

**The Subsistence Harvest of Seals and Sea Lions
by Alaska Natives in the
Norton Sound-Bering Strait Region, Alaska, 1996-97**

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ABSTRACT

This report describes the subsistence takes of bearded seal (*Erignathus barbatus*), ringed seal (*Phoca hispida*), spotted seal (*Phoca largha*), ribbon seal (*Phoca fasciata*), and Steller sea lion (*Eumetopias jubatus*) by Alaska Natives in selected communities in the Norton Sound-Bering Strait region of northwest Alaska during the 12-month period February 1996 through January 1997. The information, including size of take, seasons, geographic distribution, and age and sex of the harvest, derives from systematic interviews with hunters and users of marine mammals in 319 households in six of 16 communities in the Norton Sound-Bering Strait area (Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins). The research was conducted cooperatively by Kawerak, Inc., a non-profit, regional Native organization, and the Division of Subsistence, Alaska Department of Fish and Game, under contract with the National Marine Fisheries Service. Local research assistants trained as part of the project assisted in the collection of information.

During the study year, the estimated subsistence take of all seals by Alaska Natives in the six communities was 4,223 seals. Of the take, 86.7 percent (3,660 seals) were harvested and 13.3 percent (563 seals) were struck and lost. In terms of numbers, the regional seal take was fairly evenly divided among bearded seal (36.2 percent of total take), ringed seal (33.1 percent), and spotted seal (29.0 percent). In addition, 71 ribbon seals were taken, or 1.7 percent of the total take. No households reported taking sea lions during this period. The largest seal takes were in the St. Lawrence Island communities of Gambell (2,252 seals) and Savoonga (797 seals).

All four species of seals were harvested by hunters in all six communities. The per capita seal harvest of all species was 1.5 seals per Alaska Native living in the study communities. Of the study communities, Gambell had the highest per capita seal

harvest (3.1 seals per Alaska Native), while most of the other study communities had a per capita seal harvest of approximately one seal.

At a regional level, seals were taken in all months of the study year with seasonal peaks in the fall (September-October) and in the spring (May-June). Adults comprised about one-half of the harvest, juveniles about one-third, and pups less than ten percent. The sex of 69.6 percent of the harvest was reported as unknown. Of the harvest where the sex was known, 60.9 percent were male and 39.1 percent were female. The seasonality and age/sex composition of the seal harvest varied by species and by community.

Comparisons of the annual take of seals during the 1996-97 study year with other years can be done for only a few communities. In general, these comparisons suggest fairly stable total takes with variability in species composition over the past ten years. In key respondent interviews, hunters observed that over a longer time period—30 years—seal harvests have declined. This was primarily attributed to a decline in dog teams, and a subsequent decline in the number of seals needed for dog food, after snowmachines were introduced. For the most part, hunters in the region reported that all the seal populations were stable, although some had noticed modest declines or increases in some seal species over time.

TABLE OF CONTENTS

TABLE OF CONTENTS	ii
LIST OF TABLES	iii
LIST OF FIGURES	iv
ACKNOWLEDGEMENTS	v
INTRODUCTION	1
METHODOLOGY	3
REGIONAL SETTING	11
THE SUBSISTENCE TAKE OF SEAL AND SEA LION IN 1996-97	14
OVERVIEW OF FINDINGS	14
Per Capita Seal Harvests	14
Geographic Distribution of the Seal Takes	17
Seasonal Distribution of the Seal Takes	17
Age and Sex Distribution of Seal Harvests	19
Hunting Participation and Harvest Success	20
BEARDED SEAL	27
RINGED SEAL	32
SPOTTED SEAL	35
RIBBON SEAL	38
STELLER SEA LION	40
DISCUSSION	42
REFERENCES	47
APPENDIX A. SURVEY INSTRUMENT USED IN HOUSEHOLD INTERVIEWS, 1997	49
APPENDIX B. INTERVIEW GUIDE FOR KEY RESPONDENT INTERVIEWS WITH SEAL HUNTERS, 1997	55
APPENDIX C. TOTAL SUBSISTENCE TAKES OF SEAL AND SEA LION BY SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97	57
APPENDIX D. SUBSISTENCE TAKES OF SEAL AND SEA LION BY COMMUNITY, NORTON SOUND-BERING STRAIT REGION, 1996-97	61

LIST OF TABLES

Table 1.	Sampling Information by Community, Norton Sound-Bering Strait Seal and Sea Lion Surveys, 1996-97.....	8
Table 2.	Population of Norton Sound-Bering Strait Communities, 1990 and 1996.....	12
Table 3.	Estimated Subsistence Takes of Seals and Sea Lions by Alaska Natives, Six Norton Sound-Bering Strait Communities, 1996-97	15
Table 4.	Species Composition of Seal Take by Six Norton Sound-Bering Strait Communities, 1996-97	15
Table 5.	Subsistence Seal and Sea Lion Harvest, Take, and Use by Alaska Natives, 1996-97, with Confidence Intervals and Statistical Ranges, in Six Norton Sound-Bering Strait Communities	16
Table 6.	Age and Sex Distribution of Seal Harvests, All Species, by Alaska Natives in Six Norton Sound-Bering Strait Communities, 1996-97.....	21
Table 7.	Age and Sex Distribution of Bearded Seal Harvests by Alaska Natives in Six Norton Sound-Bering Strait Communities, 1996-97	21
Table 8.	Age and Sex Distribution of Ringed Seal Harvests by Alaska Natives in Six Norton Sound-Bering Strait Communities, 1996-97	22
Table 9.	Age and Sex Distribution of Spotted Seal Harvests by Alaska Natives in Six Norton Sound-Bering Strait Communities, 1996-97	22
Table 10.	Age and Sex Distribution of Ribbon Seal Harvests by Alaska Natives in Six Norton Sound-Bering Strait Communities, 1996-97	23
Table 11.	Age and Sex Distribution of Sea Lion Harvests by Alaska Natives in Six Norton Sound-Bering Strait Communities, 1996-97	23
Table 12.	Subsistence Hunting, Harvest, and Use of Seals, All Species, by Six Norton Sound-Bering Strait Communities, 1996-97	24
Table 13.	Percent of Alaska Native Households Hunting Seals and Sea Lions, By Species, Six Norton Sound-Bering Strait Communities, 1996-97.....	28
Table 14.	Sampling Information, Division of Subsistence Community Baseline Studies, Norton Sound-Bering Strait Region, 1980-95.....	45

Table 15. Seal and Sea Lion Harvests in Selected Communities, Division of Subsistence Community Baseline Studies, Norton Sound-Bering Strait Region, 1980-95.....	45
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LIST OF FIGURES

Fig. 1. Map of Norton Sound-Bering Strait Region with Community Locations.	2
Fig. 2. General Distribution of Bearded Seal and Ringed Seal in Alaska.....	4
Fig. 3. General Distribution of Spotted Seal and Ribbon Seal in Alaska.	5
Fig. 4. General Distribution of Steller Sea Lion in Alaska.	6
Fig. 5. Estimated Seasonally Adjusted Take of Seals and Sea Lions by Alaska Natives in Six Norton Sound-Bering Strait Communities, 1996-97.....	18
Fig. 6. Specialization in Bearded Seal Takes: Percent of Hunting Households by Percent of Take, 1996-97	25
Fig. 7. Specialization in Ringed Seal Takes: Percent of Hunting Households by Percent of Take, 1996-97	25
Fig. 8. Specialization in Spotted Seal Takes: Percent of Hunting Households by Percent of Take, 1996-97	26
Fig. 9. Specialization in Ribbon Seal Takes: Percent of Hunting Households by Percent of Take, 1996-97	26

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Heartfelt thanks are owed to the many elders and hunters who allowed us to interview them at length about their knowledge of seals and sea lions and to the several hundred households who volunteered to report their subsistence seal harvests. We are indebted to the locally hired research assistants who carried out their survey work with care and diligence: Debbie Amarok in Golovin, Joel James in Gambell, William Kakoona in Brevig Mission, Wilson Okoomealingok in Savoonga, Joseph Pete in Stebbins, and Carrie Takak in Shaktoolik. Nita Towarak at the Bering Strait School District and Sandy Iknokinok at Kawerak, Inc. assisted with the Alaska Native names for seals used in this report.

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INTRODUCTION

This report summarizes the results of seal and sea lion harvest surveys of Alaska Native households in six of 16 communities in the Norton Sound-Bering Strait region of Alaska. The surveys were conducted in spring 1997 in Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins. Key respondent interviews with hunters in the study communities provided additional information on seal and sea lion hunting and ecology to supplement the harvest data. The research was conducted by the Division of Subsistence of the Alaska Department of Fish and Game in cooperation with Kawerak, Inc., a Native non-profit organization representing the Bering Strait region. Funding for the project was provided by the National Marine Fisheries Service, a part of the National Oceanic and Atmospheric Administration. The geographic area covered by this study is depicted in Figure 1.

The report provides information on the subsistence takes of bearded seal (*Erignathus barbatus*), ringed seal (*Phoca hispida*), spotted seal (*Phoca largha*), ribbon seal (*Phoca fasciata*), and Steller sea lion (*Eumetopias jubatus*), including hunting participation, seasons, age and sex of harvested animals, and number of animals struck and lost. Information was collected principally by local researchers trained in each community. The research was modeled after studies conducted by the Division in numerous communities in Bristol Bay, the Aleutian Islands, and the Gulf of Alaska (Wolfe and Mishler 1996). Although the harvest of seals for subsistence use has a long tradition in communities in the Norton Sound-Bering Strait region, little information has been systematically collected in recent years that describes local knowledge of seal populations and ecology and quantifies the number of seals harvested by species

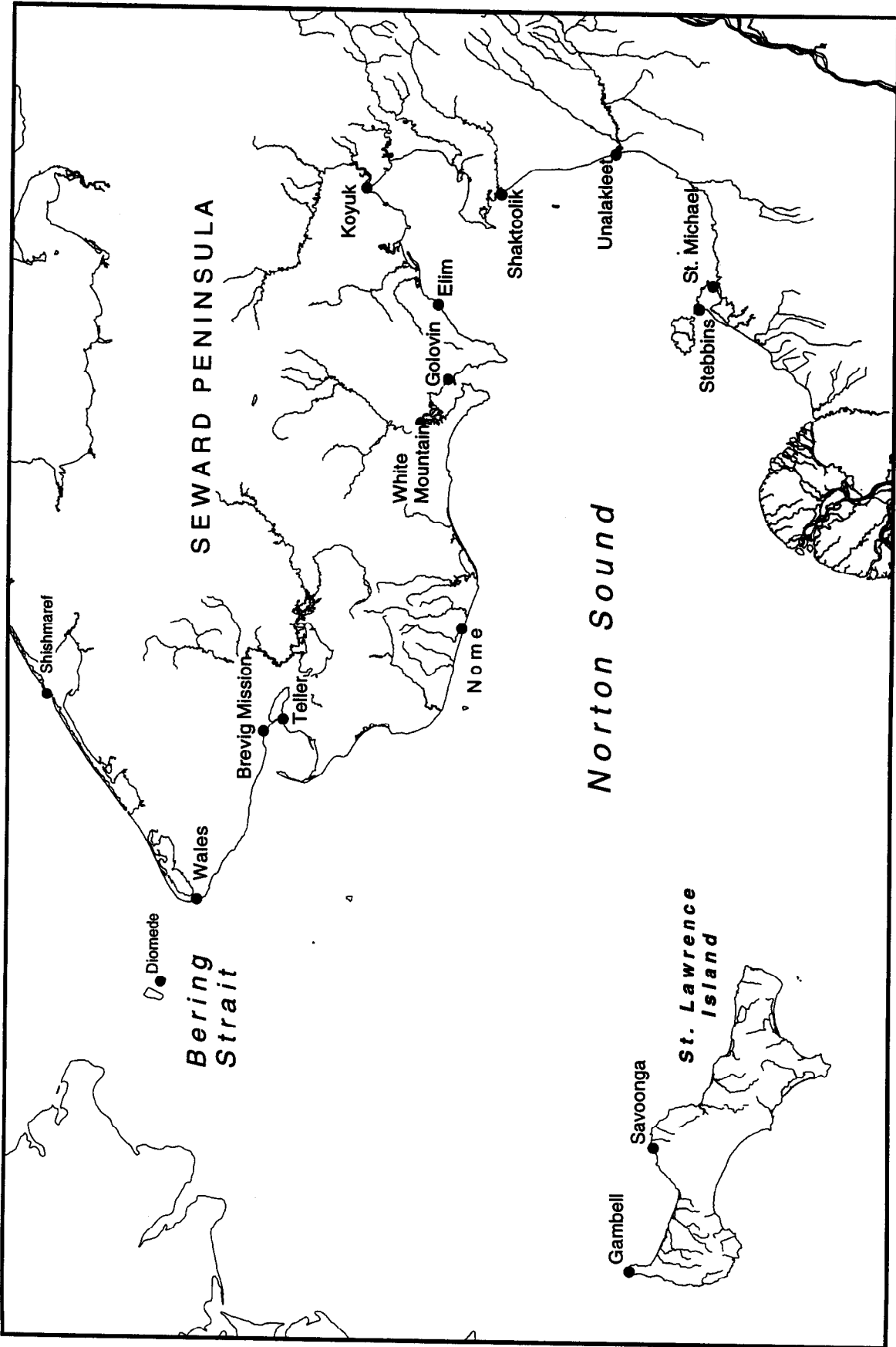


Fig. 1. Map of Norton Sound-Bering Strait Region with Community Locations.

and month. The report also presents a brief summary of seal and sea lion harvest data from previous Division studies in the region between 1980 and 1995. The ranges of the seal and sea lion species included in this study are presented in Figures 2, 3, and 4.

METHODOLOGY

Information on the subsistence takes of seal and sea lion in 1996-97 was collected through interviews with persons in 319 Alaska Native households in six coastal communities in the Norton Sound-Bering Strait region: Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins. Although marine mammals were harvested by all the region's communities, time and budget limitations prevented data collection in every one. The six study communities were selected by Kawerak and the Division of Subsistence primarily to provide geographical coverage of the Norton Sound-Bering Strait region, but other factors were also considered such as the extent of existing data, the size of the community, and the community's level of seal use. The study communities ranged in population size from 161 in Golovin to 636 in Gambell and represented three Alaska Native cultural groups: the Siberian Yup'ik (Gambell and Savoonga), the Iñupiat (Brevig Mission, Golovin, and Shaktoolik), and the Yup'ik (Golovin and Stebbins).

This report does not depict all seal and sea lion harvest and use in the Norton Sound-Bering Strait region. Because the study included fewer than one-half of the region's communities, much of the region's subsistence seal harvest remains undocumented. The study covered one 12-month period (February 1996 to January 1997). The range of variability of seal harvests from year to year is as yet undocumented, so the extent that this period may be "typical" is unknown. This report best serves as an initial step in understanding the subsistence take of seal in the region.

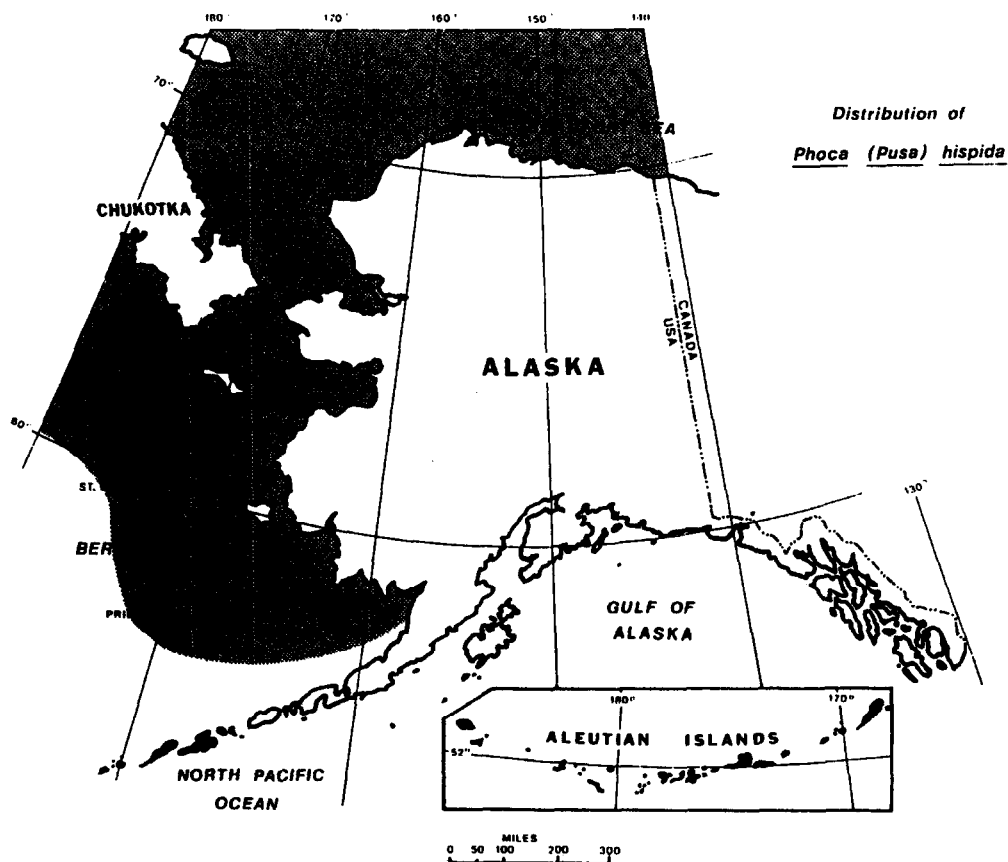
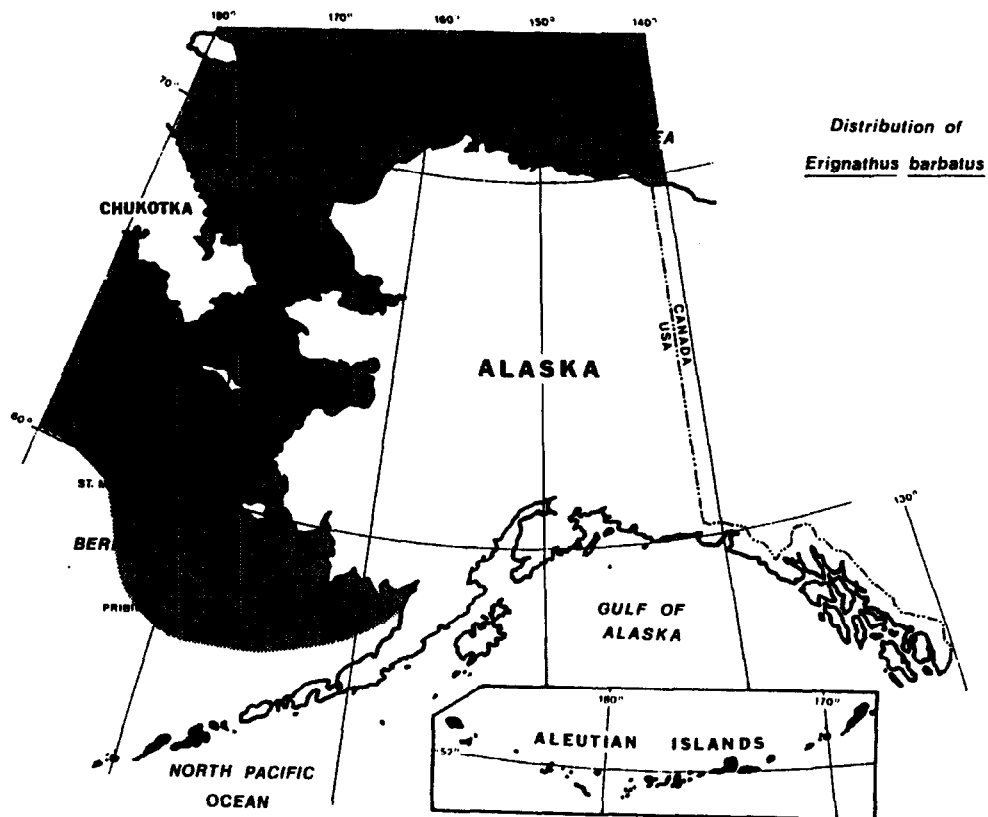


Fig. 2. [Top] General distribution of bearded seal (*Erignathus barbatus*) in Alaska. [Bottom] General distribution of ringed seal (*Phoca hispida*) in Alaska. (Source: Burns, Frost, and Lowry 1985)

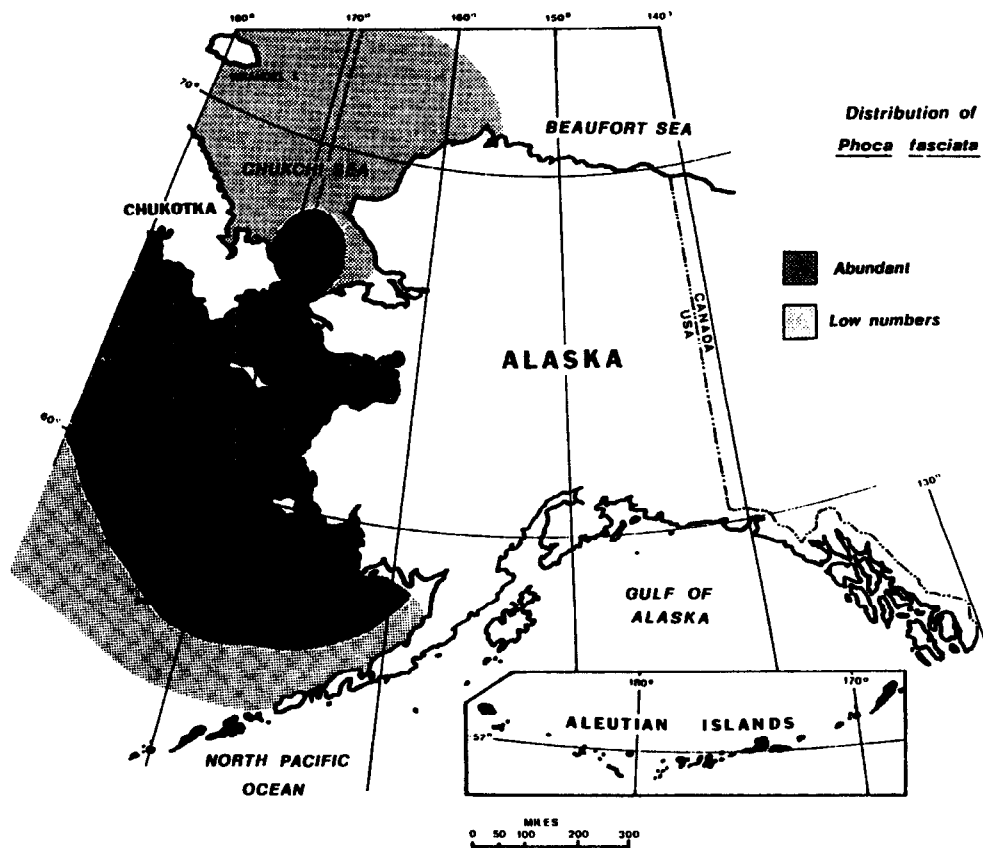
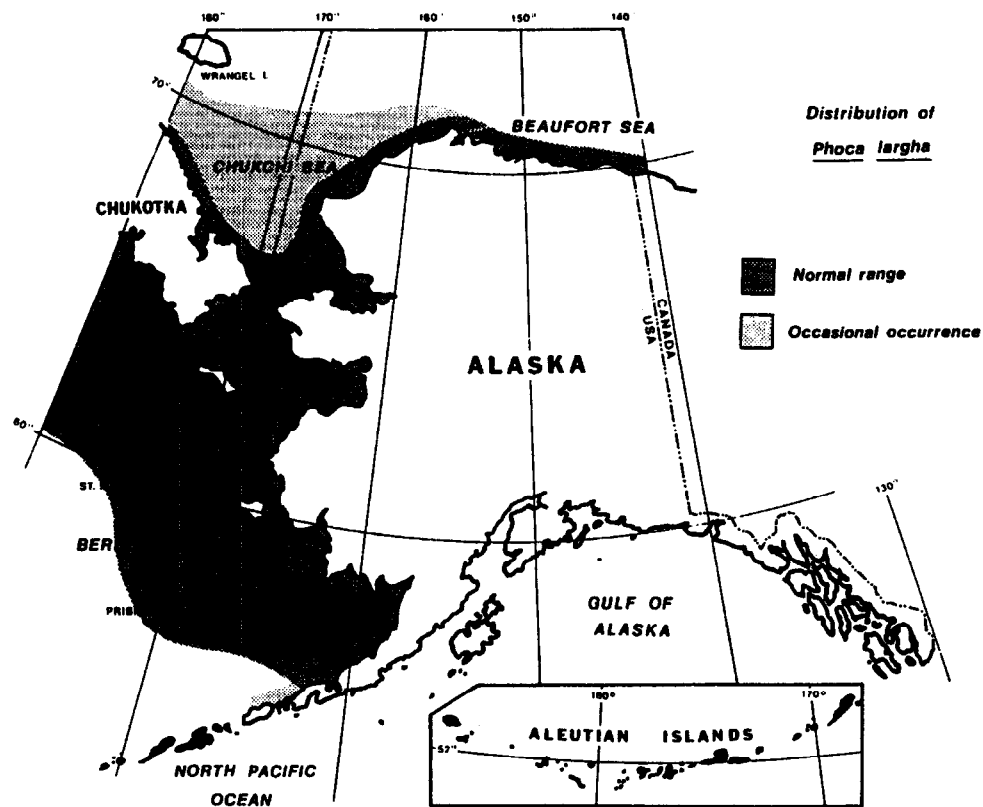


Fig. 3. [Top] General distribution of spotted seal (*Phoca largha*) in Alaska. [Bottom] General distribution of ribbon seal (*Phoca fasciata*) in Alaska. (Source: Burns, Frost, and Lowry 1985)

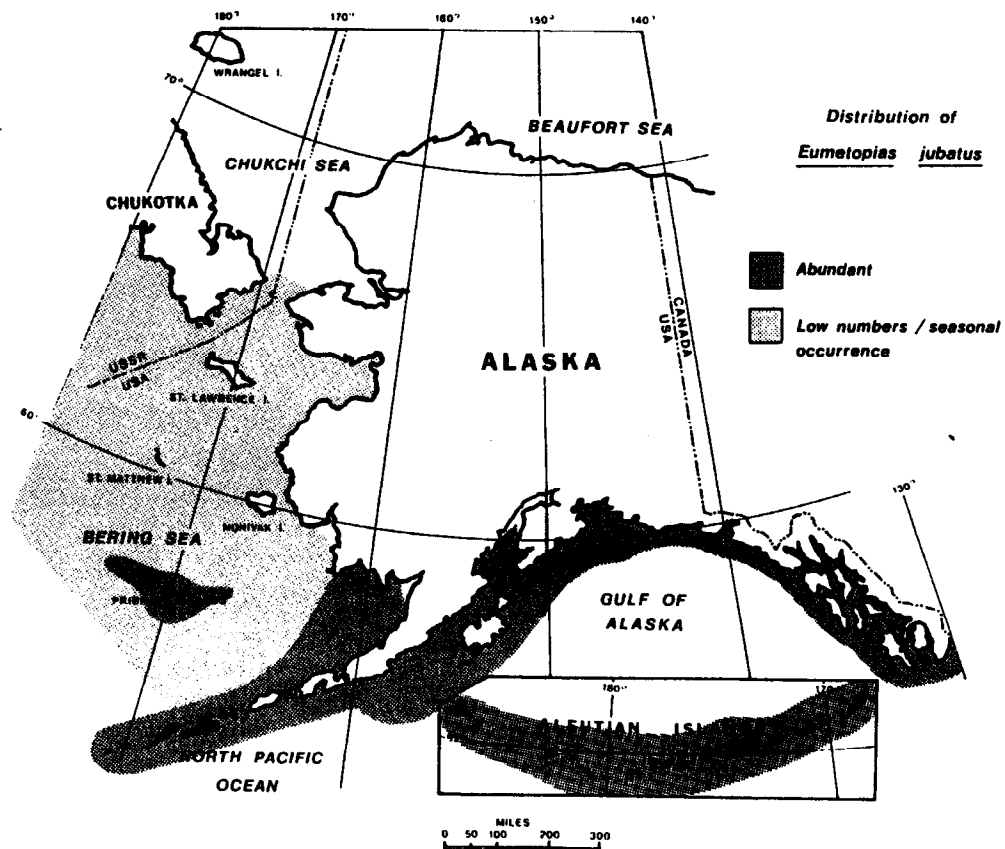


Fig. 4. General distribution of Steller sea lion (*Eumetopias jubatus*) in Alaska. (Source: Burns, Frost, and Lowry 1985)

A standard procedure of Division of Subsistence research in communities with Alaska Native governments is to seek approval of subsistence projects from local Native governments. In this project, Kawerak requested approval to conduct the study from local governments in each of the six communities. The local governments passed resolutions in support of the project and assisted the project in other ways, such as providing household lists and recruiting local research assistants to conduct the surveys.

The survey instrument administered in household interviews was similar to the one used in 1992-95 in 59 communities in Bristol Bay, the Aleutian Islands, Gulf of Alaska, and the Southeast Alaska archipelago (Appendix A). Respondents were asked to recall information about their household's harvest and use of five species of seals and sea lions for the 12-month period from February 1996 through January 1997. Hunters and household heads were asked to recall the number of seals and sea lions taken by household members during each month of this period. The survey contained questions about struck and lost animals, age of animals, and sex of animals. It also asked whether the household used, harvested, received, or gave away seal or sea lion during the study year.

Surveys were conducted by local researchers hired and supervised by Kawerak. The local researchers resided in the communities they surveyed and were familiar with the interviewed households and the community's seal hunting practices. Data collection occurred from March through April 1997. Division of Subsistence staff provided on-site training for the researchers in their communities. Both Kawerak and Division of Subsistence staff reviewed completed surveys, which were then forwarded to Division staff in Anchorage for data entry and analysis. Division staff wrote the project report which Kawerak reviewed.

**TABLE 1. SAMPLING INFORMATION BY COMMUNITY,
NORTON SOUND-BERING STRAIT SEAL AND SEA LION SURVEYS, 1996-97**

Community	Estimated 1997 Native Population	Type of Design	Number of Native Households	Surveyed Households	Percent of Households Surveyed	Number of Key Respondents Interviewed
Brevig Mission	199	Census	60	60	100.0%	2
Gambell	623	Random	142	70	49.3%	4
Golovin	147	Census	45	39	86.7%	5
Savoonga	675	Random	126	67	53.2%	2
Shaktolik	239	Two Strata	48	27	56.3%	4
Stebbins	<u>575</u>	Random	<u>107</u>	<u>56</u>	<u>52.3%</u>	<u>4</u>
Total	2,458		528	319	60.4%	21

Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

Permission to administer the household survey was asked of each respondent. Respondents were informed that participation in the surveys was voluntary and that their identities would be kept confidential in reports presenting the information. Persons who were interviewed as part of the harvest survey were not paid. Nearly all hunters and household heads generously offered their assistance to the study.

Sampling methods varied with the size of the community. A census sample was used in communities with less than 60 households (Brevig Mission and Golovin) and a 50 percent random sample was used in communities with 60 or more households (Gambell, Savoonga, and Stebbins) (Table 1). Although a census sample had been planned for Shaktolik, the local research assistant there primarily interviewed known seal hunting households. To retain the accuracy of a community-wide estimate, researchers chose to do a post-survey stratification of Shaktolik into two strata: seal hunting and non-seal hunting households. The local researcher assisted staff in placing the households not surveyed into one of these strata.

Before beginning the surveys, local researchers were provided with a list of households to survey. In communities with census sampling, this list included all households. In communities with random sampling, the list included a 50 percent random selection of households as well as a list of alternate households if some on the original list were not available. Community household lists were initially provided by each local government; local researchers updated the household lists as necessary during the course of the surveys. Because marine mammal hunting was legal only for Alaska Natives, only Native households were surveyed in this project. A Native household was defined as any household having at least one adult Alaska Native occupant.

A total of 319 households were surveyed (Table 1). The percentage of households surveyed in each community ranged from 100.0 percent in Brevig Mission to 49.3 percent in Gambell. Overall, 60.4 percent of all Alaska Native households in the six communities were surveyed.

Division of Subsistence staff also conducted key respondent interviews with two to five seal hunters in each community who were identified with the assistance of local researchers. These interviews provided qualitative information on local knowledge of the population status, biology, ecology, and hunting of seals and sea lions. Division staff used an interview guide in conducting these interviews (Appendix B). Overall, 21 individuals were interviewed as key respondents in the six study communities. Notes from these interviews were typed, keyworded, and organized into a computer searchable database.

In Appendices C and D, the statistical analysis presents harvest data by species for the six communities combined and for each community separately. The tables and figures in the appendices present data on the following:

- sampling design,
- percentage of Alaska Native households hunting, harvesting, using, receiving, and giving seal and sea lion,
- estimated community seal and sea lion harvest and take, including struck and lost,
- estimated community harvest of seal and sea lion by age and sex,
- seasonally adjusted seal and sea lion take by month, and
- reported and estimated harvest and take of each species by month.

The tables with reported or unexpanded harvests represent actual animals reported killed by surveyed hunters, so there are no fractions of animals. In the tables with estimated or expanded harvests, the takes of surveyed households are expanded to include an estimate of the harvests of households not surveyed. In communities with census and random sampling, the mean harvests of surveyed households in each community were attributed to Alaska Native households not surveyed in that community. In Shaktoolik, the harvest numbers were expanded within each stratum and then combined for a community estimate. Fractions of animals commonly result from the expansions. A harvest summary for all surveyed communities was generated by summing across the six communities.

Harvest months were unknown for some seals taken. These seals were assigned a harvest month based on the proportion of the known take for that seal species in that community. This information is presented in the appendices in tables called *Estimated Seasonally Adjusted Harvest and Take (Expanded)*. They are the source of most numbers in the report's narrative and in the graphic information presented in the appendices.

Data on the subsistence harvest of seal and sea lion collected in previous Division studies in the region are presented near the end of this narrative. These community-

based studies, taking place from 1980-95, typically examined the full range of fish and wildlife harvested in a community for subsistence. Information on marine mammal harvests was available from these studies for five communities: Brevig Mission (1989), Golovin (1989), Shishmaref (1995), Stebbins (1980), and Wales (1993). This information supplements that collected in the current study.

REGIONAL SETTING

The Norton Sound-Bering Strait region is located in western Alaska (Fig. 1) just south of the Arctic Circle. The region includes most of the Seward Peninsula and Norton Sound, as well as St. Lawrence and Diomed islands. The climate is predominantly subarctic, although local variations are considerable. Numerous rivers drain the area, most notably the Unalakleet, Koyuk, Fish, and Kuzitrin rivers. The interior taiga extends into the eastern portion of the region while the western portion is arctic tundra. Four small mountain ranges divide the central Seward Peninsula: the Darby, Bendeleben, Kigluaik, and York mountains. The Nulato Hills separate eastern Norton Sound from the Yukon River.

Five species of Pacific salmon are found in the region as well as several types of freshwater fish including Dolly Varden, grayling, northern pike, burbot, and whitefish. Marine fish and shellfish include herring, saffron cod, arctic cod, flounder, crab, and, in offshore areas, halibut. Many species of birds and waterfowl migrate to the region for nesting during the brief summer. Moose, caribou, brown bear, black bear, and muskox are present in at least parts of the region. Small game and a variety of furbearers are also abundant. Several small, privately-owned reindeer herds are located on the Seward Peninsula, supplying some meat and income to the region. A variety of marine mammals are found in the northern Bering Sea, including bowhead whale, gray whale,

**TABLE 2. POPULATION OF NORTON SOUND-BERING STRAIT
COMMUNITIES, 1990 AND 1996**

Community	1990 Census Population	1996
		Department of Labor Population Estimates
Brevig Mission	198	261
Diomede	178	172
Elim	264	284
Gambell	525	636
Golovin	127	161
Koyuk	231	280
Nome	3,500	3,511
Saint Michael	295	329
Savoonga	519	615
Shaktoolik	178	231
Shishmaref	456	537
Stebbins	400	507
Teller	232	278
Unalakleet	714	798
Wales	161	165
White Mountain	<u>180</u>	<u>212</u>
Total	8,158	8,977

Source: Alaska Department of Labor 1997.

beluga whale, walrus, bearded seal, ringed seal, spotted seal, ribbon seal, and sea lion (Conger and Magdanz 1990). Most of the fish and wildlife resources of the region are migratory with periods of seasonal abundance.

Sixteen communities are located in the Norton Sound-Bering Strait region, most of them along the coast. These communities stretch from Stebbins in the south to Shishmaref in the north, and include the island communities of Gambell, Savoonga, and Diomede. The region's estimated 1996 population was 8,977 (Table 2). With almost 40 percent of the region's population, Nome is by far the largest community, serving as the regional hub for government, services, transportation, and commerce. In 1996 the other

communities ranged in size from 161 people in Golovin to 798 in Unalakleet. The region is culturally diverse, including Iñupiat, Yup'ik, Siberian Yup'ik, and Euroamerican cultural traditions.

The harvest of fish and wildlife for subsistence use continues to be an important sector in the region's subsistence-cash economy. In communities where studies have occurred, annual wild food harvests have ranged from 579 to 997 pounds edible weight per person (Scott, Paige, Jennings, and Brown 1995). In some communities, particularly in the region's western portion, marine mammals provide more than 50 percent of the total subsistence harvest (Scott et al. 1995). Timing of subsistence activities is primarily a function of resource availability and abundance. Environmental factors such as weather and ice conditions also influence access to resources. In some years, poor sea ice conditions, lack of snow, and strong winds can prevent or delay hunters from reaching subsistence harvest areas. These factors should be remembered when interpreting the findings of a single year's subsistence survey.

THE SUBSISTENCE TAKE OF SEAL AND SEA LION IN 1996-97

Overview of Findings

During the study year (February 1996-January 1997), an estimated 4,223 seals of all species were taken by Alaska Native households in the six surveyed communities (Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins). No households reported taking sea lions during this period. The number of seals taken was fairly evenly divided among bearded, ringed, and spotted seals. Of the total take, bearded seal accounted for 1,531 seals (36.2 percent), ringed seal for 1,398 (33.1 percent), and spotted seal for 1,223 (29.0 percent). In addition, 71 ribbon seals were taken, or 1.7 percent of the total take (Tables 3 and 4). Of the seal take, 3,660 seals (86.7 percent) were harvested and 563 seals (13.3 percent) were struck and lost.

Per Capita Seal Harvests

The per capita seal harvest for all species was 1.5 seals per Alaska Native living in the six surveyed communities. By species, the per capita harvests in the six surveyed communities were .53 bearded seal, .51 ringed seal, .42 spotted seal, and .03 ribbon seal (Table 5). Gambell had by far the highest per capita seal harvest (3.09 seals per Alaska Native), about 2.5 times that of the next highest community. Seal harvests in Brevig Mission, Golovin, Savoonga, and Shaktoolik were all approximately one seal per person, while in Stebbins the per capita harvest was slightly more than one-half seal (Table 5).

TABLE 3. ESTIMATED SUBSISTENCE TAKES OF SEALS AND SEA LIONS BY ALASKA NATIVES, SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97

	Estimated Total ¹			Lower and Upper Confidence Range for Total Take
	<u>Harvest</u>	<u>Struck and Lost</u>	<u>Total Take</u>	
Bearded Seal	1,304.4 85.2%	226.0 14.8%	1,530.5 100.0%	1,262 - 1,810
Ringed Seal	1,257.9 90.0%	140.2 10.0%	1,398.1 100.0%	1,098 - 1,738
Spotted Seal	1,028.5 84.1%	194.5 15.9%	1,223.0 100.0%	989 - 1,467
Ribbon Seal	68.9 97.2%	2.0 2.8%	70.9 100.0%	45 - 111
Sea Lion	0 0.0%	0 0.0%	0 0.0%	0 - 0
All Seals	3,659.7 86.7%	562.7 13.3%	4,222.5 100.0%	3,394 - 5,126

¹ Includes six study communities: Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins. Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

TABLE 4. SPECIES COMPOSITION OF SEAL TAKE BY SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97

Community	Percent of Total Seal Take				
	Bearded Seal	Ringed Seal	Spotted Seal	Ribbon Seal	Sea Lion
Brevig Mission	23.3	36.3	34.4	5.9	0
Gambell	40.4	26.6	31.7	1.3	0
Golovin	20.4	45.9	32.5	1.2	0
Savoonga	35.9	31.6	30.4	2.1	0
Shaktoolik	33.3	48.7	17.5	0.5	0
Stebbins	<u>32.8</u>	<u>52.2</u>	<u>14.2</u>	<u>0.8</u>	<u>0</u>
Total	36.2	33.1	29.0	1.7	0

Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

**TABLE 5. SUBSISTENCE SEAL AND SEA LION HARVEST, TAKE, AND USE BY ALASKA
NATIVES, 1996-97, WITH CONFIDENCE INTERVALS AND STATISTICAL RANGES,
IN SIX NORTON SOUND-BERING STRAIT COMMUNITIES**

	Number Of Animals Harvested Per Capita	Percent of Native Households Harvesting	Percent of Native Households Using	Estimated Number Harvested	Estimated Number Struck and Lost	Total Take	Confidence Interval (+/- %)	Lower Range Estimate	Upper Range Estimate
BEARDED SEAL									
Brevig Mission	.26	36.7%	86.7%	52.0	11.0	63.0	0.0%	63.0	63.0
Gambell	1.21	81.4%	91.4%	750.6	158.2	908.8	14.6%	776.6	1,041.0
Golovin	.21	20.5%	71.8%	31.2	9.2	40.4	26.5%	35.0	51.1
Savoonga	.41	46.3%	82.1%	274.6	11.3	285.9	25.2%	213.8	357.9
Shaktolik	.32	40.2%	79.1%	75.8	11.5	87.2	40.7%	58.0	122.7
Stebbins	<u>.21</u>	<u>57.1%</u>	<u>87.5%</u>	<u>120.4</u>	<u>24.8</u>	<u>145.2</u>	<u>20.1%</u>	<u>116.1</u>	<u>174.4</u>
Total	.53	54.1%	85.1%	1,304.4	226.0	1,530.5	18.3%	1,262.4	1,810.0
RINGED SEAL									
Brevig Mission	.45	18.3%	18.3%	89.0	9.0	98.0	0.0%	98.0	98.0
Gambell	.92	71.4%	77.1%	572.1	26.4	598.4	20.8%	473.7	723.2
Golovin	.53	12.8%	15.4%	77.3	13.8	91.2	36.8%	79.0	124.7
Savoonga	.35	59.7%	86.6%	237.0	15.0	252.0	22.8%	194.6	309.4
Shaktolik	.45	34.2%	65.7%	108.7	18.6	127.3	49.6%	83.0	190.4
Stebbins	<u>.30</u>	<u>51.8%</u>	<u>71.4%</u>	<u>173.9</u>	<u>57.3</u>	<u>231.2</u>	<u>26.5%</u>	<u>169.9</u>	<u>292.5</u>
Total	.51	50.2%	65.2%	1,257.9	140.2	1,398.1	24.3%	1,098.2	1,738.1
SPOTTED SEAL									
Brevig Mission	.43	36.7%	36.7%	85.0	8.0	93.0	0.0%	93.0	93.0
Gambell	.92	74.3%	82.9%	570.0	144.0	714.1	18.0%	585.5	842.6
Golovin	.32	25.6%	82.1%	47.3	17.3	64.6	25.2%	56.0	80.9
Savoonga	.35	58.2%	73.1%	235.1	7.5	242.6	23.6%	185.4	299.8
Shaktolik	.17	29.8%	38.7%	41.4	4.3	45.7	35.6%	32.0	62.0
Stebbins	<u>.09</u>	<u>25.0%</u>	<u>32.1%</u>	<u>49.7</u>	<u>13.4</u>	<u>63.1</u>	<u>41.3%</u>	<u>37.0</u>	<u>89.1</u>
Total	.42	48.0%	60.9%	1,028.5	194.5	1,223.0	20.0%	988.9	1,467.4
RIBBON SEAL									
Brevig Mission	.07	11.7%	11.7%	14.0	2.0	16.0	0.0%	16.0	16.0
Gambell	.05	8.6%	8.6%	30.4	0.0	30.4	73.7%	15.0	52.8
Golovin	.02	5.1%	5.1%	2.3	0.0	2.3	49.9%	2.0	3.5
Savoonga	.03	9.0%	9.0%	16.9	0.0	16.9	55.8%	9.0	26.4
Shaktolik	.01	3.0%	7.5%	1.4	0.0	1.4	107.4%	1.0	3.0
Stebbins	<u>.01</u>	<u>1.8%</u>	<u>3.6%</u>	<u>3.8</u>	<u>0.0</u>	<u>3.8</u>	<u>135.3%</u>	<u>2.0</u>	<u>9.0</u>
Total	.03	6.8%	7.6%	68.9	2.0	70.9	56.0%	45.0	110.6
SEA LION									
Brevig Mission	.00	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0	0.0
Gambell	.00	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0	0.0
Golovin	.00	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0	0.0
Savoonga	.00	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0	0.0
Shaktolik	.00	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0	0.0
Stebbins	<u>.00</u>	<u>0.0%</u>	<u>0.0%</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0%</u>	<u>0.0</u>	<u>0.0</u>
Total	.00	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0	0.0
ALL SEALS									
Brevig Mission	1.21	50.0%	86.7%	240.0	30.0	270.0	0.0%	270.0	270.0
Gambell	3.09	84.3%	92.9%	1,923.1	328.6	2,251.7	18.1%	1,850.8	2,659.6
Golovin	1.08	25.6%	89.7%	158.1	40.3	198.5	31.1%	172.0	260.2
Savoonga	1.13	80.6%	92.5%	763.6	33.8	797.4	24.6%	602.8	993.5
Shaktolik	.95	43.2%	100.0%	227.3	34.4	261.6	44.5%	174.0	378.1
Stebbins	<u>.60</u>	<u>71.4%</u>	<u>92.9%</u>	<u>347.8</u>	<u>95.5</u>	<u>443.3</u>	<u>27.5%</u>	<u>325.0</u>	<u>565.0</u>
Total	1.49	68.2%	92.5%	3,659.9	562.7	4,222.5	21.4%	3,394.6	5,126.4

Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

Geographic Distribution of the Seal Takes

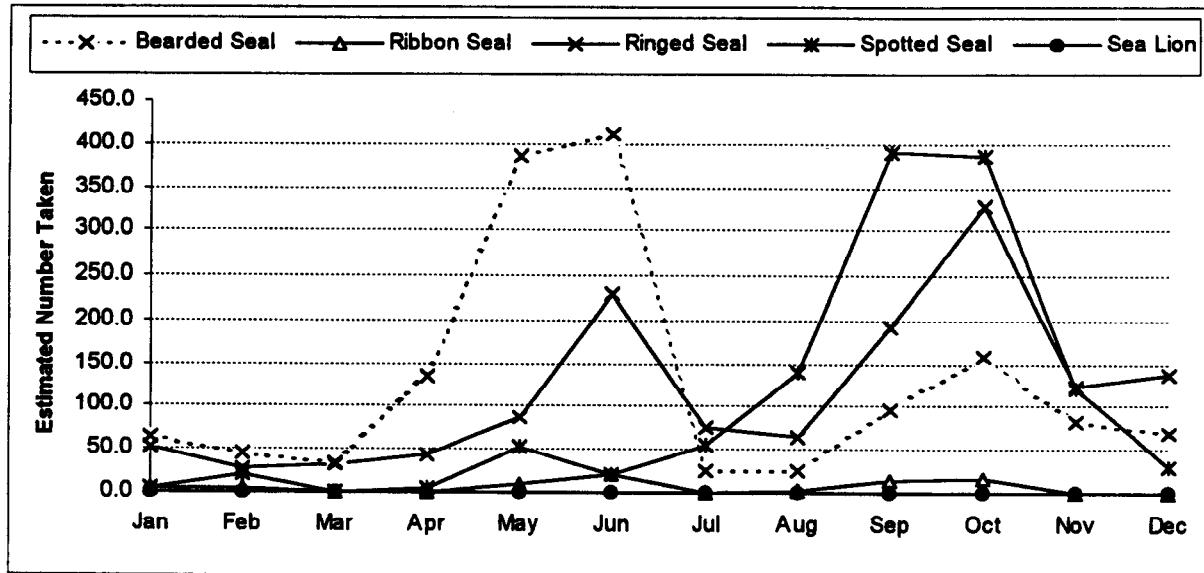
In terms of absolute numbers, the largest seal takes were in the two St. Lawrence Island communities—Gambell (2,252 seals) and Savoonga (797 seals). Following these were Stebbins (443 seals), Brevig Mission (270 seals), Shaktoolik (262 seals), and Golovin (199 seals). Gambell's and Savoonga's seal harvests were largest because the communities depend almost entirely on the sea—especially marine mammals—for their subsistence food, whereas in mainland communities caribou and moose are part of the subsistence harvest, in addition to marine mammals and fish.

All four species of seals were harvested by hunters in all six communities. Bearded seal accounted for the largest proportion of the seal take in both Gambell and Savoonga, while ringed seal accounted for the largest proportion in the other four study communities (Brevig Mission, Golovin, Shaktoolik, and Stebbins). In no community did spotted seals constitute the largest part of the take. Nevertheless, spotted seals contributed substantially to each community's seal take, accounting for about one-third of the take in Brevig Mission, Gambell, Golovin, and Savoonga (Table 4).

Seasonal Distribution of the Seal Takes

Combining all six communities, seals were harvested in every month of the study year (February 1996-January 1997) (Fig. 5). In each community, seals were taken in eight or more months of the year. In Gambell and Savoonga, seals were taken in every month (Appendix D). Combining all six communities, most seals were taken in fall (16.4 percent in September and 21.0 percent in October) and in spring (12.6 percent in May and 16.1 percent in June). About two-thirds of the seal take occurred in these four

Fig. 5. Estimated Seasonally Adjusted Take of Seals and Sea Lions by Alaska Natives in Six Norton Sound-Bering Strait Communities, 1996-97



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bearded Seal	63.2	46.7	35.0	135.7	384.7	410.5	24.9	24.5	95.4	157.8	82.5	69.8
Percentage	4.1%	3.1%	2.3%	8.9%	25.1%	26.8%	1.6%	1.6%	6.2%	10.3%	5.4%	4.6%
Cum. Percent	4.1%	7.2%	9.5%	18.3%	43.5%	70.3%	71.9%	73.5%	79.7%	90.1%	95.4%	100.0%
Ringed Seal	52.9	28.2	32.7	44.5	86.4	229.4	75.3	64.4	192.6	329.4	123.6	138.7
Percentage	3.8%	2.0%	2.3%	3.2%	6.2%	16.4%	5.4%	4.6%	13.8%	23.6%	8.8%	9.9%
Cum. Percent	3.8%	5.8%	8.1%	11.3%	17.5%	33.9%	39.3%	43.9%	57.7%	81.2%	90.1%	100.0%
Spotted Seal	3.9	21.0	0.0	4.8	53.4	20.2	54.2	139.4	390.2	385.0	120.6	30.3
Percentage	0.3%	1.7%	0.0%	0.4%	4.4%	1.7%	4.4%	11.4%	31.9%	31.5%	9.9%	2.5%
Cum. Percent	0.3%	2.0%	2.0%	2.4%	6.8%	8.4%	12.9%	24.3%	56.2%	87.7%	97.5%	100.0%
Ribbon Seal	4.1	4.1	0.0	0.0	9.3	21.8	0.0	2.0	13.2	16.6	0.0	0.0
Percentage	5.7%	5.7%	0.0%	0.0%	13.1%	30.7%	0.0%	2.8%	18.6%	23.4%	0.0%	0.0%
Cum. Percent	5.7%	11.4%	11.4%	11.4%	24.5%	55.2%	55.2%	58.1%	76.6%	100.0%	100%	100.0%
Sea Lion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentage	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cum. Percent	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
All Seals	124.1	100.0	67.7	185.0	533.8	681.9	154.4	230.3	691.4	888.8	326.7	238.8
Percentage	2.9%	2.4%	1.6%	4.4%	12.6%	16.1%	3.7%	5.5%	16.4%	21.0%	7.7%	5.7%
Cum. Percent	2.9%	5.3%	6.9%	11.3%	23.9%	40.1%	43.7%	49.2%	65.6%	86.6%	94.3%	100.0%

NOTE: Includes six study communities (Brevig Mission, Gambell, Golovin, Savoonga, Shaktolik, and Stebbins) and covers the year February 1996 through January 1997.

Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

months. For most of the study area, these were the periods of mixed open water and ice when nearly all seals were plentiful, the animals in good condition, and access to hunting areas possible by motorized boat. Little seal hunting took place in summer because many seals had moved north with the ice and those that remained had thin blubber and poor skins due to the warm weather. Likewise, in most of the region little seal hunting occurred in mid-winter when the days were short and cold, boating was hazardous or impossible, and seals not as abundant.

Peak harvest months varied by community and by species (Appendix D). October was clearly the peak harvest month for seals in Brevig Mission and Golovin, while September and October were the peak harvest months in Shaktolik. In the St. Lawrence Island communities, seal harvests peaked in both spring and fall (Savoonga in June and September, Gambell in May, June, and October). Only in Stebbins were the peak harvest months confined to the spring (April and May). Discussion of the seasonality of the harvest by species is presented below in the summaries for each seal species.

Age and Sex Distribution of Seal Harvests

Generalizing across all species and communities, adults comprised the majority (56.8 percent) of all seals harvested. Juveniles accounted for one-third of the harvest, while pups comprised 7.7 percent. The age was unknown for only 2.2 percent of the seal harvest (Table 6). The relatively large harvest of juveniles was due in part to preferences of some hunters. According to key respondents, given a choice many hunters preferred juvenile seals, especially juvenile bearded seals. Hunters generally did not target seal pups, but killed them if their mothers were shot. Unborn seals were typically considered “pup” harvests by hunters taking pregnant females. In some

communities, the meat of unborn seal pups was consumed and the skin used for certain crafted items, such as mittens, trim for baby clothes, ammunition bags, and dolls.

Hunters were much less certain of the sex of harvested seals than of the age. Respondents provided information on the sex for only 30.4 percent of the harvested seals and reported the sex of the other 69.6 percent as “unknown” (Table 6). This compares with the “age unknown” for about two percent of the seal harvest, and suggests that hunters in the region do not routinely take note of nor remember the sex of seals harvested over the course of a year. The sex of juveniles and pups was particularly difficult for hunters to remember with 86.9 percent and 97.2 percent of the harvest respectively reported as unknown sex. Age and sex were also unknown for animals struck and lost. Of the seals (all species) whose sex was known, males comprised 60.9 percent of the harvest and females 39.1 percent of the harvest, or a male-to-female ratio of 1.6 to 1. However, with the sex unknown for such a large percentage of the harvest, this number may or may not accurately reflect the actual sex ratio. Data on the age and sex of the harvest by species are presented in Tables 7-11 and discussed below in the summaries for each seal species.

Hunting Participation and Harvest Success

Many households in the surveyed communities participated in seal hunting during the study year. Combining all six communities, 73.1 percent of Alaska Native households hunted seals, most of whom were successful (Table 12). In Brevig Mission, Gambell, Savoonga, and Stebbins, between 71.4 and 84.3 percent of households hunted seals during the study year. In Golovin and Shaktolik, participation in seal hunting was less, but still considerable (35.9 percent and 46.1 percent of households respectively). These high levels of participation indicate that seal hunting activities in

TABLE 6. AGE AND SEX DISTRIBUTION OF SEAL HARVESTS, ALL SPECIES, BY ALASKA NATIVES IN SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97

	Male	Female	Unknown Sex	Total
Adult	586.0	359.3	1,133.8	2,079.1
Row Percent	28.2%	17.3%	54.5%	100.0%
Column Percent	86.4%	82.7%	44.5%	56.8%
Juvenile	86.4	73.3	1,058.3	1,218.0
Row Percent	7.1%	6.0%	86.9%	100.0%
Column Percent	12.7%	16.9%	41.6%	33.3%
Pup	5.9	2.0	273.2	281.1
Row Percent	2.1%	0.7%	97.2%	100.0%
Column Percent	0.9%	0.5%	10.7%	7.7%
Unknown Age	0.0	0.0	81.4	81.4
Row Percent	0.0%	0.0%	100.0%	100.0%
Column Percent	0.0%	0.0%	3.2%	2.2%
Total	678.3	434.6	2,546.7	3,659.6
Row Percent	18.5%	11.9%	69.6%	100.0%
Column Percent	100.0%	100.0%	100.0%	100.0%

NOTE: Includes the six study communities of Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins.
Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

TABLE 7. AGE AND SEX DISTRIBUTION OF BEARDED SEAL HARVESTS BY ALASKA NATIVES IN SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97

	Male	Female	Unknown Sex	Total
Adult	239.8	224.2	355.7	819.7
Row Percent	29.3%	27.4%	43.4%	100.0%
Column Percent	84.6%	88.2%	46.4%	62.8%
Juvenile	39.8	27.9	297.9	365.5
Row Percent	10.9%	7.6%	81.5%	100.0%
Column Percent	14.0%	11.0%	38.9%	28.0%
Pup	3.9	2.0	88.2	94.2
Row Percent	4.2%	2.2%	93.7%	100.0%
Column Percent	1.4%	0.8%	11.5%	7.2%
Unknown Age	0.0	0.0	25.0	25.0
Row Percent	0.0%	0.0%	100.0%	100.0%
Column Percent	0.0%	0.0%	3.3%	1.9%
Total	283.5	254.1	766.8	1,304.4
Row Percent	21.7%	19.5%	58.8%	100.0%
Column Percent	100.0%	100.0%	100.0%	100.0%

NOTE: Includes the six study communities of Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins.
Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

**TABLE 8. AGE AND SEX DISTRIBUTION OF RINGED SEAL HARVESTS BY ALASKA
NATIVES IN SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97**

	Male	Female	Unknown Sex	Total
Adult	169.5	99.6	356.1	625.3
Row Percent	27.1%	15.9%	57.0%	100.0%
Column Percent	94.1%	77.2%	37.5%	49.7%
Juvenile	10.6	29.4	414.0	454.0
Row Percent	2.3%	6.5%	91.2%	100.0%
Column Percent	5.9%	22.8%	43.6%	36.1%
Pup	0.0	0.0	155.5	155.5
Row Percent	0.0%	0.0%	100.0%	100.0%
Column Percent	0.0%	0.0%	16.4%	12.4%
Unknown Age	0.0	0.0	23.1	23.1
Row Percent	0.0%	0.0%	100.0%	100.0%
Column Percent	0.0%	0.0%	2.4%	1.8%
Total	180.2	129.0	948.7	1,257.9
Row Percent	14.3%	10.3%	75.4%	100.0%
Column Percent	100.0%	100.0%	100.0%	100.0%

NOTE: Includes the six study communities of Brevig Mission, Gambell, Golovin, Savoonga, Shaktolik, and Stebbins.
Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

**TABLE 9. AGE AND SEX DISTRIBUTION OF SPOTTED SEAL HARVESTS BY ALASKA
NATIVES IN SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97**

	Male	Female	Unknown Sex	Total
Adult	154.6	32.5	401.2	588.3
Row Percent	26.3%	5.5%	68.2%	100.0%
Column Percent	80.3%	67.0%	50.9%	57.2%
Juvenile	36.0	16.0	339.4	391.3
Row Percent	9.2%	4.1%	86.7%	100.0%
Column Percent	18.7%	33.0%	43.1%	38.0%
Pup	2.0	0.0	15.6	17.6
Row Percent	11.5%	0.0%	88.5%	100.0%
Column Percent	1.1%	0.0%	2.0%	1.7%
Unknown Age	0.0	0.0	31.3	31.3
Row Percent	0.0%	0.0%	100.0%	100.0%
Column Percent	0.0%	0.0%	4.0%	3.0%
Total	192.6	48.4	787.5	1,028.5
Row Percent	18.7%	4.7%	76.6%	100.0%
Column Percent	100.0%	100.0%	100.0%	100.0%

NOTE: Includes the six study communities of Brevig Mission, Gambell, Golovin, Savoonga, Shaktolik, and Stebbins.
Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

**TABLE 10. AGE AND SEX DISTRIBUTION OF RIBBON SEAL HARVESTS BY ALASKA
NATIVES IN SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97**

	Male	Female	Unknown Sex	Total
Adult	22.1	3.0	20.8	46.0
Row Percent	48.1%	6.6%	45.3%	100.0%
Column Percent	100.0%	100.0%	47.6%	66.7%
Juvenile	0.0	0.0	7.0	7.0
Row Percent	0.0%	0.0%	100.0%	100.0%
Column Percent	0.0%	0.0%	16.1%	10.2%
Pup	0.0	0.0	13.9	13.9
Row Percent	0.0%	0.0%	100.0%	100.0%
Column Percent	0.0%	0.0%	31.8%	20.2%
Unknown Age	0.0	0.0	2.0	2.0
Row Percent	0.0%	0.0%	100.0%	100.0%
Column Percent	0.0%	0.0%	4.6%	2.9%
Total	22.1	3.0	43.8	68.9
Row Percent	32.1%	4.4%	63.5%	100.0%
Column Percent	100.0%	100.0%	100.0%	100.0%

NOTE: Includes the six study communities of Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins.
Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

**TABLE 11. AGE AND SEX DISTRIBUTION OF SEA LION HARVESTS BY ALASKA NATIVES
IN SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97**

	Male	Female	Unknown Sex	Total
Adult	0.0	0.0	0.0	0.0
Row Percent	0.0%	0.0%	0.0%	0.0%
Column Percent	0.0%	0.0%	0.0%	0.0%
Juvenile	0.0	0.0	0.0	0.0
Row Percent	0.0%	0.0%	0.0%	0.0%
Column Percent	0.0%	0.0%	0.0%	0.0%
Pup	0.0	0.0	0.0	0.0
Row Percent	0.0%	0.0%	0.0%	0.0%
Column Percent	0.0%	0.0%	0.0%	0.0%
Unknown Age	0.0	0.0	0.0	0.0
Row Percent	0.0%	0.0%	0.0%	0.0%
Column Percent	0.0%	0.0%	0.0%	0.0%
Total	0.0	0.0	0.0	0.0
Row Percent	0.0%	0.0%	0.0%	0.0%
Column Percent	0.0%	0.0%	0.0%	0.0%

NOTE: Includes the six study communities of Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins.
Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

TABLE 12. SUBSISTENCE HUNTING, HARVEST, AND USE OF SEALS, ALL SPECIES, BY SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97

Community	Percent of Native Households			Hunting Success Rate	Estimated Community Harvest	Mean Harvest Per Capita
	Using Seal	Harvesting Seal	Hunting Seal			
Brevig Mission	86.7	50.0	80.0	62.5	240.0	1.21
Gambell	92.9	84.3	84.3	100.0	1,923.1	3.09
Golovin	89.7	25.6	35.9	71.5	158.1	1.08
Savoonga	92.5	80.6	82.1	98.2	763.6	1.13
Shaktoolik	100.0	43.2	46.1	93.6	227.3	.95
Stebbins	92.9	71.4	71.4	100.0	347.8	.60
Total	92.5	68.2	73.1	93.3	3,659.9	1.49

Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

the Norton Sound-Bering Strait region were generally widespread. Use of seal was nearly universal in the surveyed communities with 92.5 percent of Alaska Native households reporting they used seal during the study year.

Despite the widespread participation in seal hunting, a relatively small percentage of highly-productive households took the majority of the seals (Figs. 6, 7, 8, and 9). For each seal species, about 30 percent of the hunting households took 60 to 70 percent of the seals, depending on the species. About one-third of the seals were taken by 10 percent of the seal hunting households.

Seal hunting households in all communities had a high success rate. Combining all six communities, 93.3 percent of households that hunted seals were successful (Table 12). In Gambell, Savoonga, Shaktoolik, and Stebbins, 93.6 to 100 percent of seal hunting households were successful. Harvest success was less, but still substantial, among seal hunting households in Golovin (71.5 percent) and Brevig Mission (62.5 percent). These high levels of success suggest that environmental

Fig. 6. Specialization in Bearded Seal Takes: Percent of Hunting Households by Percent of Take, 1996-97

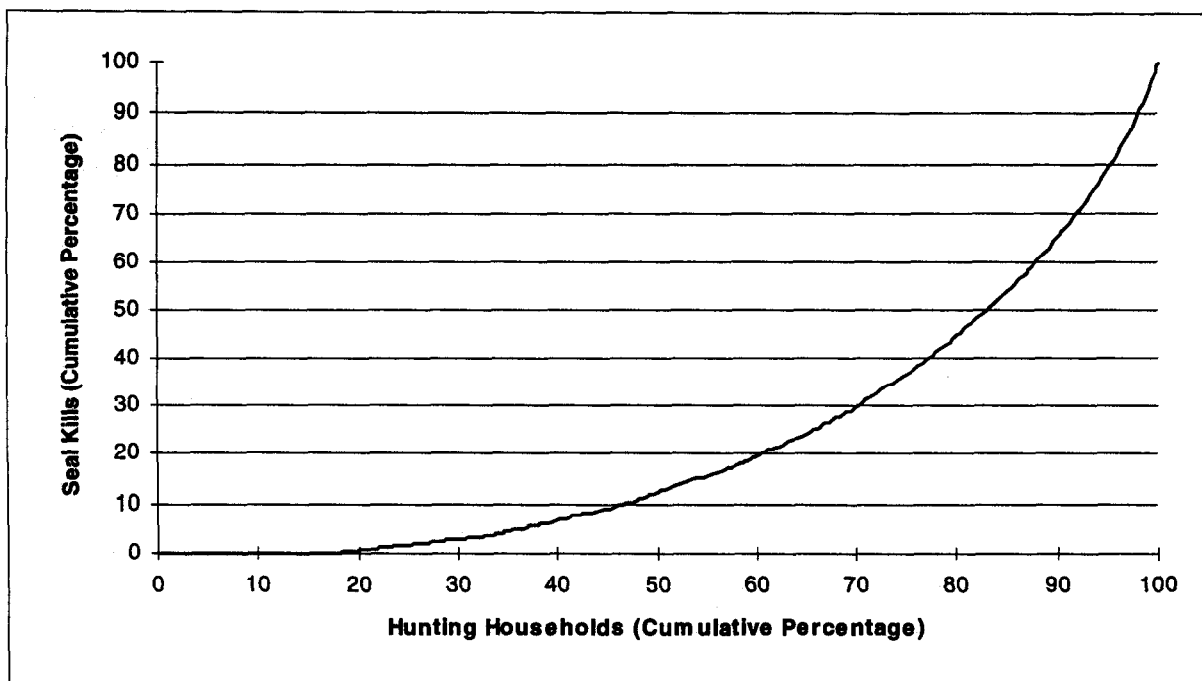
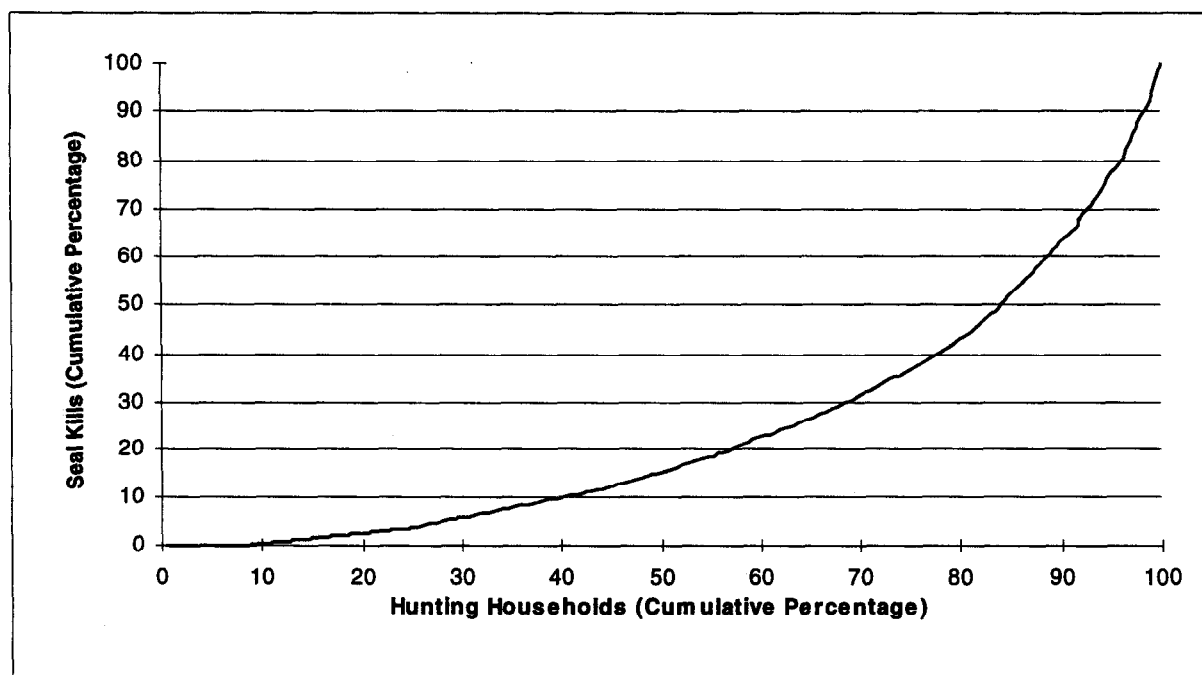


Fig. 7. Specialization in Ringed Seal Takes: Percent of Hunting Households by Percent of Take, 1996-97



NOTE: Includes the six study communities of Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins.
Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

Fig. 8. Specialization in Spotted Seal Takes: Percent of Hunting Households by Percent of Take, 1996-97

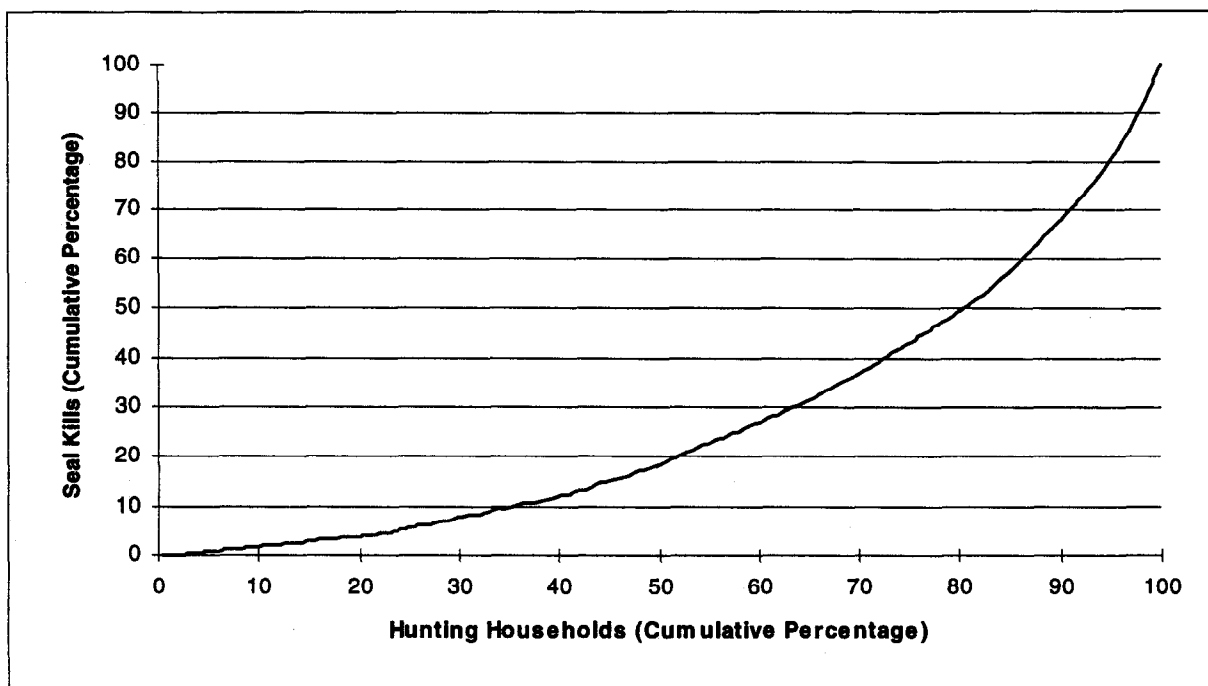
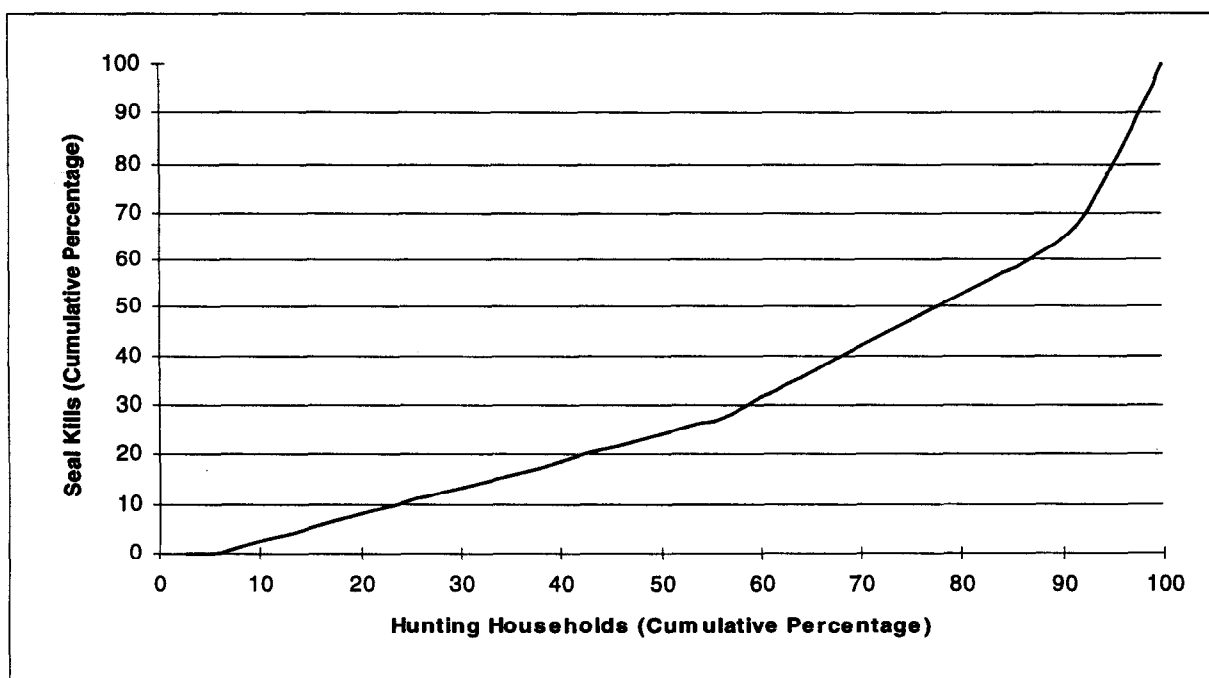


Fig. 9. Specialization in Ribbon Seal Takes: Percent of Hunting Households by Percent of Take, 1996-97



NOTE: Includes the six study communities of Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins.
Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

conditions and seal availability were favorable during the study period in each community's hunting area, and that hunters throughout the region were equipped for and skilled in hunting seals.

Combining all communities, more households (67.1 percent) hunted bearded seal than any other seal species (Table 13). Similar percentages of households in the six communities hunted ringed and spotted seal (55.0 percent and 49.7 percent respectively). Only a small percentage of households (7.2 percent) hunted ribbon seal. No households reported hunting sea lion during the 12-month study period.

Bearded Seal

For most hunters in the study communities, bearded seals were the seal of choice. Bearded seals were widely considered the best seal for meat. The blubber was rendered into oil and the hide used for a variety of items, including boot soles, rope, mats, and rifle cases. The following descriptive information was derived from interviews with hunters in the study communities.

Adult bearded seals migrate north and south with the seasonal movement of sea ice. In winter, they avoid shorefast and thick, unbroken drift ice, preferring areas with a mix of floating ice and open water. They also prefer clean ice. In winter, bearded seals are often solitary, but during mating season in spring they are seen in small groups. Hunters reported finding clams, crabs, shrimp, sea urchins, arctic cod, saffron cod, herring, smelt, sculpins, and other small fish in the stomachs of bearded seals. Pups are born on the ice in late March or April and fatten up quickly, leaving their mothers within two to three weeks. The pups are ready to swim right after birth, unlike pups of other seals. Male bearded seals in the spring are heard making a bubbling or whistling sound underwater, as if they were singing. Adult bearded seals are called *ugruk* or

**TABLE 13. PERCENT OF ALASKA NATIVE HOUSEHOLDS HUNTING SEALS
AND SEA LIONS, BY SPECIES,
SIX NORTON SOUND-BERING STRAIT COMMUNITIES, 1996-97**

	Percent of Native Households	Percent of Hunting Households
BEARDED SEAL		
Hunted Successfully	54.1%	80.6%
Hunted Unsuccessfully	13.0%	19.4%
Did Not Hunt	32.9%	—
Total Hunting Households	67.1%	100.0%
RINGED SEAL		
Hunted Successfully	50.2%	91.3%
Hunted Unsuccessfully	4.8%	8.7%
Did Not Hunt	45.0%	—
Total Hunting Households	55.0%	100.0%
SPOTTED SEAL		
Hunted Successfully	48.0%	96.6%
Hunted Unsuccessfully	1.7%	3.4%
Did Not Hunt	50.3%	—
Total Hunting Households	49.7%	100.0%
RIBBON SEAL		
Hunted Successfully	6.8%	94.5%
Hunted Unsuccessfully	0.4%	5.5%
Did Not Hunt	92.8%	—
Total Hunting Households	7.2%	100.0%
SEA LION		
Hunted Successfully	0%	0%
Hunted Unsuccessfully	0%	0%
Did Not Hunt	100%	—
Total Hunting Households	0%	0%

NOTE: Includes 528 Alaska Native households in the six study communities of Brevig Mission, Gambell, Golovin, Savoonga, Shaktolik, and Stebbins.

Source: Kawerak, Inc. and Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1997.

ugzruk in Iñupiaq, *maklak* in Siberian Yup'ik, and *almigaq* or *maklak* in Yup'ik (there are other terms for bearded seals of different ages).

The total estimated take of bearded seals by the six surveyed communities was 1,531, of which 1,304 were harvested (85.2 percent) and 226 (14.8 percent) were struck and lost (Table 3). Gambell alone accounted for 59.4 percent (909 animals) of the bearded seal take during the 12-month study year (Table 5). Bearded seals comprised 40.4 percent of the seal take in Gambell; in the other communities, bearded seals comprised 20.4 to 35.9 percent of the total seal take (Table 4). In all the surveyed communities except Gambell, the per capita bearded seal harvest was fairly similar (0.2 to 0.4 seal). In Gambell, the per capita harvest was 1.2 bearded seals, about three to six times higher than elsewhere (Table 5).

The importance and desirability of bearded seals as a subsistence food were evident in high hunting and use rates. Combining all six communities, 67.1 percent of Alaska Native households hunted for bearded seals, more than for any other seal species (Table 13). About 80.6 percent of these hunting households were successful. The percent of Native households using bearded seal was very high among all six communities, ranging from 71.8 percent in Golovin to 91.4 percent in Gambell (Table 5).

Hunting for adult bearded seals primarily took place in the spring (April, May, and June) when the days were long and warm, the water calm, and the seals plentiful as they moved north with the floating ocean ice. In some mainland areas with open water, particularly near Golovin and Shaktolik, hunters were able to harvest bearded seals in small numbers throughout the winter when the ice conditions were favorable. Adult bearded seal hunting also took place in the fall, although in some areas, particularly eastern and southern Norton Sound, large adults were less common in fall than in spring. At St. Lawrence Island, adult bearded seals arrived just ahead of the ice (late

October-December) and usually stayed until the ice was gone in spring, as long as enough open water remained in the area. Bearded seal hunting mostly occurred from motorized boats but also took place occasionally from the ice edge and, in Gambell, from shore blinds in the fall. Hunters preferred to shoot bearded seals resting on the ice, but also shot them swimming in the water.

Unlike the adults, young bearded seals often do not move north with the ice but stay in ice-free waters during the summer and fall. Young bearded seals are called *teghigluk* in Gambell and Savoonga, *maktasuaq* in Shaktoolik, *maktachuaq* in Golovin, *anmiaq* in Brevig Mission, and *amirkaq* or *maklacuar* in Stebbins. In late summer and fall, young bearded seals often move with the tides into freshwater rivers around Norton Sound and Port Clarence, feeding on fish and sometimes hauling out in sloughs and on mud banks. Highly prized for their tender meat and clear oil, young bearded seals were hunted in late summer and fall (late August-November). They generally move south with the ice in winter. At St. Lawrence Island, young bearded seals are found year-round in small numbers. Many hunters throughout the region preferred the young seals to the adults.

Reported harvests in 1996-97 were consistent with the general patterns described by interviewed hunters. In both Gambell and Savoonga in 1996, 59.2 percent and 67.1 percent respectively of the bearded seal take occurred in May and June. In Stebbins, almost one-half of the bearded seal take occurred in April. Golovin and Brevig Mission, in contrast, took almost one-half of their bearded seals in September or October. Shaktoolik intensively hunted bearded seals in both spring and fall, with 61.9 percent of its take occurring in April and October. Combining the six communities, 51.9 percent of the bearded seal take occurred in May and June, while 16.5 percent took place in September and October (Appendices C and D). The high spring harvests of the St. Lawrence Island communities skewed the combined data in favor of the spring,

obscuring some of the individual community patterns. In Gambell, bearded seals were taken in every month of the study year. In the other communities, bearded seals were taken in six to nine months of the year, mostly March through June and August through November with some communities reporting harvests in mid-winter and summer (Appendix D).

Adults comprised the majority (62.8 percent) of the bearded seal harvest of the six communities, with juveniles accounting for 28.0 percent and pups for 7.2 percent (Table 7). Less than two percent of the harvest was of unknown age. These totals, however, hide wide variations among the communities. The juvenile harvest, for instance, ranged from 59.3 percent of the bearded seal harvest in Golovin to 2.8 percent in Shaktoolik. Brevig Mission and Gambell also had relatively large juvenile bearded seal harvests (Appendix D). The majority of the bearded seals (58.8 percent) were reported as unknown sex. Of those whose sex was known, almost equal numbers of males and females were taken (Table 7).

In general, hunters reported that bearded seal populations were stable or increasing. One Golovin hunter reported that bearded seal populations were not as high as they once were and a Gambell hunter thought that bearded seals were coming back from a decline 20 years ago. A Stebbins hunter said that bearded seals had declined in the past 10 or 15 years. In Shaktoolik, one hunter thought that adult bearded seals were getting more abundant, while the young ones were getting harder to find. This latter observation was also made by a Stebbins hunter, who attributed the decline in young seals to an increase in boat noise and traffic. In general, however, most hunters in the surveyed communities reported that bearded seals were healthy and in good supply.

Ringed Seal

Ringed seals, known as “winter seals” or “regular seals,” are the only seals generally available throughout the region all winter. One hunter called ringed seals “a good all-around seal.” In Gambell and Savoonga, ringed seals are called *neghsapik*; in Shaktoolik and Brevig Mission, *niqsaq*; and in Stebbins, *nayiq*. In terms of meat, ringed seals were generally second in preference to bearded seals. However, ringed seals were the first choice of many hunters for oil. Skins from ringed seals were used for clothing such as boots, pants, mittens, and hats and for making floats for whaling. The following descriptive information was derived from interviews with hunters in the surveyed communities.

Ringed seals are found in shore-fast ice, maintaining breathing holes and using open leads where they are often seen along the ice edge. One hunter said ringed seals maintain three breathing holes, so if one or two freeze over they have another one available. They feed on smelt, arctic cod, herring, sculpin, other fish, and sometimes shrimp. Pups are born from mid-April to early May on stable ice, often not far from shore. In most of the region, ringed seals appear in large numbers with the slush ice in fall and remain until the ice disappears in the spring. They are seen in smaller numbers in summer, with young seals occasionally getting caught in salmon nets. Ringed seals often haul out on rocks with spotted seals in the fall.

Ringed seals were hunted from boats, from the ice, and in some places from the shore. At St. Lawrence Island, shore hunting took place from driftwood blinds at favorable locations. On-shore winds are needed for shore hunting to enable hunters to recover their kills. Wind in general is a critical factor in seal hunting because, along with the tide, it determines the location and extent of open water during months of ice cover.

The total estimated take of ringed seals by the six communities was 1,398, of which 1,258 (90.0 percent) were harvested and 140 (10.0 percent) were struck and lost (Table 3). In the mainland coastal communities (Brevig Mission, Golovin, Shaktoolik, and Stebbins), ringed seals were taken in greater numbers than any other seal species, accounting for 36.3 to 52.2 percent of the total seal take (Table 4). The per capita harvests of ringed seals were fairly similar among the six communities, ranging from 0.3 seal in Stebbins to 0.9 seal in Gambell (Table 5). Several hunters commented that fewer seals were taken now than in the past when everyone had dog teams to feed.

Combining the six communities, 55.0 percent of Alaska Native households hunted ringed seals, most of whom were successful (Table 13). This was similar to participation in spotted seal hunting. At a community level, the percentage of Native households harvesting ringed seals ranged widely, from 12.8 percent in Golovin to 71.4 percent in Gambell (Table 5). Ringed seals were used by about two-thirds or more of the Native households in Gambell, Savoonga, Shaktoolik, and Stebbins.

Fall was the primary season for ringed seal hunting. In general, seals are thin by late spring and fatten up by early fall. The fat was prized, and hunters had little interest in thin seals. Rendered into oil, the fat provided a staple in Native food diets. Because fat content largely determined how long a shot seal would float, fall hunting usually allowed for easier retrieval of seals. Hunters reported that ringed seals were more likely to float than other seals.

From April to June breeding male ringed seals are called “gasoline seals” and are widely regarded as inedible because they smell and taste “gassy.” The skins of gas seals are usable, but the meat is typically fed to dogs. In Stebbins and on St. Lawrence Island, these rutting male ringed seals are called *tegak*; in Shaktoolik, *tigak*; and in Brevig Mission, *tigaq*. Hunters identify these seals easily by their dark faces and avoid

shooting them. Instead hunters target females, identified by their “clean, pure skins.” Some hunters observed, however, that pregnant females in the spring are scarce and wary, often under the ice and difficult to catch.

Based on the survey data, 56.1 percent of the ringed seal harvest by the six communities in 1996-97 occurred from September through December, with October the peak harvest month (Fig. 5). A second peak harvest month occurred in June, although for the most part this was confined to Gambell, Savoonga, and Stebbins. Fall—September, October, and November—was overwhelmingly the major hunting season for ringed seals in Brevig Mission, Golovin, and Shaktoolik (73.0 to 84.8 percent of the take). The number of months in which ringed seals were taken ranged from seven months in Brevig Mission and Golovin to 12 months in Gambell (Appendix D).

Adults comprised about one-half of the ringed seal harvest in the six communities, with juveniles accounting for 36.1 percent and pups for 12.4 percent (Table 8). A small number were of unknown age. Gambell accounted for two-thirds of the juvenile harvest and nearly all of the pup harvest. Given a choice, Gambell hunters said they preferred juvenile seals because of their tender meat. In the other communities, adults comprised 70.8 to 98.7 percent of the ringed seal harvest (Appendix D). Information on the sex composition of the harvest was inconclusive because three-fourths of the harvest was reported as unknown sex (Table 8). Of the animals of known sex, 58.3 percent were reported as males and 41.7 percent as females.

For the most part, hunters throughout the region reported that ringed seals were healthy, fat, and abundant. Most said the population of ringed seals was stable, although two hunters in Golovin thought the population had declined over the past 20 years.

Spotted Seal

Spotted seals are the only seals found in large numbers in the northern Bering Sea during the ice-free months. They are generally an open water and ice-edge seal. In Stebbins, spotted seals are called *issuriq*; in Gambell and Savoonga, *qasigyaq*; in Shaktoolik, *qasigiaq*; and in Brevig Mission, *qazigiaq*.

According to interviewed hunters, spotted seals typically show up in the region during break-up in the spring and stay through freeze-up in the fall. Only on St. Lawrence Island did hunters report seeing spotted seals all winter in recent years, and this was considered very unusual. One hunter attributed it to the number of open leads, and another to warmer winters. Spotted seals feed on saffron cod, herring, smelt, Dolly Varden, salmon, and other fish, according to hunters. Their pups are born in April. Hunters reported that spotted seals get big, sometimes as big as bearded seals. Big spotted seals, called “rangers,” are sometimes found far offshore scouting new areas.

To a greater extent than bearded and ringed seals, preferences for spotted seal varied widely both among and within communities. Spotted seals were the favorite of one Savoonga hunter, and a Gambell hunter preferred their meat second only to bearded seals. In Shaktoolik, several hunters liked the oil and skins from spotted seals, but did not eat the meat. Another Shaktoolik hunter thought spotted seals were good for both oil and meat. In Golovin, one hunter did not eat the meat or oil from spotted seals, using them instead for dog food. A Stebbins hunter stated he preferred oil from bearded and ringed seals over oil from spotted seals. Another Stebbins hunter said people used all species of seal for oil and meat. Spotted seal skins were in demand by skin sewers who fashioned them into slippers, boots, mittens, parkas, and floats. One Brevig Mission resident said that untanned spotted seal skins sell for \$15 per foot.

The total estimated take of spotted seal by the six communities was 1,223, of which 1,028.5 (84.1 percent) were harvested and 194.5 (15.9 percent) were struck and lost (Table 3). The St. Lawrence Island communities of Gambell and Savoonga accounted for 78.2 percent of the spotted seal take during the 12-month study year (Table 5). In Brevig Mission, Golovin, Gambell, and Savoonga, spotted seals comprised 30.4 to 34.4 percent of each community's seal take (Table 4). In the eastern Norton Sound communities of Shaktoolik and Stebbins, spotted seals comprised 14.2 to 17.5 percent of the community's seal take. The per capita harvests of spotted seal ranged from a low of 0.1 seal in Stebbins to a high of 0.9 seal in Gambell (Table 5).

Combining the six communities, almost one-half of Alaska Native households hunted spotted seals, nearly all of whom were successful (Table 13). In the four mainland communities, 25.0 to 36.7 percent of Native households harvested spotted seals, while on St. Lawrence Island 58.2 to 74.3 percent of households harvested spotted seals. The use of spotted seal ranged from 32.1 percent of households in Stebbins to 82.9 percent in Gambell (Table 5).

Residents of the six communities most commonly hunted spotted seals by boat in open water in late summer and fall. Hunting also took place to a lesser extent in spring. In Gambell, spotted seals were hunted from driftwood blinds on the beach in summer and fall. This technique required an on-shore wind so seals drifted to shore when shot. Hunting occasionally occurred at some haul out sites in the region, especially in fall when the skins were in good condition. One Gambell hunter said that spotted seal meat and hides were best in October, November, and December. In summer, spotted seals provided fresh meat for St. Lawrence Island residents until other seal meat was dried.

Based on the survey, fall was the primary season for spotted seal harvests in 1996-97. An estimated 63.4 percent of the spotted seal take in the six communities

occurred in September and October, with an additional 21.3 percent taken in August and November (Fig. 5). This pattern generally held true for all communities except Stebbins. In Stebbins, the peak harvest month for spotted seals was May, while the peak harvest month in all the other study communities was September or October. The number of months in which spotted seals were taken ranged from three months in Golovin to ten months in Gambell.

Combining the six communities, adults comprised more than one-half (57.2 percent) of the spotted seal harvest, with juveniles accounting for 38.0 percent and pups for 1.7 percent (Table 9). A small number were of unknown age. This total, however, did not represent each community's harvest pattern. For example, in Golovin, Shaktoolik, Stebbins, and Savoonga, the spotted seal harvest was overwhelmingly adults (73.1 to 100 percent), while in Gambell and Brevig Mission juveniles accounted for the largest component of the harvest (Appendix D). Three-fourths of the harvest was reported as unknown sex (Table 9). Of the animals of known sex, 79.9 percent were reported as males and 20.1 percent as females.

Spotted seal haul out sites were identified on maps by hunters in the surveyed communities. Near Golovin, spotted seals haul out near Rocky Point, Carolyn Island, and Chukak Point. In summer and fall, hunters typically see 50 to 100 or more spotted and ringed seals hauled out near Rocky Point, and 10 to 30 seals hauled out at Carolyn Island. Brevig Mission hunters said that spotted seals haul out on "Seal Island" in southern Port Clarence, about 50 to 100 seals of all sizes. Near Shaktoolik, an estimated 100 or more spotted and ringed seals typically haul out on a sandspit on the northeast corner of Besboro Island, with three to four seals often found together on the island's smaller coves and beaches. Shaktoolik hunters also occasionally see small numbers of spotted seals hauled out at Cape Denbigh and near the mouths of Sineak

River and Shaktoolik Bay. Near Stebbins, hunters often see 20 or more spotted seals on a rock pile on the north side of Stuart Island. On St. Lawrence Island, hunters identified several locations on the island's south and east sides where spotted seals haul out in summer and fall, including near Seckoovook Bay, Kangeeghuk Bay, Tasighoovik Bay, Kialegak Point, Tapaghtalghee Bay, and Sivneghak Lagoon.

For the most part, hunters in the region believed that spotted seals were healthy and stable in number. Some hunters in Golovin and Brevig Mission thought spotted seals had declined over the past five to 20 years, while a Gambell hunter believed that spotted seals were coming back from a low in the 1960s. In Stebbins, one hunter said he saw more spotted seals last spring than he had ever seen before.

Ribbon Seal

Ribbon seals are the least common seal of the four species in this study, generally inhabiting offshore areas not accessible to coastal residents. In the Norton Sound communities of Golovin, Shaktoolik, and Stebbins, hunters see ribbon seals only occasionally. Ribbon seals are more common in the open ocean areas near Brevig Mission, Gambell, and Savoonga, but still available in smaller numbers than other seal species. Additional descriptive information obtained from interviews with hunters is presented below.

Ribbon seals typically appear at St. Lawrence Island in late May or June with the last of the ice from the Siberian side. A Brevig Mission hunter said the appearance of ribbon seals is a main indicator that the ice has almost passed. Ribbon seals again appear in the fall with the first of the ice, usually in October or November in the mainland coastal communities and as late as December at St. Lawrence Island. They are seldom seen in summer or winter. In Brevig Mission, Golovin, and Shaktoolik, ribbon seals are

more common in the fall than in the spring. Ribbon seals are called *qiaguulik* in Brevig Mission and *kukupak* on St. Lawrence Island.

Ribbon seal pups are born on the ice in early May, although they are usually separated from the adults by the time the seals arrive in the region in spring. Adult male ribbon seals are darker in color and have more distinct markings than the females which were described as “faded” or “brownish.” Because the banded markings do not appear until the seals are older, hunters identify juveniles in the fall by their dark backs and different whiskers. Ribbon seals eat fish. They are most often seen alone, rarely in groups. The males have an air bladder inside them, according to one Gambell hunter.

Nearly all hunters said that ribbon seals were hunted only occasionally. Their meat is rich in blood and not a favored food, although St. Lawrence Island residents said the meat was good if dried. Some hunters liked the oil. Ribbon seals, particularly males, used to be hunted for their skins, and still are at times, but this is less common than before. Because ribbon seal skins tear easily, they are most suitable for decoration or ceremonial clothing. Hunters reported that ribbon seals are tame and easy to approach.

In 1996-97, the total estimated take of ribbon seals by the six communities was 71, of which 69 (97.2 percent) were harvested and two (2.8 percent) were struck and lost (Table 3). Ribbon seals were taken in each community during the study year. In Gambell, Savoonga, and Brevig Mission, the ribbon seal take ranged from 16 to 30 seals, while in the other communities the take was fewer than four seals each (Table 5). In all communities, ribbon seals were only a small component of the total seal take (Table 4). Combining the six communities, 7.2 percent of Alaska Native households hunted ribbon seals (Table 13). The percent of Native households harvesting ribbon seals was highest in Brevig Mission (11.7 percent) (Table 5).

Almost three-fourths of the ribbon seal take in the six communities occurred in June, September, and October (Fig. 5). Adults comprised two-thirds of the harvest, juveniles 10.2 percent, and pups 20.2 percent (Table 10). Only the St. Lawrence Island communities reported harvesting ribbon seal pups, while Brevig Mission accounted for most of the juvenile harvest. The Norton Sound communities of Golovin, Shaktoolik, and Stebbins harvested only adult ribbon seals (Appendix D). The sex was unknown for 63.5 percent of the ribbon seal harvest. Of the portion whose sex was known, males outnumbered females by a ratio of more than 7 to 1 (Table 10).

Hunters had mixed views on the population status of ribbon seals. Norton Sound hunters (Golovin, Shaktoolik, and Stebbins) generally observed that ribbon seal numbers were stable. A Brevig Mission hunter noticed an increase in ribbon seals, particularly juveniles, in the fall of 1996. A hunter from Gambell believed the ribbon seal population was lower than before.

Steller Sea Lion

Sea lions were the least hunted of the five species in this study. During the 12-month study year, no surveyed household hunted or used sea lions. However, hunters in Gambell, Savoonga, and Brevig Mission said they harvest sea lions occasionally. Descriptive information on sea lions from interviewed hunters is summarized below.

Sea lions are most common near the St. Lawrence Island communities of Gambell and Savoonga. Hunters from these communities reported seeing large mixed groups of males, females, and calves all around the island, especially on the south side. Called *ulghaaq* in Siberian Yup'ik, sea lions are present only during the ice-free months, usually from June until October, at which time they begin to move south. They are often seen

hauled out in summer at Punuk Islands and near Boxer Bay and Southwest Cape. Sea lions are known as fast swimmers. They eat salmon and have been seen attacking gray whales, taking bites out of their flippers. Adult sea lions swallow fist-sized rocks to help grind up their food, according to hunters.

St. Lawrence Island residents reported that they seldom hunt sea lions. Occasionally a young one is taken when no other meat is available. The meat and fat are used, the latter described as similar to polar bear fat. Big adult sea lions are generally considered unpalatable and not hunted. Sea lions were hunted more in the 1960s when people needed summer dog food. Hunters from Gambell reported seeing increasing numbers of sea lions around the island, while Savoonga hunters thought the sea lion population was stable or slightly declining.

According to hunters in the other surveyed communities, sea lions are rare near the mainland coastal communities. Some hunters had never seen one, while others had seen only a handful in their lives. Sea lions seemed to be more common near Brevig Mission than further east in Norton Sound, but still far less common than at St. Lawrence Island. When observed near the mainland communities, sea lions are usually alone, swimming along shore in summer. Near Shaktoolik, single sea lions are occasionally sighted hauled out at Cape Denbigh. Only in Brevig Mission did hunters report that they harvest sea lions, but the harvest was very rare. Stebbins hunters considered sea lions dangerous, citing stories of the animals attacking boats and kayaks and exhibiting tempers when wounded. In Stebbins, sea lions are called *uginaq* and in Brevig Mission, *ulġuaq*.

DISCUSSION

Based on household surveys, substantial numbers of bearded, ringed, and spotted seals were harvested in 1996-97 by the six surveyed communities (Brevig Mission, Gambell, Golovin, Savoonga, Shaktoolik, and Stebbins). Each community harvested all three of the major seal species, along with a small number of ribbon seals. Spring and fall were the peak harvest seasons. Bearded seal was the seal of choice for meat for nearly all hunters and showed consistently high use among all six communities. Ringed seal was the generally preferred seal species for oil. Sea lions were rare in much of the study area, and no one reported harvesting sea lions during the study year. Throughout the region, participation in seal hunting was high (35.9 to 84.3 percent of Alaska Native households) and use of seal was nearly universal (86.7 to 100 percent of Native households), showing that seals play a significant role in the subsistence resource base of the region.

The six communities varied to some degree in the species composition and timing of their seal harvests, due largely to local coastal and ecological conditions that affected the availability of seals. In smaller measure, it was also due to community and personal preferences. The greatest contrast in seal harvest patterns was between St. Lawrence Island, particularly Gambell, and the mainland coastal communities. In Gambell, seals were hunted in more months of the year, juveniles and pups comprised larger components of the harvest, and overall harvests were substantially higher than the mainland. St. Lawrence Island residents also used techniques such as shore-based hunting from driftwood blinds that were not common elsewhere. Gambell alone accounted for more than 50 percent of the seal harvest in the six surveyed communities and its per capita seal harvest was the highest by a factor of 2.5. The per capita seal harvests across the other five communities were fairly similar.

For the most part, hunters in the region reported that all the seal populations were stable, although some had noticed modest declines or increases in some seal species over time in their hunting area. In general, the ability to harvest seals was more dependent on weather, ice, and other environmental conditions than on seal abundance.

The sex composition of most harvested seals was reported as unknown. Key respondent interviews indicated that, except in some cases, hunters generally did not target seals by sex, and did not routinely note or remember the sex of killed animals. Widespread exceptions to this included breeding male ringed seals, which were avoided in the spring, and male ribbon seals, which were more desirable because of their distinct coloration. Hunters were much more able to identify and recall seal harvests by age. More than one-half of the seals harvested by the six communities were adults, about one-third juveniles, and a small percentage pups (Table 6). Given a choice, many hunters expressed preferences for juvenile bearded seals, and in Gambell, juvenile ringed and spotted seals were preferred.

One of the limitations of single-year hunter surveys such as this is that they cannot provide quantitative information on the degree of change in seal harvests over time or on the degree to which the study year was typical. Subsistence harvests tend to be dynamic, changing over time due to a number of ecological, economic, and cultural factors. In key respondent interviews, for instance, many hunters commented that seal harvests had declined over the past 30 years. This was primarily attributed to the decline of dog teams after snowmachines came into use in the 1960s. Seals had provided an important source of dog food throughout the region, and many more seals were taken then to support dogs than were needed now to provide for human consumption. One Golovin hunter estimated that in the 1960s each family harvested 40 to 60 seals before freeze-up for dog food. Nonetheless, in some communities, seals still

provided an important source of food for dogs, particularly in Brevig Mission and Shaktoolik where several households maintained dog teams in the late 1990s.

Prior to this study, the Division of Subsistence had collected seal and sea lion information from five communities in the region—Brevig Mission, Golovin, Shishmaref, Stebbins, and Wales—as part of its community baseline harvest studies. Three of these communities, Brevig Mission, Golovin, and Stebbins, were also included in the 1996-97 seal and sea lion survey. Because the methodology used for the community baseline studies was different from the current survey, some of the information is not directly comparable. For example, the seasonality of the harvest and the number of seals struck and lost were not recorded during the earlier studies. Sampling information and seal harvest data from these earlier studies are presented in Tables 14 and 15.

Brevig Mission's total seal harvest in 1989 was an estimated 189 seals, compared to 240 seals harvested in 1996-97. The per capita harvests were 1.0 seal per person in 1989 and 1.2 seals in 1996-97. The composition of the harvest shifted moderately from ringed seals to bearded seals, while spotted seals stayed nearly the same. Ribbon seals, none of which were harvested in 1989, accounted for a small portion of the 1996-97 harvest.

In Golovin, the estimated total harvest in 1989 was 134 seals compared to 158 seals in 1996-97. In 1989, the per capita harvest was 0.8 seals per person and in 1996-97 1.1 seals. The species composition, however, was different. In 1989, spotted seals accounted for 73.1 percent and ringed seals for 12.7 percent of Golovin's harvest. In 1996-97, spotted seals were 32.5 percent of the harvest, while ringed seals were 45.9 percent of the harvest. The reasons for these differences are not known, although they may reflect normal between-year variation in subsistence harvests.

**TABLE 14. SAMPLING INFORMATION, DIVISION OF SUBSISTENCE COMMUNITY
BASELINE STUDIES, NORTON SOUND-BERING STRAIT REGION, 1980-95**

Community	Study Year	Estimated Population	Total Number of Households	Number of Households Surveyed	Percent of Households Surveyed
Brevig Mission	1989	184	43	15	34.9
Golovin	1989	169	41	33	80.5
Shishmaref	1995	560	140	45	32.1
Stebbins	1980	380	60	12	20.0
Wales	1993	<u>152</u>	<u>50</u>	<u>42</u>	<u>84.0</u>
Totals		1,445	334	147	44.0

Source: Alaska Department of Fish and Game, Division of Subsistence, Community Profile Database.

**TABLE 15. SEAL AND SEA LION HARVESTS IN SELECTED COMMUNITIES,
DIVISION OF SUBSISTENCE COMMUNITY BASELINE STUDIES,
NORTON SOUND-BERING STRAIT REGION, 1980-95**

	Study Year	Estimated Number of Animals Harvested						Per Capita
		Bearded Seal	Ringed Seal	Spotted Seal	Ribbon Seal	Sea Lion	All Seals	
Brevig Mission	1989	26 13.8%	100 52.9%	63 33.3%	0	0	189 100%	1.0
Golovin	1989	19 14.2%	17 12.7%	98 73.1%	0	0	134 100%	.8
Shishmaref	1995	588 35.8%	520 31.7%	513 31.3%	19 1.2%	*	1,640 100%	2.9
Stebbins	1980	180 33.3%	300 55.6%	60 11.1%	*	0	540 100%	1.4
Wales	1993	106 47.7%	77 34.7%	39 17.6%	0	*	222 100%	1.5

* Not included in resource list.

Source: Alaska Department of Fish and Game, Division of Subsistence, Community Profile Database.

In Stebbins, an estimated 540 seals were harvested in 1980 compared to 348 seals in 1996-97. The per capita harvest was 1.4 seals per person in 1980 and 0.6 seals in 1996-97. Unlike Golovin and Brevig Mission, the species composition of Stebbins' seal harvest in 1980 was nearly identical to 1996-97.

In Wales, the total seal harvest in 1993 was an estimated 222 seals for a harvest of 1.5 seals per person, similar to the per capita harvests of most of the communities surveyed in 1996-97. The seal harvest in Wales in 1993 was notable in that bearded seals comprised a larger portion of the harvest (47.7 percent) than in any other community in the region for which data were available. Elsewhere in the region bearded seals typically comprised one-third or less of the total harvest.

In Shishmaref, the seal harvest in 1995 appeared to have more in common with St. Lawrence Island than with other communities on the mainland. The total seal harvest in Shishmaref was 1,640 seals for a per capita harvest of 2.9 seals, nearly as high as Gambell's per capita harvest of 3.1 seals in 1996-97. Shishmaref's seal harvest was nearly equally divided among bearded, ringed, and spotted seals, a species composition that most closely resembled Savoonga's.

Information gathered in this and earlier studies provides important documentation of subsistence harvests of seal in representative communities in the Norton Sound-Bering Strait region. Additional key respondent interviews in the communities would contribute to a fuller understanding of information about seals and their uses. Hunters' perspectives aid in interpretation of survey information, particularly regarding changes in hunting patterns over time, and offer more detailed explanations for the differences and similarities among the region's communities.

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APPENDIX A.
SURVEY INSTRUMENT USED
IN HOUSEHOLD INTERVIEWS, 1997

NORTHERN BERING SEA SEAL SURVEY 1997

COVER SHEET & BEARDED SEAL

ARE ANY MEMBERS OF YOUR HOUSEHOLD ALASKA NATIVES?

NO: _____ Thank you for your cooperation. This survey is only relevant to Native households.

YES: _____ Please answer the following questions.

HOW MANY PEOPLE LIVED IN YOUR HOUSEHOLD IN 1996?

DID YOU OR MEMBERS OF YOUR HOUSEHOLD HUNT OR USE SEALS OR SEA LIONS BETWEEN FEBRUARY 1996 AND JANUARY 1997?

NO - THANK YOU. THAT COMPLETES THE SURVEY. YES - WHICH SPECIES DID YOU HUNT OR USE? YES NO

BEARDED SEAL?		
RINGED SEAL?		
SPOTTED SEAL?		
RIBBON SEAL?		
SEA LION?		

(Attach survey form for each yes)

BEARDED SEAL

PLEASE ANSWER THE FOLLOWING QUESTIONS IF YOU ANSWERED YES FOR BEARDED SEAL

Between February 1996 and January 1997, did you or your household:

Yes No

1. Use bearded seals (meat, hides, or oil)?		
2. Hunt bearded seals?		
3. Kill and retrieve bearded seals?		
4. Receive bearded seals from other households or communities?		
5. Give bearded seals to other households or communities?		

IF YES TO QUESTION 2 OR 3 ABOVE, GO TO QUESTION 6. IF NO, COMPLETE FORMS FOR OTHER SPECIES WHICH YOU HUNTED OR USED

6. How many bearded seals did your household kill and retrieve? [Enter in total box.]

7. In which months were they killed and retrieved? How many in (February, etc.)? [Enter the numbers by month.]

BEARDED SEAL	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
TOTAL														

8. Of the bearded seals killed and retrieved in (January, etc.), how many were male, female, and how many were pups, juveniles, or adults?

BEARDED SEAL (Detail)	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
ADULT														
JUVENILE														
PUP														
UNKNOWN														
AGE														

During 1996/97, 9. How many bearded seal were struck and lost by your household? [Enter number in total box.]

10. In which months were they struck and lost? [Enter numbers by month.]

BEARDED SEAL	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
STRUCK AND LOST														

Community: _____ () HHID: _____

Interviewer: _____ Date: _____
Kawerak, Jake Olanna 443-4728 Alaska Dept. of Fish and Game, Susan Georgetown 1-800-560-2271

NORTHERN BERING SEA SEAL SURVEY 1997

RINGED SEAL

RINGED SEAL

PLEASE ANSWER THE FOLLOWING QUESTIONS IF YOU ANSWERED YES FOR RINGED SEAL Between February 1996 and January 1997, did you or your household:

	Yes	No
1. Use ringed seals (meat, hides, or oil)?		
2. Hunt ringed seals?		
3. Kill and retrieve ringed seals?		
4. Receive ringed seals from other households or communities?		
5. Give ringed seals to other households or communities?		

IF YES TO QUESTION 2 OR 3 ABOVE, GO TO QUESTION 6. IF NO, COMPLETE FORMS FOR OTHER SPECIES WHICH YOU HUNTED OR USED

6. How many ringed seals did your household kill and retrieve? [Enter in total box.] Y
 7. In which months were they killed and retrieved? How many in (February, etc.)? [Enter the numbers by month.]

RINGED SEAL	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
TOTAL														

8. Of the ringed seals killed and retrieved in (January, etc.), how many were male, female, and how many were pups, juveniles, or adults?
 [Enter the numbers by month.]

RINGED SEAL (Detail)	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
ADULT														
MALE														
FEMALE														
UNKNOWN														
JUVENILE														
MALE														
FEMALE														
UNKNOWN														
PUP														
MALE														
FEMALE														
UNKNOWN														
UNKNOWN														
MALE														
FEMALE														
UNKNOWN														

During 1996/97, 9. How many ringed seal were struck and lost by your household? [Enter number in total box.]
 10. In which months were they struck and lost? [Enter numbers by month.]

RINGED SEAL	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
STRUCK AND LOST														

Community: _____ () HHID: _____ Interviewer: _____ Date: _____

NORTHERN BERING SEA SEAL SURVEY 1997

SPOTTED SEAL

SPOTTED SEAL

PLEASE ANSWER THE FOLLOWING QUESTIONS IF YOU ANSWERED YES FOR SPOTTED SEAL

Between February 1996 and January 1997, did you or your household:

Yes No

1. Use spotted seals (meal, hides, or oil)?		
2. Hunt spotted seals?		
3. Kill and retrieve spotted seals?		
4. Receive spotted seals from other households or communities?		
5. Give spotted seals to other households or communities?		

IF YES TO QUESTION 2 OR 3 ABOVE, GO TO QUESTION 6. IF NO, COMPLETE FORMS FOR OTHER SPECIES WHICH YOU HUNTED OR USED

6. How many spotted seals did your household kill and retrieve? [Enter in total box.]

7. In which months were they killed and retrieved? How many in (February, etc.)? [Enter the numbers by month.]

SPOTTED SEAL	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
TOTAL														

8. Of the spotted seals killed and retrieved in (January, etc.), how many were male, female, and how many were pups, juveniles, or adults?

[Enter the numbers by month.]

SPOTTED SEAL (Detail)	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
ADULT														
MALE														
FEMALE														
UNKNOWN														
JUVENILE														
MALE														
FEMALE														
UNKNOWN														
PUP														
MALE														
FEMALE														
UNKNOWN														
UNKNOWN														
MALE														
FEMALE														
UNKNOWN														

During 1996/97, 9. How many spotted seal were struck and lost by your household? [Enter number in total box.]

10. In which months were they struck and lost? [Enter numbers by month.]

SPOTTED SEAL	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
STRUCK AND LOST														

Community: () HHID:

Interviewer:

Date:

NORTHERN BERING SEA SEAL SURVEY 1997

RIBBON SEAL

RIBBON SEAL

PLEASE ANSWER THE FOLLOWING QUESTIONS IF YOU ANSWERED YES FOR RIBBON SEAL

Between February 1996 and January 1997, did you or your household:

	Yes	No
1. Use ribbon seals (meal, hides, or oil)?		
2. Hunt ribbon seals?		
3. Kill and retrieve ribbon seals?		
4. Receive ribbon seals from other households or communities?		
5. Give ribbon seals to other households or communities?		

IF YES TO QUESTION 2 OR 3 ABOVE, GO TO QUESTION 6. IF NO, COMPLETE FORMS FOR OTHER SPECIES WHICH YOU HUNTED OR USED

6. How many ribbon seals did your household kill and retrieve? (Enter in total box.)

7. In which months were they killed and retrieved? How many in (February, etc.)? (Enter the numbers by month.)

RIBBON SEAL	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
TOTAL														

8. Of the ribbon seals killed and retrieved in (January, etc.), how many were male, female, and how many were pups, juveniles, or adults? (Enter the numbers by month.)

RIBBON SEAL (Detail)	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
ADULT														
MALE														
FEMALE														
UNKNOWN														
JUVENILE														
MALE														
FEMALE														
UNKNOWN														
PUP														
MALE														
FEMALE														
UNKNOWN														
UNKNOWN														
MALE														
FEMALE														
UNKNOWN														
AGE														
MALE														
FEMALE														
UNKNOWN														

During 1996/97, 9. How many ribbon seal were struck and lost by your household? (Enter number in total box.)

10. In which months were they struck and lost? (Enter numbers by month.)

RIBBON SEAL	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
STUCK AND LOST														

Community: () HHID:

Interviewer: Date:

NORTHERN BERING SEA SEAL SURVEY 1997

SEA LION

SEA LION

PLEASE ANSWER THE FOLLOWING QUESTIONS IF YOU ANSWERED YES FOR SEA LION

Between February 1996 and January 1997, did you or your household:

	Yes	No
1. Use sea lions (meat, hides, or oil)?		
2. Hunt sea lions?		
3. Kill and retrieve sea lions?		
4. Receive sea lions from other households or communities?		
5. Give sea lions to other households or communities?		

IF YES TO QUESTION 2 OR 3 ABOVE, GO TO QUESTION 6. IF NO, COMPLETE FORMS FOR OTHER SPECIES WHICH YOU HUNTED OR USED

6. How many sea lions did your household kill and retrieve? [Enter in total box.]
 7. In which months were they killed and retrieved? How many in (February, etc.)? [Enter the numbers by month.]

SEA LION	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
TOTAL														

8. Of the sea lions killed and retrieved in (January, etc.), how many were male, female, and how many were pups, juveniles, or adults?

SEA LION (Detail)	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
ADULT	MALE													
	FEMALE													
	UNKNOWN													
JUVENILE	MALE													
	FEMALE													
	UNKNOWN													
PUP	MALE													
	FEMALE													
	UNKNOWN													
UNKNOWN	MALE													
AGE	FEMALE													
	UNKNOWN													

During 1996/97, 9. How many sea lions were struck and lost by your household? [Enter number in total box.]

10. In which months were they struck and lost? [Enter numbers by month.]

SEA LION	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	UNKNOWN	TOTAL
STRUCK AND LOST														

Community: () HHID: Interviewer: Date:

APPENDIX B.
INTERVIEW GUIDE FOR KEY RESPONDENT INTERVIEWS
WITH SEAL HUNTERS, 1997

BERING STRAIT REGION SEAL PROJECT

Kawerak and ADF&G, 1997

KEY RESPONDENT INTERVIEWS

Examples of Topics

We are trying to learn about seals and sea lions in the northern Bering Sea, including bearded seal, ringed seal, spotted seal, ribbon seal, and sea lion. In the Gulf of Alaska and Aleutian Islands, harbor seals and sea lions have been declining in number. We are trying to learn about any changes hunters in this area have observed about seal populations.

1. Can you talk about bearded seals [ringed seals, spotted seals, ribbon seals, sea lions] -- what is known about them?

- Are they seen in this area?
- What times of year are they seen? What are their movements?
- In what kinds of places are you most likely to find them?
- Where and when do they have their pups?
- What do they eat? How do they feed?
- What are their Inupiaq [or Yup'ik] names (by species, age, sex)? What are their distinctive features?
- Have you noticed a change in their numbers?
- Have you noticed a change in their health, size, or condition?
- Have you noticed anything else unusual about them such as:
 - * number or health of pups,
 - * number of abandoned or starving pups,
 - * changes in the areas they use?
- Which seals are most abundant? Which ones (species, sex, age) are preferred by hunters?
- *With maps:* Can you mark places where spotted seals [and sea lions] haul out?

At what time of year are these used?

How large are these haul-outs? How many animals?

APPENDIX C.

TOTAL SUBSISTENCE TAKES OF SEAL AND SEA LION

BY SIX NORTON SOUND-BERING STRAIT COMMUNITIES,

1996-97

**SEAL AND SEA LION HARVEST AND TAKE ESTIMATES:
Six Norton Sound-Bering Strait Communities, 1996-97**

SAMPLING DESIGN:		<u>Total</u>
	Total Native Households	528
	Surveyed Households	319
	Sampling Fraction	60.4%
	Sample Household Members	1431
	Estimated Household Members	2457.8

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Used	85.1%	7.6%	65.2%	60.9%	0.0%
Hunted	67.1%	7.2%	55.0%	49.7%	0.0%
Harvested	54.1%	6.8%	50.2%	48.0%	0.0%
Received	69.4%	3.7%	49.7%	46.1%	0.0%
Gave Away	55.4%	4.7%	46.5%	44.5%	0.0%

Estimated Regional Harvest and Take (Expanded):

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Total Number Harvested	1304.4	68.9	1257.9	1028.5	0.0
Total Number Struck and Lost	226.0	2.0	140.2	194.5	0.0
Total Number Taken	1530.5	70.9	1398.1	1223.0	0.0
Number Harvested Per Capita	0.53	0.03	0.51	0.42	0.00

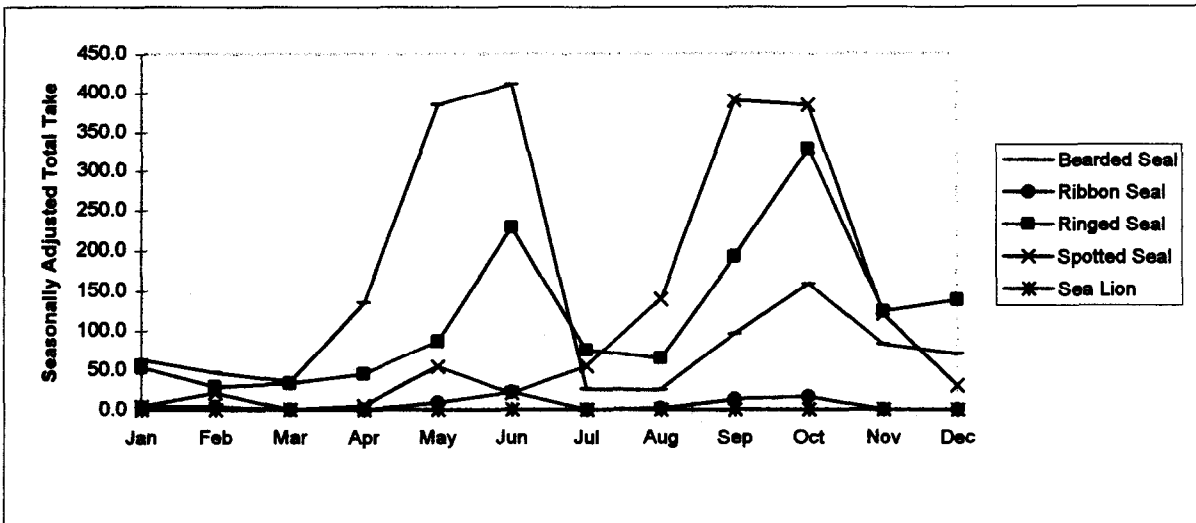
SEAL AND SEA LION HARVEST BY AGE AND SEX - REGIONAL ESTIMATE (EXPANDED)

	Seals								Sea Lion	
	Bearded		Ribbon		Ringed		Spotted		Number	%
	Number	%	Number	%	Number	%	Number	%		
Adult Male	239.8	18.4%	22.1	32.1%	169.5	13.5%	154.6	15.0%	0.0	—
Adult Female	224.2	17.2%	3.0	4.4%	99.6	7.9%	32.5	3.2%	0.0	—
Adult Unknown Sex	355.7	27.3%	20.8	30.2%	356.1	28.3%	401.2	39.0%	0.0	—
Juvenile Male	39.8	3.0%	0.0	0.0%	10.6	0.8%	36.0	3.5%	0.0	—
Juvenile Female	27.9	2.1%	0.0	0.0%	29.4	2.3%	16.0	1.6%	0.0	—
Juvenile Unknown Sex	297.9	22.8%	7.0	10.2%	414.0	32.9%	339.4	33.0%	0.0	—
Pup Male	3.9	0.3%	0.0	0.0%	0.0	0.0%	2.0	0.2%	0.0	—
Pup Female	2.0	0.2%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	—
Pup Unknown Sex	88.2	6.8%	13.9	20.2%	155.5	12.4%	15.6	1.5%	0.0	—
Male Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	—
Female Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	—
Unknown Sex and Age	25.0	1.9%	2.0	2.9%	23.1	1.8%	31.3	3.0%	0.0	—
Total	1304.4	100.0%	68.9	100.0%	1257.9	100.0%	1028.5	100.0%	0.0	—

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region, 1997.

SEAL AND SEA LION TAKE ESTIMATES: 1996-97 (Con't)

SEASONALLY ADJUSTED TAKE BY MONTH



BEARDED SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	25	21	16	65	174	192	12	15	50	79	25	25	10	709
Struck & Lost	7	4	2	7	26	19	1	2	7	19	17	10	2	123
Total Take	32	25	18	72	200	211	13	17	57	98	42	35	12	832
ESTIMATED HARVEST AND TAKE BY REGION (EXPANDED)														
Harvest	49.0	38.8	30.6	118.1	334.5	372.0	22.9	22.5	81.9	123.8	46.7	49.5	14.3	1304.4
Struck & Lost	14.2	7.2	4.1	13.6	49.7	38.4	2.0	2.0	12.3	28.4	30.0	20.3	3.8	226.0
Total Take	63.2	46.0	34.6	131.7	384.2	410.5	24.9	24.5	94.2	152.1	76.7	69.8	18.0	1530.5
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY REGION (EXPANDED)														
Harvest	49.0	39.4	30.9	122.1	335.0	372.0	22.9	22.5	83.1	129.4	48.7	49.5		1304.4
Struck & Lost	14.2	7.2	4.1	13.6	49.7	38.4	2.0	2.0	12.3	28.4	33.8	20.3		226.0
Total Take	63.2	46.7	35.0	135.7	384.7	410.5	24.9	24.5	95.4	157.8	82.5	69.8		1530.5
Total Take (%)	4.1%	3.1%	2.3%	8.9%	25.1%	26.8%	1.6%	1.6%	6.2%	10.3%	5.4%	4.6%		100.0%
Cum. Take	63.2	109.8	144.8	280.5	665.2	1075.6	1100.5	1125.0	1220.4	1378.2	1460.6	1530.5		
Cum. Take (%)	4.1%	7.2%	9.5%	18.3%	43.5%	70.3%	71.9%	73.5%	79.7%	90.1%	95.4%	100.0%		

RIBBON SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	2	2	0	0	5	11	0	2	7	14	0	0	0	43
Struck & Lost	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Total Take	2	2	0	0	5	11	0	2	7	16	0	0	0	45
ESTIMATED HARVEST AND TAKE BY REGION (EXPANDED)														
Harvest	4.1	4.1	0.0	0.0	9.3	21.8	0.0	2.0	13.2	14.6	0.0	0.0	0.0	68.9
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0
Total Take	4.1	4.1	0.0	0.0	9.3	21.8	0.0	2.0	13.2	16.6	0.0	0.0	0.0	70.9
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY REGION (EXPANDED)														
Harvest	4.1	4.1	0.0	0.0	9.3	21.8	0.0	2.0	13.2	14.6	0.0	0.0		68.9
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0		2.0
Total Take	4.1	4.1	0.0	0.0	9.3	21.8	0.0	2.0	13.2	16.6	0.0	0.0		70.9
Total Take (%)	5.7%	5.7%	0.0%	0.0%	13.1%	30.7%	0.0%	2.8%	18.6%	23.4%	0.0%	0.0%		100.0%
Cum. Take	4.1	8.1	8.1	8.1	17.4	39.2	39.2	41.2	54.3	70.9	70.9	70.9		
Cum. Take (%)	5.7%	11.4%	11.4%	11.4%	24.5%	55.2%	55.2%	58.1%	76.6%	100.0%	100.0%	100.0%		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region, 1997.

SEAL AND SEA LION TAKE ESTIMATES: 1996-97 (Con't)

RINGED SEAL HARVEST BY MONTH													Unknown	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month	
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	28	19	17	22	37	102	39	37	102	191	61	71	0	726
Struck & Lost	0	0	0	2	9	16	0	1	12	29	8	2	5	84
Total Take	28	19	17	24	46	118	39	38	114	220	69	73	5	810
ESTIMATED HARVEST AND TAKE BY REGION (EXPANDED)														
Harvest	52.9	28.2	32.7	40.7	69.2	198.3	75.3	62.4	172.6	288.3	102.8	134.6	0.0	1257.9
Struck & Lost	0.0	0.0	0.0	3.8	17.2	31.2	0.0	2.0	20.0	41.1	11.4	4.1	9.4	140.2
Total Take	52.9	28.2	32.7	44.5	86.4	229.4	75.3	64.4	192.6	329.4	114.2	138.7	9.4	1398.1
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY REGION (EXPANDED)														
Harvest	52.9	28.2	32.7	40.7	69.2	198.3	75.3	62.4	172.6	288.3	102.8	134.6		1257.9
Struck & Lost	0.0	0.0	0.0	3.8	17.2	31.2	0.0	2.0	20.0	41.1	20.8	4.1		140.2
Total Take	52.9	28.2	32.7	44.5	86.4	229.4	75.3	64.4	192.6	329.4	123.6	138.7		1398.1
Total Take (%)	3.8%	2.0%	2.3%	3.2%	6.2%	16.4%	5.4%	4.6%	13.8%	23.6%	8.8%	9.9%		100.0%
Cum. Take	52.9	81.1	113.7	158.3	244.7	474.1	549.4	613.8	806.4	1135.8	1259.4	1398.1		
Cum. Take (%)	3.8%	5.8%	8.1%	11.3%	17.5%	33.9%	39.3%	43.9%	57.7%	81.2%	90.1%	100.0%		

SPOTTED SEAL HARVEST BY MONTH													Unknown	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month	
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	2	16	0	3	26	11	25	67	187	184	53	13	0	587
Struck & Lost	0	0	0	0	10	0	2	10	28	47	8	2	1	108
Total Take	2	16	0	3	36	11	27	77	215	231	61	15	1	695
ESTIMATED HARVEST AND TAKE BY REGION (EXPANDED)														
Harvest	3.9	21.0	0.0	4.8	40.5	20.2	50.2	118.3	337.7	300.7	105.0	26.2	0.0	1028.5
Struck & Lost	0.0	0.0	0.0	0.0	12.9	0.0	4.1	19.9	51.9	84.3	15.6	4.1	1.9	194.5
Total Take	3.9	21.0	0.0	4.8	53.4	20.2	54.2	138.1	389.6	385.0	120.6	30.3	1.9	1223.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY REGION (EXPANDED)														
Harvest	3.9	21.0	0.0	4.8	40.5	20.2	50.2	118.3	337.7	300.7	105.0	26.2		1028.5
Struck & Lost	0.0	0.0	0.0	0.0	12.9	0.0	4.1	21.1	52.5	84.3	15.6	4.1		194.5
Total Take	3.9	21.0	0.0	4.8	53.4	20.2	54.2	139.4	390.2	385.0	120.6	30.3		1223.0
Total Take (%)	0.3%	1.7%	0.0%	0.4%	4.4%	1.7%	4.4%	11.4%	31.9%	31.5%	9.9%	2.5%		100.0%
Cum. Take	3.9	24.9	24.9	29.7	83.1	103.3	157.6	297.0	687.1	1072.1	1192.8	1223.0		
Cum. Take (%)	0.3%	2.0%	2.0%	2.4%	6.8%	8.4%	12.9%	24.3%	56.2%	87.7%	97.5%	100.0%		

SEA LION HARVEST BY MONTH													Unknown	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month	
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESTIMATED HARVEST AND TAKE BY REGION (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY REGION (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take (%)	—	—	—	—	—	—	—	—	—	—	—	—		—
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Cum. Take (%)	—	—	—	—	—	—	—	—	—	—	—	—		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region, 1997.

APPENDIX D.
SUBSISTENCE TAKES OF SEAL AND SEA LION
BY COMMUNITY, NORTON SOUND-BERING STRAIT REGION,
1996-97

Brevig Mission	62
Gambell.....	65
Golovin	68
Savoonga.....	71
Shaktoolik.....	74
Stebbins.....	77

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Brevig Mission, 1996-97

SAMPLING DESIGN:	Total Native Households	60
CENSUS	Surveyed Households	60
	Sampling Fraction	100.0%
	Sample Household Members	199
	Estimated Household Members	199.0

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Used	86.7%	11.7%	18.3%	36.7%	0.0%
Hunted	80.0%	15.0%	18.3%	36.7%	0.0%
Harvested	36.7%	11.7%	18.3%	36.7%	0.0%
Received	61.7%	1.7%	5.0%	3.3%	0.0%
Gave Away	21.7%	5.0%	11.7%	20.0%	0.0%

Estimated Community Harvest and Take (Expanded):

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Total Number Harvested	52.0	14.0	89.0	85.0	0.0
Total Number Struck and Lost	11.0	2.0	9.0	8.0	0.0
Total Number Taken	63.0	16.0	98.0	93.0	0.0
Number Harvested Per Capita	0.26	0.07	0.45	0.43	0.00

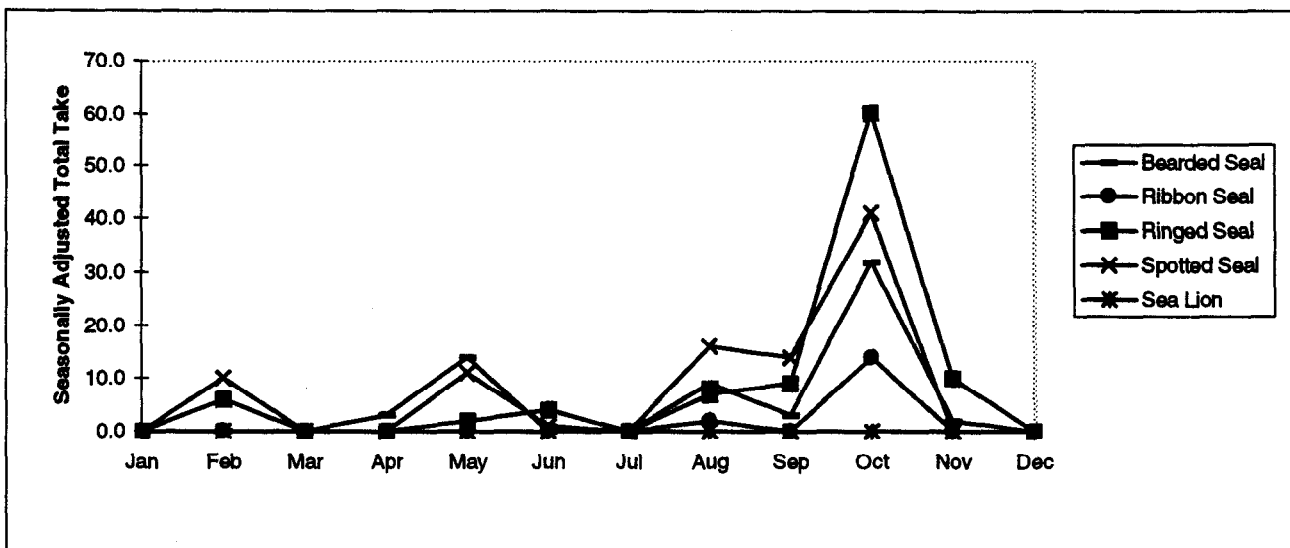
SEAL AND SEA LION HARVEST BY AGE AND SEX - COMMUNITY ESTIMATE (EXPANDED)

	Seals								Sea Lion	
	Bearded		Ribbon		Ringed		Spotted			
	Number	%	Number	%	Number	%	Number	%	Number	%
Adult Male	17.0	32.7%	4.0	28.6%	42.0	47.2%	11.0	12.9%	0.0	—
Adult Female	1.0	1.9%	1.0	7.1%	17.0	19.1%	1.0	1.2%	0.0	—
Adult Unknown Sex	6.0	11.5%	4.0	28.6%	4.0	4.5%	25.0	29.4%	0.0	—
Juvenile Male	8.0	15.4%	0.0	0.0%	3.0	3.4%	6.0	7.1%	0.0	—
Juvenile Female	4.0	7.7%	0.0	0.0%	6.0	6.7%	10.0	11.8%	0.0	—
Juvenile Unknown Sex	9.0	17.3%	5.0	35.7%	12.0	13.5%	23.0	27.1%	0.0	—
Pup Male	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	—
Pup Female	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	—
Pup Unknown Sex	0.0	0.0%	0.0	0.0%	0.0	0.0%	4.0	4.7%	0.0	—
Male Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	—
Female Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	—
Unknown Sex and Age	7.0	13.5%	0.0	0.0%	5.0	5.6%	5.0	5.9%	0.0	—
Total	52.0	100.0%	14.0	100.0%	89.0	100.0%	85.0	100.0%	0.0	—

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Brevig Mission, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Brevig Mission, 1996-97 (Continued)

SEASONALLY ADJUSTED TAKE BY MONTH



BEARDED SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	3	14	0	0	7	3	25	0	0	0	52
Struck & Lost	0	0	0	0	0	0	0	2	0	7	2	0	0	11
Total Take	0	0	0	3	14	0	0	9	3	32	2	0	0	63
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	3.0	14.0	0.0	0.0	7.0	3.0	25.0	0.0	0.0	0.0	52.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	7.0	2.0	0.0	0.0	11.0
Total Take	0.0	0.0	0.0	3.0	14.0	0.0	0.0	9.0	3.0	32.0	2.0	0.0	0.0	63.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	3.0	14.0	0.0	0.0	7.0	3.0	25.0	0.0	0.0		52.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	7.0	2.0	0.0		11.0
Total Take	0.0	0.0	0.0	3.0	14.0	0.0	0.0	9.0	3.0	32.0	2.0	0.0		63.0
Total Take (%)	0.0%	0.0%	0.0%	4.8%	22.2%	0.0%	0.0%	14.3%	4.8%	50.8%	3.2%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	3.0	17.0	17.0	17.0	26.0	29.0	61.0	63.0	63.0		
Cum. Take (%)	0.0%	0.0%	0.0%	4.8%	27.0%	27.0%	27.0%	41.3%	46.0%	96.8%	100.0%	100.0%		

RIBBON SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	0	0	2	0	12	0	0	0	14
Struck & Lost	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Total Take	0	0	0	0	0	0	0	2	0	14	0	0	0	16
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	12.0	0.0	0.0	0.0	14.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	14.0	0.0	0.0	0.0	16.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	12.0	0.0	0.0		14.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0		2.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	14.0	0.0	0.0		16.0
Total Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5%	0.0%	87.5%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	16.0	16.0	16.0		
Cum. Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5%	12.5%	100.0%	100.0%	100.0%		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Brevig Mission, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Brevig Mission, 1996-97 (Continued)

RINGED SEAL HARVEST BY MONTH														Unknown Month	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)															
Harvest	0	6	0	0	2	4	0	7	9	51	10	0	0	89	
Struck & Lost	0	0	0	0	0	0	0	0	0	9	0	0	0	9	
Total Take	0	6	0	0	2	4	0	7	9	60	10	0	0	98	
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)															
Harvest	0.0	6.0	0.0	0.0	2.0	4.0	0.0	7.0	9.0	51.0	10.0	0.0	0.0	89.0	
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0	0.0	9.0	
Total Take	0.0	6.0	0.0	0.0	2.0	4.0	0.0	7.0	9.0	60.0	10.0	0.0	0.0	98.0	
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)															
Harvest	0.0	6.0	0.0	0.0	2.0	4.0	0.0	7.0	9.0	51.0	10.0	0.0		89.0	
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0		9.0	
Total Take	0.0	6.0	0.0	0.0	2.0	4.0	0.0	7.0	9.0	60.0	10.0	0.0		98.0	
Total Take (%)	0.0%	6.1%	0.0%	0.0%	2.0%	4.1%	0.0%	7.1%	9.2%	61.2%	10.2%	0.0%		100.0%	
Cum. Take	0.0	6.0	6.0	6.0	8.0	12.0	12.0	19.0	28.0	88.0	98.0	98.0			
Cum. Take (%)	0.0%	6.1%	6.1%	6.1%	8.2%	12.2%	12.2%	19.4%	28.6%	89.8%	100.0%	100.0%			

SPOTTED SEAL HARVEST BY MONTH														Unknown Month	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)															
Harvest	0	10	0	0	10	1	0	16	12	36	0	0	0	85	
Struck & Lost	0	0	0	0	1	0	0	0	2	5	0	0	0	8	
Total Take	0	10	0	0	11	1	0	16	14	41	0	0	0	93	
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)															
Harvest	0.0	10.0	0.0	0.0	10.0	1.0	0.0	16.0	12.0	36.0	0.0	0.0	0.0	85.0	
Struck & Lost	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.0	5.0	0.0	0.0	0.0	8.0	
Total Take	0.0	10.0	0.0	0.0	11.0	1.0	0.0	16.0	14.0	41.0	0.0	0.0	0.0	93.0	
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)															
Harvest	0.0	10.0	0.0	0.0	10.0	1.0	0.0	16.0	12.0	36.0	0.0	0.0		85.0	
Struck & Lost	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.0	5.0	0.0	0.0		8.0	
Total Take	0.0	10.0	0.0	0.0	11.0	1.0	0.0	16.0	14.0	41.0	0.0	0.0		93.0	
Total Take (%)	0.0%	10.8%	0.0%	0.0%	11.8%	1.1%	0.0%	17.2%	15.1%	44.1%	0.0%	0.0%		100.0%	
Cum. Take	0.0	10.0	10.0	10.0	21.0	22.0	22.0	38.0	52.0	93.0	93.0	93.0			
Cum. Take (%)	0.0%	10.8%	10.8%	10.8%	22.6%	23.7%	23.7%	40.9%	55.9%	100.0%	100.0%	100.0%			

SEA LION HARVEST BY MONTH														Unknown Month	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)															
Harvest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Take	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)															
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)															
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Take (%)	—	—	—	—	—	—	—	—	—	—	—	—		—	
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Cum. Take (%)	—	—	—	—	—	—	—	—	—	—	—	—			

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Brevig Mission, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Gambell, 1996-97

SAMPLING DESIGN:	Total Native Households	142
RANDOM	Surveyed Households	70
	Sampling Fraction	49.3%
	Sample Household Members	307
	Estimated Household Members	622.8

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Used	91.4%	8.6%	77.1%	82.9%	0.0%
Hunted	84.3%	8.6%	72.9%	74.3%	0.0%
Harvested	81.4%	8.6%	71.4%	74.3%	0.0%
Received	80.0%	2.9%	55.7%	71.4%	0.0%
Gave Away	78.6%	4.3%	54.3%	68.6%	0.0%

Estimated Community Harvest and Take (Expanded):

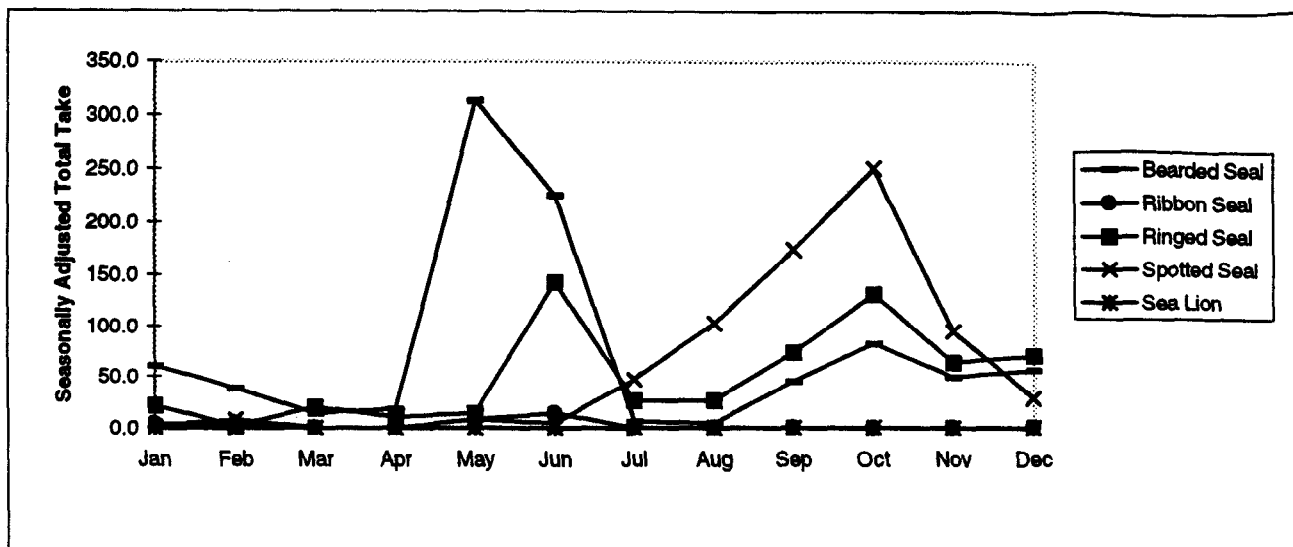
	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Total Number Harvested	750.6	30.4	572.1	570.0	0.0
Total Number Struck and Lost	<u>158.2</u>	<u>0.0</u>	<u>26.4</u>	<u>144.0</u>	<u>0.0</u>
Total Number Taken	908.8	30.4	598.4	714.1	0.0
Number Harvested Per Capita	1.21	0.05	0.92	0.92	0.00

SEAL AND SEA LION HARVEST BY AGE AND SEX - COMMUNITY ESTIMATE (EXPANDED)

	Seals								Sea Lion	
	Bearded		Ribbon		Ringed		Spotted		Number	%
	Number	%	Number	%	Number	%	Number	%		
Adult Male	117.7	15.7%	10.1	33.3%	4.1	0.7%	89.3	15.7%	0.0	--
Adult Female	125.8	16.8%	2.0	6.7%	12.2	2.1%	24.3	4.3%	0.0	--
Adult Unknown Sex	129.8	17.3%	4.1	13.3%	10.1	1.8%	91.3	16.0%	0.0	--
Juvenile Male	20.3	2.7%	0.0	0.0%	0.0	0.0%	22.3	3.9%	0.0	--
Juvenile Female	16.2	2.2%	0.0	0.0%	8.1	1.4%	4.1	0.7%	0.0	--
Juvenile Unknown Sex	247.5	33.0%	2.0	6.7%	375.3	65.6%	308.3	54.1%	0.0	--
Pup Male	2.0	0.3%	0.0	0.0%	0.0	0.0%	2.0	0.4%	0.0	--
Pup Female	2.0	0.3%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	--
Pup Unknown Sex	75.1	10.0%	10.1	33.3%	146.1	25.5%	4.1	0.7%	0.0	--
Male Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	--
Female Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	--
Unknown Sex and Age	14.2	1.9%	2.0	6.7%	16.2	2.8%	24.3	4.3%	0.0	--
Total	750.6	100.0%	30.4	100.0%	572.1	100.0%	570.0	100.0%	0.0	--

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Gambell, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Gambell, 1996-97 (Continued)
SEASONALLY ADJUSTED TAKE BY MONTH



BEARDED SEAL HARVEST BY MONTH													Unknown	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month		
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	23	16	5	7	139	93	2	2	18	32	16	17	0	370
Struck & Lost	7	3	2	2	15	18	1	0	4	8	8	10	0	78
Total Take	30	19	7	9	154	111	3	2	22	40	24	27	0	448
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	46.7	32.5	10.1	14.2	282.0	188.7	4.1	4.1	36.5	64.9	32.5	34.5	0.0	750.6
Struck & Lost	14.2	6.1	4.1	4.1	30.4	36.5	2.0	0.0	8.1	16.2	16.2	20.3	0.0	158.2
Total Take	60.9	38.5	14.2	18.3	312.4	225.2	6.1	4.1	44.6	81.1	48.7	54.8	0.0	908.8
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	46.7	32.5	10.1	14.2	282.0	188.7	4.1	4.1	36.5	64.9	32.5	34.5		750.6
Struck & Lost	14.2	6.1	4.1	4.1	30.4	36.5	2.0	0.0	8.1	16.2	16.2	20.3		158.2
Total Take	60.9	38.5	14.2	18.3	312.4	225.2	6.1	4.1	44.6	81.1	48.7	54.8		908.8
Total Take (%)	6.7%	4.2%	1.6%	2.0%	34.4%	24.8%	0.7%	0.4%	4.9%	8.9%	5.4%	6.0%		100.0%
Cum. Take	60.9	99.4	113.6	131.9	444.3	669.4	675.5	679.6	724.2	805.3	854.0	908.8		
Cum. Take (%)	6.7%	10.9%	12.5%	14.5%	48.9%	73.7%	74.3%	74.8%	79.7%	88.6%	94.0%	100.0%		

RIBBON SEAL HARVEST BY MONTH													Unknown	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month	
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	2	2	0	0	4	7	0	0	0	0	0	0	0	15
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	2	2	0	0	4	7	0	0	0	0	0	0	0	15
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	4.1	4.1	0.0	0.0	8.1	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.4
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	4.1	4.1	0.0	0.0	8.1	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.4
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	4.1	4.1	0.0	0.0	8.1	14.2	0.0	0.0	0.0	0.0	0.0	0.0		30.4
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	4.1	4.1	0.0	0.0	8.1	14.2	0.0	0.0	0.0	0.0	0.0	0.0		30.4
Total Take (%)	13.3%	13.3%	0.0%	0.0%	26.7%	46.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		100.0%
Cum. Take	4.1	8.1	8.1	8.1	16.2	30.4	30.4	30.4	30.4	30.4	30.4	30.4		
Cum. Take (%)	13.3%	26.7%	26.7%	26.7%	53.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.
 SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Gambell, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Gambell, 1996-97 (Continued)

RINGED SEAL HARVEST BY MONTH													Unknown	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month	
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	11	1	10	5	7	65	13	12	34	61	31	32	0	282
Struck & Lost	0	0	0	0	0	5	0	1	2	3	0	2	0	13
Total Take	11	1	10	5	7	70	13	13	36	64	31	34	0	295
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	22.3	2.0	20.3	10.1	14.2	131.9	26.4	24.3	69.0	123.7	62.9	64.9	0.0	572.1
Struck & Lost	0.0	0.0	0.0	0.0	0.0	10.1	0.0	2.0	4.1	6.1	0.0	4.1	0.0	26.4
Total Take	22.3	2.0	20.3	10.1	14.2	142.0	26.4	26.4	73.0	129.8	62.9	69.0	0.0	598.4
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	22.3	2.0	20.3	10.1	14.2	131.9	26.4	24.3	69.0	123.7	62.9	64.9		572.1
Struck & Lost	0.0	0.0	0.0	0.0	0.0	10.1	0.0	2.0	4.1	6.1	0.0	4.1		26.4
Total Take	22.3	2.0	20.3	10.1	14.2	142.0	26.4	26.4	73.0	129.8	62.9	69.0		598.4
Total Take (%)	3.7%	0.3%	3.4%	1.7%	2.4%	23.7%	4.4%	4.4%	12.2%	21.7%	10.5%	11.5%		100.0%
Cum. Take	22.3	24.3	44.6	54.8	69.0	211.0	237.3	263.7	336.7	466.6	529.5	598.4		
Cum. Take (%)	3.7%	4.1%	7.5%	9.2%	11.5%	35.3%	39.7%	44.1%	56.3%	78.0%	88.5%	100.0%		

SPOTTED SEAL HARVEST BY MONTH													Unknown	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month	
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	1	4	0	0	4	2	21	43	64	91	39	12	0	281
Struck & Lost	0	0	0	0	0	0	2	7	21	32	7	2	0	71
Total Take	1	4	0	0	4	2	23	50	85	123	46	14	0	352
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	2.0	8.1	0.0	0.0	8.1	4.1	42.6	87.2	129.8	184.6	79.1	24.3	0.0	570.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	4.1	14.2	42.6	64.9	14.2	4.1	0.0	144.0
Total Take	2.0	8.1	0.0	0.0	8.1	4.1	46.7	101.4	172.4	249.5	93.3	28.4	0.0	714.1
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	2.0	8.1	0.0	0.0	8.1	4.1	42.6	87.2	129.8	184.6	79.1	24.3		570.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	4.1	14.2	42.6	64.9	14.2	4.1		144.0
Total Take	2.0	8.1	0.0	0.0	8.1	4.1	46.7	101.4	172.4	249.5	93.3	28.4		714.1
Total Take (%)	0.3%	1.1%	0.0%	0.0%	1.1%	0.6%	6.5%	14.2%	24.1%	34.9%	13.1%	4.0%		100.0%
Cum. Take	2.0	10.1	10.1	10.1	18.3	22.3	69.0	170.4	342.8	592.3	685.7	714.1		
Cum. Take (%)	0.3%	1.4%	1.4%	1.4%	2.6%	3.1%	9.7%	23.9%	48.0%	83.0%	96.0%	100.0%		

SEA LION HARVEST BY MONTH													Unknown	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month	
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take (%)	---	---	---	---	---	---	---	---	---	---	---	---		---
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Cum. Take (%)	---	---	---	---	---	---	---	---	---	---	---	---		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.
 SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Gambell, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Golovin, 1996-97

SAMPLING DESIGN:	Total Native Households	45
CENSUS	Surveyed Households	39
	Sampling Fraction	86.7%
	Sample Household Members	127
	Estimated Household Members	146.5

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Used	71.8%	5.1%	15.4%	82.1%	0.0%
Hunted	28.2%	5.1%	15.4%	33.3%	0.0%
Harvested	20.5%	5.1%	12.8%	25.6%	0.0%
Received	66.7%	2.6%	7.7%	71.8%	0.0%
Gave Away	25.6%	2.6%	12.8%	28.2%	0.0%

Estimated Community Harvest and Take (Expanded):

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Total Number Harvested	31.2	2.3	77.3	47.3	0.0
Total Number Struck and Lost	<u>9.2</u>	<u>0.0</u>	<u>13.8</u>	<u>17.3</u>	<u>0.0</u>
Total Number Taken	40.4	2.3	91.2	64.6	0.0
Number Harvested Per Capita	0.21	0.02	0.53	0.32	0.00

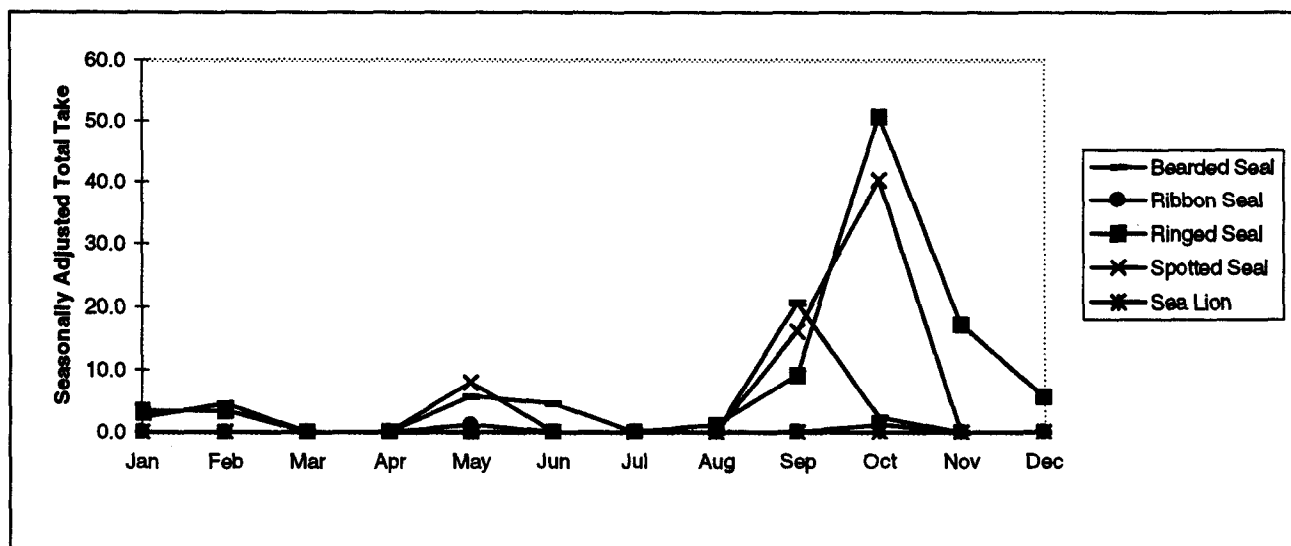
SEAL AND SEA LION HARVEST BY AGE AND SEX - COMMUNITY ESTIMATE (EXPANDED)

	Seals								Sea Lion	
	Bearded		Ribbon		Ringed		Spotted			
	Number	%	Number	%	Number	%	Number	%	Number	%
Adult Male	6.9	22.2%	2.3	100.0%	0.0	0.0%	17.3	36.6%	0.0	---
Adult Female	1.2	3.7%	0.0	0.0%	11.5	14.9%	0.0	0.0%	0.0	---
Adult Unknown Sex	4.6	14.8%	0.0	0.0%	51.9	67.2%	21.9	46.3%	0.0	---
Juvenile Male	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Juvenile Female	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Juvenile Unknown Sex	18.5	59.3%	0.0	0.0%	13.8	17.9%	8.1	17.1%	0.0	---
Pup Male	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Pup Female	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Pup Unknown Sex	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Male Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Female Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Unknown Sex and Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Total	31.2	100.0%	2.3	100.0%	77.3	100.0%	47.3	100.0%	0.0	---

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Golovin, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Golovin, 1996-97 (Continued)

SEASONALLY ADJUSTED TAKE BY MONTH



BEARDED SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	2	3	0	0	2	4	0	0	16	0	0	0	0	27
Struck & Lost	0	1	0	0	3	0	0	0	2	2	0	0	0	8
Total Take	2	4	0	0	5	4	0	0	18	2	0	0	0	35
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	2.3	3.5	0.0	0.0	2.3	4.6	0.0	0.0	18.5	0.0	0.0	0.0	0.0	31.2
Struck & Lost	0.0	1.2	0.0	0.0	3.5	0.0	0.0	0.0	2.3	2.3	0.0	0.0	0.0	9.2
Total Take	2.3	4.6	0.0	0.0	5.8	4.6	0.0	0.0	20.8	2.3	0.0	0.0	0.0	40.4
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	2.3	3.5	0.0	0.0	2.3	4.6	0.0	0.0	18.5	0.0	0.0	0.0		31.2
Struck & Lost	0.0	1.2	0.0	0.0	3.5	0.0	0.0	0.0	2.3	2.3	0.0	0.0		9.2
Total Take	2.3	4.6	0.0	0.0	5.8	4.6	0.0	0.0	20.8	2.3	0.0	0.0		40.4
Total Take (%)	5.7%	11.4%	0.0%	0.0%	14.3%	11.4%	0.0%	0.0%	51.4%	5.7%	0.0%	0.0%		100.0%
Cum. Take	2.3	6.9	6.9	6.9	12.7	17.3	17.3	17.3	38.1	40.4	40.4	40.4		
Cum. Take (%)	5.7%	17.1%	17.1%	17.1%	31.4%	42.9%	42.9%	42.9%	94.3%	100.0%	100.0%	100.0%		

RIBBON SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	1	0	0	0	0	1	0	0	0	2
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	0	0	0	0	1	0	0	0	0	1	0	0	0	2
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	2.3
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	2.3
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.2	0.0	0.0		2.3
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.2	0.0	0.0		2.3
Total Take (%)	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	0.0	1.2	1.2	1.2	1.2	1.2	2.3	2.3	2.3		
Cum. Take (%)	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	50.0%	50.0%	50.0%	100.0%	100.0%	100.0%		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Golovin, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Golovin, 1996-97 (Continued)

RINGED SEAL HARVEST BY MONTH													Unknown	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month		
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	3	3	0	0	0	0	0	1	7	38	10	5	0	67
Struck & Lost	0	0	0	0	0	0	0	0	1	6	5	0	0	12
Total Take	3	3	0	0	0	0	0	1	8	44	15	5	0	79
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	3.5	3.5	0.0	0.0	0.0	0.0	0.0	1.2	8.1	43.8	11.5	5.8	0.0	77.3
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	6.9	5.8	0.0	0.0	13.8
Total Take	3.5	3.5	0.0	0.0	0.0	0.0	0.0	1.2	9.2	50.8	17.3	5.8	0.0	91.2
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	3.5	3.5	0.0	0.0	0.0	0.0	0.0	1.2	8.1	43.8	11.5	5.8		77.3
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	6.9	5.8	0.0		13.8
Total Take	3.5	3.5	0.0	0.0	0.0	0.0	0.0	1.2	9.2	50.8	17.3	5.8		91.2
Total Take (%)	3.8%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	10.1%	55.7%	19.0%	6.3%		100.0%
Cum. Take	3.5	6.9	6.9	6.9	6.9	6.9	6.9	8.1	17.3	68.1	85.4	91.2		
Cum. Take (%)	3.8%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	8.9%	19.0%	74.7%	93.7%	100.0%		

SPOTTED SEAL HARVEST BY MONTH													Unknown	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month		
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	0	0	0	11	30	0	0	0	41
Struck & Lost	0	0	0	0	7	0	0	0	3	5	0	0	0	15
Total Take	0	0	0	0	7	0	0	0	14	35	0	0	0	56
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	34.6	0.0	0.0	0.0	47.3
Struck & Lost	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0	3.5	5.8	0.0	0.0	0.0	17.3
Total Take	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0	16.2	40.4	0.0	0.0	0.0	64.6
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	34.6	0.0	0.0		47.3
Struck & Lost	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0	3.5	5.8	0.0	0.0		17.3
Total Take	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0	16.2	40.4	0.0	0.0		64.6
Total Take (%)	0.0%	0.0%	0.0%	0.0%	12.5%	0.0%	0.0%	0.0%	25.0%	62.5%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	0.0	8.1	8.1	8.1	8.1	24.2	64.6	64.6	64.6		
Cum. Take (%)	0.0%	0.0%	0.0%	0.0%	12.5%	12.5%	12.5%	12.5%	37.5%	100.0%	100.0%	100.0%		

SEA LION HARVEST BY MONTH													Unknown	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month		
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take (%)	—	—	—	—	—	—	—	—	—	—	—	—		—
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Cum. Take (%)	—	—	—	—	—	—	—	—	—	—	—	—		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Golovin, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Savoonga, 1996-97

SAMPLING DESIGN:	Total Native Households	126
RANDOM	Surveyed Households	67
	Sampling Fraction	53.2%
	Sample Household Members	359
	Estimated Household Members	675.1

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Used	82.1%	9.0%	86.6%	73.1%	0.0%
Hunted	67.2%	9.0%	76.1%	62.7%	0.0%
Harvested	46.3%	9.0%	59.7%	58.2%	0.0%
Received	80.6%	7.5%	86.6%	71.6%	0.0%
Gave Away	46.3%	7.5%	59.7%	58.2%	0.0%

Estimated Community Harvest and Take (Expanded):

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Total Number Harvested	274.6	16.9	237.0	235.1	0.0
Total Number Struck and Lost	<u>11.3</u>	<u>0.0</u>	<u>15.0</u>	<u>7.5</u>	<u>0.0</u>
Total Number Taken	285.9	16.9	252.0	242.6	0.0
Number Harvested Per Capita	0.41	0.03	0.35	0.35	0.00

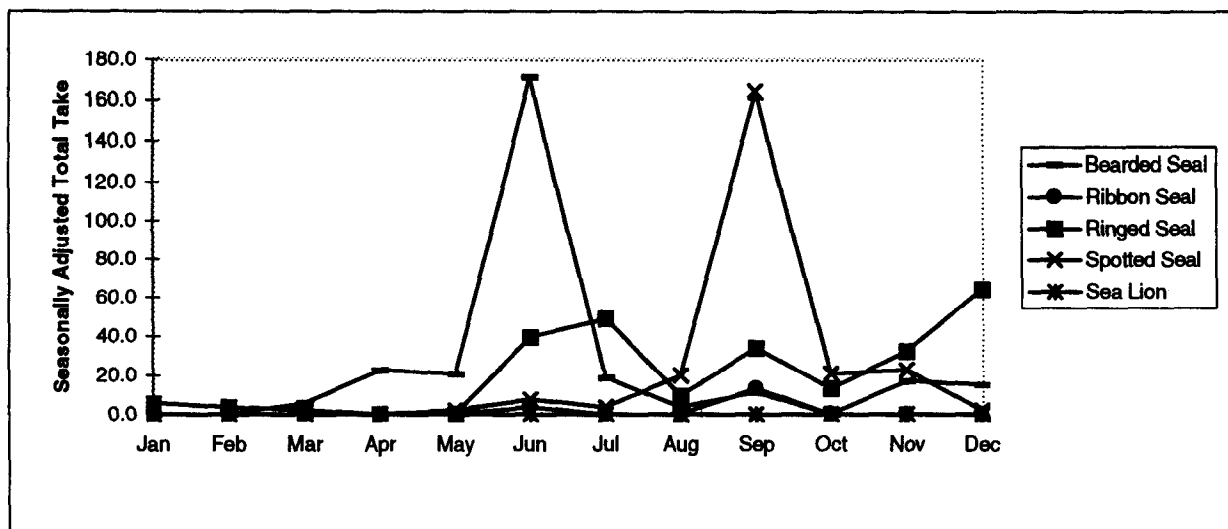
SEAL AND SEA LION HARVEST BY AGE AND SEX - COMMUNITY ESTIMATE (EXPANDED)

	Seals								Sea Lion	
	Bearded		Ribbon		Ringed		Spotted			
	Number	%	Number	%	Number	%	Number	%	Number	%
Adult Male	22.6	8.2%	5.6	33.3%	26.3	11.1%	13.2	5.6%	0.0	---
Adult Female	35.7	13.0%	0.0	0.0%	3.8	1.6%	1.9	0.8%	0.0	---
Adult Unknown Sex	188.1	68.5%	7.5	44.4%	193.7	81.7%	214.4	91.2%	0.0	---
Juvenile Male	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Juvenile Female	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Juvenile Unknown Sex	13.2	4.8%	0.0	0.0%	3.8	1.6%	0.0	0.0%	0.0	---
Pup Male	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Pup Female	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Pup Unknown Sex	13.2	4.8%	3.8	22.2%	9.4	4.0%	5.6	2.4%	0.0	---
Male Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Female Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Unknown Sex and Age	1.9	0.7%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Total	274.6	100.0%	16.9	100.0%	237.0	100.0%	235.1	100.0%	0.0	---

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Savoonga, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Savoonga, 1996-97 (Continued)

SEASONALLY ADJUSTED TAKE BY MONTH



BEARDED SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	3	12	11	91	10	2	6	0	3	8	0	146
Struck & Lost	0	0	0	0	0	0	0	0	0	0	4	0	2	6
Total Take	0	0	3	12	11	91	10	2	6	0	7	8	2	152
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	5.6	22.6	20.7	171.1	18.8	3.8	11.3	0.0	5.6	15.0	0.0	274.6
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0	3.8	11.3
Total Take	0.0	0.0	5.6	22.6	20.7	171.1	18.8	3.8	11.3	0.0	13.2	15.0	3.8	285.9
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	5.6	22.6	20.7	171.1	18.8	3.8	11.3	0.0	5.6	15.0		274.6
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3	0.0		11.3
Total Take	0.0	0.0	5.6	22.6	20.7	171.1	18.8	3.8	11.3	0.0	16.9	15.0		285.9
Total Take (%)	0.0%	0.0%	2.0%	7.9%	7.2%	59.9%	6.6%	1.3%	3.9%	0.0%	5.9%	5.3%		100.0%
Cum. Take	0.0	0.0	5.6	28.2	48.9	220.0	238.8	242.6	253.9	253.9	270.8	285.9		
Cum. Take (%)	0.0%	0.0%	2.0%	9.9%	17.1%	77.0%	83.6%	84.9%	88.8%	88.8%	94.7%	100.0%		

RIBBON SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	2	0	0	7	0	0	0	0	9
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	0	0	0	0	0	2	0	0	7	0	0	0	0	9
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	13.2	0.0	0.0	0.0	0.0	16.9
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	13.2	0.0	0.0	0.0	0.0	16.9
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	13.2	0.0	0.0	0.0		16.9
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	13.2	0.0	0.0	0.0		16.9
Total Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	22.2%	0.0%	0.0%	77.8%	0.0%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	0.0	0.0	3.8	3.8	3.8	16.9	16.9	16.9	16.9		
Cum. Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	22.2%	22.2%	22.2%	100.0%	100.0%	100.0%	100.0%		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Savoonga, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Savoonga, 1996-97 (Continued)

RINGED SEAL HARVEST BY MONTH													Unknown Month	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	3	2	1	0	0	21	26	5	18	7	9	34	0	126
Struck & Lost	0	0	0	0	0	0	0	0	0	0	3	0	5	8
Total Take	3	2	1	0	0	21	26	5	18	7	12	34	5	134
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	5.6	3.8	1.9	0.0	0.0	39.5	48.9	9.4	33.9	13.2	16.9	63.9	0.0	237.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0	9.4	15.0
Total Take	5.6	3.8	1.9	0.0	0.0	39.5	48.9	9.4	33.9	13.2	22.6	63.9	9.4	252.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	5.6	3.8	1.9	0.0	0.0	39.5	48.9	9.4	33.9	13.2	16.9	63.9		237.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0		15.0
Total Take	5.6	3.8	1.9	0.0	0.0	39.5	48.9	9.4	33.9	13.2	32.0	63.9		252.0
Total Take (%)	2.2%	1.5%	0.7%	0.0%	0.0%	15.7%	19.4%	3.7%	13.4%	5.2%	12.7%	25.4%		100.0%
Cum. Take	5.6	9.4	11.3	11.3	11.3	50.8	99.7	109.1	142.9	156.1	188.1	252.0		
Cum. Take (%)	2.2%	3.7%	4.5%	4.5%	4.5%	20.1%	39.6%	43.3%	56.7%	61.9%	74.6%	100.0%		

SPOTTED SEAL HARVEST BY MONTH													Unknown	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month		
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	1	4	2	8	86	11	12	1	0	125
Struck & Lost	0	0	0	0	0	0	0	2	1	0	0	0	1	4
Total Take	0	0	0	0	1	4	2	10	87	11	12	1	1	129
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	1.9	7.5	3.8	15.0	161.7	20.7	22.6	1.9	0.0	235.1
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	1.9	0.0	0.0	0.0	1.9	7.5
Total Take	0.0	0.0	0.0	0.0	1.9	7.5	3.8	18.8	163.6	20.7	22.6	1.9	1.9	242.6
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	1.9	7.5	3.8	15.0	161.7	20.7	22.6	1.9		235.1
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	2.5	0.0	0.0	0.0		7.5
Total Take	0.0	0.0	0.0	0.0	1.9	7.5	3.8	20.1	164.2	20.7	22.6	1.9		242.6
Total Take (%)	0.0%	0.0%	0.0%	0.0%	0.8%	3.1%	1.6%	8.3%	67.7%	8.5%	9.3%	0.8%		100.0%
Cum. Take	0.0	0.0	0.0	0.0	1.9	9.4	13.2	33.2	197.5	218.1	240.7	242.6		
Cum. Take (%)	0.0%	0.0%	0.0%	0.0%	0.8%	3.9%	5.4%	13.7%	81.4%	89.9%	99.2%	100.0%		

SEA LION HARVEST BY MONTH													Unknown	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month		
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take (%)	---	---	---	---	---	---	---	---	---	---	---	---		---
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Cum. Take (%)	---	---	---	---	---	---	---	---	---	---	---	---		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Savoonga, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Shaktoolik, 1996-97

SAMPLING DESIGN:		Active	Other	Total
STRATIFIED	Total Native Households	20	28	48
	Surveyed Households	14	13	27
	Sampling Fraction	70.0%	46.4%	56.3%
	Sample Household Members	80	58	138
	Estimated Household Members	114.3	124.9	239.2

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Used	79.1%	7.5%	65.7%	38.7%	0.0%
Hunted	43.2%	3.0%	37.2%	29.8%	0.0%
Harvested	40.2%	3.0%	34.2%	29.8%	0.0%
Received	52.3%	4.5%	41.8%	12.0%	0.0%
Gave Away	49.2%	3.0%	35.8%	26.8%	0.0%

Estimated Community Harvest and Take (Expanded):

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Total Number Harvested	75.8	1.4	108.7	41.4	0.0
Total Number Struck and Lost	11.5	0.0	18.6	4.3	0.0
Total Number Taken	87.2	1.4	127.3	45.7	0.0
Number Harvested Per Capita	0.32	0.01	0.45	0.17	0.00

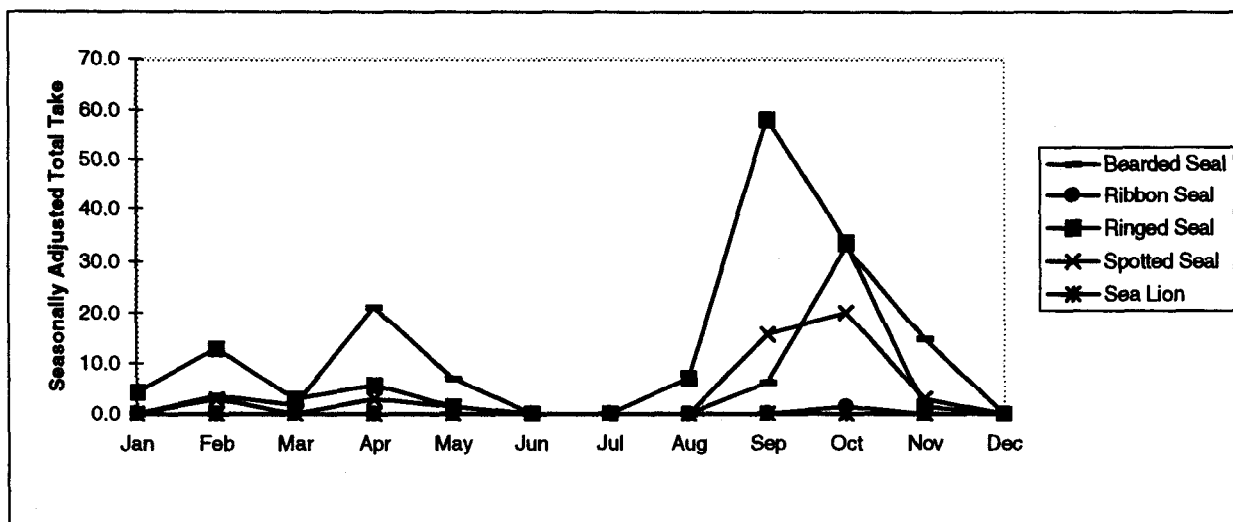
SEAL AND SEA LION HARVEST BY AGE AND SEX - COMMUNITY ESTIMATE (EXPANDED)

	Seals								Sea Lion	
	Bearded		Ribbon		Ringed		Spotted			
	Number	%	Number	%	Number	%	Number	%	Number	%
Adult Male	16.4	21.7%	0.0	0.0%	37.9	34.9%	14.3	34.5%	0.0	---
Adult Female	41.5	54.7%	0.0	0.0%	9.3	8.6%	1.4	3.4%	0.0	---
Adult Unknown Sex	15.7	20.7%	1.4	100.0%	60.0	55.2%	25.7	62.1%	0.0	---
Juvenile Male	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Juvenile Female	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Juvenile Unknown Sex	2.2	2.8%	0.0	0.0%	1.4	1.3%	0.0	0.0%	0.0	---
Pup Male	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Pup Female	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Pup Unknown Sex	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Male Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Female Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Unknown Sex and Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Total	75.8	100.0%	1.4	100.0%	108.7	100.0%	41.4	100.0%	0.0	---

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Shaktoolik, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Shaktoolik, 1996-97 (Continued)

SEASONALLY ADJUSTED TAKE BY MONTH



BEARDED SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	2	1	11	1	0	0	0	3	17	6	0	10	51
Struck & Lost	0	0	0	0	2	0	0	0	0	2	3	0	0	7
Total Take	0	2	1	11	3	0	0	0	3	19	9	0	10	58
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	2.9	1.4	17.2	2.2	0.0	0.0	0.0	5.0	24.3	8.6	0.0	14.3	75.8
Struck & Lost	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	2.9	4.3	0.0	0.0	11.5
Total Take	0.0	2.9	1.4	17.2	6.5	0.0	0.0	0.0	5.0	27.1	12.9	0.0	14.3	87.2
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	3.5	1.8	21.2	2.7	0.0	0.0	0.0	6.2	29.9	10.6	0.0		75.8
Struck & Lost	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	2.9	4.3	0.0		11.5
Total Take	0.0	3.5	1.8	21.2	7.0	0.0	0.0	0.0	6.2	32.8	14.8	0.0		87.2
Total Take (%)	0.0%	4.0%	2.0%	24.3%	8.0%	0.0%	0.0%	0.0%	7.1%	37.6%	17.0%	0.0%		100.0%
Cum. Take	0.0	3.5	5.3	26.4	33.4	33.4	33.4	33.4	39.6	72.4	87.2	87.2		
Cum. Take (%)	0.0%	4.0%	6.1%	30.3%	38.3%	38.3%	38.3%	38.3%	45.4%	83.0%	100.0%	100.0%		

RIBBON SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	0	0	0	0	0	0	0	0	0	1	0	0	0	1
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	1.4
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	1.4
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0		1.4
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0		1.4
Total Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	1.4		
Cum. Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Shaktoolik, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Shaktoolik, 1996-97 (Continued)

RINGED SEAL HARVEST BY MONTH													Unknown	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month	
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	2	7	2	4	1	0	0	5	30	19	1	0	0	71
Struck & Lost	0	0	0	0	0	0	0	0	8	4	0	0	0	12
Total Take	2	7	2	4	1	0	0	5	38	23	1	0	0	83
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	4.3	12.9	2.9	5.7	1.4	0.0	0.0	7.1	45.0	27.9	1.4	0.0	0.0	108.7
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9	5.7	0.0	0.0	0.0	18.6
Total Take	4.3	12.9	2.9	5.7	1.4	0.0	0.0	7.1	57.9	33.6	1.4	0.0	0.0	127.3
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	4.3	12.9	2.9	5.7	1.4	0.0	0.0	7.1	45.0	27.9	1.4	0.0		108.7
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9	5.7	0.0	0.0		18.6
Total Take	4.3	12.9	2.9	5.7	1.4	0.0	0.0	7.1	57.9	33.6	1.4	0.0		127.3
Total Take (%)	3.4%	10.1%	2.2%	4.5%	1.1%	0.0%	0.0%	5.6%	45.5%	26.4%	1.1%	0.0%		100.0%
Cum. Take	4.3	17.2	20.1	25.8	27.2	27.2	27.2	34.4	92.3	125.8	127.3	127.3		
Cum. Take (%)	3.4%	13.5%	15.8%	20.3%	21.4%	21.4%	21.4%	27.0%	72.5%	98.9%	100.0%	100.0%		

SPOTTED SEAL HARVEST BY MONTH													Unknown	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month	
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	2	0	2	1	0	0	0	11	12	1	0	0	29
Struck & Lost	0	0	0	0	0	0	0	0	0	2	1	0	0	3
Total Take	0	2	0	2	1	0	0	0	11	14	2	0	0	32
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	2.9	0.0	2.9	1.4	0.0	0.0	0.0	15.7	17.1	1.4	0.0	0.0	41.4
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.4	0.0	0.0	4.3
Total Take	0.0	2.9	0.0	2.9	1.4	0.0	0.0	0.0	15.7	20.0	2.9	0.0	0.0	45.7
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	2.9	0.0	2.9	1.4	0.0	0.0	0.0	15.7	17.1	1.4	0.0		41.4
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.4	0.0		4.3
Total Take	0.0	2.9	0.0	2.9	1.4	0.0	0.0	0.0	15.7	20.0	2.9	0.0		45.7
Total Take (%)	0.0%	6.3%	0.0%	6.3%	3.1%	0.0%	0.0%	0.0%	34.4%	43.8%	6.3%	0.0%		100.0%
Cum. Take	0.0	2.9	2.9	5.7	7.1	7.1	7.1	7.1	22.9	42.9	45.7	45.7		
Cum. Take (%)	0.0%	6.3%	6.3%	12.5%	15.6%	15.6%	15.6%	15.6%	50.0%	93.8%	100.0%	100.0%		

SEA LION HARVEST BY MONTH													Unknown	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month	
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take (%)	---	---	---	---	---	---	---	---	---	---	---	---		---
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Cum. Take (%)	---	---	---	---	---	---	---	---	---	---	---	---		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Shaktoolik, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Stebbins, 1996-97

SAMPLING DESIGN: RANDOM	Total Native Households	107
	Surveyed Households	56
	Sampling Fraction	52.3%
	Sample Household Members	301
	Estimated Household Members	575.1

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Used	87.5%	3.6%	71.4%	32.1%	0.0%
Hunted	64.3%	1.8%	51.8%	25.0%	0.0%
Harvested	57.1%	1.8%	51.8%	25.0%	0.0%
Received	55.4%	1.8%	44.6%	10.7%	0.0%
Gave Away	69.6%	3.6%	58.9%	25.0%	0.0%

Estimated Community Harvest and Take (Expanded):

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Total Number Harvested	120.4	3.8	173.9	49.7	0.0
Total Number Struck and Lost	<u>24.8</u>	<u>0.0</u>	<u>57.3</u>	<u>13.4</u>	<u>0.0</u>
Total Number Taken	145.2	3.8	231.2	63.1	0.0
Number Harvested Per Capita	0.21	0.01	0.30	0.09	0.00

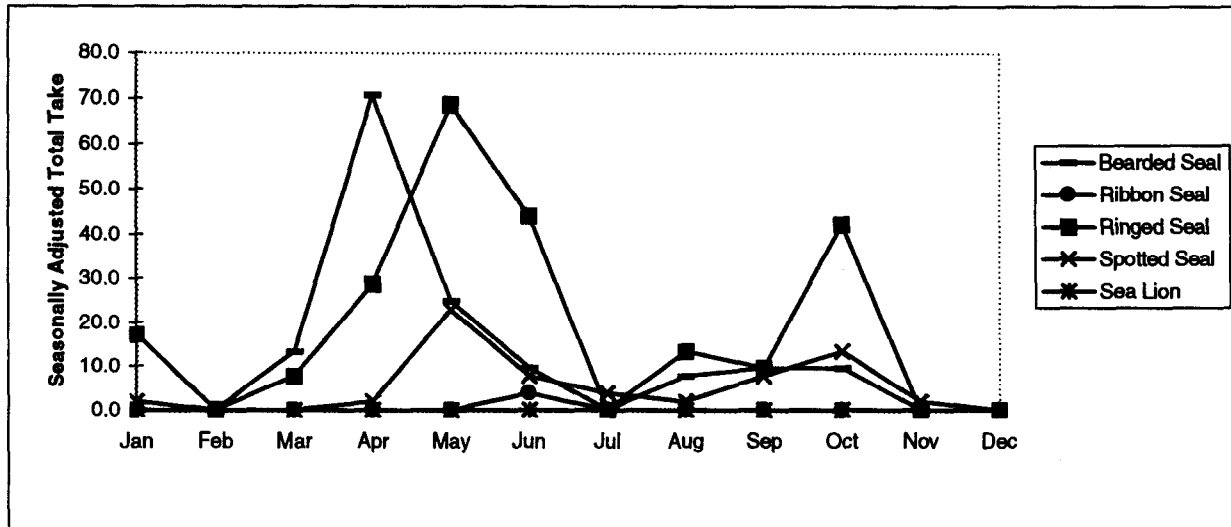
SEAL AND SEA LION HARVEST BY AGE AND SEX - COMMUNITY ESTIMATE (EXPANDED)

	Seals								Sea Lion	
	Bearded		Ribbon		Ringed		Spotted			
	Number	%	Number	%	Number	%	Number	%	Number	%
Adult Male	59.2	49.2%	0.0	0.0%	59.2	34.1%	9.6	19.2%	0.0	---
Adult Female	19.1	15.9%	0.0	0.0%	45.9	26.4%	3.8	7.7%	0.0	---
Adult Unknown Sex	11.5	9.5%	3.8	100.0%	36.3	20.9%	22.9	46.2%	0.0	---
Juvenile Male	11.5	9.5%	0.0	0.0%	7.6	4.4%	7.6	15.4%	0.0	---
Juvenile Female	7.6	6.3%	0.0	0.0%	15.3	8.8%	1.9	3.8%	0.0	---
Juvenile Unknown Sex	7.6	6.3%	0.0	0.0%	7.6	4.4%	0.0	0.0%	0.0	---
Pup Male	1.9	1.6%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Pup Female	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Pup Unknown Sex	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.9	3.8%	0.0	---
Male Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Female Unknown Age	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Unknown Sex and Age	1.9	1.6%	0.0	0.0%	1.9	1.1%	1.9	3.8%	0.0	---
Total	120.4	100.0%	3.8	100.0%	173.9	100.0%	49.7	100.0%	0.0	---

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Stebbins, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Stebbins, 1996-97 (Continued)

SEASONALLY ADJUSTED TAKE BY MONTH



BEARDED SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	7	32	7	4	0	4	4	5	0	0	0	63
Struck & Lost	0	0	0	5	6	1	0	0	1	0	0	0	0	13
Total Take	0	0	7	37	13	5	0	4	5	5	0	0	0	76
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	13.4	61.1	13.4	7.6	0.0	7.6	7.6	9.6	0.0	0.0	0.0	120.4
Struck & Lost	0.0	0.0	0.0	9.6	11.5	1.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	24.8
Total Take	0.0	0.0	13.4	70.7	24.8	9.6	0.0	7.6	9.6	9.6	0.0	0.0	0.0	145.2
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	13.4	61.1	13.4	7.6	0.0	7.6	7.6	9.6	0.0	0.0		120.4
Struck & Lost	0.0	0.0	0.0	9.6	11.5	1.9	0.0	0.0	1.9	0.0	0.0	0.0		24.8
Total Take	0.0	0.0	13.4	70.7	24.8	9.6	0.0	7.6	9.6	9.6	0.0	0.0		145.2
Total Take (%)	0.0%	0.0%	9.2%	48.7%	17.1%	6.6%	0.0%	5.3%	6.6%	6.6%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	13.4	84.1	108.9	118.5	118.5	126.1	135.7	145.2	145.2	145.2		
Cum. Take (%)	0.0%	0.0%	9.2%	57.9%	75.0%	81.6%	81.6%	86.8%	93.4%	100.0%	100.0%	100.0%		

RIBBON SEAL HARVEST BY MONTH

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month	Total
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	0	0	0	0	0	2	0	0	0	0	0	0	0	2
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0		3.8
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0		3.8
Total Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	0.0	0.0	3.8	3.8	3.8	3.8	3.8	3.8	3.8		
Cum. Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Stebbins, 1997.

SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Stebbins, 1996-97 (Continued)

RINGED SEAL HARVEST BY MONTH													Unknown	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month		
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	9	0	4	13	27	12	0	7	4	15	0	0	0	91
Struck & Lost	0	0	0	2	9	11	0	0	1	7	0	0	0	30
Total Take	9	0	4	15	36	23	0	7	5	22	0	0	0	121
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	17.2	0.0	7.6	24.8	51.6	22.9	0.0	13.4	7.6	28.7	0.0	0.0	0.0	173.9
Struck & Lost	0.0	0.0	0.0	3.8	17.2	21.0	0.0	0.0	1.9	13.4	0.0	0.0	0.0	57.3
Total Take	17.2	0.0	7.6	28.7	68.8	43.9	0.0	13.4	9.6	42.0	0.0	0.0	0.0	231.2
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	17.2	0.0	7.6	24.8	51.6	22.9	0.0	13.4	7.6	28.7	0.0	0.0		173.9
Struck & Lost	0.0	0.0	0.0	3.8	17.2	21.0	0.0	0.0	1.9	13.4	0.0	0.0		57.3
Total Take	17.2	0.0	7.6	28.7	68.8	43.9	0.0	13.4	9.6	42.0	0.0	0.0		231.2
Total Take (%)	7.4%	0.0%	3.3%	12.4%	29.8%	19.0%	0.0%	5.8%	4.1%	18.2%	0.0%	0.0%		100.0%
Cum. Take	17.2	17.2	24.8	53.5	122.3	166.2	166.2	179.6	189.2	231.2	231.2	231.2		
Cum. Take (%)	7.4%	7.4%	10.7%	23.1%	52.9%	71.9%	71.9%	77.7%	81.8%	100.0%	100.0%	100.0%		

SPOTTED SEAL HARVEST BY MONTH													Unknown	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month		
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	1	0	0	1	10	4	2	0	3	4	1	0	0	26
Struck & Lost	0	0	0	0	2	0	0	1	1	3	0	0	0	7
Total Take	1	0	0	1	12	4	2	1	4	7	1	0	0	33
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	1.9	0.0	0.0	1.9	19.1	7.6	3.8	0.0	5.7	7.6	1.9	0.0	0.0	49.7
Struck & Lost	0.0	0.0	0.0	0.0	3.8	0.0	0.0	1.9	1.9	5.7	0.0	0.0	0.0	13.4
Total Take	1.9	0.0	0.0	1.9	22.9	7.6	3.8	1.9	7.6	13.4	1.9	0.0	0.0	63.1
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	1.9	0.0	0.0	1.9	19.1	7.6	3.8	0.0	5.7	7.6	1.9	0.0		49.7
Struck & Lost	0.0	0.0	0.0	0.0	3.8	0.0	0.0	1.9	1.9	5.7	0.0	0.0		13.4
Total Take	1.9	0.0	0.0	1.9	22.9	7.6	3.8	1.9	7.6	13.4	1.9	0.0		63.1
Total Take (%)	3.0%	0.0%	0.0%	3.0%	36.4%	12.1%	6.1%	3.0%	12.1%	21.2%	3.0%	0.0%		100.0%
Cum. Take	1.9	1.9	1.9	3.8	26.8	34.4	38.2	40.1	47.8	61.1	63.1	63.1		
Cum. Take (%)	3.0%	3.0%	3.0%	6.1%	42.4%	54.5%	60.6%	63.6%	75.8%	97.0%	100.0%	100.0%		

SEA LION HARVEST BY MONTH													Unknown	Total
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Month		
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)														
Harvest	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Struck & Lost	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Take	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Take (%)	---	---	---	---	---	---	---	---	---	---	---	---		---
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Cum. Take (%)	---	---	---	---	---	---	---	---	---	---	---	---		

NOTE: Numbers on these tables and figures reflect a study period from February 1996 through January 1997.

SOURCE: Kawerak, Inc. and the Alaska Department of Fish and Game, Division of Subsistence. Subsistence Study of Seals and Sea Lions in the Norton Sound-Bering Strait region with assistance from the community of Stebbins, 1997.