OCS Study
MMS 91-0086

North Slope Subsistence Study
Barrow 1987, 1988, 1989

Social and Economic Studies

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

OCS STUDY
MMS 91-0086

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NORTH SLOPE SUBSISTENCE STUDY
BARROW, 1987, 1988 and 1989

Submitted To

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APPENDIX A

This appendix contains the following reference material:

- o the Year One Seasonal Round
- o a calendar listing of Year One activities and events
- o Year One data tables
- o Year One data figures (charts and graphs)
- o Year One subsistence harvest site maps

YEAR ONE SEASONAL ROUND

The following month by month report of subsistence activities documents Barrow resident's annual subsistence cycle from April 1, 1987 through March 31, 1988. This description highlights the month's major subsistence activities, and points out any significant or unusual environmental, social, cultural and/or economic conditions or events that may have affected hunting that month. While the pattern of activities generally remains much the same from year to year, changes in environmental conditions, local resource availability, as well as social and economic factors do affect the actual timing and the relative importance of the different resources harvested from year to year.

All temperatures are given in Fahrenheit, with most being reported as ambient temperature. Windchill temperatures are given where appropriate and when available.

APRIL 1987

During April, Barrow hunters focused primarily on harvesting bowhead whales. In early April, whaling captains or one of their crew traveled into the interior to visit their fish camp, retrieve stored caribou and fish, and kill one or two caribou. This food was used to feed the whaling crews while out on the ice. In the meantime, crews made trails through the pressure ridges near shore in order to reach the open lead edge located approximately three miles out from shore.

Seal hunters were active along the lead edge until April 15 when the first crew moved out, at which point the seal hunters refrained from sealing until after the initial bowhead harvest quota was fulfilled. The first bowhead whales moved past Barrow about April 18. Due to southwest winds, the one mile wide lead was blocked by ice floes in front of town after the 15th. Toward the end of the month, the winds switched to the northeast and the lead reopened in front of town. Polar bears were harvested this month by whaling crew members.

MAY

Bowhead hunting continued into early May with Barrow whalers harvesting three whales with the community's initial quota of nine strikes between May 2 and May 5. A tenth strike was transferred from Savoonga and Barrow whalers harvested a fourth whale on May 17. After the initial four day harvest period, some crews left the ice to prepare for inland waterfowl hunting. The remaining crews (approximately 12) stayed on the ice to wait for additional strikes to be transferred from other whaling villages and to hunt for other marine mammals and eiders.

The first large flocks of eiders flew by Barrow the first week of May. By May 12, families were traveling inland by snowmachine to establish spring hunting camps. Goose hunting continued throughout the month. Families reported encountering a lack of snow inland, causing them to stay closer to town than last year.

During the last week of May, the first *ugruk* (bearded seal) harvests of Year One were reported.

The temperature reached the 30s by mid-month and break-up conditions ensued in Barrow.

JUNE

According to Barrow residents, adverse weather was influential on their 1987 goose harvests. Conditions did not prevent households from participating in the harvest, but residents attributed lower than expected harvests to high

winds, blowing snow, and fog. The more active goose hunters averaged about two weeks in the field. Typically, one household in an extended family would stay at the camp for the entire period, with other households coming out on the weekends by snowmachine. Many family groups included young grandchildren. Goose hunting locations were scattered throughout Barrow's hunting range, with the heaviest concentrations along the Meade and Inaru rivers.

Incidental harvests of ptarmigan, eider and caribou were also recorded during June.

Barrow's fifth and final spring whale harvest of the year occurred much later than usual. On the evening of June 14, a 51 foot whale was struck and captured in an hour and 55 minutes. Four camps were still on the ice at the time of the harvest and seven boats participated in towing in the whale to shore. Many captains sent crew members onto the ice to assist in the butchering and crewshares were distributed to a total of 32 crews.

Travel to the whale harvest site by snowmachine was made difficult by the large, deep pools of water that had developed on the shorefast ice. Travel on the ice was suspended shortly after the last harvest.

Whale meat and *maktak* (whale skin with a thin layer of the attached blubber) were served at a number of different occasions during May and June. After a crew successfully harvested a whale, everyone was welcome at the successful captain's house for a meal of whale. When a successful crew brought its boat up off the ice, signifying the end of that crew's whaling season, the captain's and crew member's families served fermented whale meat (*mikigaq*), soup, cake, and tea to anyone who came down to the beach. A significant amount of whale was distributed at the *Nalukataq*, the whaling festivals. One was held in Browerville on Monday, June 29 and another in Barrow the following day.

The local rivers began breaking up in early June, effectively bringing most goose hunting trips to an end.

JULY

Two major shifts in harvest patterns occurred during July: families moved to camps inland and along the coast, and hunting by boat for marine mammals (other than bowheads) began. Subsistence activities at the shooting station or *Pigniq* also increased significantly during July to include eider hunting and fishing. Hunting for marine mammals by boat resulted in the occasional taking of caribou along the beach.

Field observations indicated that weather and ice conditions were major influences on the timing, intensity, and success of subsistence harvest activities in July, especially for marine mammal hunting. The grounded ice effectively prevented boat travel until July 5. During the next three days, the grounded ice floated out and summer boating began. July 9th through 12th was a very active hunting period. The weekend weather was sunny, winds were light, and the ice pack was within boating distance of Barrow (between seven and 20 miles out). Boat travel to camps at Peard Bay also began at this time. During the rest of the month, the ice pack moved in against shore on two occasions, remaining for three days and five days respectively.

Ringed seals, spotted seals, bearded seals, and walrus were harvested during July. Bearded seal was the preferred species and could be considered the target species during most boat hunting trips. An exception to this pattern occurred when the walrus were near shore in large numbers between July 9 and 13. The weather, wind, ice, and the timing (a weekend) all contributed to a successful harvest for many families.

July was not an active caribou harvesting period. The caribou were too lean this time of year to be sought in large numbers. According to one study participant, caribou harvests were limited to one or two, just to have some fresh meat.

During the last week of the month, boat travel began through Elson Lagoon to Admiralty Bay, providing boat access to camps in the Meade, Ikpikpuk, and Chipp river drainages.

AUGUST

Caribou, marine mammals, eiders, and fish were all harvested during the month of August. However, the weather during August was unusually poor for traveling and hunting. High winds often deterred boat travel and boat hunting. Traveling to camps by plane was often limited by low cloud cover and fog. Residents agreed that the weather was uncharacteristic for August and a common complaint was, "what happened to our summer this year?"

Bearded seal were harvested out in the drifting ice. Ringed seals were not actively pursued. As one participant stated, "we were out after oil," indicating the local preference for bearded seal oil. While the meat of ringed seal is highly desirable, the rendering of bearded seal blubber is much more common than rendering the blubber of ringed seal.

During the last week of August, the westerly winds moved the ice to within easy boating range of Barrow. The reported distance to the ice was a 20 minute boat ride, or approximately seven to eight miles from shore. While some hunters were deterred by the distance and the fog, at least 10 boats participated in a walrus hunt. Four walrus were harvested by one study household.

Unusually high water in the rivers during early August was reported to have a detrimental influence on fishing in Year One. One family was unable to catch as many fish as desired from their camp on the Chipp River, reporting a good day's catch as four or five whitefish. Grayling harvests were reported in August, but again only a few fish a day. Net fishing for salmon took place on the inside of Point Barrow. Capelin were also harvested during the month in the shallows along the beach.

Moose hunting trips to the Colville River took place at the end of the month. Large herds of caribou were sighted north of the Meade River during the last week of August. Caribou were also harvested in the vicinity of inland camps, during boating trips in Admiralty Bay, and during inland hunting trips from coastal camps. While many caribou hunters reported harvesting only one or two caribou, some households reported bringing home as many as seven caribou from a

hunting trip. Many hunters indicated that the emphasis on caribou hunting would be much higher in September when the animals would be fatter.

School began in late August. Adults employed by the schools and school-aged children moved from camp locations back to town.

SEPTEMBER

Major harvests for September included eider, caribou, and fish. Most caribou hunting and fishing occurred from inland camps. Field observations indicated that high winds blowing predominantly onshore made boat travel fairly uncommon during early September. The first snow fell on September 2. Barrow had occasional snow flurries until mid-month when a record 5.1 inches accumulated on September 14.

By the last week of September, the rivers were reportedly frozen well enough to cross, marking the beginning of easy and safe access by snowmachine to fish camps and caribou herds south of the Meade River. Fall fishing under the ice began near the end of the month and many study participants were preparing to spend time inland during October.

Bowhead whales began migrating south past Point Barrow during September.

OCTOBER

Travel by snowmachine to inland camps was a common activity throughout October. Cabins and tent sites are usually situated on a river near a traditional fishing area. Trips to other fishing sites and to hunt for caribou were usually day trips based out of those camps. Broad whitefish, humpback whitefish, and least cisco were the most common species caught in nets set in rivers under the ice. Broad whitefish and lake trout were harvested from lakes. Jigging for grayling and burbot both were common activities.

Most caribou hunting occurred on camping trips that varied in length from a few days to two or three weeks. Families would travel inland to their cabins and camp sites where they would set their nets and then travel out from camp in

search of caribou. The rutting season for bull caribou began the second week of October, resulting in hunters targeting young bucks from then on.

Snow cover was light south of the Meade River during October, which reportedly delayed hunters and caused problems with sleds traveling on rough, frozen tundra. Inland weather conditions were favorable to hunting and fishing: clear and cool with usually moderate winds.

At the start of the fall bowhead whale migration, Barrow whalers had no strikes or transfers remaining in their quota. On October 5, Nuiqsut whalers harvested a bowhead. On the 12th, Nuiqsut transferred their remaining strike to Barrow. On the afternoon of the 21st, Barrow harvested its sixth whale for the year, a 51 foot whale that was landed with great difficulty the next afternoon.

On October 26, Kaktovik transferred their two strikes to Barrow and three days later a 28 foot whale was harvested by Barrow whalers. Calm conditions and the smaller size of the whale led to a relatively quick tow to shore by six boats. The whale was entirely butchered by 7:30 that evening. Both whales were harvested on the Beaufort Sea side of the point, north of the barrier islands. Barrow had one strike remaining at the end of the month.

NOVEMBER

Barrow whaling crews continued hunting through the first week of November. On the 6th, winds increased to 30 mph and continued until the 13th. Fall whaling was officially halted by Barrow whaling captains on November 14.

Seals were taken north of Barrow. Large ice pans were present near Point Barrow and the hunting technique included the use of small single-person boats. The ocean in front of Barrow remained slushy until late in the month. Ice firm enough for walking began to form around Thanksgiving.

Inland activities included fishing and caribou hunting, although these activities were not as intensively pursued as in October. The weather remained cool (-10 degrees to -20 degrees) but calm during the last 10 days of the month. Some hunters endeavored to "get something fresh for Thanksgiving."

DECEMBER

Seal hunting was the major subsistence activity in December. One participant reported having requests from many elders for fresh seal. He had harvested seven ringed seals and stated that he had yet to finish supplying his extended family with the seals they desired.

Temperatures plummeted at month's end, with a daily average of -20 degrees, and wind speeds averaging 17 to 21 miles per hour during the period between the 26th and the 28th.

JANUARY 1988

Hunters were targeting the larger ringed seals in January. According to one hunter, the focus on large seals at this time is due in part to the fact that the seals go into rut around late January, tainting the meat. Thus, to obtain the large skin and still be able to use the meat, the big seals are hunted at this time.

The coldest temperature of Year One was recorded on January 26: -43 degrees on a relatively calm day. Another extreme was reached on January 1, when the wind gusts peaked at 58 mph while temperatures were averaging zero degrees.

FEBRUARY

Seal hunting, polar bear hunting, trapping, and furbearer hunting were the primary harvest activities during February.

The average monthly temperature was lowest for Year One during February at -23 degrees. A relatively calm period occurred between the 8th and the 22nd, providing reportedly favorable traveling and hunting conditions.

MARCH

Ringed seal hunting continued to be a primary subsistence activity in March. One of the more active seal hunters observed fewer seals this year. Hunters

indicated that sealing was made more difficult much of the time due to a frequent lack of open water.

Wolverine, fox, and caribou hunting also occurred during March. Caribou hunting occurred throughout the month, usually as day-long or overnight hunting trips from town.

Barrow individuals fished for rainbow smelt while visiting Wainwright.

Preparation for the whaling season became a common activity this month. In preparation for whaling and the goose hunting that occurs shortly after whaling, many families were transporting supplies such as fuel and building materials to cabins. This was the month of longer days, good snow cover, and a little extra time before the full-time effort of whaling began.

As a summary to the Seasonal Round, the following list highlights the key community and environmental events that directly or indirectly influenced subsistence activities in Year One.

DATE	ACTIVITY OR EVENT
April 15, 1987	Whaling crews begin to establish camps on the ice.
April 17-19	Spring carnival weekend.
April 19	Easter Sunday.
May 1	Whale harvest, Barrow's 1st whale.
May 2	Whale harvest, Barrow's 2nd whale.
May 4	Whale harvest, Barrow's 3rd whale.
May 17	Whale harvest, Barrow's 4th whale.
May 25	Memorial Day.
June 1	Rivers beginning to break up.
June 14	Whale harvest, Barrow's 5th whale.
June 19	Wainwright *Nalukataq.*
June 29-30	Barrow *Nalukataq.*
July 3-5	Fourth of July games.
July 8	Boat travel begins through passages in the grounded ice south of town.
July 11-13	Ice floes in front of town, good walrus & ugruk hunting.
July 17	Open ocean in front, ice north of town.

DATE	ACTIVITY OR EVENT
July 21-26	Eskimo Olympics in Fairbanks.
July 23	Passage to ocean blocked in front, open to the Point.
July 24	Boating to inland camps begins about this time.
August 27	First day of school.
August 31	Ice floes in front of Barrow, good walrus hunting.
September 1	First light snow in town.
September 7	Labor Day.
September 14	Record snow fall in 24 hours: 5.1 inches.
September 24	Wainwright school fire.
September 26	Rivers begin to freeze up.
October 6	Election day, local elections.
October 11	Caribou bulls are rutting.
October 12	Columbus day.
October 17-25	Alaska Federation of Natives convention in Anchorage.
October 19	Alaska day.
October 22	Whale harvest, Barrow's 6th whale.
October 29	Whale harvest, Barrow's 7th whale.
October 31	Halloween.
November 2	City and Borough run-off elections.
November 4	One of the last calm days for boat travel.
November 6-7	Siberian medical team in Barrow.
November 11	Veterans Day.
November 14	Whaling officially ends for the year.
November 18	Sun sets in Barrow for 65 days.
November 23	Ice firming up in front of town.
November 26	Thanksgiving Day.
December 25	Christmas Day.
January 7-10, 1988	Messenger Feast or *Kivgiq* held in Barrow.
January 23	First sunrise of the year.
February 17-19	Alaska Eskimo Whaling Convention held in Barrow.
March 14	Native Village of Barrow meeting, agenda includes discussion of U.S. Fish & Wildlife Service prohibitions on spring waterfowl hunting.

TABLE A-1: TOTAL HARVEST ESTIMATES BY MAJOR RESOURCE CATEGORY - ALL BARROW HOUSEHOLDS, YEAR ONE REVISED (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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 (4)	n/a	n/a	316,229	337.5	104.9	51%	41%	19	36	301	374	11%
Terrestrial Mammals	n/a	n/a	213,834	228.2	70.9	34%	30%	34	66	162	294	29%
Fish	n/a	n/a	68,448	73.1	22.7	11%	33%	10	19	54	92	27%
Birds	n/a	n/a	22,329	23.8	7.4	4%	36%	6	12	12	36	51%
Other Resources	n/a	n/a	216	0.2	0.1	**	3%	0	0	0	0	117%
Total (4)	n/a	n/a	621,055	662.8	205.9	100%	58%	52	101	561	764	15%

(1) Year One: April 1, 1987 - March 31, 1988.

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

(3) See Table D-5 for sources of conversion factors.

(4) 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, 1993

TABLE A-2: MONTHLY HARVEST ESTIMATES BY MAJOR RESOURCE CATEGORY - BARROW, YEAR ONE REVISED
(Pounds of Usable Resource Product)

TOTALS
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	1987							1988				
MAJOR RESOURCE CATEGORY	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Marine Mammals	3,933	66,641	66,489	80,286	26,998	3,444	57,857	1,015	1,358	1,079	4,725	2,405
Terrestrial Mammals	702	5,068	3,915	28,674	50,174	39,449	65,144	1,371	0	702	9,181	9,457
Fish	0	724	2,491	3,510	14,786	11,740	31,248	3,886	0	0	0	67
Birds	351	14,164	642	2,450	4,333	273	120	0	0	0	0	0
Total	4,986	86,597	73,537	114,920	96,291	54,905	154,369	6,272	1,358	1,781	13,906	11,929

PERCENTS
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	1987							1988					
MAJOR RESOURCE CATEGORY	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March	
Marine Mammals	1%	21%	21%	25%	9%	1%	18%	0%	0%	0%	1%	1%	= 100%
Terrestrial Mammals	0%	2%	2%	13%	23%	18%	30%	1%	0%	0%	4%	4%	= 100%
Fish	0%	1%	4%	5%	22%	17%	46%	6%	0%	0%	0%	0%	= 100%
Birds	2%	63%	3%	11%	19%	1%	1%	0%	0%	0%	0%	0%	= 100%
All Resources Combined	1%	14%	12%	19%	16%	9%	25%	1%	0%	0%	2%	2%	= 100%

Source: Stephen R. Braund & Associates, 1993

TABLE A-3: HARVEST ESTIMATES FOR MARINE MAMMALS - ALL BARROW HOUSEHOLDS, YEAR ONE REVISED (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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	316,229	337.5	104.9	50.9%	41%	19	36	301.1	373.9	11%
Bowhead (4,5)	26,375.6	7	184,629	197.0	61.2	29.7%	31%	0	0	197.0	197.0	n/a
Walrus	772.0	84	64,662	69.0	21.4	10.4%	11%	11	21	47.6	90.4	31%
Bearded Seal	176.0	236	41,518	44.3	13.8	6.7%	25%	9	17	27.4	61.2	38%
Total Ring. & Spot. Seal	42.0	469	19,675	21.0	6.5	3.2%	14%	5	11	10.3	31.7	51%
Ringed Seal	42.0	466	19,574	20.9	6.5	3.2%	14%	5	11	10.2	31.6	51%
Spotted Seal	42.0	2	101	0.1	*	**	**	0	0	0.0	0.2	56%
Polar Bear	496.0	12	5,744	6.1	1.9	0.9%	1%	3	7	0.0	12.7	107%

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(1) Year One: April 1, 1987 - March 31, 1988.

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

(3) See Table D-5 for sources of conversion factors.

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

(5) 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, 1993

TABLE A-4: MARINE MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Pounds of Usable Resource Product)

TOTALS
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SPECIES	1987 April	May	June	July	August	Sept.	October	Nov.	1988 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	34,499	24,110	3,242	2,812	0	0	0	0	0
Bearded Seal	0	0	1,521	37,365	1,520	0	1,068	42	0	0	0	0
Polar Bear	2,311	0	0	0	0	0	0	0	0	0	3,432	0
Total Ring. & Spot. Seal	1,622	202	756	8,422	1,368	201	0	973	1,358	1,079	1,292	2,405
Ringed Seal	1,622	202	756	8,422	1,268	201	0	973	1,358	1,079	1,292	2,405
Spotted Seal	0	0	0	0	101	0	0	0	0	0	0	0
All Marine Mammals	3,933	66,641	66,489	80,286	26,998	3,444	57,857	1,015	1,358	1,079	4,725	2,405

PERCENTS
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SPECIES	1987 April	May	June	July	August	Sept.	October	Nov.	1988 Dec.	Jan.	Feb.	March	
Bowhead Whale	0%	36%	35%	0%	0%	0%	29%	0%	0%	0%	0%	0%	100%
Walrus	0%	0%	0%	53%	37%	5%	4%	0%	0%	0%	0%	0%	100%
Bearded Seal	0%	0%	4%	90%	4%	0%	3%	0%	0%	0%	0%	0%	100%
Polar Bear	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	60%	0%	100%
Total Ring. & Spot. Seal	8%	1%	4%	43%	7%	1%	0%	5%	7%	5%	7%	12%	100%
Ringed Seal	8%	1%	4%	43%	6%	1%	0%	5%	7%	6%	7%	12%	100%
Spotted Seal	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%
All Marine Mammals	1%	21%	21%	25%	9%	1%	18%	0%	0%	0%	1%	1%	100%

Source: Stephen R. Braund & Associates, 1993

TABLE A-5: MARINE MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Number Harvested)

	1987								1988			
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	0	4	1	0	0	0	2	0	0	0	0	0
Walrus	0	0	0	45	31	4	4	0	0	0	0	0
Bearded Seal	0	0	9	212	9	0	6	0	0	0	0	0
Polar Bear	5	0	0	0	0	0	0	0	0	0	7	0
Total Ring. & Spot. Seal	39	5	18	201	33	5	0	23	32	26	31	57
Ringed Seal	39	5	18	201	30	5	0	23	32	26	31	57
Spotted Seal	0	0	0	0	2	0	0	0	0	0	0	0

Source: Stephen R. Braund & Associates, 1993

TABLE A-6: HARVEST ESTIMATES FOR TERRESTRIAL MAMMALS - ALL BARROW HOUSEHOLDS, YEAR ONE REVISED (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE POUNDS HARVESTED	PER HOUSEHOLD	PER CAPITA			STANDARD DEVIATION (lbs)	SAMPLING ERROR AT 95% (lbs)	LOW ESTIMATE (Mean lbs/ Household)	HIGH ESTIMATE (Meen lbs/ Household)	SAMPLING ERROR AS % OF MEAN
Total Terrestrial Mammals	n/a	n/a	213,834	228.2	70.9	34.4%	30%	34	66	162.03	294.39	29%
Caribou	117.0	1,595	186,669	199.2	61.9	30.1%	26%	33	64	135.22	263.22	32%
Moose	500.0	52	25,786	27.5	8.5	4.2%	6%	13	26	1.39	53.65	95%
Dall Sheep	99.0	12	1,199	1.3	0.4	0.2%	1%	1	2	0.00	3.69	188%
Brown Bear	100.0	1	122	0.1	*	**	**	0	0	0.03	0.23	79%
Other Terrestrial Mammals		29	57	0.1	*	**	1%	0	0	0.00	0.15	146%
Porcupine	10.0	5	48	0.1	*	**	1%	0	0	0.00	0.14	174%
Ground Squirrel	0.4	24	10	0.0	*	**	**	0	0	0.00	0.02	80%
Wolverine	n/a	4	n/a	n/a	n/a	n/a	**	n/a	n/a	n/a	n/a	n/a
Arctic Fox (Blue)	n/a	192	n/a	n/a	n/a	n/a	3%	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	**	n/a	n/a	n/a	n/a	n/a

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(1) Year One: April 1, 1987 - March 31, 1988.

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

(3) See Table D-5 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, 1993

TABLE A-7: TERRESTRIAL MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Pounds of Usable Resource Product)

TOTALS
******

SPECIES	1987 April	May	June	July	August	Sept.	October	Nov.	Dec.	1988 Jan.	Feb.	March
Caribou	702	5,068	3,915	27,465	46,397	17,315	65,096	1,371	0	702	9,181	9,457
Moose	0	0	0	1,200	2,575	22,014	0	0	0	0	0	0
Brown Bear	0	0	0	0	0	120	0	0	0	0	0	0
Dall Sheep	0	0	0	0	1,202	0	0	0	0	0	0	0
Other Terrestrial Mammals	0	0	0	10	0	0	48	0	0	0	0	0
Porcupine	0	0	0	0	0	0	48	0	0	0	0	0
Ground Squirrel	0	0	0	10	0	0	0	0	0	0	0	0
All Terrestrial Mammals (excluding furbearers)	702	5,068	3,915	28,674	50,174	39,449	65,144	1,371	0	702	9,181	9,457

PERCENTS
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SPECIES	1987 April	May	June	July	August	Sept.	October	Nov.	Dec.	1988 Jan.	Feb.	March	
Caribou	0%	3%	2%	15%	25%	9%	35%	1%	0%	0%	5%	5%	100%
Moose	0%	0%	0%	5%	10%	85%	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%
Other Terrestrial Mammals	0%	0%	0%	17%	0%	0%	83%	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%	2%	2%	13%	23%	18%	30%	1%	0%	0%	4%	4%	100%

Source: Stephen R. Braund & Associates, 1993

TABLE A-8: TERRESTRIAL MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Number Harvested)

	1987			TOTALS ******					1988		
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	6	43	33	235	397	148	556	12	0	6	78	81
Moose	0	0	0	2	5	44	0	0	0	0	0	0
Brown Bear	0	0	0	0	0	1	0	0	0	0	0	0
Dall Sheep	0	0	0	0	12	0	0	0	0	0	0	0
Other Terrestrial Mammals	0	0	0	24	0	0	5	0	0	0	0	0
Porcupine	0	0	0	0	0	0	5	0	0	0	0	0
Ground Squirrel	0	0	0	24	0	0	0	0	0	0	0	0
Arctic Fox (Blue)	0	0	0	0	0	0	1	0	93	40	37	21
Red Fox (Cross, Silver)	0	0	0	0	0	0	0	0	0	0	0	8
Wolverine	0	0	0	0	0	0	1	0	0	0	2	0

Source: Stephen R. Braund & Associates, 1993

TABLE A-9: HARVEST ESTIMATES FOR FISH - ALL BARROW HOUSEHOLDS, YEAR ONE REVISED (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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 Fish	n/a	n/a	68,448	73.1	22.7	11.0%	33%	10	19	53.61	92.49	27%
Total Whitefish		27,366	51,254	54.7	17.0	8.3%	20%	7	14	40.82	68.58	25%
Whitefish (non-specif.)	2.0	5,108	10,213	10.9	3.4	1.6%	3%	2	5	6.11	15.69	44%
Round Whitefish	1.0	2,122	2,118	2.3	0.7	0.3%	7%	1	1	1.07	3.45	53%
Broad Whitefish (River)	2.5	9,388	23,472	25.1	7.8	3.8%	11%	5	10	15.46	34.64	38%
Broad Whitefish (Lake)	3.4	1,191	4,048	4.3	1.3	0.7%	2%	1	2	2.10	6.54	51%
Humpback whitefish	2.5	1,225	3,064	3.3	1.0	0.5%	5%	1	2	0.79	5.75	76%
Least cisco	1.0	7,024	7,028	7.5	2.3	1.1%	**	2	4	3.36	11.64	55%
Bering, Arctic cisco	1.0	1,309	1,312	1.4	0.4	0.2%	3%	0	1	0.61	2.19	57%
Total Other Freshwater Fish		13,944	15,198	16.2	5.0	2.4%	16%	4	8	8.16	24.28	50%
Arctic grayling	0.8	12,664	10,129	10.8	3.4	1.6%	14%	3	5	5.54	16.08	49%
Arctic char	2.8	38	103	0.1	*	**	3%	0	0	0.00	0.23	107%
Burbot (Ling cod)	4.0	1,086	4,348	4.6	1.4	0.7%	7%	2	3	1.22	8.06	74%
Northern pike	2.3	2	9	0.0	*	**	**	0	0	0.00	0.02	57%
Lake trout	4.0	153	609	0.7	0.2	0.1%	1%	0	0	0.37	0.93	43%
Total Salmon		196	1,190	1.3	0.4	0.2%	3%	0	1	0.29	2.25	77%
Salmon (non-specified)	6.1	66	403	0.4	0.1	**	**	0	0	0.18	0.68	58%
Chum (Dog) salmon	6.1	11	66	0.1	*	**	1%	0	0	0.01	0.13	90%
Pink (Humpback) salmon	3.1	12	37	0.0	*	**	**	0	0	0.01	0.07	73%
Silver (Coho) salmon	6.0	103	618	0.7	0.2	0.1%	1%	0	1	0.00	1.59	141%
King (Chinook) salmon	18.0	4	66	0.1	*	**	**	0	0	0.01	0.13	79%
Total Other Coastal Fish		4,057	806	0.9	*	**	8%	1	1	0.00	2.36	174%
Capelin	0.2	3,960	796	0.9	*	**	8%	1	1	0.00	2.35	176%
Rainbow smelt	0.2	97	9	0.0	*	**	**	0	0	0.00	0.02	100%

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(1) Year One: April 1, 1987 - March 31, 1988.

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

(3) See Table D-5 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, 1993

TABLE A-10: FISH HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Pounds of Usable Resource Product)

SPECIES	1987 April	May	June	July	August	TOTALS ****** Sept.	October	Nov.	1988 Dec.	Jan.	Feb.	March
Total Whitefish	0	300	2,160	3,236	12,102	7,875	21,707	3,871	0	0	0	0
Whitefish (non-specified)	0	0	240	1,066	3,937	2,261	2,520	192	0	0	0	0
Round Whitefish	0	0	720	0	305	388	709	0	0	0	0	0
Broad Whitefish (River)	0	300	1,200	2,169	7,549	2,965	6,341	2,945	0	0	0	0
Broad Whitefish (Lake)	0	0	0	0	0	1,287	2,028	734	0	0	0	0
Humpback whitefish	0	0	0	0	251	909	1,903	0	0	0	0	0
Least cisco	0	0	0	0	60	17	6,946	0	0	0	0	0
Bering, Arctic cisco	0	0	0	1	0	48	1,260	0	0	0	0	0
Total Other Freshwater Fish	0	388	259	223	860	3,865	9,540	14	0	0	0	55
Arctic grayling	0	0	259	223	832	2,861	5,956	0	0	0	0	0
Arctic char	0	52	0	0	24	27	3	0	0	0	0	0
Burbot (Ling cod)	0	336	0	0	5	972	2,977	0	0	0	0	55
Lake trout	0	0	0	0	0	5	594	14	0	0	0	0
Northern pike	0	0	0	0	0	0	10	0	0	0	0	0
Total Salmon	0	36	72	50	1,032	0	0	0	0	0	0	0
Salmon (non-specified)	0	0	0	0	403	0	0	0	0	0	0	0
Chum (Dog) salmon	0	0	0	0	66	0	0	0	0	0	0	0
Pink (Humpback) salmon	0	0	0	0	37	0	0	0	0	0	0	0
Silver (Coho) salmon	0	36	72	50	462	0	0	0	0	0	0	0
King (Chinook) salmon	0	0	0	0	65	0	0	0	0	0	0	0
Total Other Coastal Fish	0	0	0	0	792	0	0	0	0	0	0	12
Capelin	0	0	0	0	792	0	0	0	0	0	0	0
Rainbow Smelt	0	0	0	0	0	0	0	0	0	0	0	12
All Fish Species	0	724	2,491	3,510	14,786	11,740	31,248	3,886	0	0	0	67

(Continued on next page)

TABLE A-10, CONTINUED: FISH HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Pounds of Usable Resource Product)

PERCENTS
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SPECIES	1987 April	May	June	July	August	Sept.	October	Nov.	1988 Dec.	Jan.	Feb.	March	
Total Whitefish	0%	1%	4%	6%	24%	15%	42%	8%	0%	0%	0%	0%	100%
Whitefish (non-specified)	0%	0%	2%	10%	39%	22%	25%	2%	0%	0%	0%	0%	100%
Round Whitefish	0%	0%	34%	0%	14%	18%	33%	0%	0%	0%	0%	0%	100%
Broad Whitefish (River)	0%	1%	5%	9%	32%	13%	27%	13%	0%	0%	0%	0%	100%
Broad Whitefish (Lake)	0%	0%	0%	0%	0%	32%	50%	18%	0%	0%	0%	0%	100%
Humpback whitefish	0%	0%	0%	0%	8%	30%	62%	0%	0%	0%	0%	0%	100%
Least cisco	0%	1%	5%	9%	32%	13%	27%	13%	0%	0%	0%	0%	100%
Bering, Arctic cisco	0%	0%	0%	0%	1%	0%	99%	0%	0%	0%	0%	0%	100%
Total Other Freshwater Fish	0%	3%	2%	1%	6%	25%	63%	0%	0%	0%	0%	0%	100%
Arctic grayling	0%	0%	3%	2%	8%	28%	59%	0%	0%	0%	0%	0%	100%
Arctic char	0%	49%	0%	0%	22%	25%	3%	0%	0%	0%	0%	0%	100%
Burbot (Ling cod)	0%	8%	0%	0%	0%	22%	69%	0%	0%	0%	0%	1%	100%
Lake trout	0%	0%	0%	0%	0%	1%	97%	2%	0%	0%	0%	0%	100%
Northern pike	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%
Total Salmon	0%	3%	6%	4%	87%	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%	0%	100%	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%	6%	12%	8%	74%	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%	99%	0%	0%	0%	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%	0%	0%	0%	0%	0%	100%	100%
All Fish Species	0%	1%	4%	5%	22%	17%	46%	6%	0%	0%	0%	0%	100%

Source: Stephan R. Braund & Associates, 1993

TABLE A-11: FISH HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Number Harvested)

	1987								1988			
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0	120	1,320	1,402	5,453	3,512	14,069	1,490	0	0	0	0
Whitefish (non-specified)	0	0	120	533	1,968	1,130	1,260	96	0	0	0	0
Round Whitefish	0	0	720	0	305	388	709	0	0	0	0	0
Broad Whitefish (River)	0	120	480	868	3,020	1,186	2,537	1,178	0	0	0	0
Broad Whitefish (Lake)	0	0	0	0	0	379	596	216	0	0	0	0
Humpback whitefish	0	0	0	0	100	364	761	0	0	0	0	0
Least cisco	0	0	0	0	60	17	6,946	0	0	0	0	0
Bering, Arctic cisco	0	0	0	1	0	48	1,260	0	0	0	0	0
Total Other Freshwater Fish	0	103	324	278	1,050	3,830	8,342	4	0	0	0	14
Arctic grayling	0	0	324	278	1,040	3,576	7,445	0	0	0	0	0
Arctic char	0	19	0	0	8	10	1	0	0	0	0	0
Burbot (Ling cod)	0	84	0	0	1	243	744	0	0	0	0	14
Lake trout	0	0	0	0	0	1	148	4	0	0	0	0
Northern pike	0	0	0	0	0	0	2	0	0	0	0	0
Salmon	0	6	12	8	169	0	0	0	0	0	0	0
Salmon (non-specified)	0	0	0	0	66	0	0	0	0	0	0	0
Chum (Dog) salmon	0	0	0	0	11	0	0	0	0	0	0	0
Pink (Humpback) salmon	0	0	0	0	12	0	0	0	0	0	0	0
Silver (Coho) salmon	0	6	12	8	77	0	0	0	0	0	0	0
King (Chinook) salmon	0	0	0	0	4	0	0	0	0	0	0	0
Total Other Coastal Fish	0	0	0	0	3,960	0	0	0	0	0	0	97
Capelin	0	0	0	0	3,960	0	0	0	0	0	0	0
Rainbow Smelt	0	0	0	0	0	0	0	0	0	0	0	97

Source: Stephen R. Braund & Associates, 1993

TABLE A-12: HARVEST ESTIMATES FOR BIRDS - ALL BARROW HOUSEHOLDS, YEAR ONE REVISED (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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	22,329	23.8	7.4	3.6%	36%	6	12	11.79	35.87	51%
Total Geese		2,873	12,743	13.6	4.2	2.1%	20%	3	6	7.16	20.04	47%
Geese (non-specified)	4.5	329	1,480	1.6	0.5	0.2%	3%	1	1	0.50	2.66	68%
Brant	3.0	127	384	0.4	0.1	0.1%	2%	0	0	0.19	0.63	54%
White-fronted geese	4.5	2,417	10,879	11.6	*	**	16%	3	6	5.20	18.02	55%
Total Eider		5,173	7,752	8.3	2.6	1.2%	22%	3	7	1.54	15.00	81%
Eider (non-specified)	1.5	5,080	7,618	8.1	2.5	1.2%	21%	3	7	1.40	14.86	83%
Common eider	1.5	7	9	0.0	*	**	**	0	0	0.00	0.03	183%
King eider	1.5	83	122	0.1	*	**	1%	0	0	0.03	0.23	74%
Spectacled eider	1.5	2	3	0.0	*	**	**	0	0	0.00	0.01	104%
Ptarmigan	0.7	2,454	1,715	1.8	0.6	0.3%	16%	1	1	0.58	3.08	68%
Other ducks (non-sepcif.)	1.5	79	122	0.1	*	**	3%	0	0	0.00	0.31	135%

(1) Year One: April 1, 1987 - March 31, 1988.

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

(3) See Table D-5 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, 1993

TABLE A-13: BIRD HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Pounds of Usable Resource Product)

SPECIES	1987 April	May	June	July	August	TOTALS ****** Sept.	October	1988 Nov.	Dec.	Jan.	Feb.	March
Total Geese	0	12,004	499	4	68	163	0	0	0	0	0	0
White-fronted goose	0	10,390	488	0	0	0	0	0	0	0	0	0
Brant	0	146	0	4	68	163	0	0	0	0	0	0
Goose (non-specified)	0	1,468	11	0	0	0	0	0	0	0	0	0
Total Eiders	351	748	143	2,301	4,115	101	0	0	0	0	0	0
Eider (non-specified)	351	696	68	2,291	4,115	101	0	0	0	0	0	0
Common eider	0	10	0	0	0	0	0	0	0	0	0	0
King eider	0	42	72	11	0	0	0	0	0	0	0	0
Spectacled eider	0	0	4	0	0	0	0	0	0	0	0	0
Ptarmigan	0	1,412	0	40	135	10	120	0	0	0	0	0
Other Ducks	0	0	0	105	14	0	0	0	0	0	0	0
All Bird Species	351	14,164	642	2,450	4,333	273	120	0	0	0	0	0

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TABLE A-13, CONTINUED: BIRD HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Pounds of Usable Resource Product)

PERCENTS

SPECIES	1987 April	May	June	July	August	Sept.	October	Nov.	Dec.	1988 Jan.	Feb.	March	
Total Geese	0%	94%	4%	0%	1%	1%	0%	0%	0%	0%	0%	0%	100%
White-fronted goose	0%	96%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Brant	0%	38%	0%	1%	18%	43%	0%	0%	0%	0%	0%	0%	100%
Goose (non-specified)	0%	99%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Total Eiders	5%	10%	2%	30%	53%	1%	0%	0%	0%	0%	0%	0%	100%
Eider (non-specified)	5%	9%	1%	30%	54%	1%	0%	0%	0%	0%	0%	0%	100%
Common eider	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
King eider	0%	33%	58%	9%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Spectacled eider	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Ptarmigan	0%	82%	0%	2%	8%	1%	7%	0%	0%	0%	0%	0%	100%
Other Ducks	0%	0%	0%	88%	12%	0%	0%	0%	0%	0%	0%	0%	100%
All Bird Species	2%	63%	3%	11%	19%	1%	1%	0%	0%	0%	0%	0%	100%

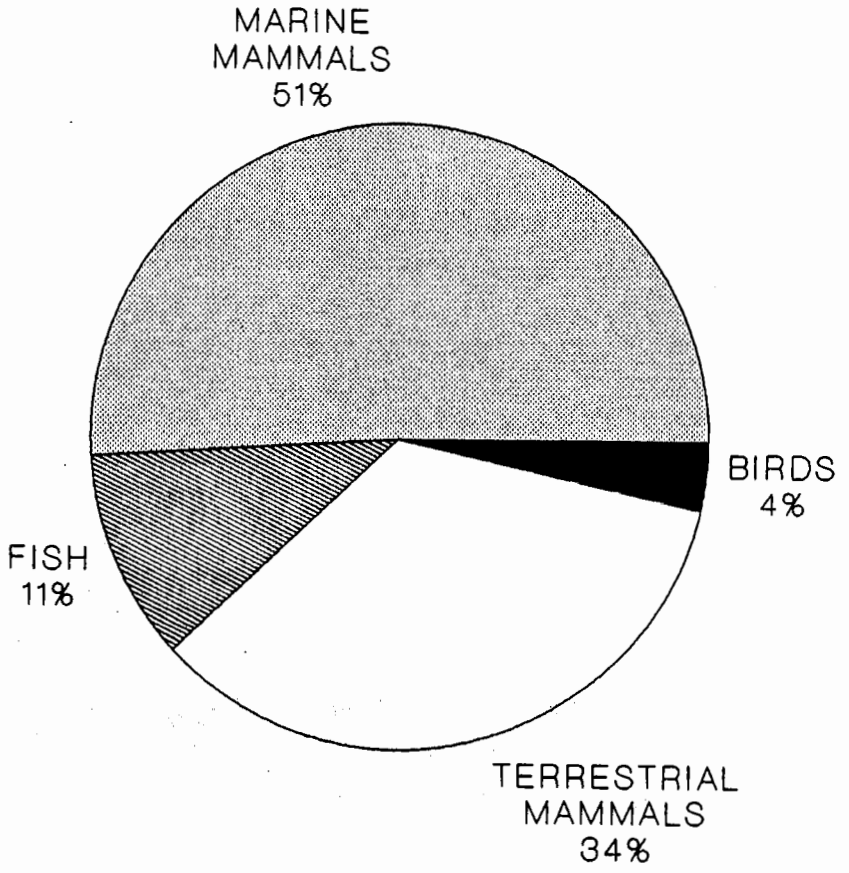
Source: Stephen R. Braund & Associates, 1993

TABLE A-14: BIRD HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR ONE REVISED
(Number Harvested)

SPECIES	1987 April	May	June	July	August	Sept.	October	Nov.	1988 Dec.	Jan.	Feb.	March
Total Geese	0	2,684	111	1	23	54	0	0	0	0	0	0
White-fronted goose	0	2,309	108	0	0	0	0	0	0	0	0	0
Brant	0	49	0	1	23	54	0	0	0	0	0	0
Goose (non-specified)	0	326	2	0	0	0	0	0	0	0	0	0
Total Eiders	234	499	95	1,534	2,743	67	0	0	0	0	0	0
Eider (non-specified)	234	464	45	1,527	2,743	67	0	0	0	0	0	0
Common eider	0	7	0	0	0	0	0	0	0	0	0	0
King eider	0	28	48	7	0	0	0	0	0	0	0	0
Spectacled eider	0	0	2	0	0	0	0	0	0	0	0	0
Ptarmigan	0	2,017	0	57	193	14	172	0	0	0	0	0
Other ducks	0	0	0	70	10	0	0	0	0	0	0	0

Source: Stephen R. Braund & Associates, 1993

Figure A-1: Estimated Harvest Percentages by Major Resource Category
Barrow, Year One

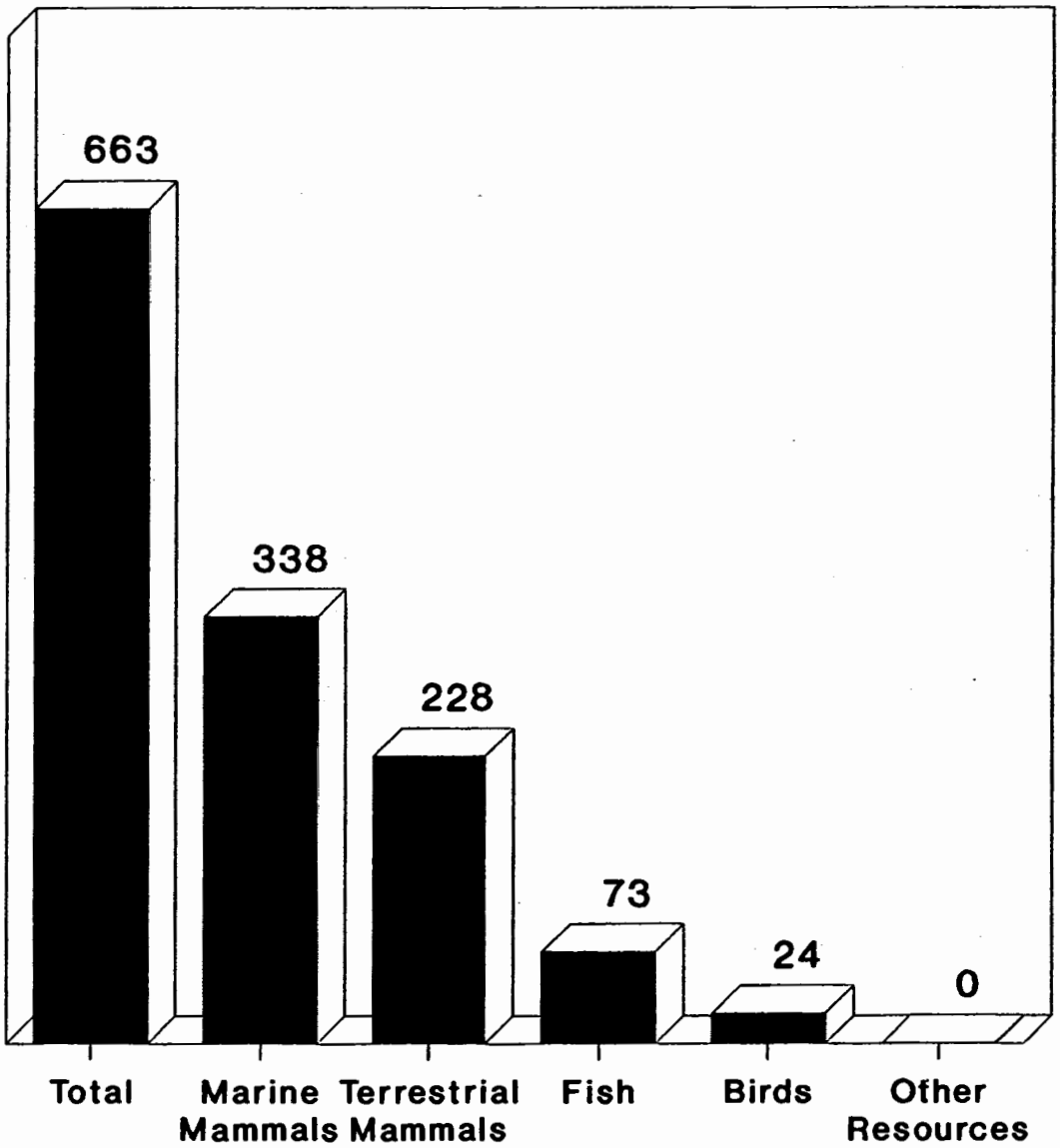


Based on usable pounds harvested.
Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

Figure A-2: Harvest Estimates by Major Resource Category

All Barrow Households, Year One Revised

(Mean Usable Pounds Per Household)

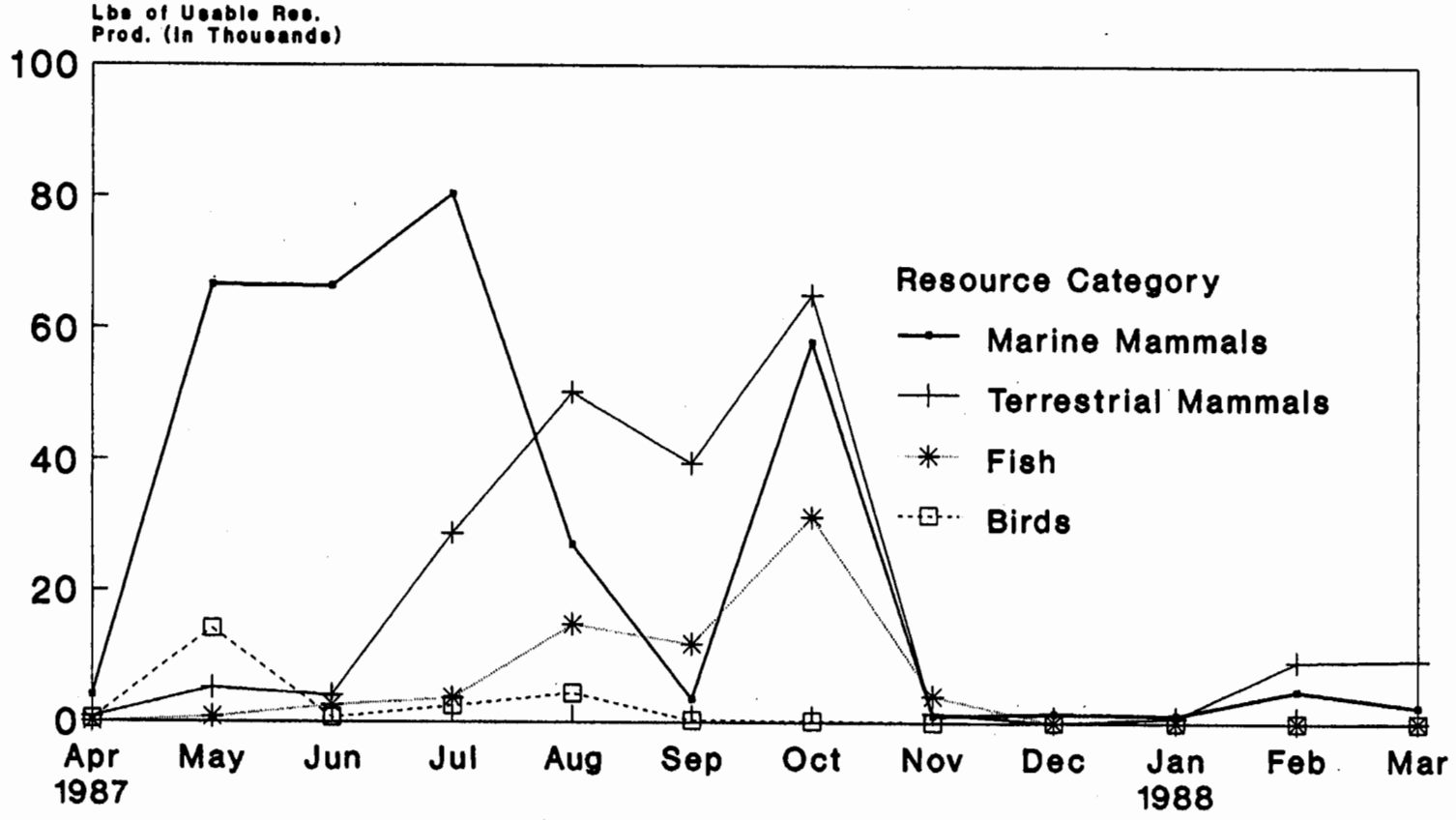


% of Total:	100%	51%	34%	11%	4%	<1%

Year One: April 1, 1987 - March 31, 1988

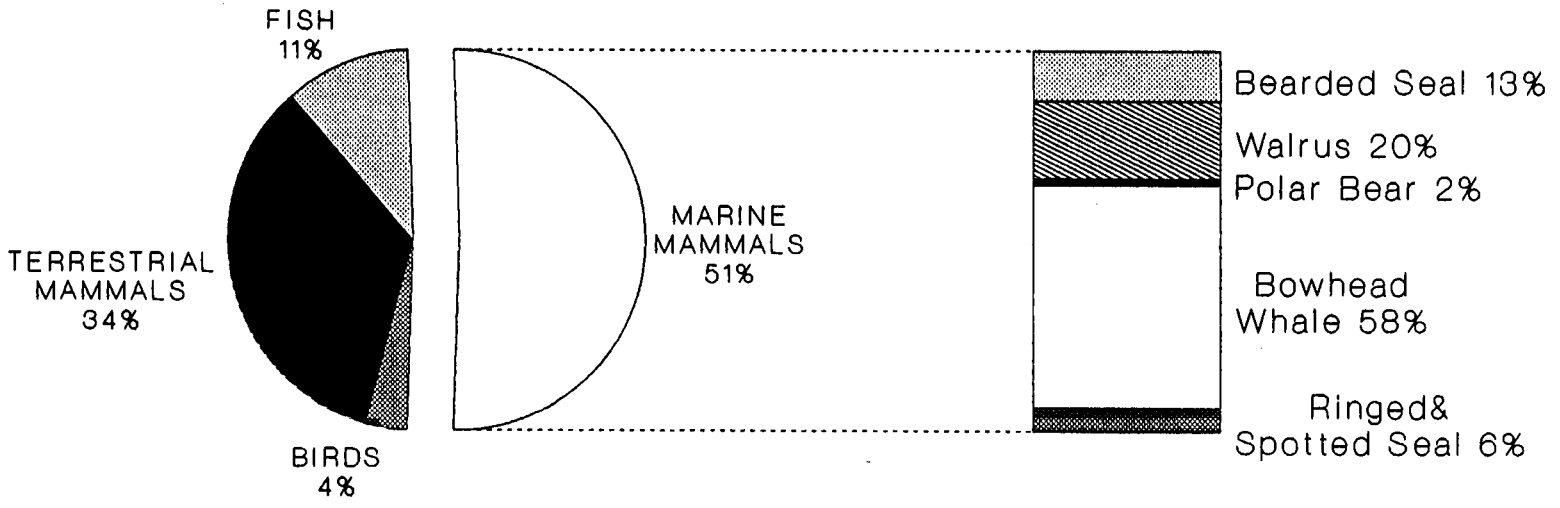
Source: Stephen R. Braund & Assoc., 1993

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



Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

Figure A-4: Estimated Harvest Percentages of Marine Mammals Barrow, Year One (Usable Pounds Harvested)

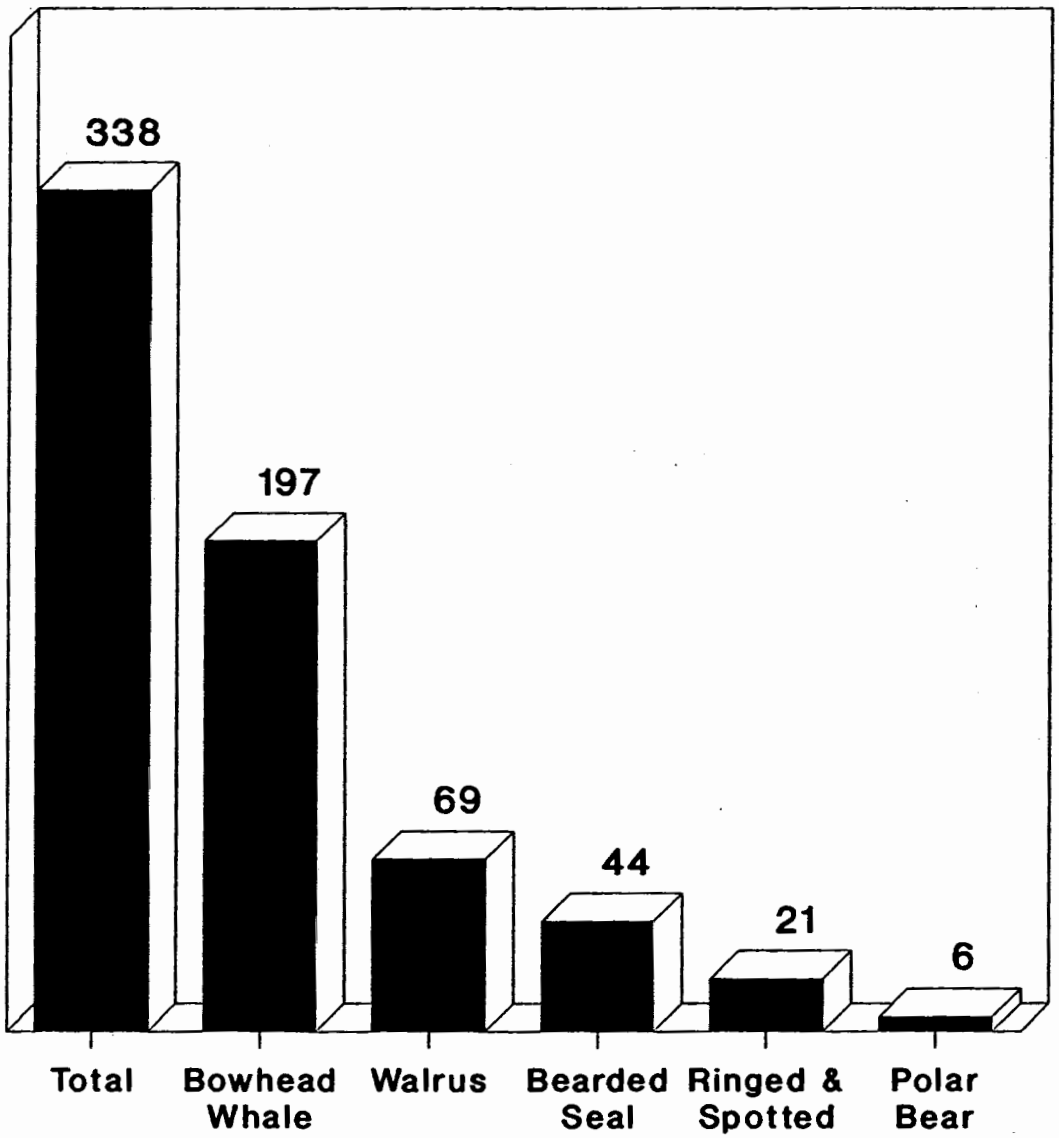


Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

Figure A-5: Marine Mammal Harvest Estimates

All Barrow Households, Year One Revised

(Mean Usable Pounds Per Household)

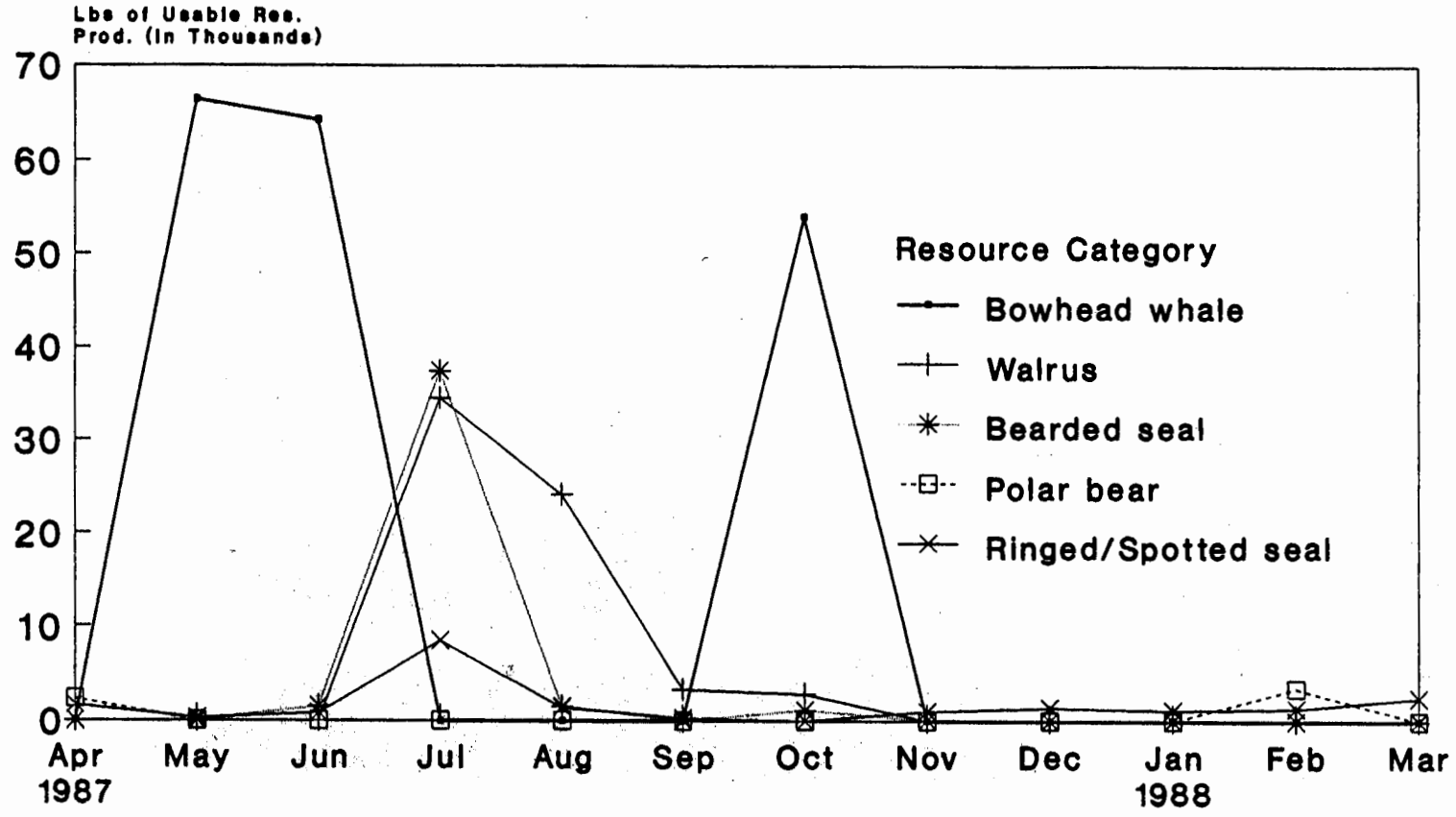


% of Marine Mammals:	100%	58%	20%	13%	6%	2%

Year One: April 1, 1987 - March 31, 1988

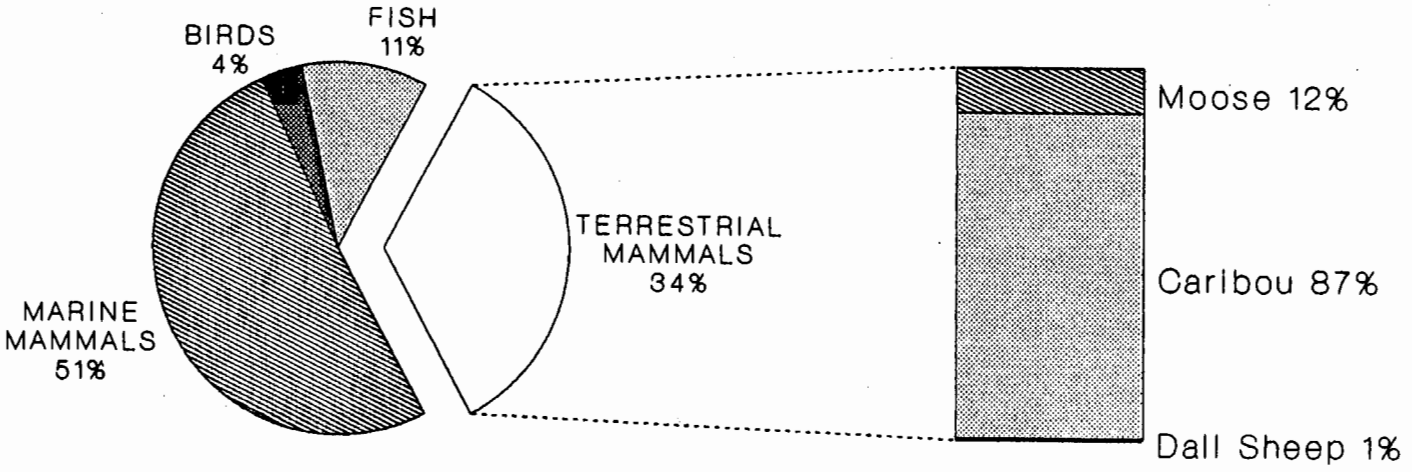
Source: Stephen R. Braund & Assoc., 1993

Figure A-6: Monthly Marine Mammal Harvest Estimates
All Barrow Households, Year One Revised



Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

Figure A-7: Estimated Harvest Percentages of Terrestrial Mammals
Barrow, Year One
(Usable Pounds Harvested)

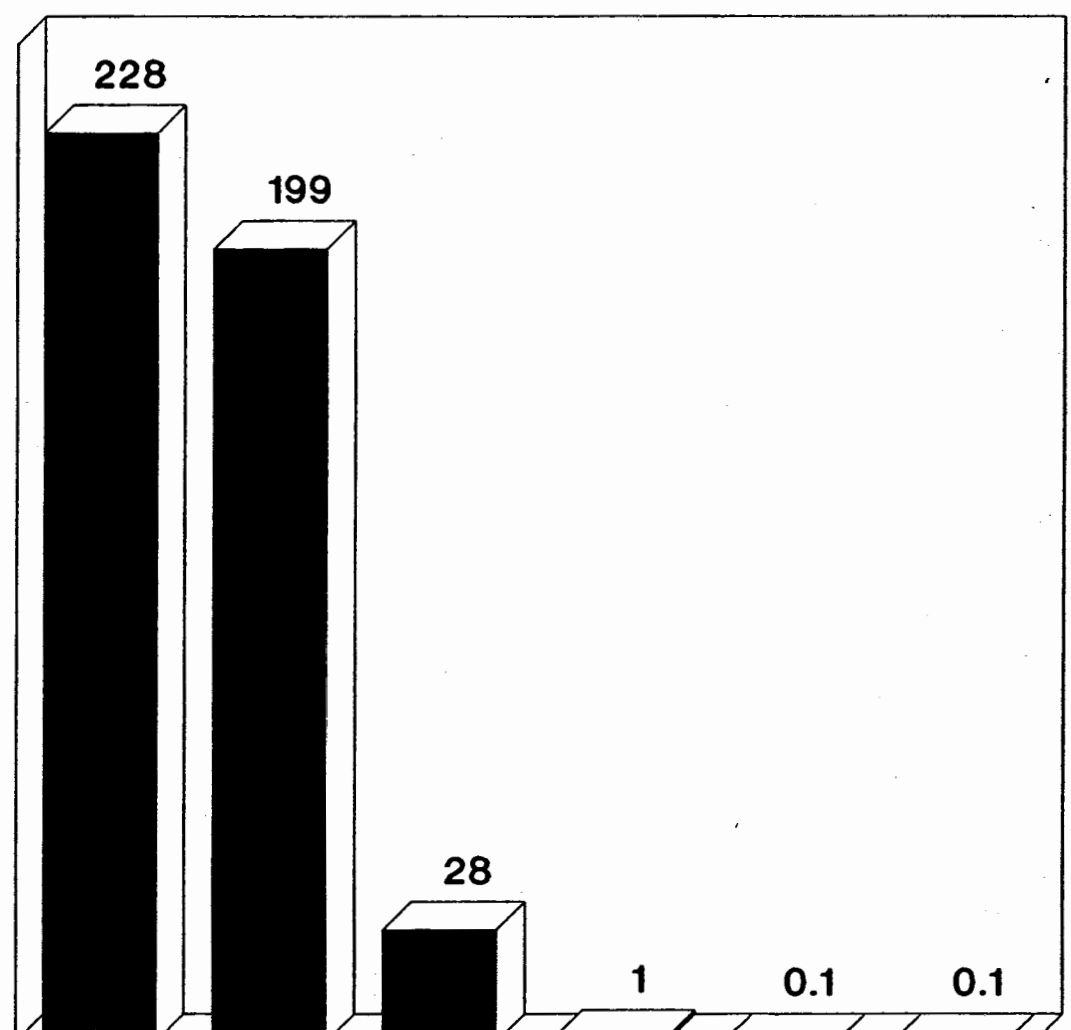


Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

Figure A-8: Terrestrial Mammal Harvest Estimates

All Barrow Households, Year One Revised

(Mean Usable Pounds Per Household)

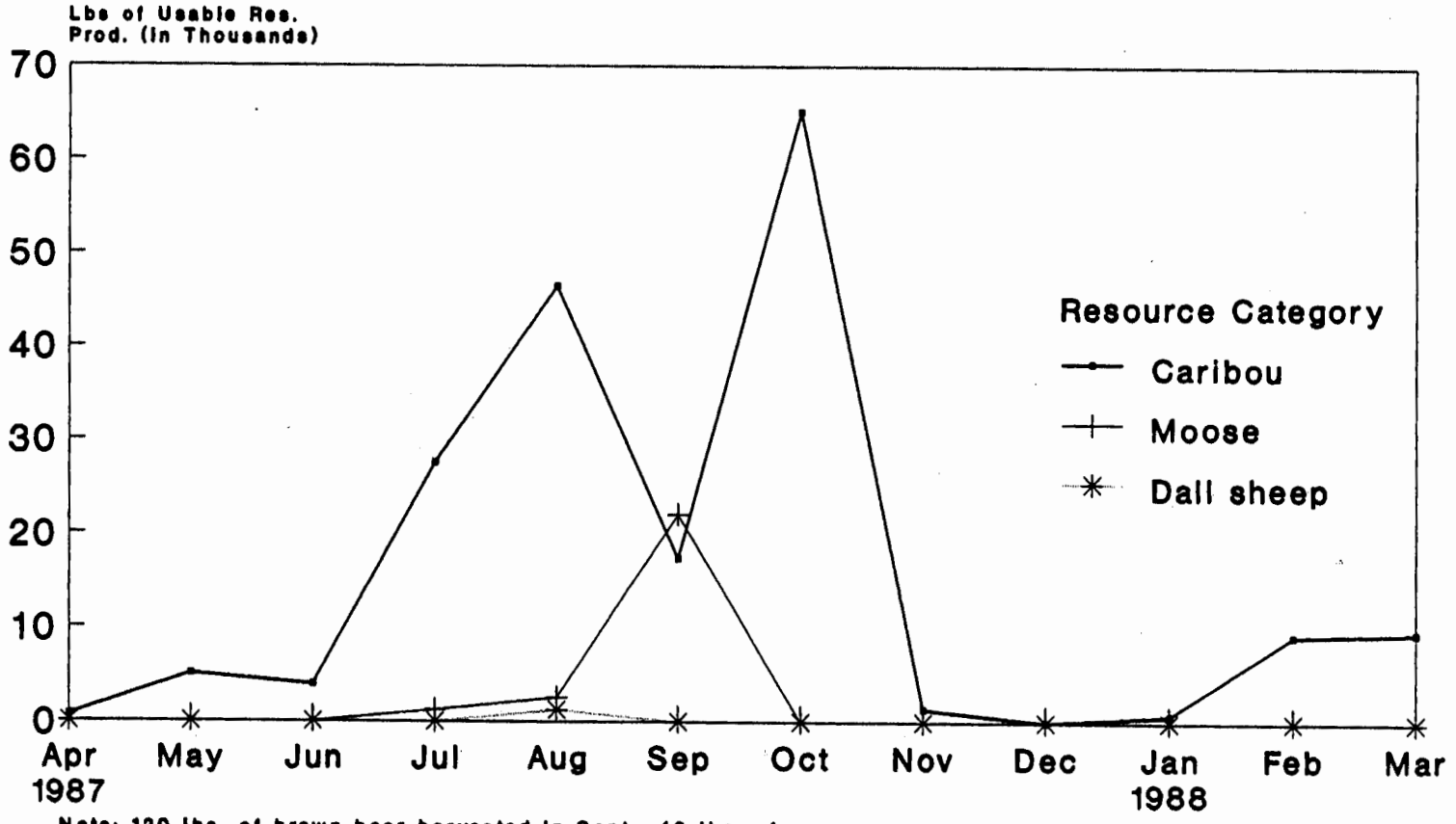


% of Terrestrial Mammals:	100%	87%	12%	<1%	<1%	<1%

Year One: April 1, 1987 - March 31, 1988

Source: Stephen R. Braund & Assoc., 1993

Figure A-9: Monthly Terrestrial Mammal Harvest Estimates
All Barrow Households, Year One Revised

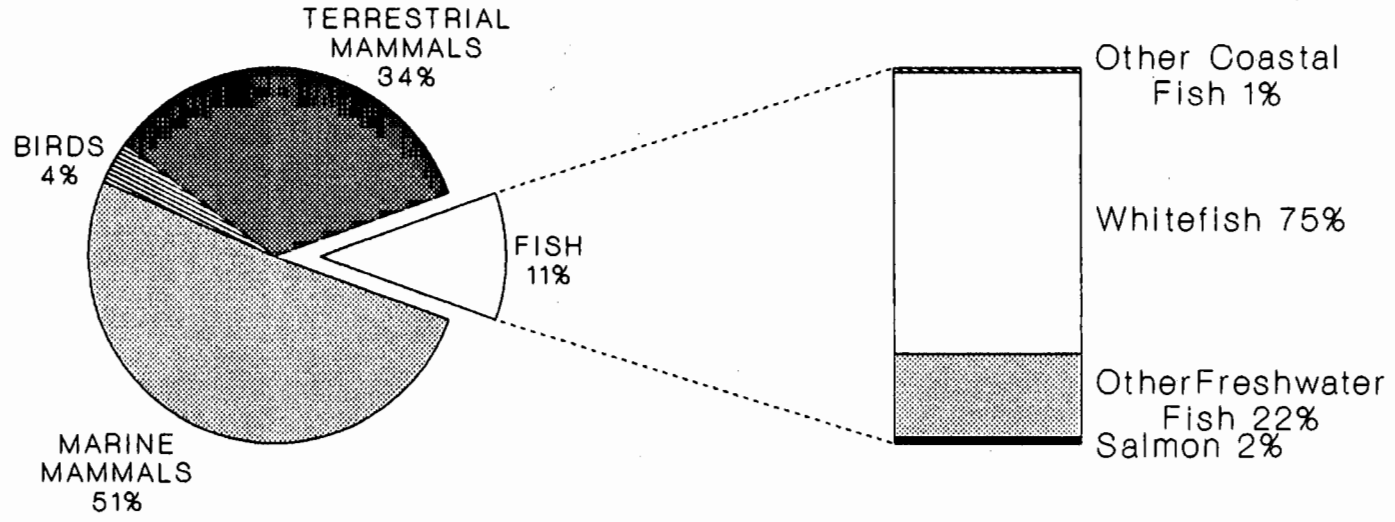


Note: 120 lbs. of brown bear harvested in Sept., 48 lbs. of porcupine harvested in Oct., and 10 lbs. of ground squirrel harvested in July do not appear on this chart due to scale.

Year One: April 1, 1987 - March 31, 1988

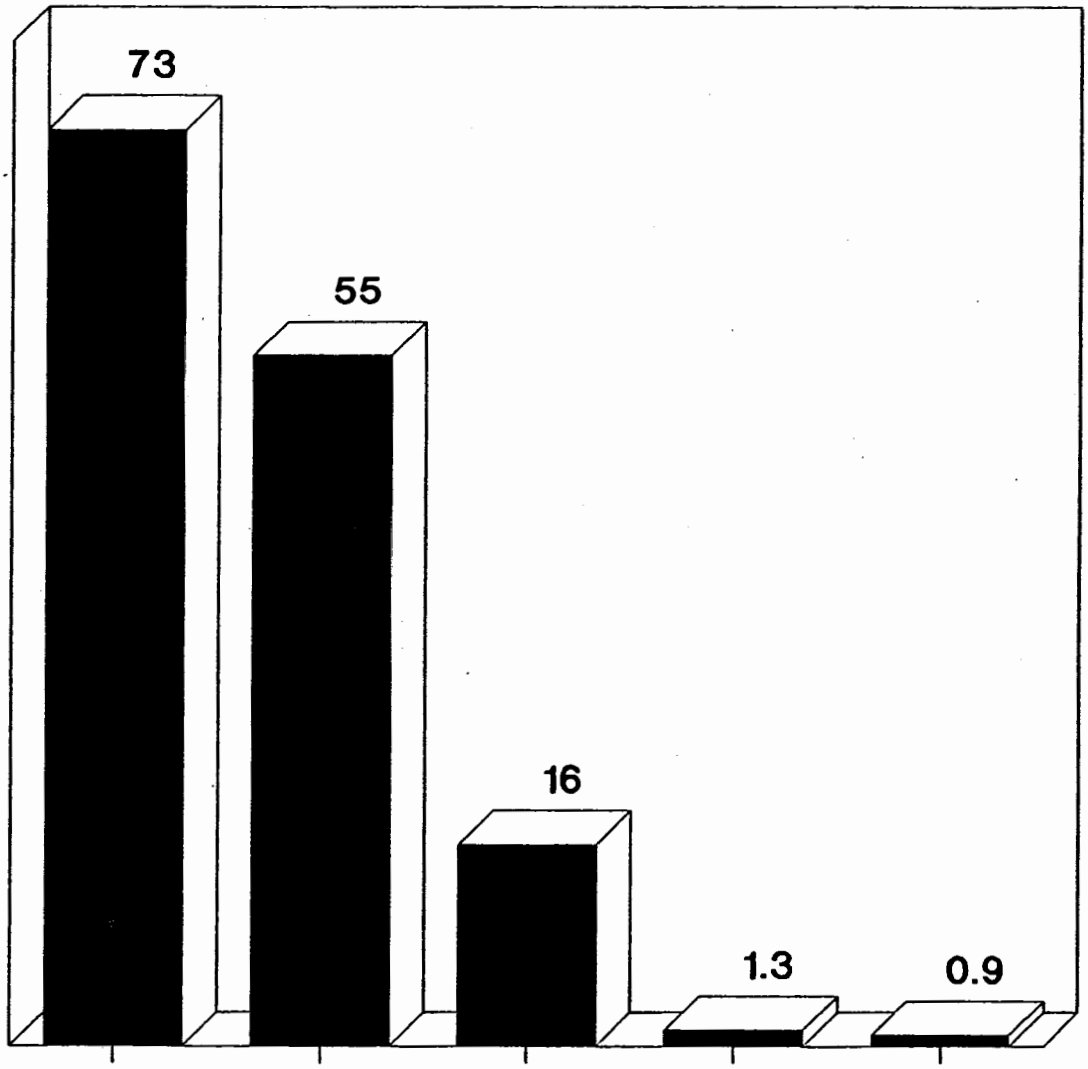
Source: Stephen R. Braund & Assoc., 1993

Figure A-10: Estimated Harvest Percentages of Fish
Barrow, Year One
(Usable Pounds Harvested)



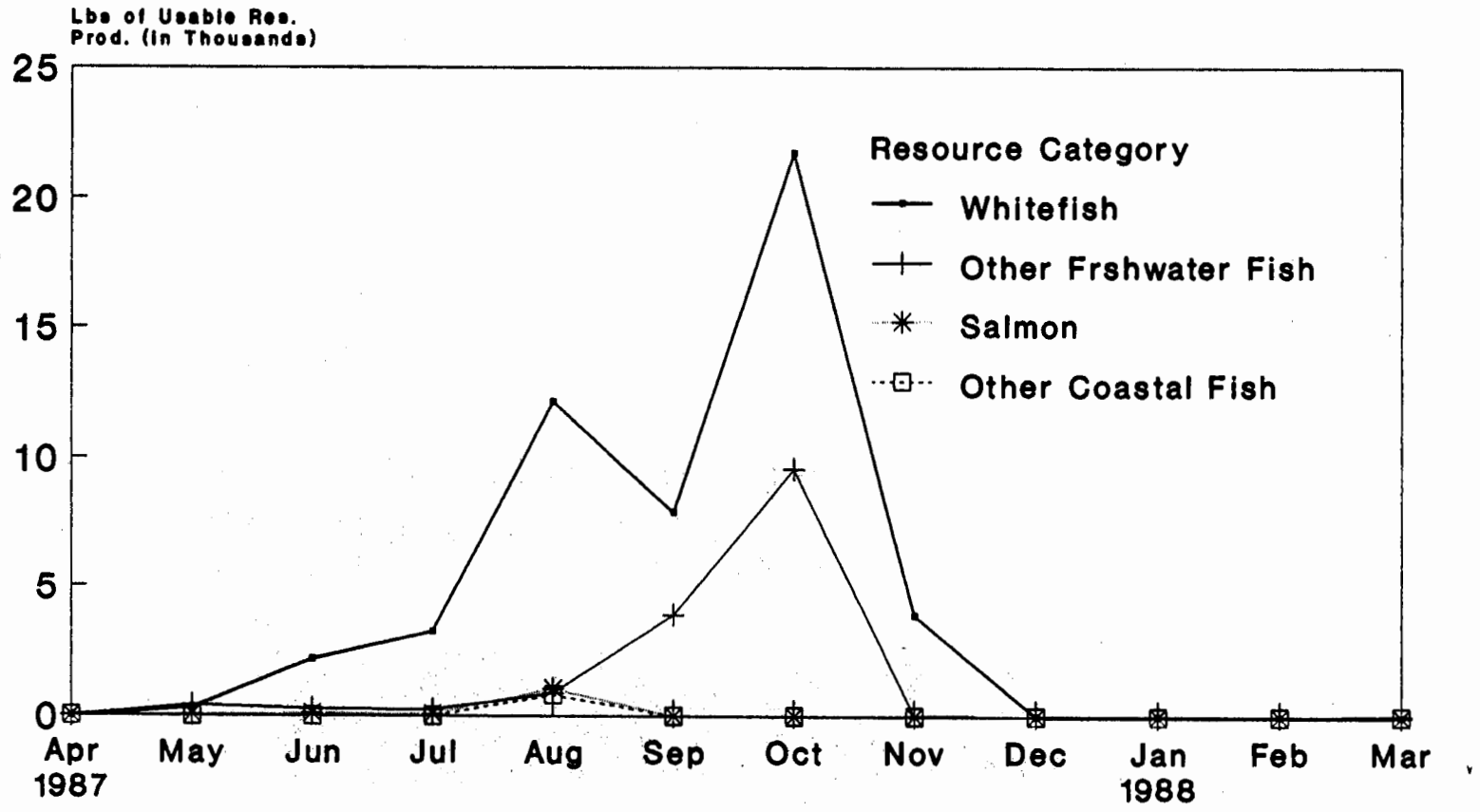
Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

Figure A-11: Fish Harvest Estimates
All Barrow Households, Year One Revised
(Mean Usable Pounds Per Household)



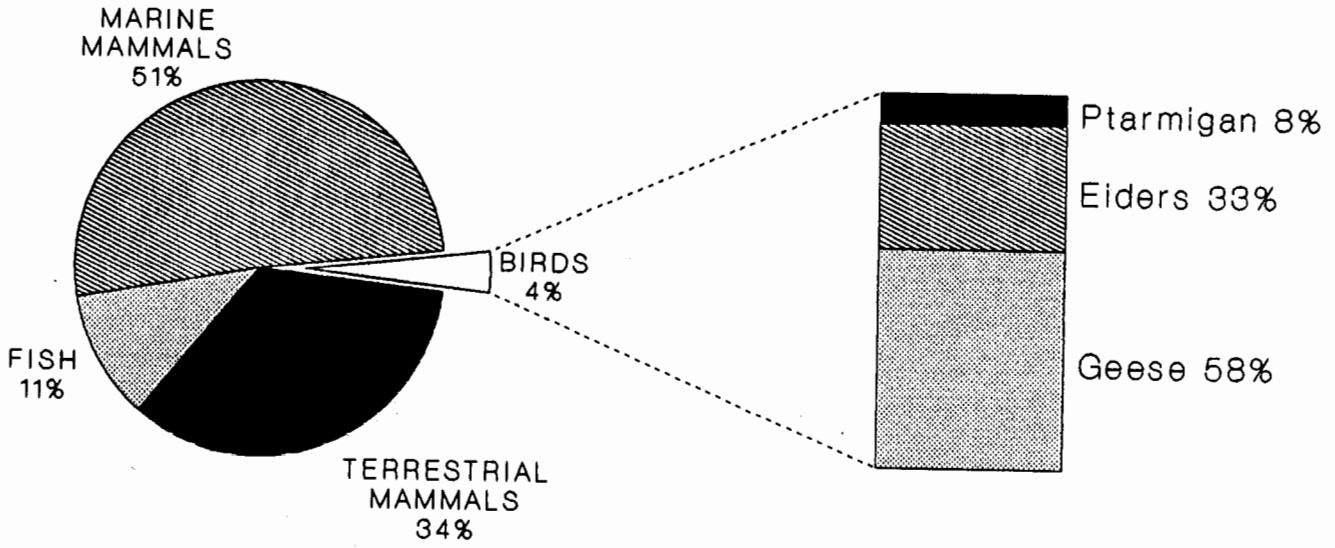
Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

Figure A-12: Monthly Fish Harvest Estimates
All Barrow Households, Year One Revised



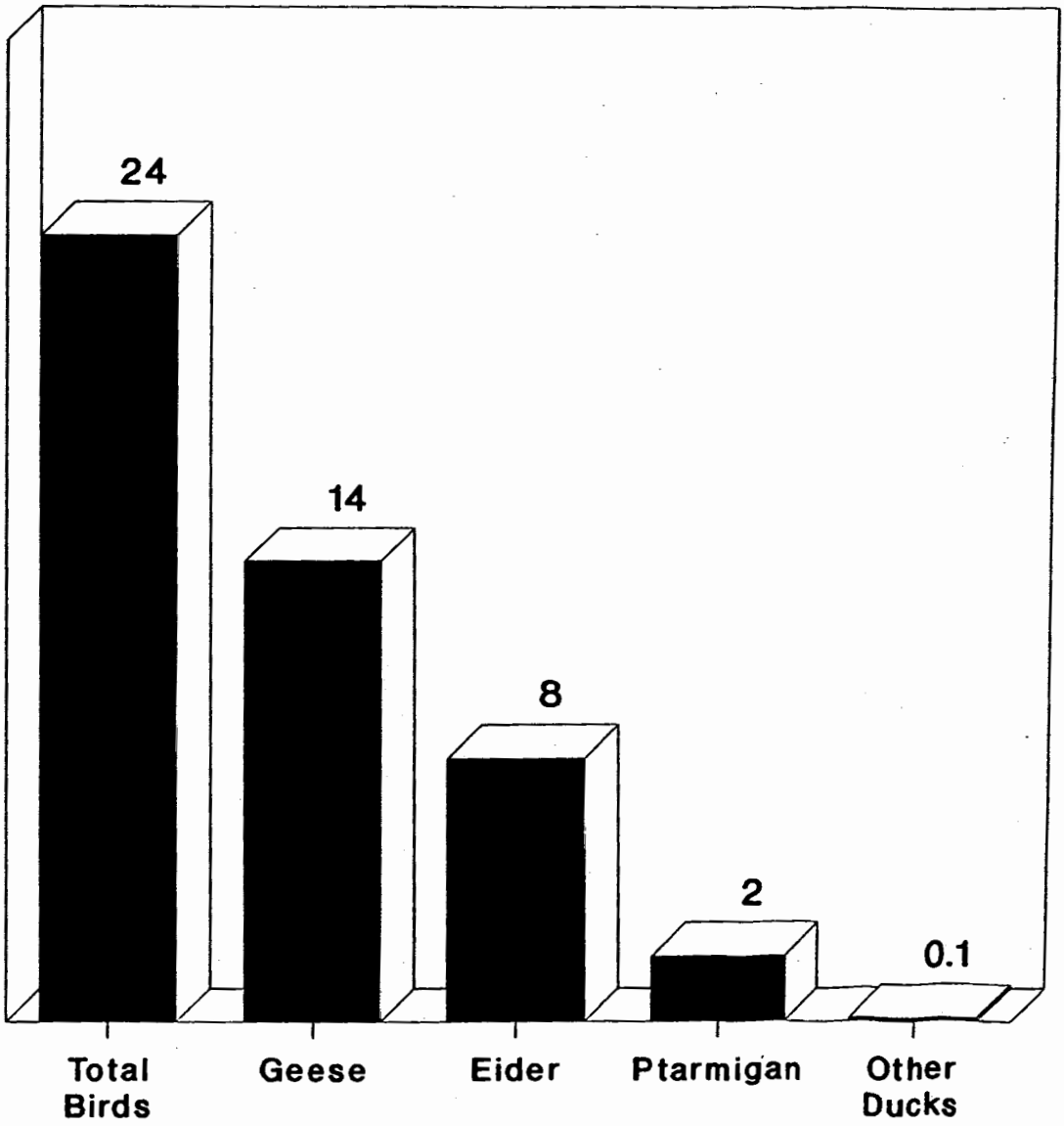
Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

Figure A-13: Estimated Harvest Percentages of Birds Barrow, Year One (Usable Pounds Harvested)



Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

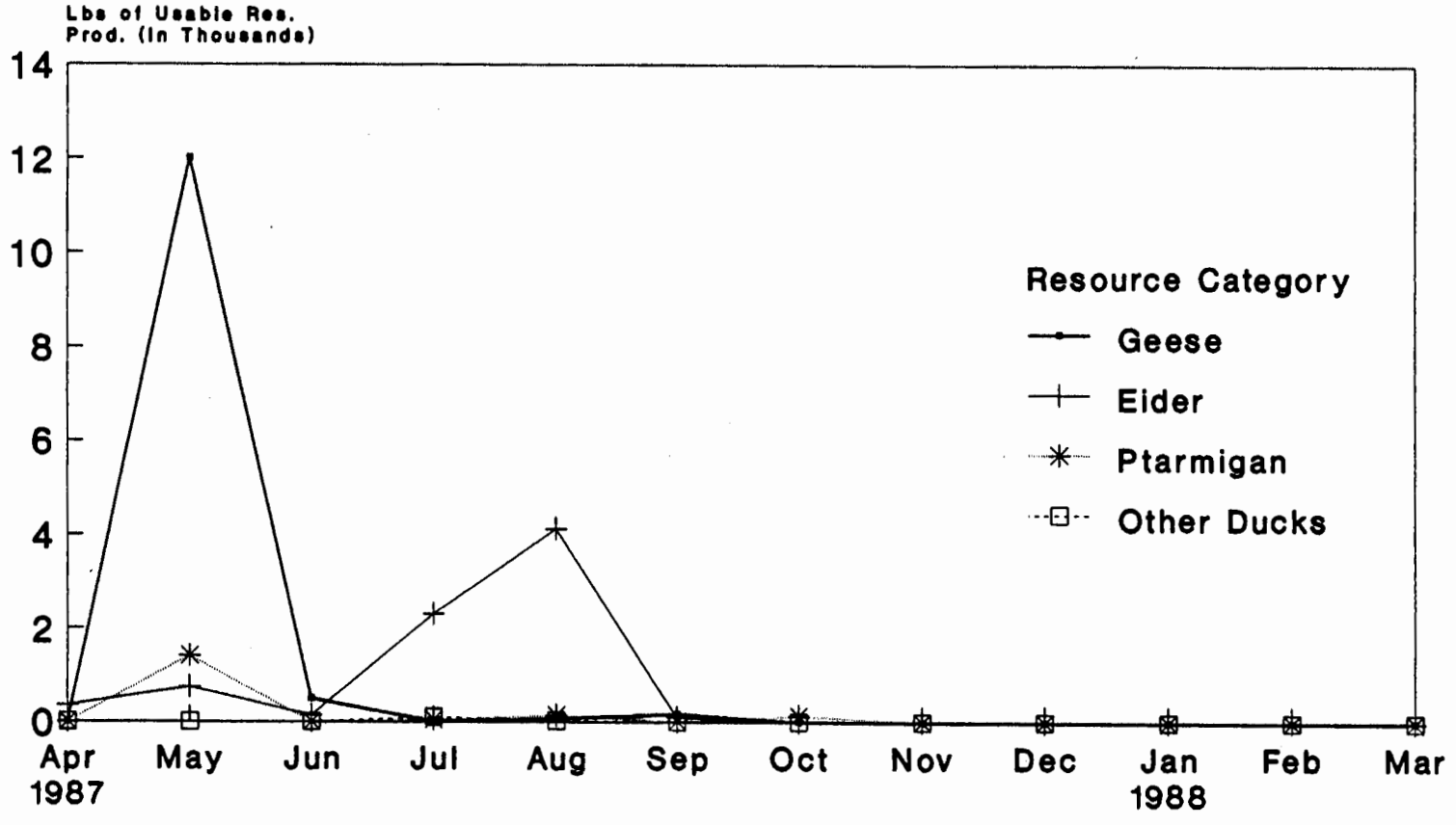
Figure A-14: Bird Harvest Estimates
All Barrow Households, Year One Revised
(Mean Usable Pounds Per Household)



% of Birds:	100%	58%	33%	8%	<1%

Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

Figure A-15: Monthly Bird Harvest Estimates
All Barrow Households, Year One Revised



Year One: April 1, 1987 - March 31, 1988
Source: Stephen R. Braund & Assoc., 1993

MAP A-1

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE

SUBSISTENCE HARVEST SITES, 1987 - 1988

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the North Slope Subsistence Study. Additional areas were used by Barrow residents not included in this study. Lifetime-community harvest areas, collected in the form of map biographies from 20 Barrow 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).
- All Species Harvested
- Caribou, Moose, Brown Bear
- Wolverine, Fox
- Ground Squirrel, Porcupine
- Seals, Walrus
- Polar Bear
- Bowhead Whale
- Eiders, Other Ducks, Geese
- Ptarmigan
- Fish
- Berries
- Bird Eggs
- Greens/Roots
- Water
- ★ Barrow

100 0 100

MILES

N

Map Production: North Slope Borough GIS

Date: December 30, 1988

MAP A-2

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE

SUBSISTENCE HARVEST SITES BY MAJOR RESOURCE CATEGORY

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

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LEGEND INFORMATION

- Marine Mammals (Bowhead whale, seals, polar bear, walrus)
- Terrestrial Mammals (Caribou, moose, brown bear, fox, porcupine, ground squirrel, wolverine)
- Fish (Salmon, whitefish, capelin, grayling, arctic char, burbot northern pike, rainbow smelt, lake trout)
- Birds (Eiders, other ducks, geese, ptarmigan)
- ★ Barrow

30 0 30 60 90

MILES

Map Production: North Slope Borough GIS

Date: December 30, 1988

MAP A-3
NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE
MARINE MAMMAL HARVEST SITES -- ALL SPECIES

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the North Slope Subsistence Study. Additional areas were used by Barrow residents not included in this study. Lifetime-community harvest areas, collected in the form of map biographies from 20 Barrow households (Pedersen 1979), are also illustrated.

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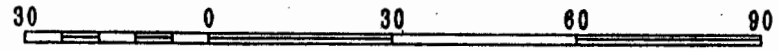
LEGEND INFORMATION

Lifetime community land use (Pedersen 1979).

Marine Mammals
- Bowhead whale
- Bearded seal
- Ringed seal
- Spotted seal
- Walrus
- Polar bear

★ Barrow



Map Production: North Slope Borough GIS

Date: December 30, 1988

MAP A-4

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE

MARINE MAMMAL HARVEST SITES BY SPECIES

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

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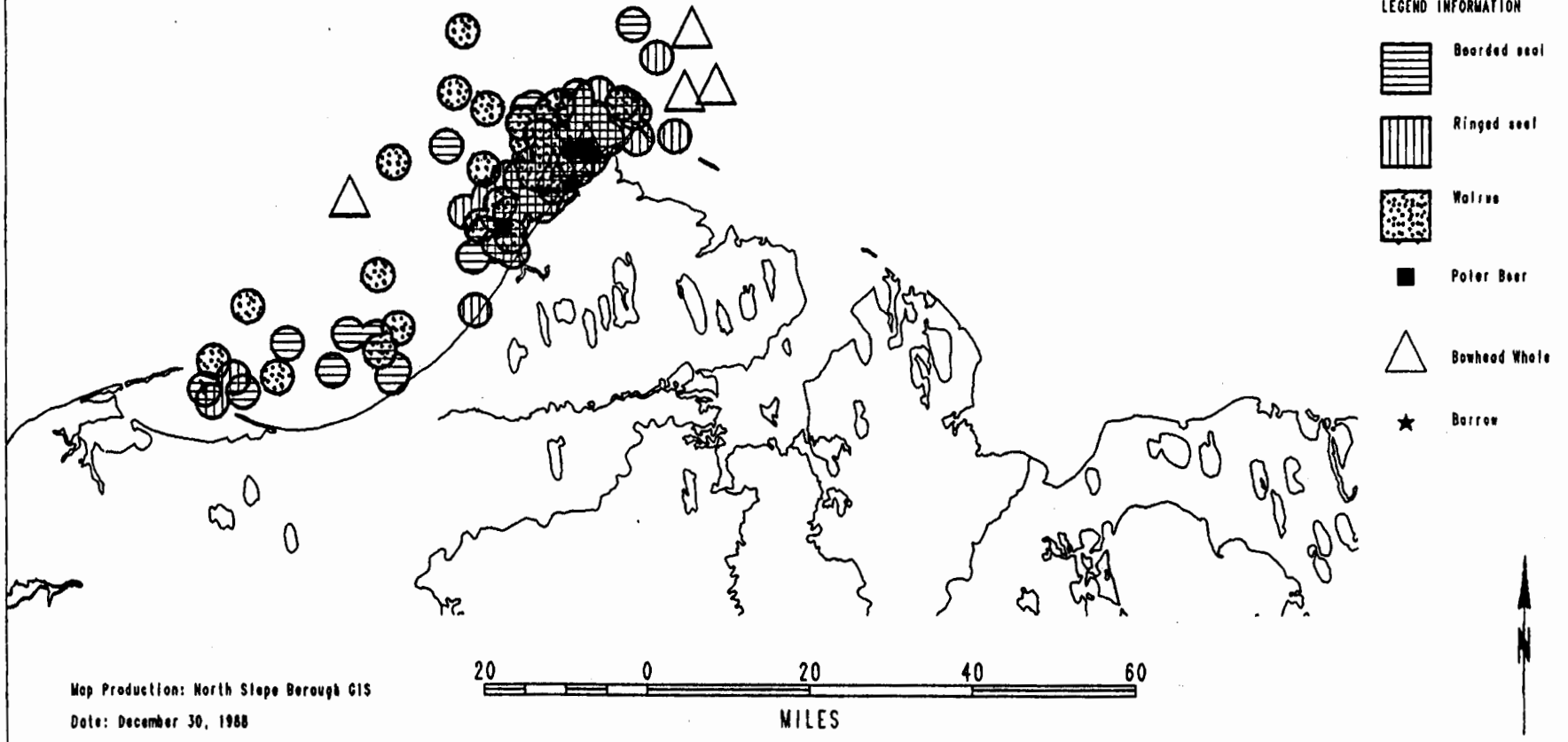

Map Production: North Slope Borough GIS

Date: December 30, 1988

MAP A-5

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE

MARINE MAMMAL HARVEST SITES BY SEASON

This dreft map depicts approximate subsistence harveet sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the 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

- June - October
- November - May
- ★ Barrow

20 0 20 40 60

MILES

N

Map Production: North Slope Borough GIS

Date: December 30, 1988

MAP A-6

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE

TERRESTRIAL MAMMAL HARVEST SITES -- ALL SPECIES

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the North Slope Subsistence Study. Additional areas were used by Barrow residents not included in this study. Lifetime-community harvest areas, collected in the form of map biographies from 20 Barrow households (Pedersen 1979), are also illustrated.

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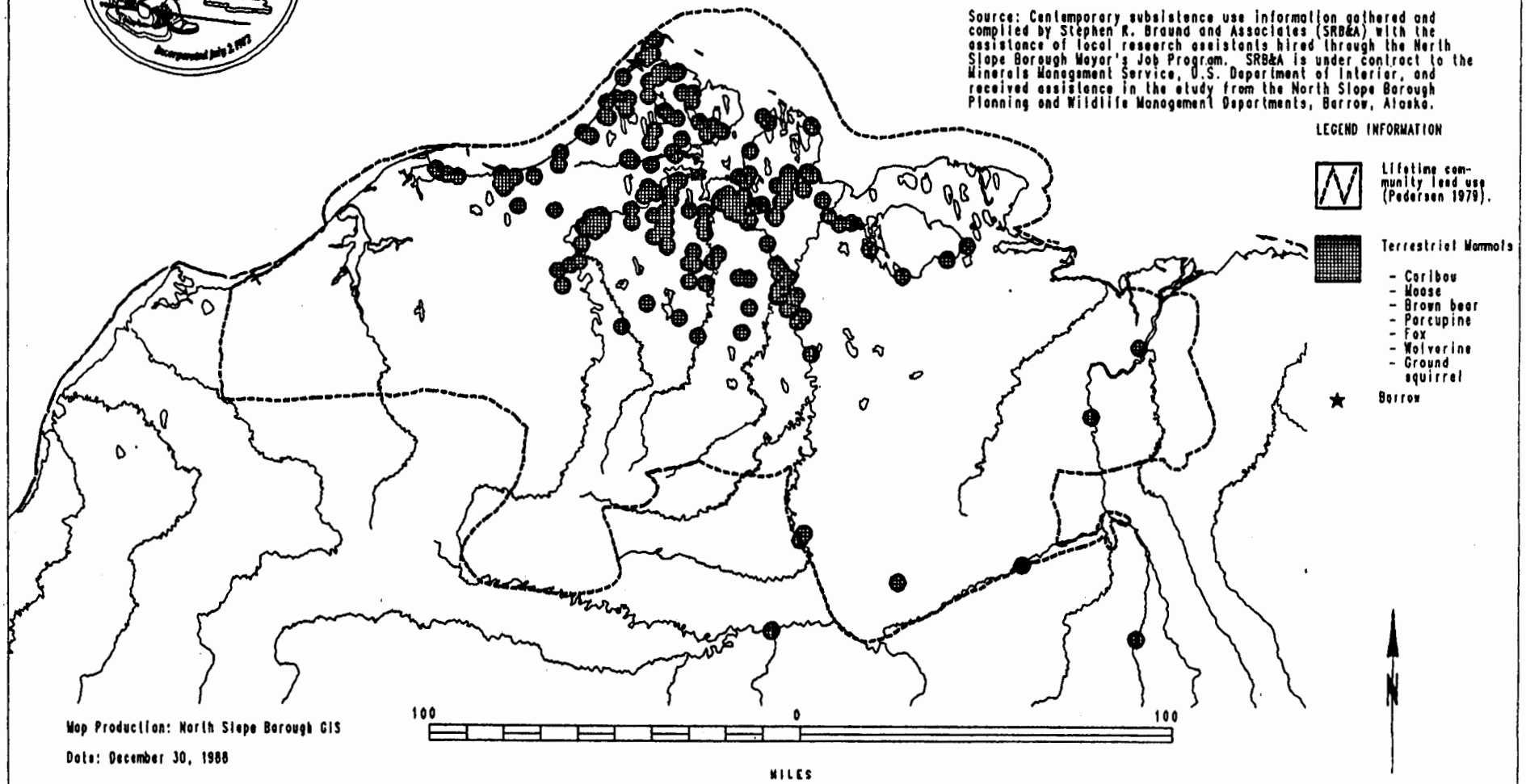

Map Production: North Slope Borough GIS

Date: December 30, 1988

MAP A-7

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE

TERRESTRIAL MAMMAL HARVEST SITES BY SPECIES (EXCLUDING CARIBOU)

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

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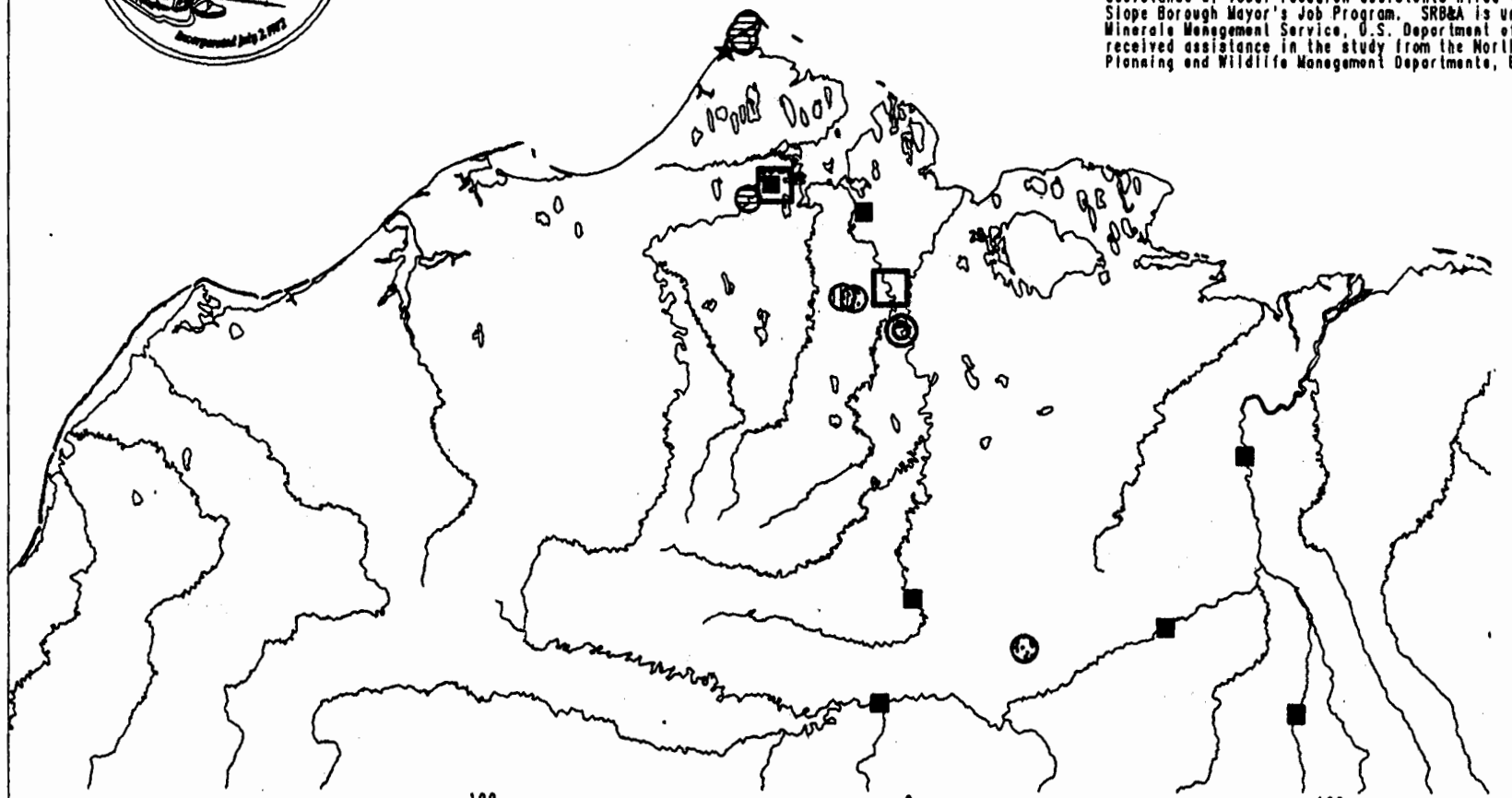


Map Production: North Slope Borough GIS

Date: December 30, 1988

MAP A-8

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE

CARIBOU HARVEST SITES BY SEASON

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the 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 1987
- July, August, September 1987
- October, November 1987
- December 1987, January, February, March 1988
- ★ Barrow

20 0 20 40 60

MILES

N

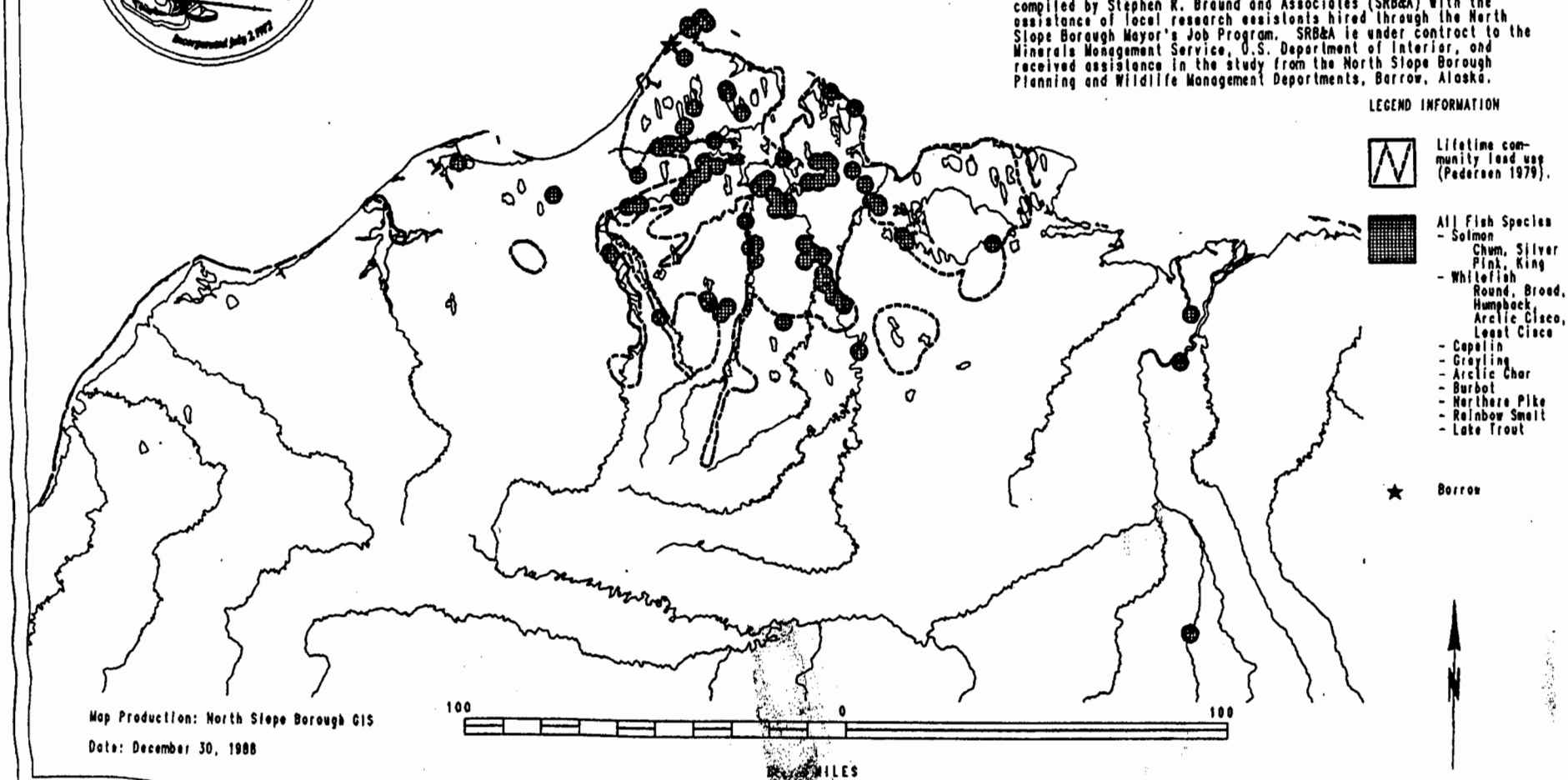
Map Production: North Slope Borough GIS

Date: December 30, 1988

MAP A-9
NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE
FISH HARVEST SITES -- ALL SPECIES

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the North Slope Subsistence Study. Additional areas were used by Barrow residents not included in this study. Lifetime-community harvest areas, collected in the form of map biographies from 20 Barrow households (Pedersen 1979), are also illustrated.

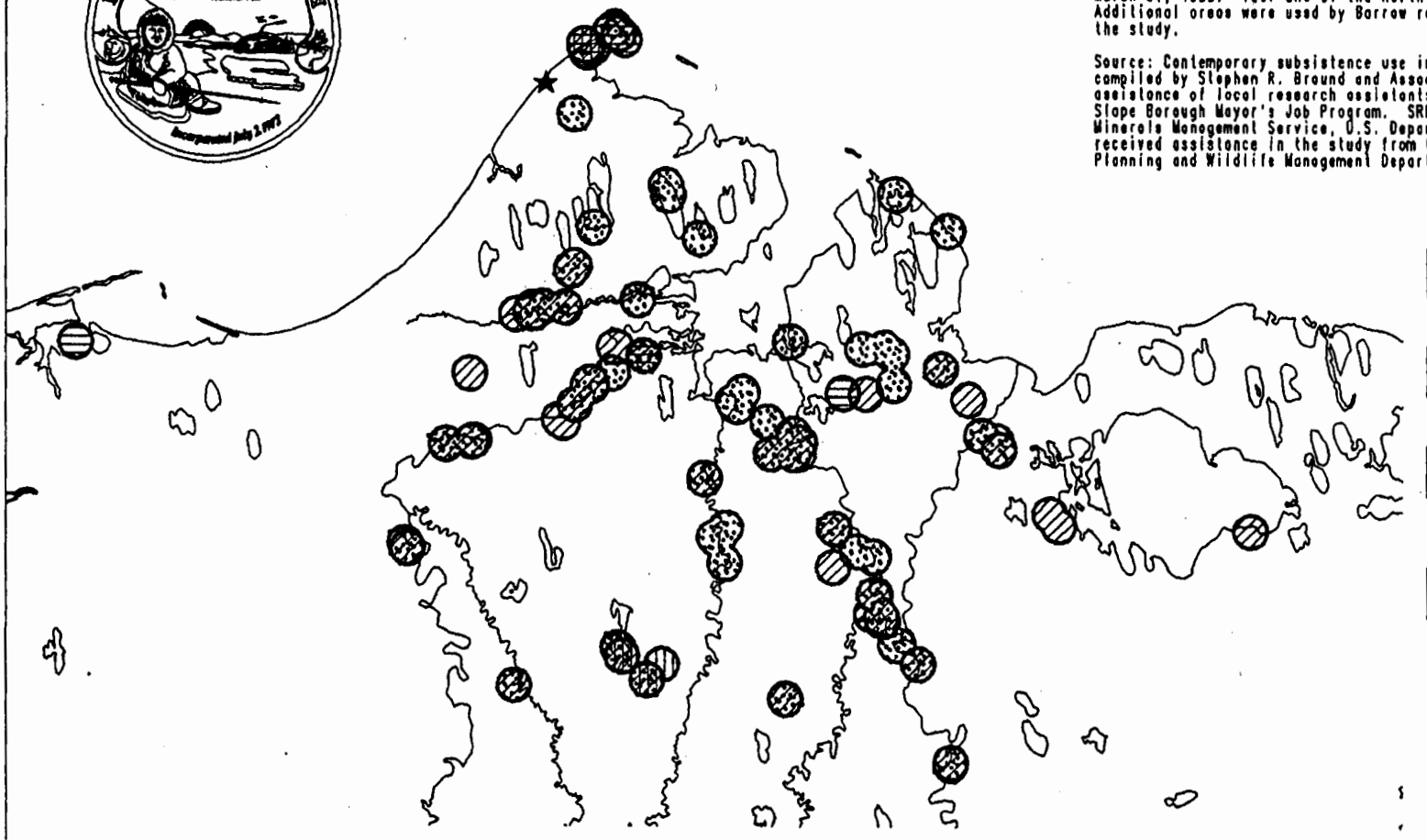
Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SRB&A) with the assistance of local research assistants hired through the North Slope Borough Mayor's Job Program. SRB&A is under contract to the Minerals Management Service, U.S. Department of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



MAP A-10
NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE
FISH HARVEST SITES BY SPECIES GROUPS

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the 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.



Map Production: North Slope Borough GIS

Date: December 30, 1988

MAP A-11

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE

BIRD HARVEST SITES -- ALL SPECIES

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the North Slope Subsistence Study. Additional areas were used by Barrow residents not included in this study. Lifetime-community harvest areas, collected in the form of map biographies from 20 Barrow households (Pedersen 1979), are also illustrated.

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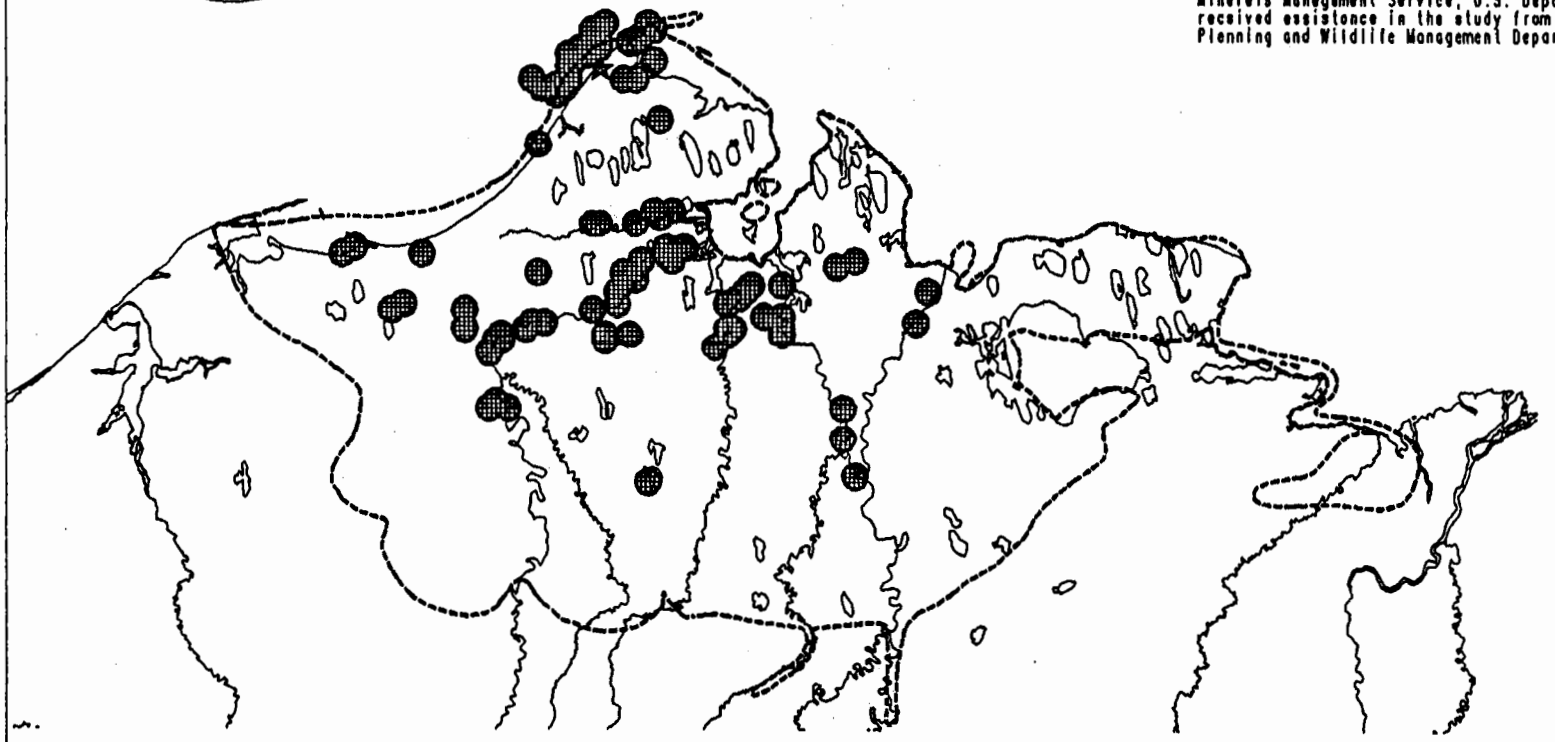

LEGEND INFORMATION

- Lifetime community land use (Pedersen 1979).
- Birds
  - Eiders
    - Common
    - King
    - Spectacled
  - Other Ducks
  - Geese
    - Black Brant
    - White-fronted
  - Ptarmigan
    - Willow
- ★ Barrow

30 0 30 60 90

MILES

Map Production: North Slope Borough GIS

Date: December 30, 1988

MAP A-12

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR ONE

BIRD HARVEST SITES BY SPECIES

This draft map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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, 1988: Year One of the 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

- Eiders
- Other Ducks
- Geese
- Ptarmigan
- ★ Barrow

20 0 20 40 60

MILES

N

Map Production: North Slope Borough GIS

Date: December 30, 1988

APPENDIX B

This appendix contains the following reference material:

- o the Year Two Seasonal Round
- o a calendar listing of Year Two activities and events
- o Year Two data tables
- o Year Two data figures (charts and graphs)
- o Year Two subsistence harvest site maps

YEAR TWO 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 description highlights the month's major subsistence activities, and points out any significant or unusual environmental, social, cultural and/or economic conditions or events that may have affected hunting that month. While the pattern of activities generally remains much the same from year to year, changes in environmental conditions, local resource availability, as well as social and economic factors do affect the actual timing and the relative importance of the different resources harvested from year to year.

All temperatures are given in Fahrenheit, with most being reported as ambient temperature. Windchill temperatures are given where appropriate and when available.

APRIL 1988

Final preparations for whaling were completed in April. New bearded seal (*ugruk*) skins were sewn on the *umiaq* (skin whaling boat) frames. Ice cellars were cleaned out and fresh snow placed inside. Trail building also began in earnest as crews decided where they would 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 Point Barrow 10 miles to the north. The ice remained closed the first two weeks of April. When it opened 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, Jonathan Aiken's 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 a half mile from shore. The lead edge became established there when a large ice pan broke off and floated out that evening. Crews began re-establishing 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 landed. However, a strike was received from Kivalina at mid-month and approximately half of the crews re-established 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* (blanket toss festival) celebrations in June.

Travel conditions were not favorable the second week of May. Blowing snow and average wind speeds of 25 mph, 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.

Ptarmigan were also harvested at camp. Caribou harvests were uncommon, however. 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 easily 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 soup 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. Although 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, over a month later than the final whale harvest of this spring's 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-30s for June, with the high for the month falling on the 28th in both years: 49 in Year One and 54 degrees in Year Two. The winds were more moderate in Year Two. It is also important to note that there were eight "heavy fog" 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 boat launching 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 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 wistfully 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

August activities mirrored July to a some extent; however, both 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. August was a busy month for travel, as boating had been limited for many in July and school would begin at the end of this month.

In early August, south and southeast winds finally blew the ice offshore in front of town. On August 5, for the first time since mid-July, bearded sealand 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 the 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 southwesterly 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 small boats 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 snowmachine 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 degrees compared with 22 degrees 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 to -20 degree 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 degrees.

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, making caribou soup, and preparing fruit and donuts. The successful whaling crews and successful fishermen delivered their boxes of whale and fish to the 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 degrees on the 24th. Wind speeds increased during this same period as

well. Although temperatures increased to -21 degrees on Christmas day, wind speeds increased to 37 mph giving a resultant windchill of -80 degrees. Fog and blowing snow were common throughout the month.

JANUARY 1989

The *Kivgiq* 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.

Bitter cold persisted the last three weeks of January. The National Weather Service in Barrow recorded -50 degrees on January 24 with winds to 21 miles per hour, taking the wind chill factor to below -100 degrees. Temperatures remained in the -50 degree range for the rest of the week. The monthly average temperature for the month (-24 degrees) was -14 degrees 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 a 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 wolves), 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 *umiaq* 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 Point 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 farther south.

At least 12 hunters traveled inland in search of wolverine and wolves. Reportedly few tracks were seen and fewer wolverine were harvested 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, with the large drifts facilitating river and ravine crossings. Closer to town the solid drifts, which were like cement according to one hunter, hindered travelers and increased 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.

As a summary to the Seasonal Round, the following list highlights the key community and environmental events that directly or indirectly influenced subsistence activities in Year Two.

DATE	ACTIVITY OR EVENT
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, *Piuraagiaqta.*
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	Whale harvest, 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.

DATE	ACTIVITY OR EVENT
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.
October 7	Trapped gray whales discovered off Point Barrow.
October 12	Journalists begin 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+ mph.
November 18	Sun sets in Barrow for 65 days.
November 24	Thanksgiving Day.
November (late)	Wolf and wolverine hunting begins.
December 25	Christmas Day. Major storm, blowing snow and winds to 35 mph.
December 26-31	Christmas games.
January 1-3	*Kivgiq* or Messenger Feast 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 mph. 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 mph.
March 8-11	Alaska Eskimo Whaling Commission annual meeting in Barrow.
March 26	Easter.

TABLE B-1: TOTAL HARVEST ESTIMATES BY MAJOR RESOURCE CATEGORY - ALL BARROW HOUSEHOLDS, YEAR TWO REVISED (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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 (4)	n/a	n/a	334,069	356.5	110.8	54%	39%	16	32	324	389	9%
Terrestrial Mammals	n/a	n/a	207,005	220.9	68.6	34%	27%	36	70	151	291	32%
Fish	n/a	n/a	51,069	54.5	16.9	8%	18%	6	11	44	65	20%
Birds	n/a	n/a	22,362	23.9	7.4	4%	34%	4	8	16	31	32%
Other Resources	n/a	n/a	169	0.2	0.1	**	2%	0	0	0	0	168%
Total (4)	n/a	n/a	614,673	656.0	203.8	100%	50%	46	91	565	747	14%

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(1) Year Two: April 1, 1988 - March 31, 1989.

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

(3) See Table D-5 for sources of conversion factors.

(4) 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, 1993

TABLE B-2: MONTHLY HARVEST ESTIMATES BY MAJOR RESOURCE CATEGORY - BARROW, YEAR TWO REVISED
(Pounds of Usable Resource Product)

TOTALS

	1988							1989				
MAJOR RESOURCE CATEGORY	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Marine Mammals	62,256	38,239	1,462	34,331	51,901	137,275	655	2,457	2,124	145	3,372	0
Terrestrial Mammals	140	9,938	1,543	26,783	57,707	21,255	61,179	4,675	1,760	3,444	6,732	11,855
Fish	14	139	2,070	4,299	6,152	8,943	25,688	3,587	0	0	166	0
Birds	5	16,393	1,696	798	2,916	510	38	0	0	0	0	10
Total	62,416	64,709	6,771	66,212	118,677	167,983	87,560	10,719	3,884	3,590	10,270	11,865

PERCENTS

	1988							1989					
MAJOR RESOURCE CATEGORY	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March	
Marine Mammals	19%	11%	0%	10%	16%	41%	0%	1%	1%	0%	1%	0%	= 100%
Terrestrial Mammals	0%	5%	1%	13%	28%	10%	30%	2%	1%	2%	3%	6%	= 100%
Fish	0%	0%	4%	8%	12%	18%	50%	7%	0%	0%	0%	0%	= 100%
Birds	0%	73%	8%	4%	13%	2%	0%	0%	0%	0%	0%	0%	= 100%
All Resources Combined	10%	11%	1%	11%	19%	27%	14%	2%	1%	1%	2%	2%	= 100%

Source: Stephen R. Braund & Associates, 1993

TABLE B-3: HARVEST ESTIMATES FOR MARINE MAMMALS - ALL BARROW HOUSEHOLDS, YEAR TWO REVISED (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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	334,069	356.5	110.8	54.3%	39%	16	32	324.4	388.6	9%
Bowhead (4,5)	21,218.3	11	233,313	249.0	77.4	38.0%	35%	n/a	n/a	n/a	n/a	n/a
Walrus	772.0	61	47,215	50.4	15.7	7.7%	6%	9	19	31.9	68.9	37%
Bearded Seal	176.0	179	31,436	33.6	10.4	5.1%	11%	11	21	12.9	54.2	62%
Total Ring. & Spot. Seal	42.0	392	16,454	17.6	5.5	2.7%	10%	4	8	9.8	25.3	44%
Ringed Seal	42.0	388	16,304	17.4	5.4	2.7%	10%	4	8	9.6	25.2	45%
Spotted Seal	42.0	4	150	0.2	*	**	**	0	0	0.1	0.3	60%
Polar Bear	496.0	11	5,650	6.0	1.9	0.9%	2%	1	2	4.2	7.9	31%

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(1) Year Two: April 1, 1988 - March 31, 1989.

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

(3) See Table D-5 for sources of conversion factors.

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

(5) 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, 1993

TABLE B-4: MARINE MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR TWO REVISED
(Pounds of Usable Resource Product)

TOTALS
******

SPECIES	1988 April	May	June	July	August	Sept.	October	Nov.	1989 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	17,409	29,808	0	0	0	0	0	0	0
Polar Bear	0	0	893	1,189	595	1,190	0	595	1,190	0	0	0
Bearded Seal	0	422	317	10,100	20,280	317	0	0	0	0	0	0
Total Ring. & Spot. Seal	252	1,779	252	5,633	1,218	408	655	1,862	934	145	3,372	0
Ringed Seal	252	1,779	252	5,532	1,168	408	655	1,862	934	145	3,372	0
Spotted Seal	0	0	0	101	50	0	0	0	0	0	0	0
All Marine Mammals	62,256	38,239	1,462	34,331	51,901	137,275	655	2,457	2,124	145	3,372	0

PERCENTS
****

SPECIES	1988 April	May	June	July	August	Sept.	October	Nov.	1989 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%
Polar Bear	0%	0%	16%	21%	11%	21%	0%	11%	21%	0%	0%	0%	100%
Bearded Seal	0%	1%	1%	32%	65%	1%	0%	0%	0%	0%	0%	0%	100%
Total Ring. & Spot. Seal	2%	11%	2%	34%	7%	2%	4%	11%	6%	1%	20%	0%	100%
Ringed Seal	2%	11%	2%	34%	7%	2%	4%	11%	6%	1%	21%	0%	100%
Spotted Seal	0%	0%	0%	67%	33%	0%	0%	0%	0%	0%	0%	0%	100%
All Marine Mammals	19%	11%	0%	10%	16%	41%	0%	1%	1%	0%	1%	0%	100%

Source: Stephen R. Braund & Associates, 1993

TABLE B-5: MARINE MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR TWO REVISED
(Number Harvested)

	1988									1989		
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	5	3	0	0	0	3	0	0	0	0	0	0
Walrus	0	0	0	23	39	0	0	0	0	0	0	0
Polar Bear	0	0	2	2	1	2	0	1	2	0	0	0
Bearded Seal	0	2	2	57	115	2	0	0	0	0	0	0
Total Ring. & Spot. Seal	6	42	6	134	29	10	16	44	22	3	80	0
Ringed Seal	6	42	6	132	28	10	16	44	22	3	80	0
Spotted Seal	0	0	0	2	1	0	0	0	0	0	0	0

Source: Stephen R. Braund & Associates, 1993

TABLE B-6: HARVEST ESTIMATES FOR TERRESTRIAL MAMMALS - ALL BARROW HOUSEHOLDS, YEAR TWO REVISED (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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 Terrestrial Mammals	n/a	n/a	207,005	220.9	68.6	33.7%	27%	36	70	151.17	290.67	32%
Caribou	117.0	1,533	179,314	191.4	59.5	29.2%	27%	31	61	130.32	252.42	32%
Moose	500.0	53	26,367	28.1	8.7	4.3%	4%	20	40	0.00	67.71	141%
Brown Bear	100.0	1	122	0.1	*	**	**	0	0	0.03	0.23	79%
Dall Sheep	99.0	12	1,202	1.3	0.4	0.2%	1%	1	2	0.00	3.69	188%
Wolverine	n/a	2	n/a	n/a	n/a	n/a	**	n/a	n/a	n/a	n/a	n/a
Arctic Fox (Blue)	n/a	146	n/a	n/a	n/a	n/a	**	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	**	n/a	n/a	n/a	n/a	n/a

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(1) Year Two: April 1, 1988 - March 31, 1989.

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

(3) See Table D-5 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, 1993

TABLE B-7: TERRESTRIAL MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR TWO REVISED
(Pounds of Usable Resource Product)

TOTALS
******

SPECIES	1988 April	May	June	July	August	Sept.	October	Nov.	1989 Dec.	Jan.	Feb.	March
Caribou	140	9,938	1,543	26,183	41,185	11,885	61,179	4,675	1,760	3,444	6,732	10,655
Moose	0	0	0	600	15,320	9,250	0	0	0	0	0	1,200
Brown Bear	0	0	0	0	0	120	0	0	0	0	0	0
Dall sheep	0	0	0	0	1,202	0	0	0	0	0	0	0
All Terrestrial Mammals (excluding furbearers)	140	9,938	1,543	26,783	57,707	21,255	61,179	4,675	1,760	3,444	6,732	11,855

PERCENTS
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SPECIES	1988 April	May	June	July	August	Sept.	October	Nov.	1989 Dec.	Jan.	Feb.	March	
Caribou	0%	6%	1%	15%	23%	7%	34%	3%	1%	2%	4%	6%	100%
Moose	0%	0%	0%	2%	58%	35%	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%	28%	10%	30%	2%	1%	2%	3%	6%	100%

Source: Stephen R. Braund & Associates, 1993

TABLE B-8: TERRESTRIAL MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR TWO REVISED
(Number Harvested)

	1988	TOTALS ******						1989			
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	1	85	13	224	352	102	523	40	15	29	58	91
Moose	0	0	0	1	31	19	0	0	0	0	0	2
Brown Bear	0	0	0	0	0	1	0	0	0	0	0	0
Dall sheep	0	0	0	0	12	0	0	0	0	0	0	0
Arctic Fox (Blue)	1	0	0	0	0	0	0	16	42	47	31	10
Red Fox (Cross, Silver)	0	0	0	0	0	0	0	0	0	0	0	4
Wolverine	0	0	0	0	0	0	0	0	0	0	0	2

Source: Stephen R. Braund & Associates, 1993

TABLE B-9: HARVEST ESTIMATES FOR FISH - ALL BARROW HOUSEHOLDS, YEAR TWO REVISED (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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 Fish	n/a	n/a	51,069	54.5	16.9	8.3%	18%	6	11	43.67	65.33	20%
Total Whitefish		20,628	39,766	42.4	13.2	6.5%	14%	5	9	33.60	51.28	21%
Whitefish (non-spec.)	2.0	173	347	0.4	0.1	0.1%	**	0	1	0.00	0.98	165%
Round Whitefish	1.0	721	721	0.8	0.2	0.1%	**	0	1	0.16	1.38	80%
Broad Whitefish (River)	2.5	10,494	26,236	28.0	8.7	4.3%	11%	3	6	21.52	34.48	23%
Broad Whitefish (Lake)	3.4	937	3,186	3.4	1.1	0.5%	2%	1	1	2.08	4.72	39%
Humpback whitefish	2.5	647	1,621	1.7	0.5	0.3%	4%	0	1	0.94	2.52	46%
Least cisco	1.0	7,505	7,505	8.0	2.5	1.2%	2%	2	5	3.24	12.78	59%
Bering, Arctic cisco	1.0	151	150	0.2	*	**	6%	0	0	0.05	0.27	69%
Total Other Freshwater Fish		9,224	9,014	9.6	3.0	1.5%	12%	2	4	6.01	13.23	38%
Arctic grayling	0.8	8,684	6,943	7.4	2.3	1.1%	11%	1	3	4.59	10.23	38%
Arctic char	2.8	76	216	0.2	*	**	**	0	0	0.07	0.39	71%
Burbot (Ling cod)	4.0	392	1,565	1.7	0.5	0.3%	7%	0	1	0.73	2.61	56%
Lake trout	4.0	72	290	0.3	0.1	**	1%	0	0	0.12	0.50	63%
Total Salmon		80	490	0.5	0.2	0.1%	1%	0	0	0.16	0.88	69%
Salmon (non-specified)	6.1	3	18	0.0	*	**	**	0	0	0.00	0.06	191%
Chum (Dog) salmon	6.1	5	31	0.0	*	**	**	0	0	0.01	0.06	77%
Pink (Humpback) salmon	3.1	1	3	0.0	*	**	**	0	0	0.00	0.01	102%
Silver (Coho) salmon	6.0	70	420	0.4	0.1	0.1%	**	0	0	0.13	0.76	70%
King (Chinook) salmon	18.0	1	18	0.0	*	**	**	0	0	0.00	0.04	96%
Total Other Coastal Fish		8,150	1,799	1.9	*	**	2%	1	1	0.70	3.14	64%
Arctic cod	0.2	7,945	1,593	1.7	0.5	0.3%	**	1	1	0.55	2.85	68%
Tomcod	1.0	194	197	0.2	*	**	1%	0	0	0.00	0.60	185%
Sculpin	0.6	11	9	0.0	*	**	**	0	0	0.01	0.01	41%

(1) Year Two: April 1, 1988 - March 31, 1989.

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

(3) See Table D-5 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, 1993

TABLE B-10: FISH HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR TWO REVISED
(Pounds of Usable Resource Product)

SPECIES	1988 April	May	June	July	August	Sept.	TOTALS ****** October	Nov.	1989 Dec.	Jan.	Feb.	March
Total Whitefish	0	120	2,070	3,827	4,961	5,669	20,522	2,593	0	0	0	0
Whitefish (non-specified)	0	0	0	0	0	0	346	0	0	0	0	0
Round Whitefish	0	120	120	121	120	120	120	0	0	0	0	0
Broad Whitefish (River)	0	0	1,950	3,256	4,254	4,688	10,288	1,800	0	0	0	0
Broad Whitefish (Lake)	0	0	0	0	377	82	2,162	565	0	0	0	0
Humpback whitefish	0	0	0	72	168	475	904	0	0	0	0	0
Least cisco	0	0	0	372	0	256	6,696	180	0	0	0	0
Bering, Arctic cisco	0	0	0	6	42	49	6	48	0	0	0	0
Total Other Freshwater Fish	14	19	0	317	849	3,274	3,823	552	0	0	166	0
Arctic grayling	0	0	0	306	798	3,009	2,835	0	0	0	0	0
Arctic char	0	0	0	7	37	0	0	168	0	0	0	0
Burbot (Ling cod)	14	19	0	5	14	212	753	384	0	0	166	0
Lake trout	0	0	0	0	0	53	235	0	0	0	0	0
Total Salmon	0	0	0	151	342	0	0	0	0	0	0	0
Salmon (non-specified)	0	0	0	0	21	0	0	0	0	0	0	0
Chum (Dog) salmon	0	0	0	15	15	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	137	281	0	0	0	0	0	0	0
King (Chinook) salmon	0	0	0	0	22	0	0	0	0	0	0	0
Total Other Coastal Fish	0	0	0	4	1	0	1,344	441	0	0	0	0
Tomcod (Saffron Cod)	0	0	0	0	0	0	0	194	0	0	0	0
Arctic Cod	0	0	0	0	0	0	1,344	245	0	0	0	0
Sculpin	0	0	0	4	1	0	0	2	0	0	0	0
All Fish Species	14	139	2,070	4,299	6,152	8,943	25,688	3,587	0	0	166	0

(Continued on next page)

TABLE B-10, CONTINUED: FISH HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR TWO REVISED
(Pounds of Usable Resource Product)

PERCENTS
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SPECIES	1988 April	May	June	July	August	Sept.	October	Nov.	Dec.	1989 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%	100%	0%	0%	0%	0%	0%	100%
Round Whitefish	0%	17%	17%	17%	17%	17%	17%	0%	0%	0%	0%	0%	100%
Broad Whitefish (River)	0%	0%	7%	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%	4%	10%	29%	56%	0%	0%	0%	0%	0%	100%
Least cisco	0%	0%	7%	12%	16%	18%	39%	7%	0%	0%	0%	0%	100%
Bering, Arctic cisco	0%	0%	0%	5%	0%	3%	89%	2%	0%	0%	0%	0%	100%
Total Other Freshwater Fish	0%	0%	0%	4%	9%	36%	42%	6%	0%	0%	2%	0%	100%
Arctic grayling	0%	0%	0%	4%	11%	43%	41%	0%	0%	0%	0%	0%	100%
Arctic char	0%	0%	0%	3%	17%	0%	0%	79%	0%	0%	0%	0%	100%
Burbot (Ling cod)	1%	1%	0%	0%	1%	14%	48%	25%	0%	0%	11%	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%	75%	25%	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%
Sculpin	0%	0%	0%	56%	11%	0%	0%	33%	0%	0%	0%	0%	100%
All Fish Species	0%	0%	4%	8%	12%	18%	50%	7%	0%	0%	0%	0%	100%

Source: Stephen R. Braund & Associates, 1993

TABLE B-11: FISH HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR TWO REVISED
(Number Harvested)

	1988								1989			
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0	120	900	1,831	2,042	2,514	12,108	1,114	0	0	0	0
Whitefish (non-specified)	0	0	0	0	0	0	173	0	0	0	0	0
Round Whitefish	0	120	120	121	120	120	120	0	0	0	0	0
Broad Whitefish	0	0	780	1,302	1,702	1,875	4,115	720	0	0	0	0
Broad Whitefish (Lake)	0	0	0	0	111	24	636	166	0	0	0	0
Humpback whitefish	0	0	0	29	67	190	361	0	0	0	0	0
Least cisco	0	0	0	372	0	256	6,696	180	0	0	0	0
Bering, Arctic cisco	0	0	0	6	42	49	6	48	0	0	0	0
Total Other Freshwater Fish	3	5	0	386	1,014	3,828	3,791	156	0	0	42	0
Arctic grayling	0	0	0	382	997	3,761	3,544	0	0	0	0	0
Arctic char	0	0	0	2	13	0	0	60	0	0	0	0
Burbot (Ling cod)	3	5	0	1	3	53	188	96	0	0	42	0
Lake trout	0	0	0	0	0	13	59	0	0	0	0	0
Salmon	0	0	0	25	55	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	23	47	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	6	1	0	6,720	1,423	0	0	0	0
Tomcod (Saffron Cod)	0	0	0	0	0	0	0	194	0	0	0	0
Arctic Cod	0	0	0	0	0	0	6,720	1,225	0	0	0	0
Sculpin	0	0	0	6	1	0	0	4	0	0	0	0

Source: Stephen R. Braund & Associates, 1993

TABLE B-12: HARVEST ESTIMATES FOR BIRDS - ALL BARROW HOUSEHOLDS, YEAR TWO REVISED (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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	22,362	23.9	7.4	3.6%	34%	4	8	16.25	31.48	32%
Total Geese		3,334	14,669	15.7	4.9	2.4%	19%	3	5	10.23	21.08	35%
Geese (non-specified)	4.5	69	309	0.3	0.1	0.1%	**	0	1	0.00	0.88	167%
Brant	3.0	221	665	0.7	0.2	0.1%	5%	0	0	0.33	1.09	53%
White-fronted geese	4.5	3,035	13,652	14.6	*	**	19%	3	5	9.38	19.76	36%
Snow geese	4.5	8	37	0.0	*	**	1%	0	0	0.01	0.07	74%
Canada geese	4.5	1	5	0.0	*	**	**	0	0	0.00	0.01	81%
Total Eider		4,499	6,746	7.2	2.2	1.1%	20%	2	5	2.38	12.02	67%
Eider (non-specified)	1.5	4,455	6,681	7.1	2.2	1.1%	20%	2	5	2.31	11.95	68%
Common eider	1.5	19	28	0.0	*	**	1%	0	0	0.00	0.08	178%
King eider	1.5	25	37	0.0	*	**	**	0	0	0.02	0.06	56%
Ptarmigan	0.7	1,350	946	1.0	0.3	0.2%	9%	0	1	0.50	1.52	51%

(1) Year Two: April 1, 1988 - March 31, 1989.

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

(3) See Table D-5 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, 1993

TABLE B-13: BIRD HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR TWO REVISED
(Pounds of Usable Resource Product)

	1988	TOTALS ******						1989			
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Geese	0	13,244	1,256	0	173	0	0	0	0	0	0	0
Geese (non-specified)	0	311	0	0	0	0	0	0	0	0	0	0
Brant	0	339	151	0	173	0	0	0	0	0	0	0
White-fronted geese	0	12,562	1,094	0	0	0	0	0	0	0	0	0
Lesser snow geese	0	26	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	2,468	279	758	2,743	495	0	0	0	0	0	0
Eider (non-specified)	5	2,466	279	713	2,724	495	0	0	0	0	0	0
Common eider	0	0	0	29	0	0	0	0	0	0	0	0
King eider	0	2	0	16	20	0	0	0	0	0	0	0
Ptarmigan	0	681	161	40	0	15	38	0	0	0	0	10
All Bird Species	5	16,393	1,696	798	2,916	510	38	0	0	0	0	10

(continued on next page)

TABLE B-13, CONTINUED: BIRD HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR TWO REVISED
(Pounds of Usable Resource Product)

PERCENTS
****

SPECIES	1988 April	May	June	July	August	Sept.	October	Nov.	Dec.	1989 Jan.	Feb.	March	
Total Geese	0%	90%	9%	0%	1%	0%	0%	0%	0%	0%	0%	0%	100%
Geese (non-specified)	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Brant	0%	51%	23%	0%	26%	0%	0%	0%	0%	0%	0%	0%	100%
White-fronted geese	0%	92%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Lesser snow geese	0%	71%	29%	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%	37%	4%	11%	41%	7%	0%	0%	0%	0%	0%	0%	100%
Eider (non-specified)	0%	37%	4%	11%	41%	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%	72%	17%	4%	0%	2%	4%	0%	0%	0%	0%	1%	100%
All Bird Species	0%	73%	8%	4%	13%	2%	0%	0%	0%	0%	0%	0%	100%

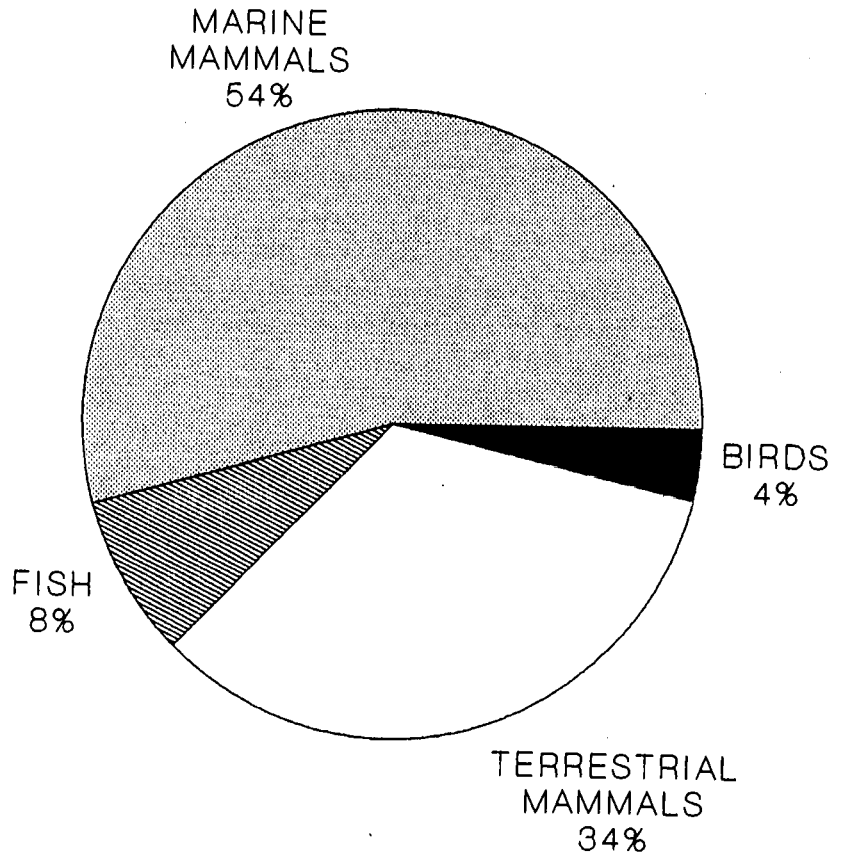
Source: Stephen R. Braund & Associates, 1993

TABLE B-14: BIRD HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR TWO REVISED
(Number Harvested)

	1988								1989			
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Geese	0	2,981	296	0	58	0	0	0	0	0	0	0
Geese (non-specified)	0	69	0	0	0	0	0	0	0	0	0	0
Brant	0	113	50	0	58	0	0	0	0	0	0	0
White-fronted geese	0	2,792	243	0	0	0	0	0	0	0	0	0
Lesser snow geese	0	6	2	0	0	0	0	0	0	0	0	0
Canada geese	0	1	0	0	0	0	0	0	0	0	0	0
Total Eiders	4	1,645	186	505	1,829	330	0	0	0	0	0	0
Eider (non-specified)	4	1,644	186	475	1,816	330	0	0	0	0	0	0
Common eider	0	0	0	19	0	0	0	0	0	0	0	0
King eider	0	1	0	11	13	0	0	0	0	0	0	0
Ptarmigan	0	973	230	58	0	22	54	0	0	0	0	14

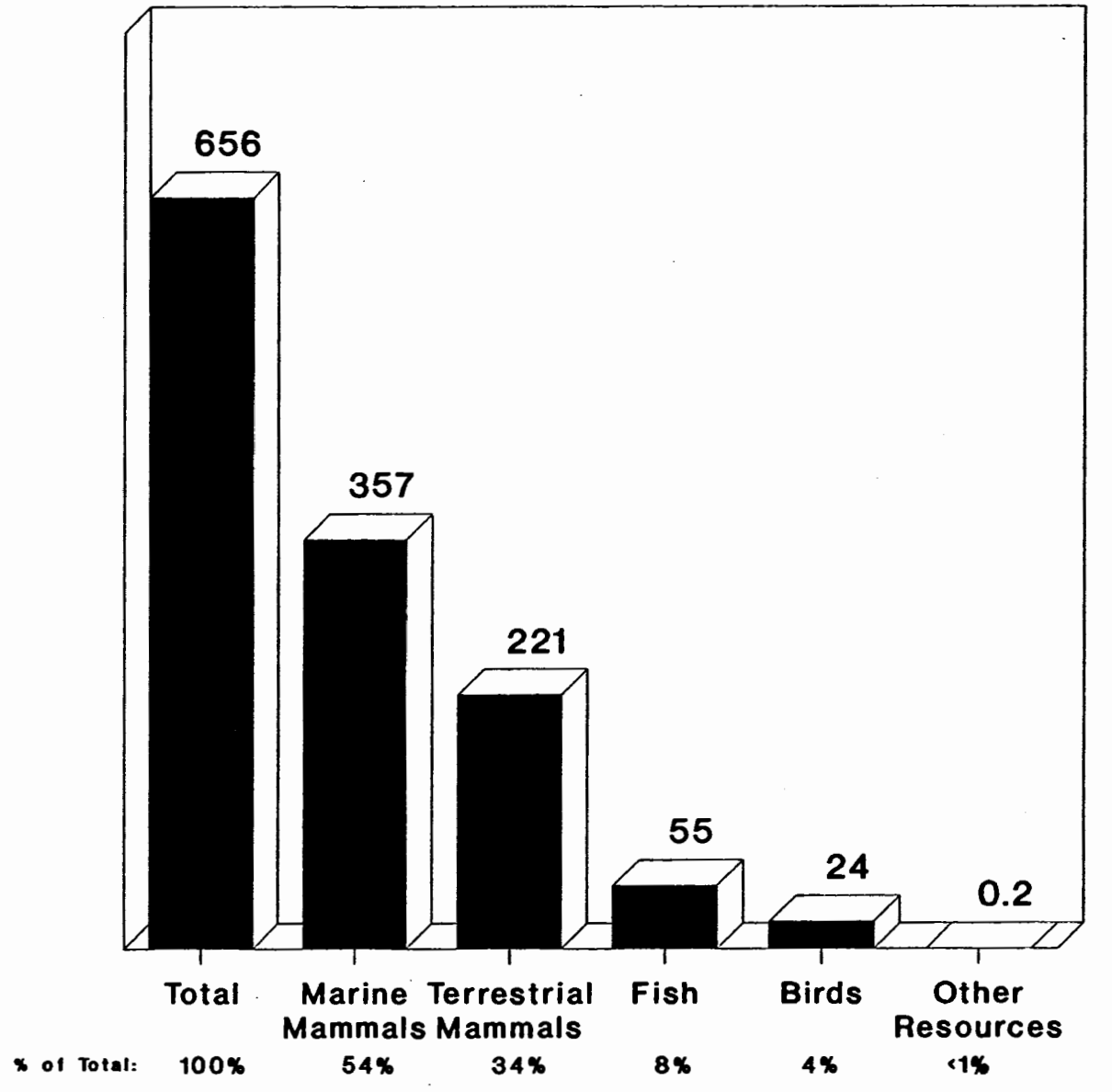
Source: Stephen R. Braund & Associates, 1993

Figure B-1: Estimated Harvest Percentages by Major Resource Category Barrow, Year Two



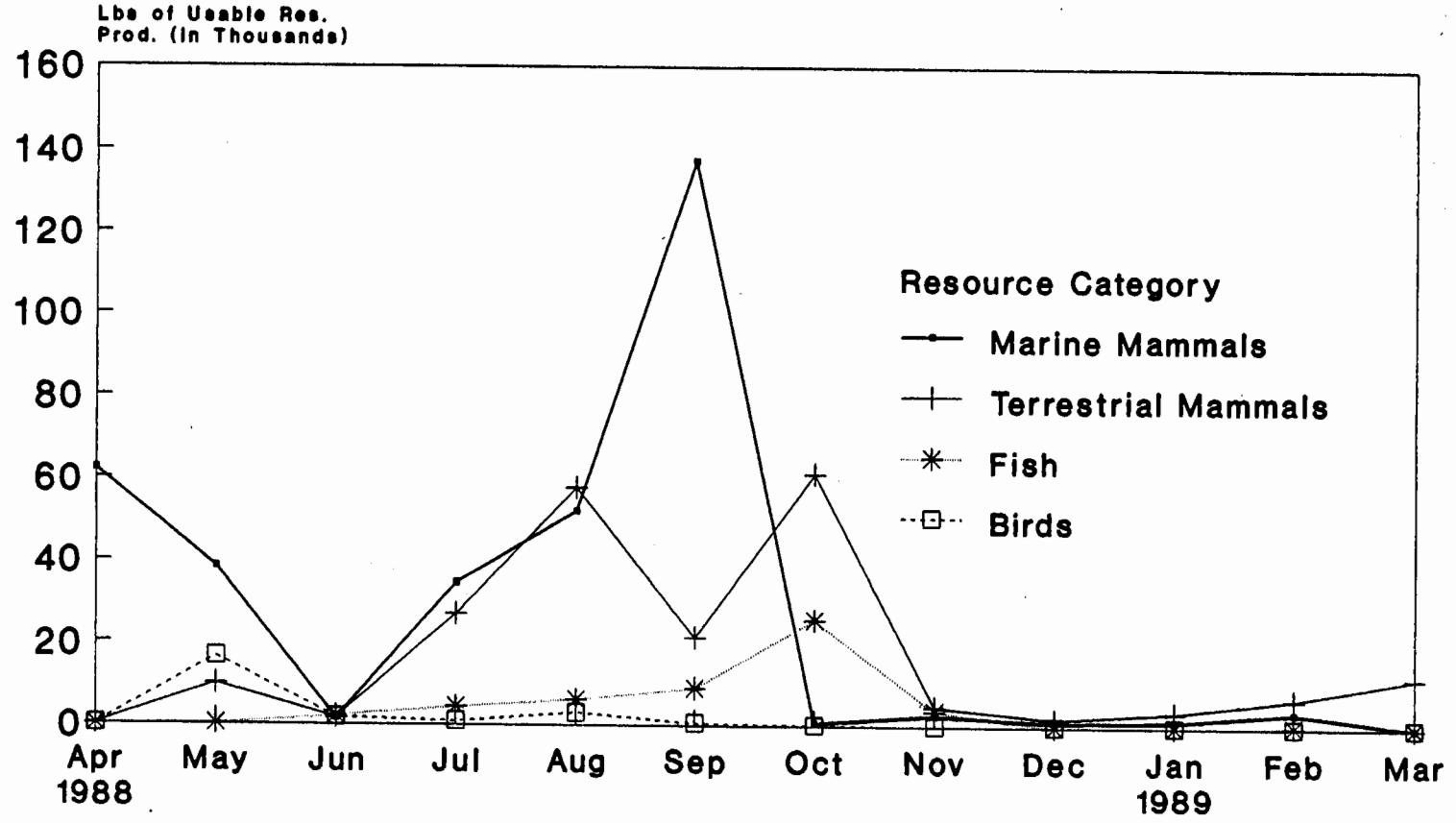
Based on usable pounds harvested.
Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-2: Harvest Estimates by Major Resource Category
All Barrow Households, Year Two Revised
(Mean Usable Pounds Per Household)



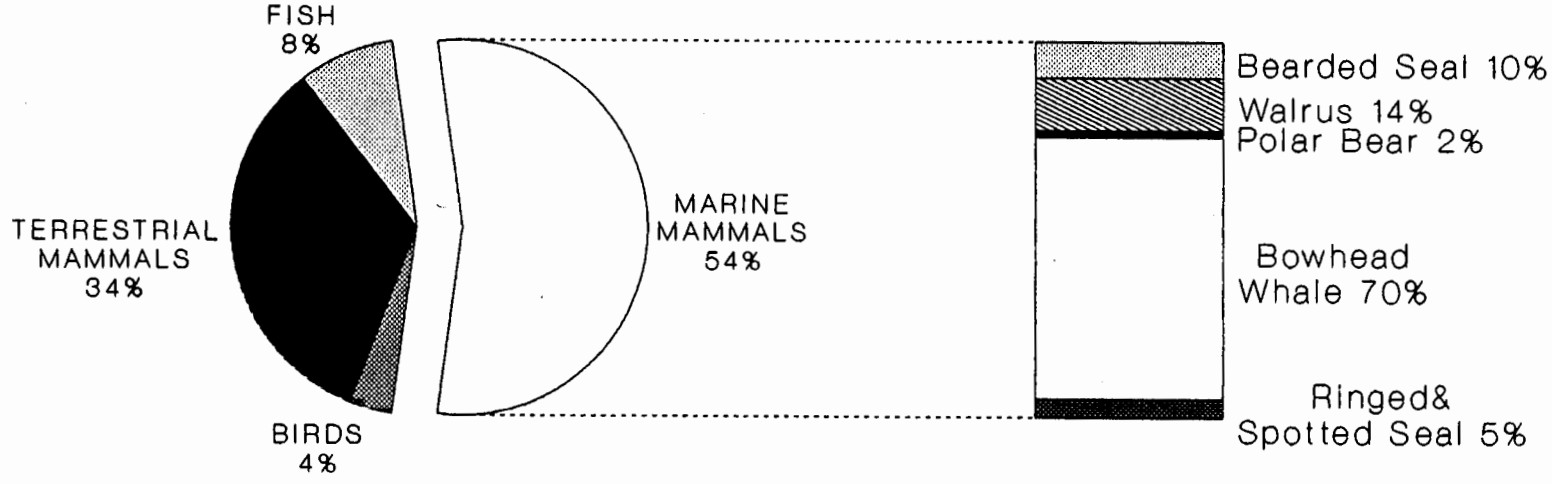
Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-3: Monthly Harvest Estimates by Major Resource Category
All Barrow Households, Year Two Revised



Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-4: Estimated Harvest Percentages of Marine Mammals Barrow, Year Two (Usable Pounds Harvested)

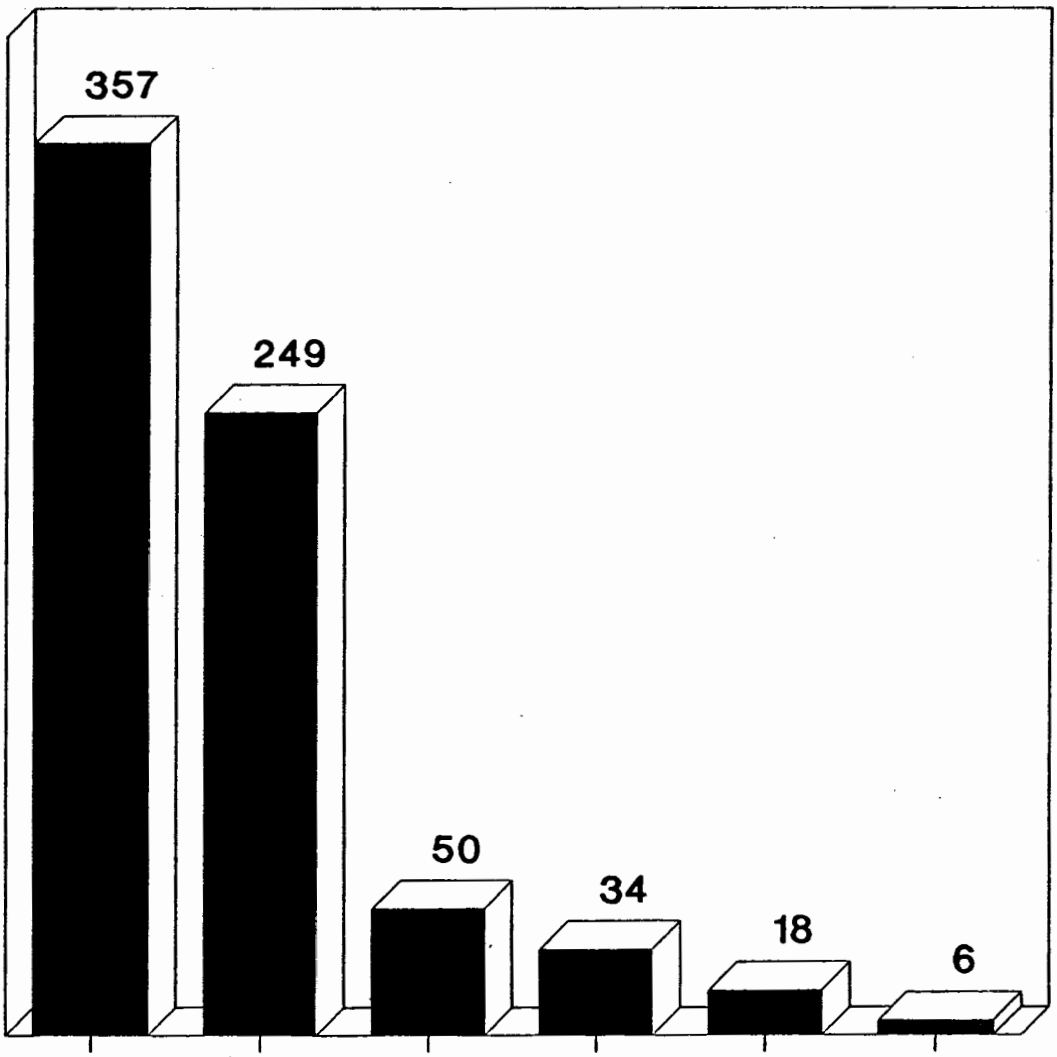


Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-5: Marine Mammal Harvest Estimates

All Barrow Households, Year Two Revised

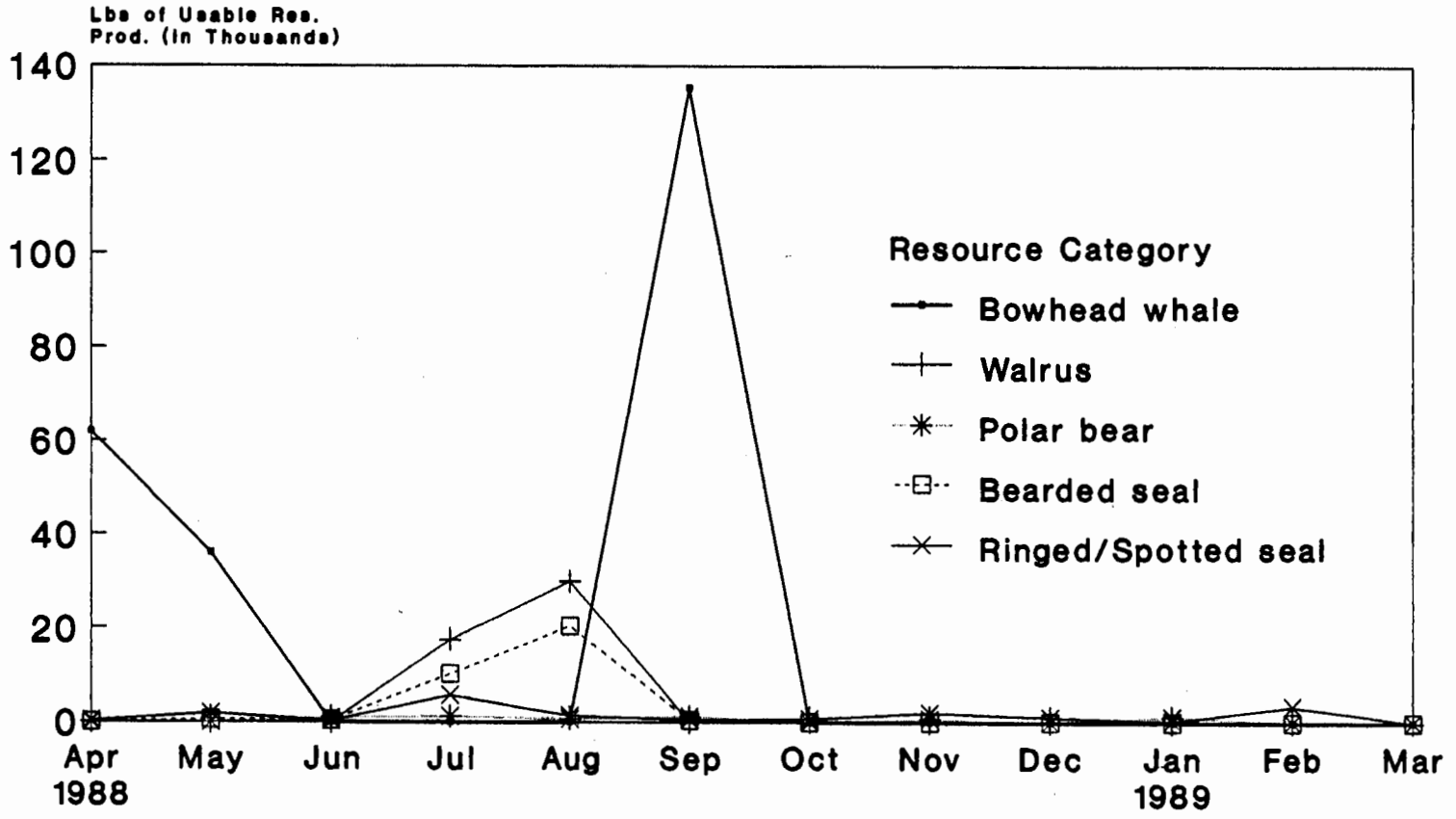
(Mean Usable Pounds Per Household)



Year Two: April 1, 1988 - March 31, 1989

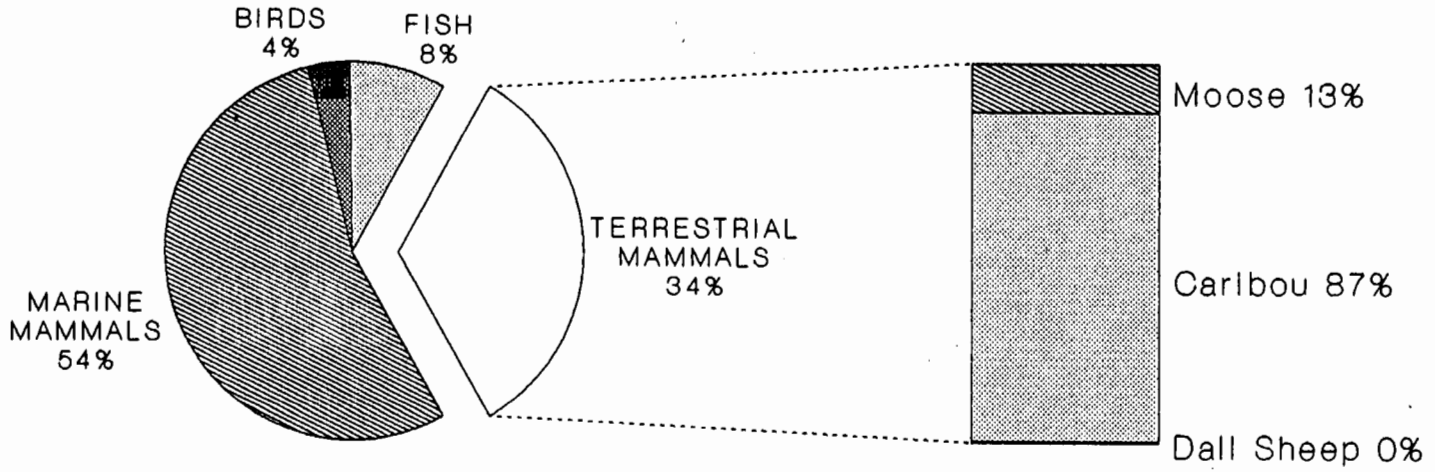
Source: Stephen R. Braund & Assoc., 1993

Figure B-6: Monthly Marine Mammal Harvest Estimates
All Barrow Households, Year Two Revised



Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-7: Estimated Harvest Percentages of Terrestrial Mammals
Barrow, Year Two
(Usable Pounds Harvested)

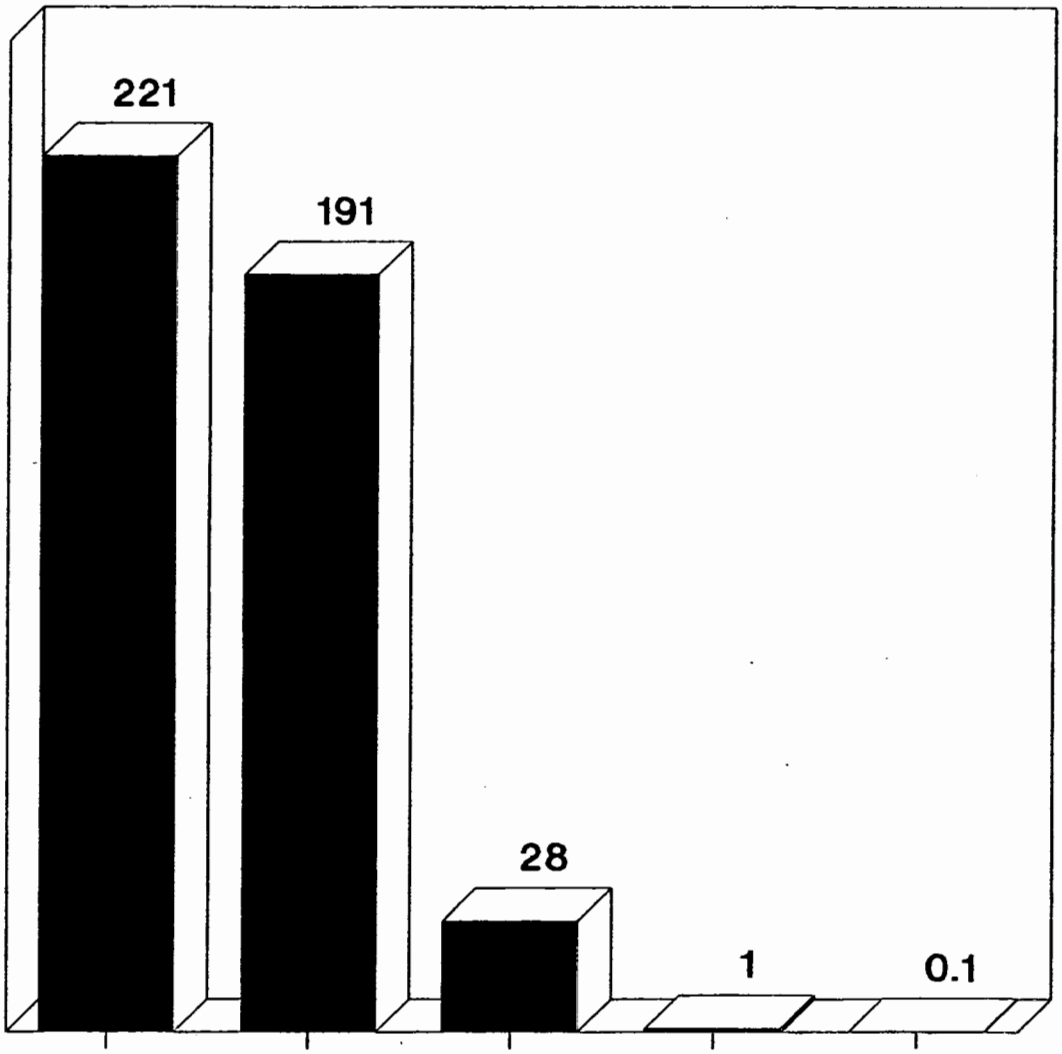


Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-8: Terrestrial Mammal Harvest Estimates

All Barrow Households, Year Two Revised

(Mean Usable Pounds Per Household)

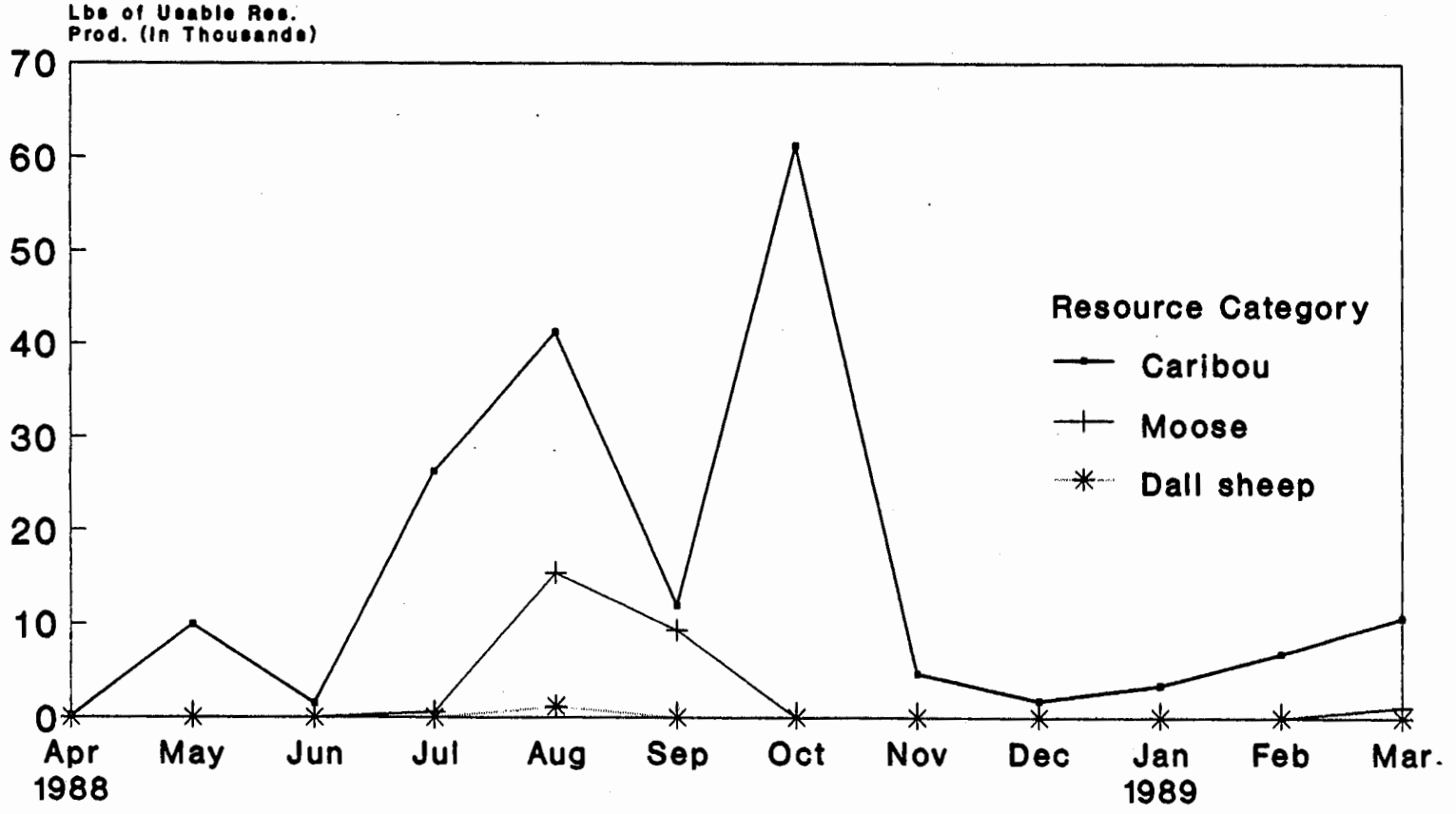


	Total Terrestrials	Caribou	Moose	Dall Sheep	Brown Bear
% of Terrestrial Mammals:	100%	86%	13%	<1%	<1%

Year Two: April 1, 1988 - March 31, 1989

Source: Stephen R. Braund & Assoc., 1993

Figure B-9: Monthly Terrestrial Mammal Harvest Estimates
All Barrow Households, Year Two Revised

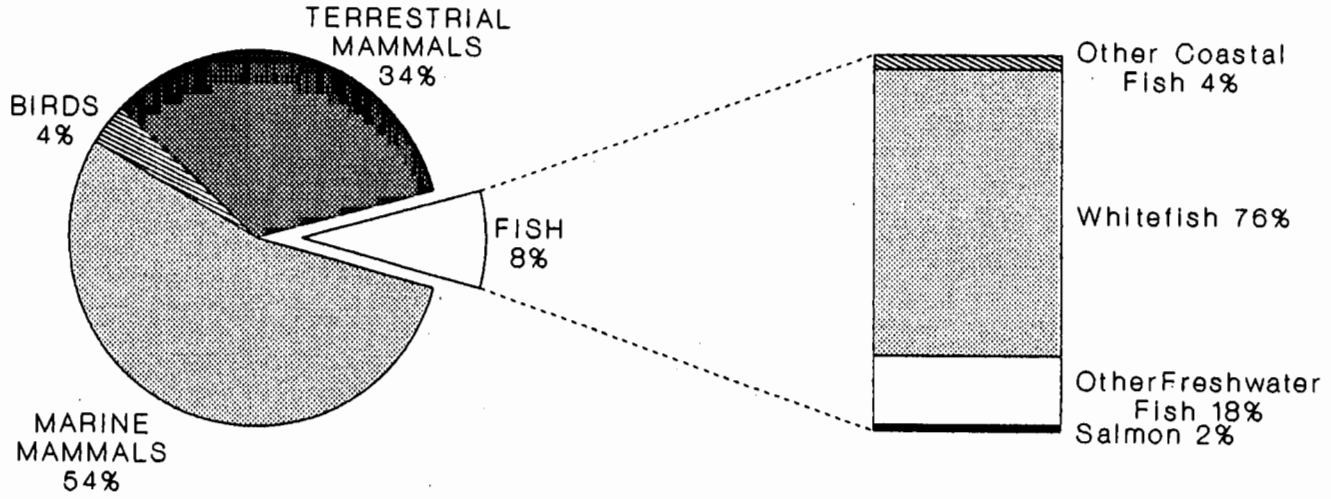


Note: 120 lbs. of brown bear were harvested in September but do not appear on this chart due to scale.

Year Two: April 1, 1988 - March 31, 1989

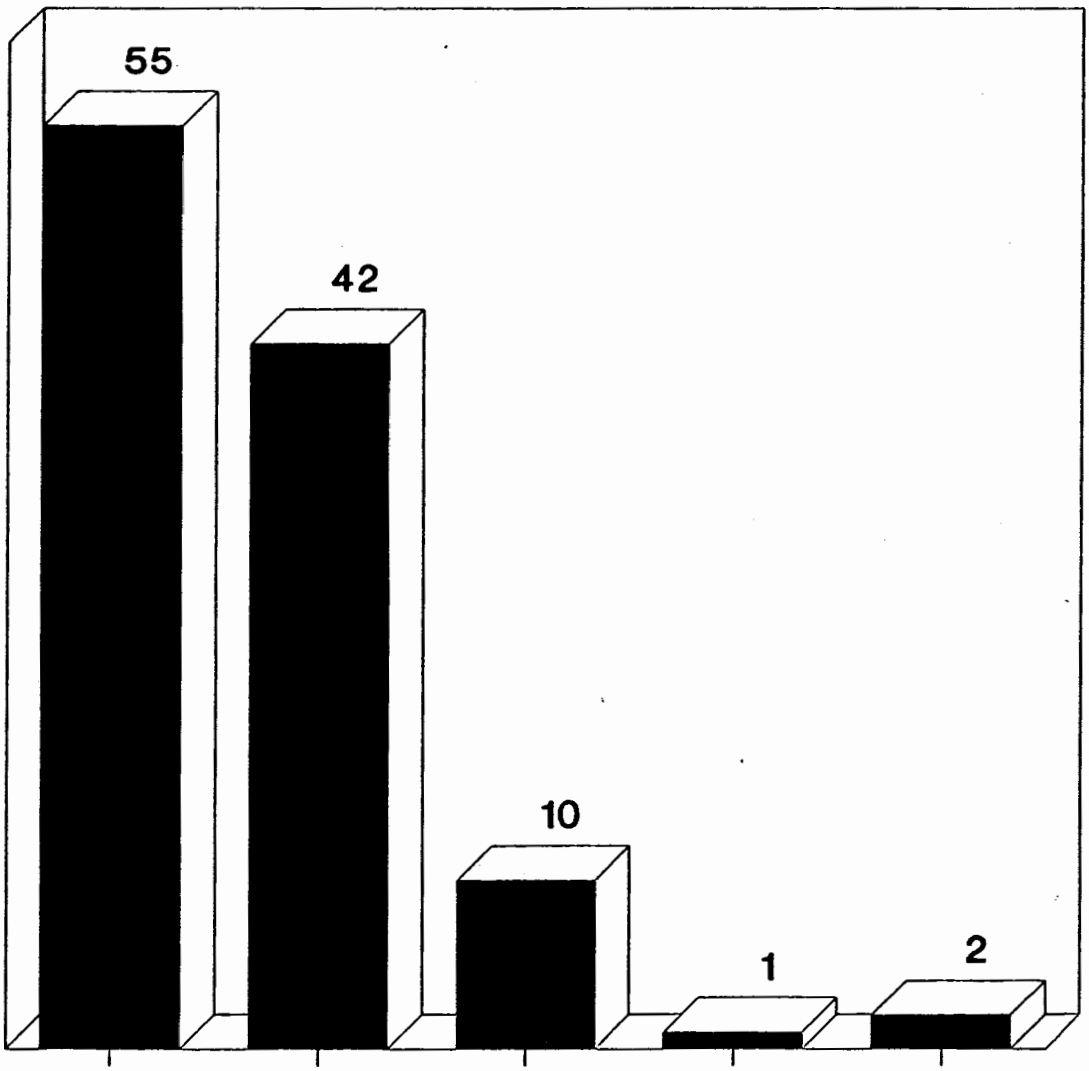
Source: Stephen R. Braund & Assoc., 1993

Figure B-10: Estimated Harvest Percentages of Fish
Barrow, Year Two
(Usable Pounds Harvested)



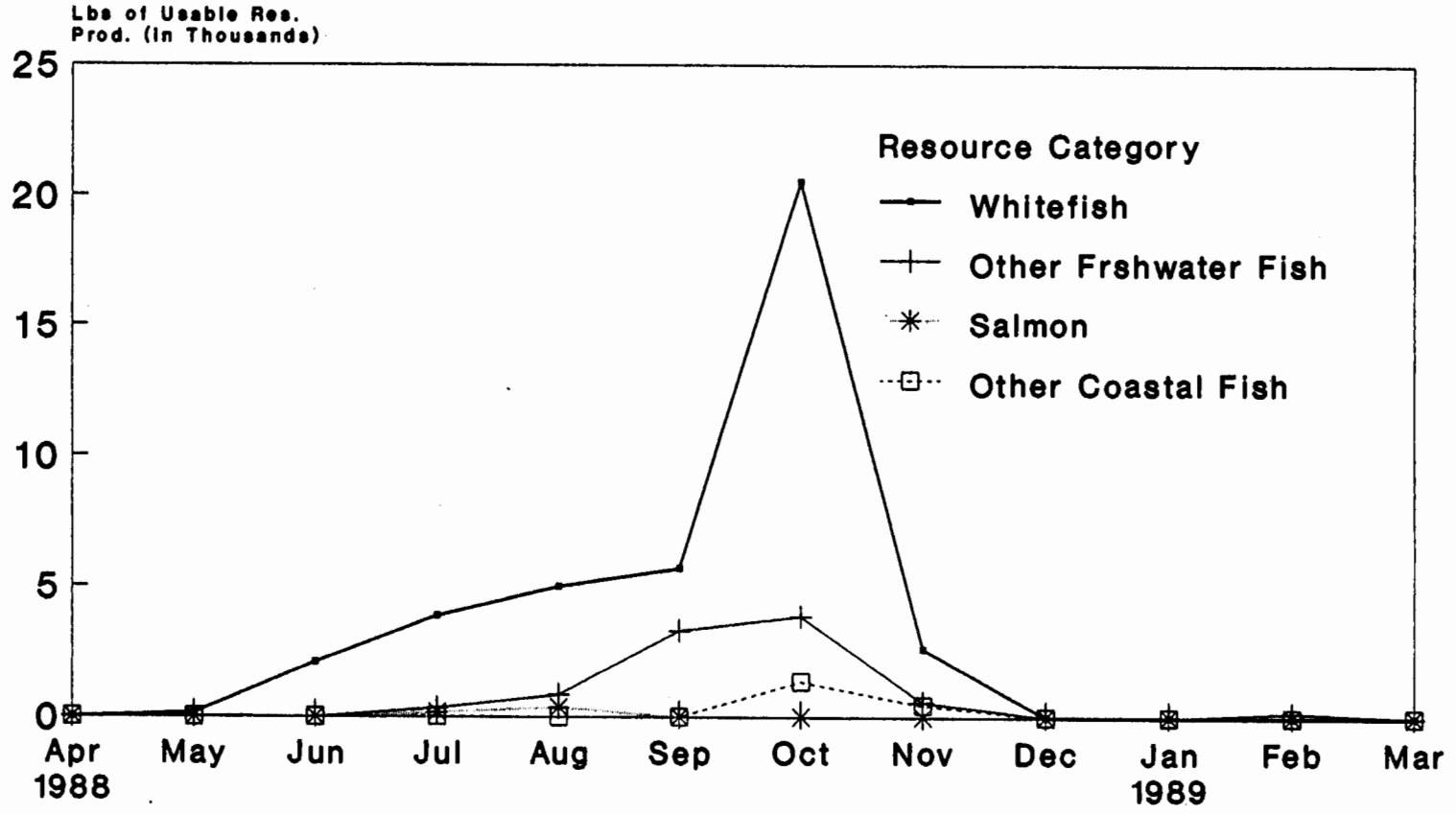
Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-11: Fish Harvest Estimates
All Barrow Households, Year Two Revised
(Mean Usable Pounds Per Household)



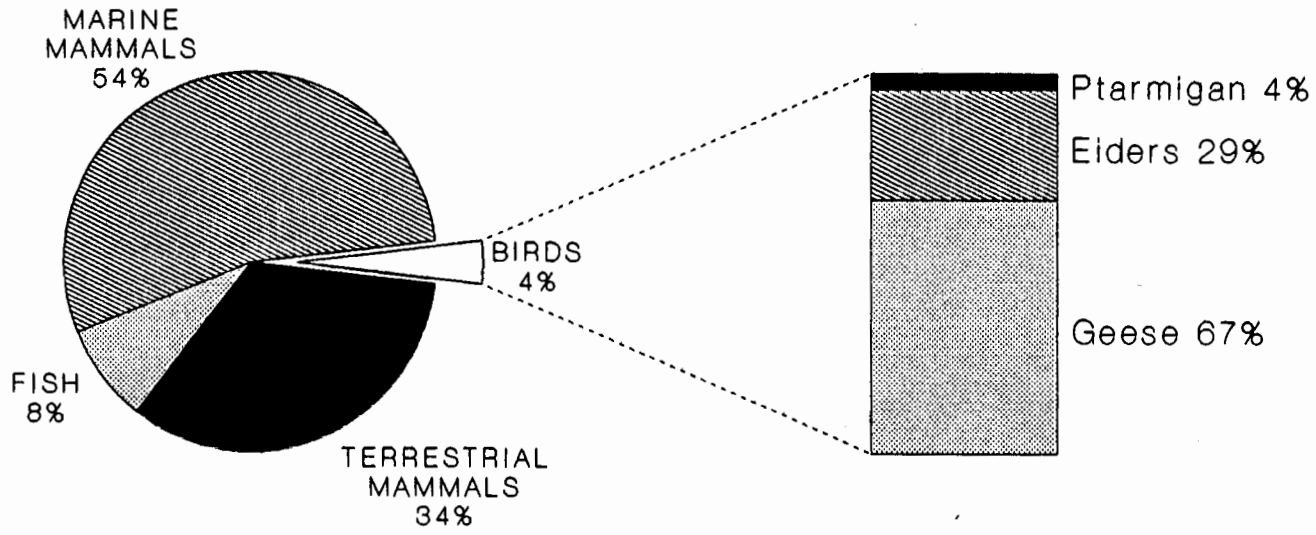
Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-12: Monthly Fish Harvest Estimates
All Barrow Households, Year Two Revised



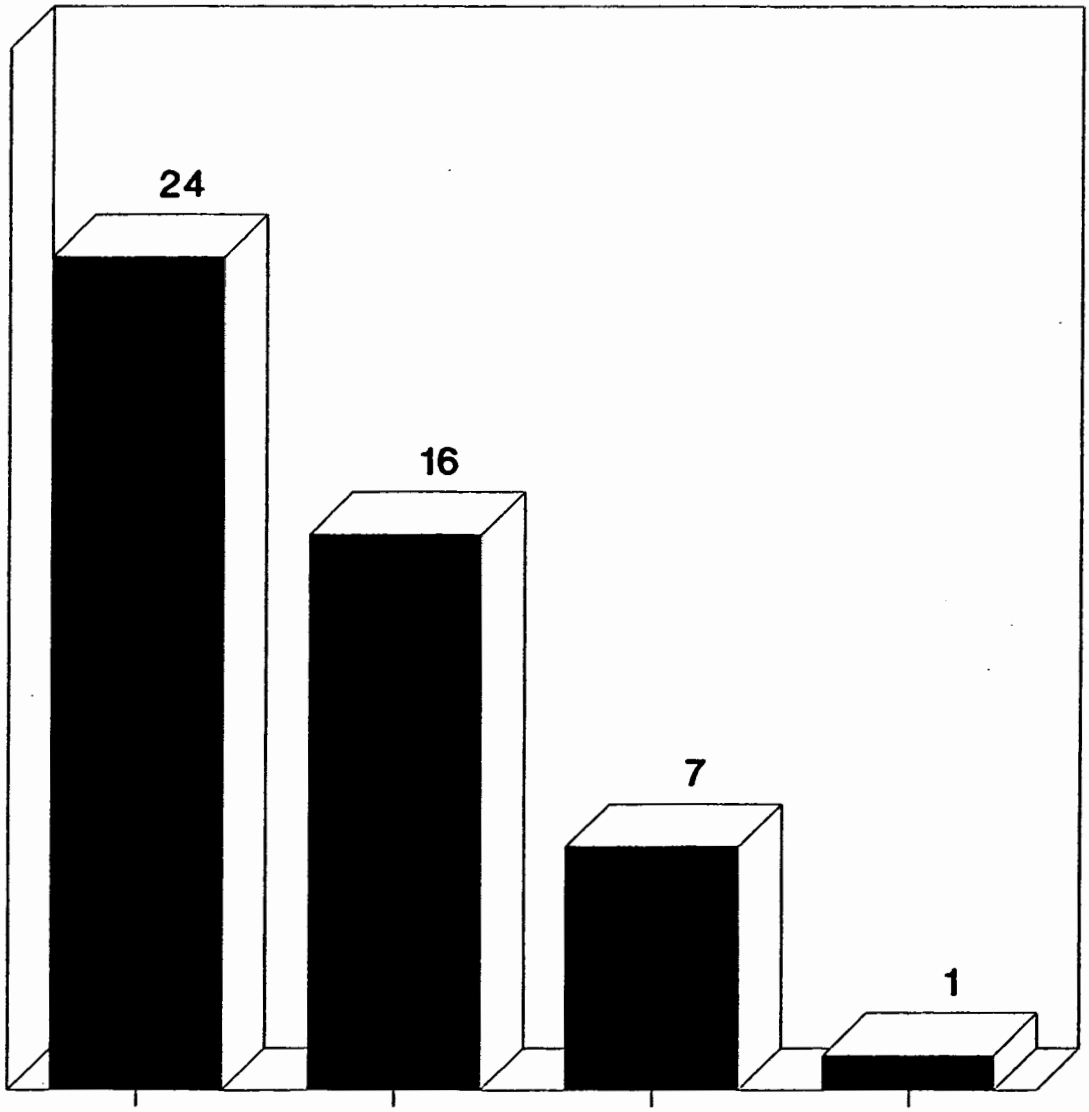
Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-13: Estimated Harvest Percentages of Birds
Barrow, Year Two
(Usable Pounds Harvested)



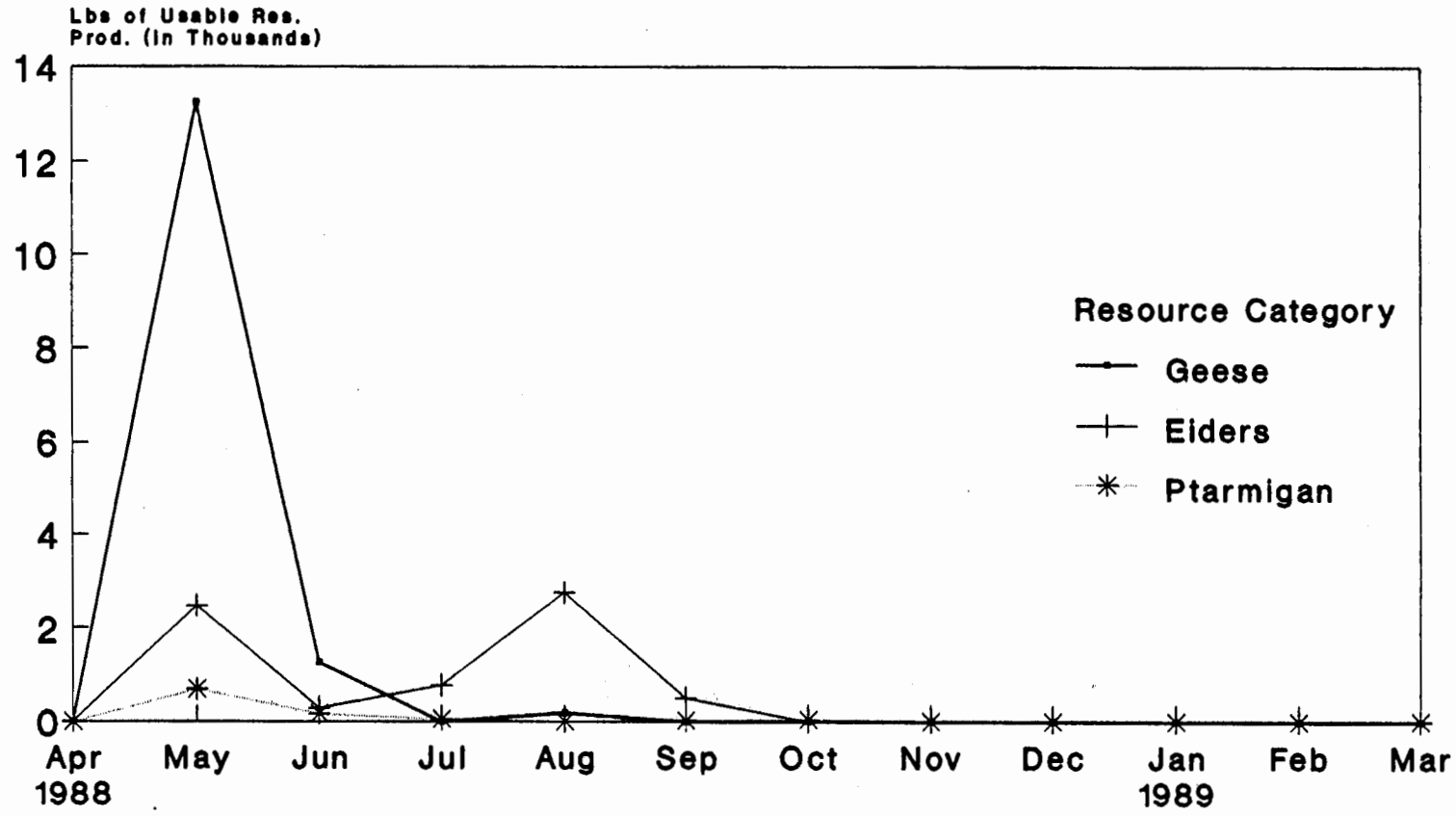
Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-14: Bird Harvest Estimates
All Barrow Households, Year Two Revised
(Mean Usable Pounds Per Household)



Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

Figure B-15: Monthly Bird Harvest Estimates
All Barrow Households, Year Two Revised



Year Two: April 1, 1988 - March 31, 1989
Source: Stephen R. Braund & Assoc., 1993

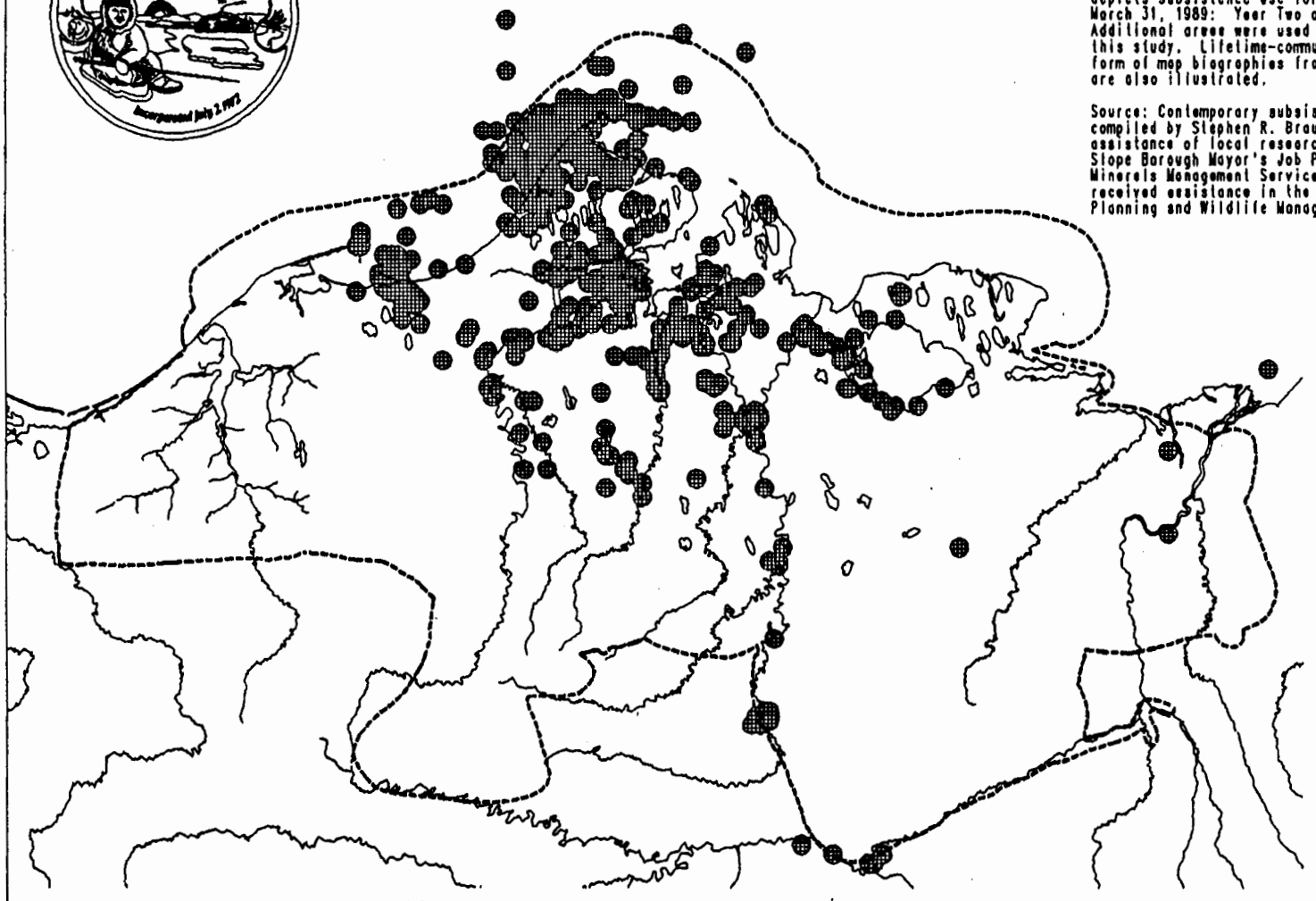
MAP B-1

NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO

SUBSISTENCE HARVEST SITES, 1988-1989

This map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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 North Slope Subsistence Study. Additional areas were used by Barrow residents not included in this study. Lifetime-community harvest areas, collected in the form of map biographies from 20 Barrow 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).

All Species Harvested

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

N

Map Production: North Slope Borough GIS

Date: June 20, 1989

25 0 25 50 75 100 125

MILES

MAP B-2
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 (13 percent of the community 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 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

- 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)

N

Map Production: North Slope Borough GIS

Date: June 19, 1989

25 0 25 50 75 100 125

MILES

MAP B-3
NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
MARINE MAMMAL HARVEST SITES - ALL SPECIES

This map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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 North Slope Subsistence Study. Additional areas were used by Barrow residents not included in this study. Lifetime-community harvest areas, collected in the form of map biographies from 20 Barrow households (Pedersen 1979), are also illustrated.

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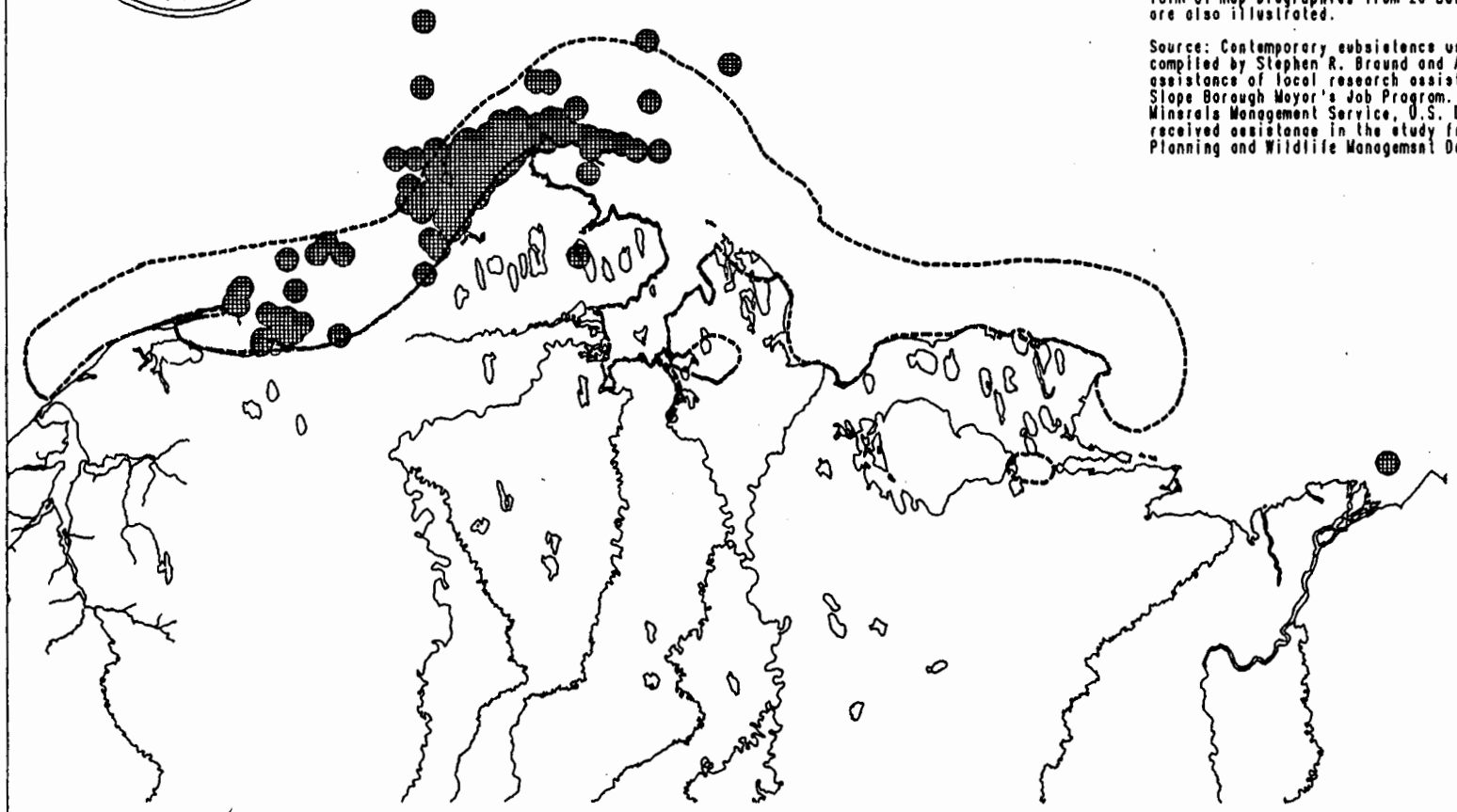


LEGEND INFORMATION

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 19, 1989

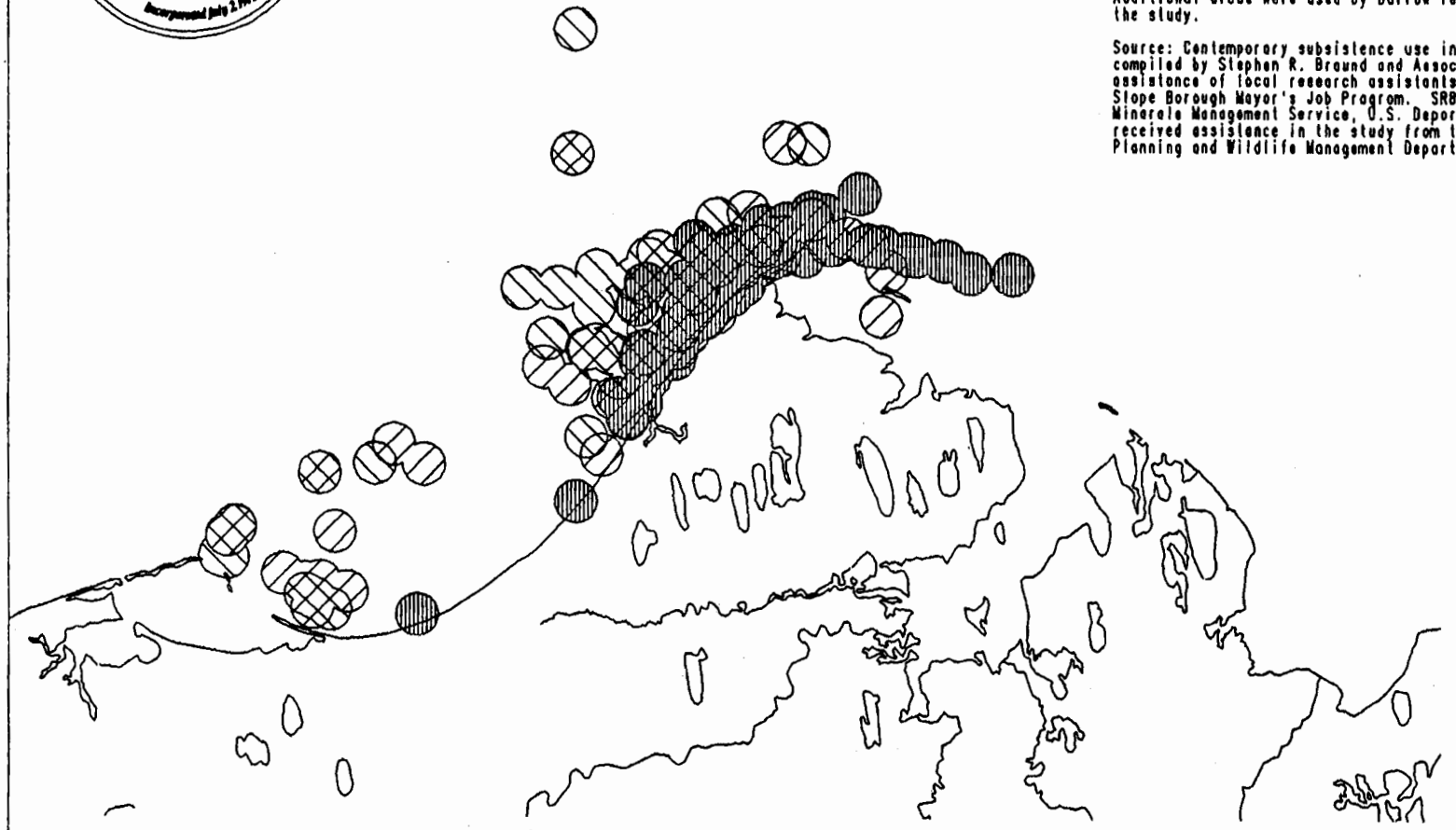
30 0 30 60 90

MILES

MAP B-4
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 (13 percent of the community 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 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.



Map Production: North Slope Borough GIS

Date: June 19, 1989

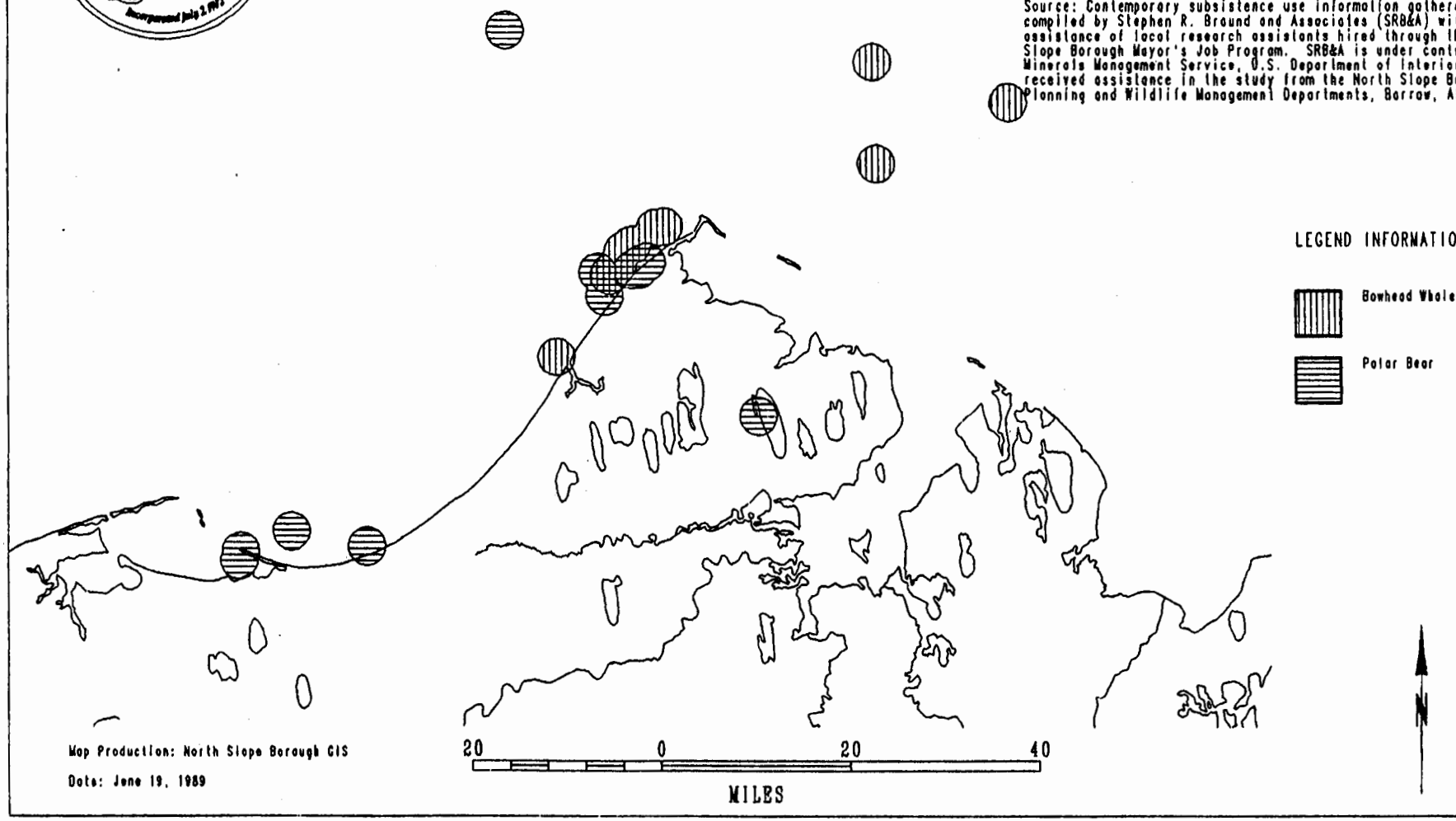
MAP B-5

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 (13 percent of the community 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 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.



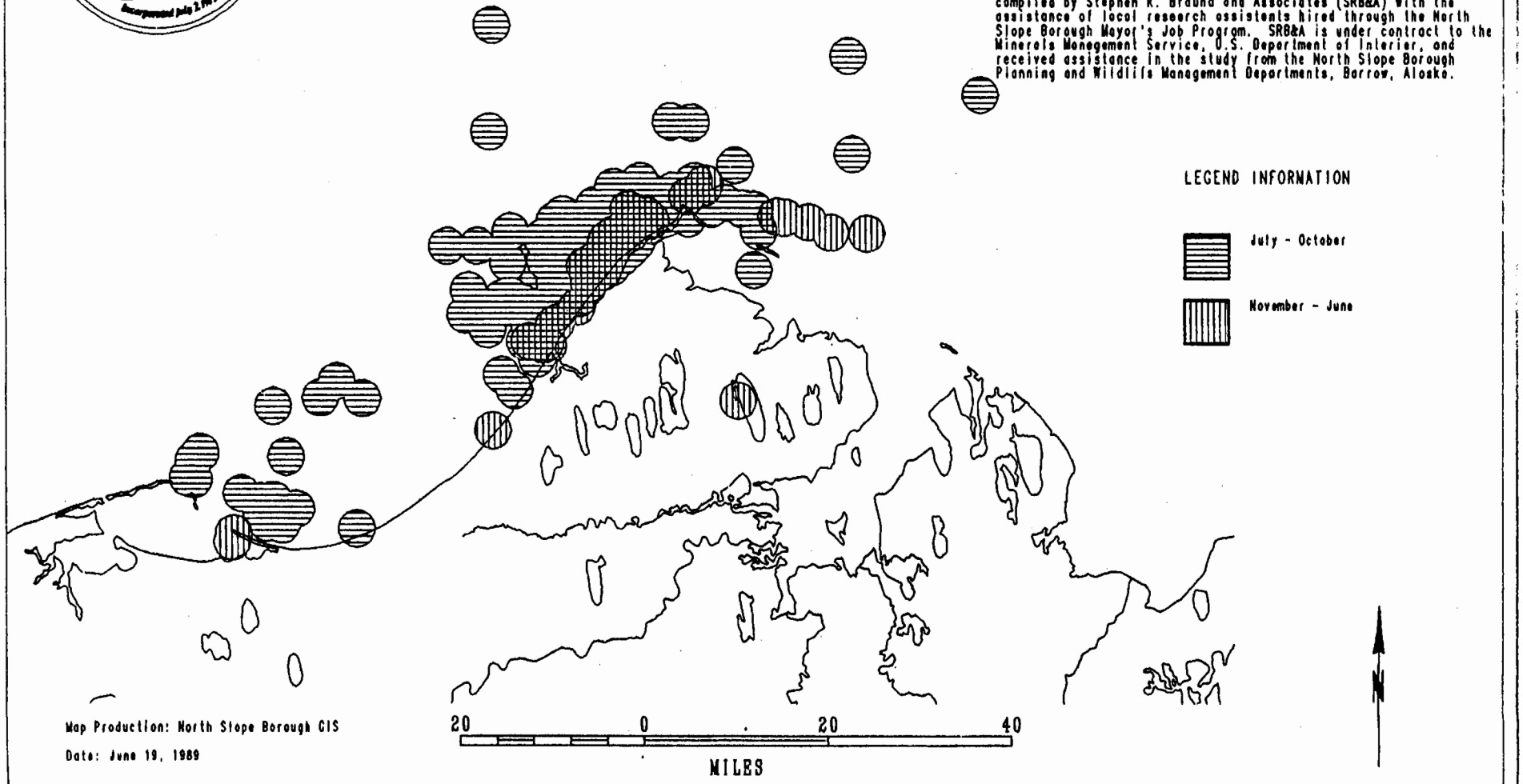
Map Production: North Slope Borough GIS

Date: June 19, 1989

MAP B-6
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 (13 percent of the community 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 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.



Map Production: North Slope Borough GIS

Date: June 19, 1989

MAP B-7
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 (13 percent of the community 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 North Slope Subsistence Study. Additional areas were used by Barrow residents not included in this study. Lifetime-community harvest areas, collected in the form of map biographies from 20 Barrow households (Pedersen 1979), are also illustrated.

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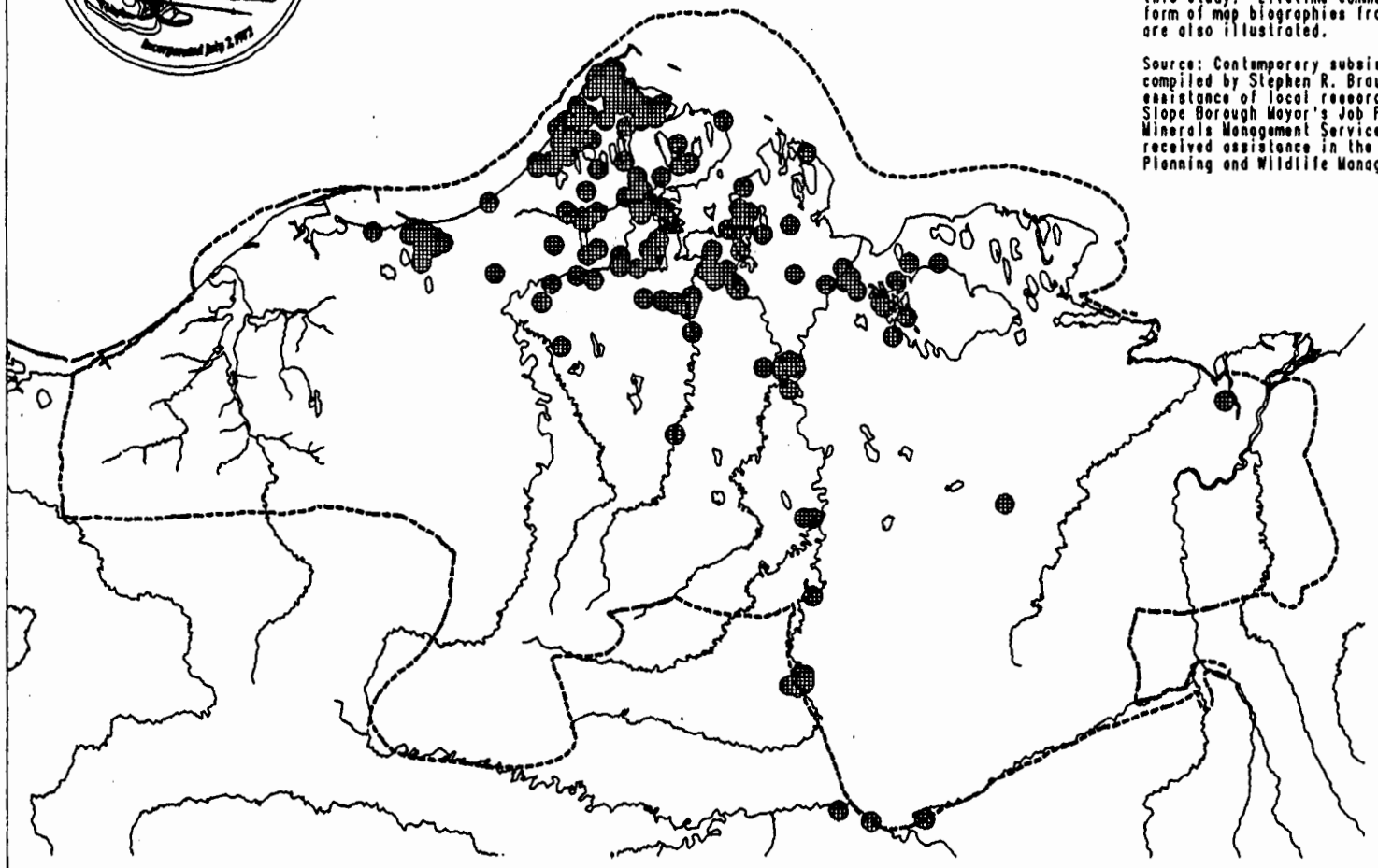


LEGEND INFORMATION

Lifetime community land use (Pedersen 1979).

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

N

Map Production: North Slope Borough GIS

Date: June 20, 1989

25 0 25 50 75 100 125

MILES

MAP B-8
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 (13 percent of the community 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 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

- Moose
- Fox
  - Arctic
  - Red
- Wolverine
- Brown bear

Map Production: North Slope Borough GIS

Date: June 20, 1989

30 0 30 60 90 120

MILES

N

MAP B-9
NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
CARIBOU HARVEST SITES BY SEASON

This map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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 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

N

20 0 20 40 60

MILES

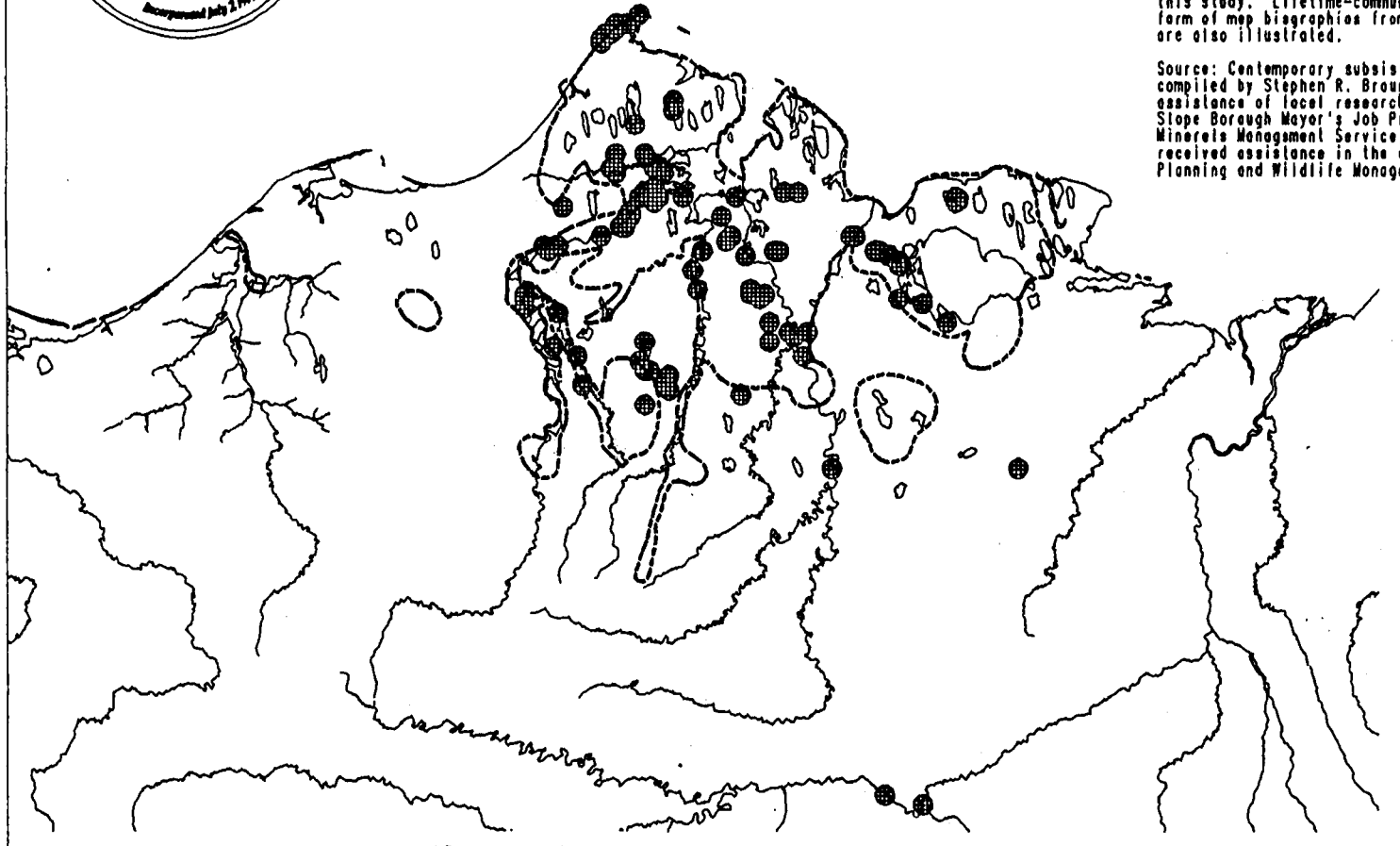
Map Production: North Slope Borough GIS

Date: June 19, 1989

MAP B-10
NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
FISH HARVEST SITES - ALL SPECIES

This map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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 North Slope Subsistence Study. Additional areas were used by Barrow residents not included in this study. Lifetime-community harvest areas, collected in the form of map biographies from 20 Barrow 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).

All Fish Species
- Whitefish
  Round whitefish, broad 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.

N

Map Production: North Slope Borough GIS

Date: June 20, 1989

25 0 25 50 75 100 125

MILES

MAP B-11
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 (13 percent of the community 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 North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

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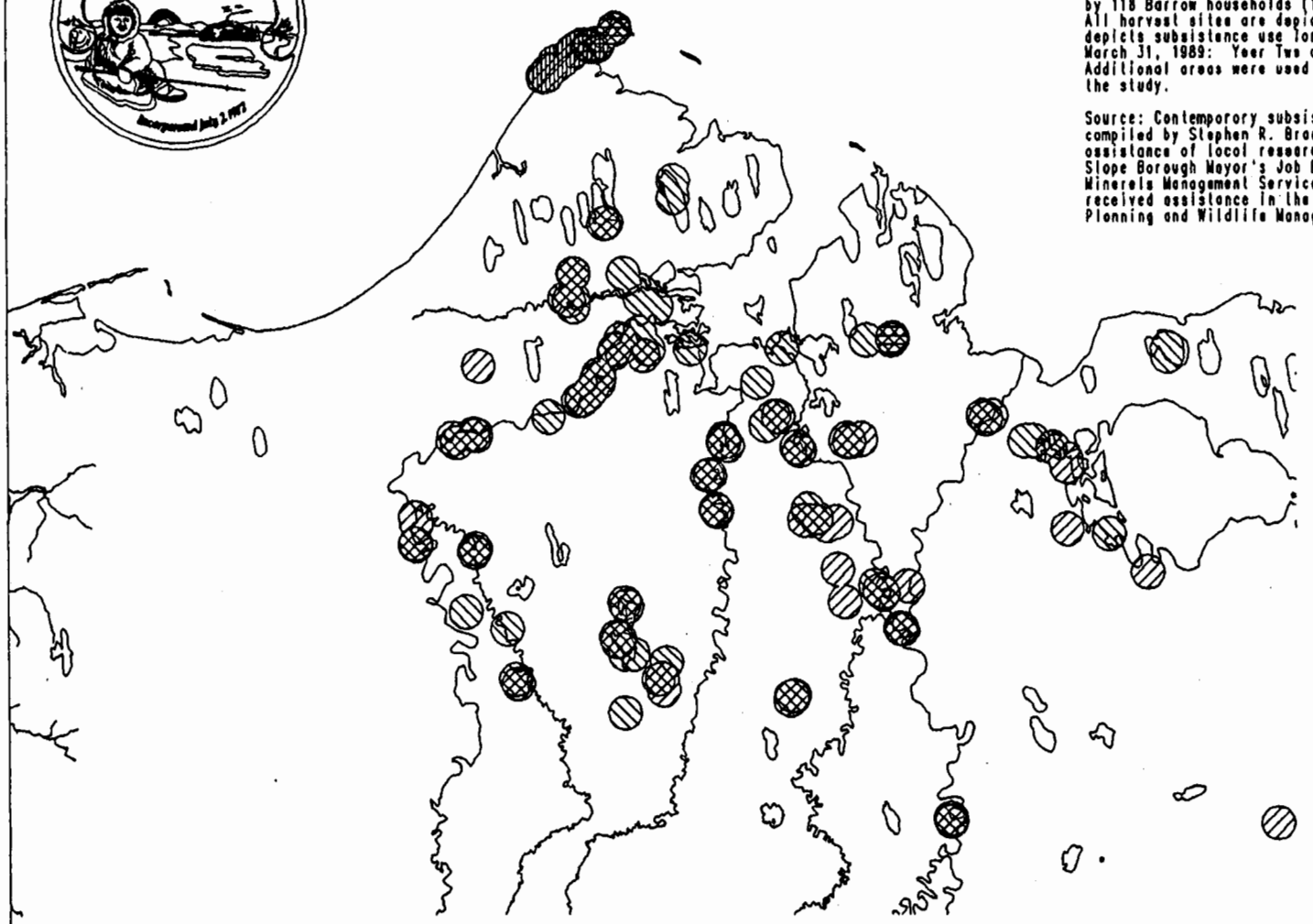

LEGEND INFORMATION

- Whitefish
  Round whitefish, broad 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,

20 0 20 40 60

MILES

Map Production: North Slope Borough GIS

Date: June 19, 1989

MAP B-12
NORTH SLOPE SUBSISTENCE STUDY - BARROW: YEAR TWO
BIRD HARVEST SITES - ALL SPECIES

This map depicts approximate subsistence harvest sites used by 118 Barrow households (13 percent of the community 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 North Slope Subsistence Study. Additional areas were used by Barrow residents not included in this study. Lifetime-community harvest areas, collected in the form of map biographies from 20 Barrow households (Pedersen 1979), are also illustrated.

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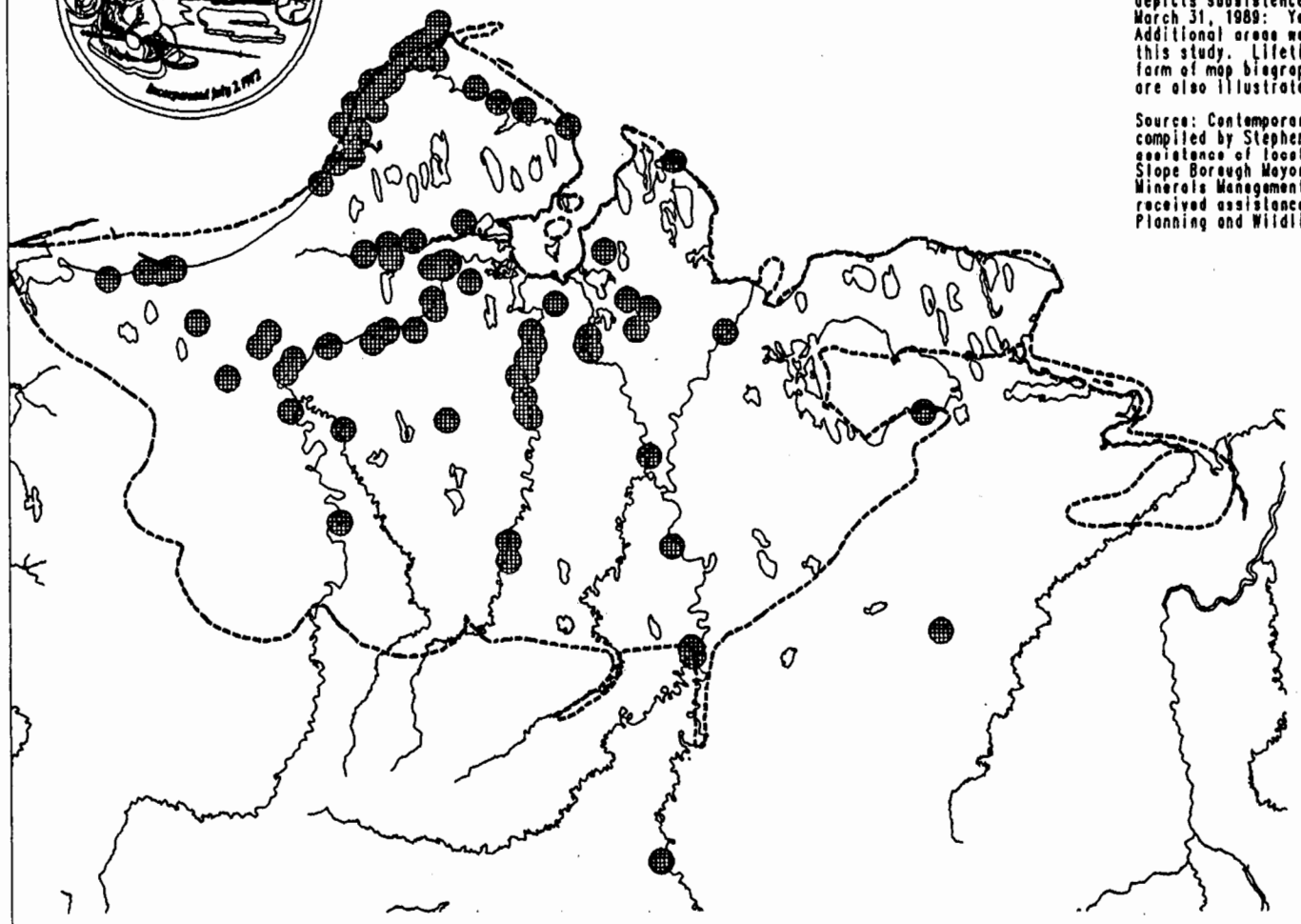

LEGEND INFORMATION

Lifetime community land use (Pedersen 1979).

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

30 0 30 60 90

MILES

Map Production: North Slope Borough GIS

Date: June 20, 1989

MAP B-13
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 (13 percent of the community 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 North Slope Subsistence Study. Additional areas were used by Barrow residents not included in the study.

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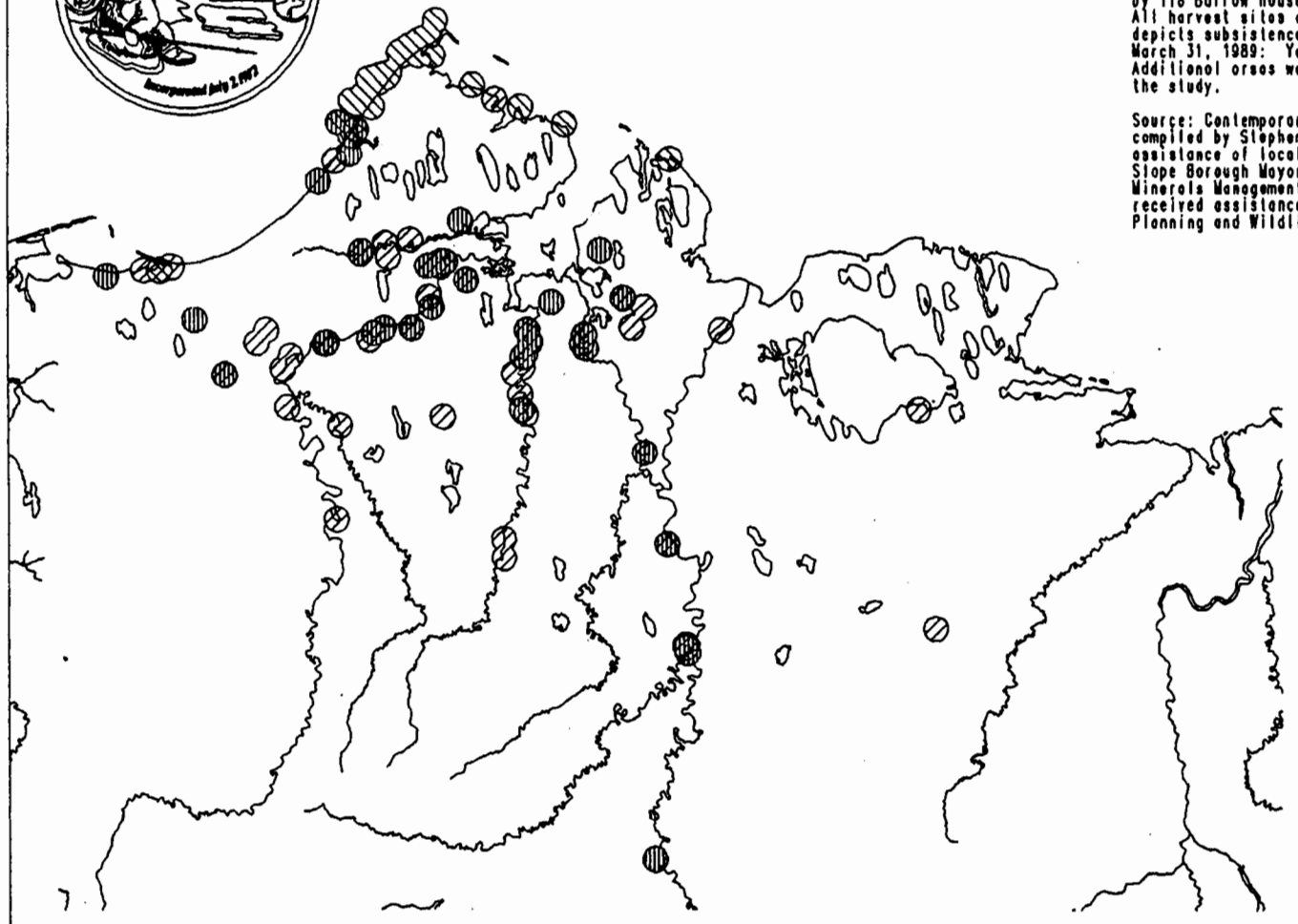
LEGEND INFORMATION

- Eiders
- Geese
- Ptarmigan



Map Production: North Slope Borough GIS

Date: June 19, 1989

30 0 30 60 90

MILES

N

APPENDIX C

This appendix contains the following reference material:

- o the Year Three Seasonal Round
- o a calendar listing of Year Three activities and events
- o Year Three data tables
- o Year Three data figures (charts and graphs)
- o Year Three subsistence harvest site maps

YEAR THREE SEASONAL ROUND

The following month by month report of subsistence activities documents Barrow resident's annual subsistence cycle from April 1, 1989 through March 31, 1990. This description highlights the month's major subsistence activities, and points out any significant or unusual environmental, social, cultural and/or economic conditions or events that may have affected hunting that month. While the pattern of activities generally remains much the same from year to year, changes in environmental conditions, local resource availability, as well as social and economic factors do affect the actual timing and the relative importance of the different resources harvested from year to year.

All temperatures are given in Fahrenheit, with most being reported as ambient temperature. Windchill temperatures are given where appropriate and when available.

APRIL 1989

Preparations for whaling occupied most Barrow hunters' time in the month of April. Evenings and weekends were devoted to preparing and repairing whaling equipment, and building sleds. Early in the month, some crews were still re-skinning and rebuilding *umiat* (traditional skin boats) frames. Crews were out making trails through the extremely rough rubble ice during the first week of the month, culminating their efforts around the 8th. At least five separate trails were chipped out by hand. The length of these trails varied

depending upon ice conditions and the location of an open lead. In 1989, the lead was sometimes as far as 10 miles from the coast, while in 1987 and 1988 the open lead was within three to four miles of Barrow.

The spring ice was rough in 1989. One whaling captain related that ice conditions were almost the roughest he had seen in his thirty years of whaling. Others, however, said the rough ice conditions were not so unusual. Though the ridges of rubble ice were not as high as in other memorable years, a wind storm in late February piled up ridge after ridge all the way to the open lead, approximately six miles offshore. With the rubble ice and lack of an open lead, the whalers were forced to go farther from town in search of smooth ice and open water with the consequence that in 1989 spring whaling camps were especially widespread. Whale camps were concentrated in two regions: west of Walakpa and just north of Point Barrow. With the farthest trail located about 25 miles south along the coast from Barrow, whale camps covered a total coastal distance of about 40 miles.

By April 20, approximately six of the forty-four registered whaling crews in Barrow were camped on the ice. Most of the crews were in place by the 23rd when the Arnold Brower, Sr. crew landed the first whale of the season. Forty-two crewshares were distributed at the whale site, each share representing a participating whaling crew. Crewshares were then further divided into 15 or 17 individual crew member shares, depending on the size of the crew.

Through this method of distribution, the first whale of the spring was shared among at least 500 individual crew members ensuring that virtually every Inupiat household in Barrow received fresh *maktak* the day of the harvest. According to tradition, the first spring whale is distributed among all active whale crews, whether or not they have established their camp on the ice yet. All whales thereafter are shared only among the crews camped on the ice and who actively participate in the harvest, towing, or butchering of the whale. Each crew sends one or two crew members to a landed whale to help butcher and to claim their crew's portion.

The next day, April 24, Barrow whalers took an unsuccessful strike, their last for several weeks. On the evening of the 24th, strong westerly currents

brought moving ice along the lead edge eventually filling the lead. At that point all the crews moved back from the lead and by morning every previous camp location had drifted out with the current. By month's end, the lead remained filled with ice and most crew members were back in town, though all the boats and equipment remained out on the ice, a safe distance back from where the open water had been. While some men went back to work so as not to deplete their annual leave time, others decided to stay on annual leave and use the extra free time to work on equipment and get organized for the waterfowl hunting season that closely follows whaling.

MAY

Whaling was the primary subsistence activity in May. However, the ice conditions were either unsafe or unfavorable for locating whales at the lead edge for much of the month. The floating ice pack that had moved in tight against the lead edge on April 24 remained there until May 12. During this period, virtually no open lead was accessible to Barrow hunters.

A lead opened briefly on May 12 and on May 15 a second whale, measuring 47 feet, was harvested at the lead edge. On the following day, however, the lead closed again and many whaling crews moved their camps completely off the ice, frustrated with the poor ice conditions and few whales harvested and preferring to shift their focus to spring waterfowl hunting.

The spring whaling season did not come to a close, however, until the end of May when the Joash Tukle crew landed a 56 foot female whale on May 29. At this point, only twelve crews remained on the ice so only twelve crewshares were distributed at the harvest site, compared to forty-two and thirty-five crewshares handed out after the previous two whales. Those crews remaining had considerable difficulty pulling the large whale up onto the weakened ice. The butchering ended abruptly when moving pack ice endangered the crews and they pulled back from the lead edge to a safer location. The head, including the baleen, the tongue, and a portion of the meat and *maktak* were abandoned in the moving ice. Another crew lost some equipment when their camp had to be partially rescued by helicopter during these last days of rapidly shifting ice; they were unable to move to safety quickly enough. Fortunately, no lives were

lost. Also, many crews damaged sleds and other equipment during the long trips through the rough ice back and forth from town.

Travel conditions on the ice deteriorated at the end of May. The winter's heavy snows turned to slush during the sunny days in late May. Due to the poor travel conditions, the very unfavorable ice conditions for whaling at the lead edge, and most whales having migrated past Barrow, the remaining crews moved their camps off the ice immediately following the last whale harvest. A few crews stayed on the ice into June, with one reporting June 11 as the date they moved off the ice. By the end of whaling, Barrow crews had used only four of their allocated 14 strikes (three landed whales and one struck and lost).

The lack of open water during the bulk of spring whaling prevented the crews from actively scouting for and pursuing whales. This "free time" provided the crews a greater opportunity to pursue other species on the ice than when there is a consistent open lead and all attention is focused on whaling. Seals, eiders and particularly polar bears were harvested in higher numbers than in the same season of the two previous years of the study. The number of bears killed was greater in 1989 because people were around the whaling camps more as they waited for an open lead, and hungry bears, unable to locate open water and food, came closer to shore and whaling camps looking for food. In fact, three or four polar bears were shot right on the trails to the whaling camps.

Geese hunting also took place in May, beginning about mid-month. With ice conditions so unfavorable, many hunters began turning their attention inland earlier than in the other study years when whaling was more successful. However, the poor whaling season also influenced some people's spring waterfowl hunting in the opposite way, in that they chose to stay out on the ice, hoping for open water and more successful harvests. The latter people ended up postponing or canceling their spring waterfowl hunting trips. Nevertheless, many families were at inland camps over Memorial Day weekend.

JUNE

River break-up was complete by the first of June, at least a week earlier than in 1988. The water levels during break-up were unusually high for the second

year in a row. At least one cabin was totally washed out on the Inaru River, with many other cabins receiving at least some water damage.

Travel conditions on the ice improved in early June. Once the slush and water drained off the ice, travel was relatively easy on smooth, snow-free ice. As one elder related, "in the dog sled days this is the time of year when they did a lot of traveling up and down the coast." This year, once the ice conditions improved, some people moved down the coast to camp and hunt seals while others took advantage of the improved ice conditions by hauling equipment and supplies to be used all summer at their Peard Bay cabins.

Many people left on inland waterfowl hunting trips soon after their crew moved off the ice. Inland conditions proved favorable for waterfowl hunting with an absence of the fog and blowing snow so characteristic of the previous two years of the study. However, an unexpected rain storm in early June combined with a rapid snow melt caused many families to shorten their hunting trips and return to town. The unusually large amount of melting snow and a warm spell early in the month had left many of the inland travel routes inaccessible or dangerous to maneuver by snowmachine due to too much water. Hunters reported that travel time increased three to four times which prevented some people from going as far inland for geese hunting as they had in other years. Consequently, more geese hunting occurred along the Meade and Inaru rivers than usual.

During a typical year, people travel to the Chipp River and Teshekpuk Lake areas to hunt geese once the birds have landed but before they have begun to nest. Under this strategy white-fronted geese are the main species harvested. In 1989, however, when most of the geese hunting occurred along the major river flyways, a wider variety of geese were killed which increased the brant harvest substantially. Brants, unlike white-fronted geese which are taken on the ground before they nest, are usually shot while in migratory flight. By not getting to the nesting grounds at the right time, people were left no choice but to hunt geese as they flew overhead on the Meade and Inaru rivers. These geese were predominantly brants.

Successful whaling crews spent much of June hunting for *Nalukataq*, the annual spring whaling festival, to insure there was an abundance of food for

the feasts. A week prior to *Nalukataq*, food preparation and division began in earnest. *Nalukataq* was held on June 23, with the three successful crews collaborating on a single day event, instead of the multi-day event held in previous years. Shares of *maktak*, *mikigaq* (a mixture of fermented whale blood, meat, tongue and *maktak*), goose soup, tea, bread, and stewed fruit for dessert were all passed out in hearty portions. The day of feasting and socializing was rounded out by a blanket toss followed by Eskimo dancing that continued until 2 a.m.

A small area of open water developed around Point Barrow at the end of the month allowing for some early bearded seal and other seal harvest activity. However, the peak in summer marine mammal harvest activity did not occur until July, when the ice went out in front of town.

An occasional polar bear was harvested in June while the shore ice remained grounded. A few very skinny polar bears were seen near town. Although such bears typically would not be harvested because of their apparent undernourished condition, they were believed to be especially dangerous when hungry and were usually shot when seen too close to town.

Some of the fishermen were at their inland camps and were catching fish by mid-June. One study participant, whose camp is close to Barrow, reported that it seemed early to be catching river broad whitefish. Families with camps located farther inland were sending fish back to town at the end of the month. Due to the high water levels, some fishermen did not travel to their camps as early as they did in 1988, waiting for the water level in the rivers to subside. Those who depended on flying to fish camp were also delayed because their landing locations remained flooded well into the month.

JULY

Barrow celebrated the Fourth of July on July 3 and 4, with such activities as three-legged and sack races, an egg toss, a long distance running race, *umiaq* races, and softball games.

On July 6, the shorefast ice floated out, opening up the boat launching areas in front of town. This occurrence instigated a flurry of boating, harvesting, and butchering activity and marked the beginning of the summer boating season. This date corresponds very closely to the dates the ice floated out the previous two summers. The ice remained close to town most of July, leaving an open lead of anywhere from one-fourth to two miles. Toward the end of the month the ice moved out of view and out of the preferred boating range of most of Barrow's small boats (taking about an hour by boat to reach the leading edge). At the same time Barrow received a significant amount of rain.

These ice conditions were in direct contrast to those of the previous two summers. In 1987, the ice moved out quickly and stayed far from town for most of the summer. In 1988, a couple of weeks after the shorefast ice floated out on July 6, strong westerly and southwesterly winds pushed the ice back in and grounded it until the beginning of August resulting in a short summer boating season.

In the early days of open water the ice conditions changed quickly, being highly susceptible to the ocean current and wind conditions. In one instance, three boats that had followed an open lead through the ice soon found themselves trapped by enclosing ice. Their boats were air-lifted back to open water by the NSB Search and Rescue helicopter.

The summer ice and open ocean conditions are directly related to the level of boating activity and marine mammal harvest. Most marine mammal hunting at this time of year occurs around the ice floes, where the animals concentrate to feed and take refuge on the moving ice. Throughout July when the leading edge of the pack ice remained close to town, i.e., visible and not more than a forty-five minute boat ride away, walrus, bearded seal and other seal harvests experienced a marked increase. Because of these ideal ice conditions, a wealth of warm and clear summer days, and a desire to make up for the poor conditions of the last two years, the summer marine mammal harvest in 1989 (particularly walrus) was significantly greater than in 1987 and 1988.

The first walrus harvest of the summer was reported on July 10 at Peard Bay. Walrus harvesting continued steadily throughout July while the edge of the pack

ice remained visible and within a few miles from shore. Once the ice moved too far away for easy and safe travel in a small, open skiff the walrus harvest declined. The correlation between ice conditions and walrus hunting is especially strong. Not only are most of the walrus found amid the moving ice floes, but the hunters use the ice as a place to butcher the walrus prior to returning home. A large, heavy walrus is much easier to transport when cut into pieces than when whole.

Many hunters plan their route in search of walrus according to the current. By heading south when first leaving Barrow the intent is that while butchering, the moving ice will push the ice, boat, and crew toward Barrow. This strategy shortens their return trip thereby saving time and fuel. This practice is also safe since it prevents a crew from being carried out to sea.

Elson Lagoon was free of ice by July 9, providing a clear access route to the area's river systems for those families wishing to boat to fish camp. By mid-month nets were being set in Elson Lagoon; a total of nineteen nets were counted at month's end. Most families used a small boat to check their nets every evening after work. Salmon, arctic char, grayling, arctic and least cisco, and whitefish were all being harvested, even with a few king salmon being caught in the larger mesh nets.

During July, many families left town for their inland fish camps, or moved out to their cabins at the shooting station or *Pigniq* at the base of Point Barrow. Many families enjoyed staying at *Pigniq* away from the noise of town and commuted into town for work. Dried whitefish or *pivsi* from the inland camps was readily available in Barrow by mid-month.

By the end of July, eiders began their post-breeding southwesterly migration. Flocks ranging in size from 50 to 200 birds began to fly over Point Barrow in fairly regular intervals and thus were easily attainable to Barrow hunters. The vast majority of the harvest this month was male king eiders, with occasional female king eiders and a few common eiders being harvested. Much of the July eider harvest was accomplished by younger male hunters at Point Barrow or was incidental to the activities of setting or checking fish nets in Elson Lagoon. When the wind was blowing from the east, the birds few in even larger

numbers and at least 30 to 40 families could be observed waiting for a good shot. The summer's warm weather encouraged family duck hunting trips to *Pigniq* for a few hours in the evenings after work or on a weekend day, thereby contributing to the community's increased eider duck harvest in 1989.

At the beginning of the month, caribou were near town and hunters were observed hauling caribou into town by four-wheeler. With temperatures around 60 degrees during these first days of July, the caribou wandered near town and toward the coastline to escape the heat and mosquitos inland. However, the majority of caribou harvested in July were taken at inland fish camps or on multiple day boating trips up the Inaru, Meade, and Chipp rivers.

The weather in July was varied, and somewhat unusual. While it rained nearly continuously from the 10th through the 13th, there were also a number of very warm days with temperatures hitting the mid-60s and even a 70 degree day at the end of the month. On July 21, Barrow had thunder and lightning for the first time since 1982. The National Weather Service reported July to be one of the wettest months of the year, with three inches of rain accumulating, and temperatures averaging four degrees above normal for the month.

AUGUST

During August, the ocean ice remained too far out from shore which curtailed marine mammal hunting. The ice remained out of sight for the entire month.

A hot spell, with temperatures in the high 60s, occurred during the first part of August and lasted for several days. Because of the unusual temperatures, more hunters went out after caribou and ducks than is typical at this time of year. Large numbers of caribou that had moved to the coast to escape the heat and bugs were harvested by hunters traveling in boats either up or down the coast or on multi-day trips upriver. Eiders continued to be harvested at *Pigniq*.

Those families with free time or with time off from work traveled upriver to their inland camps on the Inaru, Meade, or Chipp rivers or at Teshekpuk Lake for caribou and fish. As the month progressed, more and more caribou were

harvested but many hunters complained that the caribou were skinnier than usual. Many of the coastal caribou harvests occurred within a single day's boat ride from Barrow, frequently allowing households who were unable to take lengthy trips upriver to obtain fresh caribou meat.

Fishing continued to be a primary activity in August, both at inland camps and at Elson Lagoon. As the month progressed, temperatures got cooler, winds increased, and the fish moved elsewhere, so catches tapered off at the lagoon. More and more families pulled their nets from Elson Lagoon and turned their attention to the main fall activities of caribou hunting and ice fishing for whitefish.

Berry picking was a favorite pastime in August for those along the Meade and Inaru rivers, and around Atqasuk and Wainwright. Finally, after three years of poor berry seasons, this summer provided a plentiful harvest of salmonberries, blueberries, and cranberries.

By mid-August, whaling captains and their crews were preparing themselves for fall whaling. Bowhead whales were observed feeding from the barrier islands that distinguish Elson Lagoon from the Beaufort Sea, to about 40 miles northeast of Point Barrow. Activity turned to onshore preparation and safety training, and aerial and boat scouting trips. With only three whales landed so far this year and ten strikes available to Barrow crews, whalers began to prepare early in hopes of having a successful fall whaling season.

During a number of days in August, boating was not possible because of strong winds, rough seas, and fog. By mid-month, temperatures in the low 40s with winds gusting up to 30 mph were becoming the norm. Although the weather restricted boating, these windy and rainy days made for good beachcombing in the days following the storms. Beachcombing for artifacts and clams is a popular late summer activity for many Barrow residents.

School began in Barrow on August 17. Consequently, families with children or with school district employees returned from summer camping trips at that time.

SEPTEMBER

In 1989, the ocean remained ice free until November, which meant fall whaling lasted longer. Whether more crews participated, however, is unknown. In early September, whaling crews scouted for whales, sighting grey whales and feeding bowheads but not pursuing them. Although ice conditions were favorable, high winds and rough water during the last two weeks of the month limited boat travel and grounded whaling crews. Crews went out whenever conditions permitted, i.e., when it was safe to travel by small boat; generally, however, poor whaling conditions predominated during September.

Variations in weather also had an affect on fall hunting and fishing conducted inland. Barrow's first snowfall of autumn occurred September 11, which was later than in the previous two years when snow fell by the end of August. By the third week of September, Barrow was having regular snow showers, average temperatures around 30 degrees, and winds of 15 to 20 mph. The thin layer of snow that dusted town and the chill in the air gave the impression that fall had arrived, with winter not far behind. Hopes of freeze-up and travel inland by snowmachine were quickly dashed, however, as the temperatures rose, all that had frozen melted, and rain returned at the end of the month.

Because of the unseasonably warm weather, many families postponed their fall inland fishing and hunting trips until freeze-up, which occurred in October, or cancelled their trips altogether. Going to inland camps for ice fishing and caribou hunting is a popular fall subsistence activity and many people wait until after freeze-up to go to camps when travel by snowmachine is possible and when broad whitefish, grayling, and burbot are running in larger numbers. Typically, such trips occur in September when inland rivers and lakes have frozen sufficiently for safe travel. Consequently, in previous years our harvest reports for September and October have indicated the largest quantities of fish and caribou harvested. However, because of the warm weather the major fall harvest of fish and caribou in 1989 did not occur until late October and into November.

Occasional trips to inland camps for fishing and caribou did occur in September, especially around the middle of the month when the land, rivers and

lakes initially froze. Some of the families that travelled by snowmachine to their fish camps with hopes of successful ice fishing were disappointed when the rivers returned to flowing water at the end of the month, and their nets became clogged with debris and floating ice. These unusual conditions, in combination with the summer's high rainfall and high water in the rivers, resulted in lower than normal whitefish, grayling, and burbot harvests in September.

Caribou were harvested during these trips whenever possible, since the fatter caribou of the fall are preferred and the upcoming rutting time would make the meat of the bull caribou inedible. However, the number of caribou harvested in September was lower in 1989 than in other years since many families waited to go inland until freeze-up in October.

Travel conditions are typically uncertain at this time of year because of the rapidity with which flowing rivers can freeze, thaw, and refreeze. This year those who went inland by snowmachine during the middle of September were prevented from further travel during the thaw at the end of the month. These people either had to wait for freeze-up again in October or be flown back to Barrow, leaving their snowmachines to be retrieved later in the year. In 1988, by contrast, freeze-up occurred early and stranded many families who had gone to their camps by boat. Therefore, many people choose to fly to and from their fall camps to ensure that they would not be stranded without a means of transportation home.

Moose season along the Colville River opened at the beginning of September. Some Barrow residents flew down to the Colville to hunt moose; however, moose is not a heavily sought species. These annual hunting trips provide the year's supply of wild meat for most of these moose hunters.

OCTOBER

The Beaufort and Chukchi seas remained ice-free for the entire month of October. This resulted in an especially long boating season which began in late June/early July and did not end until November. Rivers, lakes, and the land froze up by the middle of the month, allowing for many households to

finally take their regular fall fishing and caribou hunting trips. The lateness of freeze-up made for variations in the seasonal pattern of subsistence activity, with whaling, fishing, and caribou hunting occurring later than in previous years. One hunter said that he stayed out whaling too long and missed the opportunity to go inland fishing while the appropriate environmental conditions existed.

The month of October was dominated by whaling. Crews went out whenever weather permitted, i.e., when winds were low, visibility was good, and the water was calm. At month's end, young slush ice began to develop but did not hamper the whaler's efforts.

Four whales were struck on October 1 near Cape Simpson. Since the harvest site was so far from Barrow, towing each of these whales to town took 25 to 30 hours. All four whales were butchered on the Barrow beach the afternoon and evening of October 2. The long tow time led to spoilage of the tongue, intestines, and internal organs of all four whales, and of the meat of the largest whale. Barrow whaling crews landed three other whales in October, one on the 10th, one on the 25th, and a "stinker" (i.e., a whale that had been struck and lost and recovered later) on the 28th. These seven fall whales, added to the three whales landed in the spring, made for a total of ten landed whales in Barrow in 1989. On October 27, Barrow received two additional strikes to its 1989 allocation of 14 strikes from the Alaska Eskimo Whaling Commission.

The meat, *maktak* and baleen of the fall whales were distributed immediately to the captains of the boats that helped tow the whale. These "boat shares" were then divided among whomever was in the boat plus anybody who contributed to the crew. Additionally, individuals who participated in butchering but were not otherwise part of a fall whaling crew received shares. (Not all crews fall whale, so some individuals participate on their own. This kind of participation is not possible during spring whaling, when participation is based on being a member of a registered crew.) Each of these fall whales was divided anywhere from seven to twenty-one ways, while the spring whales were divided into forty-two, thirty-five, and twelve crewshares respectively.

Additional meat, *maktak*, and internal organs (when not spoiled) were consumed at the successful captain's houses in public feasts the day after the harvest. In addition, the successful captains distributed *maktak* to the community throughout the year at public feasts. The successful fall whaling captains distributed their harvests at the Thanksgiving and Christmas feasts, and at community potlucks such as those held in conjunction with *Kivgiq* (the Messenger Feast held in January) and the annual Whaling Captains Convention.

On October 8, Barrow experienced a severe fall storm with winds peaking at 47 mph and waves between six and eight feet. These conditions resulted in bluff erosion, road damage, and the beach being covered with washed up debris. Clamming and the collection of capelin that had been washed ashore were reported as harvest activities in the few days immediately following this storm. This clam and capelin harvest was possible only due to the unusual fact that there was open ocean when the storm hit. In other years, the ocean would already have been frozen at this time, thereby preventing such "washing ashore".

By the middle of October, travel by snowmachine to inland fish camps was common. Net fishing for river and lake broad whitefish and jigging for grayling and burbot, which has occurred in September in the previous two years, began in earnest in late October this year. At this time, the ice had frozen thick enough to provide the proper environmental conditions for the schooling of the fish and for the setting of the nets under the ice.

While at fish camp, families also hunted large numbers of caribou. Fall caribou generally are taken in larger numbers than other times of the year because of their fattened condition and to provide a family's winter supply of meat. By the middle of October, the fall rut made the meat of the bulls inedible. However, caribou continued to be harvested, making sure only females or young males not in rut were taken.

At the end of October, Elson Lagoon had frozen and intensive ice fishing occurred about a week along its shoreline, yielding a substantial harvest of small arctic cod. Ice fishing is a preferred activity of the elderly residents

of Barrow; the older women sitting around their ice holes patiently jigging their hooks were especially successful.

By month's end, winter had arrived. Temperatures dipped to below zero and blizzard conditions ensued.

NOVEMBER

By the beginning of November, the landfast sea ice had begun to freeze solid, preventing any further boat travel. Barrow's newly acquired two strikes remained unused. The boating season and fall whaling had both been long and successful this year. According to elders, not often does the ocean remain ice-free and open for travel so late into the fall, and only occasionally has fall whaling continued into November.

By the middle of the month, the sea ice had frozen thick enough to make traveling across it by snowmachine safe. Seal hunting began at the edge of this landfast ice. From the middle to the end of November, open water was found anywhere from a half to one mile from town. Many of the hunters took small boats to the ice edge to hunt bearded and other seals. Many families even had fresh seal meat for Thanksgiving.

Because of the late freeze-up, the major harvests of grayling, burbot, and whitefish were reported in November in 1989, while in other years the equivalent peaks in fall fish harvesting occurred in September and early October. Many families took advantage of the Veteran's Day holiday to go inland fishing for three days. Ice fishing activities occurred mostly along the Inaru, Meade, and Topagoruk rivers. However, one study participant flew to Atqasuk to jig for grayling and burbot, and other households got lake broad whitefish from nets set in Lake Tusikvoak east of Barrow.

With days getting shorter, temperatures dropping, and a decline in winter hunting activities, most families moved from their camps back to town by the middle of November. While one study household stayed at fish camp from May to

November, most people go out for shorter periods based on species - and season - specific activities.

Caribou continued to be harvested during November by families at fish camp, however in fewer numbers than occurred earlier in the fall. These later caribou were less actively pursued, only being hunted if they were seen and if they were easily accessible from camp or close to town. Hunters observed that the caribou migration was different this year: the animals were staying in the Cape Simpson area longer than in previous years, resulting in fewer caribou being seen around the Inaru and Meade river camps at the time of year when they typically are found in that area.

Collecting freshwater ice for drinking water began in November when the lakes had been frozen for nearly a month, and continued throughout the rest of the winter. Most of the ice was taken at Imikpuk Lake just north of town by *Pigniq*, and at Ikroavik Lake east of Barrow. Ice was gathered either by truckload at the road accessible harvest sites, or by sledload when traveling out from town by snowmachine.

DECEMBER

Since daylight was limited in December and the subzero temperatures made extended journeys potentially dangerous, most subsistence activity occurred close to town. In general, there is an obvious decline in subsistence activity at this time of year because of these environmental conditions and because only a limited number of species are available.

Around the middle of the month, a week of consistently strong easterly winds and heavy currents pushed the ice out directly in front of town. This movement provided Barrow hunters a good opportunity for easily accessible seal hunting. These conditions were short-lived, as the winds and currents shifted, the ice was pushed back in, and the ocean froze solid once again. Towards the end of the month Caribou began to appear closer to town, which was unusual according to study participants. Groups of caribou were mainly located to the south near Walakpa Bay and along the Gaswell Road to the east and were hunted for fresh meat for Christmas.

JANUARY 1990

While some caribou were observed near town in December, by mid-January significant numbers of the animals began to make their appearence close to town. These provided fresh meat for the community when stored supplies of whale, seal, caribou and fish began to run low. These winter caribou also provided a source of fresh meat for the *Kivgiq* or Messenger Feast.

Kivgiq was held on January 11, 12, 13 in 1989 and was the most significant subsistence related community activity held during January. Visitors and dancers from all North Slope villages came to town to help celebrate being Inupiat, to renew family ties and traditions, and just to have fun. It was a full three days of celebration which included late-night Eskimo dancing, visiting, a community feast of various subsistence foods, and exchange of gifts (e.g., ivory, furs, crafts).

Throughout January, sealing continued wherever open water could be found and weather permitted safe travel over the ice. Open water was most commonly found near Point Barrow or two to five miles from town. Polar bears were also frequently sighted at this time of year by those hunting seals. People reported seeing more bear tracks on the landfast ocean ice than in previous years.

Traplines for catching white arctic fox were set in early January near town, but harvesting was only minimally successful. Low fur prices appeared to be at least one reason why some of the regular fox trappers were not active this season.

The month of January was characterized by cold temperatures (averaging from -25 to -35 degrees), but during an extended period mid-month the lack of wind made it feel warmer. During the latter portion of the month, the winds increased up to 20 mph from the east/northeast, thereby bringing windchill temperatures down to near -70 degrees. The blowing snow, in combination with foggy conditions, made for poor visibility at this time. The latter half of January was dominated by frigid temperatures, fog, and blowing snow. Outdoor subsistence activity was at a minimum for most of January, but indoor activity prevailed especially during these last cold, windy days of the month.

Finally, Barrow's subsistence harvest activity was further limited in January because of a flu epidemic that hit in the middle of the month. Most residents suffered at least some symptoms of this debilitating flu, or had to stay home with sick children.

On January 23, the sun rose officially after sixty-five days below the horizon. According to the National Weather Service, a sunrise occurs when 50 percent of the sun is visible above the horizon. Starting from January 23, the hours of daylight rapidly increased; by month's end there were about four hours of light per day.

FEBRUARY

In the early part of February, seal hunters successfully took advantage of small leads of open water as they developed a few miles from town or near Point Barrow. However, by month's end the open leads that typically develop on the Beaufort Sea side of Point Barrow at this time of year became difficult to locate. This lack of open water and rough ice conditions curtailed seal hunting activities. From the end of February until whaling began in April, there was a significant lack of open water around Barrow.

On February 15, Barrow experienced a severe blizzard, with east winds averaging 30 mph. The blowing snow and high winds made for nearly zero visibility and cold temperatures. Out of town trips were put off until the weather improved. The storm's strong winds and fast moving currents, combined with pressures from shifting pack ice, forced a channel to open within the landfast ice directly in front of town, threw large blocks of ice into piles on the beach as if they were pick-up sticks, and replaced what had been smooth ice and open water with a never-ending jumble of rough ice. Immediately following the blizzard, hunters refrained from venturing onto the ice in front of town until conditions stabilized.

During the third week of February, temperatures dropped to frigid conditions. Days averaged -25 degrees to -30 degrees on the thermometer, but windchill temperatures were closer to -60 degrees to -70 degrees. These extremely cold conditions tended to limit out of town activity. The few trips taken were of

short duration and often resulted in frostbitten faces and noses from the snowmachine ride.

Throughout the month, caribou remained close to Barrow and continued to be harvested. Many hunters were motivated to supplement dwindling food supplies and to fulfill the desire for fresh meat. The AEWC meetings at the end of the month also prompted an increase in caribou harvests as people were eager to have fresh meat to serve their honored guests and visitors. In February, the most common Barrow caribou harvest locations were to the east around the Gaswell Road area, and to the south toward Walakpa River and Atqasuk.

During the latter half of February, people began to travel inland for extended periods in search of wolf, wolverine, and a variety of foxes. At least one community member indicated that he would be making his annual trip, while another person said that because there was so little snow this year the tundra travel conditions were rough and few people were going inland very far.

MARCH

Much of March was dominated by preparation for the upcoming spring whaling season. Whalers began covering their *umiaq* frames with fresh ugruk skins starting at the beginning of March. Six to eight average size bearded seal skins are needed for reskinning a *umiaq*. This activity continued throughout the month, with many crews requiring the special skills of the elderly women skin sewers. Many of those *umiat* not needing new skins were painted with white marine paint to serve as an extra layer of protection and add to the life of the skins.

During the sunny days of approaching spring, whalers worked hard getting ready for whaling. Around town caribou hides could be seen hanging on racks to dry and air out before being used for sleeping mats while at whale camp, for padding on freight sleds, and for making new mukluks. New mukluks and hunting parkas were crafted for crew members; fresh meat was harvested to serve the crew. Ice cellars were cleaned out, with extra food given away; sleds were built or repaired. Snowmachines were put into good working order, all gear and

supplies were gathered together, and whatever was missing was replaced. Barrow was busy with activity on evenings and weekends.

Trail building for whaling camps began at the end of March. One main trail was constructed starting just north of town, and another led from the gravel pit to the south out from Walakpa and Nulavik bays.

Caribou were plentiful in Atqasuk during March. Consequently, significant numbers of Barrow residents traveled down there to get easy access to caribou. The cat trail from Barrow to Atqasuk used for the transportation of fuel, equipment, and supplies was clear of snowdrifts and was well packed down. For most of the month, until new snow fell and winds picked up, the road was passable by two-wheel drive vehicle. Caribou also remained near Barrow, resulting in considerable hunting activity as well.

Furbearer hunting trips inland became increasingly common in March as temperatures warmed up. However, hunters reported few successful harvests, despite seeing many wolf and wolverine tracks. This year's light snowfall contributed to rough travel conditions, thereby limiting how often people went out and how far they went. Despite a variety of reports about inland travel conditions and the amount of snow, many people took advantage of the three day Seward's Day weekend to travel to their cabins upriver to retrieve stored supplies of caribou and fish for use during whaling.

Seal harvesting peaked whenever a lead developed in the ice close to town. Such expanses of open water existed on March 8, 9 and 19 and were between one and three miles from town. On these days, hunters attempted to fulfill a desire for fresh seal meat. A number of the seal hunters distributed their harvests to the elders of the community. Despite the difficulty in finding open water during most of the month, many of the town's avid seal hunters continued to travel onto the ice regularly, with varying degrees of success. During most of the month the ice was accessed by a trail heading out just north of town, where the ice was smooth.

On March 3, a hungry polar bear wandered into town and was about to attack a tethered dog before the bear was shot. The NSB Department of Public Safety

gave a non-Native man at the site permission to shoot the bear in defense of life and property. Some degree of controversy developed over the legality of the shooting and some people questioned why the officers did not locate a Native to shoot the bear. The bear was butchered, the meat was distributed around the community, and the hide and skull were turned over to the U.S. Fish and Wildlife Service, as required by law in such situations.

Polar bears continued to be pursued by hunters on the ice during March, but only a few bears were harvested. Their hides appeared on people's roofs and racks for drying.

Smelt from Wainwright made their appearance in Barrow during March as a result of family movement and trade between villages. Smelt was a welcome treat as it provided some variety to the regular diet of caribou, whale, other marine mammals, and whitefish.

Weather conditions in Barrow varied throughout March, ranging from cold temperatures of -70 degrees at the beginning of the month, to the arrival of spring-like weather during the following weeks. The nice weather, which included sunny, warm days between 5 degrees above and -10 degrees, was ushered in by the winter storm on the 15th. On the 16th the thermometer reached a record-breaking high of 27 degrees.

As a summary to the Seasonal Round, the following list highlights the key community and environmental events that directly or indirectly influenced subsistence activities in Year Three.

DATE	ACTIVITY OR EVENT
April 8	Trail building through rubble ice begins.
April 14-17	Barrow Spring Carnival (*Piuraagiaqta*).
April 19	Whaling crews begin to establish camps on the ice.
April 23	Whale harvest, Barrow's first whale.
April 24	Unsuccessful whale strike. Westerly flowing current and winds close the lead.
May 1	Eider ducks begin to be harvested at whale camps.
May 1-12	Closed lead during most of this period.
May 5	Barrow high school graduation. Largest class yet to graduate from new building, with fifty graduates.
May 10	Last sunset until August.
May 11	School out for the summer.
May 12-16	Lead opens again, after nearly three weeks with no open water.
May 15	Whale harvest, Barrow's second whale.
May 20	Inland travel for geese hunting begins.
May 27	Chipp River begins breaking up.
May 29	Whale harvest, Barrow's third whale. Travel conditions on the ice deteriorating.
May 29	Memorial Day, warm temperatures. Many families inland geese hunting for weekend.
May 30	Most whaling crews off ice today.
June 2	Rivers begin breaking up. Travel conditions deteriorate as a lot of snow melt and slush develops. Travel times inland multiplied due to slow, wet conditions.
June 3	Rain storm, speeds up rapid melting. Many families return early from waterfowl hunting camps.
June 6	Caribou calving time.
June (mid)	First fish harvests for season. High water in rivers.
June 23	Barrow *Nalukataq*.
June 24	Open water develops around Point Barrow. Seal hunting from boats begins.
July 1	Dried whitefish (*pivsi*) from inland camps available in town.
July 3-4	Fourth of July community celebration and games.
July 6	Open ocean in front of town, good *ugruk* hunting along ice floes. Grounded ice remains about a mile offshore.
July 7-15	Boating to inland camps begins through passages in the grounded ice.
July 15	Fish nets begin to be put out in Elson Lagoon. Mainly whitefish and salmon harvested.
July 21	First thunder and lightning reported in Barrow since 1982.
July 24	Flocks of eiders returning west past Point Barrow.
July 29	Temperature reached 70^{o}.
July 24-28	Inuit Circumpolar Conference held in Sisimuit, Greenland

August 2	First sunset since May.
August 10	Soviet scientists in Barrow signing cooperative study agreement with NSB Department of Wildlife Management.
August 11	Heavy rain storm; weekend travelers come home early because too wet.
August 16-18	Alaska Mayors meet in Barrow at UIC/NARL. Alaska Municipal League meeting at UIC/NARL.
August 17	School starts in Barrow.
August 22	Barrow Whaling Captain's Association holds safety, rope towing, and hauling training session for all captains and crew in preparation for fall whaling.
September 4	Labor Day. Last fish nets removed from Elson Lagoon.
September 9	Kaktovik harvests first whale.
September 11	First snow fall. Nuiqsut harvests first whale.
September 12	Kaktovik harvests their second whale.
September 15-16	North Slope Borough's Third Annual Women's Conference held in Barrow.
September 19-22	Fifth International Cross Cultural Education Seminar in the Circumpolar North: "Educating for the Future in a Multicultural Society" met in Barrow.
September 19-22	State Legislative Joint Committee on School Performance hearings in Barrow.
September(mid)	River/lake begin freezing. Ocean remains ice-free.
September 26	Temperatures rise back into mid-30's, causing snow and beginning of freeze-up to melt. Kaktovik harvests their third whale.
October 1	Whale harvest, Barrow's fourth, fifth, sixth, and seventh whales of 1989. Nuiqsut harvests their second whale.
October 3	NSB and City Elections.
October 8	Fall storm with high winds (peak at 47 mph), waves 6-8 ft. caused coastline erosion and minimal road damage.
October 10	Rivers/lakes begin to freeze again. Whale harvest, Barrow's eighth whale.
October 12	First Annual Celebration of the Great Gray Whale Rescue in Barrow.
October 13	Unsuccessful whale strike for Barrow.
October 15	Caribou rutting time.
October 16-20	Alaska Federation of Natives annual meeting in Anchorage, including RurAL CAP conference on subsistence.
October 18	Alaska Day holiday.
October 25	Whale harvest, Barrow's ninth whale. Young slush ice begins to form on ocean.
October 26	Two unsuccessful whale strikes for Barrow.
October 27	Barrow receives two additional strikes from the AEWC.
October(late)	Arctic cod fishing at Elson Lagoon.
October 28	Whale harvest, Barrow's tenth whale. Was struck and lost on the 26th, found and butchered as "stinker" (only *maktak* edible) on the 28th.
October 31	Halloween

November 1	Whaling officially ends for the year as ocean ice thickens and weather conditions deteriorate.
November(beg.)	Landfast ice sets in.
November 10	NMFS Hearing on Incidental Take of Marine Mammals by Oil Industry.
November 10	Veterans Day holiday.
November 11	AEWC whale bomb workshop with Egil Oen.
November 15	Landfast ice solid enough for travel. Open water less than a mile out. Seal hunting occuring along ice edge in small boats towed out by snowmachine.
November 19	Last sunrise until January.
November 23	Thanksgiving Day
December(mid)	Area of open ocean starting from shore developed in front of town after more than a week of persistent easterly winds averaging 15-25 mph.
December 25	Christmas Day.
December 31	Midnight display of fireworks celebrating New Year's.
January 1	Caribou begin to be seen close to town.
January 11-13	*Kivgiq* - Messenger Feast.
January 15	Martin Luther King holiday.
January 23	First sunrise after sixty-five days of darkness.
February 1	LGL Consultants gives public presentation on results of study about noise impacts to bowhead whales.
February 9	Lunar eclipse visible in Barrow.
February 12	Lincoln's Birthday holiday.
February 15	Severe winter storm high winds caused ocean ice to break apart and be piled along shoreline.
February 19	President's Day holiday.
February 28,29, March 1	AEWC Annual Meeting, Barrow. Barrow allocated fifteen landed whales and Wainwright allocated five landed whales for 1990.
March 1	Ice road from Barrow to Atqasuk begins to be passable and to be used consistently.
March 3	Polar bear shot in town.
March 8	First *umiaq* frame of the season covered with fresh *ugruk* skins. Lead develops one mile in front of town.
March (mid)	Trips inland to hunt furbearers occurring.
March 15-20	Rising Sun Dancers, Soviet Eskimo dance group performs in Barrow and Wainwright.
March 15	Warm winter storm with high winds, blowing snow, poor visibility.
March 16	Record breaking high temperature of 27^{0}.
March 19	Lead develops one half to one mile from shore.
March 21	Native Village of Barrow celebrates its 50th anniversary.
March 26	Seward's Day holiday.

TABLE C-1: TOTAL HARVEST ESTIMATES BY MAJOR RESOURCE CATEGORY - ALL BARROW HOUSEHOLDS, YEAR THREE (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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 (4)	n/a	n/a	508,181	542.3	168.5	58%	45%	30	59	484	601	11%
Terrestrial Mammals	n/a	n/a	214,683	229.1	71.2	25%	43%	40	78	151	307	34%
Fish	n/a	n/a	118,477	126.4	39.3	14%	29%	23	45	81	172	36%
Birds	n/a	n/a	29,222	31.2	9.7	3%	41%	6	12	19	43	38%
Other Resources	n/a	n/a	1,312	1.4	0.4	**	**	1	2	0	4	0%
Total (4)	n/a	n/a	871,875	930.5	289.1	100%	61%	71	139	792	1069	15%

(1) Year Three: April 1, 1989 - March 31, 1990.

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

(3) See Table D-5 for sources of conversion factors.

(4) 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, 1993

TABLE C-2: MONTHLY HARVEST ESTIMATES BY MAJOR RESOURCE CATEGORY - BARROW, YEAR THREE
(Pounds of Usable Resource Product)

TOTALS
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MAJOR RESOURCE CATEGORY	1989 April	May	June	July	August	Sept.	October	Nov.	Dec.	1990 Jan.	Feb.	March
Marine Mammals	12,989	153,431	3,894	91,005	9,666	50	223,780	1,034	1,475	1,082	291	9,483
Terrestrial Mammals	140	1,402	1,724	41,710	57,116	37,606	35,584	4,678	1,177	21,902	3,351	8,291
Fish	0	0	2,647	25,962	29,798	10,888	47,728	1,023	0	89	89	249
Birds	123	15,704	5,104	2,936	3,539	1,949	38	34	0	0	0	18
Total	13,252	170,536	13,370	161,614	100,119	50,494	307,130	6,769	2,652	23,073	3,730	18,041

PERCENTS
****

MAJOR RESOURCE CATEGORY	1989 April	May	June	July	August	Sept.	October	Nov.	Dec.	1990 Jan.	Feb.	March	
Marine Mammals	3%	30%	1%	18%	2%	0%	44%	0%	0%	0%	0%	2%	= 100%
Terrestrial Mammals	0%	1%	1%	19%	27%	18%	17%	2%	1%	10%	2%	4%	= 100%
Fish	0%	0%	2%	22%	25%	9%	40%	1%	0%	0%	0%	0%	= 100%
Birds	0%	53%	17%	10%	12%	7%	0%	0%	0%	0%	0%	0%	= 100%
All Resources Combined	2%	20%	2%	19%	11%	6%	35%	1%	0%	3%	0%	2%	= 100%

Source: Stephen R. Braund & Associates, 1993

TABLE C-3: HARVEST ESTIMATES FOR MARINE MAMMALS - ALL BARROW HOUSEHOLDS, YEAR THREE (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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	508,181	542.3	168.5	58.3%	45%	30	59	483.6	601.1	11%
Bowhead (4,5)	37,764.7	10	377,647	403.0	125.2	43.3%	45%	n/a	n/a	n/a	n/a	n/a
Walrus	772.0	101	77,987	83.2	25.9	8.9%	13%	19	37	46.1	120.3	45%
Bearded Seal	176.0	109	19,152	20.4	6.4	2.2%	11%	4	9	11.7	29.2	43%
Total Ring. & Spot. Seal	42.0	332	13,925	14.9	4.6	1.6%	11%	3	7	8.1	21.6	46%
Ringed Seal	42.0	328	13,774	14.7	4.6	1.6%	11%	3	7	7.9	21.5	46%
Spotted Seal	42.0	4	151	0.2	0.1	**	**	0	0	0.1	0.2	45%
Polar Bear	496.0	39	19,471	20.8	6.5	2.2%	4%	10	20	0.9	40.6	95%

(1) Year Three: April 1, 1989 - March 31, 1990.

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

(3) See Table D-5 for sources of conversion factors.

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

(5) 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 & Associetes, 1993

TABLE C-4: MARINE MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR THREE
(Pounds of Usable Resource Product)

TOTALS
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SPECIES	1989 April	May	June	July	August	Sept.	October	1990 Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	11,496	142,371	0	0	0	0	223,780	0	0	0	0	0
Walrus	0	0	0	70,809	7,179	0	0	0	0	0	0	0
Bearded Seal	0	422	0	15,817	2,487	0	0	0	422	0	0	0
Polar Bear	1,190	6,795	1,716	0	0	0	0	0	0	595	0	9,176
Total Ring. & Spot. Seal	302	3,843	2,178	4,380	0	50	0	1,034	1,053	486	291	307
Ringed Seal	302	3,792	2,178	4,329	0	0	0	1,034	1,053	486	291	307
Spotted Seal	0	50	0	50	0	50	0	0	0	0	0	0
All Marine Mammals	12,989	153,431	3,894	91,005	9,666	50	223,780	1,034	1,475	1,082	291	9,483

PERCENTS
****

SPECIES	1989 April	May	June	July	August	Sept.	October	1990 Nov.	Dec.	Jan.	Feb.	March	
Bowhead Whale	3%	38%	0%	0%	0%	0%	59%	0%	0%	0%	0%	0%	100%
Walrus	0%	0%	0%	91%	9%	0%	0%	0%	0%	0%	0%	0%	100%
Bearded Seal	0%	2%	0%	83%	13%	0%	0%	0%	2%	0%	0%	0%	100%
Polar Bear	6%	35%	9%	0%	0%	0%	0%	0%	0%	3%	0%	47%	100%
Total Ring. & Spot. Seal	2%	28%	16%	31%	0%	0%	0%	7%	8%	3%	2%	2%	100%
Ringed Seal	2%	28%	16%	31%	0%	0%	0%	8%	8%	4%	2%	2%	100%
Spotted Seal	0%	33%	0%	33%	0%	33%	0%	0%	0%	0%	0%	0%	100%
All Marine Mammals	3%	30%	1%	18%	2%	0%	44%	0%	0%	0%	0%	2%	100%

Source: Stephen R. Braund & Associates, 1993

TABLE C-4: MARINE MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR THREE
(Pounds of Usable Resource Product)

TOTALS
******

SPECIES	1989 April	May	June	July	August	Sept.	October	1990 Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	11,496	142,371	0	0	0	0	223,780	0	0	0	0	0
Walrus	0	0	0	70,809	7,179	0	0	0	0	0	0	0
Bearded Seal	0	422	0	15,817	2,487	0	0	0	422	0	0	0
Polar Bear	1,190	6,795	1,716	0	0	0	0	0	0	595	0	9,176
Total Ring. & Spot. Seal	302	3,843	2,178	4,380	0	50	0	1,034	1,053	486	291	307
Ringed Seal	302	3,792	2,178	4,329	0	0	0	1,034	1,053	486	291	307
Spotted Seal	0	50	0	50	0	50	0	0	0	0	0	0
All Marine Mammals	12,989	153,431	3,894	91,005	9,666	50	223,780	1,034	1,475	1,082	291	9,483

PERCENTS
****

SPECIES	1989 April	May	June	July	August	Sept.	October	1990 Nov.	Dec.	Jan.	Feb.	March	
Bowhead Whale	3%	38%	0%	0%	0%	0%	59%	0%	0%	0%	0%	0%	100%
Walrus	0%	0%	0%	91%	9%	0%	0%	0%	0%	0%	0%	0%	100%
Bearded Seal	0%	2%	0%	83%	13%	0%	0%	0%	2%	0%	0%	0%	100%
Polar Bear	6%	35%	9%	0%	0%	0%	0%	0%	0%	3%	0%	47%	100%
Total Ring. & Spot. Seal	2%	28%	16%	31%	0%	0%	0%	7%	8%	3%	2%	2%	100%
Ringed Seal	2%	28%	16%	31%	0%	0%	0%	8%	8%	4%	2%	2%	100%
Spotted Seal	0%	33%	0%	33%	0%	33%	0%	0%	0%	0%	0%	0%	100%
All Marine Mammals	3%	30%	1%	18%	2%	0%	44%	0%	0%	0%	0%	2%	100%

Source: Stephen R. Braund & Associates, 1993

TABLE C-5: MARINE MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR THREE
(Number Harvested)

	1989								1990			
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Bowhead Whale	1	2	0	0	0	0	7	0	0	0	0	0
Walrus	0	0	0	92	9	0	0	0	0	0	0	0
Bearded Seal	0	2	0	90	14	0	0	0	2	0	0	0
Polar Bear	2	14	3	0	0	0	0	0	0	1	0	19
Total Ring. & Spot. Seal	7	91	52	104	0	1	0	25	25	12	7	7
Ringed Seal	7	90	52	103	0	0	0	25	25	12	7	7
Spotted Seal	0	1	0	1	0	1	0	0	0	0	0	0

Source: Stephen R. Braund & Associates, 1993

TABLE C-6: HARVEST ESTIMATES FOR TERRESTRIAL MAMMALS - ALL BARROW HOUSEHOLDS, YEAR THREE (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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 Terrestrial Mammals	n/a	n/a	214,683	229.1	71.2	24.6%	43%	40	78	151.43	306.80	34%
Caribou	117.0	1,656	193,743	206.8	64.2	22.2%	39%	39	76	131.20	282.34	37%
Moose	500.0	40	20,014	21.4	6.6	2.3%	6%	12	23	0.00	44.69	109%
Dall Sheep	99.0	9	918	1.0	0.3	0.1%	2%	1	2	0.00	2.84	190%
Ground Squirrel	0.4	17	7	0.0	*	**	**	0	0	0.00	0.01	71%
Wolverine	n/a	1	n/a	n/a	n/a	n/a	**	n/a	n/a	n/a	n/a	n/a
Arctic Fox (Blue)	n/a	48	n/a	n/a	n/a	n/a	2%	n/a	n/a	n/a	n/a	n/a
Red Fox (Cross, Silver)	n/a	2	n/a	n/a	n/a	n/a	**	n/a	n/a	n/a	n/a	n/a

(1) Year Three: April 1, 1989 - March 31, 1990.

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

(3) See Table D-5 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, 1993

TABLE C-7: TERRESTRIAL MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR THREE
(Pounds of Usable Resource Product)

TOTALS
******

SPECIES	1989 April	May	June	July	August	Sept.	October	Nov.	1990 Dec.	Jan.	Feb.	March
Caribou	140	1,402	1,724	41,710	53,166	20,622	35,584	4,678	1,177	21,902	3,351	8,291
Moose	0	0	0	0	3,035	16,978	0	0	0	0	0	0
Dall Sheep	0	0	0	0	916	0	0	0	0	0	0	0
Ground Squirrel	0	0	0	0	0	7	0	0	0	0	0	0
All Terrestrial Mammals (excluding furbearers)	140	1,402	1,724	41,710	57,116	37,606	35,584	4,678	1,177	21,902	3,351	8,291

PERCENTS
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SPECIES	1989 April	May	June	July	August	Sept.	October	Nov.	1990 Dec.	Jan.	Feb.	March	
Caribou	0%	1%	1%	22%	27%	11%	18%	2%	1%	11%	2%	4%	100%
Moose	0%	0%	0%	0%	15%	85%	0%	0%	0%	0%	0%	0%	100%
Dall Sheep	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%
Ground Squirrel	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	100%
All Terrestrial Mammals (excluding furbearers)	0%	1%	1%	19%	27%	18%	17%	2%	1%	10%	2%	4%	100%

Source: Stephen R. Braund & Associates, 1993

TABLE C-8: TERRESTRIAL MAMMAL HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR THREE
(Number Harvested)

	1989			TOTALS ******					1990		
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Caribou	1	12	15	356	454	176	304	40	10	187	29	71
Moose	0	0	0	0	6	34	0	0	0	0	0	0
Dall Sheep	0	0	0	0	9	0	0	0	0	0	0	0
Ground Squirrel	0	0	0	0	0	17	0	0	0	0	0	0
Arctic Fox (Blue)	0	0	0	0	0	0	0	0	0	0	41	7
Red Fox (Cross, Silver)	0	0	0	0	0	0	0	0	0	0	1	1
Wolverine	1	0	0	0	0	0	0	0	0	0	0	0

Source: Stephen R. Braund & Associates, 1993

TABLE C-9: HARVEST ESTIMATES FOR FISH - ALL BARROW HOUSEHOLDS, YEAR THREE (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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 Fish	n/a	n/a	118,477	126.4	39.3	13.6%	29%	23	45	80.95	171.94	36%
Total Whitefish		38,053	92,407	98.6	30.6	10.6%	21%	23	45	53.66	143.58	46%
Round Whitefish	1.0	16	19	0.0	*	**	**	0	0	0.01	0.03	47%
Broad Whitefish (River)	2.5	25,821	64,550	68.9	21.4	7.4%	18%	13	26	42.73	95.05	38%
Broad Whitefish (Lake)	3.4	4,226	14,374	15.3	4.8	1.6%	5%	9	18	0.00	33.48	118%
Humpback whitefish	2.5	3,648	9,117	9.7	3.0	1.0%	10%	7	14	0.00	23.42	141%
Least cisco	1.0	2,929	2,933	3.1	1.0	0.3%	3%	1	3	0.48	5.78	85%
Bering, Arctic cisco	1.0	1,413	1,415	1.5	0.5	0.2%	2%	0	1	0.88	2.14	42%
Total Other Freshwater Fish		9,303	10,179	10.9	3.4	1.2%	13%	3	5	5.51	16.21	49%
Arctic grayling	0.8	8,392	6,718	7.2	2.2	0.8%	9%	2	4	3.12	11.22	56%
Arctic char	2.8	135	375	0.4	0.1	**	5%	0	1	0.00	0.93	132%
Burbot (Ling cod)	4.0	550	2,202	2.4	0.7	0.3%	7%	1	1	1.00	3.70	58%
Northern pike	2.3	10	22	0.0	*	**	**	0	0	0.01	0.04	63%
Lake trout	4.0	216	862	0.9	0.3	0.1%	3%	1	2	0.00	2.43	164%
Total Salmon		2,089	12,247	13.1	4.1	1.4%	10%	5	10	2.76	23.38	79%
Salmon (non-specified)	6.1	439	2,680	2.9	0.9	0.3%	2%	3	5	0.00	8.06	182%
Chum (Dog) salmon	6.1	529	3,223	3.4	1.1	0.4%	6%	1	1	2.14	4.74	38%
Pink (Humpback) salmon	3.1	261	815	0.9	0.3	0.1%	5%	0	0	0.37	1.37	57%
Silver (Coho) salmon	6.0	828	4,966	5.3	1.6	0.6%	2%	3	5	0.00	10.69	102%
King (Chinook) salmon	18.0	31	562	0.6	0.2	0.1%	1%	0	0	0.28	0.92	54%
Total Other Coastal Fish		18,844	3,645	3.9	1.2	0.4%	4%	1	3	1.25	6.53	68%
Capelin	0.2	346	66	0.1	*	**	**	0	0	0.00	0.19	174%
Rainbow smelt	0.2	1,480	178	0.2	0.1	**	2%	0	0	0.00	0.55	190%
Arctic cod	0.2	17,018	3,401	3.6	1.1	0.4%	2%	1	3	1.02	6.24	72%

(1) Year Three: April 1, 1989 - March 31, 1990.

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

(3) See Table D-5 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, 1993

TABLE C-10: FISH HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR THREE
(Pounds of Usable Resource Product)

SPECIES	1989 April	May	June	July	August	TOTALS ****** Sept.	October	Nov.	1990 Dec.	Jan.	Feb.	March
Total Whitefish	0	0	2,625	17,924	24,592	9,697	36,957	606	0	0	0	0
Round Whitefish	0	0	0	16	0	0	0	0	0	0	0	0
Broad Whitefish (River)	0	0	2,598	15,381	13,696	9,672	23,206	0	0	0	0	0
Broad Whitefish (Lake)	0	0	0	1,777	7,139	16	4,846	592	0	0	0	0
Humpback whitefish	0	0	27	12	2,542	9	6,529	0	0	0	0	0
Least cisco	0	0	0	16	1,214	0	1,685	14	0	0	0	0
Bering, Arctic cisco	0	0	0	724	0	0	690	0	0	0	0	0
Total Other Freshwater Fish	0	0	22	891	138	1,124	7,732	22	0	0	0	249
Arctic grayling	0	0	8	3	55	623	6,016	10	0	0	0	0
Arctic char	0	0	0	95	24	259	0	0	0	0	0	0
Burbot (Ling cod)	0	0	0	0	0	225	1,716	10	0	0	0	249
Northern pike	0	0	0	0	3	17	0	3	0	0	0	0
Lake trout	0	0	14	793	58	0	0	0	0	0	0	0
Total Salmon	0	0	0	7,147	5,068	29	0	0	0	0	0	0
Salmon (non-specified)	0	0	0	51	2,625	0	0	0	0	0	0	0
Chum (Dog) salmon	0	0	0	1,749	1,448	29	0	0	0	0	0	0
Pink (Humpback) salmon	0	0	0	417	393	0	0	0	0	0	0	0
Silver (Coho) salmon	0	0	0	4,561	407	0	0	0	0	0	0	0
King (Chinook) salmon	0	0	0	367	194	0	0	0	0	0	0	0
Total Other Coastal Fish	0	0	0	0	0	38	3,039	395	0	89	89	0
Capelin	0	0	0	0	0	0	69	0	0	0	0	0
Rainbow smelt	0	0	0	0	0	0	0	0	0	89	89	0
Arctic Cod	0	0	0	0	0	38	2,970	395	0	0	0	0
All Fish Species	0	0	2,647	25,962	29,798	10,888	47,728	1,023	0	89	89	249

(Continued on next page)

TABLE C-10, CONTINUED: FISH HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR THREE
(Pounds of Usable Resource Product)

PERCENTS
****

SPECIES	1989 April	May	June	July	August	Sept.	October	Nov.	Dec.	1990 Jan.	Feb.	March	
Total Whitefish	0%	0%	3%	19%	27%	10%	40%	1%	0%	0%	0%	0%	100%
Round Whitefish	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Broad Whitefish (River)	0%	0%	4%	24%	21%	15%	36%	0%	0%	0%	0%	0%	100%
Broad Whitefish (Lake)	0%	0%	0%	12%	50%	0%	34%	4%	0%	0%	0%	0%	100%
Humpback whitefish	0%	0%	0%	0%	28%	0%	72%	0%	0%	0%	0%	0%	100%
Least cisco	0%	0%	0%	1%	41%	0%	58%	0%	0%	0%	0%	0%	100%
Bering, Arctic cisco	0%	0%	0%	51%	0%	0%	49%	0%	0%	0%	0%	0%	100%
Total Other Freshwater Fish	0%	0%	0%	9%	1%	11%	76%	0%	0%	0%	0%	2%	100%
Arctic grayling	0%	0%	0%	0%	1%	9%	90%	0%	0%	0%	0%	0%	100%
Arctic char	0%	0%	0%	25%	6%	69%	0%	0%	0%	0%	0%	0%	100%
Burbot (Ling cod)	0%	0%	0%	0%	0%	10%	78%	0%	0%	0%	0%	11%	100%
Northern pike	0%	0%	0%	0%	13%	75%	0%	13%	0%	0%	0%	0%	100%
Lake trout	0%	0%	2%	92%	7%	0%	0%	0%	0%	0%	0%	0%	100%
Total Salmon	0%	0%	0%	58%	41%	0%	0%	0%	0%	0%	0%	0%	100%
Salmon (non-specified)	0%	0%	0%	2%	98%	0%	0%	0%	0%	0%	0%	0%	100%
Chum (Dog) salmon	0%	0%	0%	54%	45%	1%	0%	0%	0%	0%	0%	0%	100%
Pink (Humpback) salmon	0%	0%	0%	51%	49%	0%	0%	0%	0%	0%	0%	0%	100%
Silver (Coho) salmon	0%	0%	0%	92%	8%	0%	0%	0%	0%	0%	0%	0%	100%
King (Chinook) salmon	0%	0%	0%	65%	35%	0%	0%	0%	0%	0%	0%	0%	100%
Total Other Coastal Fish	0%	0%	0%	0%	0%	1%	83%	11%	0%	2%	2%	0%	100%
Capelin	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%
Rainbow smelt	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%	0%	100%
Arctic Cod	0%	0%	0%	0%	0%	1%	87%	12%	0%	0%	0%	0%	100%
All Fish Species	0%	0%	2%	22%	25%	9%	40%	1%	0%	0%	0%	0%	100%

Source: Stephen R. Braund & Associates, 1993

TABLE C-11: FISH HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR THREE
(Number Harvested)

	1989								1990			
SPECIES	April	May	June	July	August	Sept.	October	Nov.	Dec.	Jan.	Feb.	March
Total Whitefish	0	0	1,050	7,434	9,809	3,877	15,694	188	0	0	0	0
Round Whitefish	0	0	0	16	0	0	0	0	0	0	0	0
Broad Whitefish (River)	0	0	1,039	6,152	5,479	3,869	9,283	0	0	0	0	0
Broad Whitefish (Lake)	0	0	0	523	2,100	5	1,425	174	0	0	0	0
Humpback whitefish	0	0	11	5	1,017	3	2,612	0	0	0	0	0
Least cisco	0	0	0	16	1,214	0	1,685	14	0	0	0	0
Bering, Arctic cisco	0	0	0	724	0	0	690	0	0	0	0	0
Total Other Freshwater Fish	0	0	13	236	92	935	7,949	16	0	0	0	62
Arctic grayling	0	0	10	4	68	779	7,520	12	0	0	0	0
Arctic char	0	0	0	34	8	93	0	0	0	0	0	0
Burbot (Ling cod)	0	0	0	0	0	56	429	2	0	0	0	62
Northern pike	0	0	0	0	1	7	0	1	0	0	0	0
Lake trout	0	0	4	198	14	0	0	0	0	0	0	0
Total Salmon	0	0	0	1,210	873	5	0	0	0	0	0	0
Salmon (non-specified)	0	0	0	8	430	0	0	0	0	0	0	0
Chum (Dog) salmon	0	0	0	287	237	5	0	0	0	0	0	0
Pink (Humpback) salmon	0	0	0	135	127	0	0	0	0	0	0	0
Silver (Coho) salmon	0	0	0	760	68	0	0	0	0	0	0	0
King (Chinook) salmon	0	0	0	20	11	0	0	0	0	0	0	0
Total Other Coastal Fish	0	0	0	0	0	192	15,197	1,975	0	740	740	0
Capelin	0	0	0	0	0	0	346	0	0	0	0	0
Rainbow smelt	0	0	0	0	0	0	0	0	0	740	740	0
Arctic Cod	0	0	0	0	0	192	14,851	1,975	0	0	0	0

Source: Stephen R. Braund & Associates, 1993

TABLE C-12: HARVEST ESTIMATES FOR BIRDS - ALL BARROW HOUSEHOLDS, YEAR THREE (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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	29,222	31.2	9.7	3.4%	41%	6	12	19.34	43.04	38%
Total Geese		3,943	16,291	17.4	5.4	1.9%	13%	4	8	9.32	25.45	46%
Geese (non-specified)	4.5	34	150	0.2	*	**	**	0	0	0.04	0.28	78%
Brant	3.0	973	2,923	3.1	1.0	0.3%	4%	2	4	0.00	7.11	128%
White-fronted geese	4.5	2,932	13,193	14.1	4.4	1.5%	12%	4	7	6.65	21.51	53%
Snow geese	4.5	4	19	0.0	*	**	**	0	0	0.01	0.03	51%
Canada geese	4.5	1	6	0.0	*	**	**	0	0	0.00	0.01	77%
Total Eider		8,590	12,879	13.7	4.3	1.5%	37%	4	8	5.83	21.66	58%
Eider (non-specified)	1.5	8,411	12,612	13.5	4.2	1.4%	37%	4	8	5.54	21.38	59%
Common eider	1.5	69	103	0.1	*	**	1%	0	0	0.00	0.27	146%
King eider	1.5	100	150	0.2	*	**	2%	0	0	0.10	0.22	37%
Stellar's eider	1.5	10	14	0.0	*	**	**	0	0	0.01	0.02	57%
Ptarmigan	0.7	329	234	0.3	0.1	0.1%	5%	0	0	0.17	0.33	31%
Other birds		10	52	0.1	*	**	1%	0	0	0.03	0.08	47%
Red-throated Loon	3.0	3	9	0.0	*	**	**	0	0	0.00	0.03	183%
Sandhill Crane	10.0	2	28	0.0	*	**	**	0	0	0.02	0.04	48%
Tundra Swan	10.0	1	9	0.0	*	**	**	0	0	0.00	0.02	102%
Oldsquaw	1.5	2	4	0.0	*	**	**	0	0	0.00	0.01	76%
Surf scoter	1.5	1	2	0.0	*	**	**	0	0	0.00	0.00	79%

(1) Year Three: April 1, 1989 - March 31, 1990.
(2) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.
(3) See Table D-5 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, 1993

TABLE C-12: HARVEST ESTIMATES FOR BIRDS - ALL BARROW HOUSEHOLDS, YEAR THREE (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESOURCE	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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	29,222	31.2	9.7	3.4%	41%	6	12	19.34	43.04	38%
Total Geese		3,943	16,291	17.4	5.4	1.9%	13%	4	8	9.32	25.45	46%
Geese (non-specified)	4.5	34	150	0.2	*	**	**	0	0	0.04	0.28	78%
Brant	3.0	973	2,923	3.1	1.0	0.3%	4%	2	4	0.00	7.11	128%
White-fronted geese	4.5	2,932	13,193	14.1	4.4	1.5%	12%	4	7	6.65	21.51	53%
Snow geese	4.5	4	19	0.0	*	**	**	0	0	0.01	0.03	51%
Canada geese	4.5	1	6	0.0	*	**	**	0	0	0.00	0.01	77%
Total Eider		8,590	12,879	13.7	4.3	1.5%	37%	4	8	5.83	21.66	58%
Eider (non-specified)	1.5	8,411	12,612	13.5	4.2	1.4%	37%	4	8	5.54	21.38	59%
Common eider	1.5	69	103	0.1	*	**	1%	0	0	0.00	0.27	146%
King eider	1.5	100	150	0.2	*	**	2%	0	0	0.10	0.22	37%
Stellar's eider	1.5	10	14	0.0	*	**	**	0	0	0.01	0.02	57%
Ptarmigan	0.7	329	234	0.3	0.1	0.1%	5%	0	0	0.17	0.33	31%
Other birds		10	52	0.1	*	**	1%	0	0	0.03	0.08	47%
Red-throated Loon	3.0	3	9	0.0	*	**	**	0	0	0.00	0.03	183%
Sandhill Crane	10.0	2	28	0.0	*	**	**	0	0	0.02	0.04	48%
Tundra Swan	10.0	1	9	0.0	*	**	**	0	0	0.00	0.02	102%
Oldsquaw	1.5	2	4	0.0	*	**	**	0	0	0.00	0.01	76%
Surf scoter	1.5	1	2	0.0	*	**	**	0	0	0.00	0.00	79%

(1) Year Three: April 1, 1989 - March 31, 1990.
(2) Estimated sampling errors do not include errors in reporting, recording, and in conversion to usable weight.
(3) See Table D-5 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, 1993

TABLE C-13, CONTINUED: BIRD HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR THREE
(Pounds of Usable Resource Product)

PERCENTS
****

SPECIES	1989 April	May	June	July	August	Sept.	October	Nov.	Dec.	1990 Jan.	Feb.	March	
Total Geese	0%	72%	26%	0%	1%	1%	0%	0%	0%	0%	0%	0%	100%
Geese (non-specified)	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Brant	0%	12%	82%	0%	6%	0%	0%	0%	0%	0%	0%	0%	100%
White-fronted geese	0%	85%	14%	0%	0%	1%	0%	0%	0%	0%	0%	0%	100%
Snow geese	0%	100%	0%	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	1%	30%	6%	23%	26%	14%	0%	0%	0%	0%	0%	0%	100%
Eider (non-specified)	1%	30%	6%	23%	26%	14%	0%	0%	0%	0%	0%	0%	100%
Common eider	0%	10%	0%	83%	0%	7%	0%	0%	0%	0%	0%	0%	100%
King eider	0%	58%	17%	2%	23%	0%	0%	0%	0%	0%	0%	0%	100%
Stellar's eider	0%	50%	0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	100%
Ptarmigan	0%	62%	5%	0%	0%	11%	0%	15%	0%	0%	0%	8%	100%
Other birds	0%	70%	0%	10%	0%	20%	0%	0%	0%	0%	0%	0%	100%
Red-throated loon	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	100%
Sandhill crane	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Tundra swan	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Oldsquaw	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Surf scoter	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
All Bird Species	0%	53%	17%	10%	12%	7%	0%	0%	0%	0%	0%	0%	100%

Source: Stephen R. Braund & Associates, 1993

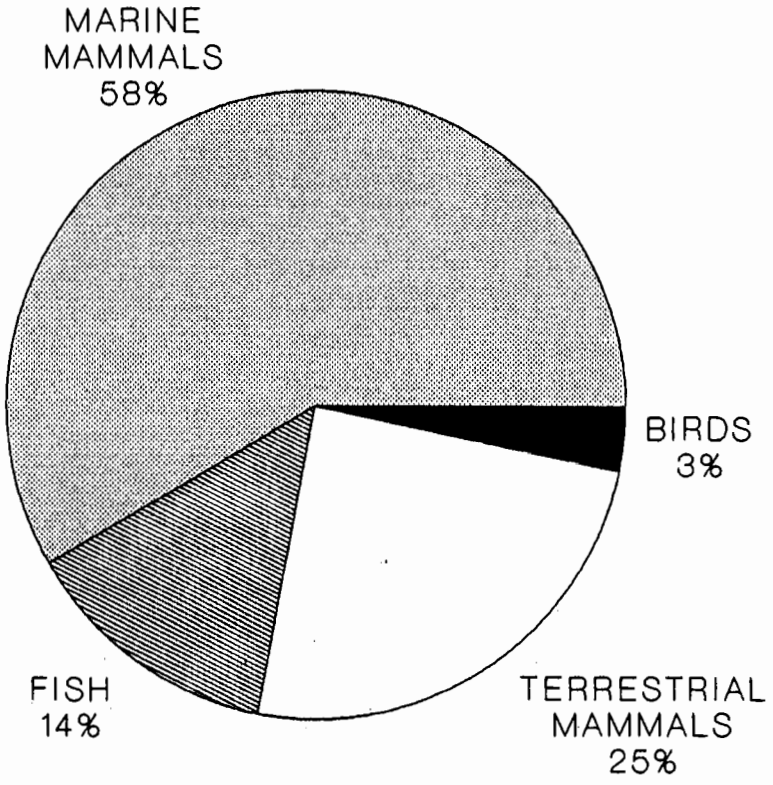
TABLE C-13, CONTINUED: BIRD HARVEST ESTIMATES BY SPECIES AND MONTH - BARROW, YEAR THREE
(Pounds of Usable Resource Product)

PERCENTS
****

SPECIES	1989 April	May	June	July	August	Sept.	October	Nov.	Dec.	1990 Jan.	Feb.	March	
Total Geese	0%	72%	26%	0%	1%	1%	0%	0%	0%	0%	0%	0%	100%
Geese (non-specified)	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Brant	0%	12%	82%	0%	6%	0%	0%	0%	0%	0%	0%	0%	100%
White-fronted geese	0%	85%	14%	0%	0%	1%	0%	0%	0%	0%	0%	0%	100%
Snow geese	0%	100%	0%	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	1%	30%	6%	23%	26%	14%	0%	0%	0%	0%	0%	0%	100%
Eider (non-specified)	1%	30%	6%	23%	26%	14%	0%	0%	0%	0%	0%	0%	100%
Common eider	0%	10%	0%	83%	0%	7%	0%	0%	0%	0%	0%	0%	100%
King eider	0%	58%	17%	2%	23%	0%	0%	0%	0%	0%	0%	0%	100%
Stellar's eider	0%	50%	0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	100%
Ptarmigan	0%	62%	5%	0%	0%	11%	0%	15%	0%	0%	0%	8%	100%
Other birds	0%	70%	0%	10%	0%	20%	0%	0%	0%	0%	0%	0%	100%
Red-throated loon	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	100%
Sandhill crane	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Tundra swan	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Oldsquaw	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Surf scoter	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
All Bird Species	0%	53%	17%	10%	12%	7%	0%	0%	0%	0%	0%	0%	100%

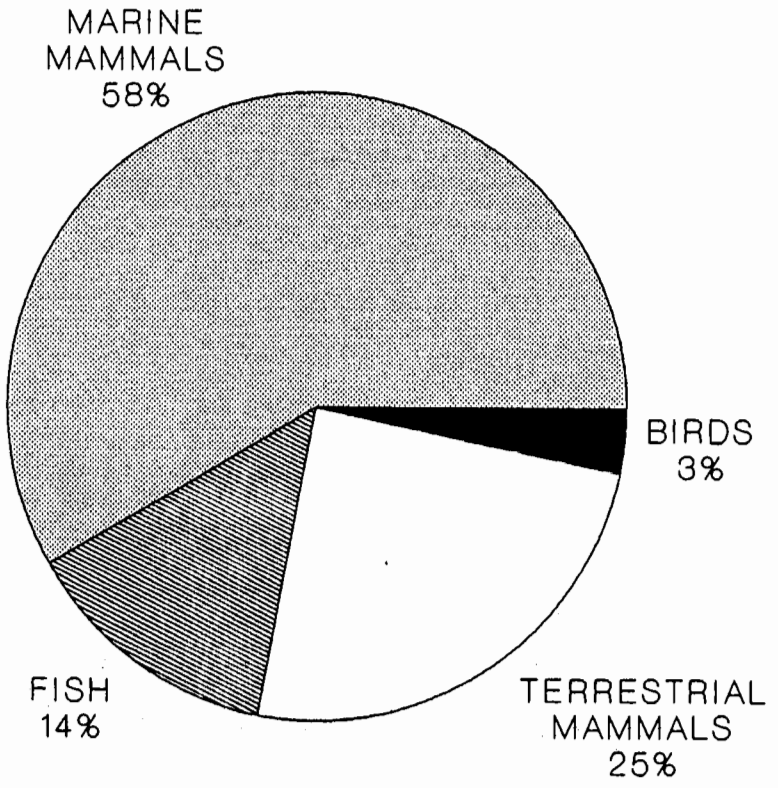
Source: Stephen R. Braund & Associates, 1993

Figure C-1: Estimated Harvest Percentages by Major Resource Category Barrow, Year Three



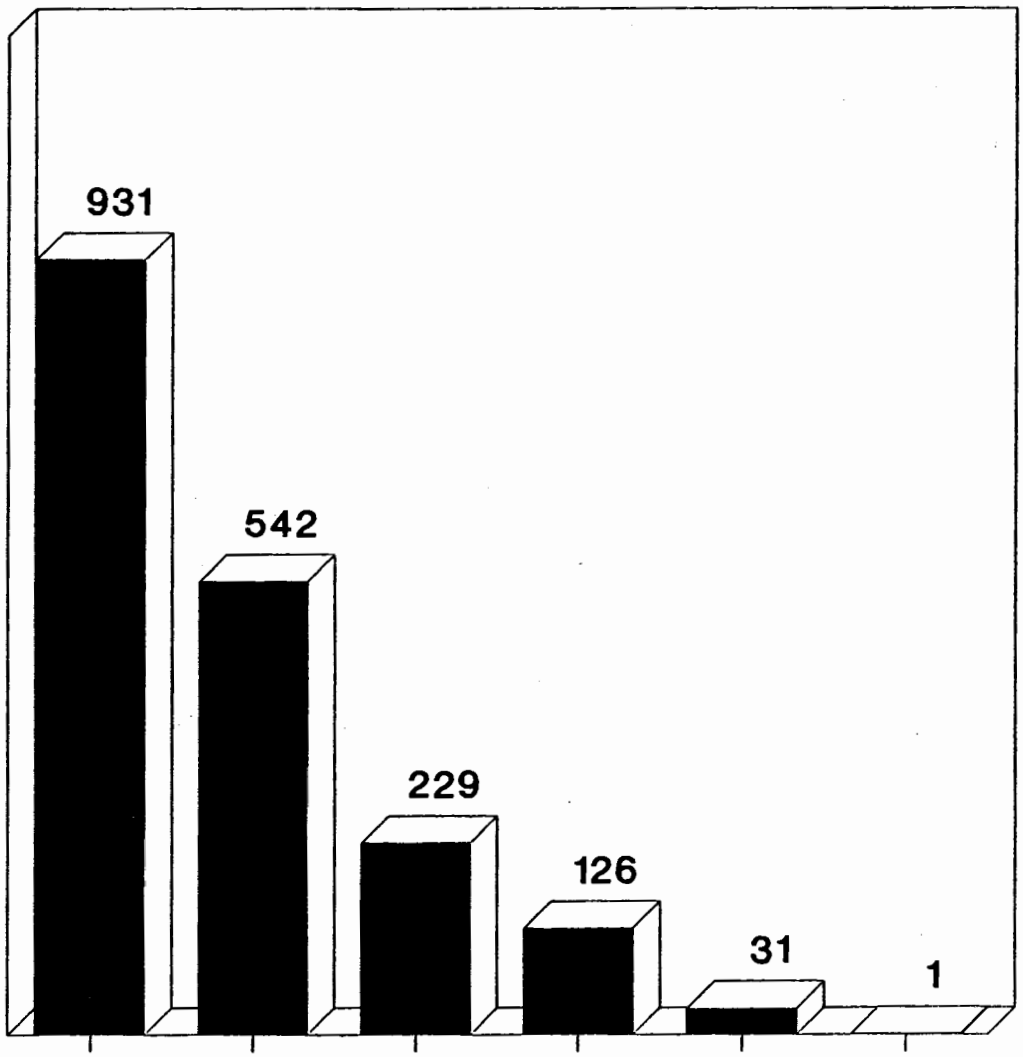
Based on usable pounds harvested.
Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-1: Estimated Harvest Percentages by Major Resource Category Barrow, Year Three



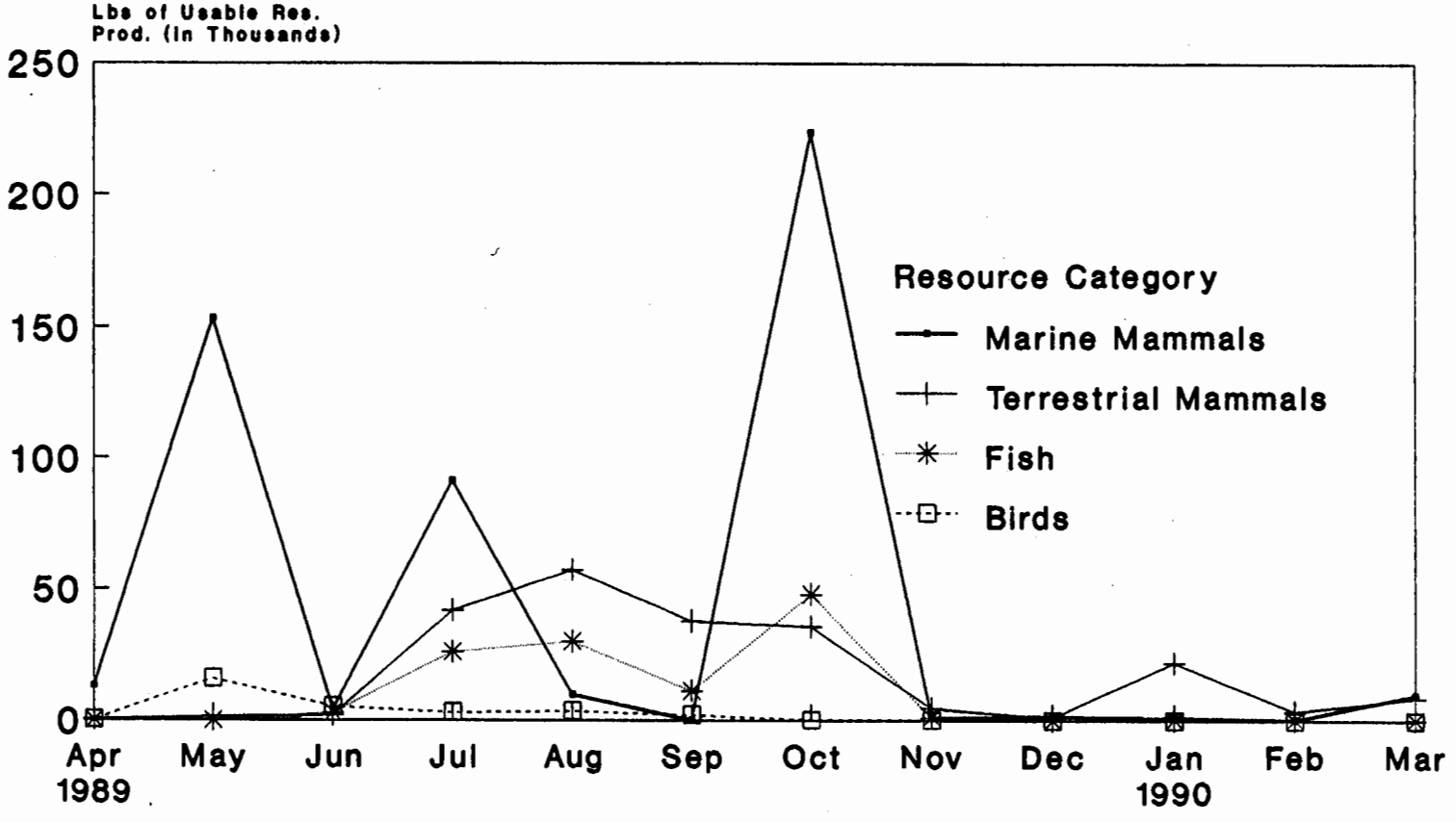
Based on usable pounds harvested.
Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-2: Harvest Estimates by Major Resource Category
All Barrow Households, Year Three
(Mean Usable Pounds Per Household)



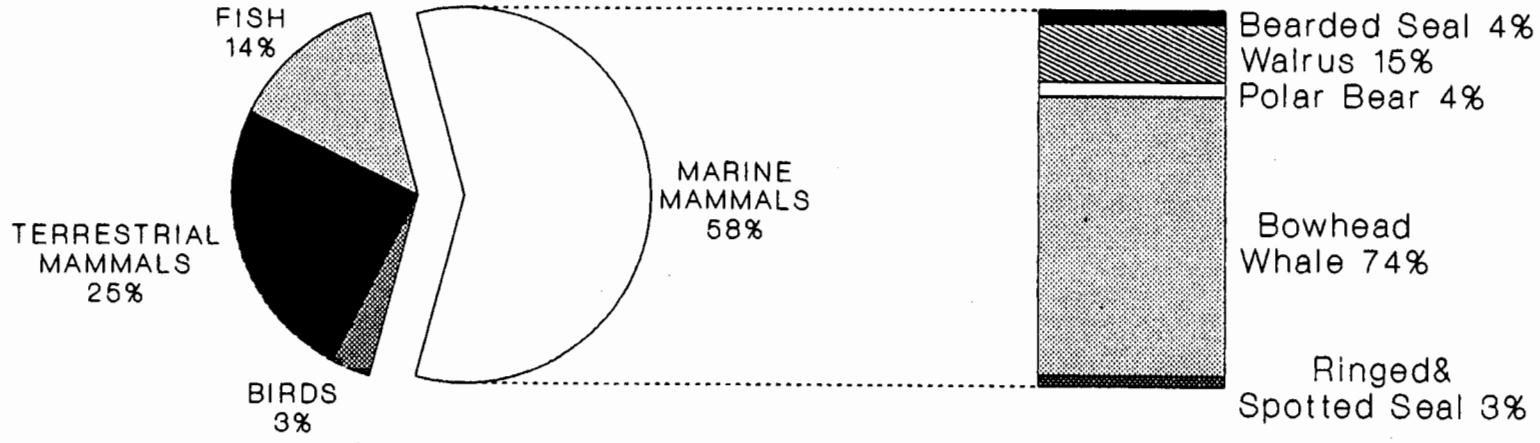
Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-3: Monthly Harvest Estimates by Major Resource Category
All Barrow Households, Year Three



Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-4: Estimated Marine Mammal Harvest Percentages
Barrow, Year Three
(Usable Pounds Harvested)

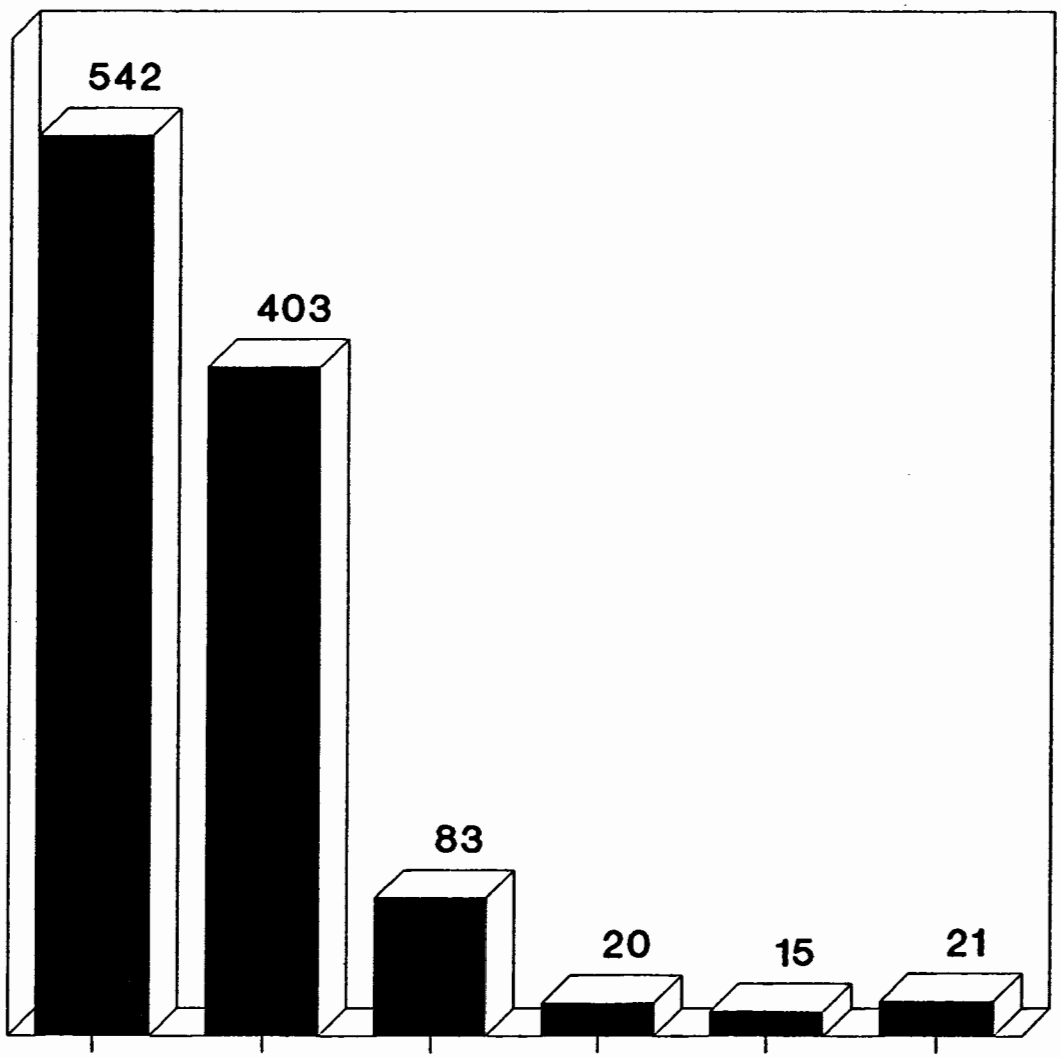


Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-5: Marine Mammal Harvest Estimates

All Barrow Households, Year Three

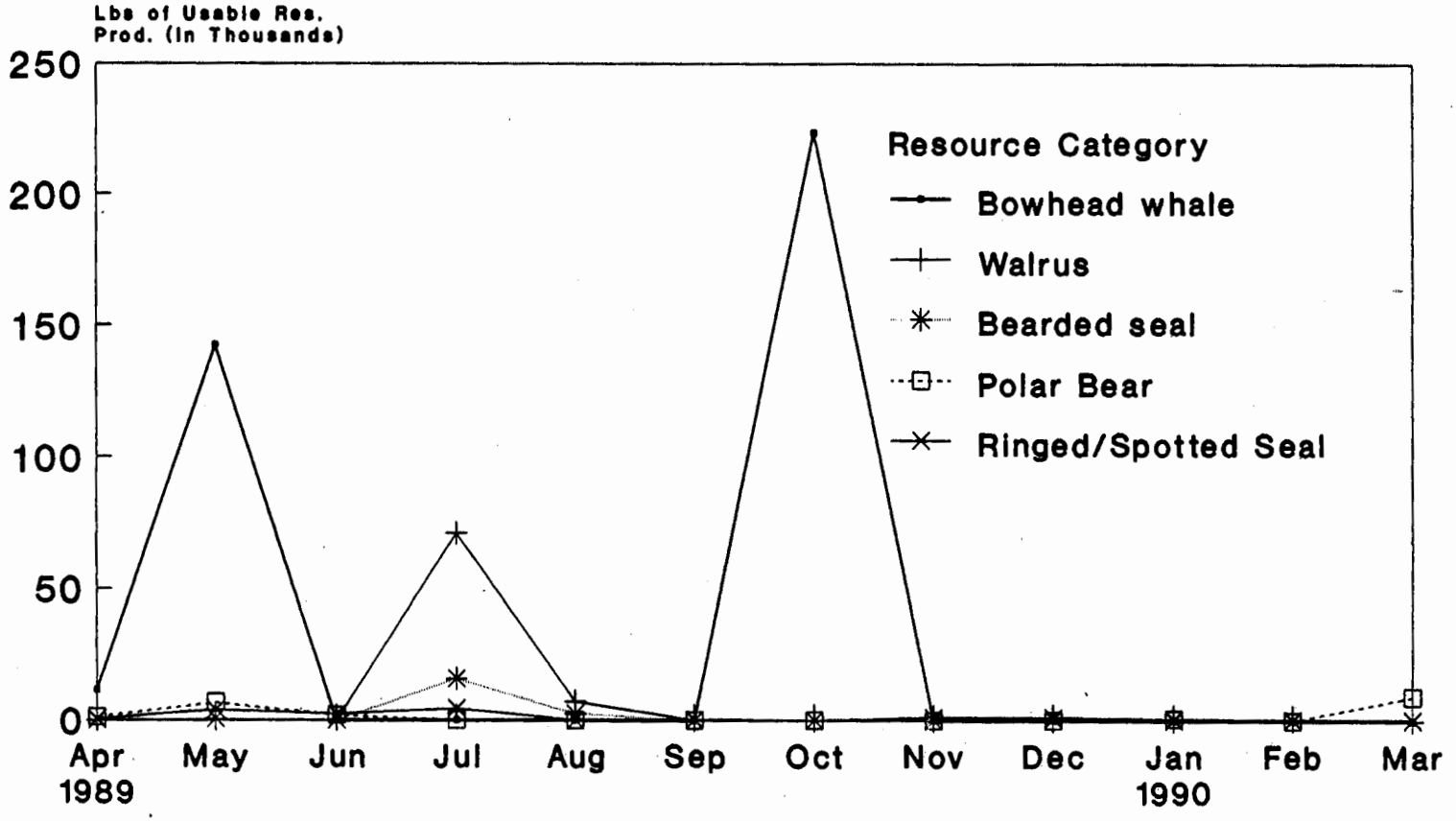
(Mean Usable Pounds Per Household)



Year Three: April 1, 1989-March 31, 1990

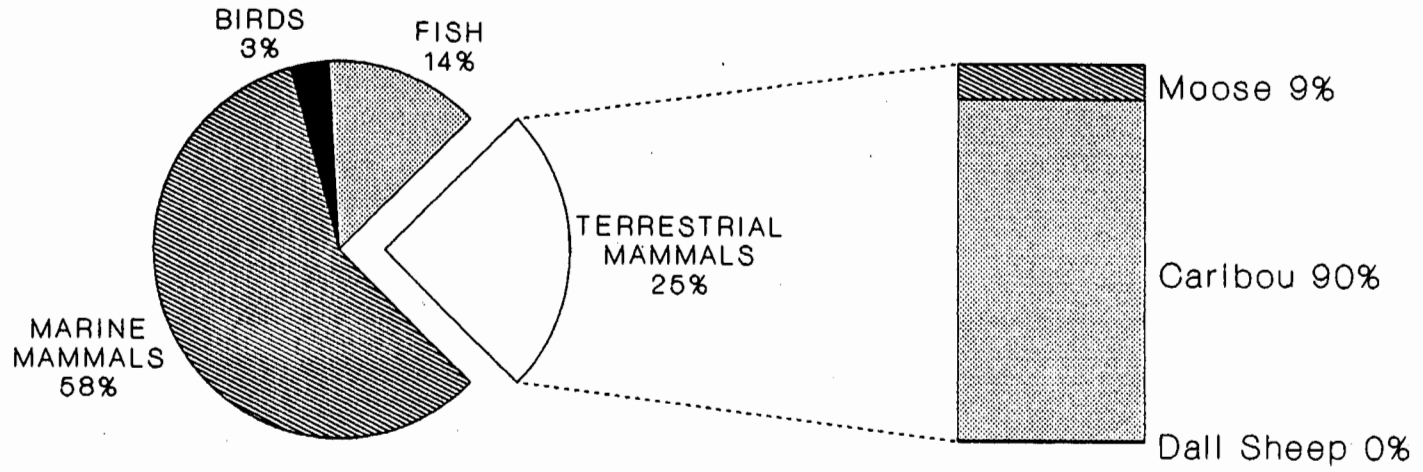
Source: Stephen R. Braund & Assoc., 1993

Figure C-6: Monthly Marine Mammal Harvest Estimates
All Barrow Households, Year Three



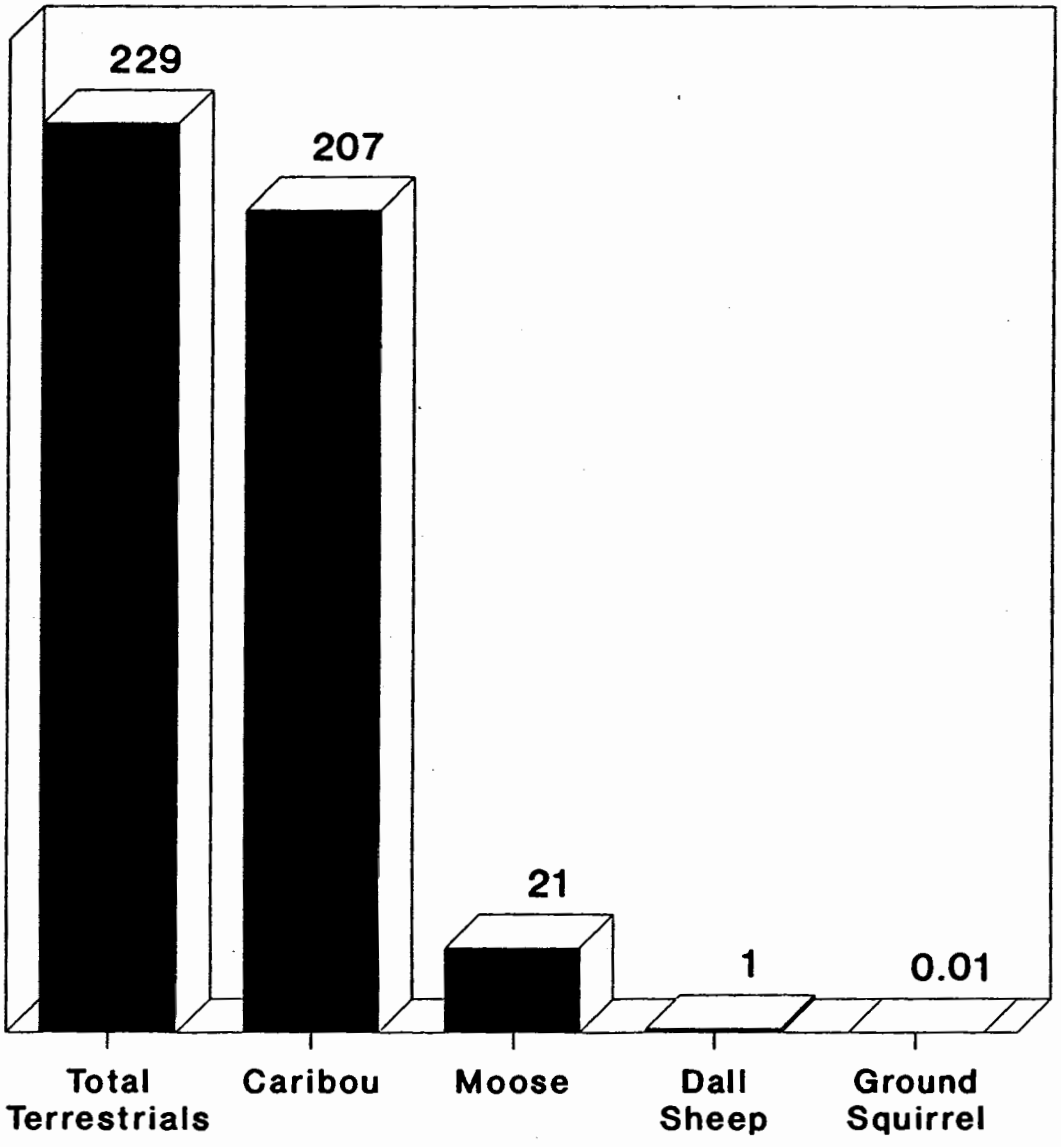
Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-7: Estimated Harvest Percentages of Terrestrial Mammals Barrow, Year Three (Usable Pounds Harvested)



Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

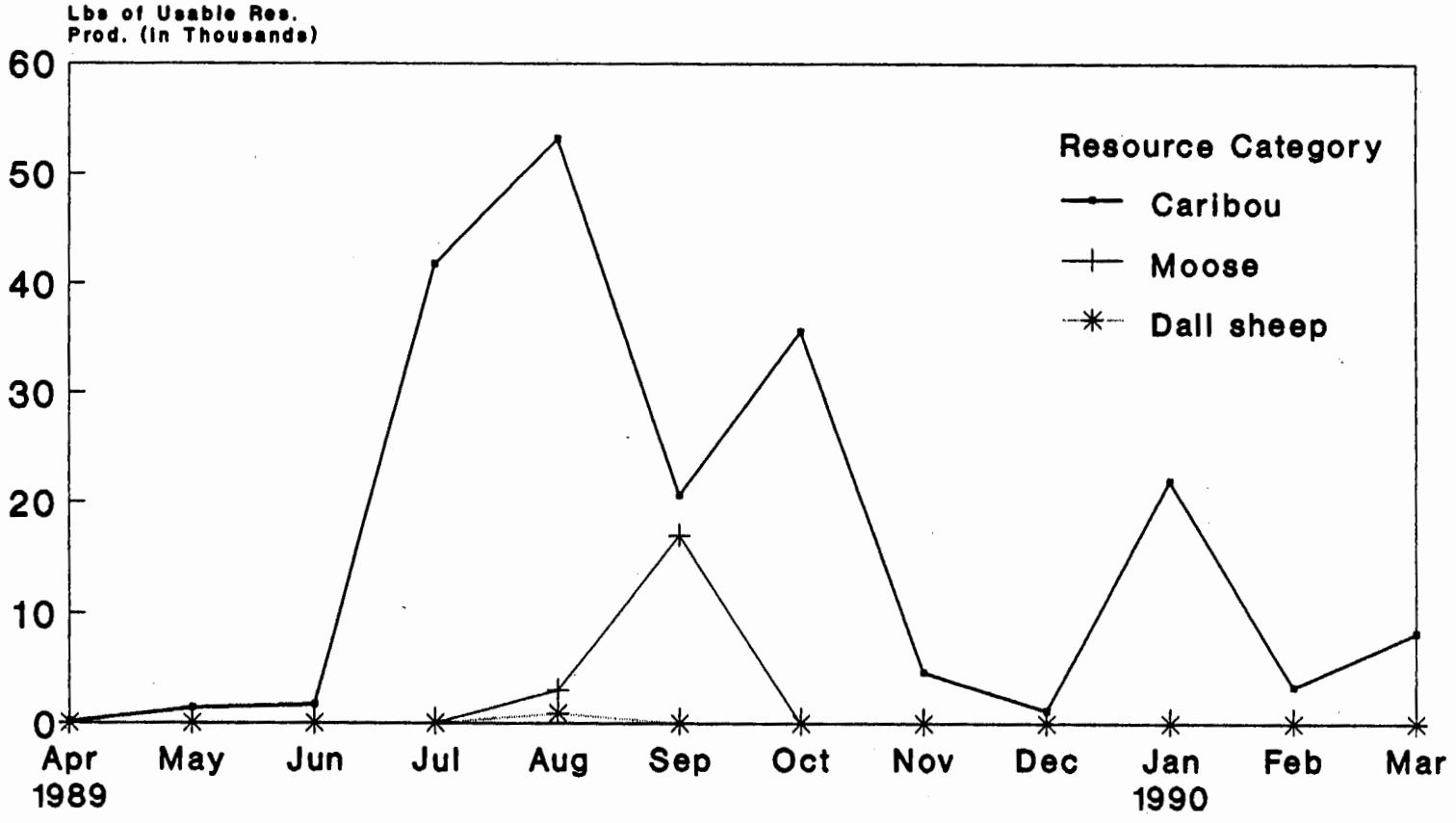
Figure C-8: Terrestrial Mammal Harvest Estimates
All Barrow Households, Year Three
(Mean Usable Pounds Per Household)



% of Terrestrial Mammals:	100%	90%	9%	<1%	<1%

Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-9: Monthly Terrestrial Mammal Harvest Estimates
All Barrow Households, Year Three

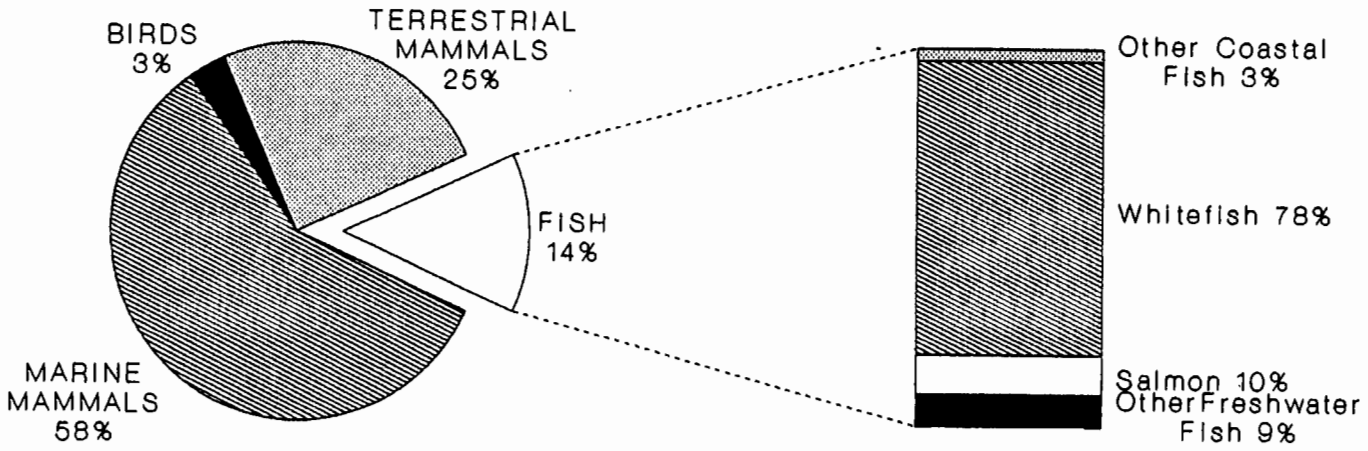


Note: 7 lbs. of Ground squirrel were harvested in September but do not appear on this chart due to scale.

Year Three: April 1, 1989-March 31, 1990

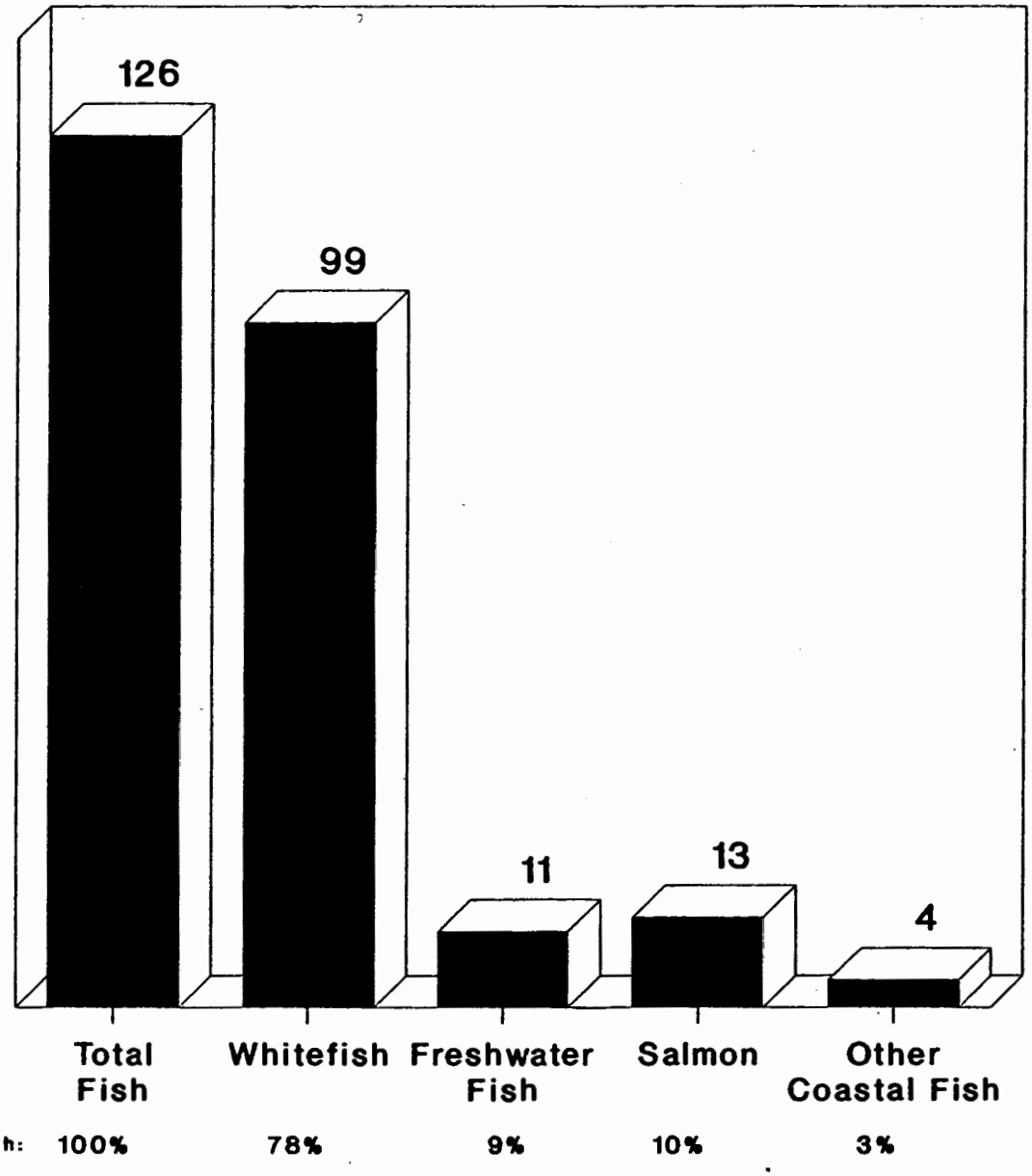
Source: Stephen R. Braund & Assoc., 1993

Figure C-10: Estimated Harvest Percentages of Fish Barrow, Year Three (Usable Pounds Harvested)



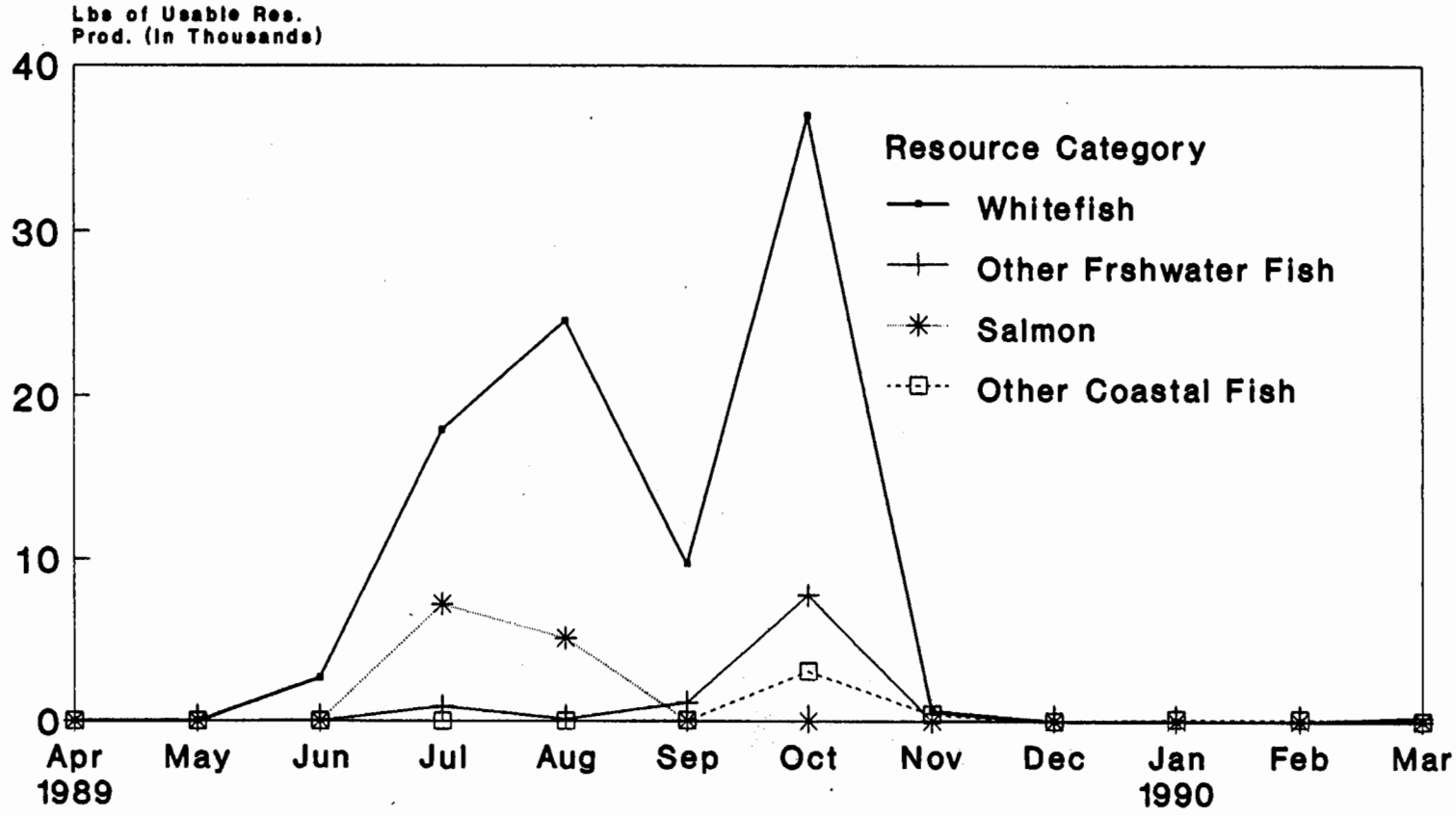
Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-11: Fish Harvest Estimates
All Barrow Households, Year Three
(Mean Usable Pounds Per Household)



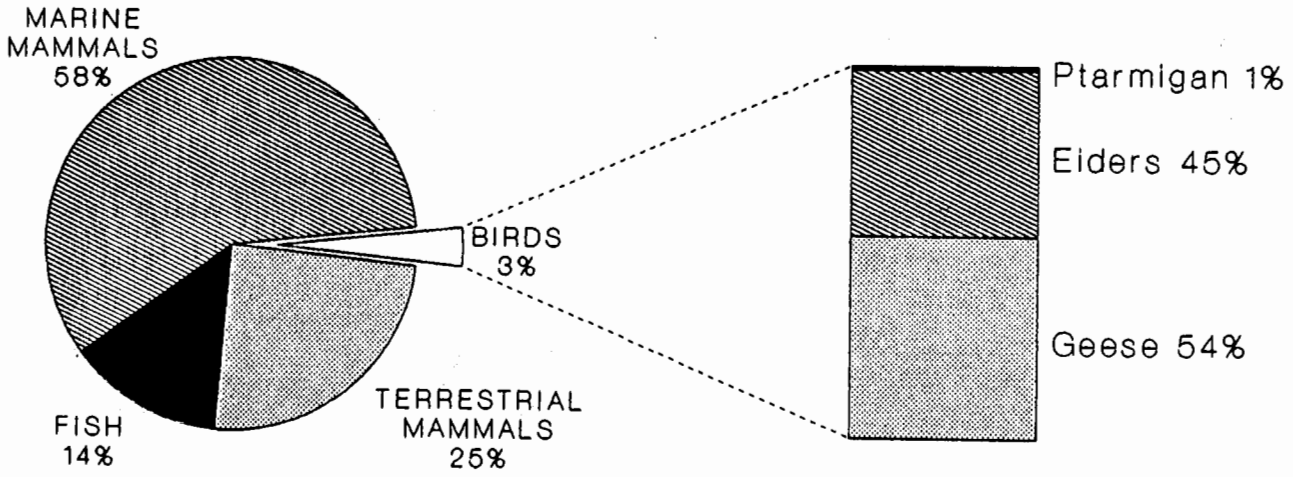
Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-12: Monthly Fish Harvest Estimates
All Barrow Households, Year Three



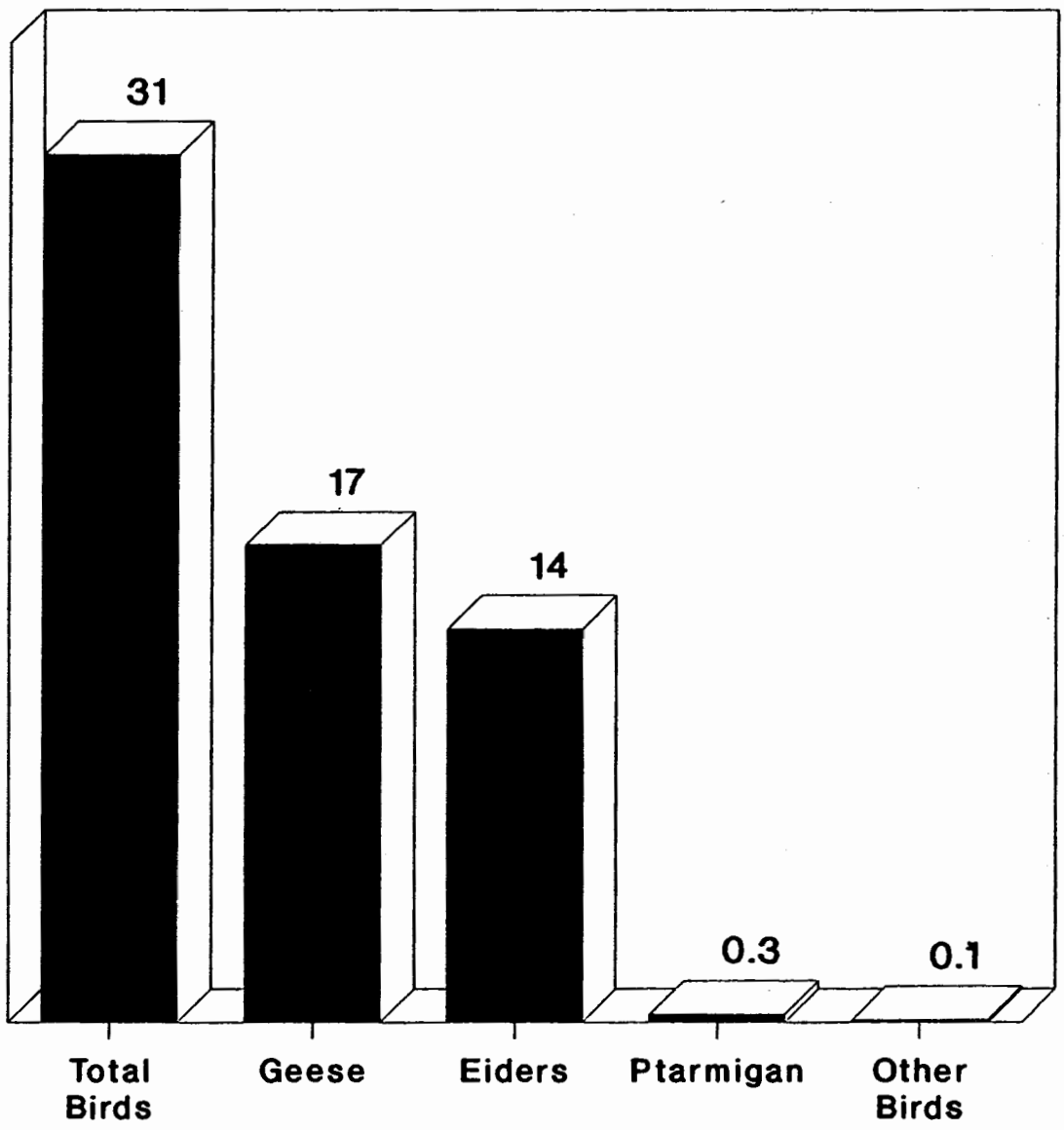
Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-13: Estimated Harvest Percentages of Birds
Barrow, Year Three
(Usable Pounds Harvested)



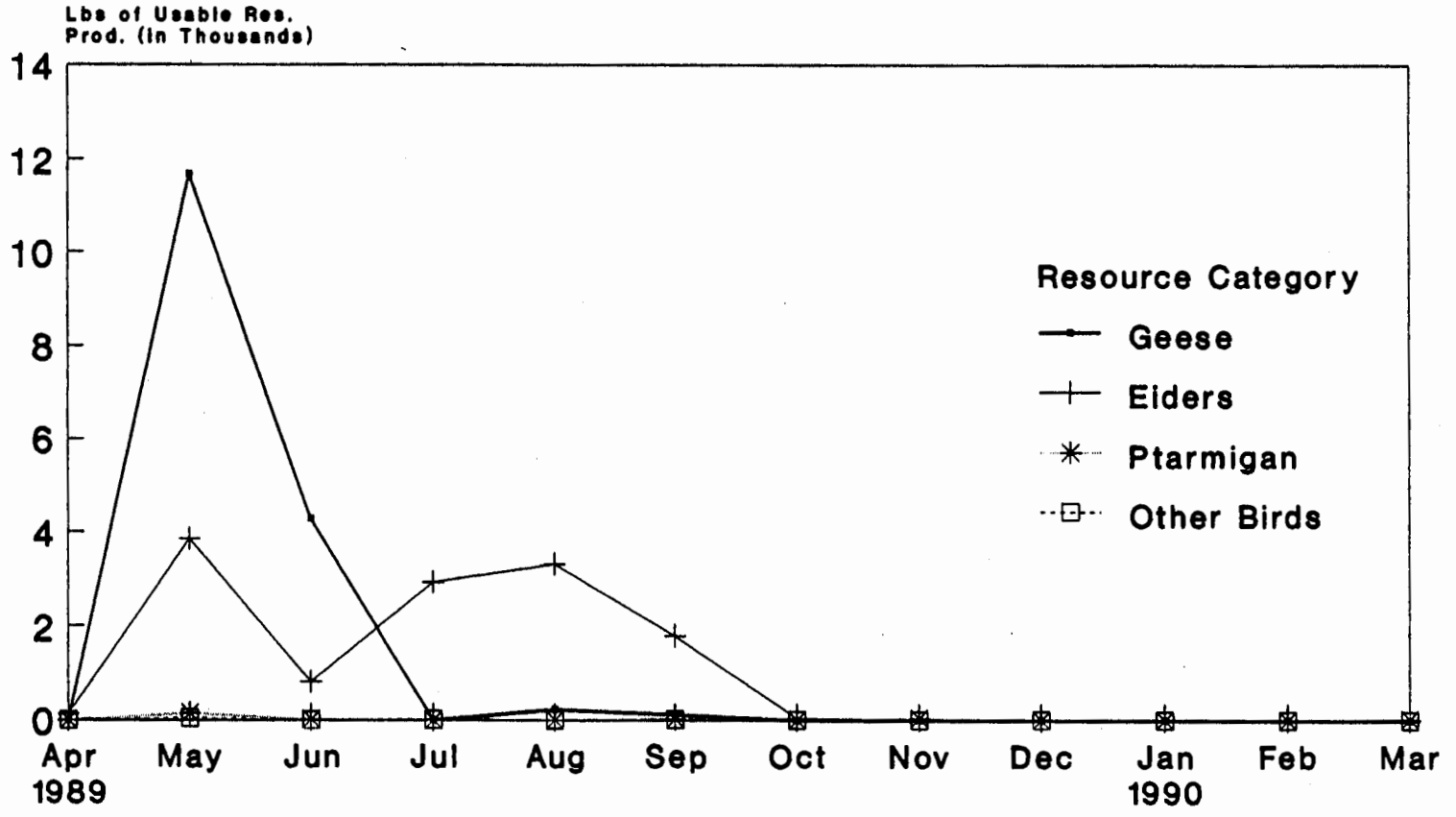
Year Three: April 1, 1989-March 31, 1990.
Source: Stephen R. Braund & Assoc., 1993

Figure C-14: Bird Harvest Estimates
All Barrow Households, Year Three
(Mean Usable Pounds Per Household)



Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

Figure C-15: Monthly Bird Harvest Estimates
All Barrow Households, Year Three



Year Three: April 1, 1989-March 31, 1990
Source: Stephen R. Braund & Assoc., 1993

MAP C-1
NORTH SLOPE SUBSISTENCE STUDY - BARROW
SUBSISTENCE HARVEST SITES, YEAR THREE

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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.

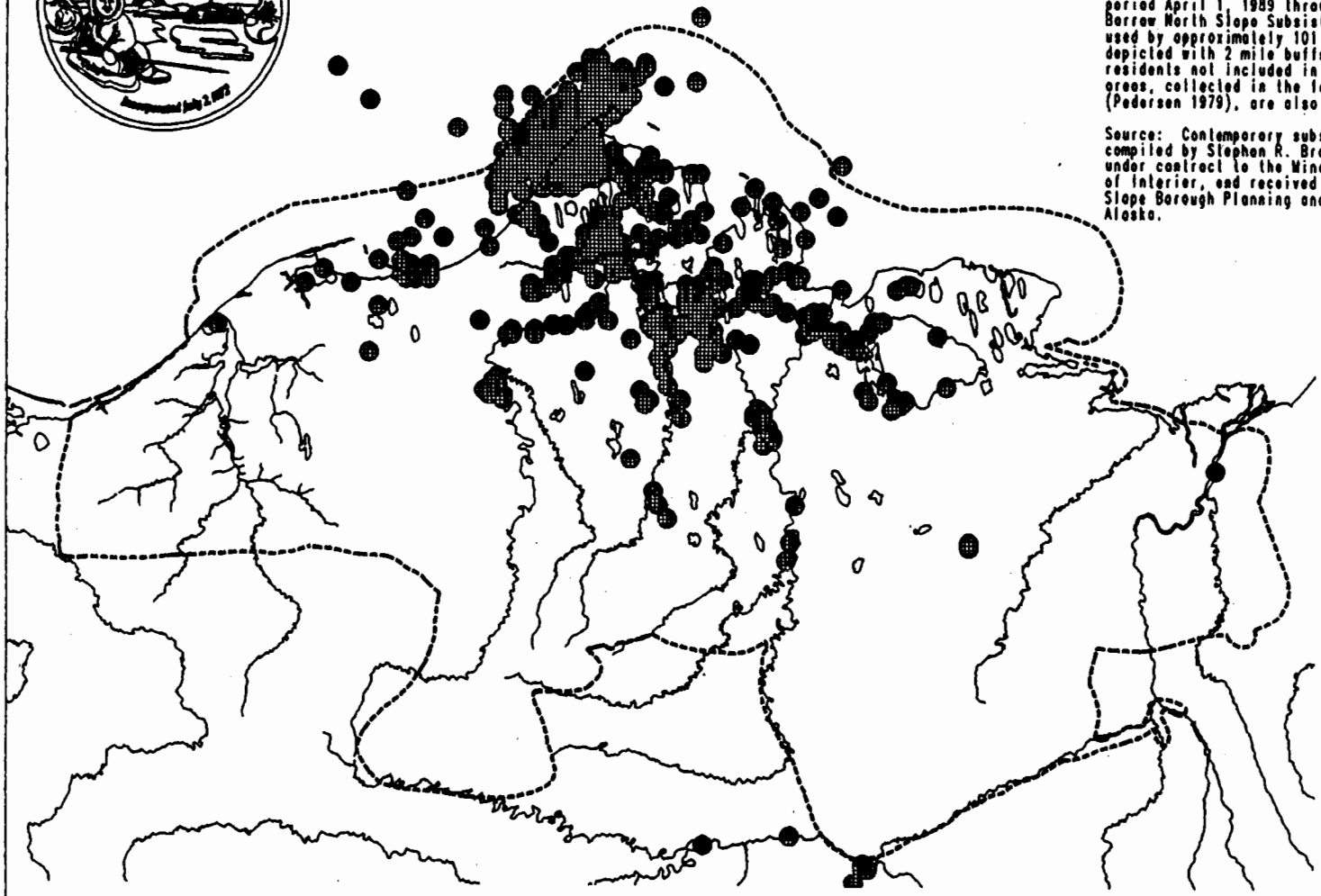
Source: Contemporary subsistence use information gathered and compiled by Stephen R. Braund and Associates (SRB&A). SRB&A is under contract to the Minerals Management Service, U.S. Department of Interior, and received assistance in the study from the North Slope Borough Planning and Wildlife Management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

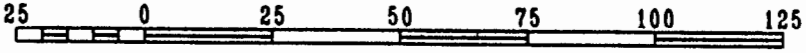
LEGEND INFORMATION

Lifetime community land use (Pedersen 1979).

All Species Harvested

Seals, walrus, polar bear, bowhead whale, caribou, moose, fox, ground squirrel, fish, geese, eiders, other ducks, loons, ptarmigan, cranes, swans, clams, berries, greens, water





MILES

Map Production: North Slope Borough GIS

Date: April 11, 1991

MAP C-2
NORTH SLOPE SUBSISTENCE STUDY - BARROW
SUBSISTENCE HARVEST SITES BY MAJOR RESOURCE CATEGORY, YEAR THREE

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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

- Marine Mammals: Bowhead whale, seals, walrus, polar bear
- Terrestrial Mammals: Caribou, moose, fox ground squirrel
- Fish: Whitefish, other freshwater fish, salmon, other coastal fish
- Birds: Eiders, other ducks, geese, ptarmigan, loons, cranes, swans

Map Production: North Slope Borough GIS

Date: April 15, 1991

25 0 25 50 75 100 125

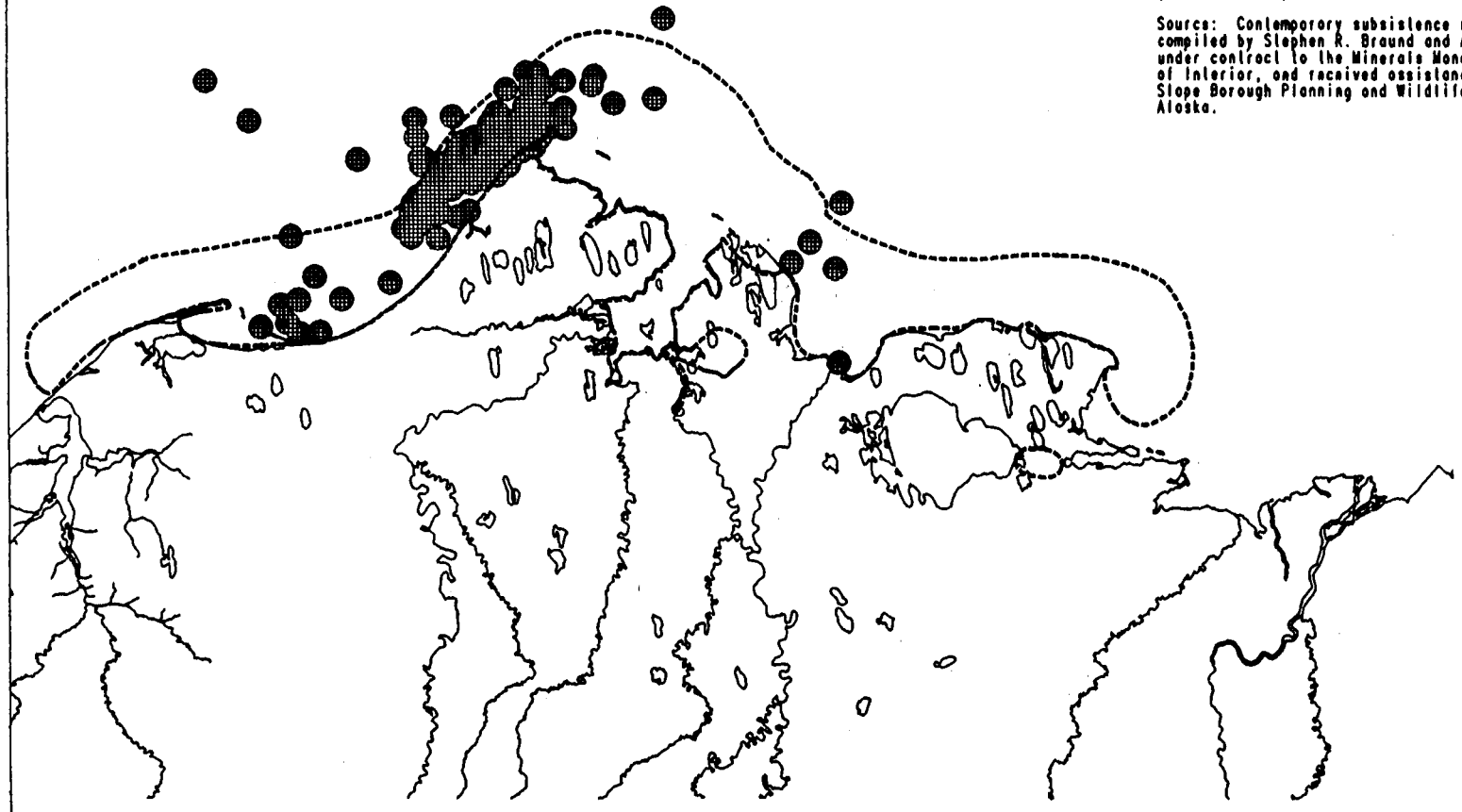
MILES

N

MAP C-3
NORTH SLOPE SUBSISTENCE STUDY - BARROW
MARINE MAMMAL HARVEST SITES - ALL SPECIES, YEAR THREE

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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
- Bearded seal
- Ringed seal
- Spotted seal
- Ribbon seal
- Bowhead whale
- Walrus
- Polar bear

30 0 30 60 90

MILES

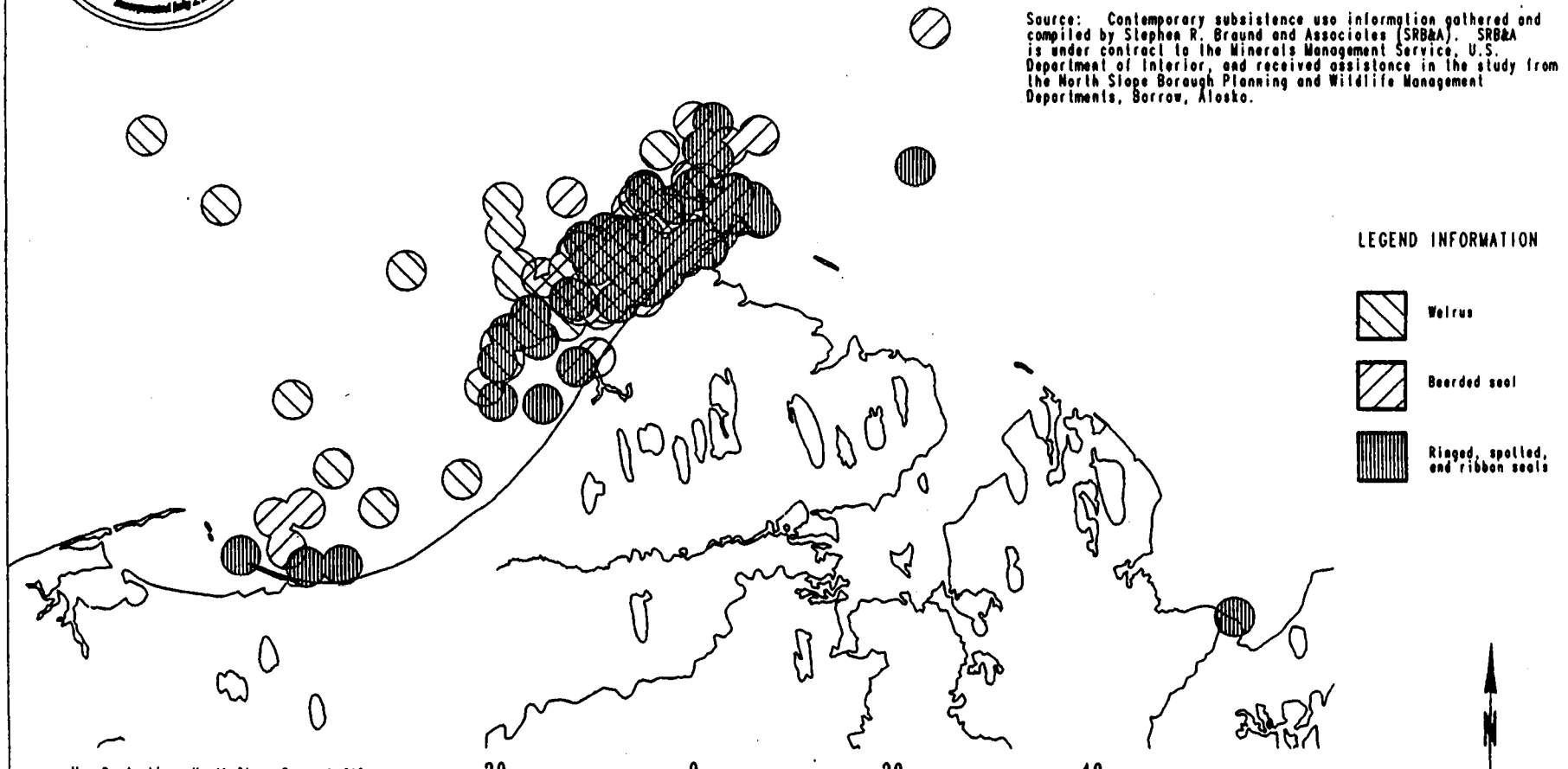
Map Production: North Slope Borough GIS

Date: April 11, 1991

MAP C-4
NORTH SLOPE SUBSISTENCE STUDY - BARROW
MARINE MAMMAL HARVEST SITES BY SPECIES, YEAR THREE: WALRUS AND SEALS

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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.



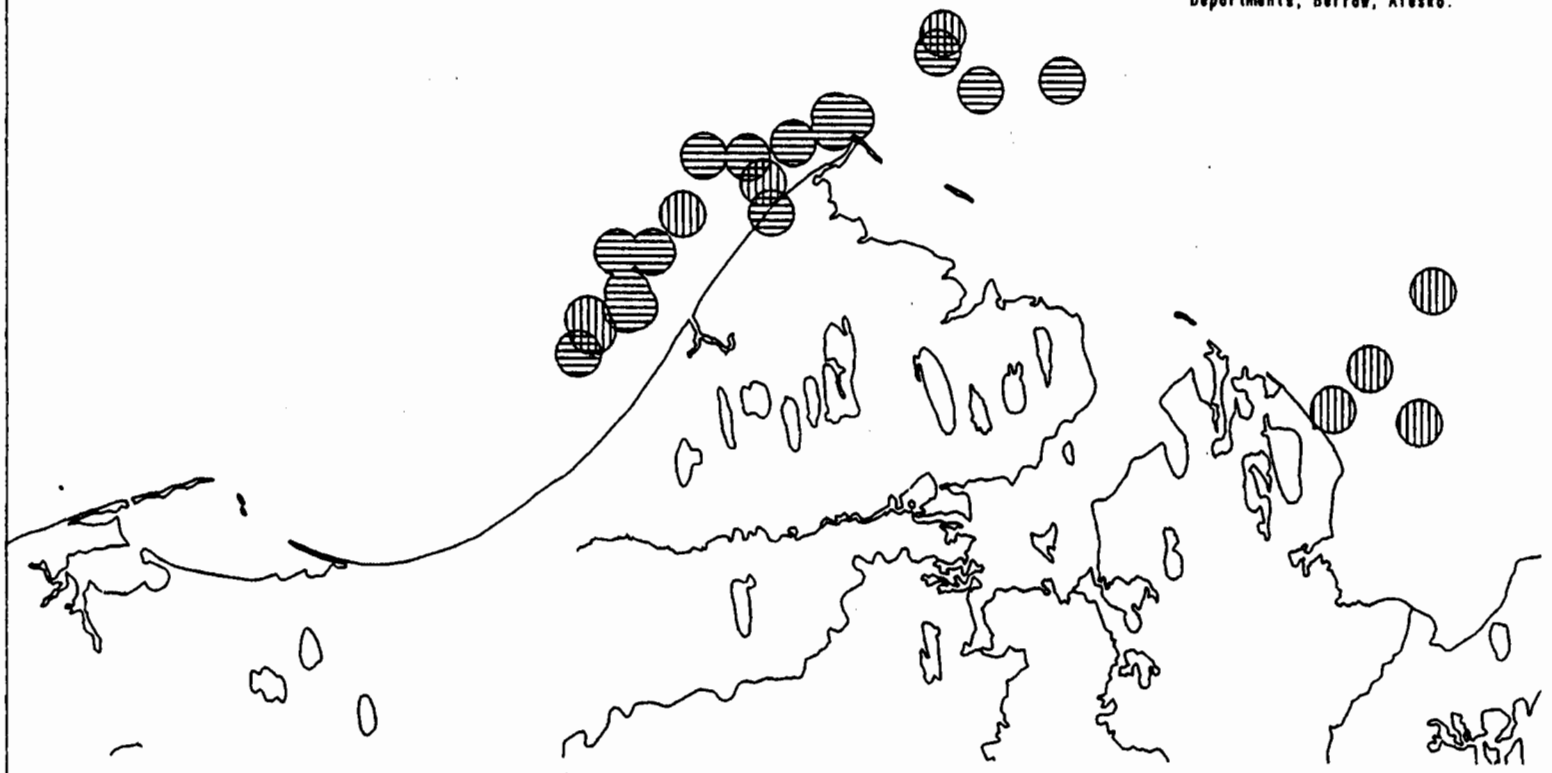
Map Production: North Slope Borough GIS

Date: April 11, 1991

MAP C-5
NORTH SLOPE SUBSISTENCE STUDY - BARROW
MARINE MAMMAL HARVEST SITES BY SPECIES, YEAR THREE: BOWHEAD WHALE AND POLAR BEAR

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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.



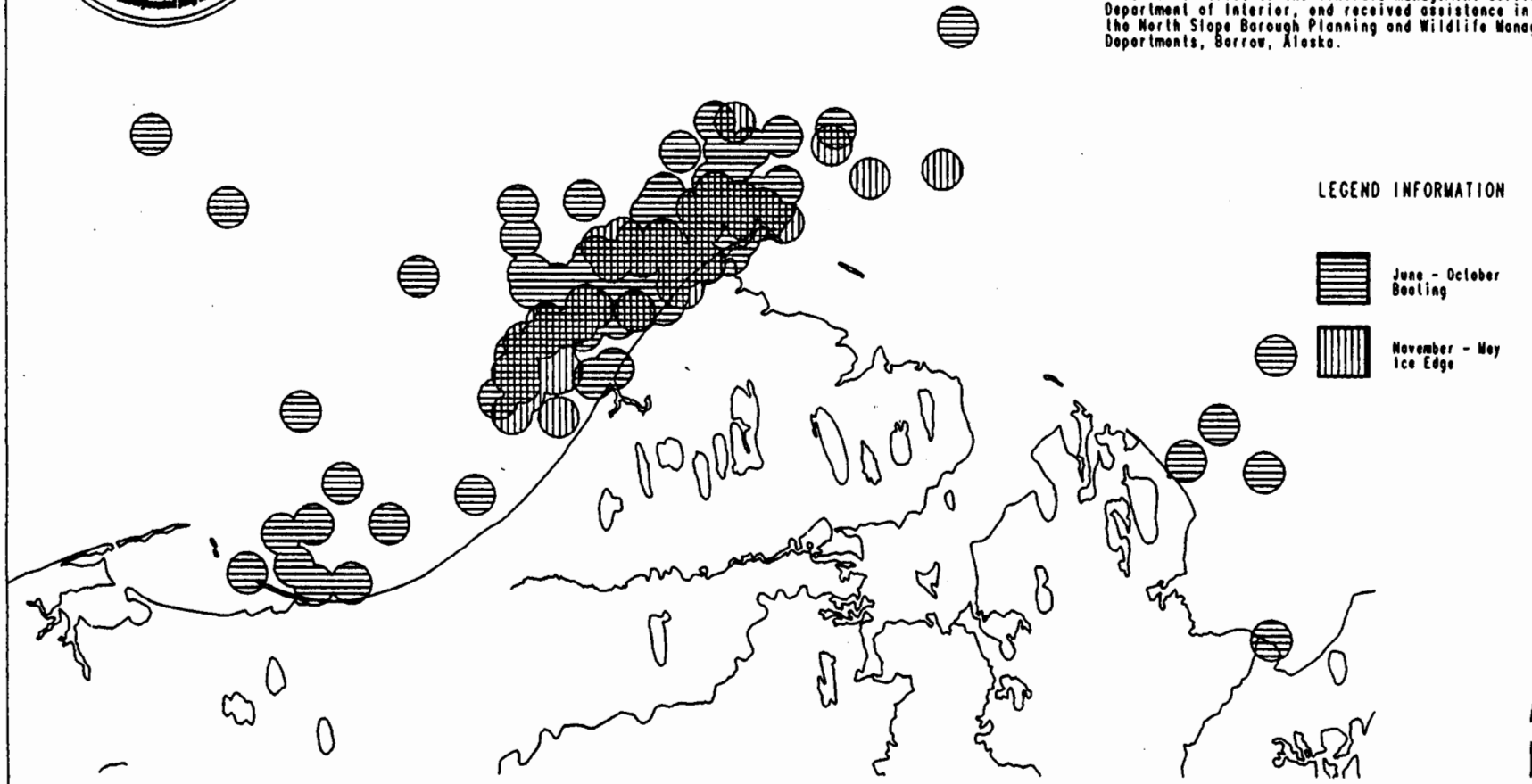
Map Production: North Slope Borough GIS

Date: April 11, 1991

MAP C-6
NORTH SLOPE SUBSISTENCE STUDY - BARROW
MARINE MAMMAL HARVEST SITES BY SEASON, YEAR THREE

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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.



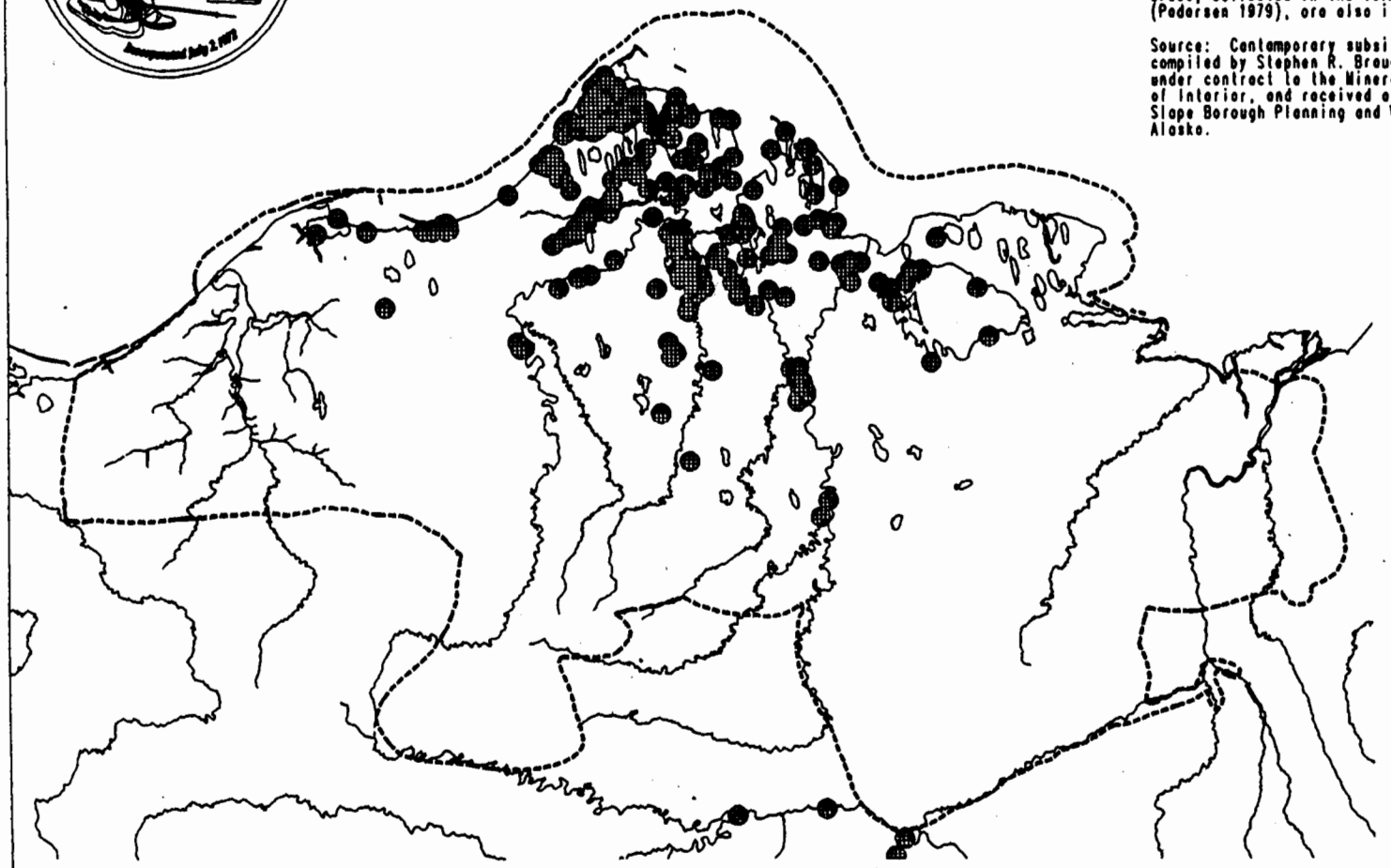
Map Production: North Slope Borough GIS

Date: April 11, 1991

MAP C-7
NORTH SLOPE SUBSISTENCE STUDY - BARROW
TERRESTRIAL MAMMAL HARVEST SITES - ALL SPECIES, YEAR THREE

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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).

Terrestrial Mammals
- Caribou
- Moose
- Fox
- Ground squirrel

N

25 0 25 50 75 100 125

MILES

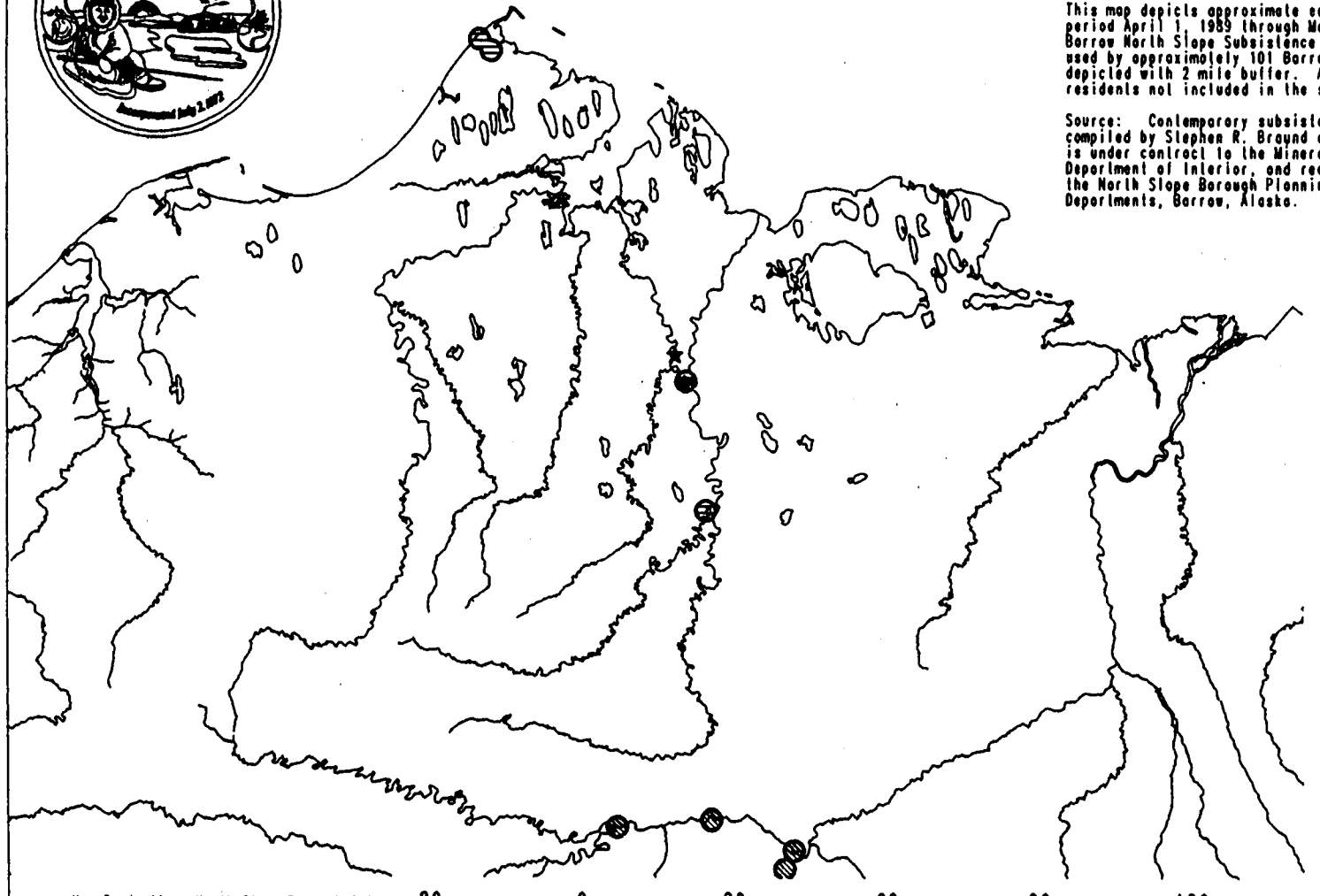
Map Production: North Slope Borough GIS

Date: April 11, 1991

MAP C-8
NORTH SLOPE SUBSISTENCE STUDY - BARROW
TERRESTRIAL MAMMAL HARVEST SITES BY SPECIES (EXCLUDING CARIBOU), YEAR THREE

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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

- Moose
- Fox
  - Arctic
  - Red
- ★ Ground squirrel

Map Production: North Slope Borough GIS

Date: April 11, 1991

30 0 30 60 90 120

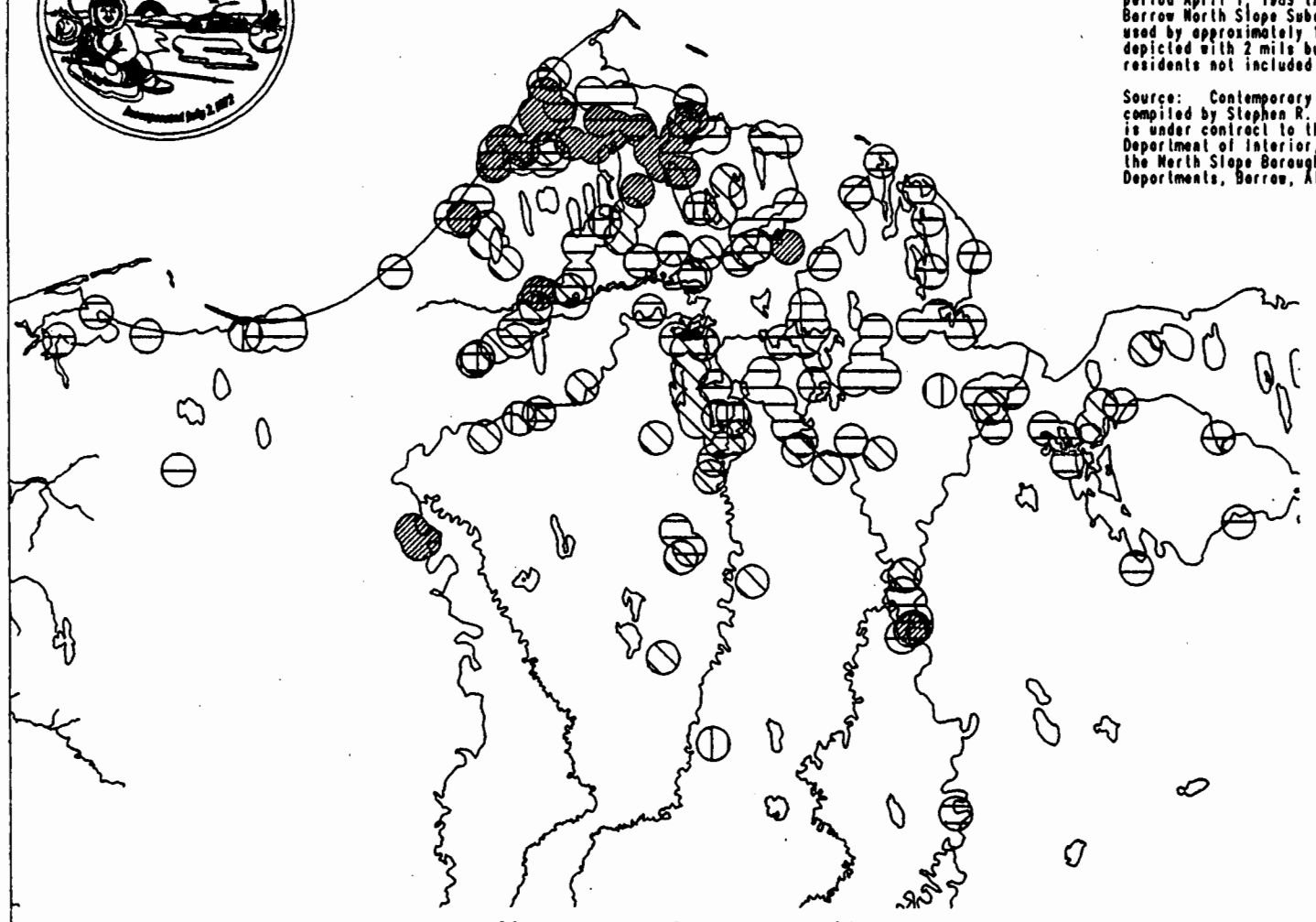
MILES

N

MAP C-9
NORTH SLOPE SUBSISTENCE STUDY - BARROW
CARIBOU HARVEST SITES BY SEASON, YEAR THREE

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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 1989
- July, August, September 1989
- October, November 1989
- December 1989, January, February, March 1990

20 0 20 40 60

MILES

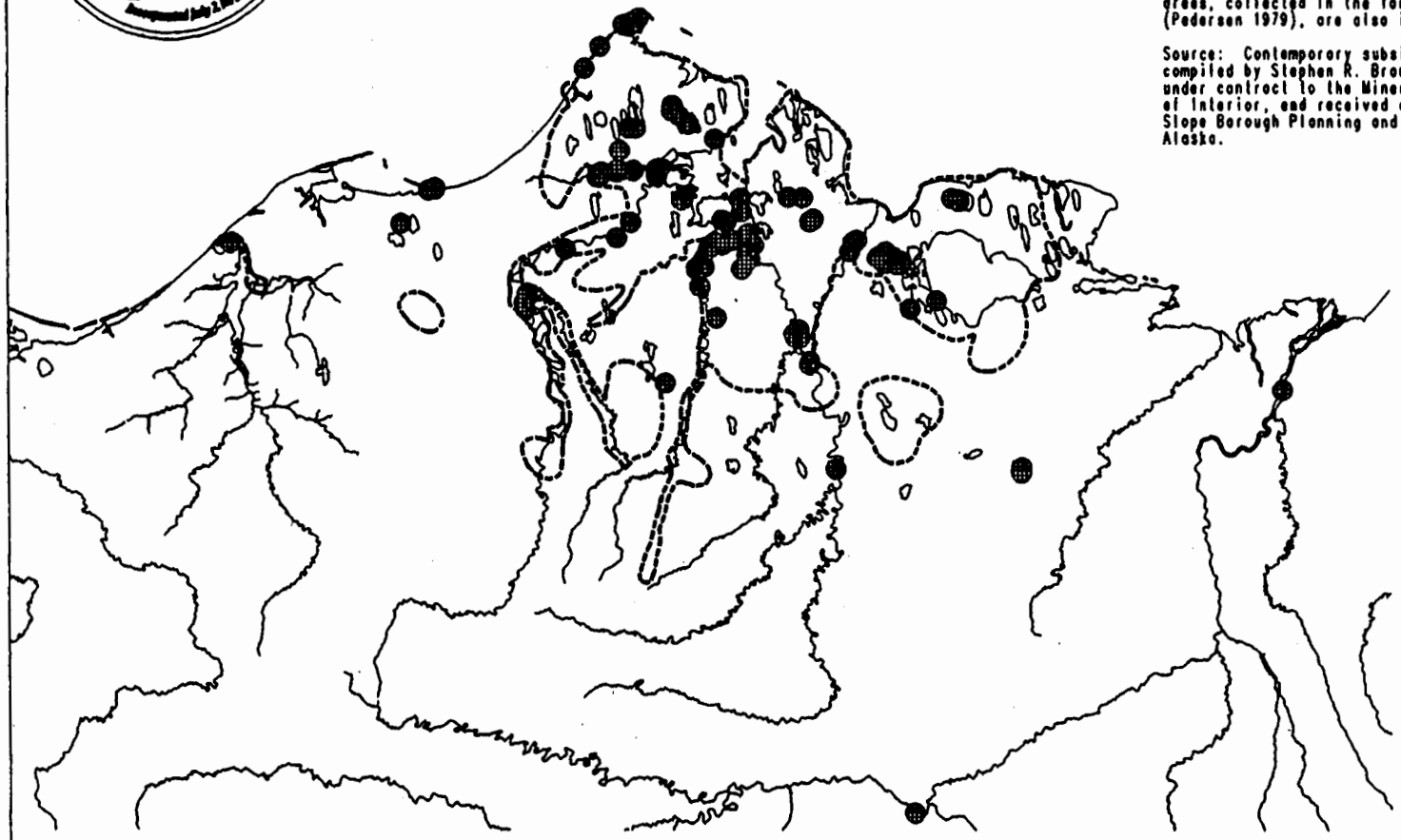
Map Production: North Slope Borough GIS

Date: April 11, 1991

MAP C-10
NORTH SLOPE SUBSISTENCE STUDY - BARROW
FISH HARVEST SITES - ALL SPECIES, YEAR THREE

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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
  Capelin, arctic cod, rainbow smelt

N

25 0 25 50 75 100 125

MILES

Map Production: North Slope Borough GIS

Date: April 11, 1991

MAP C-11
NORTH SLOPE SUBSISTENCE STUDY - BARROW
FISH HARVEST SITES BY SPECIES GROUPS, YEAR THREE

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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: Capelin, arctic cod, rainbow smelt

20 0 20 40 60

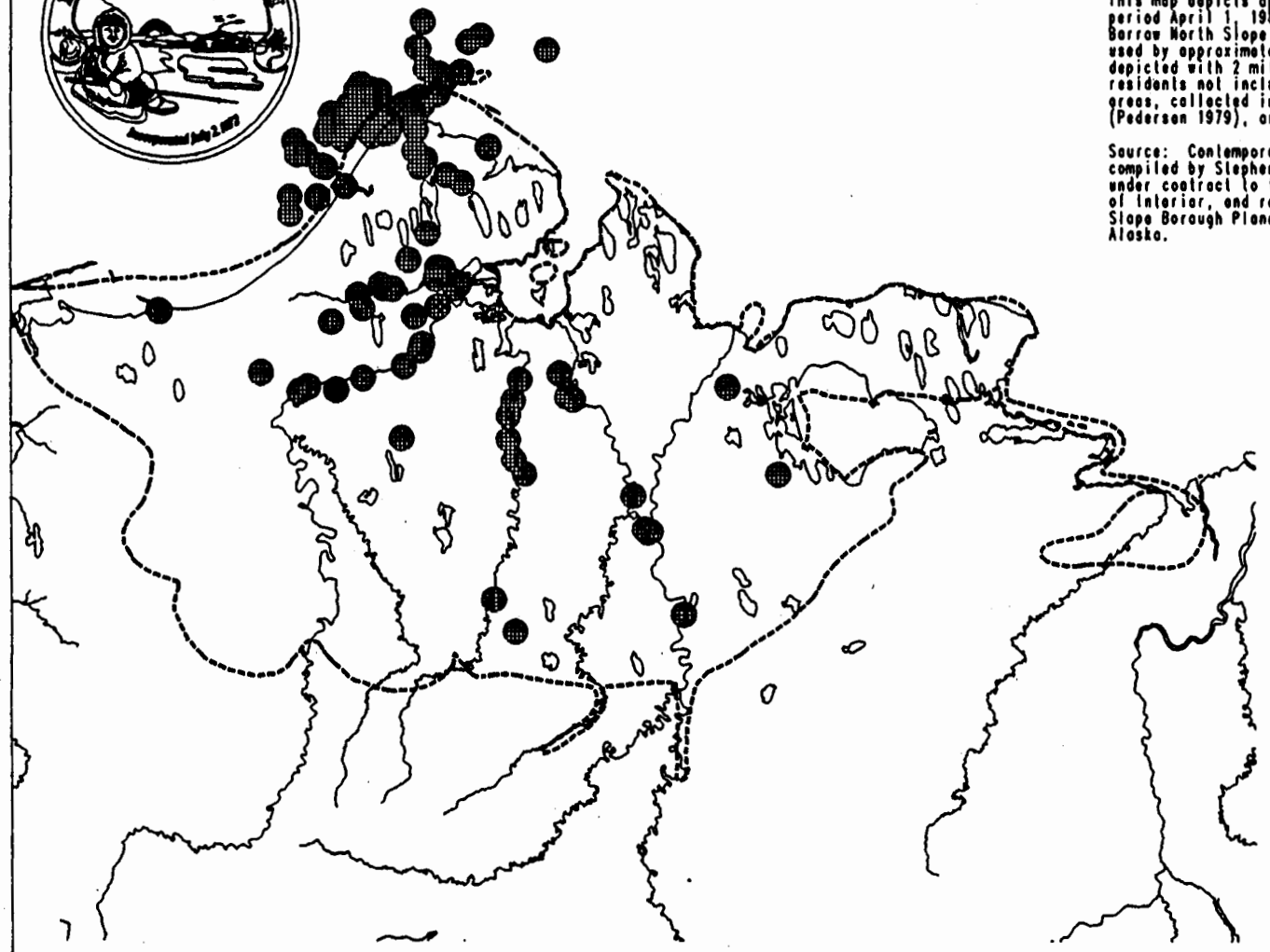
MILES

N

Map Production: North Slope Borough GIS

Date: April 11, 1991

MAP C-12
NORTH SLOPE SUBSISTENCE STUDY - BARROW
BIRD HARVEST SITES - ALL SPECIES, YEAR THREE



This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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).

Birds
- Eiders
  Common, king, Steller's
- Other ducks
  Oldsquew, surf scoter
- Geese
  White-fronted goose, black brant, lesser snow goose, Canada goose
- Ptarmigan
- Red throated loons
- Sandhill cranes
- Tundra (whistling) swans

Map Production: North Slope Borough GIS

Date: April 11, 1991

30 0 30 60 90

MILES

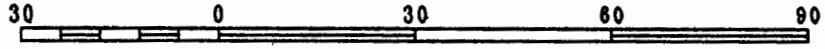
MAP C-13
NORTH SLOPE SUBSISTENCE STUDY - BARROW
BIRD HARVEST SITES BY SPECIES, YEAR THREE

This map depicts approximate subsistence harvest sites for the time period April 1, 1989 through March 31, 1990: Year Three of the Barrow North Slope Subsistence Study. Harvest sites shown were used by approximately 101 Barrow households. All harvest sites are depicted with 2 mile buffer. 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). 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

- Sandhill cranes and tundra (whistling) swans
- Eiders
- Other ducks (includes loons)
- Geese
- Ptarmigan



Map Production: North Slope Borough GIS

Date: April 11, 1991

APPENDIX D: METHODOLOGY

This appendix details the methodology used in Barrow to collect comprehensive community harvest data by species and location as well as selected household characteristics over the course of the three study years. This methodology is presented in two main sections. The first section describes the basic design elements of the field methodology, including some of the problems encountered and adjustments made in the course of implementing this design. As well, some of the study statistics are reported in this section, such as the number of households in the study and the number of harvest discussions conducted each year. The second section describes the data coding and processing procedures. Additional discussions of study design and method are found in the first two chapters of the report. References for this appendix are found in the References Cited section at the end of the main part of the report (immediately preceding Appendix A).

DATA COLLECTION DESIGN AND IMPLEMENTATION

The research design for this study developed from the answers to five fundamental questions:

1. What data are to be collected?
2. From whom will the data be collected?
3. How will the data be collected?
4. How often must the data be collected?
5. How will the data be analyzed?

This section presents the study design decisions made by the study team in consultation with the MMS and describes the implementation of the study design with respect to the first four questions listed above. The fifth design element concerning analysis of the data is addressed in the second half of this appendix under Data Coding and Processing.

Data Variables

As described previously in this report, the primary information sought in this study were numeric and mapped data about Barrow residents' subsistence harvests, including details about the species harvested, quantity harvested, date of harvest, and number of participants in each harvest. Secondarily, the study team sought to obtain a few descriptive variables about Barrow households, such as household size, ethnicity, income, and person-months of employment. The study team developed forms for recording the data to facilitate coding and processing. A more detailed explanation of the data variables, including the mapped data, is presented below in Data Coding and Processing.

Data Source

This aspect of the research design has two components: definition of the sampling unit (i.e., from whom did we opt to get our data?), and the number of sampling units to be contacted in data collection. Discussions of both of these aspects follow.

The Sampling Unit

The study team selected the household as the most logical sampling unit (see SRB&A and ISER 1988, Appendix). A number of different sampling units were considered, including the individual harvester, the nuclear family, the household, and several different concepts of productive economic units revolving around the extended family. The advantages and disadvantages of each of these possible sampling units were assessed in terms of both time and cost efficiency and the overall goals of the project. After careful consideration, the study team settled on the household as the sampling unit.

The household is a convenient, easily defined entity that has been used in past censuses and other studies. Hence, data on the household level would allow easy comparison with previously collected data. The use of households as the sampling element, however, involved compromises. Inupiat communities place greater importance on the extended family as the primary social and economic unit than on the household or nuclear family. Consequently, contemporary

Inupiat households create somewhat artificial boundaries within the extended family that do not necessarily reflect functional or productive economic units. In fact, field observations suggest that hunters generally functioned in groups that changed in size and composition depending on the species sought, time available, and traditional aspects of hunting party formation. These hunting parties generally divided the harvest among themselves such that, in some cases, the individual hunter had difficulty reporting a discrete number of animals as his household's share. Although records were kept by household, participant observation and key informant discussions frequently allowed the study team to verify subsistence data based on field knowledge of the economic unit in question. Understanding who hunted with whom (to the extent possible) aided in filling in data gaps and in the verification of sometimes difficult to remember harvest dates and amounts.

Despite the disadvantages, the benefits of ease of implementation (i.e., more easily defined than economic units), efficiency (i.e., fewer sampling units than if individuals were used), and comparability (i.e., ability to compare results with other studies based on households) convinced the study team that the household was the best sampling unit.

Selecting the Sample

The community of Barrow was so large (approximately 3,000 people who lived in 937 households) that conducting this study with all Barrow households was not possible. The study team chose a stratified sample design to identify a representative number of Barrow households to be included in the study. In a stratified sample, households are grouped into categories (strata). The particular form of stratified sample design employed in this study is called a "disproportionate stratified probability sample." Households in some categories were assigned a greater chance of being selected than households in other categories. Within each stratum, households were selected randomly. The sample was based on the 1985 NSB census which enumerated 937 households in Barrow.

By using a disproportionate stratified probability sampling method, the study team was able to produce unbiased estimates of resource harvest activity that were more reliable than estimates that could have been generated from a

comparably sized simple random sample or even from a comparably sized stratified sample in which sampling rates were constant across strata. In addition, the sampling approach employed in this study yielded a sufficiently large sample of active resource harvest households to examine separately their harvest activity patterns and household characteristics.

In this study, the categories, or strata, were intended to correspond to different levels of resource harvest activity. The method for stratifying Barrow households was based on a household member's own perceptions about the harvest of subsistence foods by their family. Five sampling strata were initially defined for Barrow corresponding to five possible answers to a question asked in a 1985 census of Barrow residents (NSB Department of Planning & Community Services 1985). The 1985 North Slope Borough census question number 67 read:

> How much of your own food would you say you and your family hunted, fished, or gathered for yourselves this year -- all of it, most of it, about half of it, some of it, or not any of it?

Assurances of confidentiality prevented the North Slope Borough from providing the study team with a list of households and their responses to the subsistence question. However, with the cooperation of the History, Language, and Culture Division within the North Slope Borough Planning Department, the households were stratified by their response to the above question, and a sample was drawn from each stratum using procedures which protected the confidentiality of responses to the 1985 census. The sampling technique occurred as follows:

1) North Slope Borough planning staff used the responses to the census question to assign each household in Barrow to one of five categories (i.e., the five possible responses to the question).

2) They informed the study team of the number of households within each stratum. The study team used this information to provide the Borough with instructions on how to draw samples from each stratum. These instructions were applied to an alphabetized and numbered listing of households in each stratum. The instructions included the list number of the first household to be sampled and the number of households counted to reach the next sample household (i.e., the

sampling interval). For example, selection of every other household would occur with a sampling interval of two.

The sampling interval varied across the strata. The sampling interval ranged from two to 32 (i.e., every second household and every thirty-second household). A sampling interval of two was used to select households from the stratum including all households previously reporting that "all" their food came from subsistence harvest activities. A sampling interval of 32 was used to select households previously reporting that "not any" of their food came from subsistence harvest activities. Sampling intervals of four, six, and 12 were used in the intermediate strata.

3) Borough planning staff selected the sample from each stratum and combined the names of all selected households on a single alphabetized list. It was therefore not possible to infer a household's response to the 1985 census question from the final sample list.

4) North Slope Borough staff then contacted the sample households to describe the study and to request the cooperation of the household.

5) A member of the study team subsequently contacted each household that had agreed to participate in the study. At that time, researchers asked each household to answer the 1985 census question again and to explain their answer. Their responses helped the study team to assess the usefulness of the question in drawing future samples. Their response did not affect the chance the household had of being selected. Regardless of how a household's actual harvest level diverged from their 1985 response to the census question, the integrity of the sample was preserved; households were not reassigned to new strata.

Thus, stratum one initially consisted of households that reported (in the 1985 census) getting all their food from hunting and fishing. Households that reported getting most of their food from subsistence activities were grouped in

stratum two. Stratum three contained households reporting that half their food came from hunting and fishing. Stratum four contained households reporting that some of their food came from subsistence and stratum five contained households that said none of their food came from subsistence activities. One hundred and seven households (11 percent) did not respond to the 1985 census question used to stratify all households in Barrow. Households not responding to the question and households not asked the question because they did not exist in 1985 were assigned to a sixth sample stratum. Every sixth household in this stratum was selected.

The study team found that the word "family" was interpreted by some respondents in 1985 to mean the extended family unit. Some of these respondents harvested no subsistence foods themselves, depending exclusively on the harvests of relatives in another household. If these respondents reported that "all" their food came from the subsistence activities of their [extended] "family," they were included in the most active sampling stratum. Their inclusion in this stratum meant that they had a greater chance of being selected than the study team intended, since the effort expended to include them in the study would not significantly increase the reliability of harvest estimates for the community as a whole. The representativeness of the sample was not affected, however, since representativeness depends exclusively on a strict adherence to the rule of equal chance of selection within each stratum. This rule was followed rigorously.

The fieldwork plan for Barrow data collection was designed with the understanding that the practical exigencies of fieldwork might require modifications to the original study design. During the first year of data collection, the study team learned that the original sample design would not reliably capture all harvest activities due to the concentration of some of these activities among a few households in the community, some of which were not in the original study sample. The reliability of harvest estimates is increased if those households accounting for the greatest harvest activity are given a higher chance of selection in the overall sample (i.e., compared to households in other strata that harvest less). Therefore, the original sample design was modified in consultation with the MMS by adding a seventh stratum for those households that were not selected in the initial sampling and that

contributed substantially to the community harvest total. These whaling captains and other highly active households were "self-representing" in that all were selected for inclusion in the study. It was not necessary or possible to generalize their harvest figures to other households in Barrow because these households were added after the original stratification and sampling of Barrow households. This seventh stratum of whaling captains and other active hunters became stratum one, while the original stratum one (households reporting getting all of their food from hunting and fishing) became stratum two, and so on. (The new strata one and two could not simply be combined because of the different sampling frames applied to each.) The reason that households in some strata had a greater chance of selection than households in other strata was that, with limited resources, we wanted to concentrate more time on interviewing households active in subsistence and spend less time interviewing households that were inactive. Hence, we stratified the households and selected a greater number from the higher (more active) strata. Table D-1 summarizes the final sample design.

All community households were grouped according to their strata assignment in the first column in Table D-1. The second column shows the number of households in each stratum. The third column shows the attempted sampling frequency for households in each stratum. In stratum one, for example, each household initially had a probability of one in one of being selected. A household assigned to stratum six, in contrast, initially only had one chance in 32 of being selected. The number of households initially selected from each stratum is shown in the fourth column. Of the 149 selected households, 11 had moved from Barrow between the 1985 census and the beginning of the study in 1987. Thus, 138 households were eligible for selection.

Any longitudinal study faces the problem of "sample mortality", or the loss of sample households from the study. In this case, the major reason households dropped from the sample was that they moved out of the community. Of the 149 households selected from the 1985 borough census records, 11 had moved from Barrow before the study began in 1987. During the course of the three year study, an additional 20 households moved from Barrow. Thus no data were available for 7.4 percent of the original sample, and only partial data were available for an additional 13.4 percent of the original sample. Of the

TABLE D-1: SUMMARY OF SAMPLE DESIGN BARROW, YEARS ONE, TWO AND THREE

Sample Strata	Number of HHs in Strata	Attempted Sampling Frequency	Initial Sample Size	Final Sample Size	Achieved Sample Frequency	Sample Weight
(1) Whaling Captains & Other Highly Active Households	48	1 in 1	48	40	1 in 1.2	1.20
Strata based on response to 1985 Census Question						
(2) All food	45	1 in 2	22	13	1 in 3.46	3.46
(3) Most food	67	1 in 4	17	14	1 in 4.79	4.79
(4) About half food	85	1 in 6	14	7	1 in 12.14	12.14
(5) Some food	222	1 in 12	19	12	1 in 18.5	18.50
(6) Not any food	360	1 in 32	11	5	1 in 72	72.00
(7) Unknown	110	1 in 6	18	10	1 in 11	11.00
TOTALS:	937		149	101		

Source: Stephen R. Braund & Associates, 1993

remaining 118 households, 12 declined to participate at the outset of the study, and an additional five decided to drop from the study during the three years of data collection.

A decision had to be made as to whether to include households for which data were not available for the entire three year study period in the final report of community harvests over three years. One purpose of the study was to observe variations in harvest patterns and harvest levels over time. There were several possible sources for this variation: presence of wildlife, favorable environmental conditions for hunting and fishing, favorable personal circumstances for hunting and fishing (e.g., time, health, equipment, gas), and changes in the number of households in the community. One approach to the study design would have been to let all factors contributing to variations in harvest level vary. This means that households which harvested fish and game for only part of a year or for a subset of study years would contribute to study harvest estimates. The sample design would also have to identify and sample new households.

In fact, however, it proved impossible to reliably identify, stratify, and sample new households since they were few in number and dispersed throughout the community. To include part year households that left the community and not include new households would produce underestimates of community harvest levels and mean household and per capita harvest levels. Since one interest in the multi-year study design was to observe the effects of environmental differences on harvest levels, it was best to hold the number of sample households constant over the three year period, and to report community harvest levels as if the population of the community remained constant. All study results reported are based on the same 101 households who participated in all three years of the study (column five). These households represent 86 percent of all sample households present in Barrow for the three year period.

Column six in Table D-1 shows the achieved sampling frequency for households in each stratum. In stratum two, for example, each household had a probability of one in 3.46 of being included in the final sample. In contrast, a household in stratum six had one chance in 72 of being in the final sample.

Column seven of Table D-1 displays the weights that were applied to sample data to properly represent community harvest totals. The weights are calculated by dividing the total number of households in each stratum by the final number of sample households in each stratum.

In short, the study team followed careful procedures and adjusted the sampling approach to provide the best possible method for generalizing sample data to the population as a whole. We chose households by random selection within each stratum; we selected with a greater frequency in strata with higher harvesters (based on the 1985 census question); we added a seventh stratum (stratum one) to ensure that we captured very active households; we kept the stratum one households self-reporting as they were chosen after our initial sampling; and, finally, we carefully weighted the answers in each stratum to reflect properly our disproportionate sampling in those strata.

Reliability of The Barrow Sample Results

As discussed above, the Barrow sample was designed as a disproportionate stratified probability sample. Strata associated with higher levels of expected harvest activity were sampled with higher selection probabilities. The intent of this procedure was to increase the reliability of sample results over that expected from a simple random sample or even a stratified sample in which each stratum was sampled with the same probability.

To estimate the reliability of the sample it is necessary to know something about the mean and variance of specific results by strata. The means and variances displayed in Table D-2 (a copy of the same table was introduced in the main body of the text as Table 8) are properly "weighted" to take into account the different probabilities of selection between strata. They are derived from the means and variances of the separate strata. The mean pounds harvested by each stratum for a given resource category (e.g., marine mammals) was calculated as follows:

TABLE D-2: TOTAL HARVEST ESTIMATES BY MAJOR RESOURCE CATEGORY - ALL BARROW HOUSEHOLDS, THREE YEAR AVERAGE (1,2)

RESOURCE	CONVERSION FACTOR (3) (Usable Weight Per Resource in lbs)	COMMUNITY TOTALS		AVERAGE POUNDS HARVESTED		PERCENT OF TOTAL USABLE POUNDS HARVESTED	PERCENT OF ALL BARROW HSEHOLDS HRVSTING RESRCE (4)	SAMPLING STATISTICS				
		NUMBER HARVESTED	USABLE 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 (5)	n/a	n/a	386,153	412.1	128.0	55%	48%	18	36	376	448	9%
Terrestrial Mammals	n/a	n/a	211,861	226.1	70.2	30%	54%	31	61	166	287	27%
Fish	n/a	n/a	79,355	84.7	26.3	11%	41%	10	19	65	104	23%
Birds	n/a	n/a	24,720	26.4	8.2	4%	53%	4	8	18	34	30%
Other Resources	n/a	n/a	572	0.6	0.2	0%	7%	0	1	0	1	0%
Total (5)	n/a	n/a	702,660	749.9	233.0	100%	68%	50	99	651	848	13%

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(1) Three years of study: April 1, 1987 - March 31, 1990.

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

(3) See Table D-5 for sources of conversion factors.

(4) This percentage is a cumulative total for the three study years rather than an annual average.

(5) 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, 1993

$$\bar{y}_{h0} = \frac{1}{n_h} \sum_{i}^{n_h} y_{hi}.$$

where: y_{hi} is the number of pounds harvested by household "i" in stratum "h".

n_h is the number of households in stratum "h".

The variance of the mean for each stratum was calculated as follows (Kish 1967, p.81):

$$\text{var}(\bar{y}_{h0}) = (1 - f_h)\frac{s_h^2}{n_h}, \qquad \text{where } s_h^2 = \frac{1}{n_h - 1}\left(\sum_{i}^{n_h} y_{hi}^2 - \frac{y_h^2}{n_h}\right).$$

The weighted mean was calculated as follows (Kish 1967, p.81,3.3.1):

$$\bar{y}_{w0} = \sum_{h}^{H} W_h \bar{y}_{h0} = \sum_{h}^{H} W_h \frac{1}{n_h} \sum_{i}^{n_h} y_{hi}.$$

where: W_h is the relative size of stratum "h", in this case expressed as the proportion of all households in the community assigned to stratum "h" for sampling purposes.

In the case of terrestrial mammals, the weighted mean is 226.1 pounds per household.

It was also necessary to combine the variances of the stratum means (Kish 1967 p.81,3.3.2):

$$\text{var}(\bar{y}_{w0}) = \sum W_h^2 (1 - f_h)\frac{s_h^2}{n_h}.$$

where: f_h is the sampling fraction (column 3 of Table 1) of stratum "h".

In this case, the weighted estimated variance of the sample mean is 961. The estimated standard deviation of the mean is the square-root of 961, or 31. The standard error can be used to express the reliability of sample results as a confidence interval around the sample mean. At a 95 percent level of confidence, the sampling error of the mean estimated pounds of terrestrial mammals harvested between April 1, 1987 and March 31, 1990 is 1.96 times the standard deviation, or:

226 Lbs. ± 1.96 * 31 Lbs., or 61 Lbs.

Differences in harvest activity patterns result in differences in the reliability of sample means across harvest categories. The best way to compare the reliability of sample means is to examine the sampling errors as percentages of their respective means. The last column of data in Table D-2 compares these figures for the major resource categories. The reliability of the sample means for marine mammals, terrestrial mammals, fish, and all resources combined is consistent with those achieved by other studies of harvest activity employing disproportionate stratified sampling techniques (Kruse et al. 1988). The sample means for birds and other resources are of lower reliability. Note, however, that these resource categories contribute relatively little to the overall community harvest.

The 1985 borough census question used to group households according to their level of subsistence harvest activity proved to be an imperfect measure. Some households reporting that all their food came from their "family's" harvest activities apparently interpreted the word family to include extended family members living in other households. Other households apparently experienced a change in household composition or circumstances that affected its level of harvest activity. As a result, some households were grouped for sampling purposes inappropriately. While such misclassification makes the sample less efficient in producing harvest estimates, it does not make the sample any less representative of all Barrow households. As long as the sample weight attached to all households in each sample stratum is the same, the requirements for a probability sample are met. Even if a household was misclassified, it is still possible to generalize to the entire community but it simply increases the sampling error. The sampling error is still lower, however, than what would have resulted if simple random sampling techniques had been used. Sampling error as a percentage of the mean is a statistic presented with each harvest estimate and serves as an indicator of the reliability of a specific piece of data. The lower the sampling error, the more reliable the data.

Data Collection Method

The study team decided that the best way to collect the desired data (both harvest data and household characteristics) would be through periodic visits with the study households throughout the three study years ("key informant discussions"). These discussions originally were designed to be conducted by local research assistants (RAs) under the supervision of the full-time field coordinator in Barrow. Their objective would be to contact each household periodically and ask the key informant in that household about all their successful harvests. Indeed, the presence of a full-time field coordinator in the community proved essential to the success of this project. With RAs, the field coordinators' presence was necessary to supervise the RAs and keep their data collection work on track; the field coordinators also were actively involved in collecting data even with RAs on staff. Without RAs, the field coordinators needed to be in the community to collect all the data themselves. Tim Holmes resided in Barrow as a full-time field coordinator from March 1987 through July 1989. Karen Brewster moved to Barrow in July, was trained by Holmes, and assumed the position of field coordinator for the remainder of Year Three. Holmes hired several RAs to help with the harvest data collection; however, the field coordinators ultimately conducted the major portion of the data collection.

Recruiting qualified RAs committed to staying with the project was one of the more challenging problems faced in the data collection phase of the project. During Years One and Two, a total of 17 local RAs were hired. Of those, eight worked for more than a month. Other jobs lured several RAs away and the difficult nature of the work frustrated some RAs. Contact frequency was best during periods when the RA staff was stable as they acquired the expertise and confidence to conduct harvest discussions efficiently. Their steady work also allowed the field coordinator to spend the time necessary to edit, code, and process data instead of searching for, hiring, and training RAs.

The RAs were hired through the NSB Mayor's Job Program. The program instituted a hiring freeze on May 1, 1989 and the program was ended June 30, 1989. This project had employed no RAs since February 1989 (Year Two). Hence, in Year Three, no RAs were involved in the project and all data were collected by the field coordinator.

Key Informant Discussions

The first harvest discussion covered harvests during the time period from April 1, 1987 to the day of the researcher's first visit to the household. (The word "visit," in this context, refers to a visit for the purpose of data collection.) The next harvest discussion covered the time period from the last visit to the current visit, and so on. The last visit covered the time period from the prior visit to this household through March 31, 1990. Field researchers attempted to discuss each household's harvest activity with the most active hunter in the household during the periodic data collection visits. 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.

During each visit, the key informant for that household reported the harvest activities of all household members. Primary data items reported by species were harvest site and number killed. 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 also recorded any anecdotal information regarding weather, comparisons with previous harvests, observations on animal health or populations, or similar topics.

The researchers usually recorded the harvest activity data directly on the data coding forms (harvest activity sheets) or occasionally in field notebooks. The household's harvest locations were marked directly onto blueline copies of United States Geological Survey (USGS) 1:250,000 scale maps by the researcher or by the harvesters themselves. Each map was marked at the time of the interview with both the appropriate household number and harvest period. The same identification variables appeared on harvest activity sheets (discussed in detail below).

The researchers also tried to determine who else participated (i.e., from other households) in every harvest event and recorded this information on the harvest activity sheet. Thus, if a harvester did not know exactly where the harvest took place, the researcher might be able to identify the harvest location through interviews with other members of the hunting party in cases in which the other hunters were also participants in this study. In order to produce the most accurate and reliable information possible, the study team cross-checked the harvest activity sheets of different members of a hunting party against one another, to the extent possible (i.e., mainly in cases in which the other households involved also were participating in this study). In instances where data conflicted (most commonly the date of the harvest) the respondent interviewed closest to the time of the harvest event was considered the most reliable source for the date unless another member of the same hunting party kept a calendar of his or her harvest events.

Participant Observation

One important and positive outcome of the placement of a full-time field coordinator in Barrow was to provide a second form of data collection: participant observation. While the key informant discussions provided the desired hard data, participant observation provided the knowledge necessary to understand and better describe the hard data. This first-hand knowledge proved invaluable. The full-time presence of a field coordinator in the community provided ample opportunity for participant observation at various subsistence related activities. The most important participant observations occurred:

- o during preparation for spring whaling and at whaling camps;
- o at whale harvest locations;
- o while whaling crew shares were distributed at captains' homes;
- o during the *Nalukataq* celebrations;
- o on various day and overnight hunting trips;
- o during visits to spring and fall camps.

Participant observation improved the accuracy of the data collection in a number of ways. Most importantly, it 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 experience gained in these situations early in the study was applied to a modification of data coding and entry rules.

In short, the study team employed two main methods of collecting the data for this project: informal key informant discussions and participant observation. The key informant discussions formed the backbone of this data collection effort with participant observation providing more experiential insights into the many elements of subsistence.

Contact Frequency

In Barrow, the actual frequency with which households were contacted depended primarily on the presence of SRB&A field staff and the availability of local research assistants. Under the proposed schedule of contacts, the study team hoped to contact the most active households three to four times a month, the somewhat active households bi-monthly, the less active households once a month and the inactive households quarterly. Due to the high attrition rate of qualified research assistants, this schedule proved unattainable. However, the study team was able to minimize recall and other problems associated with less frequent contacts by careful analysis of each household's level of activity during the various seasons and throughout the year, and by taking into consideration other circumstances in scheduling contacts. All aspects of the contact methodology are discussed below.

Adjusting the Frequency of Contacts

As mentioned above, the ideal contact schedule proved unrealistic in the field requiring that the study team reassess the planned rate of contacts. As the study team became familiar with each household's harvest activities, they were able to adjust the contact schedule for each household so that it corresponded to their active periods of harvesting. Many households hunted caribou and fished 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 the level and timing of the household's harvest activities. For example, the sampling interval for one household varied from as little as one week between contacts during an especially active harvest period to as long as nine weeks when household members were doing little or no harvesting.

The study team enlisted other methods to minimize hunters' memory attrition and ensure that harvest reports were accurate. Some active households recorded their harvests and harvest locations on their own (e.g., on a calendar or sheet of paper and a map). Many of the respondents quickly memorized the short set of questions repeatedly asked about their harvest activities. In addition, the monitoring of external variables, such as environmental conditions or cultural events, was also considered by the study team in the scheduling of contacts. For example, if blowing snow and high winds resulted in "white out" conditions that prevented travel outside the immediate vicinity of the community for several days or weeks, the contact schedule was modified to accommodate this known lull in harvest activity. Flexibility proved essential in obtaining accurate harvest data within the limits of the staff available.

Contact Data

Of the 118 households monitored continuously in Year One, the average number of successful harvest discussions per household was 5.8, with the number of contacts ranging from one to 12 (Table D-3). The total number of Year One harvest discussions per month for the entire sample of 118 households ranged from 34 in February to 72 in November, and the total number of successful harvest discussions for the year was 685. An average of 57 contacts were made per month. These figures do not include the numerous attempts that often were involved in locating and contacting the respondent before completing a successful harvest discussion, but do include one Year Two visit (i.e., a visit that occurred after March 31, 1989) per household during which harvests through the end of Year One (March 31, 1989) were recorded. One successful "contact" or "harvest discussion" often involved more than one visit, but the unsuccessful attempts were not counted.

During Year Two, the average number of successful harvest discussions per household 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 harvests discussions for the year was 441.

In Year Three, a total of 538 household contacts were made from April 1, 1989 to April 24, 1990. Although 101 households ultimately were in the Year Three sample, 106 were monitored initially in Year Three for an average of 5.1 contacts per household for the year, with a range from one to 13. During Year Three the field coordinator successfully completed harvest discussions with an average of 45 households each month. April 1989 and March 1990 had the highest number of household contacts, 74 and 95 respectively, because they marked the beginning and end of the study year. All households needed to be contacted at these important junctures to complete the year's harvest record. December 1989 had zero household contacts due to the field coordinator's absence from the community. Similarly, household contacts were low in October and November due to illness of the field coordinator during a portion of each of these months and because fall whaling occupied considerable time for many harvesters in October.

TABLE D-3: HOUSEHOLD CONTACT STATISTICS, YEARS ONE THROUGH THREE

	Total Contacts	No. Households Monitored	Mean No. Contacts per HH per Year
Year One	685	118	5.8
Year Two	441	111	4.0
Year Three	538	106	5.1

Source: Stephen R. Braund & Associates, 1993

The lowest number of successful harvest discussions per month occurred over the Christmas holidays when the field coordinator was away (e.g., December and January). As these months were usually slow in terms of harvesting, data collection was not compromised significantly by his or her absence. The high months for successful harvest discussions occurred when each study year was

coming to an end, anytime the field coordinator returned after an absence from the community, and during peak periods of harvest activity (e.g., July). The key informants' availability also varied from month to month with hunting, community activities, weather, and work as the determining factors. Cooperation was generally excellent overall, but some households preferred infrequent contacts, particularly those who were not active in hunting or fishing.

Contacts were made at the most convenient time for the community members. Some interviews were conducted at two or three in the morning, others at work during break, or at the post office, out at camp, or while waiting for ducks. There was not a specific schedule for interviewing. Instead of the community accommodating the field coordinator, the field coordinator adapted his/her work schedule around the people of Barrow. The key for collecting harvest data was complete flexibility. In several cases throughout the year the field coordinator was lucky enough to travel to hunting camps, or in some other manner be present at harvests.

The above numbers describing household contacts represent only successful, complete harvest discussions and, as such, present the very minimum picture of the level of effort involved in data collection. A successful contact was counted when all the harvest activity for that household was completed. However, many households had two, three and sometimes four members who actively hunted and fished, often requiring that the field coordinator track down these individuals to complete that household harvest report.

DATA CODING, PROCESSING AND PRESENTATION

As mentioned previously, the household was the sampling unit in this study. From Barrow households, the study team collected two kinds of data and recorded the data on two kinds of forms, one for each type of data: harvest data on harvest activity sheets, and household data on household record forms. The majority of the data collected were harvest data. Along with harvest data, harvest locations were recorded on maps and attached to the harvest activity sheet. Each harvest event resulted in one harvest record (wherein a record is a set of variables that describes something - in this case, a harvest event). In the case of a harvest event, the descriptive variables consisted of the

household identification number, a unique harvest entry identification number, harvest date (month, day, year - three variables), the species harvested, the number of that species harvested, the sex of the animal(s) if known, the household members participating in the harvest (potentially five variables), the number of non-household members participating, plus a few other administrative variables (e.g., researcher identification number, date, and similar items). Thus, a harvest record consisted of 32 variables. Collection of these data was an ongoing process throughout the three study years, and resulted in thousands of harvest records. The harvest locations recorded on maps constitute an extension of the harvest records; those sites were digitized in the GIS system as geographic data, and a subset of the harvest record variables were linked to each entry.

The household record, on the other hand, is several variables that describe the household, principally: household identification number; household size (three variables, one for each study year); ethnicity (again, three variables); income (three variables); and person-months worked by month (36 variables) and subtotaled for each study year (three more variables). The household record consisted of a total of 55 variables. These data were collected only once (near the end of Year Three) and resulted in one record per household. Thus the harvest and household records formed the organizational basis for gathering, storing, and analyzing the quantitative data collected through key informant interviews.

This section describes the study team's methodology for coding and processing the quantitative data and ultimately producing aggregate output descriptive of Barrow subsistence. The first section describes the harvest record variables and the household record variables and how they were defined and coded. The second section deals with the computer processing of the data, including the calculation of pounds harvested from the number of animals harvested. Finally, the presentation of the data in its various forms is described.

Coding

Coding is the process of editing the raw data to prepare it for entry into the computer data base. Numeric codes were developed for non-numeric data (e.g.,

the species of the animal harvested), and identification codes were developed to link harvest data to mapped points, to identify households, household members, and so forth. Rules were developed to ensure that the codes were applied consistently by all researchers.

The Harvest Record

The definition of a single resource harvest event for recording purposes is a species-specific harvest at a particular location during no more than a two week period by one or more members of a sample household. The event must be species-specific but can include the harvest of two or more of the same species. Hunting, fishing or gathering activities which did not result in a harvest were not recorded.

The above definition of a single resource harvest event produces the following results:

(1) The harvest of two species at the same location on the same date generated two harvest records.

(2) The harvest of two or more of the same species at the same location on the same date generated one record (with the number of animals harvested entered as part of the record).

(3) The harvest of the same species at two locations on the same day generated two records.

(4) The harvest of the same animal at a single location by two members of a household generated one record (with household members participating entered as part of the record).

(5) The harvest of the same animal by single members of two different households generated two records. The amount recorded in this instance, or in the case of any shared harvest, is a value proportionate to the individual's share of the harvest.

Figure D-1 displays the harvest activity sheet, where harvest events were recorded by the field coordinator or RA during or immediately following a harvest discussion with a study household. The harvest activity sheet was used to record several different harvest events (records) by a specific household. Following is a description of each variable and the guidelines used for coding the harvest data.

Figure D-1

HARVEST ACTIVITY SHEET

RESEARCHER ID _____ BEGIN DATE _____

HOUSEHOLD ID _____ END DATE _____

HH CONTACT ID _____ TODAY'S DATE _____

ENTRY ID	MAP ID	DATE	SPECIES/ RESOURCE HARVESTED	AMOUNT/NUMBER HARVESTED			ESTIMATED SIZE OR # OF SACKS	TIME IN FIELD		HH HARVESTERS INDIVIUAL ID #s					NO. OF HHOLD PARTIC.	NO. OF NON-HH PARTIC.	COMMENTS:
				TOTAL	M	F		HRS	DAYS								

Researcher ID: A unique two digit numeric code. With more than one interviewer present, the ID number of the senior interviewer was coded.

Household ID: A three digit numeric code for each household. This was a unique number assigned to each household so that resource harvest activity records could be aggregated by household and linked to household characteristics.

HH Contact ID: (HH stands for household.) A two digit numeric code identifying the individual household member who reported the data during this harvest discussion. If more than one household member answered questions, the household member responsible for the greater amount of actual harvesting was coded.

Begin Date: A set of three two digit numeric codes representing the beginning month, day and year covered by the harvest activity sheet. The begin date should be continuous with, but not overlapping, the last contact date or two week period.

End Date: A set of three two digit numeric codes representing the last month, day and year of the reporting period.

Today's Date: A set of three two digit numeric codes representing the month, day and year of the interview. This date corresponds with the end date in most cases.

Entry ID: A unique five digit numeric code identifying each successful harvest record and harvest site. These values were assigned sequentially at the time of coding and were used in four places: 1) On the harvest activity sheet next to the successful harvest record; 2) on the original map adjacent to the corresponding Map ID (described below); 3) on the aggregated map of community harvest sites delivered to the NSB GIS; and 4) in the GIS system as an identifier for the corresponding harvest site.

Map ID: A two digit numeric code corresponding to mapped harvest locations. The Map ID is any number (usually 1, 2, 3, etc.) that the researcher can use during the harvest discussion to mark the map and the harvest activity sheet so as to link the harvest location to the harvest record. Two different harvest records may share the same Map ID if the harvests occurred in the same location. For example, two species of fish caught in the same net on the same date would be different harvest records with the same Map ID. This code was, in effect, an interim code; later, when the harvest was assigned a unique Entry ID, the Map ID became obsolete.

The map ID variable was used with some non-harvests (which did not need to be mapped) as a convenient way to identify the kind of non-harvest being reported. If someone was given a gift, for example, of caribou, the species and amount were coded in the appropriate place and the map ID variable was coded 60, the code for a gift. Food received at *Nalukataq* and Thanksgiving were coded 50 and 53 (respectively), shares received for helping the harvester butcher the

animal were coded 30, and shares received for equipment loaned to the harvesters were coded 35.

Date: A set of three two digit numeric codes representing the month, day and year covered by the particular harvest record or case. While recording the actual date of harvest was desired, in some cases this goal was not possible. When a respondent was vague about a date, the interviewer showed him or her a calendar to prompt a more specific response. In some cases, this tool effectively elicited a specific date, while in other cases it served to simply narrow the harvest date down to a particular week. Camp-based harvest activities were treated slightly differently since asking informants to recall their opportunistic hunting and fishing activities on a daily basis while at camp proved impractical. Therefore, for camp-based harvests occurring more or less continuously (e.g., fish nets under the ice), respondents were asked to report their overall harvest of a specific species in a two week period rather than asking them to recall their catch on a daily basis. The implication of the two week time limit on a single resource harvest activity is that the maximum error in reporting a harvest date is two weeks. In most cases, however, the record date matches the actual harvest date.

If a harvester reported harvests for a two week period, the first day of that time period was the date entered. If the harvester could identify the week in which the harvest occurred but not the day, the day variable was coded 81 for the first week of the month, 82 for the second week of the month, 83 for the third week, or 84 for the fourth week of the month.

Species/Resource Harvested: A unique three digit numeric code identifying each species or resource used by Barrow residents. Table D-4 is a species and resource list that includes all the resources Barrow residents are known to have harvested in the past as well as the number used to code each species. The species are divided into resource categories. The first code under each category is inclusive of all species in that group and was used when the particular species was not known. The numbering system was not sequential so as to allow for the addition of other species in the different categories if they were encountered later in the study.

Amount/Number Harvested:

Total: A one to three digit, one decimal numeric code representing the total amount of a given resource harvested. In all cases but water, ice, snow and coal, this value represents the number of animals harvested. For any form of water, this number represents the number of gallons harvested; for berries, it represents the number of quarts.

Male: This variable indicates, of the total number of animals harvested, the number that were male. No effort was made to sex waterfowl or fish. This variable was not always completed for marine or terrestrial mammals as the respondent did not always remember the sex of the animals harvested.

Female: Same as above except only females were counted.

TABLE D-4: BARROW SPECIES CODING LIST

Species	Inupiaq Name	Scientific Name	Code
Big Game			001
Caribou	*Tuttu*	Rangifer tarandus	002
Moose	*Tuttuvak*	Alces alces	003
Brown bear	*Aklaq*	Ursus arctos	004
Musk Oxen	*Uminmaq*	Ovibos moschatus	005
Dall sheep	*Imnaiq*	Ovis dalli	006
Marine Mammals			010
Seal			011
Bearded seal	*Ugruk*	Erignathus barbatus	012
Ringed seal	*Natchiq*	Phoca hispida	013
Spotted seal	*Qasigiaq*	Phoca largha	014
Ribbon seal	*Qaigulik*	Phoca fasciata	015
Whale			020
Beluga whale	*Qilalugaq*	Delphinapterus leucas	021
Bowhead whale	*Agviq*	Balaena mysticetus	022
Polar bear	*Nanuq*	Ursus maritimus	025
Walrus	*Aiviq*	Odobenus rosmarus	026
Furbearers, Small Game			030
Fox			031
Arctic (Blue) fox	*Tigiganniaq*	Alopex lagopus	032
Red fox	*Kayuqtuq(Qiangaq)*	Vulpes fulva	033
Cross fox	*Qiangaq*	Vulpes fulva	033
Silver fox	*Qiugniqtaq*	Vulpes fulva	033
Snowshoe hare	*Ukalliq*	Lepus americana	036
Arctic Hare	*Ukalliq*	Lepus arcticus	037
Lynx	*Niutuiyiq*	Felis lynx	038
Hoary marmot	*Siksrikpak*	Marmota caligata	039
Porcupine	*Qinagluk*	Erethizon dorsatum	040
Ground squirrel	*Siksrik*	Spermophilus parryii	041
Wolf	*Amaguq*	Canis lupus	042
Wolverine	*Qavvik*	Gulo gulo	043
Ermine (Weasel)	*Itigiaq*	Mustela erminea	044
Wildfowl			050
Duck	*Qaugak*		051
Oldsquaw	*Aaqhaaliq*	Clangula hyemalis	052
Pintail	*Ivugaq*	Anas acuta	053
Mallard	*Kurugaktak*	Anas platyrhynchos	054
Red-breasted merganser	*Aqpaqsruayuuq*	Mergus serrator	055
Surf scoter	*Aviluktuq*	Melanitta perspicillata	056
Greater scaup	*Qaqluktuuq*	Aythya marila	057

TABLE D-4 (cont.): BARROW SPECIES CODING LIST

Species	Inupiaq Name	Scientific Name	Code
Eider			060
Common eider	*Amauligruaq*	Somateria mollissima	061
King eider	*Qinalik*	Somateria spectabilis	062
Spectacled eider	*Tuutalluk*	Somateria fischeri	063
Stellar's eider	*Igniqauqtuq*	Polysticta stelleri	064
Goose	*Nigliq*		066
Brant	*Niglingaq*	Branta bernicla n.	067
White-fronted goose	*Niglivialuk*	Anser albifrons	068
Lesser snow goose	*Kanuq*	Chen caerulescens	069
Canada goose	*Iqsragutilik*	Branta canadensis	070
Emperor goose	*Mitilugruak*	Chen canagica	071
Murre			075
Common murre	*Atpak (Atpa)*	Uria aalge	076
Thickbilled murre	*Atpatuuq*	Uria lomvia	077
Loon			080
Arctic loon	*Qaqsrauq*	Gavia arctica	081
Common loon	*Malgi*	Gavia immer	082
Red Throated loon	*Qaqsraupiagruk*	Gavia stellata	083
Yellow billed loon (King bird)	*Tuullik*	Gavia adamsii	084
Ptarmigan	*Aqargiq*		085
Rock ptarmigan	*Niksaaktuniq*	Lagopus mutus	086
Willow ptarmigan	*Nasaullik*	Lagopus lagopus	087
Snowy owl	*Ukpik*	Nyctea scandiaca	090
Sandhill crane	*Tatirqaq*	Grus canadensis	091
Tundra (Whistling) swan	*Qugruk*	Cygnus columbianus	092
Gull	*Nauyak*	Larus sp.	093
Black guillemot	*Inagiq*	Cepphus grylle	094
Fish			110
Salmon			111
Chum salmon	*Iqalugruaq*	Oncorhynchus keta	112
Pink (humpback) salmon	*Amaqtuuq*	Oncorhynchus gorbuscha	113
Silver (coho) salmon	*Iqalugruaq*	Oncorhynchus kisutch	114
King (chinook) salmon		Oncorhynchus tshawytscha	115
Whitefish			120
Round whitefish	*Aanaakliq*	Prosopium cylindraceum	121
Broad whitefish (river)	*Aanaakliq*	Coregonus nasus	122
Broad whitefish (lake)	*Aanaakliq*	Coregonus nasus	124
Humpback whitefish	*Piquktuuq*	Coregonus clupeaformis	125
Least cisco	*Iqalusaaq*	Coregonus sardinella	126
Arctic, Bering cisco	*Qaaktaq*	Coregonus autumnalis	123

TABLE D-4 (cont.): BARROW SPECIES CODING LIST

Species	Inupiaq Name	Scientific Name	Code
Capelin	*Pagmaksraq*	Mallotus villosus	130
Arctic grayling	*Sulukpaugaq*	Thymallus arcticus	131
Arctic char	*Iqalukpik*	Salvelinus alpinus	132
Arctic cod	*Iqalugaq*	Boreogadus saida	133
Burbot (ling cod)	*Tittaaliq*	Lota lota	134
Tomcod (saffron cod)	*Uugaq*	Eleginus gracilis	135
Arctic flounder	*Nataagnaq*	Liopsetta glacialis	136
Northern pike	*Siulik*	Esox lucius	137
Sculpin	*Kanayuq*	Cottus cognatus	138
Rainbow smelt	*Ilhuagniq*	Osmerus mordax	139
Lake trout	*Iqaluaqpaq*	Salvelinus namaycush	140
Blackfish	*Iluuqiniq*	Dallia pectoralis	141
Invertebrates			150
Clams	*Kiirauraq(iviluq)*	Macoma calcerea	151
Crab	*Puyyugiaq*	Chionoecetes opilio & Paralithodes platypus	152
Shrimp	*Igligaq*	Pandalidae sp. & Cragonidae sp.	153
Berries			160
Blueberry	*Asiaq*	Vaccinium uliginosum	161
Cloudberry	*Aqpik*	Rubus chamaemorus	162
Cranberry	*Kimminnaq*	Vaccinium vitis-idaea	163
Crowberry	*Paungaq*	Empetrum nigrum	164
Salmonberry	*Aqpik*	Rubus spectabilis	165
Bird Eggs	*Mannik*		170
Tern eggs			171
Gull eggs			172
Geese eggs			173
Eider eggs			174
Forest/Vegetation			190
Alder bark	*Nunaniak*		191
Birch tree	*Urgiiliq*		192
Willowbrush	*Uqpik*		193
Driftwood	*Qiruk*		194
Sod	*Ivruq*		195
Aspen	*Nunaniak*		196
Greens/Roots			200
Grass roots	*Qalgaq*		201
Hudson's Bay tea	*Tilaaqiq*	Ledum decum	202
Sourdock		Rumex archius	203
Swamp grass	*Nakaat*		204
Wild celery	*Ikunsuq*	Angelica lucida	205
Wild chives	*Quagaq*	Allium schoenoprasum	206
Wild potato	*Masu*	Hedysarum alpinum	207
Wild rhubarb	*Qunulliq*	Oxyric digyna	208

TABLE D-4 (cont.): BARROW SPECIES CODING LIST

Species	Inupiaq Name	Scientific Name	Code
Wild spinach	*Qaugaq*	Rumex arcticus	209
Willow leaves	*Akutuq*	Salix sp.	210
Minerals			220
Clay	*Qiku*		221
Coal	*Aluaq*		222
Fine sand	*Maggaraaq*		223
Gravel	*Qaviaraaq*		224
Water			230
Fresh water	*Imiq*		231
Fresh water ice	*Sikutaq*		232
Fresh water sea ice	*Siku*		233
Snow	*Apun*		234

Stephen R. Braund & Associates, 1993

Estimated Size or Measurement: A four digit numeric code that was used mainly in the coding of fish, coal, water/ice, or berry harvests. If the respondent reported his/her fish or coal harvest in sacks, the number of sacks was entered in this column. Similarly, the number of quarts of berries or gallons of water or sledloads of ice were recorded in this column, with a note written in the Comments variable confirming the unit of measurement used.

Time in Field:

Hours: A two digit numeric code representing the hours the hunter spent in this harvest event. This variable can be used independently of Days for any trip under 24 hours, but would be used in conjunction with Days for trips longer than 24 hours. That is, a 26 hour trip would be represented as 2 hours and 1 day.

Days: A one or two digit numeric code representing the number of days the hunter spent away from Barrow in this harvest activity. Used in conjunction with hours above, as needed.

Household Harvesters: A series of two digit numeric codes (unique within each household) that identify the household members who actually participated in the harvest. If more than five members of the household participated in an event, the five members who where most active in the event were coded.

No. of Household Participants: A two digit numeric code representing the total number of household members present during the harvest documented by this record. In most instances, this value corresponded to the number of household harvesters above. However, for harvest activities that occurred during an extended visit to a hunting or fishing camp (for which the majority of the family was in attendance) this value represented the total number of household members present.

No. of Non-HH Participants: A two digit numeric code representing the number of non-household members present during the harvest documented by this harvest record. When recording whaling crew member shares, the total number of crew member shares (minus the number of household harvesters) was noted in this column.

Comments: A string code of text with a maximum length of 156 printable characters (including spaces). Only comments directly related to the harvest record were coded here (e.g., an estimated size or measurement, names of participants).

A harvest activity sheet was filled out for every household harvest discussion completed. If a household reported no harvests during the time period since the last contact, the interviewer simply filled in the top portion of the form showing the household identification number, person contacted, researcher's identification, the time period covered, and the date. The words "no harvest" were written on the sheet. These data created a harvest record that indicated no harvests had occurred and served to confirm that this household was

interviewed regarding the time period indicated. Some households ultimately did not harvest anything all year. Those households were just as important to the analysis as those who did harvest.

The Household Record

Figure D-2 presents the household record form used to collect data on the study households one time near the end of the study. This record provided data that gave a profile of certain household characteristics that were seen as potentially explanatory variables to crosstabulate with subsistence data. A description of each variable and how it was coded follows.

HHID: (Household identification number) This variable is the same one used in the harvest record to link the data to the correct household.

HH Size: The researcher asked the family how many people lived in their household during Year One, how many lived there during Year Two, and how many in Year Three. In the event that the household size changed during the study year, the researcher attempted to find out the household size that was most representative of that year.

Ethn: (Ethnicity) These variables describe the ethnicity of the household in each study year. As defined by this study, a household was Inupiat if the head of household or spouse was Inupiat. Similarly, a household was classified Other Alaska Native if the head of household or spouse was Alaska Native (but not Inupiat). The appropriate code from the lower left corner of the form was used to code these variables.

Income: The respondent indicated which income bracket reflected the household income each year, and the researcher entered the appropriate code from the table on the lower portion of the form into the appropriate income box.

Months Employed: This set of 36 variables was designed to indicate how many people in the household worked each month during the study period. If someone worked half-time or less, or worked half the month or less, that employment counted as 0.5 person-months. Full-time employment (or any employment over half-time) counted as one person-month of employment.

Total Person-Months of Employment: Not shown on the form is the subtotal for each study year of the amounts entered in each month box.

Completeness of Data: Also not shown on the form are three variables that describe whether the household record was complete for this household for Year One (Y1COMPLT), Year Two (Y2COMPLT) and Year Three (Y3COMPLT). This summary information would allow the households for whom incomplete Year One, Two or Three household data were recorded to be dropped in certain analyses, if desired.

Figure D-2

NORTH SLOPE SUBSISTENCE STUDY
STEPHEN R. BRAUND & ASSOCIATES
Barrow Household Variables

HHID _____
Date completed _____

YEAR	HH SIZE	ETHN	INCOME	TOTAL MONTHS EMPLOYED BY HOUSEHOLD MEMBERS 16 OR OLDER											
				JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1987							Year 1								
1988							Year 2								
1989							Year 3								
1990	\ \ \	\ \ \	\ \ \ \				\ \ \	\ \ \	\ \ \	\ \ \	\ \ \	\ \ \	\ \ \	\ \ \	\ \ \

Ethnicity codes:

1 Inupiat
2 Other AK Native
3 White
4 American Indian
5 Hispanic
6 Filipino
7 Oriental
8 Black
10 Other

Income codes:

All sources of income for all household members combined for the calendar year

1 Under $4,999	6 $25,000 - $29,999
2 $5,000 - $9,000	7 $30,000 - $39,999
3 $10,000 - $14,999	8 $40,000 - $49,999
4 $15,000 - $19,999	9 $50,000 - $59,999
5 $20,000 - $24,999	10 $60,000 and above

Miscellaneous codes:

98 Ref
99 DK or NA

Data Processing and Presentation

By maintaining stringent procedures as to the coding of individual data items for computer entry, the study team was able to analyze the data collected using SPSS/PC+, a statistical analysis software. SPSS was the primary tool for data entry, reorganization, and analysis of the numeric data. Ultimately, the SPSS data were presented in the tables, graphs and charts included in this report. Arc/Info was the software used by the NSB GIS to digitize harvest location data and produce the report maps of Barrow subsistence harvests.

Processing Harvest and Household Data

Once the raw data forms were properly coded, SRB&A staff entered the data into the appropriate SPSS data files. Harvest records were entered into one file, and household records were entered into another file. The harvest records formed a data base consisting of 1,832 records of Year One data, 1,869 records of Year Two data and 2,000 records of Year Three data, including "no harvest" records, gifts and other distributed subsistence foods, and subsistence harvests. In contrast, the household record generated only one record per household.

The household data, for the most part, required little processing. However, the harvest data, which represented the vast majority of the data collected, required considerable processing to obtain variables that indicate the number of pounds harvested by species and by household. A separate program processed the data into pounds and number of animals harvested by species, household, and month. The resulting data files allowed the study team to produce output reporting, by species and by year, on: total harvests (pounds and number of animals) for the community, household harvest means, per capita harvest means, the percent of total pounds harvested that each species represents, percent of households harvesting that species, and the number and pounds harvested by month for each species.

Mapped Harvest Data

As mentioned above, during harvest discussions with study households, the hunter or researcher marked on a 1:250,000 scale map the location where each harvest occurred. The researcher later coded this spot with the unique entry ID number linking the location to the data variables that describe the harvest (i.e., household ID, date of harvest, species harvested, and so on). SRB&A researchers aggregated harvest locations and their entry ID numbers from individual harvest forms onto maps that were transferred to the North Slope Borough. The NSB digitized (i.e., plotted) the mapped data points, along with the unique entry ID numbers, into their computerized mapping system. SRB&A staff converted a subset of the SPSS harvest data to an ASCII file and transferred this file to the NSB GIS. The file included the household ID, entry ID, species, amount harvested, pounds harvested, and date harvested for every mapped resource harvest record. Individual records in this file were matched with the digitized location already entered into the GIS using the entry ID. Data in the GIS thus include household and entry ID numbers, species, amount harvested, date harvested, and a digitized location for each resource harvest observation. The NSB GIS could then select and map a subset of digitized points based on the descriptive variable(s) selected. For example, by selecting only the species walrus and polar bear and assigning a different symbol to represent each of those two species, a map showing (and differentiating) all walrus and polar bear harvest locations can be produced. This brief description greatly understates the amount of detailed work performed by NSB GIS staff in producing the many individual maps included in this report.

As discussed in Areal Extent of Subsistence Land Use, the mapped data represent only those harvest sites reported by study sample households. Harvest locations cannot be weighted in the same manner as numeric data. Thus, while the numeric data represent the entire community, the mapped harvests represent only those households participating in this study. A review of the mapped harvests with Barrow hunters, however, indicated that generally the mapped harvest data appeared to adequately portray areas of concentrated harvests.

When first designing this study, the study team deliberated whether to map specific harvest locations or to map hunting ranges or areas. Harvest locations alone understate the amount of land utilized in the process of harvesting, as a hunter may travel and search over a large area before being successful. However, harvest locations were selected as the preferred unit of geographic data. The study team identified the following advantages of using harvest locations:

1) Harvest location was an easier data item for hunters to report and for researchers to record.
2) It was many steps simpler to enter into the North Slope Borough (NSB) Geographic Information Service (GIS) data base.
3) Harvest locations (versus hunting areas) facilitated the entry of integrated data into the NSB GIS data base (e.g., household ID, date of harvest, species harvested, number of animals/fish harvested, amount harvested in pounds, and digitized location of the harvest).
4) Harvest locations required little interpretation or manipulation in the GIS and could be readily linked to the other harvest variables to produce informative maps.

Subsistence ranges or general use areas, on the other hand, presented a number of problems, including:

1) Difficulty in collecting the data as the area hunted was not necessarily tied to any harvest.
2) The demand placed on respondents would be much greater than that required to report only successful harvest locations. Burden on the respondent was an important concern since we needed sample households to remain involved in the study for three years.
3) Difficulty in entering into the GIS data base (i.e., entering large areas instead of single points).
4) Not readily tied to other harvest data (in contrast to amount harvested or number harvested, which are easily tied to a harvest location for each species);
5) Not as informative in terms of data presentation. The GIS output would appear as a single line for each species showing the outer

extent of the area used to hunt that species. Alternatively, the map would present a mass of overlapping and difficult to discern lines.

For these reasons, the study team, in concert with the MMS, chose "successful harvest locations" as the unit of measurement for this study. As hunting and fishing activities that did not result in a harvest were not recorded, this study did not record "subsistence ranges" used in a broader sense to include the entire area hunted either successfully or unsuccessfully.

Conversions from Numbers to Pounds

In the process of analyzing the data and producing output for the tables and figures, the study team had to decide how to assign a usable weight per animal for each species harvested, particularly in the case of bowhead whales. The harvest data are presented as the number of animals harvested and usable pounds of resource product. The usable weights were selected as the uniform 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 Kivalina study by Burch [1985]. Burch [1985] discusses the variations in what is considered by the harvesters and users as the usable weight of an animal. Burch mentions fish as an example of how usable weight varies significantly and that usable weight may be as high as 99 percent of live body weight [Burch 1985]). In the body of this report, the study team has expressed cautions about the difference between "usable" (i.e., potentially edible) and what is actually eaten (as measured in pounds). For consistency with ADF&G data and due to the inability to estimate how much of an animal is "typically" eaten, the study team presented the pounds harvested in terms of total potentially usable weight.

Although using the same conversion weights as ADF&G has some advantages, one disadvantage is that the weights may not be specifically representative for Barrow. Animals vary in size depending on the habitat of the specimen, its sex, its age and the overall status of the population. For example, salmon caught on the North Slope are typically smaller than those caught in south-central Alaska (J. Fall, ADF&G Subsistence Division, personal communication).

With walrus, individual animals tend to be smaller when the population is large, and vice versa. In addition, the proportion of an animal typically eaten by humans varies across Alaska. Similarly, harvest practices may be selective. For example, according to local residents, Barrow hunters tend not to harvest large bull walrus. Therefore, we offer the caveat that these weights are estimates only and may vary. In particular, a review of this report in draft form generated the observation that estimates for brant and white-fronted geese seemed high. Live weights for white-fronted geese (adults) average 5.9 pounds, implying that the estimated edible weight of 4.5 pounds is too high. Live weights for adult brants averaged approximately 3.2 pounds, meaning that the edible weight of 3.0 pounds is also very likely too high.

The usable weight conversions for each subsistence resource are listed in Table D-5. Fish harvests often required an additional conversion, an estimate of the number of fish per sack. These estimates were highly approximate and the actual number of fish per sack varied considerably. 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 shown in Table D-6.

Calculation of Year One, Two and Three Bowhead Whale Weights

In each year, the total usable pounds of bowhead whale harvested was estimated independently of the sample household data used for estimating the harvest weight of each of the other species. In Years One and Two, the study team actually weighed numerous portions of landed bowheads to calculate the amount of usable product harvested from individual whales. In Year Three, the study team estimated the bowhead usable weight without weighing any portions of whale. Instead, the number of pounds of usable bowhead was calculated by taking a percentage of the estimated live weight of the whales. The reasons for the unique treatment of bowhead (in contrast to other species), as well as the data collection techniques and assumptions used each year in calculating usable bowhead weight, are discussed below.

TABLE D-5: USABLE WEIGHT CONVERSION FACTORS[1]

Species	Inupiaq Name	Usable Weight per Resource in Pounds
Marine Mammals		
Bearded seal	*Ugruk*	176.0
Ringed seal	*Natchiq*	42.0
Spotted seal	*Qasigiaq*	42.0
Ribbon seal	*Qaigulik*	42.0[2]
Bowhead whale	*Agviq*	29,466.2[3]
Polar bear	*Nanuq*	496.0
Walrus	*Aiviq*	772.0
Terrestrial Mammals		
Caribou	*Tuttu*	117.0
Moose	*Tuttuvak*	500.0
Brown bear	*Aklaq*	100.0
Dall sheep	*Imnaiq*	99.0
Arctic fox (Blue)	*Tigiganniaq*	0.0
Red fox (Cross, Silver)	*Kayuqtuq*	0.0
Ground squirrel	*Siksrik*	0.4
Wolf	*Amaguq*	0.0
Wolverine	*Qavvik*	0.0
Ermine	*Itigiaq*	0.0
Porcupine	*Qinagluk*	10.0[2]
Fish		
Salmon (non-specified)		6.1[4]
Chum salmon	*Iqalugruaq*	6.1[4]
Pink (humpback) salmon	*Amaqtuq*	3.1
Silver salmon	*Iqalugruaq*	6.0[2]
King salmon		18.0[2]
Whitefish (non-specified)		2.5[2]
Round whitefish	*Aanaakliq*	1.0
Broad whitefish	*Aanaakliq*	2.5
River caught	*Aanaakliq*	2.5
Lake caught	*Aanaakliq*	3.4[2]
Humpback whitefish	*Piquktuuq*	2.5
Least cisco	*Iqalusaaq*	1.0[2]
Bering, Arctic cisco	*Qaaktaq*	1.0[2]
Capelin	*Pagmaksraq*	0.2[2]
Arctic grayling	*Sulukpaugaq*	0.8
Arctic char	*Iqalukpik*	2.8
Arctic cod	*Iqalugaq*	0.2[5]
Burbot (Ling cod)	*Tittaaliq*	4.0
Tomcod (Saffron cod)	*Uugaq*	1.0[5]
Northern pike	*Siulik*	2.3[2]
Sculpin	*Kanayuq*	0.6[5]
Rainbow smelt	*Ilhuagniq*	0.12[2]
Lake trout	*Iqalukpak*	4.0

TABLE D-5 (cont.): CONVERSION FACTORS[1]

Species	Inupiaq Name	Usable Weight per Resource in Pounds
Birds		
Duck (non-specified)	*Qaugak*	1.5
Oldsquaw	*Aahaalliq*	1.5
Surf scoter	*Aviluktuq*	1.5
Eider (non-specified)		1.5
Common eider	*Amauligruaq*	1.5
King eider	*Qinalik*	1.5
Spectacled eider	*Tuutalluk*	1.5
Stellar's eider	*Igniqauqtuq*	1.5
Goose (non-specified)	*Nigliq*	4.5
Brant	*Niglingaq*	3.0[6]
White-fronted goose	*Niglivialuk*	4.5[6]
Lesser snow goose	*Kanuq*	4.5
Canada goose	*Iqsragutilik*	4.5
Ptarmigan (non-specified)		0.7
Willow ptarmigan	*Aqargiq*	0.7
Red throated loon	*Qaqsraupiagruk*	3.0[2]
Sandhill crane	*Tatiqraq*	10.0[7]
Tundra swan	*Qugruk*	10.0[7]
Other Resources		
Berries[8]		
Blueberry	*Asiaq*	0.0
Cranberry	*Kimminnaq*	0.0
Salmonberry	*Aqpik*	0.0
Water[9]		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. Study team estimate.
3. Whale conversion weight was computed by the study team from the mean total usable weight per whale of the 28 whales harvested in Years One, Two and Three (see Table 10 in main portion of report).
4. Source: Impact Assessment, Inc. 1989.
5. Source: Burch 1985.
6. NSB comments indicate that these conversion weights likely are too high.
7. Source: Wolfe 1981.
8. Berries are measured in quarts.
9. Water is measured in gallons and ice is measured in sled loads. A sled load is estimated to equal 100 gallons of water.

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TABLE D-6: NUMBER OF FISH PER SACK

Fish Species	Inupiaq Name	Number of Fish per Sack	
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	*Pagmaksraq*	100	(per gallon pail)
Arctic grayling	*Sulukpaugaq*	90	
Rainbow smelt	*Ilhuagniq*	80	(per grocery sack)
Arctic cod	*Iqualugaq*	80	(per grocery sack)
Tomcod	*Uugaq*	100	

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Although the number of whales harvested by Barrow whaling crews was easily determined, the study team anticipated that it would be difficult to accurately measure total usable whale weight based on the number of crew member shares each study household reported receiving. To weigh each sample household's share(s) 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 crew and crew member shares distributed for each whale. (One crewshare is the total amount of whale allocated to one crew at the butcher site, and a crew member share is that portion of the crewshare that each crew member receives.) Moreover, the usable portions of a bowhead consist of much more than just the crew member shares. Other usable portions, such as those set aside for special feasts, would also have to be included in any estimate of total usable weight. Given such limitations, the study team determined that a more accurate approach would be to begin by weighing as many crewshares from as many whales as possible. Beginning with the first whale harvested, the study team weighed several crewshares from each whale, recorded the number of crews receiving a share, and recorded the number of individuals on each crew. In addition, the study team relied on NSB Department of Wildlife Management whale weight data (George et al., 1988, John C. George, personal communication), and developed standard proportions of different types of usable product, to complete estimates of the usable weight of each whale.

The crewshare distribution (*nininat*) the day of the whale harvest was estimated at 60 percent of the total usable weight. The remaining 40 percent went to the successful captains and crews, the majority of which 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. Therefore, the most direct and manageable approach appeared to be to weigh as many crewshares as possible to estimate the *nininat* and project the total usable weight based on *nininat* equalling 60 percent of the total.

While not used in the estimation of the usable whale weights, the study team did collect data on the number of crew member shares (i.e., an individual's allocation of a crewshare) that each study household received from each whale harvest. 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 reasons mentioned previously, 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 combined (*nininat*).

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. In Years One and Two, the study team, with the aid of locally hired research assistants, weighed crewshares at various stages of the processing and distribution of the whale, 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 crewshares. Crewshare weights among the different whales harvested in Years One and Two varied from 111 to 2,000 pounds and averaged 745 pounds (Tables D-7 and D-8).

TABLE D-7: NUMBER OF WHALE SHARES WEIGHED, 1987 & 1988

NSB Whale ID #	Total No. of Crewshares	# Crewshares Weighed[1]	# Crew Member Shares Weighed[2]
Year One			
87B1	39	0	4
87B2	30	3	0
87B3	36	4	4
87B4	12	0	3
87B5	32	--[3]	--[3]
87B6	16	2	3
87B7	13	3	0
Year Two			
88B1	39	0	1
88B2	30	0	3
88B3	30	1	5
88B4	23	0	3
88B5	26	0	1
88B6	39	0	1
88B7	38	0	11
88B8	38	0	3
88B9	25	0	0
88B10	25	0	0
88B11	21	0	0

1. This column refers to how many entire crewshares were weighed.

2. This column refers to how many crew member shares were weighed. The crew member shares that were weighed may have been from the same crewshare or from several different crewshares.

3. Records on weights taken from this whale were not available.

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TABLE D-8: YEAR ONE (1987) BARROW BOWHEAD WHALE HARVEST, ESTIMATED TOTAL USABLE POUNDS PER WHALE

Date	NSB Whale ID Number	Length	Number of Crew-Shares[1]	Average Crew-Share Weight	Total *Nininat* Weight[2]	Total *Tavsi* & *Uati* Weight[3]	Total Usable Weight of Whale
5/1/87	87B1	30'6"	39	266	10,374	6,916	17,290
5/2/87	87B2	29'4"	30	275	8,250	5,500	13,750
5/4/87	87B3	36'9"	36	339	12,204	8,136	20,340
5/20/87	87B4	55'1"	12	905	10,860	4,199[4]	15,059
6/14/87	87B5	51'4"	32	1,204	38,528	25,685	64,213
10/21/87	87B6	51'3"	5[5]	2,000	10,000	4,800[6]	
			11[5]	1,017	11,187	5,370[6]	31,357
10/29/87[7]	87B7	27'10"	13	1,044	13,572	9,048	22,620
TOTAL:	n/a	n/a	178	7,050	114,975	69,654	184,629
AVERAGE:	n/a	40' 4"	25	1,007	16,425	9,950	26,376

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 estimated from crewshare 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 usable whale weight. This ratio was developed by SRB&A from whale weight data collected by the NSB Department of Wildlife Management (J.C. George, personal communication).
4. All the meat was spoiled from this whale. It was lost in high seas, then retrieved and butchered three days later. The estimated weight of *tavsi* and *uati* shares was reduced by 42 percent to account for no usable meat being harvested from this whale.
5. There were two sizes of crewshares for this whale, the larger being for those who participated in a lengthy and dangerous tow to shore.
6. Approximately half the meat was spoiled from this whale. A long tow and high surf on the beach delayed the butchering process. The estimated weight of *tavsi* and *uati* shares was reduced by 28 percent to account for slightly less than half of the meat being harvested from this whale.
7. This whale was an *ingutuk*, a fat young whale still (or recently finished) nursing. Its extreme rotundity resulted in the disproportionately large weight estimate relative to its size. The study team opted to use the above weight as originally calculated, rather than using the NSB's subsequent estimate of 18,000 pounds for the whale's entire weight.

Source: Stephen R. Braund & Associates, 1993

The next opportunity to weigh shares was at a whaling captain's house before his crew or family members had divided their crewshare into crew member shares. 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. This window of opportunity 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 estimating the total *nininat* weight included the total number of crews receiving shares from each whale. 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 member shares he divided his crewshare into and how many people were on his crew.

The study team weighed varying proportions of the *nininat* in Years One and Two. Because of the high degree of variability in how much of each whale was weighed and the high degree of variability in share weights within a single whale, these estimates of total usable weight must be considered very approximate. Table D-7 shows the number of crewshares and/or crew member shares weighed from each Year One and Year Two whale.

As is illustrated in Tables D-8 and D-9, the number of crewshares for each whale was multiplied by the average crewshare weight to estimate the weight of the *nininat*. The total *nininat* from all whales was approximately 114,975 pounds in Year One and 140,040 pounds in Year Two.

The above discussion refers only to the *nininat* portion of the whale. The *tavsi* and *uati* shares comprised the remainder of the usable 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 distributed at a number of public events and feasts later in the year. Occasions for public sharing and distribution of whale included: a celebrative feast at the

TABLE D-9: YEAR TWO (1988) BARROW BOWHEAD WHALE HARVEST, ESTIMATED TOTAL USABLE POUNDS PER WHALE

Date	NSB Whale ID Number	Length	Number of Crew-Shares[1]	Average Crew-Share Weight	Total *Nininat* Weight[2]	Total *Tavsi & Uati* Weight[3]	Total Usable Weight of Whale
4/24/88	88B1	29'	39	215	8,385	5,590	13,975
4/25/88	88B2	29'8"	30	283[4]	8,490	5,660	14,150
4/25/88	88B3	29'8"	30	269	8,070	5,380	13,450
4/25/88	88B4	25'6"	23	239[4]	5,497	3,665	9,162
4/25/88	88B5	29'2"	26	260[4]	6,760	4,507	11,267
5/2/88	88B6	27'4"	39	228	8,892	5,928	14,820
5/4/88	88B7	26'10"	38	224	8,512	5,675	14,187
5/6/88	88B8	24'7"	38	111	4,218	2,812	7,030
9/15/88[5]	88B9	47'10"	25	994	24,853	16,568	41,421[7]
9/17/88[5]	88B10	49'6"	25	1,108	27,692	18,462	46,154[7]
9/17/88[5]	88B11	51'3"	21	1,365	28,671	19,114	47,785[6]
Total:	n/a	n/a	334	5,296	140,040	93,428	233,401
Average:	n/a	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 estimated from crewshare 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 usable 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 crewshares for these three whales where weighed after they had been combined with other crewshares received on the same day. The average crewshare weight of the three (260 pounds) was assigned to the whale measuring 29'2". Based on the available combined weights the average crewshare 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 usable 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 usable 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, 1993

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 usable whale weight. The *tavsi* and *uati* shares combined equaled approximately 40 percent of the entire usable whale weight of the two whales. The study team used that standard percentage to estimate all the *tavsi* and *uati* weights, and thus the total usable whale weights .

In Years One and Two in Wainwright, the study team developed a method of estimating usable weights without weighing any portion of the whale. This method was used in developing estimates of usable weight for Barrow's Year Three bowheads. Therefore, the Wainwright method is described below.

A formula was developed to estimate usable product from Wainwright whales based upon (1) the length of each landed whale and (2) the study team estimate of usable weight from Year One and Year Two Barrow bowhead harvests (see SRB&A and ISER 1991 - draft). The study team examined existing data on Barrow whales and calculated usable weight per foot length for "short" (24 to 34 feet long) and "long" (46 to 56 feet) whales for which weight data were available and then extrapolated from those length-to-weight ratios to arrive at usable weights per foot for mid-sized whales (35 to 45 feet).

In 1987 and 1988, Barrow whalers harvested 11 "short" whales that ranged in length from 24.5 to 30.5 feet. Based on the total usable weight harvested

from these whales, the study team calculated an average of 490 pounds per foot length for whales in this size range (Table D-10).

To cross-check the feasibility of using one average weight per foot for this range of whale lengths, the study team selected sub-ranges and averaged the weights for those sub-ranges (Table D-11), then compared them to the overall weight per foot for the 24.6 to 30.5 foot range. The smallest weight per foot average belonged to the shortest set of whales, 24.6 to 25.5 feet at 323 usable pounds per foot, while the largest per foot average belonged to the second shortest set of whales, 26.8 to 27.8 feet at 630 usable pounds per foot. Because the pounds per foot did not increase proportionately with the length of the whales, our choice to average the pounds per foot length for all whales between 24 and 31 feet was reinforced.

The existence of data on Barrow whales in the 50 foot range allowed the study team to use a similar process for estimating the usable weight of larger whales. In spring of 1987, Barrow crews harvested one 51.3 foot whale that yielded an estimated 64,213 pounds of usable product. That fall, a 51.25 foot whale was harvested of which approximately half the meat was spoiled and therefore was unusable. The usable portion of the whale weighed approximately 31,357 pounds. Rather than adjusting this whale's usable weight upwards to approximate an unspoiled whale at this length, the study team decided to accept the low usable weight figure since spoilage does occur occasionally and, based on field observations in Barrow, was more likely to occur with whales in the larger size category. Thus, the average usable weight per foot of length for the two 51 foot whales harvested in Barrow was 932 pounds per foot.

Whales falling between 35 and 45 feet in length were estimated slightly differently than the above method. Possessing Barrow data for only one whale in this size range (a 36.75 foot whale), the study team extrapolated from the "short" and "long" whale weight-per-foot ratios to generate a weight-per-foot for whales falling between 35 and 45 feet. The 11 whales that averaged 490 pounds per foot averaged 28.13 feet in length (Table D-10). The "long" whales that averaged 932 pounds per foot were 51.25 feet

TABLE D-10: SUMMARY STATISTICS FOR 24 TO 31 FOOT WHALES
BARROW 1987 AND 1988

NSB Whale ID Number	Date Harvested	Length (in feet)	Estimated Usable Weight
87-B1	5/1/87	30.5'	17,290
87-B2	5/2/87	29.3'	13,750
87-B7	10/29/87	27.8'	22,620
88-B1	4/24/88	29.0'	13,975
88-B2	4/25/88	29.7'	14,150
88-B3	4/25/88	29.7'	13,450
88-B4	4/25/88	25.5'	9,162
88-B5	4/25/88	29.2'	11,267
88-B6	5/2/88	27.3'	14,820
88-B7	5/4/88	26.8'	14,187
88-B8	5/6/88	24.6'	7,030
Average length:		28.13'	
Average usable weight:			13,791

Average usable weight per foot length: 490 pounds of usable product per foot length for bowhead whales between 24.6 and 30.5 feet in length.

Source: Stephen R. Braund & Associates, 1993

TABLE D-11: AVERAGE USABLE WEIGHT PER FOOT LENGTH FOR SUB-RANGES OF 24 TO 31 FOOT WHALES, BARROW 1987 AND 1988

Date Harvested	Length (in feet)	Estimated Usable Weight
Subrange #1:		
5/6/88	24.6'	7,030
4/25/88	25.5'	9,162
Totals:	50.1	16,192
Average pounds per foot:	323	
Subrange #2:		
5/4/88	26.8'	14,187
5/2/88	27.3'	14,820
10/29/87	27.8'	22,620
Totals:	81.9	51,627
Average pounds per foot:	630	
Subrange #3:		
4/24/88	29.0'	13,975
4/25/88	29.2'	11,267
5/2/87	29.3'	13,750
4/25/88	29.7'	14,150
4/25/88	29.7'	13,450
Totals:	146.9	66,592
Average pounds per foot:	453	
Subrange #4:		
5/1/87	30.5'	17,290
Average pounds per foot:	567	

Source: Stephen R. Braund & Associates, 1993

long. As an example, a 44 foot whale's usable weight was calculated as follows. Considering the difference between the average lengths to be a continuum, 44 feet falls at 69 percent between 28.13 and 51.25 feet. This percentage can then be applied to a similar continuum for pounds per foot from 490 to 932. Sixty-nine percent of the difference between those weights is 305 pounds, which is added to the base weight of 490 to give a usable weight per foot of 795 for a 44 foot whale. Thus, a 44 foot whale would be estimated to yield approximately 34,940 pounds of usable product.

As mentioned previously, the calculation of Barrow Year Three bowhead usable weights relied in part on the above method used to calculate the usable weight of Wainwright whales. The NSB Wildlife Management Department provided preliminary estimates of live weight in kilograms of Barrow Year One, Year Two and Year Three landed whales (J.C. George, personal communication). We divided our estimates of usable weight for Year One and Year Two bowheads by the live weights for those whales and found that the estimated usable weights averaged 57 percent of the live weights. For Year Three, we used the Wainwright method (multiplying the appropriate pounds per foot by the length of each whale) to estimate usable weight. We then calculated the percentage of live weight that these usable weights represented and averaged the percentages for the 10 whales. The estimated usable weight averaged 45 percent of the live weight when using the Wainwright pounds-per-foot method of calculating usable weight. The Year Three usable weights used in this report are the result of taking 45 percent of the live weights for Year Three whales. Table D-12 presents summary statistics on the Year Three bowhead harvest.

TABLE D-12: YEAR THREE (1989) BARROW BOWHEAD WHALE HARVEST, ESTIMATED TOTAL USABLE POUNDS PER WHALE

NSB Whale ID Number	Date Harvested	Length	Total Usable Weight of Whale
89B1	4/23/89	29' 4"	11,496
89B2	5/15/89	48' 3"	52,306
89B3	5/29/89	55' 7"	90,065
89B4	10/1/89	46' 3"	42,044
89B5	10/1/89	46'11"	50,819
89B6	10/1/89	43' 2"	35,683
89B7	10/1/89	48' 0"	49,785
89B8	10/10/89	38' 9"	21,532
89B9	10/25/89	26' 9"	14,730
89B10	10/28/89	26' 8"	9,187
Total:			377,647
Average:		40'10"	37,765

Source: Stephen R. Braund & Associates, 1993

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.