	0%	0%	0%	0% = 100%
Broad Whitefish (Lake)	0%	0%	0%	0%	0%	33%	49%	18%	0%	0%	0%	0% □ 1 00%
Humpback whitefish	0%	0%	7%	7%	11%	29%	46%	0%	0%	0%	0%	0% = 100%
Least cisco	0%	1%	5%	9%	33%	12%	28%	12%	0%	0%	0%	0% = 100%
Bering, Arctic cisco	0%	0%	0%	0%	1%	0%	99%	0%	0%	0%	0%	0% = 1 00%
Total Other Freshwater Fish	0%	3%	2%	1%	6%	26%	62%	0%	0%	0%	0%	0% = 1 00%
Arctic grayling	0%	0%	3%	2%	8%	28%	59%	0%	0%	0%	0%	0% = 100%
Arctic char	0%	46%	0%	0%	22%	28%	3%	0%	0%	0%	0%	0% = 10077
Burbot (Ling cod)	0%	8%	0%	0%	0%	23%	68%	0%	0%	0%	0%	1% = 1 00%
Lake trout	0%	0%	0%	0%	0%	1%	95%	3%	0%	0%	0%	0% = 100%
Total Salmon	0%	3%	7%	5%	85%	0%	0%	0%	0%	0%	0%	0% = 100%
Salmon (non-specified)	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% □ 1 00%
Chum (Dog) salmon	0%	0%	0%	0%	1 00%	0%	0%	0%	0%	0%	0%	0% = 1 00%
Pink (Humpback) salmon	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
Silver (Coho) salmon	0%	7%	14%	10%	68%	0%	0%	0%	0%	0%	0%	0% = 100%
King (Chinook) salmon	0%	0%	0%	0%	10077	0%	0%	0%	0%	0%	0%	0% = 100%
Total Other Coastal Fish	0%	0%	0%	0%	96%	0%	1%	0%	0%	0%	0%	3% = 1 00%
Capelin	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
Rainbow Smelt	0%	0%	0%	0%	0%	0%	33%	0%	0%	0%	0%	67% = 100%
Sculpin	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Tomcod	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Arctic cod	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 1 00%
All Fish Species	0%	1%	5%	10%	1977	18%	41%	5%	0%	0%	0%	0% □ 10077

Source: Stephen R. Braund & Associates, 1989

Figure 21: Monthly Harvest of Fish

All Barrow Households, Year One Revised



Source: Stephen R. Braund & Assoc., 1989

TABLE 32: FISH HARVEST BY SPECIES AND MONTH - BARROW, YEAR TWO
(Pounds of Edible Resource Product)

SPECIES	TOTALS *****											
	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0	117	2,020	3,629	4,730	5,414	19,611	2,530	0	0	0	0
Whitefish (unspecified)	0	0	0	0	0	0	300	0	0	0	0	0
Round whitefish	0	117	117	118	117	117	117	0	0	0	0	0
Broad Whitefish (River)	0	0	1,903	3,109	4,018	4,507	9,894	1,757	0	0	0	0
Broad Whitefish (Lake)	0	0	0	0	388	80	2,130	551	0	0	0	0
Humpback whitefish	0	0	0	70	166	442	851	0	0	0	0	0
Least cisco	0	0	0	326	0	225	6,313	176	0	0	0	0
Bering, Arctic cisco	0	0	0	6	41	43	6	47	0	0	0	0
Total Other Freshwater Fish	12	19	0	279	839	3,044	3,552	539	0	0	144	0
Arctic grayling	0	0	0	268	769	2,791	2,639	0	0	0	0	0
Arctic char	0	0	0	7	58	0	0	164	0	0	0	0
Burbot (Lingcod)	12	19	0	5	12	202	680	375	0	0	144	0
Lake trout	0	0	0	0	0	52	233	0	0	0	0	0
Total Salmon	0	0	0	148	331	0	0	0	0	0	0	0
Salmon (non-specified)	0	0	0	0	18	0	0	0	0	0	0	0
Chum (Dog) salmon	0	0	0	14	14	0	0	0	0	0	0	0
Pink (Humpback) salmon	0	0	0	0	4	0	0	0	0	0	0	0
Silver (Coho) salmon	0	0	0	133	274	0	0	0	0	0	0	0
King (Chinook) salmon	0	0	0	0	21	0	0	0	0	0	0	0
Total Other Coastal Fish	0	0	0	0	0	0	1,312	409	0	0	0	0
Tomcod (Saffron Cod)	0	0	0	0	0	0	0	170	0	0	0	0
Arctic Cod	0	0	0	0	0	0	1,312	239	0	0	0	0
All Fish Species	12	136	2,020	4,056	5,901	8,458	24,475	3,478	0	0	144	0

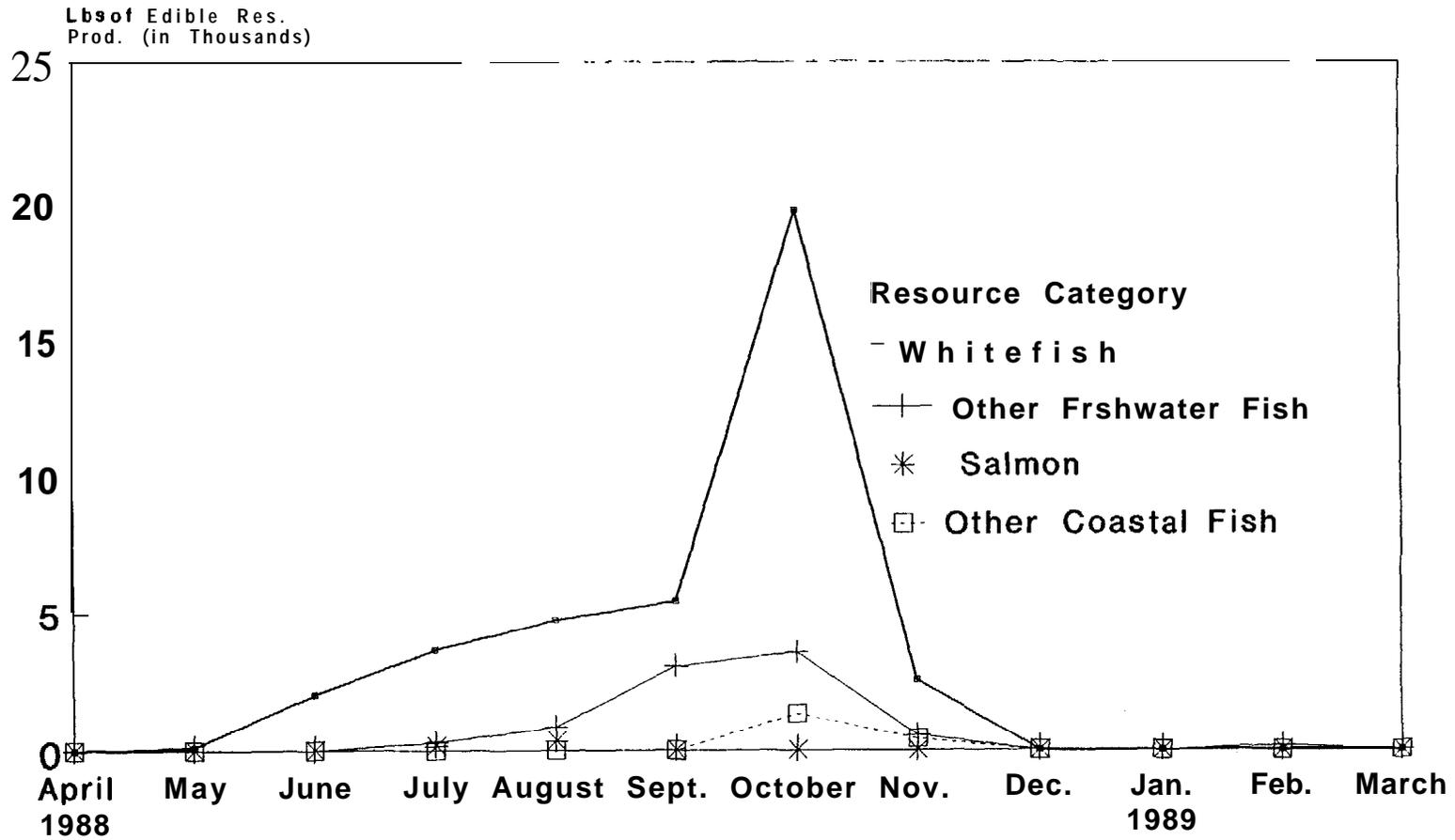
(Continued on next page)

TABLE 32, CONTINUED: FISH HARVEST BY SPECIES AND MONTH - BARROW, YEAR TWO
(Pounds of Edible Resource Product)

SPECIES	PERCENTS *****											
	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0%	0%	5%	10%	12%	14%	52%	7%	0%	0%	0%	0% = 100%
Whitefish (non-specified)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Round Whitefish	0%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17% = 100%
Broad Whitefish (River)	0%	0%	8%	12%	16%	18%	39%	7%	0%	0%	0%	0% = 100%
Broad Whitefish (Lake)	0%	0%	0%	0%	12%	3%	68%	18%	0%	0%	0%	0% = 100%
Humpback whitefish	0%	0%	0%	5%	11%	29%	56%	0%	0%	0%	0%	0% = 100%
Least cisco	0%	0%	8%	12%	16%	18%	39%	7%	0%	0%	0%	0% = 100%
Bering, Arctic cisco	0%	0%	0%	5%	0%	3%	90%	2%	0%	0%	0%	0% = 100%
Total Other Freshwater Fish	0%	0%	0%	3%	10%	36%	42%	6%	0%	0%	2%	0% = 100%
Arctic grayling	0%	0%	0%	4%	17%	43%	41%	0%	0%	0%	0%	0% = 100%
Arctic char	0%	0%	0%	3%	25%	0%	0%	72%	0%	0%	0%	0% = 100%
Burbot (Ling cod)	1%	1%	0%	0%	1%	14%	47%	26%	0%	0%	10%	0% = 100%
Lake trout	0%	0%	0%	0%	0%	18%	82%	0%	0%	0%	0%	0% = 100%
Total Salmon	0%	0%	0%	31%	69%	0%	0%	0%	0%	0%	0%	0% = 100%
Salmon (non-specified)	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
Chum (Dog) salmon	0%	0%	0%	50%	50%	0%	0%	0%	0%	0%	0%	0% = 100%
Pink (Humpback) salmon	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
Silver (Coho) salmon	0%	0%	0%	33%	67%	0%	0%	0%	0%	0%	0%	0% = 100%
King (Chinook) salmon	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
Total Other Coastal Fish	0%	0%	0%	0%	0%	0%	76%	24%	0%	0%	0%	0% = 100%
Tomcod (Saffron Cod)	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0% = 100%
Arctic Cod	0%	0%	0%	0%	0%	0%	85%	15%	0%	0%	0%	0% = 100%
All Fish Species	0%	0%	4%	8%	1%	17%	50%	7%	0%	0%	0%	0% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 22: Monthly Harvest of Fish
All Barrow Households, Year Two



Source: Stephen R. Braund & Assoc., 1989

TABLE 33: FISH HARVEST BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Number Harvested)

SPECIES	1987						1988					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0	117	1,438	1,783	5,515	3,647	14,044	1,400	0	0	0	0
Whitefish (non-specified)			117	785	1,850	1,101	1,230	94				
Round Whitefish			703		300	342	714	21				
Broad Whitefish (River)		117	468	847	3,064	1,120	2,583	1,074				
Broad Whitefish (Lake)						398	582	211				
Humpback whitefish			150	150	244	624	1,010					
Least cisco					59	15	6,696					
Bering, Arctic cisco				1		47	1,230					
Total Other Freshwater Fish	0	99	316	248	981	0	7,731	4	0	0	0	12
Arctic grayling			316	248	971	3,358	6,933					
Arctic char		17			8	10	1					
Burbot (Ling cod)		82			1	234	700					12
Lake trout						1	97	4				
Salmon	0	6	12	8	145	0	0	0	0	0	0	0
Salmon (non-specified)					64							
Chum (Dog) salmon					5							
Pink (Humpback) salmon					17							
Silver (Coho) salmon		6	12	8	55							
King (Chinook) salmon					4							
Total Other Coastal Fish	0	0	0	0	3,351	0	48	0	0	0	0	95
Capelin					3,351							
Rainbow Smelt							48					95
Sculpin												
Tomcod												
Arctic Cod												

Source: Stephen R. Braund & Associates, 1989

TABLE 34: FISH HARVEST BY SPECIES AND MONTH - BARROW, YEAR TWO
(Number Harvested)

SPECIES	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0	117	878	1,721	1,946	2,388	11,510	1,087	0	0	0	0
Whitefish (non-specified)	0	0	0	0	0	0	150	0	0	0	0	0
Round Whitefish	0	117	117	118	117	117	117	0	0	0	0	0
Broad Whitefish	0	0	761	1,244	1,607	1,803	3,958	703	0	0	0	0
Broad Whitefish (Lake)	0	0	0	0	114	23	627	162	0	0	0	0
Humpback whitefish	0	0	0	28	67	177	340	0	0	0	0	0
Least cisco	0	0	0	326	0	225	6,313	176	0	0	0	0
Bering, Arctic cisco	0	0	0	6	41	43	6	47	0	0	0	0
Total Other Freshwater Fish	3	5	0	339	985	3,552	3,527	155	0	0	36	0
Arctic grayling	0	0	0	335	961	3,488	3,299	0	0	0	0	0
Arctic char	0	0	0	2	21	0	0	59	0	0	0	0
Burbot (Lingcod)	3	5	0	1	3	50	169	97	0	0	36	0
Lake trout	0	0	0	0	0	13	58	0	0	0	0	0
Salmon	0	0	0	25	53	0	0	0	0	0	0	0
Salmon (non-specified)	0	0	0	0	3	0	0	0	0	0	0	0
Chum (Dog) salmon	0	0	0	2	2	0	0	0	0	0	0	0
Pink (Humpback) salmon	0	0	0	0	1	0	0	0	0	0	0	0
Silver (Coho) salmon	0	0	0	22	46	0	0	0	0	0	0	0
King (Chinook) salmon	0	0	0	0	1	0	0	0	0	0	0	0
Total Other Coastal Fish	0	0	0	0	0	0	6,558	1,366	0	0	0	0
Tomcod (Saffron Cod)	0	0	0	0	0	0	0	170	0	0	0	0
Arctic Cod	0	0	0	0	0	0	6,558	1,196	0	0	0	0

Source: Stephen R. Braund & Associates, 1989

Burbot were caught during eight different months of the year and were the only species recorded during the December through March period. Finally, cod were hooked in large numbers through the ice in front of town in October and early November in Year Two. In Year One, the ice did not freeze over in front of town until right around Thanksgiving. Thus, few cod were caught by residents and none were recorded for study households.

Though fish were the third most important resource group in terms of total pounds harvested, they contributed only 10.5 percent of the total harvest in Year One and 8.2 percent in Year Two. Based on study team field observations, the contribution of locally caught fish to residents' diet is likely greater than indicated by the data. Several considerations must be kept in mind when assessing the importance of contemporary fish harvests in Barrow:

- o Dog teams, traditionally recipients of a portion of the fish harvest, are no longer common in Barrow. Of the approximately five dog teams in Barrow during Year One, field research determined that fish were not the main item in their diet. Thus, virtually all fish harvests in Year One were intended for human consumption.
- o Fish harvest estimates are recalled less accurately than the estimates for larger species such as caribou, seals, or even geese and ducks. Large numbers of fish often are harvested in a short period (e. g., 3 two week-long fall fishing trip in October) and a harvester's estimate of his catch is often a best guess. In addition, the delineation of individual species is more difficult with fish. A single pull of the net in any of the local river systems could yield four or five different species of fish, (e.g., broad whitefish, humpback whitefish, least cisco, and grayling). Char, salmon, arctic cisco, round whitefish, and burbot also could be caught in any of the local drainages. The total number of fish harvested in each of the four major fish categories is more reliable than the number of individual species recorded.
- o Some of the most active fishermen were the least candid about the amount of fish they harvested. Fish harvests, unlike any other local food resource, involve the participation of local households which,

year after year, are consistent and major suppliers of the resource, Primarily five or six families, each with two or more camps spread out over the major river systems within the Barrow study area, attempted to catch enough fish to supply their extended families, to make generous contributions to the Thanksgiving and Christmas feasts, and to supply fish to those who desired them throughout the year. These families contributed a significant proportion of the total Year One community fish harvest. Three of these highly productive fishing households participate in this study with differing degrees of enthusiasm.

- o The researchers and the study participants have both become more specific and in some ways more accurate in the recording of the study household's share of the harvest. This is especially true with fish and is evident in the large decrease in the number of fish in the non-specified whitefish category in Year Two. This is not to say that the Year Two estimate is closer to the "real" Barrow fish harvest; rather, the distribution of catch between species is likely more accurate in Year Two.
- o Finally, an unknown quantity of fish were imported from nearby North Slope villages: arctic cisco from Nuiqsut, rainbow smelt from Wainwright, and broad whitefish and burbot from Atqasuk. Although fish harvest data were recorded when a study household member traveled to a North Slope village and actually participated in fish harvests, fish obtained through sharing, gifting or barter were not reflected in the harvest estimates. Field observations indicated that the latter means of obtaining fish were common during the first two years of study.

There are also two species-specific considerations about the fisheries data set to keep in mind:

- o For this study the researchers have differentiated between broad whitefish caught from rivers and those caught from lakes. This was done both because of the size difference, with the lake caught fish

estimated to be at least 25 percent larger on the average, and because local people recognize them as being different both in size and flavor.

- o The identification of coho (silver) salmon and chum (dog) salmon was difficult during the harvest discussions since both species are often referred to locally as "silver salmon." Additionally, most of the salmon catch occurred very near the ocean, either in lagoons or near river mouths, at a time when sea-run chums and silvers still looked very similar. The approach of the researchers was to probe for an individual salmon species when the reported catch was "salmon." If "silver salmon" was the response the researcher asked the fishermen if the salmon were the coho or the chum species. The final response recorded would then be "silver", "chum" or "unspecified." Due to the local nomenclature there was likely a tendency towards over-reporting of silver salmon and under-reporting of chums. However, the study team did not "second guess" fish reports and they are presented as reported. According to Craig and LGL (1987: 10), along the coastline of the northeastern Chukchi Sea, "pink salmon are the most common species, accounting for 85 percent of all salmon caught in biological surveys from 1970 to 1984, followed by chum salmon (13 percent)."

Maps 22 and 24 illustrate all the fish harvest locations recorded during Year Two, while maps 23, 25, and 26 display sites recorded in both Years One and Two. Maps 22 and 23 show harvest locations for all fish species as well as lifetime community fish harvest areas (based on Pedersen 1979). Contemporary fish harvest locations are very similar to those recorded in the 1970s. Notable exceptions are the concentrated harvest areas east of Atqasuk and fish sites higher in the Ikpikpuk drainage than documented in the previous research. In addition, some of the use area "islands" defined from Pedersen's (1979) research were not successful harvest areas for the study households in Years One and Two. However, Barrow residents not in this study may have harvested fish in those areas during the last two years.

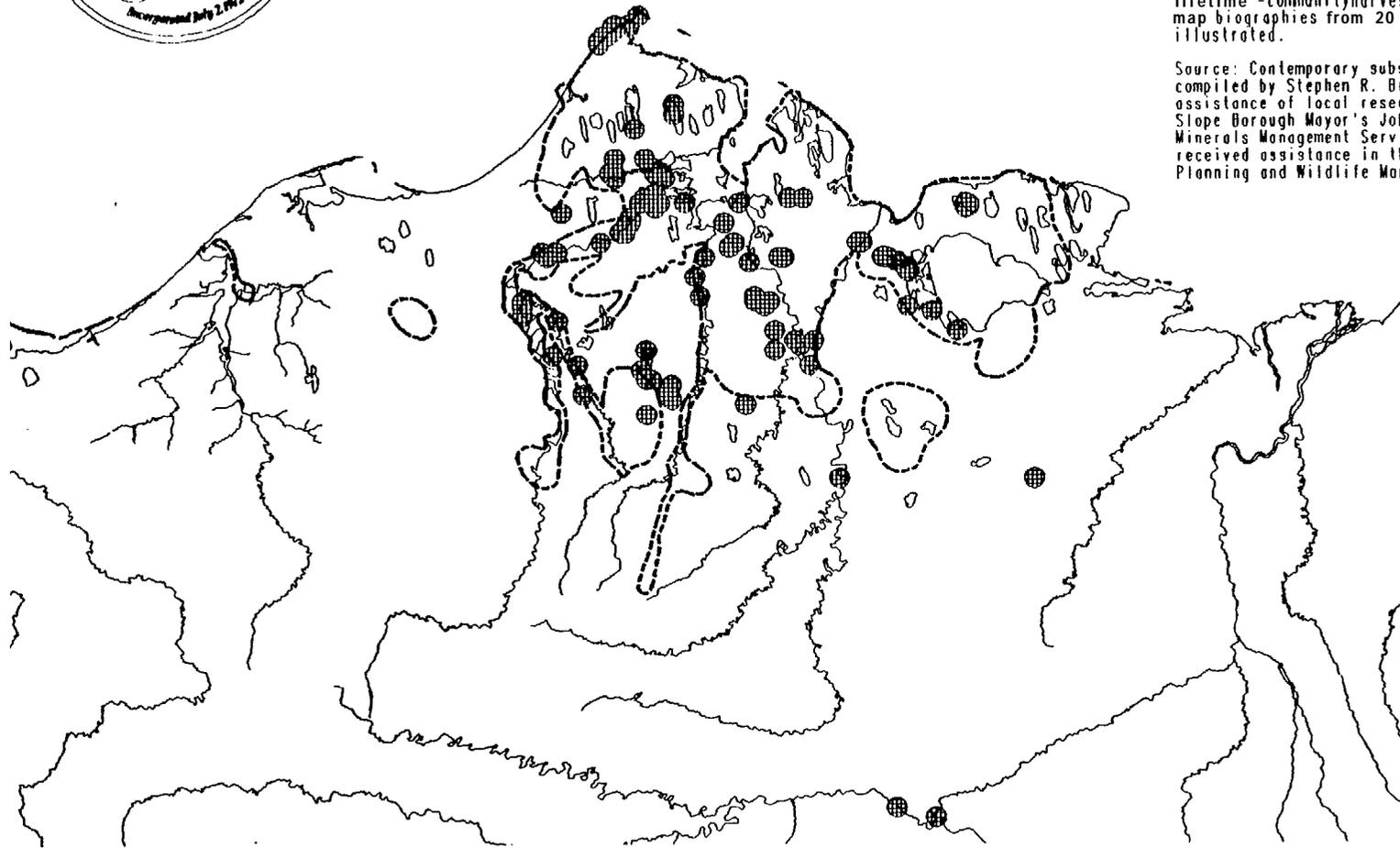
Maps 24 and 25 focus on the primary harvest locations for the current study, illustrating fish harvest sites by species groups. The maps clearly show the orientation of Barrow fish harvests to the major rivers. Lake harvests were associated with Teshekpuk Lake, large lakes between Barrow and the Inaru River.

MAP 22
 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
 FISH HARVEST SITES - ALL SPECIES



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989. Year two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study. Lifetime -community harvest areas, collected in the form of map biographies from 20 households (Pedersen 1979), are also illustrated.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braued and Associates (SRBA) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SRBA is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

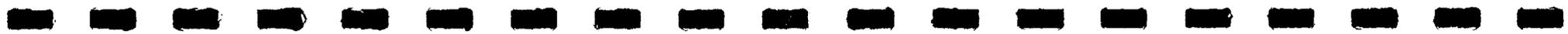


LEGEND INFORMATION

-  Lifetime community land use (Pedersen 1979).
-  All Fish Species
 - Whitefish
 - Round whitefish,
 - brood whitefish,
 - humpback whitefish,
 - least cisco,
 - arctic cisco
 - Other Freshwater Fish
 - Grayling, arctic char, burbot, lake trout
 - Salmon
 - Chum, pink, silver, king
 - Other Coastal Fish
 - Tomcod, arctic cod, sculpin



Map Production: North Slope Borough GIS 25 0 25 50 75 100 125
 Date: June 26, 1989
 MILES

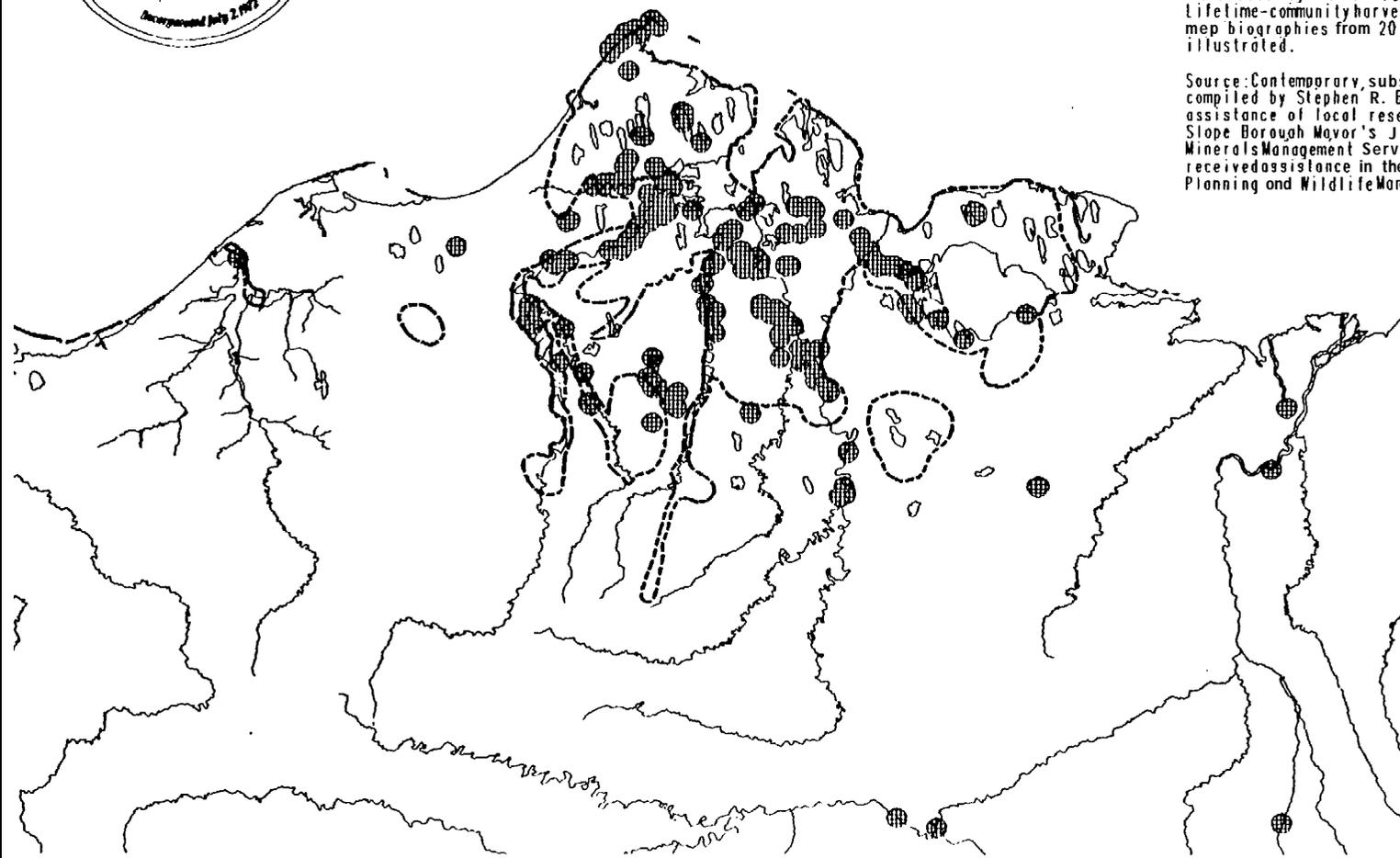


MAP 23
 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
 FISH HARVEST SITES - ALL SPECIES: YEARS ONE AND TWO



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study. Lifetime-community harvest areas, collected in the form of map biographies from 20 households (Pedersen 1979), are also illustrated.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Brund and Associates (SRB&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SRB&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION

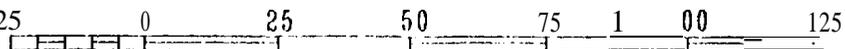
 lifetime community land use (Pedersen 1979)

 All Fish Species
 - Whitefish
 Round whitefish,
 broad whitefish,
 humpback whitefish,
 least cisco,
 arctic cisco
 - Other Freshwater Fish
 Grayling, arctic
 char, burbot, lake
 trout, northern pike
 - Salmon
 Chum, pink,
 silver, king
 - Other Coastal Fish
 tomcod, sculpin,
 arctic cod,
 rainbow smelt



Map Production: North Slope Borough GIS 25

Date: June 26, 1989



MILES

MAP 24 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO FISH HARVEST SITES BY SPECIES GROUPS

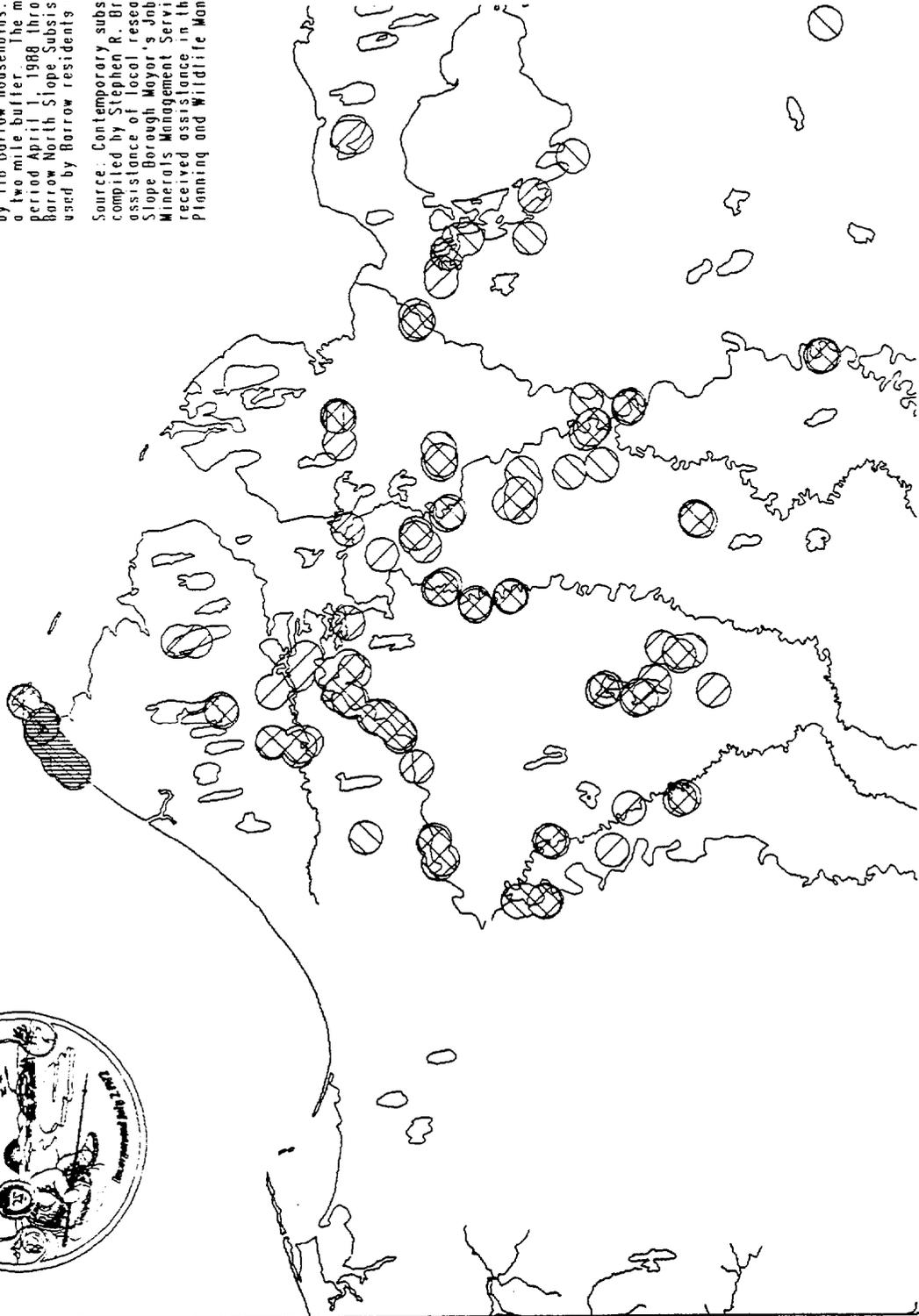


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two-mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989. Year two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

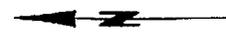
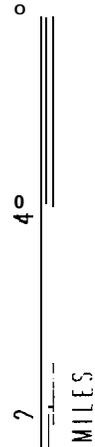
Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

- 
 - Whitefish
 Round whitefish, brood
 whitefish, humpback
 whitefish, least cisco,
 arctic cisco
- 
 Other Freshwater Fish
 Grayling, arctic char,
 burbot, lake trout
- 
 Salmon
 Chum, pink,
 silver, king
- 
 Other Coastal Fish
 Tomcod, arctic cod,
 sculpin



Map Production: North Slope Borough GIS
 Date: June 26, 1989



MAP 25 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO FISH HARVEST SITES BY SPECIES GROUPS: YEARS ONE AND TWO

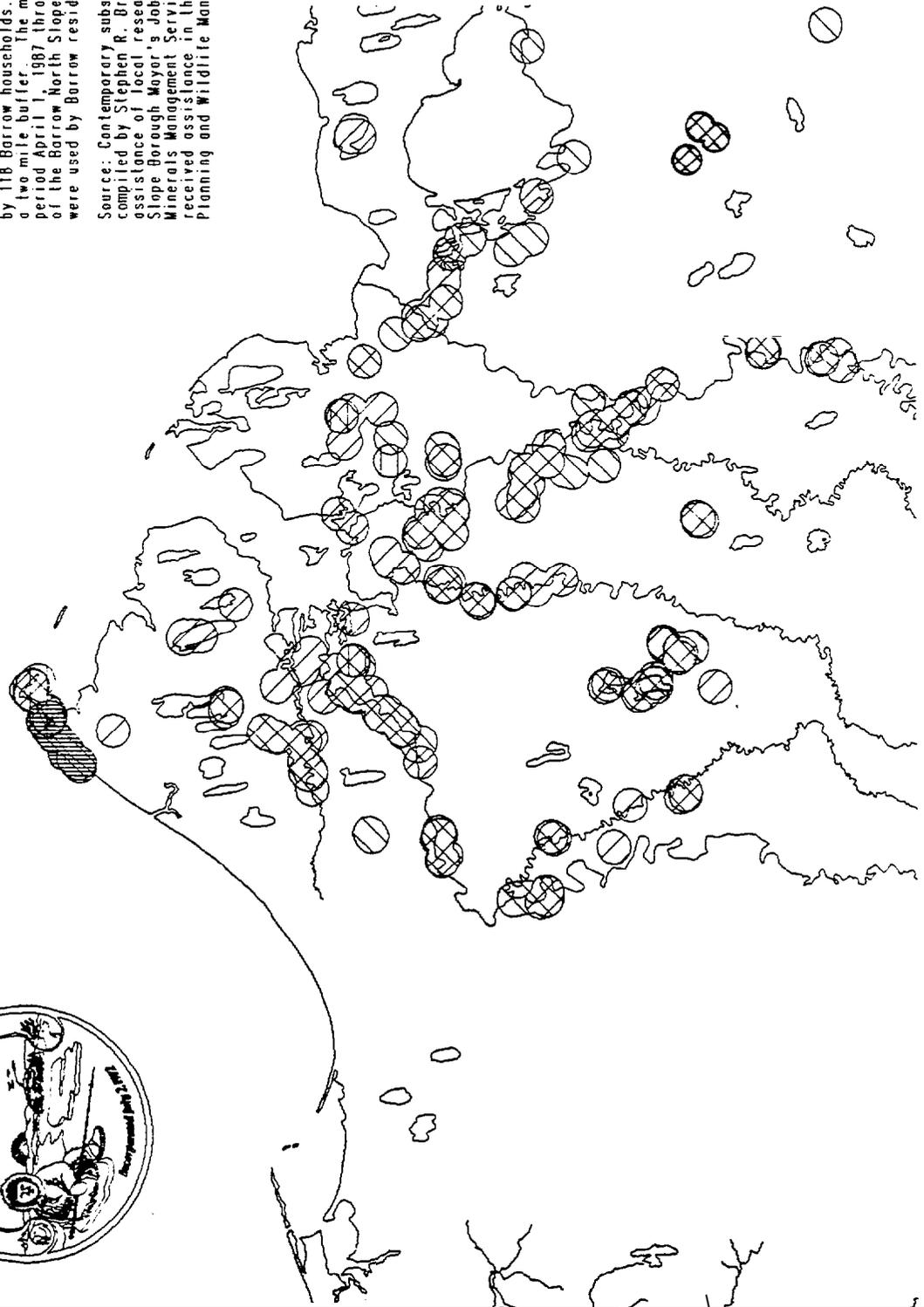


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SRB&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SRB&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

-  - Whitefish
Round whitefish, broad whitefish, humpback whitefish, least cisco, arctic cisco
-  - Other Freshwater Fish
Grayling, arctic char, burbot, lake trout, northern pike
-  - Salmon
Chum, pink, silver, king
-  - Other Coastal Fish
Tanner, arctic cod, sculpin, capelin, rainbow smelt



Map Production: North Slope Borough GIS

Date: June 26, 1989

MAP 26
NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR T °
FIXED CABIN SITES AND FISH HARVEST SITES
YEARS ONE AND TWO



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Ground and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

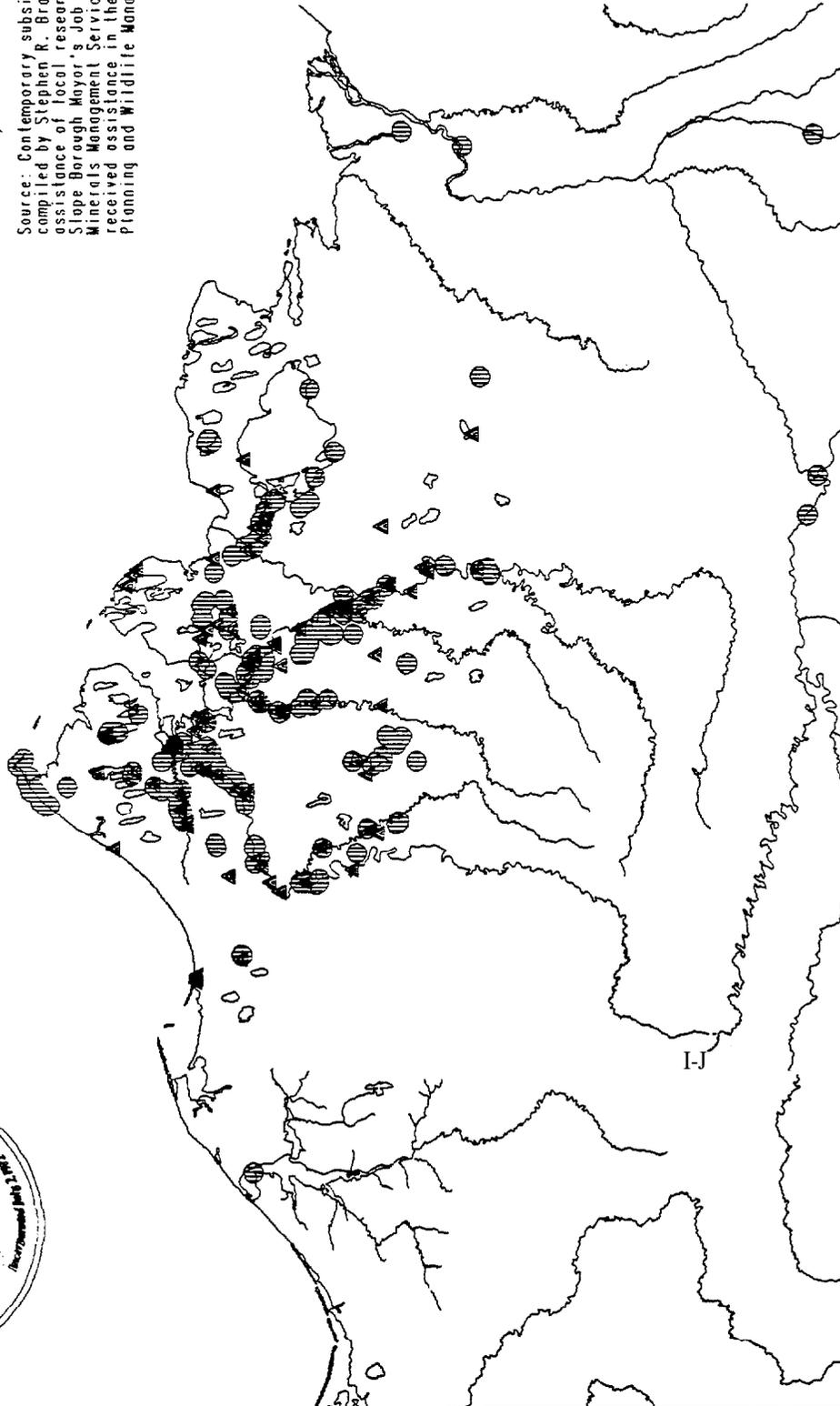
LEGEND INFORMATION



Fish harvest locations



Cabins and fixed camps
(April & May/June 1986)



Map Production: North Slope Borough GIS 25 0 25 50 75 100 125
 Date: June 26, 1989
 MILES

and numerous small lakes often located near river-based fish sites. Harvest locations that do not appear to be near water are associated with small rivers and lakes not shown on the map. Successful coastal fishing sites were few, primarily occurring in the vicinity of Barrow, in Elson Lagoon and in Admiralty Bay. Species caught in the ocean and adjacent bays and lagoons include species from all four major fish groups.

Whitefish and other freshwater fish were harvested throughout the primary use area. Additionally, three Year One fish harvest sites are not shown on Map 25 due to the enlarged scale of this map. Grayling, arctic cisco, and non-specified whitefish were harvested at two locations near Nuiqsut and a grayling harvest was recorded due south of the above harvests on a tributary of the Colville River. These harvests are the three easternmost sites depicted on Map 23. The two southernmost sites depicted on Map 22 but not visible on Map 24 represent grayling and char harvested during Year Two.

Map 26 clearly illustrates the association between the fixed cabin sites in the Barrow area and the majority of fish harvest sites.

Tables 35 through 37 and figures 23 and 24 display the average harvest data for the two years of study. Fish provide 9.5 percent of the total community harvest while whitefish provided the bulk of the Barrow fish harvest (78 percent). October was the most important month on average in terms of total pounds harvested. The data documents a steady increase in fish harvests during the May through October period, however the June fishery may be slightly more important than is represented by the data, being five percent of the average fish harvest. The June harvest is a very specialized fishery carried out by a small number of households, providing the first fresh fish of the season to the community. This fishery is also significant in that it provides the first dried fish, a very popular local food. Whitefish are reportedly caught in large numbers by households not fully participating in the study.

The other freshwater fish, primarily grayling, were caught almost exclusively in September and October, with 85 percent of the grayling caught in those months. Salmon are a summer species available in low numbers in the Barrow area. Finally, the small coastal fish were harvested when available, in August for the capelin, and in October and November for the arctic cod and tomcod. Smelt were harvested at Wainwright in October.

TABLE 35: AVERAGE HARVEST ESTIMATES FOR FISH - ALL BARROW HOUSEHOLDS, YEARS ONE & TWO (1)

RESOURCE	CONVERSION	AVERAGE POUNDS				SAMPLING STATISTICS						
	FACTOR (2)	COMMUNITY TOTALS		HARVESTED		PERCENT	SAMPLING					
	(Edible Weight Per Resource in lbs)	NUMBER HARVESTED	EDIBLE HARVESTED POUNDS	PER HOUSEHOLD	PER CAPITA	PERCENT OF TOTAL EDIBLE HARVESTED	OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	STANDARD DEVIATION (lbs)	SAMPLING ERROR AT 95% (lbs)	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN
Total Fish	n/a	n/a	58,825	62.78	19.5	9.5%	25.1%	6	12	50.29	75.27	20%
Total Whitefish		23,797	45,604	48.67	15.1	7.3%	16.7%	5	9	39.57	57.77	19%
Whitefish (non- specif.)	2.0	2,663	5,326	5.69	1.8	0.9%	2.0%	1	2	3.48	7.89	39%
Round Whitefish	1.0	1,392	1,392	1.49	0.5	0.2%	9.0%	0	1	0.75	2.22	
Broad Whitefish (River)	2.5	9,674	24,184	25.81	8.0	3.9%	6.0%	3	6	19.92	31.70	23%
Broad Whitefish (Lake)	3.4	1,059	3,599	3.84	1.2	0.6%	2.8%	1	2	2.17	5.51	44%
Humpback whitefish	2.5	1,395	3,488	3.72	1.2	0.6%	5.4%	1	3	1.12	6.33	70%
Least cisco	1.0	6,905	6,905	7.37	2.3	1.1%	2.5%	2	3	4.25	10.49	42%
Bering, Arctic cisco	1.0	710	710	0.76	0.2	0.1%	6.8%	0	0	0.39	1.13	49%
Total Other Frshwter Fish		10,797	11,259	12.02	3.7	1.8%	12.9%	3	5	7.01	17.02	42%
Arctic grayling	0.8	9,955	7,964	8.50	2.6	1.3%	7.1%	7	13	0.00	21.31	151%
Arctic char	2.8	59	166	0.18	*	**	4.4%	0	0	0.08	0.27	55%
Burbot(Ling cod)	4.0	695	2,781	2.97	0.9	0.4%	3.9%	1	2	1.13	4.81	62%
Northern pike	2.3	1	3	0.00	*	**	0.5%	0	0	0.00	0.00	52%
Lake trout	4.0	87	346	0.37	0.1	0.1%	0.5%	0	0	0.23	0.51	38%
Total Salmon		124	752	0.80	0.2	0.1%	1.2%	0	0	0.41	1.19	45%
Salmon (non-specified)	6.1	34	206	0.22	0.1	**	0.2%	0	0	0.10	0.33	52%
Chum (Dog) salmon	6.1	5	30	0.03	*	**	0.5%	0	0	0.00	0.06	99%
Pink (Humpback) salmon	3.1	9	28	0.03	*	**	0.3%	0	0	0.01	0.05	68%
Silver (Coho) salmon	6.0	74	446	0.48	0.1	0.1%	1.3%	0	0	0.12	0.83	75%
King (Chinook) salmon	18.0	2	42	0.05	*	**	0.3%	0	0	0.00	0.20	347%
Total Other Coastal Fish		5,709	1,210	1.29	*	**	4.0%	0	0	0.90	1.68	30%
Capelin	0.2	1,676	335	0.36	*	**	3.4%	0	1	0.00	0.98	174%
Rainbow smelt	0.2	71	14	0.02	*	**	0.1%	0	0	0.01	0.02	55%
Arctic cod	0.2	3,877	775	0.83	0.3	0.1%	0.2%	0	1	0.30	1.35	64%
Tom cod	1.0	85	85	0.09	*	**	0.6%	0	0	0.00	0.26	187%

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

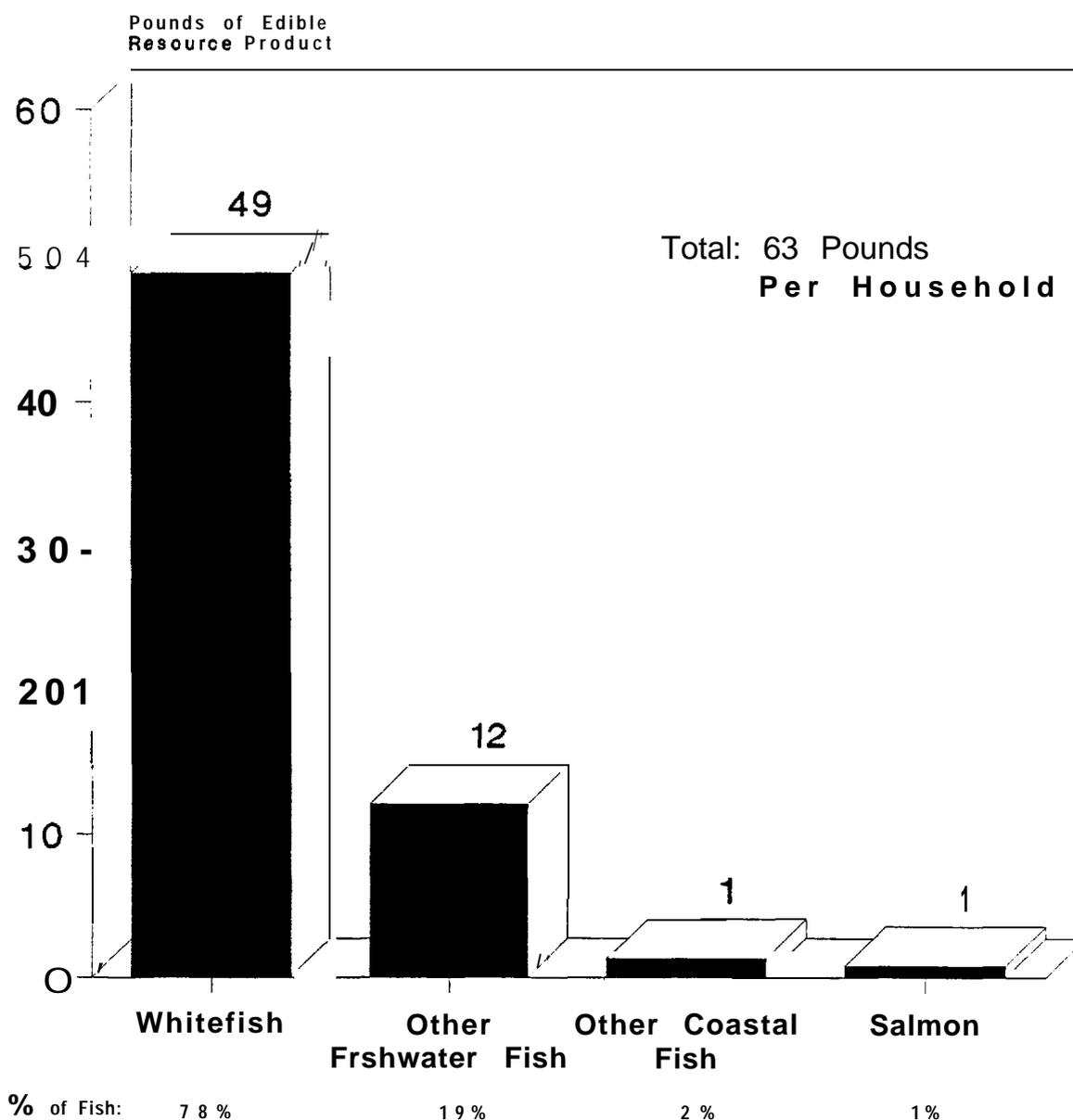
* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Source: Stephen R. Braund & Associates, 1989

Figure 23: Harvest of Fish
 All Barrow Households, Years One & Two
 (Mean Edible Pounds Per Household)



Source: Stephen R. Braund & Assoc., 1989

TABLE 36: AVERAGE FISH HARVEST BY SPECIES AND MONTH - BARROW, YEARS ONE & TWO
(Pounds of Edible Resource Product)

TOTALS

SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0	322	2,636	5,194	7,780	6,995	19,699	2,977	0	0	0	0
Whitefish (unspecified)	0	117	501	2,133	1,101	1,230	244	0	0	0	0	0
Round Whitefish	0	59	410	59	208	230	415	11	0	0	0	0
Broad Whitefish (River)	0	146	1,537	2,613	5,839	3,653	8,175	2,221	0	0	0	0
Broad Whitefish (Lake)	0	0	0	0	194	717	2,054	634	0	0	0	0
Humpback Whitefish	0	0	188	223	388	1,001	1,689	0	0	0	0	0
Least cisco	0	0	0	163	29	120	6,505	88	0	0	0	0
Bering, Arctic cisco	0	0	0	4	20	45	618	23	0	0	0	0
Total Other Freshwater Fish	6	197	126	239	822	3,350	6,147	276	0	0	72	24
Arctic grayling	0	0	126	233	773	2,738	4,093	0	0	0	0	0
Arctic char	0	24	0	3	41	14	2	82	0	0	0	0
Burbot (Ling cod)	6	173	0	2	8	569	1,739	187	0	0	72	24
Northern Pike	0	0	0	0	0	0	3	0	0	0	0	0
Lake trout	0	0	0	0	0	28	311	7	0	0	0	0
Total Salmon	0	18	35	98	601	0	0	0	0	0	0	0
Salmon (non-specified)	0	0	0	0	206	0	0	0	0	0	0	0
Chum (Dog) salmon	0	0	0	7	23	0	0	0	0	0	0	0
Pink (Humpback) salmon	0	0	0	0	28	0	0	0	0	0	0	0
Silver (Coho) salmon	0	18	35	91	302	0	0	0	0	0	0	0
King (Chinook) salmon	0	0	0	0	42	0	0	0	0	0	0	0
Total Other Coastal Fish	0	0	0	0	335	0	661	205	0	0	0	9
Capelin	0	0	0	0	335	0	0	0	0	0	0	0
Rainbow Smelt	0	0	0	0	0	0	5	0	0	0	0	9
Tomcod	0	0	0	0	0	0	0	85	0	0	0	0
Arctic cod	0	0	0	0	0	0	656	120	0	0	0	0
All Fish Species	6	537	2,797	5,531	9,538	10,345	26,507	3,458	0	0	72	33

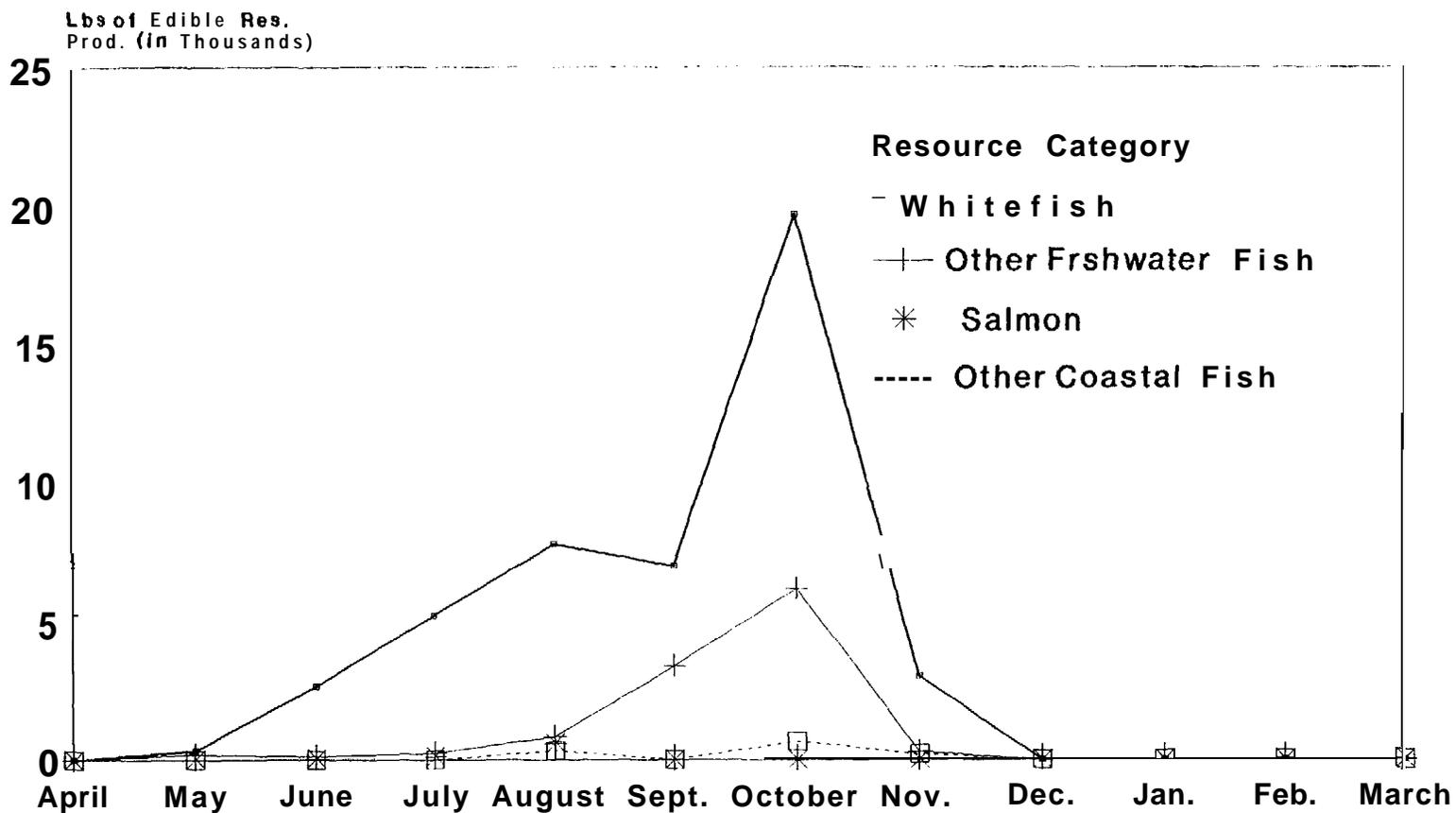
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TABLE 36, CONTINUED: AVERAGE FISH HARVEST BY SPECIES AND MONTH - BARROW, YEARS ONE & TWO
(Pounds of Edible Resource Product)

SPECIES	PERCENTS											
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0%	1%	6%	11%	17%	15%	43%	7%	0%	0%	0%	0% = 100%
Whitefish (non-specified)	0%	1%	6%	11%	17%	15%	43%	7%	0%	0%	0%	0% = 100%
Round Whitefish	0%	4%	29%	4%	15%	17%	30%	1%	0%	0%	0%	0% = 100%
Broad Whitefish (River)	0%	1%	6%	11%	24%	15%	34%	9%	0%	0%	0%	0% = 100%
Broad Whitefish (Lake)	0%	0%	0%	0%	5%	20%	57%	18%	0%	0%	0%	0% = 100%
Humpback Whitefish	0%	0%	5%	6%	11%	29%	48%	0%	0%	0%	0%	0% = 100%
Least cisco	0%	1%	6%	11%	24%	15%	34%	9%	0%	0%	0%	0% = 100%
Bering, Arctic cisco	0%	0%	0%	2%	0%	2%	94%	1%	0%	0%	0%	0% = 100%
Total Other Freshwater Fish	0%	2%	1%	2%	7%	30%	55%	2%	0%	0%	1%	0% = 100%
Arctic grayling	0%	0%	2%	3%	10%	34%	51%	0%	0%	0%	0%	0% = 100%
Arctic char	0%	14%	0%	2%	24%	9%	1%	49%	0%	0%	0%	0% = 100%
Burbot (Ling cod)	0%	6%	0%	0%	0%	20%	63%	7%	0%	0%	3%	1% = 100%
Northern Pike	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0% = 100%
Lake trout	0%	0%	0%	0%	0%	8%	90%	2%	0%	0%	0%	0% = 100%
Total Salmon	0%	2%	5%	13%	80%	0%	0%	0%	0%	0%	0%	0% = 100%
Salmon (non-specified)	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
Chum (Dog) salmon	0%	0%	0%	24%	76%	0%	0%	0%	0%	0%	0%	0% = 100%
Pink (Humpback) salmon	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
Silver (Coho) salmon	0%	4%	8%	20%	68%	0%	0%	0%	0%	0%	0%	0% = 100%
King (Chinook) salmon	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
Total Other Coastal Fish	0%	0%	0%	0%	28%	0%	55%	17%	0%	0%	0%	1% = 100%
Capelin	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0% = 100%
Rainbow Smelt	0%	0%	0%	0%	0%	0%	33%	0%	0%	0%	0%	67% = 100%
Tomcod	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0% = 100%
Arctic cod	0%	0%	0%	0%	0%	0%	85%	15%	0%	0%	0%	0% = 100%
All Fish Species	0%	1%	5%	9%	16%	18%	45%	6%	0%	0%	0%	0% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 24: Monthly Harvest of Fish
All Barrow Households, Years One and Two



Source: Stephen R. Braund & Assoc., 1989

TABLE 37: AVERAGE FISH HARVEST BY SPECIES AND MONTH - BARROW, YEARS ONE & TWO
(Number Harvested)

SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0	117	1,158	1,752	3,731	3,018	12,777	1,244	0	0	0	0
Whitefish (non-specified)	0	0	59	393	925	551	690	47	0	0	0	0
Round Whitefish	0	59	410	59	208	230	415	11	0	0	0	0
Broad Whitefish (River)	0	59	615	1,045	2,335	1,461	3,270	888	0	0	0	0
Broad Whitefish (Lake)	0	0	0	0	57	211	604	186	0	0	0	0
Humpback Whitefish	0	0	75	89	155	401	675	0	0	0	0	0
Least cisco	0	0	0	163	29	120	6,505	88	0	0	0	0
Bering, Arctic cisco	0	0	0	4	20	45	618	23	0	0	0	0
Total Other Freshwater Fish	2	52	158	293	983	3,577	5,630	79	0	0	18	6
Arctic grayling	0	0	158	291	966	3,423	5,116	0	0	0	0	0
Arctic char	0	9	0	1	14	5	1	29	0	0	0	0
Burbot(Ling cod)	2	43	0	1	2	142	435	48	0	0	18	6
Northern pike	0	0	0	0	0	0	1	0	0	0	0	0
Lake trout	0	0	0	0	0	7	78	2	0	0	0	0
Salmon	0	3	6	16	99	0	0	0	0	0	0	0
Salmon (non-specified)	0	0	0	0	34	0	0	0	0	0	0	0
Chum (Dog) salmon	0	0	0	1	4	0	0	0	0	0	0	0
pink (Humpback) salmon	0	0	0	0	9	0	0	0	0	0	0	0
Silver(Coho) salmon	0	3	6	15	50	0	0	0	0	0	0	0
King (Chinook) salmon	0	0	0	0	2	0	0	0	0	0	0	0
Total Other Coastal Fish	0	0	0	0	1,676	0	3,303	683	0	0	0	47
Capelin	0	0	0	0	1,676	0	0	0	0	0	0	0
Rainbow Smelt	0	0	0	0	0	0	24	0	0	0	0	47
Tomcod	0	0	0	0	0	0	0	85	0	0	0	0
Arctic Cod	0	0	0	0	0	0	3,279	598	0	0	0	0

BIRDS

The estimated harvest of birds was very similar in the two study years, with a Year Two harvest that was 179 pounds less than the previous year (tables 38 and 39). The average harvest per household was 23 pounds and the per capita (per person) harvest was seven pounds. The bird harvest contributed three to four percent of the total edible pounds harvested by the community in each year. Approximately one-third of all Barrow households (33.9 percent in Year One and 31.7 percent in Year Two) had a household member who participated in a successful bird harvest.

In numbers, more eiders were harvested in both years than any other bird. However in pounds, a majority of the harvest was geese. The estimated geese harvest increased by approximately 15 percent in Year Two. Sixty-six percent of the bird harvest (in pounds) was contributed by geese in Year Two compared to 56 percent in Year One (Figures 25 and 26). During the second year of the study, 91 percent of the geese harvested were white-fronted geese, compared with 83 percent in Year One. The "non-specified" geese category confounds the species-specific geese estimates somewhat. The researchers estimate that most of the non-specified geese were white-fronted geese and that the Year One geese harvest was likely 91 to 94 percent white-fronted geese.

Brant were the second most commonly reported geese harvest. Brant harvests increased in Year Two with an estimated 213 brant harvested compared with 120 the year before. Brant contributed approximately seven percent of the geese harvest (in number of birds harvested) and five percent of the geese harvest by weight.

Approximately 18 to 19 percent of all Barrow households had someone who participated in a successful goose harvest in each year. The reader is reminded that approximately 53 percent of all Barrow households were classified as Native households by the 1988 Barrow census (see Table 2). Field observations attest to spring goose hunting being a strictly Native subsistence activity; therefore, a more appropriate participation figure is that

TABLE 38: HARVEST ESTIMATES FOR BIRDS - ALL BARROW HOUSEHOLDS, YEAR ONE REVISED (1)

RESOURCE	CONVERSION FACTOR (2) (Edible Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL EDIBLE POUNDS HARVESTED	PERCENT OF ALL BARROW HOUSEHOLDS HARVESTING RESOURCE	STANDARD DEVIATION (lbs)	SAMPLING STATISTICS			
		NUMBER HARVESTED	EDIBLE POUNDS HARVESTED	PER HOUSEHOLD	PER CAPITA				SAMPLING ERROR AT 95% (lbs)	LOW ESTIMATE (Mean 1 bs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN
Total Birds	ala	n/a	21,613	23.07	7.2	3.3%	33.9%	6	11	12.11	34.02	47%
Total Geese		2,724	12,078	12.89	4.0	1.8%	18.8%	3	6	7.14	18.64	45%
Geese (non- specified)	4.5	334	1,502	1.60	0.5	0.2%	2.6%	1	1	0.48	2.73	70%
Brant	3.0	120	360	0.38	0.1	0.1%	2.2%	0	0	0.19	0.58	51%
White-fronted geese	4.5	2,270	10,216	10.90	3.4	1.6%	15.3%	3	6	5.16	16.64	53%
Total Eider		5,208	7,812	8.34	2.6	1.2%	20.6%	3	6	2.19	14.49	74%
Eider (non-specified)	1.5	5,098	7,647	8.16	2.5	1.2%	19.9%	3	6	2.01	14.31	75%
Common eider	1.5	18	27	0.03	*	**	0.4%	0	0	0.01	0.05	73%
King eider	1.5	90	134	0.14	*	**	0.7%	0	0	0.06	0.23	59%
Spectacle eider	1.5	2	3	0.00	*	**	0.1%	0	0	0.00	0.01	76%
Ptarmigan	0.7	2,297	1,608	1.72	0.5	0.2%	15.2%	1	1	0.57	2.86	67%
Other ducks (non- sepcif.)	1.5	77	116	0.12	*	**	2.9%	0	0	0.00	0.29	133%

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

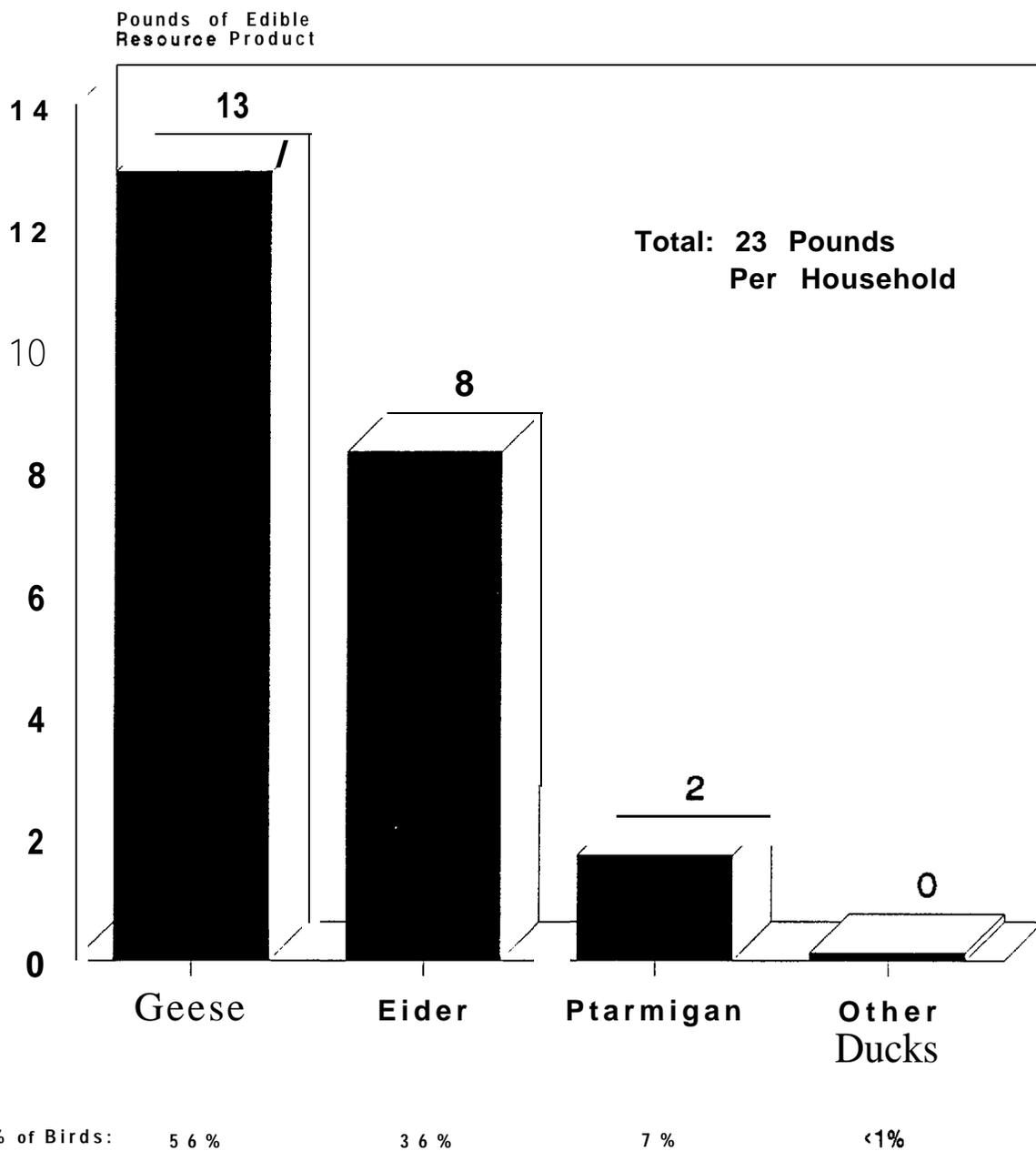
(2) See Table A-4 for sources of conversion factors.

* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Figure 25: Harvest of Birds
 All Barrow Households, Year One Revised
 (Mean Edible Pounds Per Household)



Source: Stephen R. Braund & Assoc., 1989

TABLE 39: HARVEST ESTIMATES FOR BIRDS - ALL BARROW HOUSEHOLDS, YEAR TWO (1)

RESOURCE	CONVERSION	AVERAGE POUNDS				SAMPLING STATISTICS						
	FACTOR (2)	COMMUNITY TOTALS		HARVESTED		PERCENT		SAMPLING STATISTICS				
	(Edible Weight Per Resource in lbs)	NUMBER HARVESTED	EDIBLE POUNDS HARVESTED	PER HOUSEHOLD	PER CAPITA	PERCENT OF TOTAL EDIBLE POUNDS HARVESTED	PERCENT OF ALL BARROW HOUSEHOLDS HRVSTING RESOURCE	STANDARD DEVIATION (lbs)	SAMPLING ERROR AT 95% (lbs)	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN
Total Birds	n/a	n/a	21,434	22.88	7.1	3.6%	31.7%	4	7	15.99	29.76	30%
Total Geese		3,194	14,054	15.00	4.7	2.4%	17.6%	3	5	9.95	20.05	34%
Geese (non-specified)	4.5	60	270	0.29	0.1	0.0%	0.3%	0	0	0.00	0.75	160%
Brant	3.0	213	639	0.68	0.2	0.1%	4.7%	0	0	13.63	14.35	53%
White-fronted geese	4.5	2,912	13,105	13.99	4.3	2.2%	17.3%	2	5	0.00	4.87	35%
Snow geese	4.5	8	35	0.04	0.0	0.0%	0.7%	0	0	0.00	0.03	68%
Canada geese	4.5	1	5	0.01	0.0	0.0%	0.1%	0	0	6.91	6.92	75%
Total Eider		4,320	6,480	6.92	2.1	1.1%	19.0%	2	4	2.75	11.08	60%
Eider (non-specified)	1.5	4,275	6,412	6.84	2.1	1.1%	18.7%	2	4	2.68	11.01	61%
Common eider	1.5	21	31	0.03	*	**	0.6%	0	0	0.00	0.09	174%
King eider	1.5	25	37	0.04	*	**	0.2%	0	0	0.02	0.06	52%
Ptarmigan	0.7	1,287	901	0.96	0.3	0.2%	9.0%	0	1	0.33	1.59	66%

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

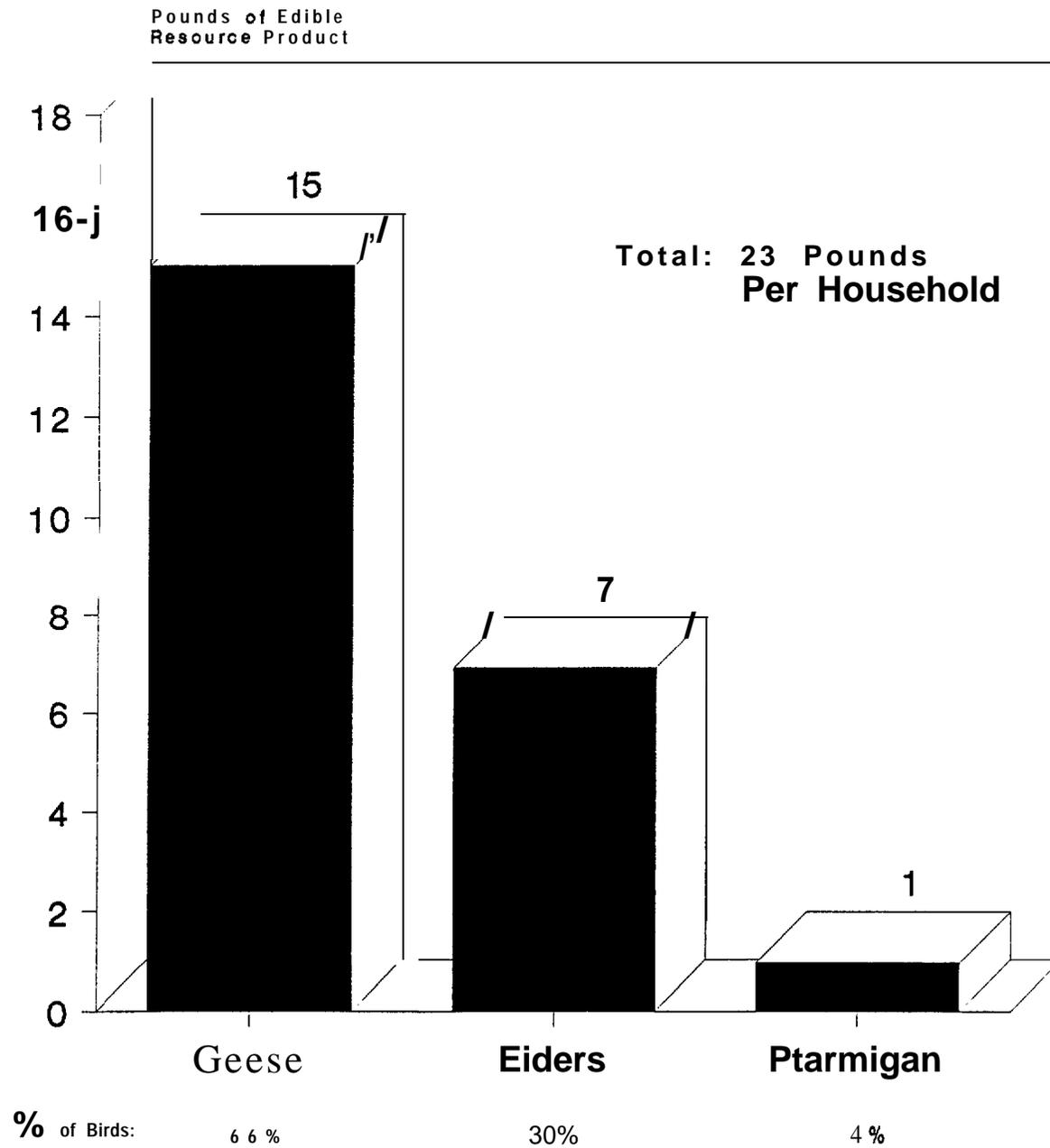
* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Source: Stephen R. Braund & Associates, 1989

Figure 26: Harvest of Birds
 All Barrow Households, Year Two
 (Mean Edible Pounds Per Household)



Source: Stephen R. Braund & Assoc., 1989

approximately 35 percent of the Native households were involved in successful geese harvests. It is also interesting to note that the sampling error for the goose estimate decreased significantly in Year Two, to 34 percent, down from 45 percent in Year One.

Eider was the next most important bird category, contributing 30 percent of the harvest by weight in Year Two, down from 36 percent in Year One. Approximately 888 less eiders were harvested in Year Two. Though most eider harvests were reported as non-specified eiders in both Years One and Two, from all indications the vast majority of eider harvests were king eiders.

The ptarmigan harvest estimate also decreased in Year Two, down significantly by 1,000 birds. The main reason for the decrease appears to be that there was a very high harvest in May of Year One that was not duplicated in Year Two. Willow ptarmigan was the only ptarmigan species reported by study households. Finally, a few "other ducks" were recorded in Year One, though none appeared in the Year Two data. The majority of other ducks were oldsquaw ducks, or aahaalliq in Inupiaq.

Tables 40 through 43 and figures 27 and 28 provide the breakdown on bird harvests by month. Birds were harvested between April and October. May was the peak bird harvest period in both years, with the majority of harvests consisting primarily of white-fronted geese. Eiders were harvested mainly in July and August in Year One, with 82 percent of the eiders taken in those months. However during Year Two, the predominant eider months were May and August. July resulted in relatively few eider harvests, perhaps due to the predominant westerly winds blowing against the path of the migration. In September, a small number of eiders and geese (brant only in the Year One data) were harvested as the birds continued to migrate west and south out of the study area. As discussed above, the ptarmigan harvest was greatest during May in Year One when 83 percent of the harvest took place, though in Year Two was distributed more evenly throughout the May through October period.

TABLE 40: BIRD HARVEST BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Pounds of Edible Resource Product)

SPECIES	TOTALS											
	1987					*****		1988				
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Geese	0	11,371	485	4	67	152	0	0	0	0	0	0
White-fronted goose	0	9,742	474	0	0	0	0	0	0	0	0	0
Brant	0	138	0	4	67	152	0	0	0	0	0	0
Goose (non-specified)	0	1,492	11	0	0	0	0	0	0	0	0	0
Snow Goose	0	0	0	0	0	0	0	0	0	0	0	0
Canada Goose	0	0	0	0	0	0	0	0	0	0	0	0
Total Eiders	380	723	136	2,633	3,831	105	0	0	0	0	0	0
Eider (non-specified)	345	678	66	2,623	3,831	105	0	0	0	0	0	0
Common eider	18	9	0	0	0	0	0	0	0	0	0	0
King eider	18	36	70	11	0	0	0	0	0	0	0	0
Ptarmigan	0	1,323	0	43	125	8	108	0	0	0	0	0
Other Ducks	0	0	0	100	15	0	0	0	0	0	0	0
All Bird Species	380	13,417	621	2,380	4,038	265	108	0	0	0	0	0

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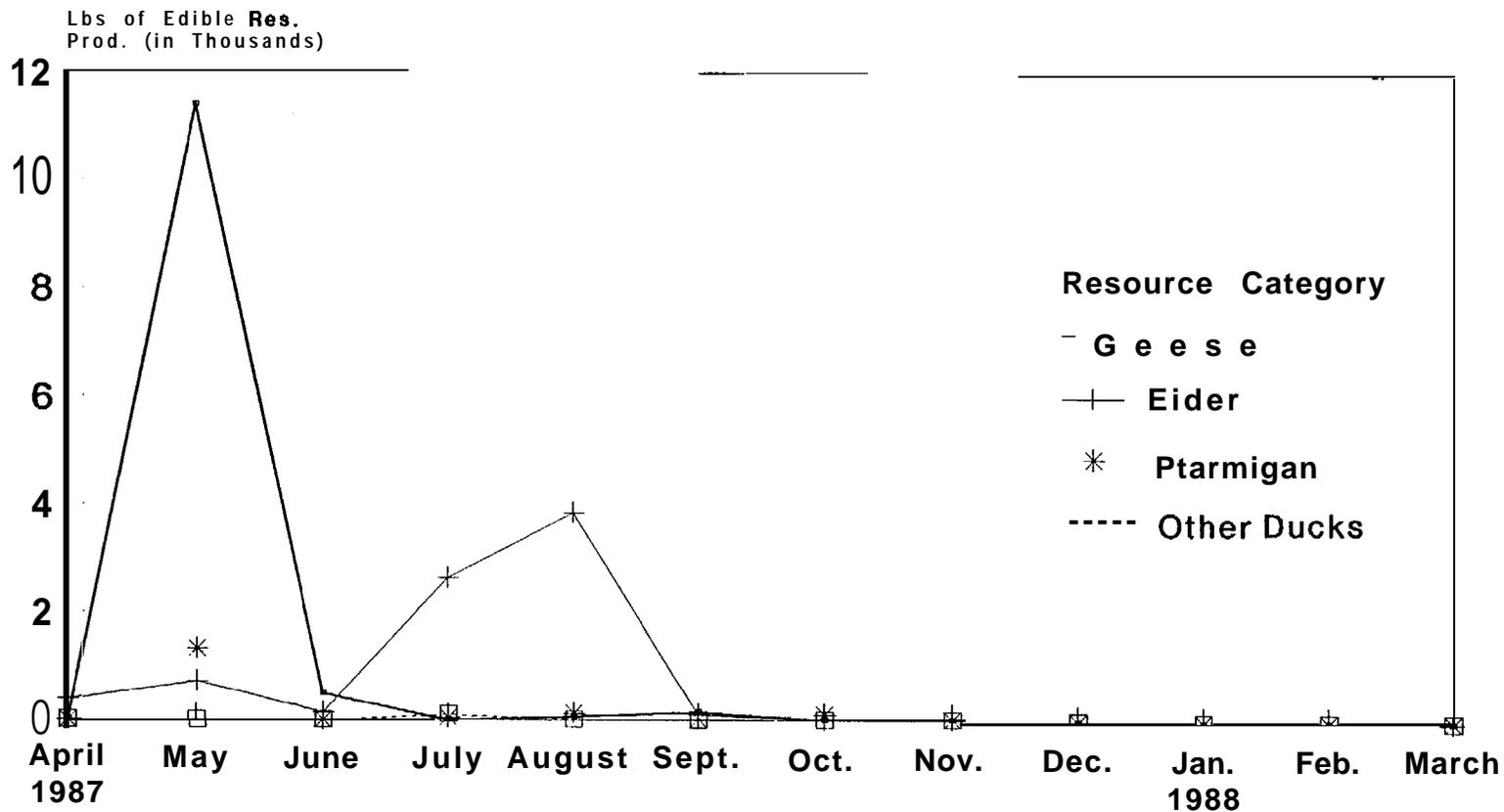
TABLE 40, CONTINUED: BIRD HARVEST BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Pounds of Edible Resource Product)

SPECIES	PERCENTS												
	1987						1988						
	April	May	June	July	August	Sept.	October	Nov.	Oec.	Jan.	Feb.	March	
Total Geese	0%	94%	4%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0% = 100%
White-fronted goose	0%	95%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Brant	0%	38%	0%	1%	19%	42%	0%	0%	0%	0%	0%	0%	0% = 100%
Goose (non-specified)	0%	99%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Snow goose	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Canada goose	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Total Eiders	5%	9%	2%	34%	49%	1%	0%	0%	0%	0%	0%	0%	0% = 100%
Eider (non-specified)	5%	9%	1%	34%	50%	1%	0%	0%	0%	0%	0%	0%	0% = 100%
Common eider	66%	34%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
King eider	13%	27%	52%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Ptarmigan	0%	82%	0%	3%	8%	1%	7%	0%	0%	0%	0%	0%	0% = 100%
Other Ducks	0%	0%	0%	87%	13%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
All Bird Species	2%	62%	3%	1377	19%	1%	0%	0%	0%	0%	0%	0%	0% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 27: Monthly Harvest of Birds

All Barrow Households, Year One Revised



- 148 -

Source: Stephen R. Braund & Assoc., 1989

TABLE 41: BIRD HARVEST BY SPECIES AND MONTH - BARROW, YEAR TWO
(Pounds of Edible Resource Product)

SPECIES	TOTALS *****											
	1988					1989						
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Geese	0	12,609	1,276	0	169	0	0	0	0	0	0	0
White-fronted geese	0	11,999	1,107	0	0	0	0	0	0	0	0	0
Brant	0	311	159	0	169	0	0	0	0	0	0	0
Geese (non-specified)	0	270	0	0	0	0	0	0	0	0	0	0
Lesser snow geese	0	24	11	0	0	0	0	0	0	0	0	0
Canada geese	0	5	0	0	0	0	0	0	0	0	0	0
Total Eiders	5	2,742	272	695	2,330	435	0	0	0	0	0	0
Eider (non-specified)	5	2,740	272	648	2,310	435	0	0	0	0	0	0
Common eider	0	0	0	31	0	0	0	0	0	0	0	0
King eider	0	2	0	16	19	0	0	0	0	0	0	0
Ptarmigan	0	630	169	39	0	15	39	0	0	0	0	10
All Bird Species	5	15,981	1,717	734	2,498	450	39	0	0	0	0	10

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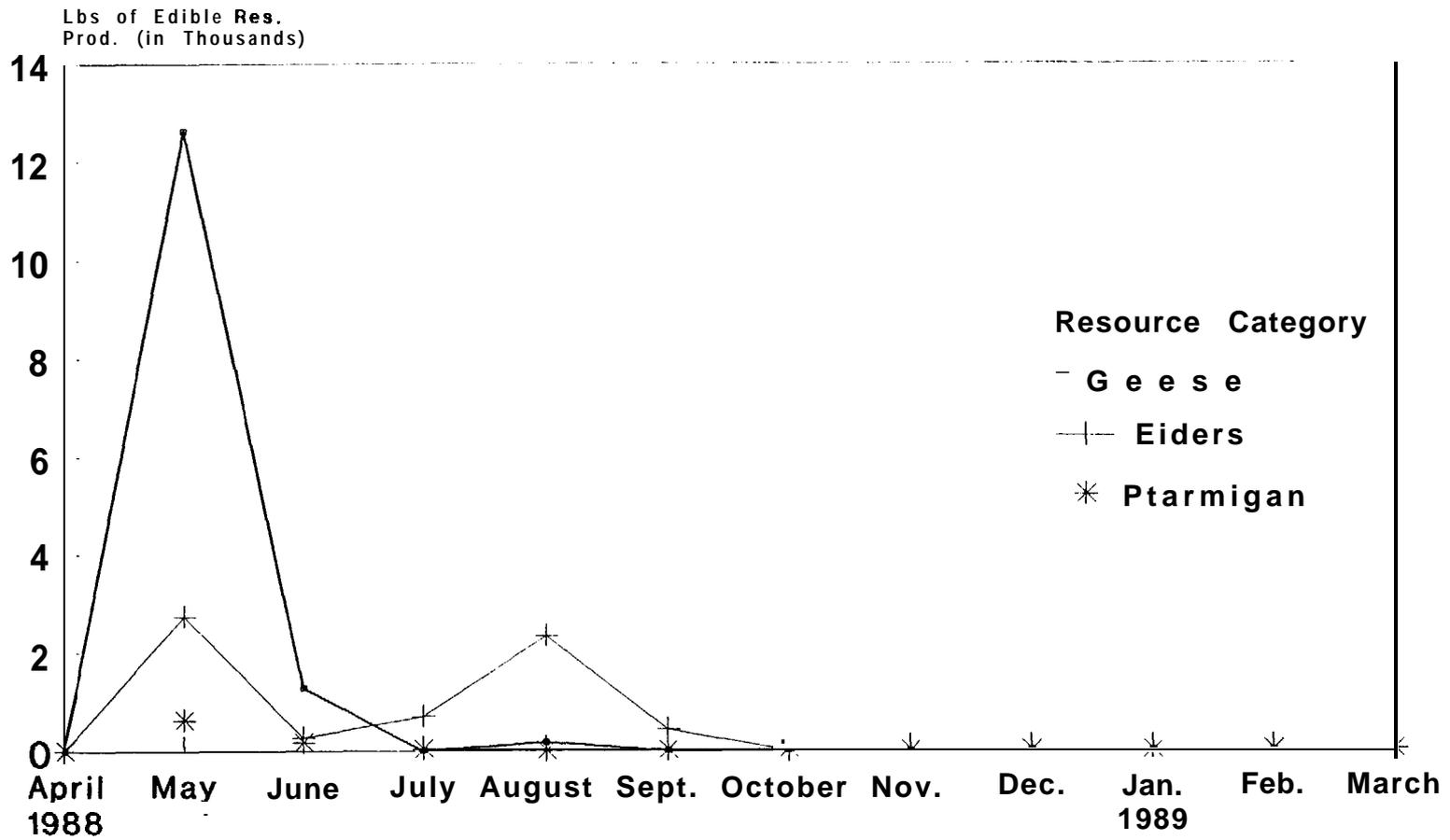
TABLE 41, CONTINUED: BIRD HARVEST BY SPECIES AND MONTH - BARROW, YEAR TWO
(Pounds of Edible Resource Product)

SPECIES	PERCENTS											
	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Geese	0%	90%	9%	0%	1%	0%	0%	0%	0%	0%	0%	0% = 100%
White-fronted geese	0%	92%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Brant	0%	49%	25%	0%	26%	0%	0%	0%	0%	0%	0%	0% = 100%
Geese (non-specified)	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Lesser snow geese	0%	70%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Canada geese	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Total Eiders	0%	42%	4%	11%	36%	7%	0%	0%	0%	0%	0%	0% = 100%
Eider (non-specified)	0%	43%	4%	10%	36%	7%	0%	0%	0%	0%	0%	0% = 100%
Common eider	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
King eider	0%	5%	0%	43%	52%	0%	0%	0%	0%	0%	0%	0% = 100%
Ptarmigan	0%	70%	19%	4%	0%	2%	4%	0%	0%	0%	0%	1% = 100%
All Bird Species	0%	75%	8%	3%	12%	2%	0%	0%	0%	0%	0%	0% = 100%

Source: Stephen R. Braund & Associates, 1989

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Figure 28: Monthly Harvest of Birds
All Barrow Households, Year Two



Source: Stephen R. Braund & Assoc., 1989

TABLE 42: BIRD HARVEST BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Number Harvested)

SPECIES	1987						1988					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Geese	0	2,542	108	1	22	51	0	0	0	0	0	0
White-fronted goose		2,165	105									
Brant		46		1	22	51						
Goose (non-specified)		331	2									
Snow goose												
Canada goose												
Total Eiders	254	482	91	1,756	2,554	70	0	0	0	0	0	0
Eider (non-specified)	230	452	44	1,749	2,554	70						
Common eider	12	6										
King eider	12	24	47	7								
Ptarmigan		1,890		62	179	12	154					
Other ducks				67	10							

Source: Stephen R. Braund & Associates, 1989

TABLE 43: BIRD HARVEST BY SPECIES AND MONTH - BARROW, YEAR TWO
(Number Harvested)

SPECIES	1988						1989					
	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Geese	0	2,837	301	0	56	0	0	0	0	0	0	0
White-fronted geese		2,666	246	0	0	0	0	0	0	0	0	0
Brant		104	53	0	56	0	0	0	0	0	0	0
Geese (non-specified)		60	0	0	0	0	0	0	0	0	0	0
Lesser snow geese		5	2	0	0	0	0	0	0	0	0	0
Canada geese		1	0	0	0	0	0	0	0	0	0	0
Total Eiders	4	1,828	182	463	1,553	290	0	0	0	0	0	0
Eider (non-specified)	4	1,827	182	432	1,540	290	0	0	0	0	0	0
Common eider		0	0	21	0	0	0	0	0	0	0	0
King eider		1	0	11	13	0	0	0	0	0	0	0
Ptarmigan		899	241	56	21	55	0	0	0	0	0	14

U
W

Source: Stephen R. Braund & Associates, 1989

June was a relatively low bird harvest month in Year One and the July harvest was relatively low in Year Two. What is not displayed in the tables and figures is that most of the June harvest occurred in the early part of June and that most of the July harvest occurred in late July. Those harvest periods conform with key informant information that most hunters do not take birds during the incubation period from mid-June through mid-July.

The cumulative average of the two study years is presented in Tables 44 through 46 and Figures 29 and 30. All numbers represent average harvest figures for the two years of study except for household participation, which reflects the percentage of all Barrow households that harvested a bird in either year of the study.

Maps 27 and 28 illustrate that the areal range of bird harvests was very similar in Years One and Two to that determined by earlier research (Pedersen 1979). Although most of the harvests appear to have occurred in the central portion of the lifetime harvest area, occasional successful harvests also occurred along the illustrated border area. Harvests occurred from Peard Bay to the east side of Teshekpuk Lake and from offshore of Barrow to the upper portion of the Ikpikpuk River. Birds were harvested off the coast of Barrow to a distance of five to seven miles, a finding not reflected in the earlier research. Those harvests consisted mainly of eiders hunted from boats or shot from the ice edge during May and June.

As can be seen in Maps 29 and 30, eiders were harvested along the coast. The single "other duck" harvest location recorded in Year One was at the Shooting Station (Pigniq) near Point Barrow. Goose harvests were primarily oriented around the major rivers in the area, especially the Meade, Topagoruk, Chipp. and Ikpikpuk rivers. The majority of goose harvests took place within 50 miles of Barrow, although harvests did occur as far away as 100 miles. Ptarmigan harvest areas corresponded closely to those of geese. For the community as a whole, ptarmigan were harvested anywhere people were camping and were an incidental harvest to the major harvest activity of the trip, whether it was geese hunting, caribou hunting, fishing, or furbearer hunting. Typically the children in camp would head out on the ptarmigan hunting excursions.

TABLE 44: AVERAGE HARVEST ESTIMATES FOR BIRDS - ALL BARROW HOUSEHOLDS, YEARS ONE & TWO (1)

RESOURCE	CONVERSION FACTOR (2) (Edible Weight Per Resource in lbs)	AVERAGE POUNDS HARVESTED				PERCENT OF TOTAL EDIBLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		COMMUNITY TOTALS NUMBER HARVESTED	EDIBLE POUNDS HARVESTED	PER HOUSEHOLD	PER CAPITA			STANDARD DEVIATION (lbs)	SAMPLING ERROR AT 95% (lbs)	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Mean lbs/ Household)	SAMPLING ERROR AS % OF MEAN
Total Birds	n/a	n/a	21,519	22.97	7.1	3.5%	32.8%	4	8	14.85	31.09	35%
Total Geese		2,959	13,062	13.94	4.3	2.1%	18.2%	3	5	8.87	19.02	36%
Geese (non-specified)	4.5	197	886	0.95	0.3	0.1%	1.5%	0	1	0.34	1.55	64%
Brant	3.0	166	499	0.53	0.2	0.1%	3.5%	0	0	0.31	0.76	42%
White-fronted geese	4.5	2,591	11,656	12.44	*	**	16.3%	3	5	7.46	17.42	40%
Snow geese	4.5	4	17	0.02	*	**	10.7%	0	0	0.01	0.02	27%
Canada geese	4.5	1	3	0.00	*	**	10.0%	0	0	0.00	0.00	76%
Total Eider		4,764	7,145	7.63	2.4	1.1%	9.7%	2	4	3.18	12.07	58%
Eider (non-specified)	1.5	4,686	7,030	7.50	2.3	1.1%	9.7%	2	4	3.06	11.94	59%
Common eider	1.5	19	29	0.03	*	**	0.4%	0	0	0.00	0.06	100%
King eider	1.5	57	86	0.09	*	**	7.7%	0	0	0.05	0.13	47%
Spectacled eider	1.5	1	2	0.00	*	**	6.0%	1	2	0.00	2.09	130259%
Ptarmigan	0.7	1,792	1,254	1.34	0.4	0.2%	12.1%	0	1	0.71	1.97	47%
Other ducks (non-specified)	1.5	39	58	0.06	*	**	1.5%	0	0	0.00	0.14	133%

(1) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.

(2) See Table A-4 for sources of conversion factors.

* represents less than .1 pound

** represents less than .1 percent

n/a means not applicable

Figure 29: Harvest of Birds
 All Barrow Households, Years One & Two
 (Mean Edible Pounds Per Household)



Source: Stephen R. Braund & Assoc., 1989

TABLE 45: AVERAGE BIRD HARVEST BY SPECIES AND MONTH - BARROW, YEARS ONE & TWO
(Pounds of Edible Resource Product)

TOTALS

SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Geese	0	11,990	880	2	118	76	0	0	0	0	0	0
White-fronted goose	0	10,870	790	0	0	0	0	0	0	0	0	0
Brant	0	225	79	2	118	76	0	0	0	0	0	0
Goose (non-specified)	0	881	5	0	0	0	0	0	0	0	0	0
Snow Goose	0	12	5	0	0	0	0	0	0	0	0	0
Canada Goose	0	3	0	0	0	0	0	0	0	0	0	0
Total Eiders	193	1,733	206	1,664	3,080	270	0	0	0	0	0	0
Eider (non-specified)	175	1,709	169	1,636	3,071	270	0	0	0	0	0	0
Common eider	9	5	0	15	0	0	0	0	0	0	0	0
King eider	9	19	35	13	10	0	0	0	0	0	0	0
Spectacle eider	0	0	2	0	0	0	0	0	0	0	0	0
Ptarmigan	0	977	84	41	63	12	74	0	0	0	0	5
Other Ducks	0	0	0	50	8	0	0	0	0	0	0	0
All Bird Species	193	14,699	1,170	1,757	3,268	357	74	0	0	0	0	5

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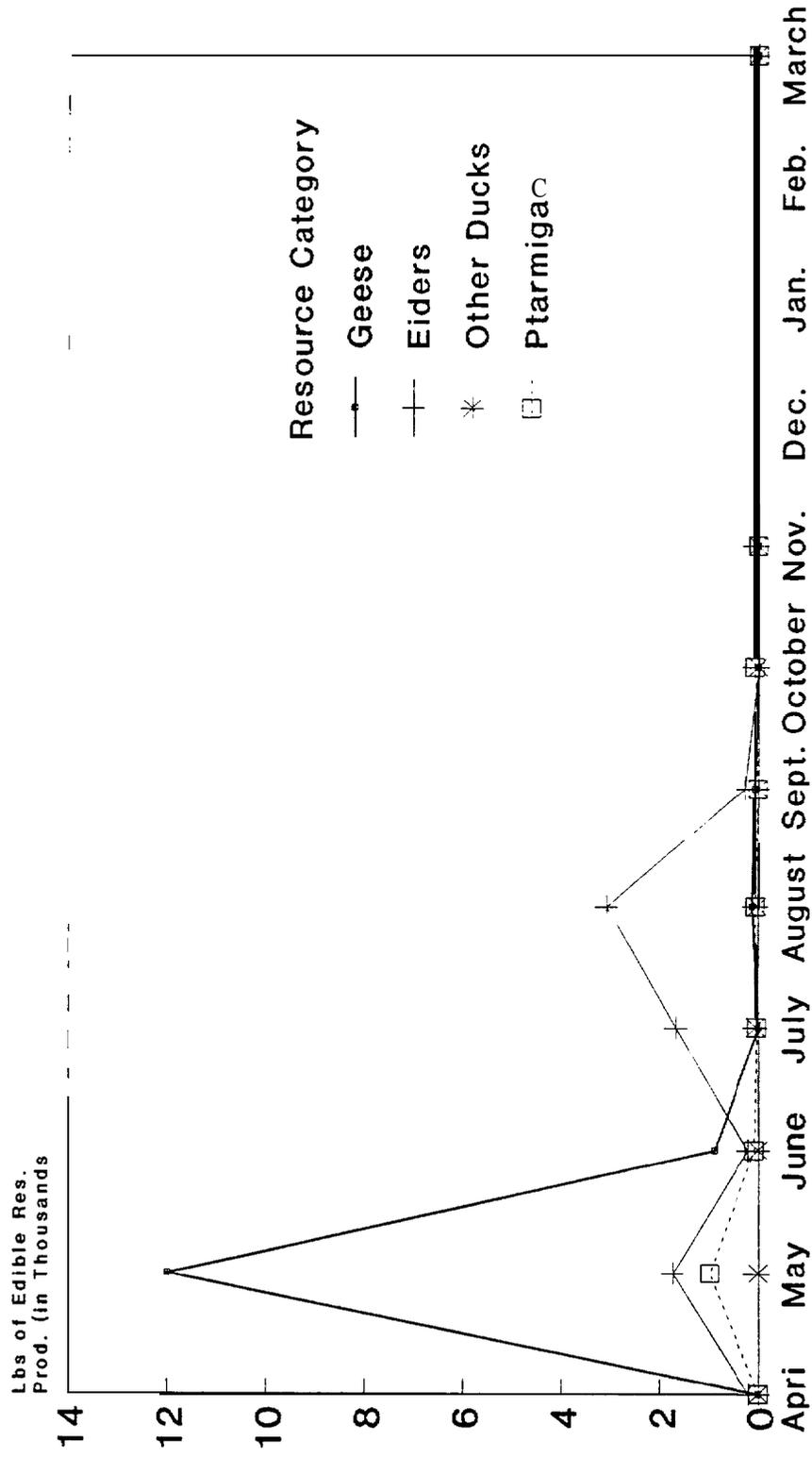
TABLE 45, CONTINUED: AVERAGE BIRD HARVEST BY SPECIES AND MONTH - BARROW, YEARS ONE & TWO
(Pounds of Edible Resource Product)

PERCENTS

SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March	
Total Geese	0%	92%	7%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0% = 100%
White-fronted goose	0%	93%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Brant	0%	45%	16%	0%	24%	15%	0%	0%	0%	0%	0%	0%	0% = 100%
Goose (non-specified)	0%	99%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Snow goose	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Canada goose	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Total Eiders	3%	24%	3%	23%	43%	4%	0%	0%	0%	0%	0%	0%	0% = 100%
Eider (non-specified)	2%	24%	2%	23%	44%	4%	0%	0%	0%	0%	0%	0%	0% = 100%
Common eider	31%	16%	0%	54%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
King eider	10%	22%	41%	15%	11%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Spectacle eider	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
Ptarmigan	0%	78%	7%	3%	5%	1%	6%	0%	0%	0%	0%	0%	0% = 100%
Other Ducks	0%	0%	0%	87%	13%	0%	0%	0%	0%	0%	0%	0%	0% = 100%
All Bird Species	1%	68%	5%	8%	15%	2%	0%	0%	0%	0%	0%	0%	0% = 100%

Source: Stephen R. Braund & Associates, 1989

Figure 30: Monthly Harvest of Birds
 All Barrow Households, Years One and Two



Source: Stephen R. Braund & Assoc., 1989

TABLE 46: AVERAGE BIRD HARVEST BY SPECIES AND MONTH - BARROW, YEARS ONE & TWO
(Number Harvested)

SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Geese	0	2,689	204	1	39	25	0	0	0	0	0	0
White-fronted goose	0	2,416	176	0	0	0	0	0	0	0	0	0
Brant	0	75	26	1	39	25	0	0	0	0	0	0
Goose (non-specified)	0	196	1	0	0	0	0	0	0	0	0	0
Snow goose	0	3	1	0	0	0	0	0	0	0	0	0
Canada goose	0	1	0	0	0	0	0	0	0	0	0	0
Total Eiders	129	1,155	137	1,110	2,053	180	0	0	0	0	0	0
Eider (non-specified)	117	1,139	113	1,090	2,047	180	0	0	0	0	0	0
Common eider	6	3	0	10	0	0	0	0	0	0	0	0
King eider	6	13	23	9	6	0	0	0	0	0	0	0
Spectacle eider	0	0	1	0	0	0	0	0	0	0	0	0
Ptarmigan	0	1,395	120	59	100	34	77	0	0	0	0	7
Other ducks	0	0	0	33	5	0	0	0	0	0	0	0

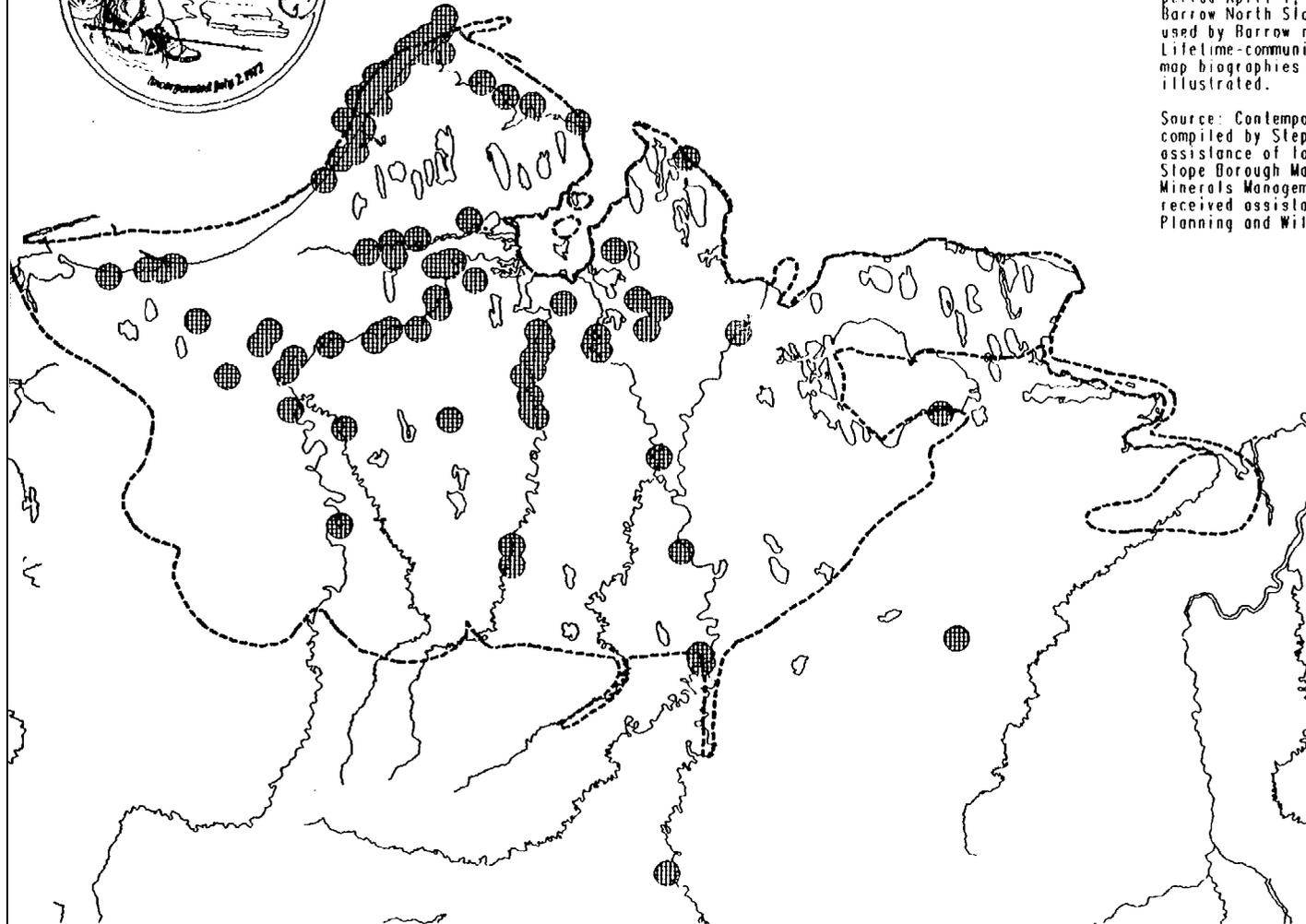
Source: Stephen R. Braund & Associates, 1989

MAP 27 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO BIRD HARVEST SITES - ALL SPECIES



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989; Year Two of the Barrow North Slope, Subsistence Study. Additional areas were used by Barrow residents not included in the study. Lifetime-community harvest areas, collected in the form of map biographies from 20 households (Pedersen 1979), are also illustrated.

Source: Contemporary subsistence use in form of information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION



Lifetime community land use (Pedersen 1979)



- Birds
- Eiders
 - Common, King
 - Geese
 - White-fronted goose, black brant, lessersnow goose, Canada goose
 - Ptarmigan

Map Production: North Slope Borough GIS

Date: June 26, 1989

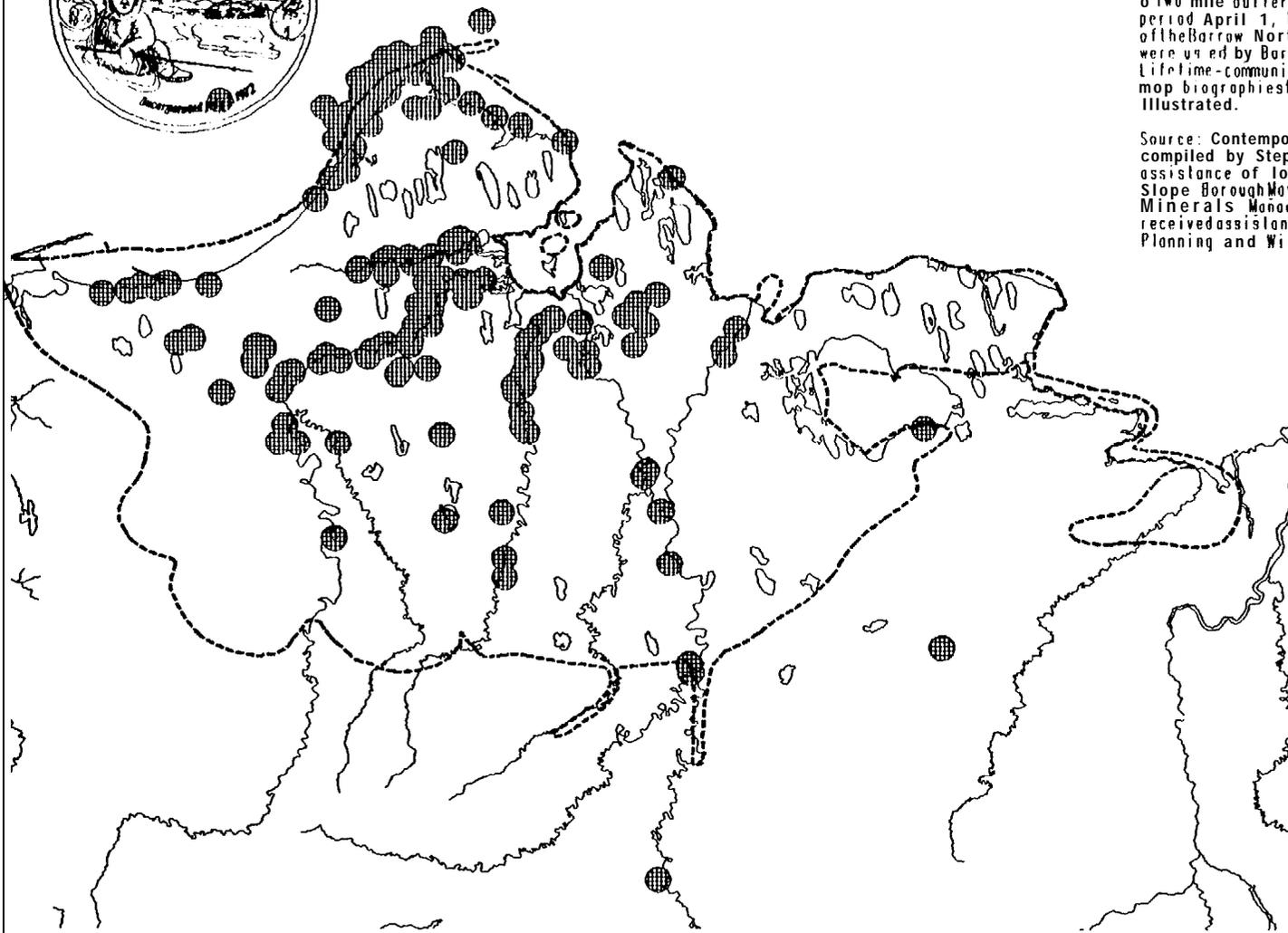


MAP 28
 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
 BIRD HARVEST SITES - ALL SPECIES: YEARS ONE AND TWO



This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study. Lifetime-community harvest areas, collected in the form of map biographies from 20 households (Pedersen 1979), are also illustrated.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SRBA) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SRBA is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION



Lifetime community land use (Pedersen 1979)



Birds
 - Eiders
 Common, King
 Spectacled
 - Other Ducks
 - Geese
 White-fronted goose,
 black brant,
 lesser snow goose,
 Canada goose
 - Ptarmigan



Map Production: North Slope Borough GIS

Date: June 26, 1989

30 0 30 60 90

MILES

MAP 29 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO BIRD HARVEST SITES BY SPECIES GROUPS

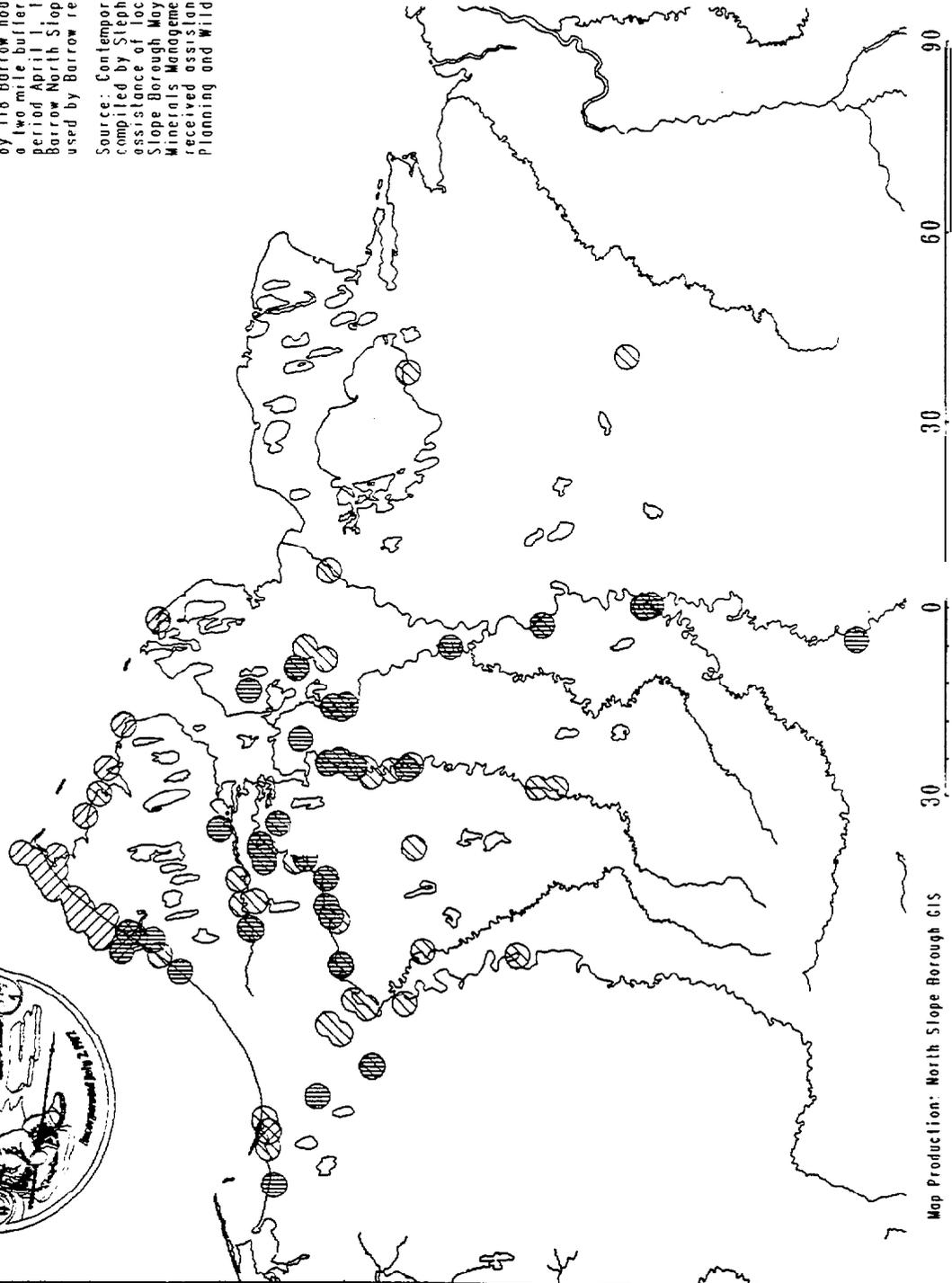


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1988 through March 31, 1989: Year Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

- Eiders
- Geese
- Plover



Map Production: North Slope Borough GIS

Date: June 26, 1989

MILES

MAP 30 NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO BIRD HARVEST SITES BY SPECIES GROUPS, YEARS ONE AND TWO

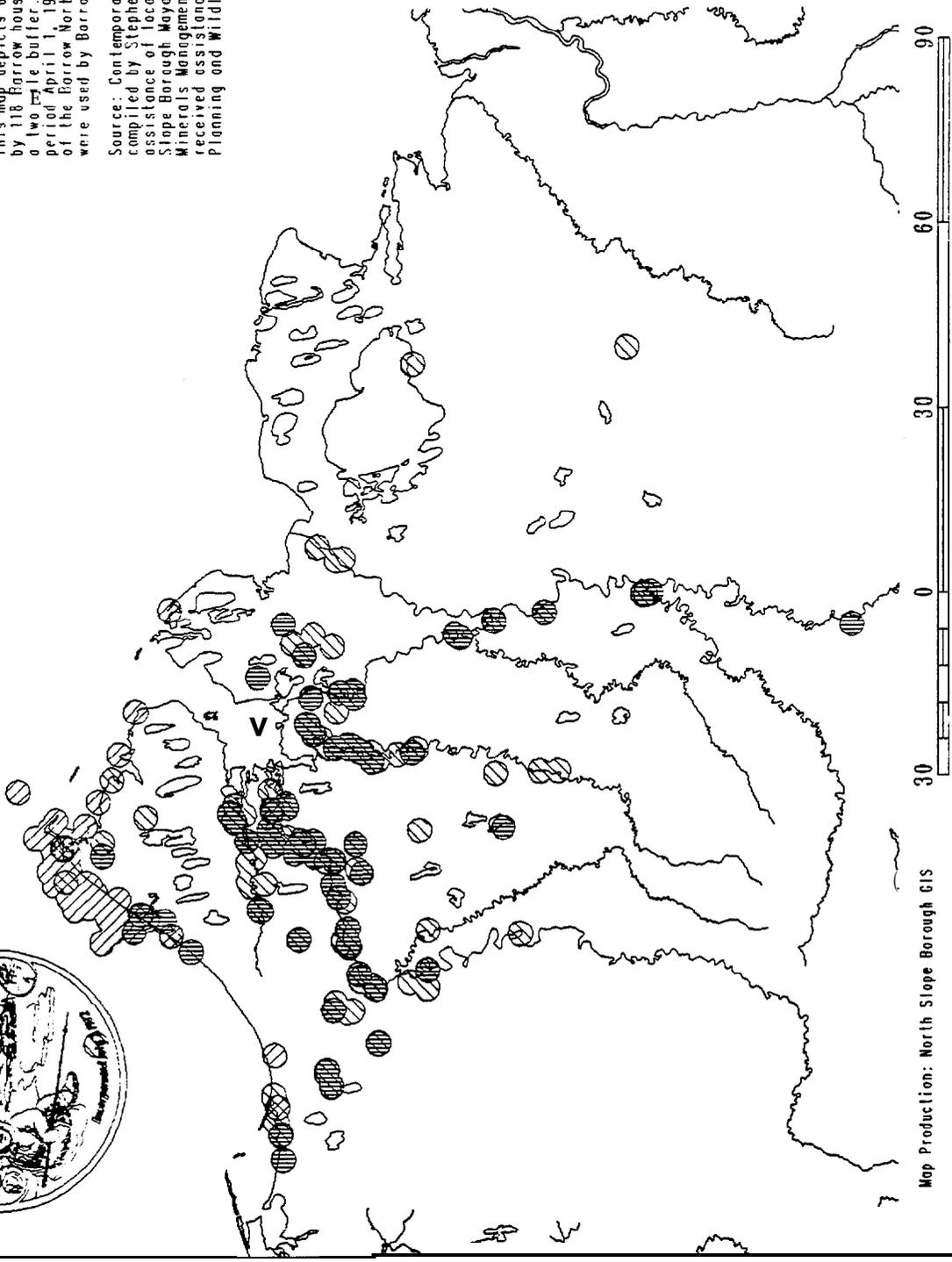


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two-mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SR&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SR&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.

LEGEND INFORMATION

-  Eiders
-  Other Ducks
-  Geese
-  Ptarmigan



Map Production: North Slope Borough GIS
Date: June 26, 1989

Map 31 is the map of fiscal cabin sites and bird harvest locations, illustrating a main feature of the Barrow bird harvest. Bird harvests, especially geese harvests, were not always associated with fixed cabin sites. However, families often headed for traditional camping sites during geese hunting season, demonstrating a connection with the land that stretches back far beyond the modern period. Although a subsistence census of all households would likely reveal other bird harvest locations, key informant information indicates that the majority of bird harvests occur within the range illustrated on these maps.

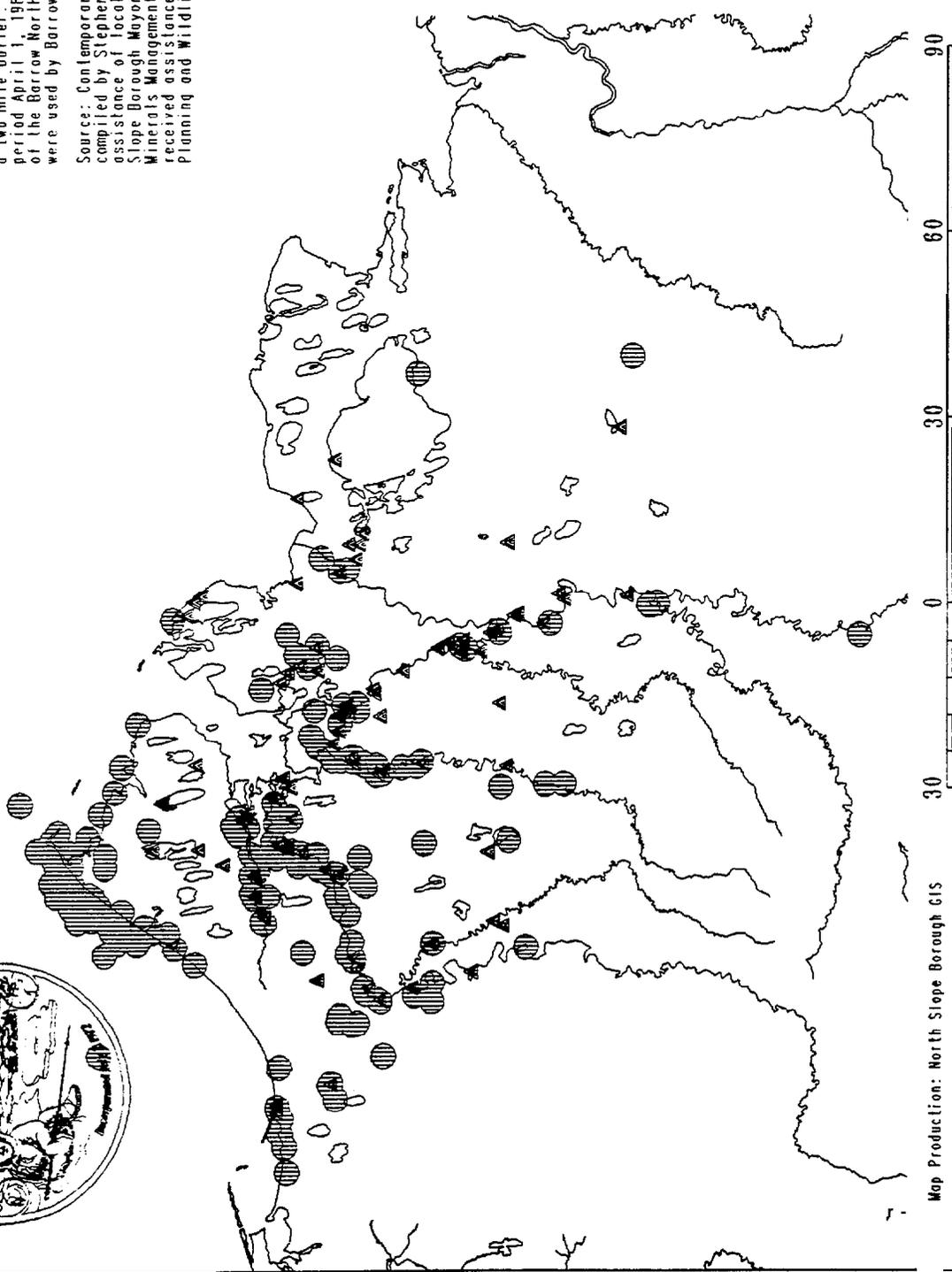
**N°R: SLOPE SUBSISTENCE STUDY - BARROW: YEAR WO
FIXED CABIN SITES AND BIRD HARVEST SITES
YEARS ONE AND TWO**

MAP 31

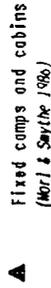


This map depicts approximate subsistence harvest sites used by 118 Barrow households. All harvest sites are depicted with a two mile buffer. The map depicts subsistence use for the time period April 1, 1987 through March 31, 1989: Years One and Two of the Barrow North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SRB&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SRB&A is under contract to Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management Departments, Barrow, Alaska.



LEGEND INFORMATION



Map Production: North Slope Borough GIS
Date: June 26, 1989

OTHER RESOURCES

The resources in this category included bird eggs, blueberries, cranberries, salmonberries, wild rhubarb, snow, water, and ice. Except for water and ice, the pounds of other resources harvested were included in the calculation of total edible pounds harvested during the two study years. "Other resources" accounted for less than one percent of the total edible pounds harvested during both years (see Tables 4 & 5). However, maps and harvest estimates were not generated for the other resources items in the Year Two report.

With the exception of water and ice, which many families depended on exclusively for their drinking water, harvest of these resources was usually incidental to other activities. Fresh water was a commonly harvested resource throughout the year. Many elders would not drink the city water, using it only for cooking and washing. Fresh water was collected as snow, water, and ice. The ice was often cut in blocks or chipped from lakes near the community. In addition, multi-year sea ice (from which the salt has leached out) also was used as a source of drinking water, as were glacial icebergs when they were found trapped in the pack ice near town.

HOUSEHOLD DIFFERENCES IN SPECIES HARVEST LEVELS

Thus far, this report has presented preliminary Barrow Year One and Year Two harvest data in terms of community totals (by month and for the entire year) and household and per capita means. Preceding data tables have also shown the percentage of Barrow households participating in the harvest of each species. This section of the report examines the distribution of harvest activity across households.

Based on statistical analysis (rather than field observations), the study team divided the 110 sample Barrow households in the Year 1-Year 2 combined sample into four categories according to the mean number of pounds each household harvested in Year Two. The categories or harvester levels used are the same as those initially defined by the study team for Wainwright to facilitate community comparisons. The total pounds per household upon which these breakdowns were based included only edible products and thus excluded furbearers, ice, and water.

The harvest data by harvester level were weighted to represent the entire community and are presented in two tables. Table 47 shows what percentage of the total community harvest of a species was obtained by each harvester level. Table 48 presents the average edible pounds of each species harvested per household within each harvester level. The far right column of Table 48 shows mean harvests per household for the entire community. For most entries, this statistic corresponds to the column entitled "Average Pounds Harvested Per Household" in tables 8, 17, 26, 35 and 44. However, these figures do not match for the total marine mammals and total mean household harvests because bowhead data were excluded from tables 47 and 48. Bowhead harvests throughout this report are derived from the total estimated edible weight of each whale which cannot be readily translated into household amounts by harvester level.

TABLE 47: PERCENTAGE OF TOTAL EDIBLE POUNDS HARVESTED BY SPECIES
AND BY HARVESTER LEVEL, BARROW YEARS ONE AND TWO

SPECIES HARVESTED	HARVESTER	HARVESTER	HARVESTER	HARVESTER	TOTAL
	LEVEL 1 D-299 LBS	LEVEL 2 300-999 LBS	LEVEL 3 1000-1999 LBS	LEVEL 4 2000++ LBS	
Total-All Species /1	2.7%	16.7%	47.0%	33.6%	100%
Total Marine Mammals /1	0.8%	9.6%	50.6%	39.0%	100%
Walrus	0.2%	8.2%	46.3%	45.3%	100%
Bearded Seal	2.0%	14.0%	56.4%	27.6%	100%
Polar Bear	0.0%	5.7%	31.4%	62.9%	100%
Total Ringed & Spotted Seal	0.9%	6.7%	61.3%	31.1%	100%
Ringed Seal	0.9%	6.8%	61.6%	30.7%	100%
Spotted Seal	0.0%	0.0%	20.0%	80.0%	100%
Total Terrestrial Mammals /2	2.7%	24.6%	47.7%	24.9%	100%
Caribou	2.8%	16.6%	53.0%	27.6%	100%
Moose	2.0%	78.4%	12.6%	7.0%	100%
Sheep	0.0%	100.0%	0.0%	0.0%	100%
Brown Bear	0.0%	0.0%	0.0%	100.0%	100%
Other Terrestrial Mammals	0.0%	0.0%	84.3%	15.7%	100%
Porcupine	0.0%	0.0%	100.0%	0.0%	100%
Ground Squirrel	0.0%	0.0%	0.0%	100.0%	100%
Total Fish	3.9%	6.2%	33.3%	56.6%	100%
Total Whitefish	2.6%	5.3%	31.9%	60.2%	100%
Whitefish (non-specified)	1.8%	0.0%	14.6%	83.6%	100%
Round Whitefish	5.9%	6.1%	21.5%	66.5%	100%
Broad Whitefish, River	2.1%	7.3%	28.1%	62.5%	100%
Broad Whitefish, lake	0.0%	0.0%	30.1%	69.977	100%
Humpback whitefish	9.5%	6.7%	63.3%	20.4%	100%
Least cisco	2.2%	4.7%	44.8%	48.4%	100%
Bering, Arctic cisco	0.0%	0.0%	38.1%	61.9%	100%
Total Other Freshwater Fish	5.0%	10.9%	43.2%	40.9%	100%
Arctic grayling	5.5%	10.6%	43.6%	40.3%	100%
Arctic char	6.6%	14.4%	67.1%	11.9%	100%
Burbot (Ling cod)	4.3%	12.7%	44.5%	38.5%	100%
Northern pike	0.0%	0.0%	50.0%	50.0%	100%
Lake trout	0.0%	0.0%	12.7%	87.3%	100%
Total Salmon	21.9%	0.0%	21.1%	57.0%	100%
Salmon (non-specified)	0.0%	0.0%	4.5%	95.5%	100%
Chum (Dog) salmon	0.0%	0.0%	52.4%	47.6%	100%
Pink (Humpback) salmon	0.0%	0.0%	100.0%	0.0%	100%
Silver salmon	37.0%	0.0%	16.5%	46.5%	100%
King salmon	0.0%	0.0%	75.0%	25.0%	100%
Total Other Coastal Fish	31.8%	0.0%	0.0%	68.2%	100%
Capelin	89.5%	0.0%	0.0%	10.5%	100%
Rainbow smelt	0.0%	0.0%	0.0%	100.0%	100%
Tomcod (Saffron Cod)	100.0%	0.0%	0.0%	0.0%	100%
Arctic cod	0.0%	0.0%	0.0%	100.0%	100%

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TABLE 47, continued: PERCENTAGE OF TOTAL EDIBLE POUNDS HARVESTED BY SPECIES AND BY HARVESTER LEVEL, BARROW YEARS ONE AND TWO

SPECIES HARVESTED	HARVESTER LEVEL 1		HARVESTER LEVEL 2		HARVESTER LEVEL 3		HARVESTER LEVEL 4		TOTAL
	0-299 LBS		300-999 LBS		1000-1999 LBS		2000++ LBS		
Total Birds	10.6%		11.8%		56.1%		21.6%		100%
Total Geese	4.3%		16.0%		55.7%		24.0%		100%
White-fronted goose	2.5%		16.0%		59.0%		22.5%		100%
Brant	6.4%		5.1%		32.9%		55.6%		100%
Goose (non-specified)	27.5%		21.8%		26.4%		24.4%		100%
Lesser snow goose	0.0%		39.0%		0.0%		61.0%		100%
Canada goose	0.0%		0.0%		0.0%		100.0%		100%
Total Eiders	22.4%		3.1%		57.0%		17.5%		100%
Eider (non-specified)	22.7%		3.2%		57.2%		16.9%		100%
Common eider	0.0%		0.0%		53.8%		46.2%		100%
King eider	0.0%		0.0%		47.2%		52.8%		100%
Spectacled eider	0.0%		0.0%		0.0%		100.0%		100%
Ptarmigan	8.5%		17.0%		54.7%		19.8%		100%
Number of Households	599		184		125		29		937
Percentage of Households	64.0%		20.0%		13.0%		3.0%		100%

1. Totals for marine mammals and totals for all species combined do not include bowhead.
2. Furbearers were not included in the calculation of harvester levels or amounts harvested per harvester level. They are not eaten and therefore are not measured in pounds, the unit upon which this analysis is based.

Source: Stephen R. Braund & Associates, 1989

TABLE 48: MEAN EDIBLE POUNDS HARVESTED BY
HARVESTER LEVEL, BARROW YEARS ONE AND TWO

SPECIES HARVESTED	HARVESTER LEVEL 1 0-299 LBS	HARVESTER LEVEL 2 300-999 LBS	HARVESTER LEVEL 3 1000-1999 LBS	HARVESTER LEVEL 4 2000++ LBS	MEAN HARVEST PER HOUSEHOLD
Total- All Species /1	18.57	373.51	1,548.08	4,827.63	440.67
Total Marine Mammals /1	1.73	66.64	517.80	1,737.16	136.83
Walrus	0.19	30.11	249.66	1,065.74	72.17
Bearded Seal	1.26	28.42	168.47	359.84	39.99
Polar Bear	0.00	1.73	14.04	122.41	5.98
Total Ringed & Spotted Seal	0.28	6.38	85.63	189.17	18.70
Ringed Seal	0.28	6.38	85.43	185.75	18.57
Spotted Seal	0.00	0.00	0.20	3.42	0.13
Total Terrestrial Mammals /2	9.24	273.42	778.47	1,774.44	218.31
Caribou	8.41	160.60	752.88	1,709.13	190.18
Moose	0.82	107.12	25.38	61.07	26.85
Sheep	0.00	5.71	0.00	0.00	1.12
Brown Sear	0.00	0.00	0.00	4.07	0.13
Other Terrestrial Mammals	0.00	0.00	0.21	0.17	0.03
Porcupine	0.00	0.00	0.21	0.00	0.03
Ground Squirrel	0.00	0.00	0.00	0.17	0.01
Total Fish	3.81	19.72	155.87	1,155.01	62.62
Total Whi tefi sh	1.95	13.07	115.72	951.45	48.51
Whi tefi sh (non-speci fi ed)	0.16	0.00	6.02	150.41	5.52
Round Whi tefi sh	0.14	0.46	2.38	32.19	1.49
Broad Whi tefi sh, River	0.85	9.58	54.25	525.30	25.81
Broad Whitefish, lake	0.00	0.00	8.65	87.42	3.84
Humpback whitefish	0.55	1.28	17.61	24.76	3.72
Least cisco	0.26	1.75	24.65	116.09	7.37
Bering, Arctic cisco	0.00	0.00	2.15	15.29	0.76
Total Other Freshwater Fish	0.94	6.65	38.89	159.99	12.02
Arctic grayling	0.73	4.60	27.71	111.53	8.50
Arctic char	0.02	0.13	0.89	0.68	0.18
Burbot(Ling cod)	0.20	1.92	9.87	37.23	2.97
Northern pike	0.00	0.00	0.07	0.05	0.00
Lake trout	0.00	0.00	0.35	10.50	0.37
Total Salmon	0.28	0.00	1.26	14.90	0.80
Salmon (non-specified)	0.00	0.00	0.07	6.83	0.22
Chum (Dog) salmon	0.00	0.00	0.13	0.50	0.03
Pink (Humpback) salmon	0.00	0.00	0.23	0.00	0.03
Silver salmon	0.28	0.00	0.59	7.21	0.48
King salmon	0.00	0.00	0.25	0.37	0.05
Total Other Coastal Fish	0.64	0.00	0.00	28.67	1.29
Capelin	0.50	0.00	0.00	1.22	0.36
Rainbow smelt	0.00	0.00	0.00	0.50	0.02
Tomcod (Saffron Cod)	0.14	0.00	0.00	0.00	0.09
Arctic cod	0.00	0.00	0.00	26.96	0.83

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TABLE 48, continued: MEAN EDIBLE POUNDS HARVESTED BY
HARVESTER LEVEL, BARROW YEARS ONE AND TWO

SPECIES HARVESTED	HARVESTER	HARVESTER	HARVESTER	HARVESTER	MEAN
	LEVEL 1 0-299 LBS	LEVEL 2 300-999 LBS	LEVEL 3 1000-1999 LBS	LEVEL 4 2000+ LBS	HARVEST PER HOUSEHOLD
Total Birds	3.80	13.73	95.94	161.01	22.91
Total Geese	0.95	11.36	57.99	108.95	13.94
White-fronted goose	0.49	10.14	54.82	91.33	12.44
Brant	0.05	0.14	1.31	9.65	0.53
Goose (non-specified)	0.41	1.05	1.86	7.51	0.95
Lesser snow goose	0.00	0.04	0.00	0.37	0.02
Canada goose	0.00	0.00	0.00	0.09	0.00
Total Eiders	2.67	1.21	32.49	43.43	7.62
Eider (non-specified)	2.67	1.21	32.04	41.40	7.50
Common eider	0.00	0.00	0.12	0.46	0.03
King eider	0.00	0.00	0.32	1.57	0.09
Spectacle eider	0.00	0.00	0.00	0.00	0.00
Ptarmigan	0.18	1.16	5.47	8.63	1.34
Number of Households	599	184	125	29	937
Percentage of Households	64.0%	20.0%	13.0%	3.0%	100%

1. Totals for marine mammals and totals for all species combined do not include bowhead.
2. Furbearers were not included in the calculation of harvester levels or amounts harvested per harvester level. They are not eaten and therefore are not measured in pounds, the unit upon which this analysis is based.

Source: Stephen R. Braund & Associates, 1989

Table 47 shows that, in terms of all species combined, Level 4 harvested a third of the total community harvest. This means that three percent of all Barrow households (i.e., the number of households in the highest harvest level) accounted for one-third of the total community harvest. Level 3 harvested close to one half of the total harvest. Thus, the two top strata together accounted for 81 percent of the total harvest and 16 percent of all households. Level 2 harvested 17 percent and Level 1 harvested less than three percent of the mean edible pounds harvested in Year One and Year Two by each Barrow household.

When looking at major resource groups and individual species, these proportions vary somewhat. The harvest of marine mammals was slightly more concentrated in the higher levels while the harvests of caribou and birds in general were considerably less concentrated. The harvest pattern for moose and sheep was actually the reverse of the norm, reflecting the harvest of these species by non-Inupiat households who were otherwise relatively inactive harvesters.

Underlying the differences by harvester level are substantial differences in harvest activity between Inupiat and non-Inupiat households. Table 49 and Figure 31 show that 16 percent of all Barrow Inupiat households harvested at least 2,000 pounds while no non-Inupiat households harvested this much. In fact, almost 90 percent of all non-Inupiat households reported harvests of under 300 pounds (many reporting no harvest activity at all), whereas 45 percent of the Barrow Inupiat households harvested under 300 pounds.

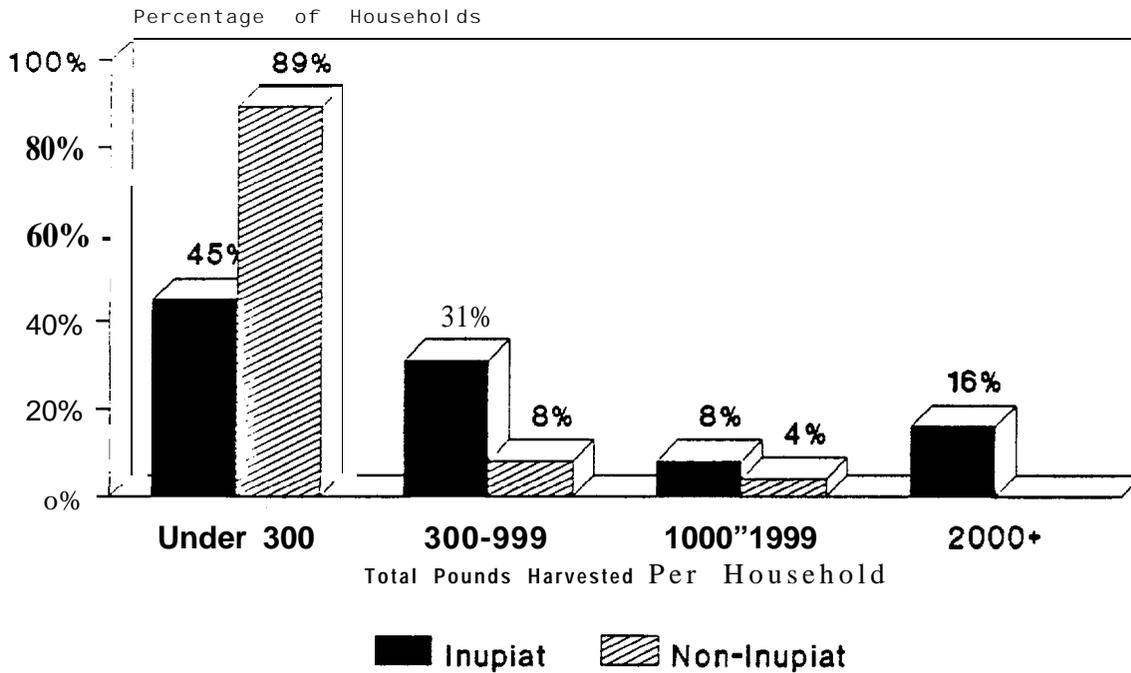
Table 50 examines differences in harvest activity among all Barrow households by household size, total months of household employment and household income. The first four columns of the table indicate the percentage of all households of each type (e.g., households occupied by one person) which fall into each of the four categories of harvest level. Ninety-four percent of the single person households, for example, fall into the lowest level of harvest activity compared with only 62 percent of those households occupied by five or more people. Also shown in Table 50 are mean pounds harvested by household type. Five person households harvested an average of 708 pounds annually compared with 174 pounds for one person households,

TABLE 49: Differences in Harvest Levels by Ethnicity, Barrow Year One

Harvester Level		Inupiat Households	Other Household
1	Under 300 Lbs.	45%	89%
2	300-999 Lbs.	31%	8%
3	1,000-1,999 Lbs.	8%	4%
4	2,000 Lbs. Plus	1677	
		100%	100%
	Mean Pounds	974	99
	Number of Sample Households on which Weighted Totals are Based	92	26

Source: Stephen R. Braund & Associates

Figure 31: Differences in Harvest Level By Ethnicity: All Barrow Households Year One



Stephen R. Braund & Associates, 10S9

TABLE 50: Differences in Harvest Levels Among All Households, Barrow Year One*

	Harvester Level 1 Under 300 Lbs.	Harvester Level 2 300-999 Lbs.	Harvester Level 3 1,000-1,999 Lbs.	Harvester Level 4 2,000 Lbs. Plus		Weighted Mean Pounds Total Harvested	Number of Sample Household
Household Size							
1	94%	1%		5%	.	100% 174	14
2,3	61%	24%	1%	15%	.	101% 7.48	28
4	49%	31%	10%	10%	=	100% 564	18
5+	62%	22%	10%	8%	.	102% 708	50

							Total 110
Total Months Worked By Household Members							
0	54%	19%		26%	99%	1,097	14
1-11	48%	39%	2%	11%	100%	534	17
12	71%	10%	16%	3%	100%	527	29
13-22	55%	36%	3%	7%	101%	635	8
23+	79%	10%	3%	9%	101%	461	32

							Total 100
Year One Household income							
Under \$10,000	50%	16%	3%	31%	100%	1,397	26
\$10-39,999	7%	70%	9%	14%	100%	898	17
\$40,000 Plus	75%	14%	8%	3%	100%	398	42

							Total 85

* Year One = April 1, 1987 through March 31, 1988

Source: Stephen R. Braund & Associates, 1989

Table 50 does not show a clear relationship between total months worked and harvest level for all Barrow residents. It does suggest, however, that working single person households and households with two full-time workers tend to harvest less.

Still looking at all Barrow households, harvest activity appears to be lower among households with higher incomes. Approximately one third of all households reporting incomes of under \$10,000 also reported harvests totalling at least 2,000 pounds. In comparison, only three percent of households reporting harvests of at least 2000 pounds also reported incomes of \$40,000 or more.

The picture is somewhat different, however, if only Inupiat households are considered. Table 51 displays data comparable to Table 50. Nineteen percent of single person Inupiat households reported harvest levels of at least 2,000 pounds. Nineteen percent of all Inupiat households in which members worked at least 23 months also reported harvests of 2,000 pounds or more. Finally, 20 percent fewer Inupiat households than all Barrow households receiving \$40,000 or more in income harvested under 300 pounds. The extra 20 percent of Inupiat households were distributed between the three higher harvest levels, making each level six percent higher for Inupiat households than for non-Inupiat households. Taken together, these results suggest that subsistence harvests retain their importance among Inupiat households heavily involved in the wage labor force.

TABLE 51: Differences in Harvest Levels Among Inupiat Households, Barrow Year One*

	Harvester Level 1 Under 300 Lbs.	Harvester Level 2 300-999 Lbs.	Harvester Level 3 1,000-1,999 Lbs.	Harvester Level 4 2,000 Lbs. Plus		Weighted Mean Pounds Total Harvested	Number of Sample Household
Household Size							
1	75%	6%		19%	=	100% 721	9
2,3	48%	24%	1%	27%	=	100% 1,250	20
4	20%	60%	5%	18%	=	1074 846	14
5+	50%	25%	14%	11%	=	100% 1,006	45
							Total 88
Total Months Worked By Household Members							
0	46%	23%		31%	=	100% 1,271	12
1-11	27%	56%	3%	15%	=	101% 760	12
12	44%	12%	33%	10%	=	99% 1,325	20
13-22	46%	43%	3%	9%	=	101% 761	7
23+	66%	10%	6%	19%	=	101% 926	26
							Total 77
Year One Household Income							
Under \$10,000	46%	17%	3%	34%	=	100% 1,483	25
\$10-39,999	7%	70%	9%	14%	=	100% 898	17
\$40,000 Plus	56%	20%	14%	9%	=	99% 901	28
							Total 70

* Year One = April 1, 1987 through March 31, 1988

Source: Stephen R. Braund & Associates, 1989

STATUS OF MAJOR FAUNAL RESOURCES

by Sam Stoker, PhD.

Beringia

The following section discusses recent population histories for major subsistence species harvested at Barrow, and presents estimates of current population size, areal and temporal distribution, population trends, recruitment rates, sustainable yield levels, and current impact of subsistence harvests on these populations.

When reviewing this information it must be kept in mind that the numbers presented are in most cases best estimates only. In the case of marine mammals in particular, census work is costly and difficult and the results are always imprecise and subject to interpretation. The same concept applies to recruitment rates and sustainable yield estimates for both marine and terrestrial resources. These figures are based primarily on the productivity (birth rate) of the population, age composition of the population, and natural mortality rates, all of which are poorly understood and documented for most species in question and are often subject to unpredictable environmental factors such as weather and ice conditions.

Similar reservations pertain to estimates of subsistence harvest impact on these populations. As noted above, population and sustainable yield levels for the resources themselves are subject to uncertainty, which makes it difficult to accurately assess effects on such populations resulting from subsistence harvests or other sources of impact. In addition, harvest figures themselves are in most cases incomplete and inadequate. For instance, good harvest data may exist for certain communities for specific years, but the application of such data to regional and usually migratory populations is of limited value without comparable information on a broader areal and temporal scale. For most species in question, such regional harvest information consists of estimates only, often extrapolated from a few locations during specific years. Such estimates are not without value, but at the same time must be viewed and applied with caution. As has been noted in other studies (Stoker 1984) subsistence harvests tend to be extremely variable from location to location and from year to year as to both magnitude and species composition.

Subsistence strategies are by nature flexible and opportunistic, with emphasis shifting from resource to resource depending not only on need but also on local abundance, weather, ice conditions, and timing of migrations. To extrapolate results from any one location or for any given year to the population as a whole is risky at best.

The following pages will discuss, in as much detail as is possible, population status, distribution, sustainable yield and subsistence harvest impact, by species or general taxa, for resources of apparently major importance to Barrow. Current information suggests that such species or resources are (not necessarily in order of importance): bowhead whale, bearded seal, ringed seal, walrus, caribou, fish, and waterfowl.

BOWHEAD WHALE (*Balaena mysticetus*)

Population estimates for the western bowhead stock have increased rather dramatically over the past 10 years. In 1978 the population estimate, derived from shore counts near Barrow during the spring migration, was 1,783 to 2,864 animals, with 95 percent confidence limits. In subsequent years this estimate was increased conservatively to its present mean of 7,800, with a 95 percent confidence range from about 5,400 to 10,200 (Report of the IWC Scientific Committee, 1988). Though the population itself is thought to be on the road to recovery after severe depletion by commercial interests during the latter 19th and early 20th centuries, the rapid increase indicated by these figures is almost certainly due more to improved estimation techniques than to population increase per se over that period of time.

Estimates of productivity, natural mortality, net recruitment and maximum sustainable yield rates for the western bowhead population are somewhat uncertain at present. For purposes of simulation models the International Whaling Commission (IWC) currently employs a conservative annual natural mortality rate of five percent and an annual net recruitment range of 1.9 to 2.9 percent. Employing the currently accepted population mean of 7,800, this calculates to an annual population increase of from 148 to 226 animals, well in excess of the 41 landed or 44 struck annual quota approved by the IWC in 1988 for the nine communities currently participating in bowhead whaling.

The western bowhead stock is distinctly migratory, moving annually from winter grounds in the southern and central Bering Sea to summer feeding areas in the eastern Beaufort Sea. The population begins its northward migration about March, depending on weather and ice conditions, normally passes through Bering Strait in late March or early April and from there follows nearshore lead systems up the Chukchi coast, usually arriving in the vicinity of Barrow during May. From Barrow the whales continue their migration to the east following offshore leads to the vicinity of Banks Island where they spend the summer months. The fall migration usually begins in September or early October with a nearshore easterly movement from the eastern Beaufort to Point Barrow, then largely offshore from Barrow south through the Chukchi and northern Bering seas. Whaling is conducted primarily during the spring migration by residents of Bering Strait and the Chukchi coast, and during the fall by residents of the Beaufort, Barrow, and to some extent communities of the Bering Strait region. are able to take advantage of both spring and fall migrations, though the spring hunt is generally more productive.

Bowheads are baleen filter-feeders, obtaining their food from the water column in the form of zooplankton (krill) such as copepods, mysids, and euphausiids.

BEARDED SEAL (*Erignathus barbatus*)

Bearded seals are distributed over virtually all of the continental shelf waters of the northern Bering, Chukchi and Beaufort seas, with largest concentrations observed during late winter (January through April) in the northern Bering Sea (Burns 1981, Braham et al. 1984). The general population is somewhat migratory, shifting northward from the Bering and southern Chukchi toward the northern Chukchi and Beaufort in summer and back southward during winter months. The bulk of the northward movement usually begins in April, passes through Bering Strait sometime from early May to mid-June, and by June or July is in the vicinity of Barrow. This is a trend, however, as opposed to a distinct and predictable migration, with some animals remaining in the Bering Sea throughout the summer and others wintering in the Beaufort Sea. As for most marine mammals of the region, the fall movement, occurring from September through December, is even less concentrated and predictable than is the movement northward in the spring.

As a general rule bearded seals stay within the seasonal ice but avoid zones of unbroken shore fast ice or dense pack ice, preferring broken ice and areas with leads and polynas (Burns 1981). Bearded seal is considered the most widely distributed pinniped occurring in the drifting seasonal ice of the Bering and Chukchi seas (Burns and Frost 1979).

Bearded seals are opportunistic bottom feeders, utilizing a wide variety of prey including crabs, shrimp, mollusks and demersal fish (Lowry et al. 1982). They appear to be limited to continental shelf areas with feeding depths of 150 to 200 meters (Kelly 1988a, Burns et al. 1981), and as might be expected concentrate in relatively shallow waters with high benthic biomass such as occur in the northern Bering and southern and central Chukchi seas.

Population estimates for bearded seals are imprecise, deriving largely from fixed-wing aerial surveys of seals resting on the ice in spring and summer (Kelly 1988a). Available estimates for the Bering/Chukchi population range from 250,000 to 300,000 animals (U.S. Interagency Task Group Report 1976, Burns 1981, Popov 1976, Kelly 1988a).

Information regarding productivity, natural mortality, recruitment rates and sustainable yield levels for bearded seals is limited and incomplete. Gross annual productivity was estimated at about 24 percent for the Bering and Chukchi population during the 1960s and 1970s (Kelly 1988a). Reliable estimates of natural mortality and net recruitment to the population, however, are not presently available. Total recommended harvest levels for Alaska range from 3,000 retrieved seals per year (U.S. Federal Register 1979) to 9,000 retrieved per year (U.S. Interagency Task Group Report 1976).

Data pertaining to total annual subsistence harvests of bearded seals in Alaska are also incomplete, particularly in recent years, and consist for the most part of general estimates based on harvest returns from a few locations in certain years. The total annual retrieved harvest for Alaska is estimated at 1,784 per year (with a standard deviation of 941) between 1966 and 1977 (Burns 1981, Kelly 1988a). There is some indication, however, that this number may be on the low side. During 1977 a retrieved harvest of 4,750 was recorded for Alaska, probably due to increased monitoring effort that year rather than to unusually high harvest levels (Lloyd Lowry, Alaska Department of Fish and Game,

personal communication). An earlier report (Burns 1967) estimates the total kill of bearded seals in Alaska to be about 7,000 to 9,000 per year. If a killed but lost ratio of 50 percent is assumed, this would equate to an annual retrieved harvest of 3,500 to 4,500, more in accord with the 1977 return.

On the Soviet side, retrieved harvests in the Bering and Chukchi seas are estimated to range between 1,986 and 7,009 per year (mean 4,467 with standard deviation 1,974) for the period 1966 through 1970, declining to 1,150 to 2,053 per year (mean 1,448 with standard deviation 249) for 1971 through 1983 (Kelly 1988a).

Total U.S./U.S.S.R. harvests, applying the conservative estimates of 1,784 and 1,448, calculate to 3,232 per year retrieved or approximately 6,500 killed using a killed but lost ratio of 50 percent. This would equate to two to three percent of the total population per year, presumably well within the range of maximum sustainable yield. This assumption is awkward, however; since the harvest estimates are for somewhat different sets of years and are probably conservative, no good estimates are available for recruitment and sustainable yield for this population on either a numbers or percentage basis, and population data are out of date and imprecise. Alaskan harvests do appear, however, to remain within levels recommended by federal agencies as described above.

RINGED SEAL (Phoca hispida)

The ringed seal is the most common and widely distributed arctic seal, occurring throughout the region. As with bearded seals, population estimates are based on aerial observations in the summer, when at least some seals are on the ice, and are imprecise and subject to variable interpretation. For Alaskan waters, the best guess seems to be one to 1.5 million (Kelly 1988b, Littlefield 1977), with annual sustainable yield estimated at eight to 11 percent (McLaren 1958). Again, however, it must be pointed out that this figure is based on incomplete information and is an estimate only.

In Alaskan waters ringed seals seem to be strongly reliant on ice as a substrate for hauling out, molting and pupping, which occurs in subnivean dens in shorefast ice or within stable pack ice. And though they inhabit to some extent the ice-covered reaches of the Bering, Chukchi and Beaufort seas during

all seasons. they are somewhat migratory. The bulk of the population shifts from north to south in the fall and winter and back during spring in response to ice conditions. In recent years the greatest numbers are taken in the Bering Strait vicinity from late April through June, arriving in the Barrow vicinity in late June (Alaska Department of Fish and Game 1976). The population distribution at any one time or during any given year seems to vary depending on ice and weather conditions. It is estimated, for example, that from 1970 through 1977 the density of ringed seals declined by 50 percent in the Beaufort Sea and by 35 percent in the northern Chukchi Sea, presumably in response to severe ice conditions. At the same time a corresponding increase in population was observed in the southern Chukchi and northern Bering seas (U.S. Department of Commerce 1978). During mid-winter ringed seals tend to concentrate inshore, replacing the larger bearded seals which move offshore to areas of flawed and moving ice (Burns 1967).

Ringed seals are opportunistic feeders, including items such as fish (primarily arctic and saffron cod), shrimp, mysids, and euphausiids in their diet.

The subsistence harvest of ringed seals has declined significantly in Alaska in recent years, although the population of seals has not. From estimates of 10,000 to 20,000 ringed seals taken per year in the 1950s and 1960s, the harvest has fallen to levels of 4,000 to 5,000 or lower in recent years (U.S. Department of Commerce 1978, Frost 1985, personal communication with John Burns). The recommended sustainable yield for Alaska is estimated at 20,000 per year, including killed but lost, significantly above the present harvest level (U.S. Federal Register 1979, U.S. Interagency Task Group Report 1976).

WALRUS (*Odobenus rosmarus divergens*)

Like the bowhead whale, the walrus was subjected to major commercial exploitation in the last half of the nineteenth and first half of the twentieth centuries and suffered a consequentially severe population decline. The initial, pre-commercial harvest population, estimated at around 200,000, was reduced to dangerously low levels by the mid-twentieth century. Over the past few decades, however, this species has been under joint U.S.-U.S.S.R. management and protection and populations have recovered to levels comparable with the pre-exploited stock. The most recent estimates, derived from joint

U.S.-Soviet aerial surveys, place the population at about 233,000 (Gilbert 1989), down slightly from the 1980 estimate of 246,000.

The bulk of the walrus population, particularly the females, calves and young adults, are distinctly migratory in nature. Most winter in the central and northwestern Bering Sea, then follow the ice edge northward in its retreat to the northern Chukchi Sea in spring and summer (Fay 1982). Exceptions to this pattern are groups of males that summer at specific locations in Bristol Bay. These groups move northwestward to mingle with the migratory population on their wintering grounds, and may or may not consist of the same animals from one year to the next (F. H. Fay and J.J. Burns, personal communication). Depending on weather and ice conditions, the bulk of the migratory population passes through Bering Strait in May and June and arrives in the Barrow vicinity in July. By late September they are moving back southward, passing through Bering Strait again in October and November. As a rule, the northward migration in spring is more well-defined, predictable and concentrated than the return fall migration.

Walrus are limited for feeding purposes to continental shelf areas with water depths of 100 meters or less. Though they prey on a wide variety of benthic invertebrates, including clams, snails, crabs, shrimp, worms, tunicates, and other taxa, the majority of their diet seems to consist of a few genera of bivalve mollusks (Fay 1982, Fay and Stoker 1982). In addition to invertebrates they ingest small demersal fish on occasion, and are known to kill or at least scavenge seals.

There are indications that the walrus population may be at or in excess of the carrying capacity of its environment (probably defined by food resources) and may already have begun to decline. These indications include: greater diversity and smaller size of prey species found in stomachs, increasing average age of the population, reduced birth rate and calf survival, and decreasing fat reserves observed from harvested animals (Fay and Stoker 1982, Fay et al. 1989). Recent calculations indicate that the current annual recruitment rate may be as low as one percent (Fay et al. 1989).

Concurrently, subsistence harvests have increased significantly in recent years on both the Alaskan and Siberian sides. Total retrieved Alaskan harvests have

increased from about 1,500 to 2,000 per year in the 1960s and early 1970s to harvests exceeding 5,000 per year in the 1980s, while Soviet harvest have increased from about 1,000 to 4,000 per year. Factoring in a killed but lost ratio, current mortality from hunting may be 10,000 to 15,000 per year (Fayet al. 1989), or four to six percent of the population. If the annual recruitment estimate of one percent is accurate, this current harvest level is clearly in excess of sustained yield, and will probably result in a further population decline over the coming years. In addition to increased overall harvest levels, the percentages of adult females in this harvest has increased in recent years, compounding the effect.

Historically, the bulk (plus or minus 80 percent) of the Alaskan harvest takes place in the north Bering Sea and Bering Strait region in May and June. An additional seven to eight percent are taken between Point Hope and Barrow during the summer, and the remaining 10 to 12 percent in the Bering Strait and north Bering Sea during fall and winter.

CARIBOU (*Rangifer tarandus granti*)

The Western Arctic caribou herd (WAH), the largest in the state, seems particularly prone to drastic population fluctuations. Though no numerical data are available, historical records indicate that caribou were "abundant" in the WAH region in the early 1800s and "scarce" by the late nineteenth and early twentieth centuries. By 1950, when the first aerial survey was undertaken, the population had recovered to an estimated 238,000. By the mid-1960s population estimates had increased to around 300,000 animals, but declined again to 242,000 in 1970. By 1975 this decline had accelerated (102,000 estimated), and by 1976 the Western Arctic herd had reached a population low of 77,000 to 82,000 (Davis et al. 1980). At that time major harvest restrictions were imposed by the state. Since 1976 the herd has increased steadily to estimated levels of 113,000 in 1979, 165,000 in 1981, 239,000 in 1986, and 311,000 as of 1988 (Davis and Valkenburg 1978, Jim Davis, personal communication).

The other caribou herd from which harvests are taken by residents of Barrow is the Teshekpuk herd. Though figures for this herd are less available than for the Western Arctic herd, the Teshekpuk population also seems to be on the

increase at present, with the most recent estimate (1983) being about 11,000 animals (Jim Davis, personal communication).

For both herds, the annual recruitment rate is estimated at 11 to 14 percent. This calculates to an annual recruitment to the Western Arctic herd of about 34,000 to 44,000, and 1,200 to 1,500 to the Teshekpuk herd. As of 1983, a conservative sustained yield estimate of five percent per year was derived for the Western Arctic herd (Jim Davis, Personal communication), which would equate to about 15,500 per year for this herd and about 550 per year for the Teshekpuk herd at present population levels.

FISH (all species)

As is obvious from Table 35 and Figure 23, various species of whitefish constitute the bulk of fish harvests at Barrow, followed by other species of freshwater fish and salmon.

For the region as a whole, total annual fish harvests are estimated at about 210,000 pounds for the villages of Barrow, Wainwright, Point Lay, Atkasuk, Nuiqsut and Kaktovik (Craig 1989), consisting primarily of various species of whitefish and cisco, arctic char, Pacific herring, grayling, lake trout, burbot, rainbow smelt, arctic cod and saffron cod, arctic flounder, fourhorn sculpin, capelin and several species of salmon.

Little information is available concerning population or sustainable yield levels for any of these species in this region, so it is impossible to assess the impact of present harvest levels other than to say that harvest levels seem to be relatively stable over years for which data are available. The only population data available are for the Colville River arctic cisco fishery (Gallaway et al. 1989). This population seems to be somewhat variable from year to year, though it is thought that such variability is not due to fisheries impacts.

WATERFOWL

The most recent and most comprehensive estimates of waterfowl populations in the Barrow region are derived from aerial surveys of the Arctic coastal plain

during 1986 and 1987. Surveys were flown along predetermined transects by the U.S. Fish and Wildlife Service during late June and early July of both years. A similar survey was conducted during 1988, but data from that survey are not yet available.

Results of the 1986 and 1987 surveys indicate that duck populations were up by about 31 percent in 1987, or 817,446 versus **622,029** for 1986 (King and Cain 1987). Major duck species included in the 1987 survey are oldsquaw (418,465), pintail (322,036), scaup (30,379) and eiders (16,978). It is thought that this increase probably is due to an influx of birds displaced by drought conditions in Canada, and does not indicate a permanent population increase in the region (King and Cain 1987).

The goose population on the Arctic coastal plain, on the other hand, shows a 35 percent decrease in 1987 (112,252 in 1987 versus 173,385 in 1986), probably due to late springs the last several years and generally poor rearing conditions (King and Cain 1987). Goose species included in the 1987 survey are white fronted geese (88,538), Canada geese (20,110), and brant (3,604).

Similar surveys of molting geese flown in the Teshekpuk Lakes area (King 1987) indicate that goose populations, particularly brant, were down by about 35 percent in 1987 compared with 1986. They were 47 percent below the long term mean since surveys were begun in 1976 and were the lowest total numbers observed since 1976. It is thought that this decrease does not, however, reflect local factors so much as it does poor nest productivity in the Yukon Delta National Wildlife Refuge in recent years (King 1987).

LOCAL IMPACT

For most species or resources discussed, the impact of local harvests on more general population dynamics is minimal. This is certainly true regarding the impact of Barrow on walrus, and probably holds true for bearded seals and ringed seals.

The retrieved harvest of walrus by Barrow for the period April 1987 through March 1988 was estimated at 117 animals, constituting approximately two to three percent of the total subsistence harvest for Alaska. Present levels of

subsistence harvest do pose a threat to the stability of the walrus population. but the threat in this case emanates from Bering Strait and the north Bering Sea.

The retrieved bearded seal harvest by Barrow for the same time period was approximately 259 animals, about eight percent of the total combined U.S.-Soviet take. There appears to be no immediate threat to this population, certainly none from Barrow.

Harvests of ringed seals by Barrow during April 1987 through March 1988 totalled 463 retrieved, about 10 to 13 percent of the total for all Alaska. There is not a problem with ringed seal populations so far as is known.

As discussed above, the Western Arctic caribou herd and the Teshekpuk herd seem to be healthy and increasing at present. Barrow harvests are not described by area, so it is difficult to say how the harvest is divided between these two herds. It seems unlikely, however, that local harvests are of sufficient impact to adversely affect either population at this time.

As stated above, it is impossible to evaluate the effect of fish harvests on the various populations at this time. Harvests do seem to be relatively stable, however, which probably indicates that populations are being maintained.

The waterfowl harvest by Barrow residents between April 1987 and March 1988 included 2,724 geese (2,270 white fronted geese, 120 brant, and 334 non-specified) and 5,280 eider, mostly non-specified. If all of this harvest is taken from the Arctic coastal plain population discussed above, it would constitute about two percent of the white fronted population, about three percent of the brant population, and 28 percent of the censused eider population. In the case of eider, however, the estimates presented above for the Arctic coastal plain are not a true reflection of the regional population as a whole (Rodney King, U.S. Fish and Wildlife Service, personal communication). Although no estimates are available for productivity, recruitment, or sustainable yield for these populations, present subsistence harvests do not appear to be a threat to their maintenance.

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APPENDIX

References for this Appendix start on page 189 of the preceding section titled References Cited.

CONVERSIONS OF HARVEST AMOUNTS TO POUNDS

The harvest data are presented as the number of animals harvested and edible pounds of resource product. The edible weights were selected as one reporting unit in order to provide the public with data that are easily compared with ADF&G data. The ADF&G has published the bulk of Alaska subsistence studies and the majority of their research is reported as edible (usable) pounds. One notable exception is the recent Kivalina study by Burch (1985), a consultant on this study. Burch (1985) discusses in detail the tremendous variations in what is considered by the harvesters and users as the edible weight of an animal. Burch mentions fish as an example of how edible weight varies significantly and that edible weight may be as high as 99 percent of live body weight (Burch 1985).

The edible weight conversions for each subsistence resource are listed in Table A-1. Fish harvests often required an additional conversion, an estimate of the number of fish per sack. Unless otherwise noted, the type of sack is a large garbage or gunny sack. For those fish harvests that were reported in number of sacks, the number of fish in a sack were computed as follows:

<u>Fish Species</u>	<u>Inupiaq Name</u>	<u>Number of Fish per Sack</u>
Whitefish (non-specified)		50
Round whitefish	Aanaakliq	50
Broad whitefish	Aanaakliq	50
River caught	Aanaakliq	50
Lake caught	Aanaakliq	25
Humpback whitefish	Pikutuuq	50
Least cisco	Iqalusaaq	100
Bering, Arctic cisco	Qaaktaq	100
Capelin	Pagmakraq	100 (per gallon pail)
Arctic grayling	Sulukpaugaq	90
Rainbow smelt	Ilhuagniq	80 (per grocery sack)
Arctic cod	Iqalugaq	80 (per grocery sack)
Tomcod	Uugaq	100

TABLE A-1: CONVERSIONFACTORS¹

<u>Species</u>	<u>Iñupiaq Name</u>	<u>Edible Weight per Resource in Pounds</u>
Marine Mammals		
Bearded seal	Ugruk	176.0
Ringed seal	Natchiq	42.0
Spotted seal	Qasigiaq	42.0
Bowhead whale	Aḡviq	21,218.02
Polar bear	Nanuq	496.0
Walrus	Aiviq	772.0
Terrestrial Mammals		
Caribou	Tuttu	117.0
Moose	Tuttuvak	500.0
Brown bear	Akḡaq	100.0
Dall sheep	Imnaiq	99.0
Arctic fox (Blue)	Tiḡiganniaq	0.0
Red fox (Cross, Silver)	Kayuqtuq	0.0
Porcupine	Qinaḡluk	10.0 ³
Ground squirrel	Siksrik	0.4 ⁴
Wolverine	Qavvik	0.0
Fish		
Salmon (non -specified)		6.1 ⁴
Chum s2j111011	Iqalugruaq	6.1 ⁴
Pink (humpback) salmon	Amaqtuuq	3.1
Silver(coho) salmon	Iqalugruaq	6.0 ³
King (chinook) salmon		18.0 ³
Whitefish (non-specified)		2.0 ³
Round whitefish	Aanaakliq	1.0
Broad whitefish	Aanaakliq	2.5
River caught	Aanaakliq	2.5
Lake caught	Aanaakliq	3.4 ³
Humpback whitefish	Pikutuuq	2.5
Least cisco	Iqalusaaq	1.0 ³
Bering, Arctic cisco	Qaaktaq	1.0 ³
Capelin	Pagmaksraq	0.2 ³
Arctic grayling	Sulukpaugaq	0.8
Arctic cod	Iqalugaq	0.2 ⁵
Tomcod (Saffron cod)	Uugaq	1.0 ⁵
Sculpin	Kanayuq	0.6 ⁵
Arctic char	Iqalukpik	2.8
Burbot(Ling cod)	Tittaaliq	4.0
Northern pike	Siulik	2.3 ³
Rainbow smelt	Iḡhuḡniq	0.12 ³
Lake trout	Iqalukpak	4.0

TABLE A-1 (cont.): CONVERSION FACTORS¹

<u>Species</u>	<u>Iñupiaq Name</u>	<u>Edible Weight per Resource in Pounds</u>
Birds		
Duck (non-specified)	Qaugak	1.5
Eider (non-specified)		1.5
Common eider	Amauligruaq	1.5
King eider	Qiqalik	1.5
Spectacle eider	Tuutalluk	1.5
Goose (non-specified)	Nigliq	4.5
Brant	Nigliñgaq	3.0
White-fronted goose	Niglivialuk (Nigliq)	4.5
Lesser snow goose	Kaṇuq	4.5
Canada goose	Iqsraḡutilik	4.5
Ptarmigan (non-specified)		0.7
Willow ptarmigan	Aqargiq	0.7
Other Resources		
Berries (non-specified)		1.0 ⁶
Blueberry	Asiaq	1.0 ⁶
Cranberry	Kimmiññaq	1.0 ⁶
Salmonberry	Aqpik	1.0 ⁶
Bird Eggs (non-specified)	Mannik	0.15
Eider eggs		0.15
Greens/Roots (non-specified)		1.0 ⁶
Wild rhubarb	Quṇulliq	1.0 ⁶
Water ⁷		0.0
Fresh water	Imiq	0.0
Fresh water ice	Sikutaq	0.0
Sea ice	Siku	0.0

1. Sources are ADF&G Division of Subsistence Community Profile Database for Nuiqsut and Kaktovik (n.d.) unless otherwise noted.
2. Whale conversion weight was computed by the study team from the mean total edible weight per whale of the 11 whales harvested in Year Two (see Table A-2).
3. Study team estimate.
4. Source: Pedersen 1988.
5. Source: Burch 1985.
6. Measured in quarts.
7. Water is measured in gallons and ice is measured in sled loads. A sled load is estimated to equal 100 gallons of water.

The bowhead whale weight is an average of the estimated edible weight of each of the eleven whales harvested by Barrow in 1988 (Table A-2). The total edible pounds of bowhead whale harvested was calculated independently of the sample data used for estimating the harvest weight of each of the other species. The reasons for our unique treatment of bowhead, as well as the data collection techniques and assumptions about the edible weight of individual whales, are discussed below.

Although the number of whales harvested by Barrow whaling crews is easily determined, the study team anticipated that it would be difficult to accurately measure how many pounds of whale each study household received. To weigh each sample household's share was an impossible task and having the household members estimate the weight of their shares would be unreliable. Application of an assumed average weight of a share was also unreliable since the size of the whales harvested varied as did the number of crewshares distributed for each whale. Beginning with the first whale harvested, the study team weighed several crewshares (i.e., one crewshare is the total amount of whale allocated to one crew at the butcher site) from each whale, recorded the number of crews receiving a share, and recorded the number of individuals on each crew. This information was used as the primary basis for estimating the total number of pounds of whale taken off the ice. The study team also relied on NSB Department of Wildlife Management whale weight data (George et al., 1988, John C. George, personal communication) to complete estimates of the edible portion of each whale.

While not used in the estimation of the edible whale weights, the study team did collect crew member share (i. e., an individual's allocation of a crewshare) data from each study household. Each share received was recorded along with a unique whale identification number. Household harvest records for whale were used to estimate the percentage of community participation in bowhead whale harvests rather than to estimate the amount of whale harvested. For the following reasons, these data were less reliable as a basis for estimating total whale harvest amount for the community than the independent approach of estimating the weight of all crewshares.

0 Sample-derived estimates of the total whale harvest are less reliable in part because the total harvest is based on only 11 harvest events

TABLE A-2: 1988 BARROW BOWHEAD WHALE HARVEST,
ESTIMATED TOTAL EDIBLE POUNDS PER WHALE

<u>Date</u>	<u>Length</u>	<u>Number of Crew-Shares¹</u>	<u>Average Crew-Share Weight</u>	<u>Total Nininat Weight²</u>	<u>Total Tavsi & Uati Weight³</u>	<u>Total Edible Weight of Whale</u>
4/24/88	29'	39	215	8,385	5,590	13,975
4/25/88	29'8"	30	2834	8,490	5,660	14,150
4/25/88	29'8"	30	269	8,070	5,380	13,450
4/25/88	25'6"	23	239 ⁴	5,497	3,665	9,162
4/25/88	29'2"	26	260 ⁴	6,760	4,507	11,267
5/ 2/88	27'4"	39	228	8,892	5,928	14,820
5/ 4/88	26'10"	38	224	8,512	5,675	14,187
5/ 6/88	24'7"	38	111	4,218	2,812	7,030
9/15/88 ⁵	47'10"	25	994	24,853	16,568	41,4217
9/17/88 ⁵	49'6"	25	1,108	27,692	18,462	46,154 ⁷
9/17/88 ⁵	51'3"	21	1,365	28,671	19,114	47,785 ⁶
Total:	n/a	334	5.296	140,040	93,428	233,401
Average:	33'8"	30.4	481.5	12,731	8,494	21,218

1. One crewshare is the total amount of whale allocated to one crew at the butcher site.
2. Nininat is the portion of the whale distributed to participating crews at the harvest site. The weight of the nininat shares was computed from crew share data collected for this study.
3. Of the tavsi portion, half is cooked and served to the public and the other half is distributed to the successful crew. The uati portion is stored by the successful captain and distributed at various feasts and celebrations throughout the year. Total tavsi and uati weights were estimated to equal 40 percent of total edible whale weight, a ratio developed by SRB&A from whale weight data collected by the NSB Department of Wildlife Management (John C. George, personal communication).
4. The only available crew shares for these three whales were weighed after they had been combined with other crew shares received on the same day. The average crew share weight of the three, (260 pounds) was assigned to the whale measuring 29'2". Based on the available combined weights the average crew share weights were increased by nine percent for the 29'8" whale and decreased by eight percent for the 25'6" whale.
5. No field weights were taken for the three fall whales. The weights in these rows are estimates based on previous knowledge.
6. The total weight is the SRB&A average estimated edible whale weight for two 51 foot whales (51'4" and 51'3") taken by Barrow whalers in 1987.
7. Estimated total weights for these two whales are based on the average edible weight per foot in length for the 51 foot whales discussed in footnote 6. The average weight per foot of 932 pounds was reduced proportionately based on the actual length of the whales.

Source: Stephen R. Braund & Associates, 1989.

(i. e., whales). Chance variations in participation by sample households contribute to a substantial sampling error. When this is multiplied by large harvest shares, the community total can vary substantially by chance.

- o The distribution of whale is a complex social and cultural process. One tradition observed during fieldwork for this study was that each household in an extended family often would store their shares together, usually in the family ice cellar at the parent's house. Individual households within that extended family would be unsure of the number or size of "their" individual shares.
- o Whale harvest data, at the level of detail presented at this report, did not fit the data recording rules established for recording other species. For example, the study team commonly gathered the whale harvest information from secondary sources (i.e., from individuals who may not have been present at the division of the whale). In the situations when whaling crew members did not leave camp until the whaling season was over, family members would pick up their shares for them. Furthermore, usually only one crew member from a crew would travel to a whale harvest site to aid in the butchering. He would be the only "active" participant in the harvest for that crew.
- o Finally, as discussed in more detail below, the crewshare distribution the day of the whale harvest was estimated at 60 percent of the total edible weight. The remaining 40 percent went to the successful captains and crews and the majority was distributed during at least six public events and feasts throughout the year. The amount distributed at each occasion was impossible to gauge during this study.

The bowhead harvest was characterized by extensive distribution and sharing throughout the year, with a major distribution in the form of crewshares occurring on the day of the harvest. In Barrow this nininat portion was generally taken from the front half of the whale and divided into crewshares, with one crewshare going to each whaling crew that assisted in the capture.

towing, and/or butchering of the whale. The shares were usually of equal size, although larger shares were sometimes given to crews that helped to capture and land the whale. Not all crews arrived to help with every whale and usually an extra share or two was set aside for those individuals who helped with the butchering but who were not members of whaling crews. The number of crewshares per whale varied from 21 to 39 in Year Two (Table A-2). The study team measured and weighed representative crewshares and crew member shares in an attempt to arrive at a valid weight for the edible portion of the nininatshare of each whale.

The study team, with the aid of locally hired research assistants, weighed crewshares at various stages of the processing and distribution of the whole, depending upon circumstances. The first opportunity entailed weighing entire crewshares at the whale harvest site when the researchers were able to be there at the right moment. The amount of time between when the whale was divided into crewshares and when the crews were ready to haul them to their captain's house was very short. The weighing of entire crewshares often depended on available manpower and the study team cooperated with individuals from the NSB Department of Wildlife Management in weighing crew shares. Crewshare u'eights among the different whales harvested varied from 111 to 1,365 pounds and averaged 482 pounds (Table A-2).

The next opportunity was to weigh the shares at a whaling captain's house before his crew or family members had divided their crewshare into crew member shares. However, under ideal circumstances the study team weighed the crewshare immediately after it had been divided into crew member shares but before crew members had begun to take their shares home. The window of opportunist\ was also very brief. Finally, if not enough crewshare weights had been gathered for a particular whale, the researchers visited individual crew members' households to weigh their shares before those were distributed further or consumed.

Supplemental data required for the computation of total crewshare weights included the total number of crews receiving shares from each whale and the total number of crew members on each crew. Information on total crews per whale was obtained at the whale site by the researchers or from knowledgeable

people who were present at the harvest. The researchers also asked each whaling captain how many crew members shares he divided his crewshare into and how many people were on his crew. In Year Two, the average size of a crew was 12 members.

As is illustrated in Table A-2, the number of crewshares for each whale was multiplied by the average crewshare weight to compute the estimated weight of the nininat share. The total nininat share for the entire community was 140,040 pounds.

The above discussion refers only to the nininat portion of the whale. The tavsi and uati shares comprised the remainder of the edible whale weight. Half of the tavsi was apportioned to the successful crew, while the other half was cooked and served to the public. The uati was stored by the successful captains and was distributed at a number of public events and feasts. Occasions for public sharing and distribution of whale in Years One and Two included: a celebrative feast at the captain's house the day (or the day after) the harvest occurred; a feast on the beach when the successful crews formally brought their whaling boats off the ice; the Nalukataq celebration: Thanksgiving; Christmas; and Kivgiq (the messenger feast). Successful captains also were called upon to contribute whale for events and holiday celebrations taking place in other North Slope villages.

The study team obtained average weights for the tavsi and uati shares from the NSB Wildlife Management Department (John C. George, personal communication). SRB&A worked in association with Craig George and Geoff Carroll and their staff to weigh these portions at two whale harvest sites in 1987. The study team used that data to develop a ratio of tavsi and uati to the total edible whale weight. The tavsi and uati shares combined equaled approximately 40 percent of the entire edible whale weight of the two whales. The study team used that standard percentage to compute all the tavsi and uati weights, and thus all the total whale weights presented in this study.

DATA COLLECTION AND DATA PROCESSING

The primary study objective (i. e., community representative subsistence harvest data by species and location) has been achieved in Barrow through regular contact with members of 111 Barrow households. Over 1,500 individual harvest events were recorded during Year One (April 1, 1988 through March 31, 1989). The harvest information gathered during the informal household discussions was systematically recorded on one-page forms and blue-line copies of USGS 1:250,000 maps. Each event became a record of data that was added to the SPSS/PC+ data set in the SRB&A Barrow office. Harvest locations were also transferred to base maps in Barrow. The base maps were then sent to the North Slope Borough Planning Department's Geographic Information Systems (GIS) Anchorage office where NSB staff digitized the harvest locations and prepared harvest arcmaps for this report.

The researchers have also been assembling household data during Year One and Year Two that will describe the role of subsistence activities in the lives of Barrow residents. These data include average household size, ethnic classification, total months of employment activity and income of households. The following discussion explains in more detail the procedures and techniques the study team used to collect, code, record and process the Year Two subsistence harvest data.

Data Collection Methods

The study team employed two main methods of collecting the data for this project: in forma I key informant discussions and participant observation. The study team continually attempted to employ locally hired research assistants to aid in the data collection effort. During Year Two nine local residents were hired as research assistants to gather harvest data and participate in other aspects of the research such as translating and interpretation, entering data into the computer data base, and general office work.

Key Informant Discussions

The basic harvest data were collected during periodic visits with each sample household. During each visit, the key informant reported the harvest

activities of household members. Primary data items reported by species were harvest site and number harvested. Key informants also reported (if available): the sex of the species harvested, which household members participated in the harvest activity, total number of household members present during the harvest trip, and the total number of non-household members participating in the harvest activity. Finally, researchers recorded any anecdotal information regarding weather, comparisons with previous harvests, observations on animal health or populations, or similar topics.

The researchers recorded the harvest activity data either in field notebooks or directly on the data coding forms. The household's harvest locations were marked directly onto maps by the researcher or by the harvesters themselves. Each map used to identify harvest areas included a legend block for identifying the household and harvest period. The same identification variables appear on activity record forms (discussed in detail below). The mapped information was collected on blueline USGS 1:250,000 scale topographic maps. The study team also used a blueline composite of the nine 1:250,000 Barrow-area quad sheets to record harvest locations. SRB&A and the MMS developed the Barrow Area Base Map to encompass the geographic area most commonly used by Barrow hunters.

Field researchers attempted to discuss each household's harvest activity with the most active hunter in the household. If he (or she) was unavailable, they contacted another household member who was present during the harvest. Occasionally a household member who was not present during the harvest would provide information about the recent harvest activities of the household members. In these cases, field staff later contacted the participating harvesters to verify the data and/or to obtain any missing information.

Infrequently a harvester did not know exactly where the harvest took place. In most instances, however, the harvester was able to refer the researcher to a member of the harvest group who could identify the harvest location.

The average number of successful harvest discussions per household for Year Two was four, with a range from one to 13. The total number of Year Two harvest discussions per month for the entire sample of 111 households ranged from 10 in August to 69 in April, and the total number of successful harvest discussions for the year was 441. These figures do not include the numerous attempts that

often were involved in locating and contacting the respondent before completing a successful harvest discussion. Most of the households required atleasttwo unsuccessful visits during the year, when either the main harvester of the household was unavailable or only partial information on the household's harvest activities was available. In addition there were two households that were out of the area for most of the year and there were five households that were "reluctant" participants. Harvest discussions with reluctant households were consistently incomplete so the discussions were not counted as successful. However, these households were maintained in the study and an estimate of their yearly harvest incorporated in the data because they contain active hunters whose contribution to the total Barrow harvest is important. The judgement of the study team was that partial information was better then none, and that the importance and value of the study to the community would become evident to the reluctant participants as the study progressed.

The actual frequency with which a household was contacted depended primarily on two factors: the observed level of activity during the first year of data collection and seasonal variation in the household's harvest activity level. Additionally, other factors affected the frequency of contact, such as bad weather, cultural events, difficulty locating and engaging participation of some respondents, and staffing problems. During the study a typology of household harvest activity levels emerged, with some households being non-harvesters, others being very active harvesters, and the majority being somewhat active depending primarily on the season of the year. Those who were inactive required very few visits while those who were very active required visits as often as hi-weekly (every two weeks) during their most active periods.

A household's harvest pattern varied primarily by season. Many households fished and hunted caribou in the fall, while others did not. Some households resided at camp for part of the summer, constituting their subsistence activities for the entire year. While full-time work did not prevent most hunters from hunting in the evenings and on weekends, others hunted only during vacations and leave time taken in the spring and fall. Once the general household pattern was determined, the frequency of visits was adapted to fit with the level and timing of the household's harvest activities. This procedure continued in Year Two with timing of harvest discussions becoming

even more focused around the households' actual harvest activity levels and timing of the harvests.

An unfavorable response to the hi-weekly visits initially attempted necessitated, for some households, less frequent contact in order to retain these households in the study. Other households viewed the study more favorably when the visits corresponded with their active periods rather than occurring arbitrarily.

Finally, many of the respondents quickly memorized the short set of questions repeatedly asked about their harvest activities. Recall appeared to be enhanced significantly through this process (an impression based on the ease versus the difficulty a respondent would have in reporting their data). About ten percent of the active households also began recording their harvests and harvest locations on their own (e.g., on a calendar or sheet of paper). Thus, while maintaining regular contact was integral to the success of the study, the high contact frequency rate initially envisioned for this study (i. e.. hi-weekly visits for active harvesters) was not necessary; moreover, bi-weekly visits were not well received by respondents.

As stated above, the study team attempted to increase the contact frequency for more active households during particularly active harvest periods in order to minimize hunter recall problems. However, the most active harvesters were typically the most difficult to contact *during the busy hunting times. They were either spending all their free time hunting or they were residing at their camps away from Barrow. The solution to the first problem was to contact the active hunter briefly during busy periods to gather as much harvest data as possible. The remainder of the information was filled in later when he was available for a more lengthy discussion.

In an attempt to solve the second problem of active harvesters residing at their hunting and fishing camps during peak hunting and fishing times, the study team experimented with self-reporting of harvests. During Year Two we providing five households with subsistence harvest journals and maps for recording harvests at camp. The participants were asked to record the species, the amount harvested, the date, and usually the sex of the animal(s) harvested, Remaining information (e.g., location and participants) would be

obtained in a subsequent harvest discussion with the household. Compared to respondents who did not use camp journals, the journals appeared to be most useful for enhancing the recall of harvest dates and species' sex. However, the journals were complete for only one of the households. Two others had started them but then lost the journals in the process of moving back to town from camp. One of these households had excellent recall of their summer harvest. The other two households had decided not to use the journals after arriving at camp. Although marginally successful, the study team plans to encourage the use of journals by households that spend extended times at camp during Year Three of the study.

Participant Observation

Tim Holmes, the SRB&A field coordinator, resided in Barrow throughout Year Two. Holmes' full-time presence in the community provided him ample opportunity for participant observation at various subsistence related activities and events. Braund, Burnham, and Stoker were also involved in participant observation in Barrow. The most important participant observations occurred:

- o during preparation for spring whaling, trail building out on the ice, and at whaling camps;
- o at whale harvest locations;
- o while whaling crew shares were distributed at captains' homes;
- o fishing with nets for salmon and whitefish near Pt. Barrow in Elson Lagoon;
- o eider hunting at Pigniq;
- o when bearded seal was butchered and hung to dry;
- o fall whaling;
- o fall fishing under the ice and caribou hunting south of Meade River;
- o distribution of whale and sharing of other foods during Thanksgiving.

Participant observation improved the accuracy of the data collection in a number of ways and has contributed to a trend in greater accuracy throughout the past two years of the study. Most importantly during Year Two, it provided the opportunity for informal interaction and discussions with many of the

Barrow families participating in the study. While the study team learned more about subsistence in the process, the community members were able to learn more about the project. This reciprocity was important; although many of the Barrow community leaders have publicly supported the project from the beginning, many of the individual hunters remained skeptical of its purpose. Participation in subsistence activities also demonstrated to many of the hunters the interest of the researchers in learning about many aspects of contemporary subsistence activities. Their perception of the project was also thereby enhanced.

Travel with hunters also benefitted the project. For example, most hunters use the Iñupiaq names for landmarks and hunting areas. Through personal experience Holmes learned to recognize some of the locations. A familiarity with significant landmarks, weather, travel conditions, and species availability out in the field allowed Holmes to assist the hunters in recalling the necessary information about their harvests. As in Year One, participant observation also provided the opportunity to continually field check the data collection rules and methods. Researchers directly observed, for example: how harvests were divided among hunters; how harvests were counted and weighed; and how hunters approached the task of locating harvest resources. The distribution of bowhead whale has been especially difficult to analytically conform to the structure of a computerized data base. The accuracy of the whaling data continues to improve through participation in whaling activities and the experience gained in these situations was applied to modifying the data coding and entry rules. In addition, the training program for the research assistants was subsequently improved to handle unique harvest reports.

Locally Hired Research Assistants

The data collected for this study would not be as complete as it is without the aid of locally hired research assistants. The research assistants salaries were paid through the NSB Mayor's Job Program and the NSB Planning Department handled the record keeping involved with hiring and paying the individuals. During the duration of the project 17 individuals have been hired in Barrow and trained to collect subsistence data. Eight of the individuals worked with the project for more than one month. The research assistants averaged about 12 hours per week. During Year Two nine locally hired individuals worked on the project.

The duties of the RAs included 3 high degree of responsibility and self-initiative. Each had a list of approximately 20 households that they contacted on a regular basis to inquire on any subsistence activities occurring since the last visit. The RA was usually responsible for initiating the contact and visiting the household at the convenience of the hunters. The visits often involved evening and weekend visits. The RAs were also responsible for:

- o keeping track of when households should be visited as well as maintaining a sense of when the household members tend to participate in subsistence activities,
- o correctly filling out the harvest sheets and accurately mapping harvest locations,
- o regularly updating household composition and employment information on each household,
- o noting hunters' comments about subsistence, and
- o editing the data collection forms for data entry into the computer data base.

An additional responsibility of each RA was to encourage continued participation by the study households. Active hunters sometimes felt that this study may not be in their best interests. The RAs then had "public relations" responsibilities that at times were the most difficult aspect of the work.

Our goal was to transfer as many of the field coordinator's responsibilities [to the RAs as possible. To that end we trained the RAs to use the computer for entering data and notes into the data base. One RA especially preferred that aspect of the research and became very proficient at data entry. She was unavailable for work the second half of Year Two.

Two RAs worked throughout most of Year One; however, they both resigned early in Year Two, one for a better job and the other because her family moved away from Barrow. All of the RAs in Year Two have been short-term employees. One of the most proficient RAs in Year Two was hired near the end of the study year. He subsequently retired for the whaling season, but may be available for work later in Year Three.

For the most part working with local research assistants has been productive and informative. The knowledge of local individuals about the community, the households, and local subsistence activities facilitated data collection considerably. Many of the households preferred to discuss their harvests with local individuals, others would talk about their subsistence activities only with local Inupiaq people. In those situations the data collected by the RAs was more accurate and complete than would otherwise be available.

Unfortunately, the group comprising the most advantageous RAs for this project - hunters - were the most difficult to hire and retain on the project. Because of past restrictions, limits, and quotas on Barrow subsistence harvest activities, the acceptance of subsistence studies is an evolving process in the community. The active hunters were the most suspicious of the study and would especially press the RAs to explain why they should be candid about their subsistence activities. When the RA was an active hunter themselves, the position would become personally uncomfortable.

The study team will continue to attempt to hire local individuals in Year Three. The goal of hiring a local field coordinator has been unsuccessful through Year Two and will likely not be attained in Year Three.

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