

**The Subsistence Harvest of Seals and
Sea Lions by Alaska Natives in Three
Communities of the Yukon-Kuskokwim
Delta, Alaska, 1998-99**

Technical Paper No. 257

by Michael Coffing, Cheryl L. Scott,
and Charles J. Utermohle

**Subsistence Seal and Sea Lion Research (No. NA66FX0476)
Funded by the National Oceanographic and Atmospheric Administration**

**Alaska Department of Fish and Game
Division of Subsistence
Juneau, Alaska
September 1999**

TABLE OF CONTENTS

LIST OF TABLES.....	ii
LIST OF FIGURES.....	iii
ACKNOWLEDGEMENTS	iv
INTRODUCTION.....	1
METHODOLOGY	2
REGIONAL SETTING	5
THE SUBSISTENCE TAKE OF SEALS AND SEA LIONS IN 1998-99.....	6
Estimated Size of the Seal and Sea Lion Take.....	6
Per Capita Seal and Sea Lion Harvests	6
Geographic Distribution of Seal and Sea Lion Takes	7
Seasonal Distribution of Seal and Sea Lion Takes	8
Age and Sex of Seal and Sea Lion Harvests.....	8
Hunting Participation and Harvest Success.....	9
DISCUSSION: COMPARISON OF THE 1997 AND 1998 SURVEY DATA.....	11
Harvest Levels	11
Hunting Participation	12
Geographic Distribution of Seal Takes	13
Seasonality of Harvest	14
Age and Sex of Seals Harvested.....	14
1973 TO 1976 HARVEST DATA.....	15
REFERENCES.....	18
APPENDIX A. SEAL AND SEA LION SURVEY INSTRUMENT USED FOR HOUSEHOLD INTERVIEWS, 1999.....	47
APPENDIX B. TOTAL SUBSISTENCE TAKES OF SEAL AND SEA LION BY THREE COMMUNITIES IN THE YUKON-KUSKOKWIM DELTA REGION, 1998-99	53
APPENDIX C. SUBSISTENCE TAKES OF SEAL AND SEA LION BY COMMUNITY, YUKON-KUSKOKWIM DELTA REGION, 1998-99	57
APPENDIX D. HOOPER BAY SEAL HARVEST DATA, 1973 – 1976	67

LIST OF TABLES

Table 1.	Sampling Methodology by Community, Yukon-Kuskokwim Delta Seal and Sea Lion Surveys, 1998-99	19
Table 2.	Population of Yukon-Kuskokwim Delta Coastal Communities, 1990 and 1998	19
Table 3.	Estimated Subsistence Takes of Seals and Sea Lions by Alaska Natives in Emmonak, Hooper Bay, and Quinhagak, 1998-99	20
Table 4.	Species Composition of Seal Take at Emmonak, Hooper Bay, and Quinhagak, 1998-99	20
Table 5.	Subsistence Seal and Sea Lion Harvest, Take, and Use by Alaska Natives, 1998-99, in Three Yukon-Kuskokwim Delta Communities with Confidence Intervals and Statistical Ranges	21
Table 6.	Age and Sex Composition of Seal Harvests, All Species, by Alaska Natives in Emmonak, Hooper Bay, and Quinhagak, 1998-99	22
Table 7.	Age and Sex Composition of Bearded Seal Harvests by Alaska Natives in Emmonak, Hooper Bay, and Quinhagak, 1998-99	22
Table 8.	Age and Sex Composition of Ringed Seal Harvests by Alaska Natives in Emmonak, Hooper Bay, and Quinhagak, 1998-99	23
Table 9.	Age and Sex Composition of Spotted Seal Harvests by Alaska Natives in Emmonak, Hooper Bay, and Quinhagak, 1998-99	23
Table 10.	Age and Sex Composition of Ribbon Seal Harvests by Alaska Natives in Emmonak, Hooper Bay, and Quinhagak, 1998-99	24
Table 11.	Age and Sex Composition of Sea Lion Harvests by Alaska Natives in Emmonak, Hooper Bay, and Quinhagak, 1998-99	24
Table 12.	Subsistence Hunting, Harvest, and Use of Seals, All Species, by Three Yukon-Kuskokwim Delta Communities, 1998-99	25
Table 13.	Percent of Alaska Native Households in Emmonak, Hooper Bay, and Quinhagak Hunting Seals and Sea Lions, by Species, 1998-99	26

LIST OF FIGURES

Fig. 1.	Map of the Yukon-Kuskokwim Delta Region with Locations of Coastal Communities.....	27
Fig. 2.	General Distribution of Bearded Seal and Ribbon Seal in Alaska	28
Fig. 3.	General Distribution of Ringed Seal and Spotted Seal in Alaska	29
Fig. 4.	General Distribution of Steller Sea Lion in Alaska	30
Fig. 5.	Estimated Seasonally Adjusted Take of Seals and Sea Lions by Alaska Natives in Three Yukon-Kuskokwim Delta Communities, 1998-99.....	31
Fig. 6.	Specialization in Bearded Seal Takes: Percent of Hunting Households by Percent of Take, 1998-99	32
Fig. 7.	Specialization in Ribbon Seal Takes: Percent of Hunting Households by Percent of Take, 1998-99	32
Fig. 8.	Specialization in Ringed Seal Takes: Percent of Hunting Households by Percent of Take, 1998-99	33
Fig. 9.	Specialization in Spotted Seal Takes: Percent of Hunting Households by Percent of Take, 1998-99	33
Fig. 10.	Estimated Take of All Seals and Sea Lions by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998	34
Fig. 11.	Estimated Take of Sea Lions by Alaska Natives in Emmonak, Hooper Bay, and Quinhagak, 1997-1998	34
Fig. 12.	Estimated Take of Seals and Sea Lions by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997- 1998.....	35
Fig. 13.	Percent of Alaska Native Households in Emmonak, Hooper Bay and Quinhagak Hunting Seal and Sea Lion, 1997-1998	35
Fig. 14.	Estimated Take of Seals and Sea Lions by Alaska Natives in Emmonak, 1997- 1998	36
Fig. 15.	Percent of Alaska Native Households in Emmonak Hunting Seal and, Sea Lion, 1997-1998.....	36
Fig. 16.	Estimated Take of Seals and Sea Lions by Alaska Natives in Hooper Bay, 1997- 1998	37

Fig. 17. Percent of Alaska Native Households in Hooper Bay Hunting Seal, and Sea Lion, 1997-1998.....	37
Fig. 18. Estimated Take of Seals and Sea Lions by Alaska Natives in Quinhagak 1997- 1998	38
Fig. 19. Percent of Alaska Native Households in Quinhagak Hunting Seal, by Species, and Sea Lion, 1997-1998	38
Fig. 20. Geographic Distribution of Bearded Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	39
Fig. 21. Geographic Distribution of Ribbon Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	39
Fig. 22. Geographic Distribution of Ringed Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	40
Fig. 23. Geographic Distribution of Spotted Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	40
Fig. 24. Seasonality of Bearded Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	41
Fig. 25. Seasonality of Ribbon Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	41
Fig. 26. Seasonality of Ringed Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	42
Fig. 27. Seasonality of Spotted Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	42
Fig. 28. Age of Bearded Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	43
Fig. 29. Age of Ribbon Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	43
Fig. 30. Age of Ringed Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	44
Fig. 31. Age of Spotted Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	44
Fig. 32. Sex Composition of Bearded Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	45

Fig. 33. Sex Composition of Ribbon Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	45
Fig. 34. Sex Composition of Ringed Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	46
Fig. 35. Sex Composition of Spotted Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997-1998.....	46

ACKNOWLEDGEMENTS

This study was a cooperative project with the communities of Emmonak, Hooper Bay, and Quinhagak. The support of the tribal councils in each community was essential to the project's success.

Sincere thanks are given to the elders and hunters who allowed us to interview them at length about their knowledge of seals and sea lions and to the many households who volunteered to report their subsistence seal harvests. The village research assistants that conducted the household interviews; John W. Fox and Alexie Ford Jr. in Quinhagak; Allen Moore, and Louis Immamak in Emmonak; and Rudy Smith and Martha Fisher in Hooper Bay, deserve special recognition. Willard Church and Joe Pleasant in Quinhagak; Ted Hamilton in Emmonak and Boscoe Olson in Hooper Bay provided valuable advice and guidance during the project. Ruth Pingayak, and Ramona Bell, with the Native Village of Hooper Bay provided their full support and assistance on the project.

Staff of the Alaska Department of Fish and Game also assisted the project. Robert Wolfe provided the foundation for this work through his planning, designing and supervisory efforts in this and many other marine mammal research projects for the Division. He also provided helpful, supportive advice throughout the project and ensured that the final report was properly edited. We are also grateful to all that had a hand in entering the data and providing administrative support.

INTRODUCTION

This report describes the results of seal and sea lion harvest surveys conducted in the communities of Emmonak, Hooper Bay and Quinhagak, located on the Bering Sea coast of the Yukon-Kuskokwim Delta. The household harvest surveys were conducted during late winter – early spring 1999. The research was a joint effort between the Alaska Department of Fish and Game, Division of Subsistence, and Emmonak Village, Native Village of Hooper Bay, and Native Village of Kwinhagak (the tribal governments of the three communities). The research was funded by the National Oceanic and Atmospheric Administration's, National Marine Fisheries Service.

Marine mammals, including seals, are an important subsistence resource in the coastal area of the Yukon-Kuskokwim Delta region (Fig. 1). In the mid 1970s the Department collected biological specimens from seals taken by hunters in some Bering Sea coast communities, including Hooper Bay. The data resulting from those efforts may not represent the total community take of seals, but it does provide a picture of the seasonality of harvests and minimum harvest levels. That data is discussed briefly in this report. This report focuses specifically on the subsistence harvest and use of bearded seal (*Erignathus barbatus*), ribbon seal (*Phoca fasciata*), ringed seal (*Phoca hispida*), spotted seal (*Phoca largha*), and Steller sea lion (*Eumetopias jubatus*) over a 12 month period. It includes information on the number of animals harvested, sex and age of animals harvested; seasons that animals were taken; numbers of animals struck and lost; the degree of community household involvement on harvest activities and the use and sharing of seals and sea lions. The research was modeled after previous seal research conducted by the Division of Subsistence in other communities throughout coastal areas of Alaska, particularly in the Gulf of Alaska, Alaska Peninsula, Bristol Bay,

Bering Straits and Yukon Kuskokwim Delta regions of Alaska (Wolfe and Mishler 1996, Georgette, Coffing, Scott and Utermohle 1998, and Coffing, Scott, and Utermohle 1999). Little detailed information describing the subsistence harvest and use of seal and sea lions had been gathered in the Yukon-Kuskokwim Delta region prior to the initiation of harvest surveys in the spring of 1998. Earlier research conducted by the Division of Subsistence on the Yukon-Kuskokwim Delta in the 1980s included harvest estimates for nine communities (CPDB 1999). This report focuses on three communities, provides much of the same type of detail found in the 1999 report and also compares the findings of the two most recent study years.

METHODOLOGY

Seals are harvested by all coastal and near-coastal communities in the Yukon-Kuskokwim region, however, constraints of money, time and staff prevented the collection of data from every community. The communities of Emmonak, Hooper Bay and Quinhagak were selected because of their geographical location, the desire to get a broad geographic representation of harvests, and also by the willingness of the communities to participate in the study. Each of the three communities selected had participated in an identical research project the previous year and was therefore familiar with the scope of the project, the purpose and the methods used. Both Quinhagak and Emmonak had existing Natural Resource offices under their tribal governments and had staff available and ready to offer assistance with natural resource related projects. Species accounts of marine mammals, including general distribution information (Fig. 2, 3, and 4), also served as a basis for understanding the types of seal that were likely available to hunters in the Yukon-Kuskokwim Delta region.

The survey covered a 12 - month period from February 1, 1998 through January 31, 1999. In each community, officials of the Native Tribal offices approved the study prior to the initiation of the key respondent interviews or household surveys. The survey instrument used was the same basic survey form used the previous year (Appendix A). Household respondents were asked to recall information about the harvest and use of seal and sea lions by everyone in their household. Included on the survey forms were questions about hunting and using seal, sharing and receiving, and struck and loss. Respondents were also asked to try and recall the sex and approximate age of animals they harvested and the month each animal was taken.

Local research assistants were hired in each community and trained by the project manager. Five of the six research assistants hired had worked on the project the previous year and were also seal hunters, familiar with the area used by the community and comfortable in talking with other hunters about harvest and use of seal and sea lion. The surveys began in February 1999 and were completed in mid May. The completed surveys were reviewed by the project manager before being forwarded to Division of Subsistence data management staff in Anchorage for data entry and analysis.

Respondents were informed of the purpose of the project, that their participation of the project was voluntary, and that their individual household information would remain confidential. Respondents were not paid for their participation.

Sampling methods varied by community. In Emmonak and Quinhagak, households were stratified into two strata; those that hunted seal and those that didn't hunt seal. This stratification was done with the input from the Natural Resource staff in each community and with the help of the assistants hired to conduct the surveys. A census sampling method was used in Hooper Bay. Prior to beginning the surveys, the research assistants were provided with a list of households in their community. These lists were provided by the Traditional Council office and updated prior to the surveys.

Only Alaska Native households were included in the surveys. A “Native household” was defined as any household having at least one adult Alaska Native occupant. Because of the size of the communities, there was no intention to survey all of the households. Instead, the goal was to survey as many of the seal hunting households in Quinhagak and Emmonak as possible, and a proportion of the non-hunting households as well. In Hooper Bay, the goal was to survey as many households as possible. The percent of households surveyed ranged from 47% in Hooper Bay to about 70% in Quinhagak (Table 1). A total of 262 households were surveyed in the three communities. In Emmonak and Quinhagak where a two-stratum sampling design was used, 73 percent of the combined active seal hunting households in the two communities were surveyed. Forty-eight percent of the non-seal hunting households in these two communities were also surveyed. In Hooper Bay, where a census-designed survey was administered, 47 percent of all Alaska Native households were surveyed. The largest proportion of the households surveyed during 1998 was in Emmonak. Overall, about 57 percent of the Alaska Native households in these communities were surveyed.

A summary of the statistical analysis of the harvest data by species and by each community is presented in Appendices B and C at the end of this report. These appendices include information about the sampling design, percentage of households harvesting, using, and sharing seals and sea lions, reported and estimated community harvest and take, sex and age information of seals and sea lions harvested, month of harvests and struck and lost, and the number of seals and sea lions struck and lost.

In some instances the month a specific seal was taken was unknown. During the analysis, these animals were assigned a harvest month based on a percentage of the known harvest and take. This is presented in the portion of the tables labeled *Seasonally Adjusted Harvest and Take (Expanded)*.

REGIONAL SETTING

There are 21 communities located in the coastal region of the Yukon-Kuskokwim Delta (Table 2). The estimated population of these combined communities is approximately 9,200 people. The percapita harvest of fish and wildlife within the region is among the highest in the state. The Yukon-Kuskokwim Delta and the Bering Sea coast environment supports a large population of seasonally available migratory waterfowl and a rich variety of anadromous and resident fish species. Large game such as moose, caribou, and bear, are available in the upland areas of the Delta, however, the marine environment continues to supply most coastal communities with a majority of the fish and wildlife resources that are necessary and important to the subsistence economy of the region. Marine mammals play an important role in the subsistence diet of Delta residents. Residents of other non-coastal communities within the Yukon-Kuskokwim Delta also participate in seal hunting and obtain seal meat, seal oil, and seal hides through gift giving, bartering and trading with friends and extended family members within the Delta region and beyond.

Seals are hunted all along the coast, however, seal are also harvested within the rivers and sloughs during spring, summer, and fall. Seal have been harvested up the Kuskokwim River as far as Kwethluk, located 100 miles from saltwater, and Pilot Station, located approximately 100 miles up the Yukon River, from the sea.

THE SUBSISTENCE TAKE OF SEALS AND SEA LION IN 1998-99

Estimated Size of the Seal and Sea Lion Take

Hunters in Emmonak, Hooper Bay and Quinhagak took an estimated total of 819 seals during the study period (Table 3). There was no reported take of seal lions during this study period. Ringed seal accounted for 462 (56 percent) of all seals taken (Table 4). Bearded seal accounted for 174 (21 percent), spotted seal accounted for 174 (21 percent), and ribbon seal for 9 (1 percent). Of the total estimated seal take, 54 seals (6 percent) were estimated to be struck and lost. Upper and lower estimates of the total takes for each of the seal species, within a 95 percent confidence range, are provided in Table 5.

Per Capita Seal and Sea Lion Harvests

The percapita seal harvest of all seals combined was .37 animals per Alaska Native (Table 5). The percapita harvest was greatest for ringed seal (.22) and lowest for ribbon seal. Households in Hooper Bay had the highest percapita seal harvest at .54 animals, followed by Emmonak at .25 and Quinhagak at .22 animals per Alaska Native. Emmonak had the highest percapita harvest of bearded seal (.10) while percapita ringed seal harvests were highest in Hooper Bay (.42). The percapita harvest of spotted seal was highest in Quinhagak at .15 seals.

Geographic Distribution of Seal and Sea Lion Takes

Seal takes in Emmonak were spread almost evenly across three the main species; bearded seal (38 percent), ringed seal (35 percent), and spotted seal (24 percent). About 3 percent of Emmonak's total seal take was ribbon seal (Table 4). Hunters in Hooper Bay took largely ringed seal. Seventy-five percent of the community's total seal take was this species. Fifteen percent of Hooper Bay's seal take was bearded seal while 10 percent was spotted seal. Quinhagak hunters took primarily spotted seal (67 percent). Bearded seal comprised 20 percent and ringed seal 12 percent of the remaining takes in Quinhagak. Ribbon seal was taken in small numbers in both Hooper Bay and Quinhagak.

The highest proportion of the total seal take came from the communities of Hooper Bay and Emmonak (Table 5). These two communities are generally better situated for favorable sea ice environment that result in better seal hunting conditions than is Quinhagak, located on South Kuskokwim Bay. During key respondent surveys conducted in 1998, individuals in Emmonak and Hooper Bay reported that seal hunting was generally best when there were north and northwesterly winds that pushed the sea ice, and the seals with it, towards shore. The coastal area near Quinhagak is often opened and ice free, primarily due to the currents caused by the Kuskokwim River emptying into the Kuskokwim Channel of Kuskokwim Bay.

Bearded seal were taken in nearly the same numbers in Emmonak and Hooper Bay. These two communities accounted for 88 percent of the total bearded seal take (Table 5). The majority (82 percent) of ringed seals was taken by hunters in Hooper Bay. Takes of bearded seal and ringed seal was lowest in Quinhagak. Hunters in Emmonak took about the same number of ringed seals as they did bearded seal. Spotted seal were harvested by hunters in each of the communities, however,

Quinhagak hunters accounted for largest proportion (42 percent) of the spotted seals taken. Compared to other seal species, very few ribbon seal are taken by hunters in the three study communities. During this survey period, approximately 9 ribbon seal were taken, most by Emmonak hunters.

Seasonal Distribution of Seal and Sea Lion Takes

Seals were harvested during every month of the study period (Fig. 5). The majority of the overall harvest (62 percent) occurred during three months; March, April and September. More than one-third of the take occurred during one month – April. The take of seals was lowest during June, July, November, December and January. Bearded seal were taken from February through October, with most of the harvest occurring during the months of April, August, September and October. Ribbon seal were taken only during July, August and October, consistent with reports from hunters that ribbon seal were seen only occasionally and then usually only during the fall months. Ringed seal were taken every month. January through May, September and October were the times when the majority of the ringed seal takes occurred. Spotted seal takes occurred primarily during April, September and October.

Hunters in Emmonak took the greatest proportion of seals harvested in that community during the fall months (Appendix C). In contrast, hunters in both Hooper Bay and Quinhagak took the majority of seals in their communities during spring (April).

Age and Sex of Seal and Sea Lion Harvests

Adult seals comprised about 80 percent of all seals harvested (Table 6). Juvenile seals comprised approximately 17 percent of the harvest. Bearded seal were harvested more frequently as juvenile than either ringed or spotted seal and represented

about 40 percent of the total juvenile seal harvest. More than one-third (34 percent) of the bearded seal harvested were juveniles while only about 10 percent of the ringed seal and 18 percent of the spotted seal harvested were juveniles (Tables 7, 8, 9). Pups were rarely harvested and accounted for less than 2 percent of the total seal harvest. Hunters were unable to recall the ages of approximately 2 percent of the seals harvested (Table 6).

Hunters had relatively little difficulty determining the age category of the seal they harvested, however, they were less certain of the sex of the seal they caught. Of all seals harvested, nearly half (49.5 percent) were of unknown sex (Table 6). Hunters knew the sex of the majority of bearded and ringed seals they harvested but were unsure of the sex of about 70 percent of the spotted seals harvested. If hunters didn't recall the age of a particular seal they harvested, they usually didn't recall the sex of the seal.

Hunting Participation and Harvest Success

Approximately 41 percent of the Alaska Native households in the three communities hunted seal (Table 12). Household participation in seal hunting was highest in Hooper Bay where more than one-half (52 percent) of the community households reported hunting. Nearly all households (92 percent) in the three communities that hunted were successful in their attempts, however, hunting success was highest in Quinhagak where every hunting household surveyed reported harvesting seal. No households reported hunting sea lion during the study period.

Some households were relatively more successful harvesting seals than were other households. Even though a significant proportion of households in the three communities hunted seal, approximately 70 percent of the seals were taken by only 30

percent of the hunting households (Figs. 6, 7, 8, and 9). A relatively small proportion of highly successful hunting households harvested the majority of the seals.

Households most often reported they hunted for ringed, bearded, and spotted seal. Only about 3 percent of all Alaska Native households in the communities reported trying to catch ribbon seal (Table 13). Ringed seal was the species most commonly sought with 29 percent of the households responding they tried to catch ringed seal. One-fourth (25 percent) of the households reported hunting for bearded seal and about 21 percent hunted for spotted seal.

Harvest success was highest for households that hunted ringed seal (86 percent) and spotted seal (83 percent) (Table 13). Harvest success for households hunting bearded seal was also high (70 percent). Households that reported they hunted for ribbon seal had a harvest success of 58 percent.

Seal that were struck and lost accounted for 6.5 percent of the total take (Table 3). Bearded seals were the species most often reported as lost by hunters. One possible explanation for this may be that seals taken in fresh water sink more easily than seals taken in salt water. Hunters report that they often see young bearded seals near the mouths of freshwater tributaries and even miles inside of meandering sloughs during the fall months. Hunters do not find spotted or ringed seal these inland waterways as frequently as bearded seal. Hunters also reported that seals are more likely to sink during late summer and early fall before the seals have fattened up and during late spring when there is more freshwater near the coast as a result of spring breakup. April, September and October were primary months that seals were struck and lost.

Seals of each species were shared or given away to other households (Appendix B). Households reported sharing ringed seal with other households more than any other seal. Approximately one-third (31 percent) of the Alaska Native households in the three study communities reported receiving bearded seal during the study period. More than

63 percent of the Alaska Native households in these communities reported using seal meat or seal oil during the study period (Table 5). Use of seal by households was highest in Hooper Bay (67.8 percent).

More than 40 percent of the households in the study communities reported using ringed seal while about the same percentage reported using bearded seal. About one-third of the households reported using spotted seal. Very few households (2.5 percent) used ribbon seal during the study period.

Communities differed in the percentage of households that used different types of seals. Nearly one-half of the households in Emmonak and Hooper Bay reported using bearded seal while less than 20 percent of the households in Quinhagak reported using bearded seal (Table 5). Relatively fewer households in Quinhagak also reported using ringed seal than either Emmonak or Hooper Bay. However, a larger proportion of Quinhagak households reported using spotted seal than either of the other two communities.

DISCUSSION: COMPARISON OF THE 1997 AND 1998 SURVEY DATA

Harvest Levels

The combined take of an estimated 819 bearded, ribbon, ringed and spotted seals during the 1998 harvest period was approximately 44 percent less than the estimated combined take of 1,472 seals in 1997 (Fig. 10.) The take of sea lions dropped from 2.1 to 0 during this period (Fig. 11). Per capita harvests of .67 seals in 1997 declined to .37 in 1998. The decline in seal takes in 1998 occurred for each of the four species of seals harvested (Fig. 12). Overall, struck and lost rates for seals in 1998 (6.5 percent) were lower than those in 1997 (9.4 percent). Stuck and lost rates for both

bearded and ribbon seal were higher in 1998 than 1997, while struck and lost rates for ringed and spotted seal were lower in 1998.

Hunting Participation

Household participation in seal hunting activities during 1998 mirrored the declines in seal takes (Fig. 13). The numbers of households participating in seal hunting and the number of seal taken declined in each of the three communities (Fig. 14, 15, 16, 17, 18, and 19). The decline in hunting participation was most noticeable in Emmonak and Quinhagak. The number of Emmonak households that reported hunting for bearded seal declined from 55 percent in 1997 to 26 percent in 1998. There was a 61 percent decline in the number of bearded seal taken and a 54 percent decline in the number of ringed seals taken by Emmonak households in 1998 compared to 1997. Participation rates among Hooper Bay households also declined for all species. Among the types of seal taken by Hooper Bay hunters, bearded seal takes declined the most (60 percent). Takes of ringed seal and spotted seal also declined, though not as much (12 percent and 41 percent respectively). Participation rates among Quinhagak households that hunted for ringed seals declined from 33 percent in 1997 to 8 percent in 1998; a 75 percent decline in hunting effort. Not surprisingly, the take of ringed seal by Quinhagak households also declined markedly (91 percent).

Reasons for the decline in hunting participation and corresponding harvest levels are not completely understood. However, during the spring of 1998, there was very little ice in Kuskokwim Bay, in the vicinity of Quinhagak, compared to Spring 1997. Declines in hunting and takes of ringed seal, in particular, by Quinhagak may be attributed to the mere lack of ice necessary to have ringed seals in the area. Residents in Hooper Bay and Emmonak reported that during the spring of 1998, the predominate wind direction

was from the south and southeast. Residents there also reported that hunters generally have more success finding seals after there have been northwesterly winds which blow in ice flows and seals from the central Bering Sea area. According to residents, the warm southerly winds during Spring 1998 resulted in fewer seals being available. In the past when this has happened, hunters wanting to hunt seals in Spring have had to travel several miles offshore (30 to 50 miles) in small skiffs to reach ice where they could expect to find seals. When seal hunting conditions are poor; when sea ice and wind conditions are such that hunters are very unlikely to have success, hunters may not try to hunt. This is especially true as households decide how much of a very limited amount of cash they can afford to spend on gasoline and other supplies necessary for the hunt.

Geographic Distribution of Seal Takes

A comparison of the distribution of seal takes among the three communities during 1997 and 1998 shows that a larger portion of the bearded seal take occurred in Quinhagak in 1998 than in 1997 (Fig. 20). Ribbon seal takes decreased proportionally in Hooper Bay during 1998 but increased in Emmonak (Fig. 21). Hooper Bay hunters took the largest proportion of ringed seals during both study years (Fig. 22.) The decline in hunting effort by households in Quinhagak resulted in only about 3 percent of the overall ringed seal take coming from that community. Takes of spotted seal were distributed nearly the same for Hooper bay during both study years (Fig. 23). Compared to the 1997 takes, there was a shift of about 6 percent of the spotted seal takes from Quinhagak to Emmonak during 1998.

Seasonality of Harvest

There were also differences in the times of the year that seals were taken. During 1998, a larger percentage of the bearded seal were taken in February, April, July, August and September than in 1997 (Fig. 24.) However, there were declines in the percentage of bearded seal taken during March, May, June and October. Although the majority of ringed seal were taken in March, April and September during both 1997 and 1998, there was a decline in the percentage of seals taken in during these three months during 1998 and an increase in the number of ringed seal taken during October through February (Fig. 26). The largest proportion of spotted seal takes occurred in April during both study years (Fig. 27). There was a slight increase in the percent of spotted seal takes in April 1998 as well as during September and October, compared to the previous year. There were also corresponding reductions in the percent of spotted seal takes during March, May, June, and August of 1998.

Age and Sex of Seals Harvested

The majority of the seals harvested during both study years were adults. Bearded seal and ribbon seal were more likely to be harvested as juveniles than were ringed seal or spotted seal (Fig. 28, 29, 30, and 31). Approximately 60 percent of the bearded seal harvested during 1998 were adults. In 1997 about 50 percent were juveniles. Harvests of ribbon seals also included both adults and juveniles. In 1997, juveniles comprised more than 50 percent of the total ribbon seal harvest, however in 1998 they represented less than 20 percent of the harvest. Most ringed and spotted seals harvested are adults. Juveniles and pups are also taken. During 1997 juvenile seals comprised 25 percent of the known spotted seal harvest. During both years the

harvest of juvenile ringed seals never exceeded 16 percent of the total harvest of that species. Pups of bearded, ringed and spotted seals are occasionally harvested.

During the two study years, about 50 percent of the time, hunters could not recall the sex of the seals they harvested. Male seals comprised the majority (69 percent) of the animals for which hunters could recall the sex. Hunters seemed to have more difficulty recalling the sex of spotted seals than other types of seal (Fig. 32, 33, 34, and 35). During 1998, hunters could not recall the sex of approximately 70 percent of the spotted seals harvested. It was also difficult for hunters to recall the sex of juvenile bearded seal and juvenile ribbon seal that they had harvested (Table 7 and 10). Females comprised only 20 percent or less of each seal species harvested. This is still an approximation, however, because the sex of many of the seals harvested was unknown.

1973 TO 1976 HARVEST DATA

During the early to mid 1970s, when the State of Alaska had management authority over marine mammals, the Department collected biological samples from seals harvested by residents of several Bering Sea coast communities. Hooper Bay was one of those communities. The focus of the data collection program was to collect jaws and claws from seals that were harvested for subsistence use. The Department paid a Hooper Bay resident to collect seal parts from seal hunters and also paid the hunters a small amount for each seal specimen they provided. The specimens and the data were then sent to the Department. The types of harvest data collected included the date of harvest, species of seal, and often the sex of the seal harvested. Written correspondence between the Department biologist in Nome and the village data collector in Hooper Bay indicates that, for a variety of reasons, harvest data may not

have been collected for all seals harvested by community hunters for the entire year. In other words, some seal harvests occurred which was not recorded by the village data collector.

Although the data for each of the 4 years, 1973 through 1976, may not represent the total harvest of seal by Hooper Bay hunters, it does represent the minimum harvest levels. The data also provides some insight into the seasonality of the reported harvest 25 years prior to the most recent 1997 and 1998 data collected by the Division of Subsistence.

During the mid 1970s, much of the seal harvest occurred during the months of April and May (Appendix D). Bearded seal and ringed seal, in particular were targeted during these times. September and October were months when most of the spotted seal harvest occurred. There appears to be seasonal variation from year to year, especially regarding the harvest of ringed seal. During December 1975 as well as January and February 1976, the reported ringed seal harvests were relatively high compared to the same periods for 1973 and 1974. This may indicate that environmental conditions such as temperatures, wind directions and duration, and presence of sea ice conducive to good seal hunting conditions affected the outcome of the harvest. This is speculative, of course, and can't be known for certain without more complete information about the seal hunting conditions at that time. What can be said, however, is that the seasonality of the seal harvest may vary markedly from one year to another.

The composition of seal harvests also varies year to year. Examining the reported harvest information for Hooper Bay collected from 1973 through 1976 with the estimated harvests for 1997 and 1998, indicates that the largest variability in harvest among species is with bearded and ringed seal. The composition of the 1997 harvest was almost identical to the 1976 harvest. The composition of the 1973 and 1974 harvests indicate that bearded seal contributed a larger proportion of the overall harvest

while ringed seal contributed less to the overall harvest. Because of limitations of the data collected during the 1973 through 1976 time period, a more complete analysis and comparison of the two data sets (1973-1976 and 1997-1998) has not been attempted.

REFERENCES

Alaska Department of Labor.

1999 Alaska Population Overview, 1998 Estimates

Alaska Department of Fish and Game

1973- Unpublished fieldnotes of Reported Hooper Bay seal harvests.

1976 Assorted papers in office files. Division of Subsistence, Bethel

Burns, John, Kathryn Frost, and Lloyd Lowry

1985 Marine Mammal Species Accounts. Game Technical Bulletin No.7, Alaska Department of Fish and Game, Juneau.

Coffing, Michael, Cheryl L. Scott, and Charles Utermohle

1999 The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Yukon-Kuskokwim Delta Communities, 1997-98. Technical Paper No.255, Division of Subsistence, Alaska Department of Fish and Game, Juneau.

Georgette, Susan, Michael Coffing, Cheryl Scott, and Charles Utermohle

1998 The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in the Norton Sound-Bering Strait Region, Alaska, 1996-97. Technical Paper No.242, Division of Subsistence, Alaska Department of Fish and Game, Juneau.

Scott, Cheryl L., Amy Paige, Gretchen Jennings, and Louis Brown

1999 Community Demographic and Economic Information. Community Profile Data Base Supplemental Tables No.1. Division of Subsistence, Alaska Department of Fish and Game, Juneau.

Wolfe, Robert J. and Craig Mishler

1996 The Subsistence Harvest of Harbor Seal and Sea Lions by Alaska Natives in 1995. Technical Paper No.238, Division of Subsistence, Alaska Department of Fish and Game, Juneau.

TABLE 1. SAMPLING METHODOLOGY BY COMMUNITY, YUKON-KUSKOKWIM DELTA SEAL AND SEA LION SURVEYS, 1998-99

Community	Estimated 1998 Native Population	Number of Native Households	Type of Sampling Design	Number of Households Surveyed	Percent of Households Surveyed
Emmonak	642	163	Two Strata	100	61.3%
Hooper Bay	845	189	Census	90	47.6%
Quinhagak	501	107	Two Strata	72	67.3%
Total	1,988	459		262	57.1%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

TABLE 2. POPULATION OF YUKON-KUSKOKWIM DELTA COASTAL COMMUNITIES, 1990 AND 1998

Community	1990 Census Population	1998 Estimated Population
Kotlik	461	552
Emmonak	642	838
Alakanuk	544	671
Sheldon Point	109	161
Scammon Bay	343	450
Chevak	598	741
Hooper Bay	845	1,039
Newtok	207	267
Tununak	316	330
Toksook Bay	420	515
Nightmute	153	222
Mekoryuk	177	192
Chefornak	320	423
Kipnuk	470	556
Kwigillingok	278	324
Kongiganak	294	348
Tuntutuliak	300	357
Eek	254	309
Quinhagak	501	612
Goodnews Bay	241	256
Platinum	64	41
Total	7,537	9,204

Source: Alaska Department of Labor 1999.

**TABLE 3. ESTIMATED SUBSISTENCE TAKES OF SEALS AND SEA LIONS BY
ALASKA NATIVES IN EMMONAK, HOOPER BAY AND QUINHAGAK
1998-99**

	Harvest	Estimated Total Struck And Lost	Total Take	Lower and Upper Confidence Range for Total Take
Bearded Seal	150 86.1%	24 13.9%	174 100.0%	127 - 227
Ribbon Seal	7 85.0%	1 15.0%	9 100.0%	6 - 16
Ringed Seal	448 97.0%	14 3.0%	462 100.0%	330 - 597
Spotted Seal	159 91.7%	15 8.3%	174 100.0%	119 - 228
Sea Lion	0 0.0%	0 0.0%	0 0.0%	0 - 0
All Seals/S.Lions	765 93.5%	54 6.5%	819 100.0%	625 - 1,013

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999

**TABLE 4. SPECIES COMPOSITION OF SEAL TAKE BY EMMONAK, HOOPER BAY
AND QUINHAGAK, 1998-99**

Community	Percent of Each Community's Total Seal Take				
	Bearded Seal	Ringed Seal	Spotted Seal	Ribbon Seal	Sea Lion
Emmonak	38.4	34.6	24.4	2.6	0.0
Hooper Bay	14.6	75.0	10.0	0.4	0.0
Quinhagak	19.8	11.8	67.1	1.3	0.0
Total	21.3	56.4	21.2	1.1	0.0

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

TABLE 5. SUBSISTENCE SEAL AND SEA LION HARVEST, TAKE AND USE BY ALASKA NATIVES, 1998-99, IN THREE YUKON-KUSKOKWIM DELTA COMMUNITIES WITH CONFIDENCE INTERVALS AND STATISTICAL RANGES

	Number	Percent of	Percent of	Estimated	Number	Total	Total Take		
	Of Animals	Native	Native				Confidence	Lower	Upper
	Harvested	Households	Households				Interval	Range	Range
	Per Capita	Harvesting	Using	Harvested	Struck	Take	(+/- %)	Estimate	Estimate
BEARDED SEAL									
Emmonak	.10	23.4%	47.5%	72.4	6.6	79.0	17.8%	64.9	93.0
Hooper Bay	.07	17.8%	51.1%	58.8	14.7	73.5	35.6%	47.4	99.6
Quinhagak	.04	8.1%	19.3%	18.7	2.9	21.6	58.2%	15.0	34.1
Total	.08	17.5%	42.4%	149.9	24.1	174.1	30.3%	127.3	226.8
RIBBON SEAL									
Emmonak	.01	2.4%	2.4%	3.9	1.3	5.3	47.4%	4.0	7.8
Hooper Bay	.00	1.1%	3.3%	2.1	0.0	2.1	142.6%	1.0	5.1
Quinhagak	.00	1.3%	1.3%	1.4	0.0	1.4	107.9%	1.0	3.0
Total	.00	1.6%	2.5%	7.5	1.3	8.8	79.9%	6.0	15.8
RINGED SEAL									
Emmonak	.09	21.9%	41.9%	66.0	5.3	71.3	20.5%	56.7	85.8
Hooper Bay	.42	37.8%	58.9%	369.6	8.4	378.0	30.2%	263.9	492.1
Quinhagak	.03	8.0%	16.4%	12.9	0.0	12.9	47.1%	9.0	18.9
Total	.22	25.2%	43.0%	448.5	13.7	462.1	29.2%	329.6	596.9
SPOTTED SEAL									
Emmonak	.06	18.7%	22.8%	44.9	5.3	50.2	21.9%	39.2	61.2
Hooper Bay	.05	14.4%	32.2%	48.3	2.1	50.4	43.7%	28.4	72.4
Quinhagak	.15	21.6%	48.4%	66.1	7.1	73.3	29.4%	51.8	94.8
Total	.08	17.6%	32.7%	159.4	14.5	173.9	31.4%	119.3	228.4
SEA LION									
Emmonak	.00	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0	0.0
Hooper Bay	.00	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0	0.0
Quinhagak	.00	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0	0.0
Total	.00	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0	0.0
ALL SEALS									
Emmonak	.25	35.8%	62.4%	187.3	18.4	205.7	16.0%	172.8	238.7
Hooper Bay	.54	45.6%	67.8%	478.8	25.2	504.0	25.6%	374.9	633.1
Quinhagak	.22	28.3%	56.5%	99.1	10.0	109.1	29.3%	77.1	141.1
Total	.37	38.1%	63.2%	765.2	53.6	818.8	23.7%	624.7	1,013.0

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

TABLE 6. AGE AND SEX COMPOSITION OF SEAL HARVESTS, ALL SPECIES, BY ALASKA NATIVES IN EMMONAK, HOOPER BAY AND QUINHAGAK, 1998-99

	Male	Female	Unknown Sex	Total
Adult	202.2	106.4	301.1	609.7
Row Percent	33.2%	17.5%	49.4%	100.0%
Column Percent	76.4%	87.2%	79.5%	79.7%
Juvenile	55.5	12.7	60.1	128.3
Row Percent	43.2%	9.9%	46.8%	100.0%
Column Percent	21.0%	10.4%	15.9%	16.8%
Pup	4.2	2.9	4.2	11.3
Row Percent	37.3%	25.4%	37.3%	100.0%
Column Percent	1.6%	2.3%	1.1%	1.5%
Unknown Age	2.6	0.0	13.3	15.9
Row Percent	16.5%	0.0%	83.5%	100.0%
Column Percent	1.0%	0.0%	3.5%	2.1%
Total	264.5	122.0	378.7	765.2
Row Percent	34.6%	15.9%	49.5%	100.0%
Column Percent	100.0%	100.0%	100.0%	100.0%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

TABLE 7. AGE AND SEX COMPOSITION OF BEARDED SEAL HARVESTS BY ALASKA NATIVES IN EMMONAK, HOOPER BAY AND QUINHAGAK, 1998-99

	Male	Female	Unknown Sex	Total
Adult	44.1	13.0	31.2	88.4
Row Percent	49.9%	14.7%	35.3%	100.0%
Column Percent	67.7%	65.6%	48.1%	58.9%
Juvenile	18.9	3.9	28.5	51.3
Row Percent	36.9%	7.7%	55.4%	100.0%
Column Percent	29.1%	19.9%	43.8%	34.2%
Pup	2.1	2.9	0.0	5.0
Row Percent	42.4%	57.6%	0.0%	100.0%
Column Percent	3.2%	14.4%	0.0%	3.3%
Unknown Age	0.0	0.0	5.3	5.3
Row Percent	0.0%	0.0%	100.0%	100.0%
Column Percent	0.0%	0.0%	8.1%	3.5%
Total	65.2	19.8	65.0	149.9
Row Percent	43.5%	13.2%	43.3%	100.0%
Column Percent	100.0%	100.0%	100.0%	100.0%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

TABLE 8. AGE AND SEX COMPOSITION OF RINGED SEAL HARVESTS BY ALASKA NATIVES IN EMMONAK, HOOPER BAY AND QUINHAGAK, 1998-99

	Male	Female	Unknown Sex	Total
Adult	135.7	80.9	172.7	389.4
Row Percent	34.9%	20.8%	44.4%	100.0%
Column Percent	84.2%	90.2%	87.4%	86.8%
Juvenile	20.7	8.8	16.6	46.1
Row Percent	44.8%	19.1%	36.1%	100.0%
Column Percent	12.8%	9.8%	8.4%	10.3%
Pup	2.1	0.0	4.2	6.3
Row Percent	33.3%	0.0%	66.7%	100.0%
Column Percent	1.3%	0.0%	2.1%	1.4%
Unknown Age	2.6	0.0	4.1	6.7
Row Percent	39.3%	0.0%	60.7%	100.0%
Column Percent	1.6%	0.0%	2.1%	1.5%
Total	161.2	89.7	197.6	448.5
Row Percent	35.9%	20.0%	44.1%	100.0%
Column Percent	100.0%	100.0%	100.0%	100.0%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

TABLE 9. AGE AND SEX COMPOSITION OF SPOTTED SEAL HARVESTS BY ALASKA NATIVES IN EMMONAK, HOOPER BAY AND QUINHAGAK, 1998-99

	Male	Female	Unknown Sex	Total
Adult	21.0	12.6	92.3	125.9
Row Percent	16.7%	10.0%	73.3%	100.0%
Column Percent	59.0%	100.0%	83.0%	79.0%
Juvenile	14.6	0.0	15.0	29.6
Row Percent	49.3%	0.0%	50.7%	100.0%
Column Percent	41.0%	0.0%	13.5%	18.5%
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	3.9	3.9
Row Percent	0.0%	0.0%	100.0%	100.0%
Column Percent	0.0%	0.0%	3.5%	2.5%
Total	35.5	12.6	111.3	159.4
Row Percent	22.3%	7.9%	69.8%	100.0%
Column Percent	100.0%	100.0%	100.0%	100.0%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

TABLE 10. AGE AND SEX COMPOSITION OF RIBBON SEAL HARVESTS BY ALASKA NATIVES IN EMMONAK, HOOPER BAY AND QUINHAGAK, 1998-99

	Male	Female	Unknown Sex	Total
Adult	1.3	0.0	4.8	6.2
Row Percent	21.4%	0.0%	78.6%	100.0%
Column Percent	50.0%	---	100.0%	82.4%
Juvenile	1.3	0.0	0.0	1.3
Row Percent	100.0%	0.0%	0.0%	100.0%
Column Percent	50.0%	---	0.0%	17.6%
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%
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%
Total	2.6	0.0	4.8	7.5
Row Percent	35.2%	0.0%	64.8%	100.0%
Column Percent	100.0%	---	100.0%	100.0%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

TABLE 11. AGE AND SEX COMPOSITION OF SEA LION HARVESTS BY ALASKA NATIVES IN EMMONAK, HOOPER BAY AND QUINHAGAK, 1998-99

	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%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

**TABLE 12. SUBSISTENCE HUNTING, HARVEST AND USE OF SEALS, ALL SPECIES,
BY THREE YUKON-KUSKOKWIM DELTA COMMUNITIES, 1998-99**

Community	Percent of Native Households			Hunting Success Rate	Estimated Community Harvest (animals)	Mean Harvest Percapita (animals)
	Using Seal	Hunting Seal	Harvesting Seal			
Emmonak	62.4	37.4	35.8	95.7%	187.3	0.25
Hooper Bay	67.8	52.2	45.6	87.2%	478.8	0.54
Quinhagak	56.5	28.3	28.3	100.0%	99.1	0.22
Total	63.2	41.4	38.1	92.0%	765.2	0.37

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

**TABLE 13. PERCENT OF ALASKA NATIVE HOUSEHOLDS IN EMMONAK,
HOOPER BAY AND QUINHAGAK HUNTING SEALS AND
SEA LIONS, BY SPECIES, 1998- 99**

	Percentage of Native Households	Percentage of Hunting Households
BEARDED SEAL		
Hunted	25%	100%
Harvested	18%	70%
Hunted Unsuccessfully	8%	30%
Did Not Hunt	75%	--
RINGED SEAL		
Hunted	29%	100%
Harvested	25%	86%
Hunted Unsuccessfully	4%	14%
Did Not Hunt	71%	--
SPOTTED SEAL		
Hunted	21%	100%
Harvested	18%	83%
Hunted Unsuccessfully	4%	17%
Did Not Hunt	79%	--
RIBBON SEAL		
Hunted	3%	100%
Harvested	2%	58%
Hunted Unsuccessfully	1%	42%
Did Not Hunt	97%	--
SEA LIONS		
Hunted	0%	0%
Harvested	0%	0%
Hunted Unsuccessfully	0%	0%
Did Not Hunt	100%	--

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

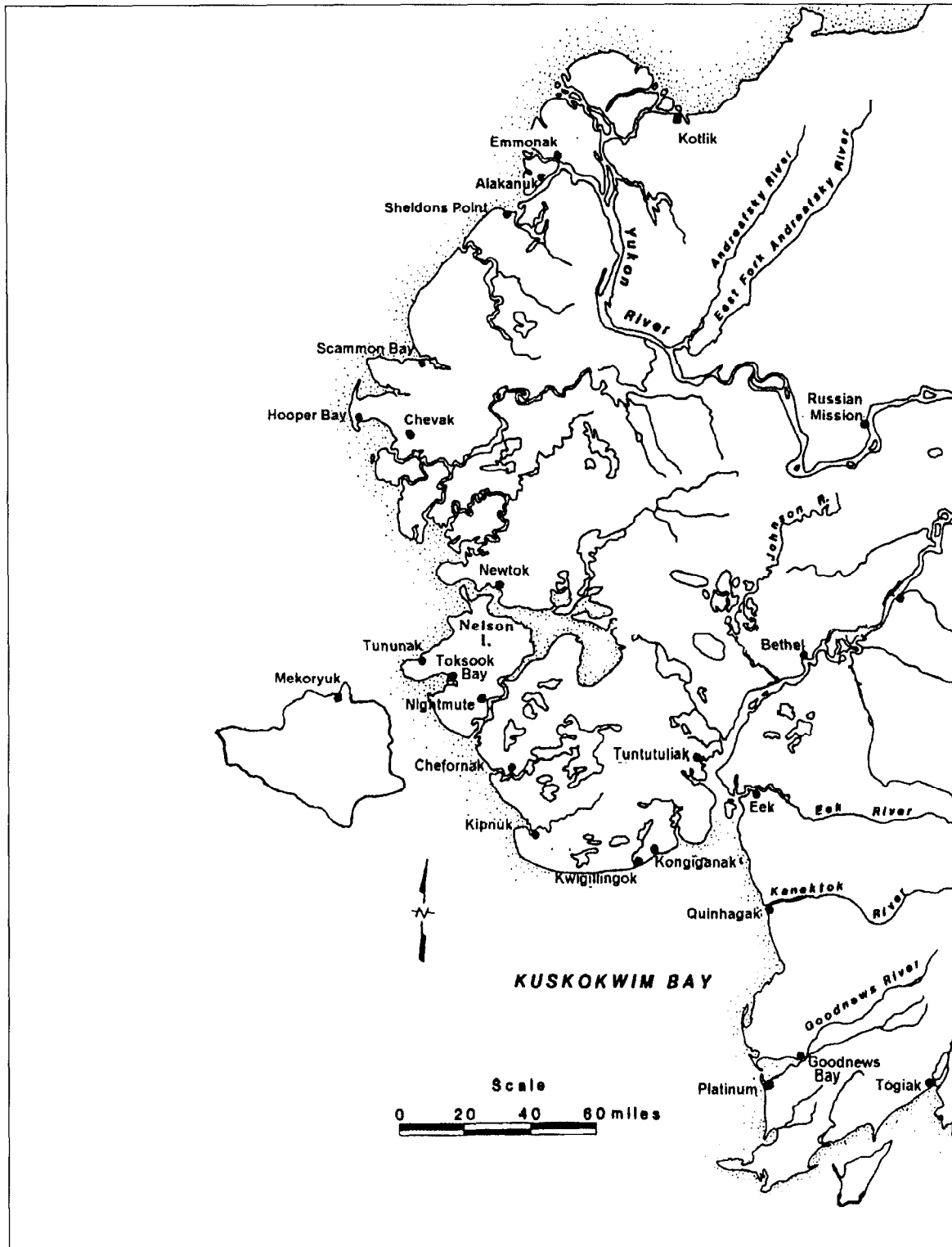


Fig. 1. Map of the Yukon-Kuskokwim Delta Region with Locations of Coastal Communities

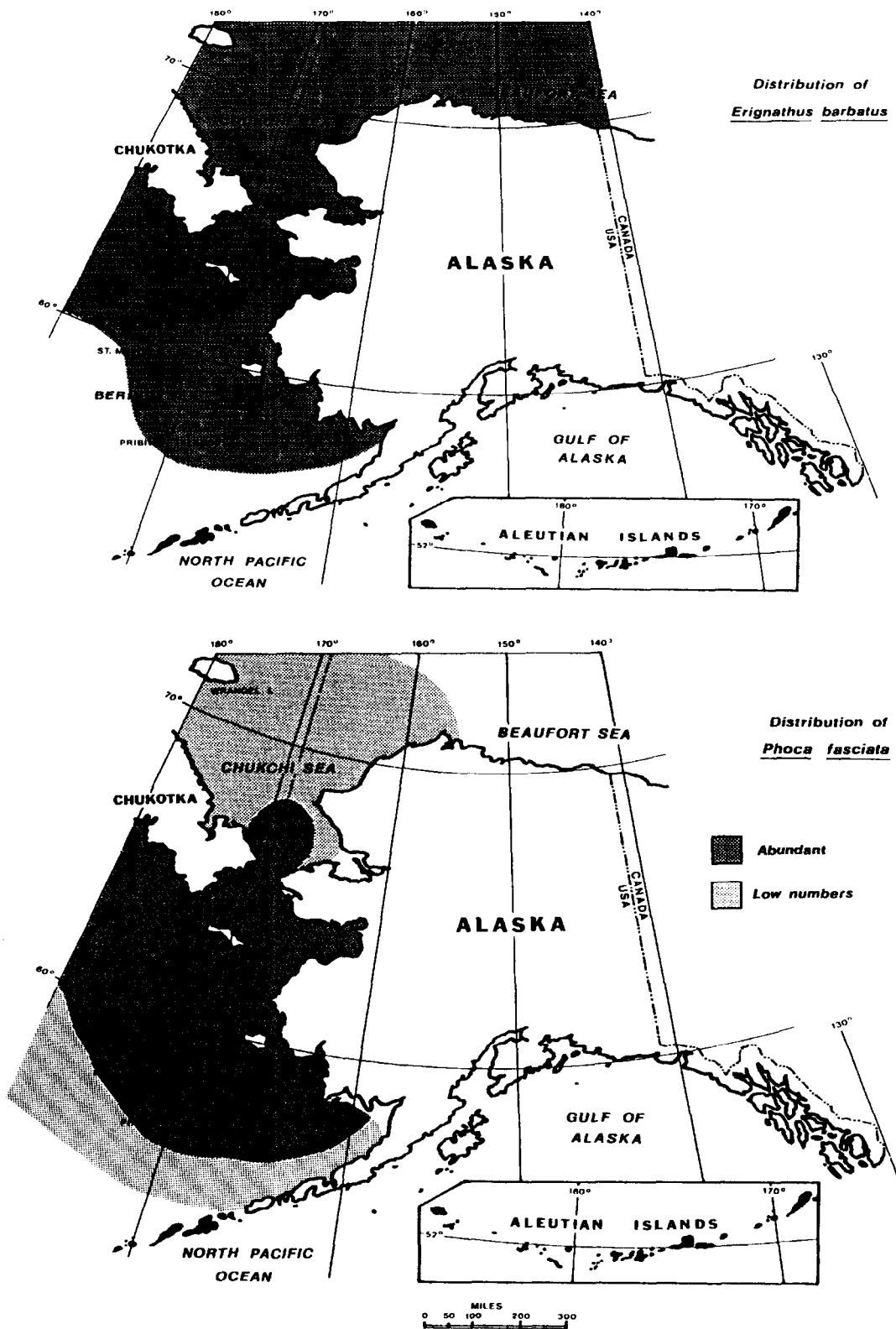


Fig. 2. [Top] General distribution of bearded seal (*Erignathus barbatus*) in Alaska. [Bottom] General distribution of ribbon seal (*Phoca fasciata*) in Alaska. (Source: Burns, Frost, and Lowery 1985)

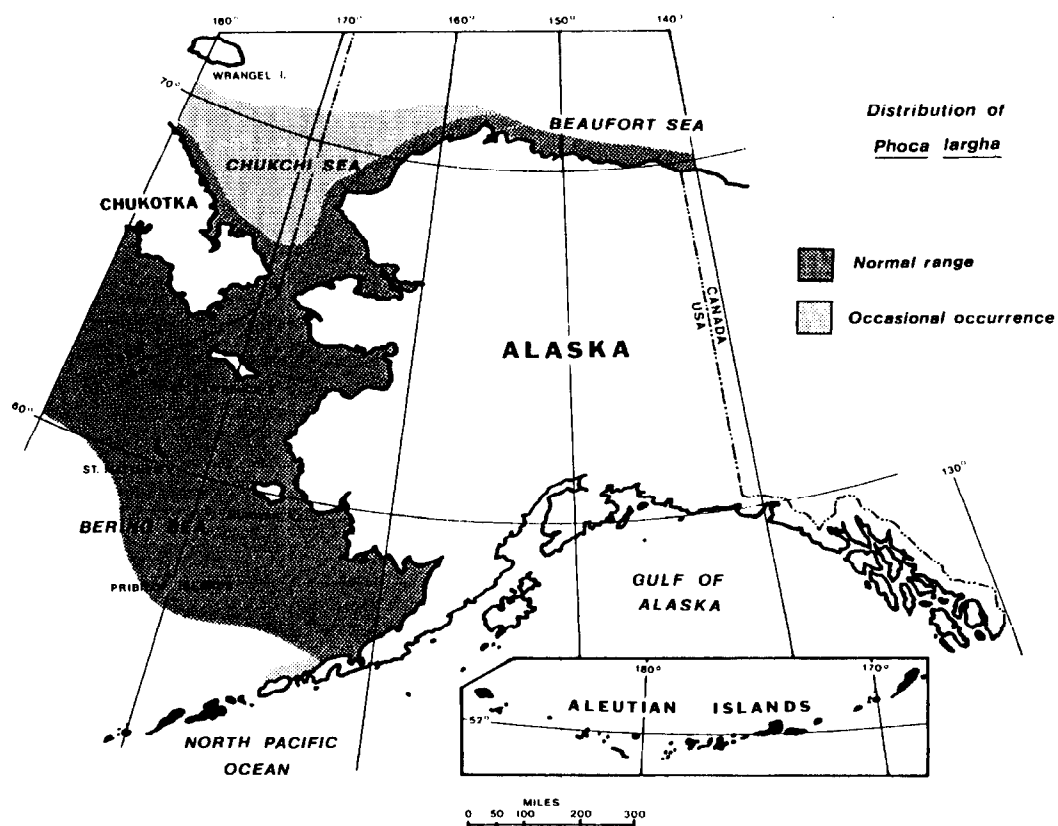
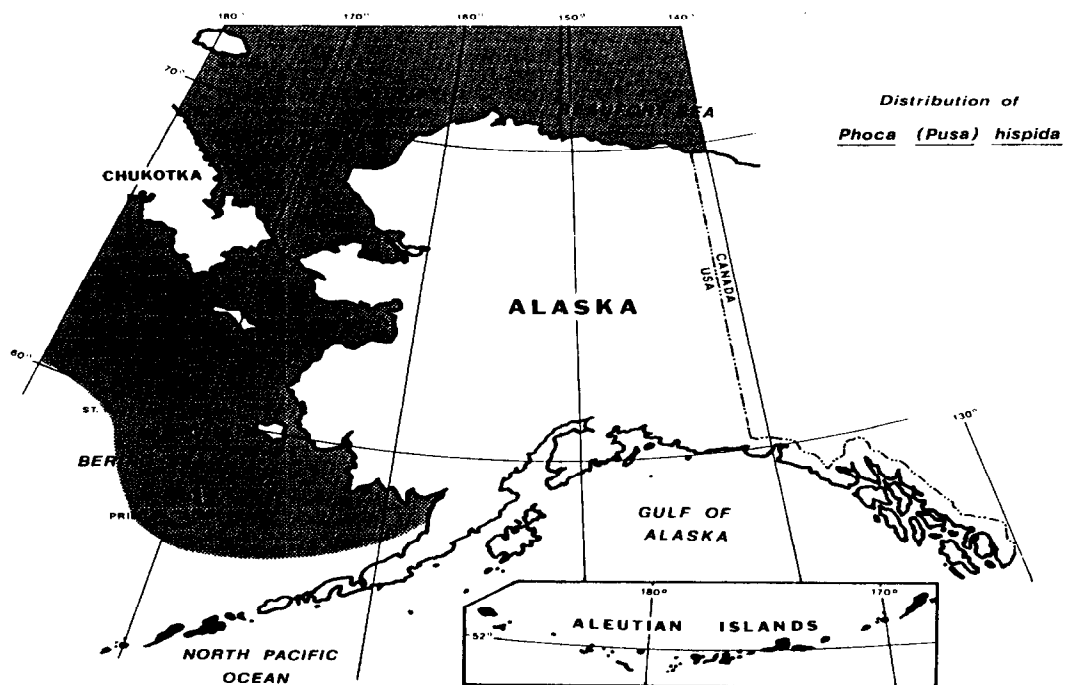


Fig. 3. [Top] General distribution of ringed seal (*Phoca hispida*) in Alaska. [Bottom] General distribution of spotted seal (*Phoca largha*) in Alaska. (Source: Burns, Frost, and Lowery 1985)

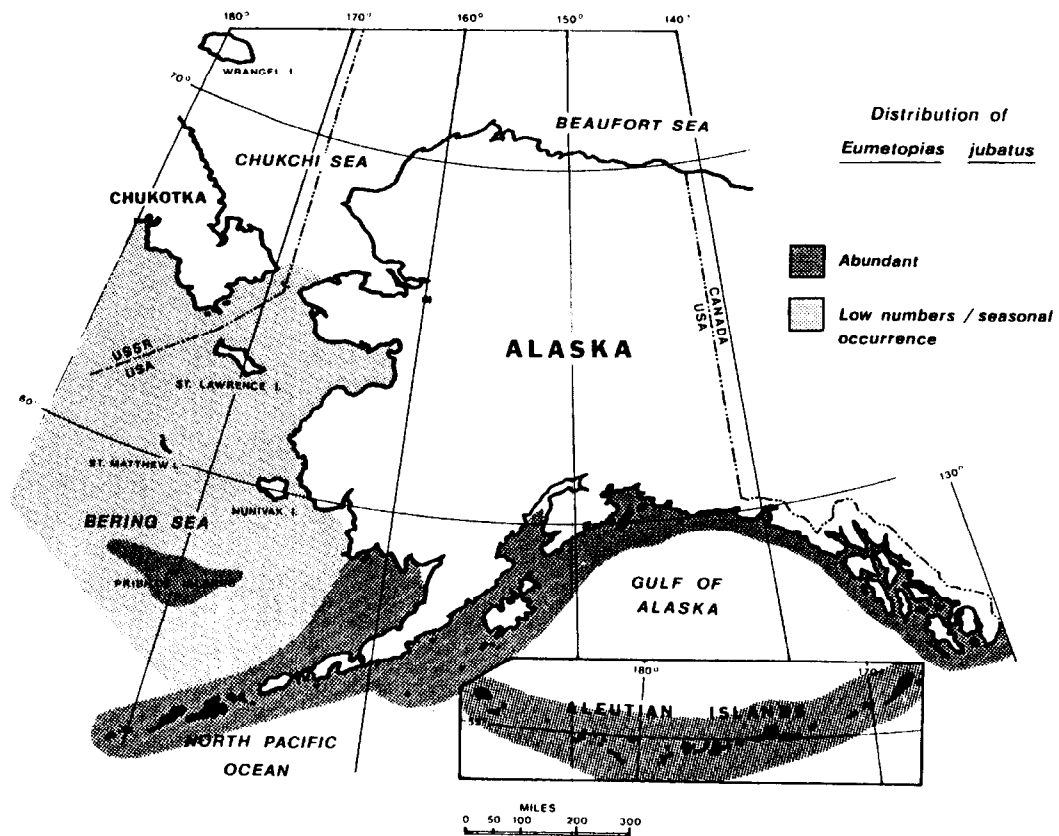
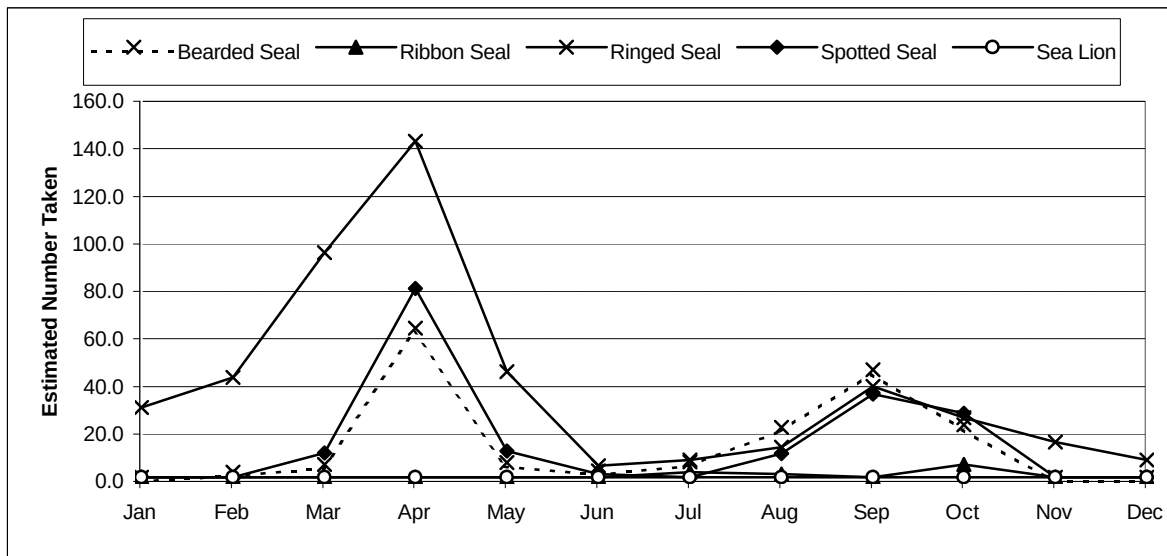


Fig. 4. General distribution of Steller sea lion (*Eumetopias jubatus*) in Alaska. (Source: Burns, Frost, and Lowery 1985)

Fig. 5. Estimated Seasonally Adjusted Take of Seals and Sea Lions by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1998-99



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bearded Seal	0.0	2.1	5.5	62.6	6.3	2.6	6.6	21.1	45.2	22.1	0.0	0.0
Percentage	0.0%	1.2%	3.2%	36.0%	3.6%	1.5%	3.8%	12.1%	26.0%	12.7%	0.0%	0.0%
Cum. Percent	0.0%	1.2%	4.4%	40.4%	44.0%	45.5%	49.3%	61.4%	87.3%	100.0%	100.0%	100%

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ribbon Seal	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.3	0.0	5.4	0.0	0.0
Percentage	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	23.9%	15.0%	0.0%	61.2%	0.0%	0.0%
Cum. Percent	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	23.9%	38.8%	38.8%	100.0%	100.0%	100%

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ringed Seal	29.4	42.0	94.6	141.5	44.5	4.9	7.3	12.8	38.2	25.0	14.7	7.3
Percentage	6.4%	9.1%	20.5%	30.6%	9.6%	1.1%	1.6%	2.8%	8.3%	5.4%	3.2%	1.6%
Cum. Percent	6.4%	15.4%	35.9%	66.5%	76.1%	77.2%	78.8%	81.6%	89.8%	95.2%	98.4%	100%

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Spotted Seal	0.0	0.0	10.2	79.5	10.9	1.3	0.0	10.0	34.9	26.9	0.0	0.0
Percentage	0.0%	0.0%	5.9%	45.7%	6.3%	0.8%	0.0%	5.8%	20.1%	15.5%	0.0%	0.0%
Cum. Percent	0.0%	0.0%	5.9%	51.6%	57.9%	58.7%	58.7%	64.4%	84.5%	100.0%	100.0%	100%

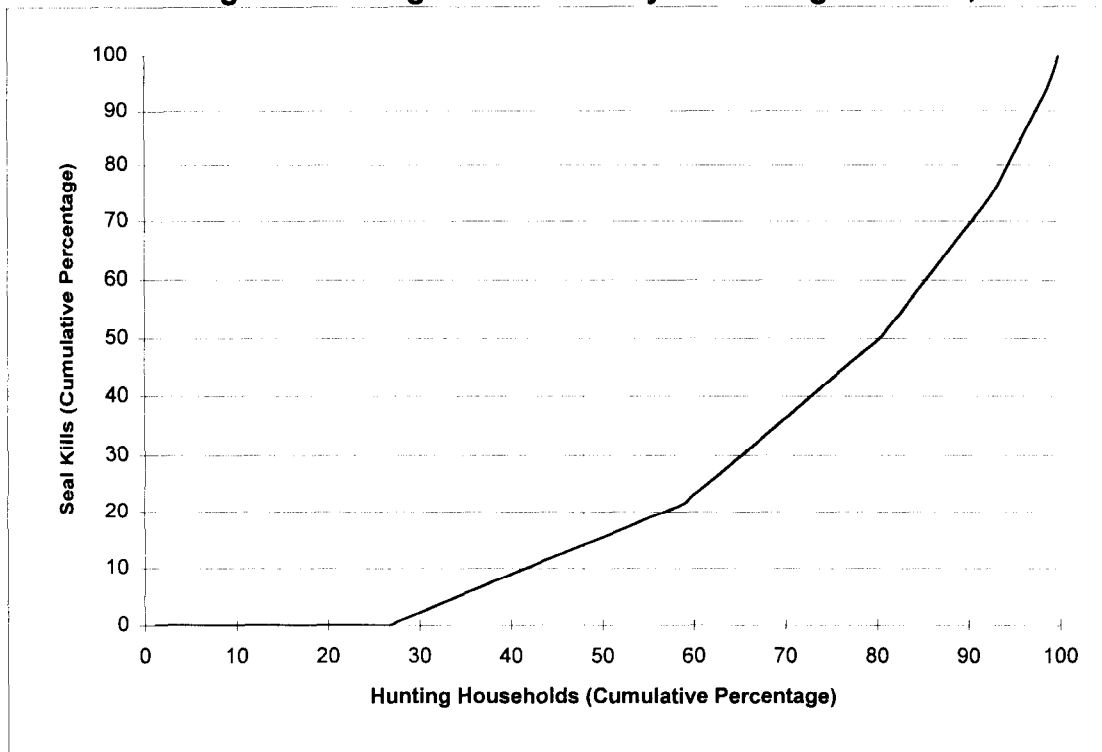
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sea Lion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentage	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cum. Percent	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0%

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
All Seals	29.4	44.1	110.3	283.6	61.7	8.8	16.0	45.2	118.3	79.4	14.7	7.3
Percentage	3.6%	5.4%	13.5%	34.6%	7.5%	1.1%	2.0%	5.5%	14.4%	9.7%	1.8%	0.9%
Cum. Percent	3.6%	9.0%	22.4%	57.1%	64.6%	65.7%	67.7%	73.2%	87.6%	97.3%	99.1%	100%

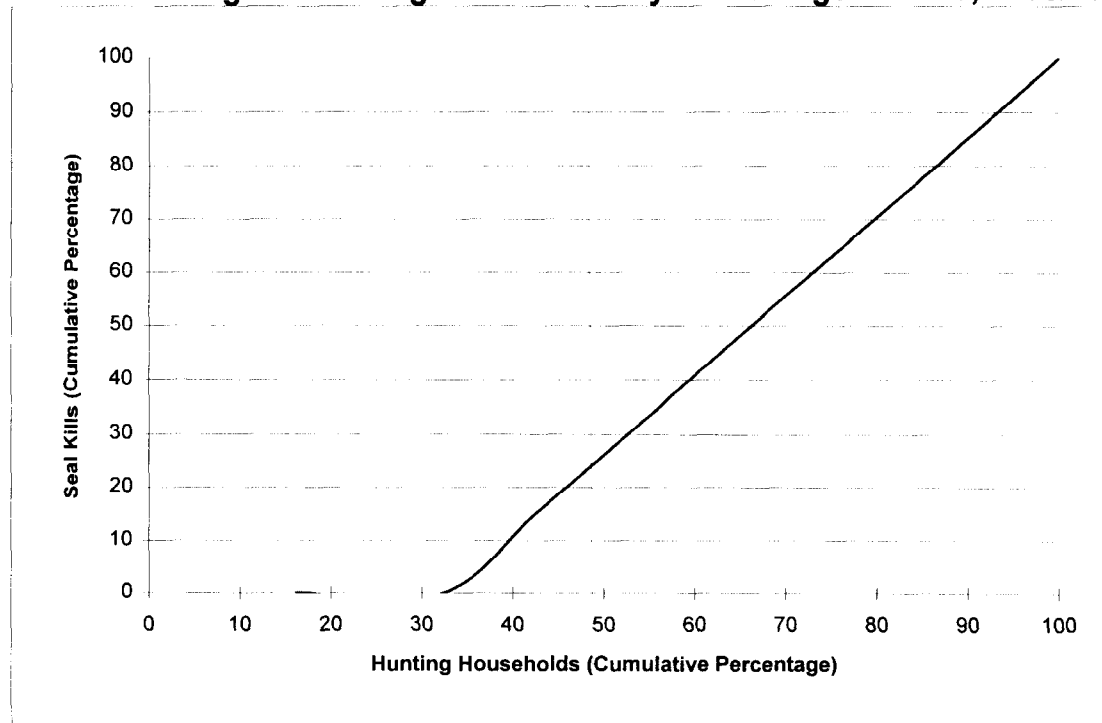
NOTE: Numbers on these tables and figures reflect a study period from February 1998 through March 1999 and includes the communities of Emmonak, Hooper Bay, and Quinhagak.

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

**Fig. 6. Specialization in Bearded Seal Takes:
Percentage of Hunting Households by Percentage of Take, 1998/99**

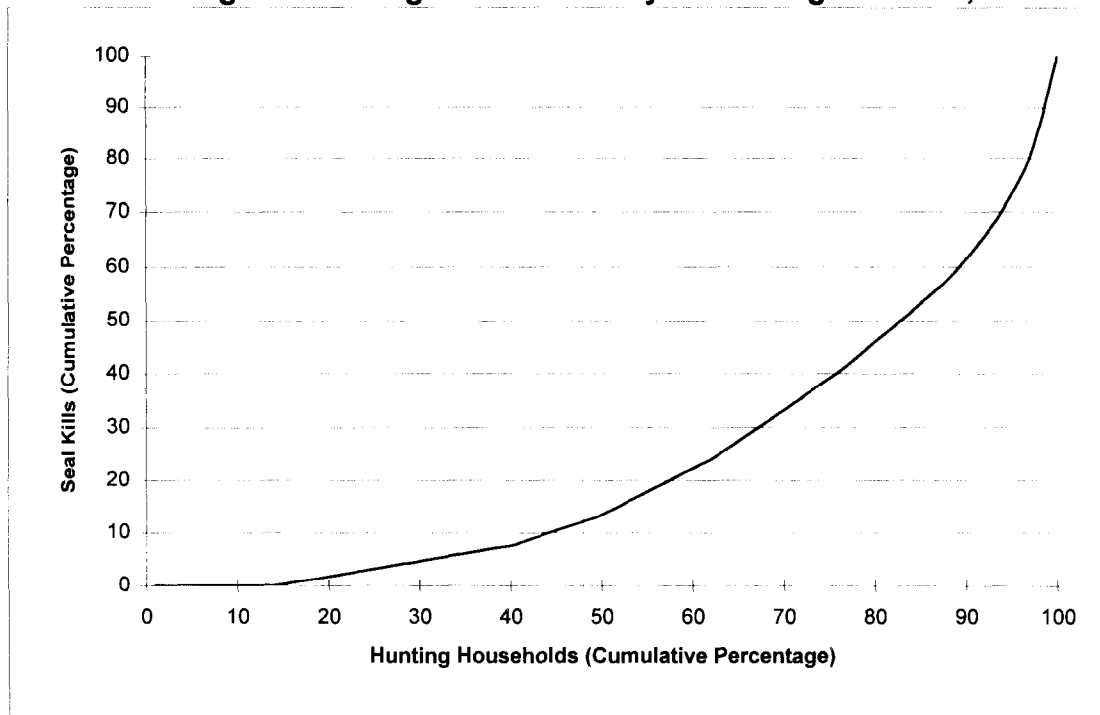


**Fig. 7. Specialization in Ribbon Seal Takes:
Percentage of Hunting Households by Percentage of Take, 1998/99**

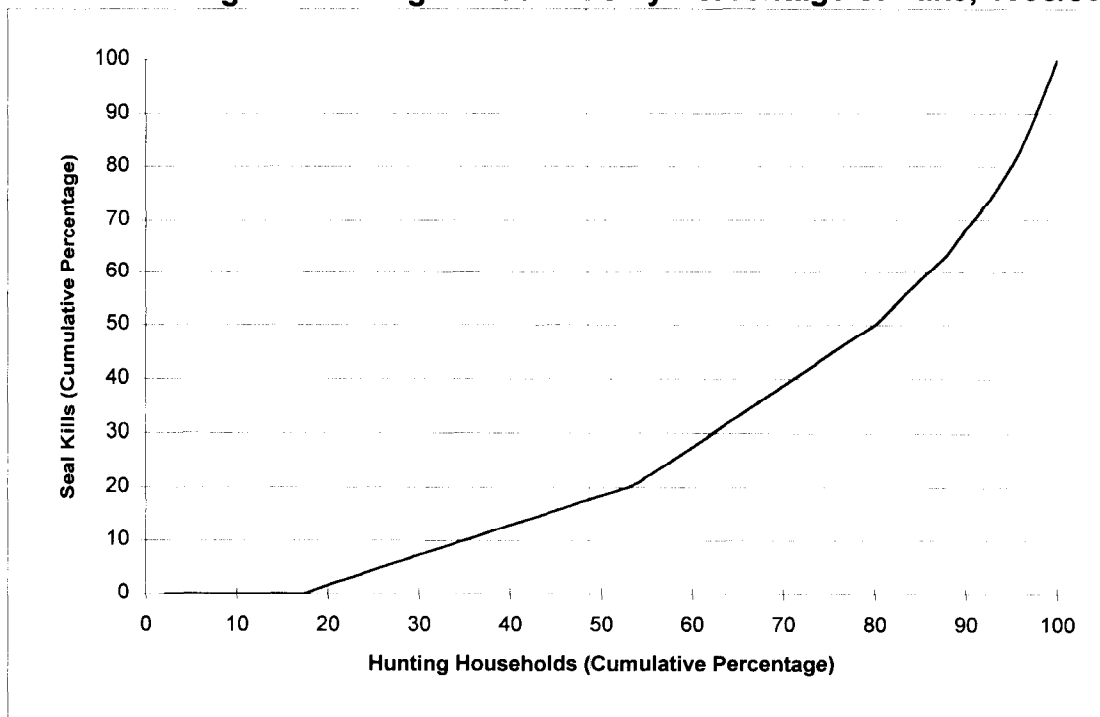


Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

**Fig. 8. Specialization in Ringed Seal Takes:
Percentage of Hunting Households by Percentage of Take, 1998/99**



**Fig. 9. Specialization in Spotted Seal Takes:
Percentage of Hunting Households by Percentage of Take, 1998/99**



Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

Fig. 10. Estimated Takes of All Seals by Emmonak, Hooper Bay and Quinhagak, 1997-1998

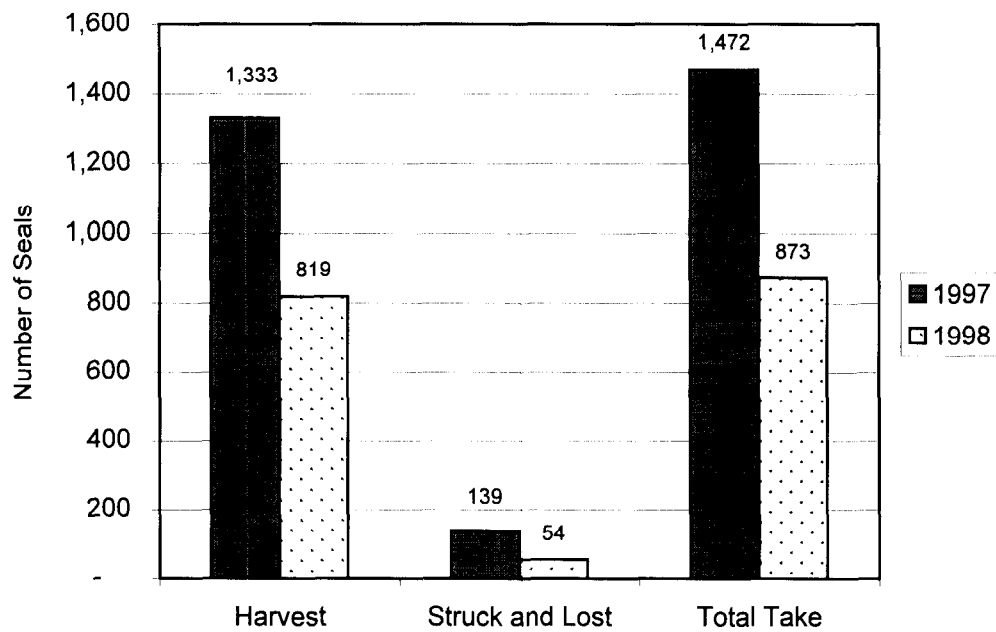


Fig. 11. Estimated Takes of Sea Lions by Emmonak, Hooper Bay and Quinhagak, 1997-1998

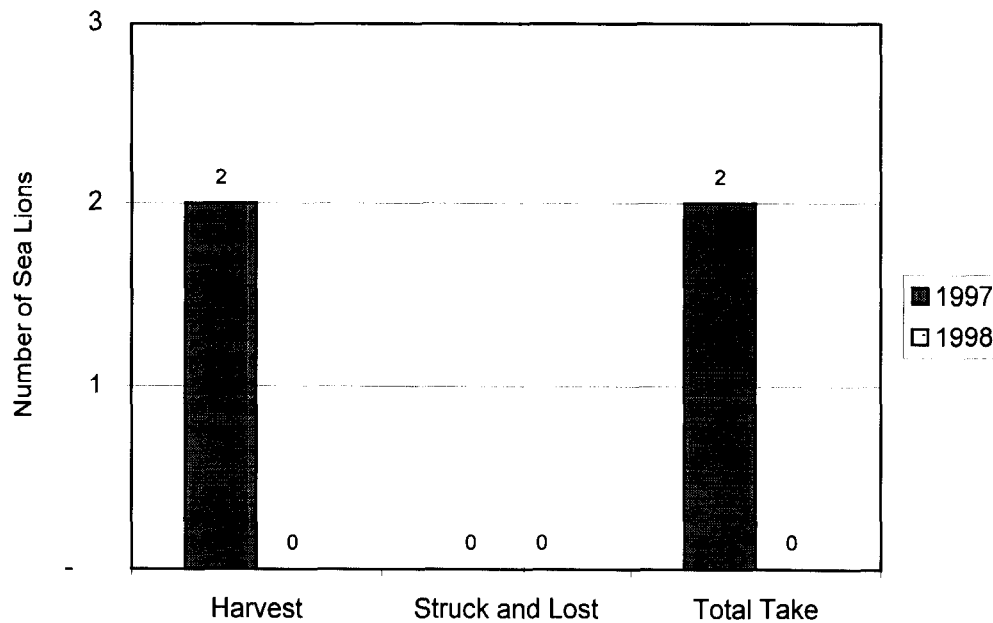


Fig. 12. Estimated Takes of Seal and Sea Lion by Alaska Natives in Emmonak, Hooper Bay and Quinhagak 1997 - 1998

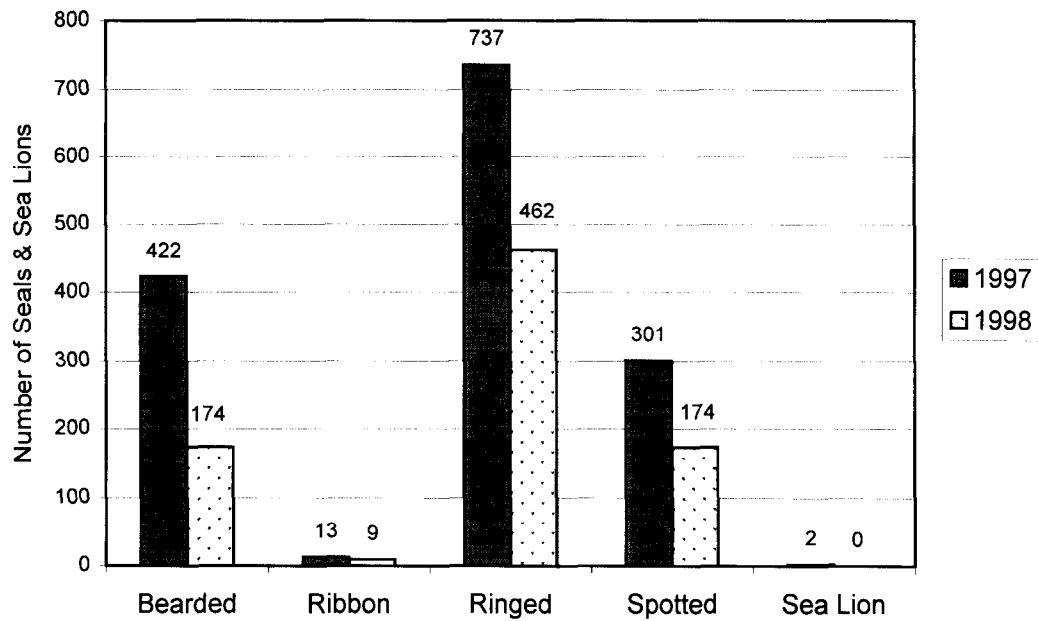


Fig. 13. Percent of Alaska Native Households in Emmonak, Hooper Bay and Quinhagak Hunting Seal and Sea Lion, 1997 - 1998

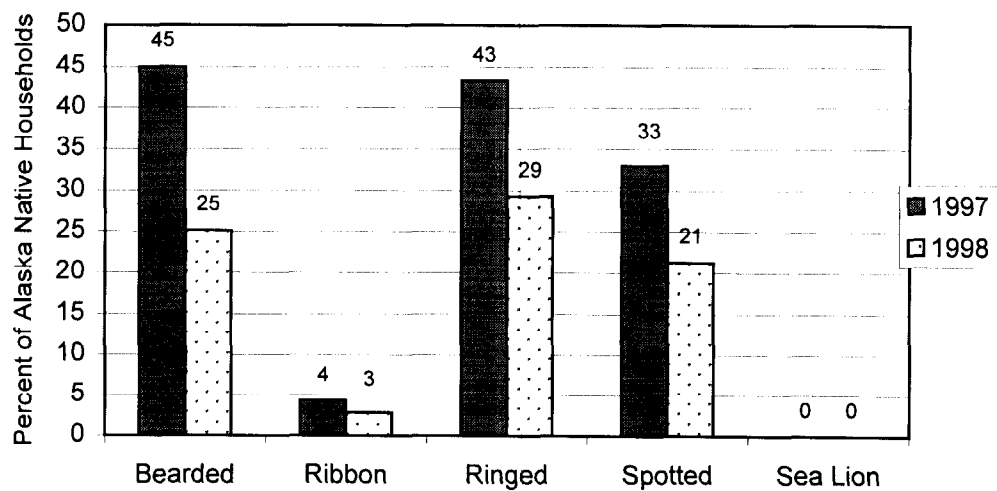


Fig. 14. Estimated Takes of Seal and Sea Lion by Alaska Natives in Emmonak, 1997 - 1998

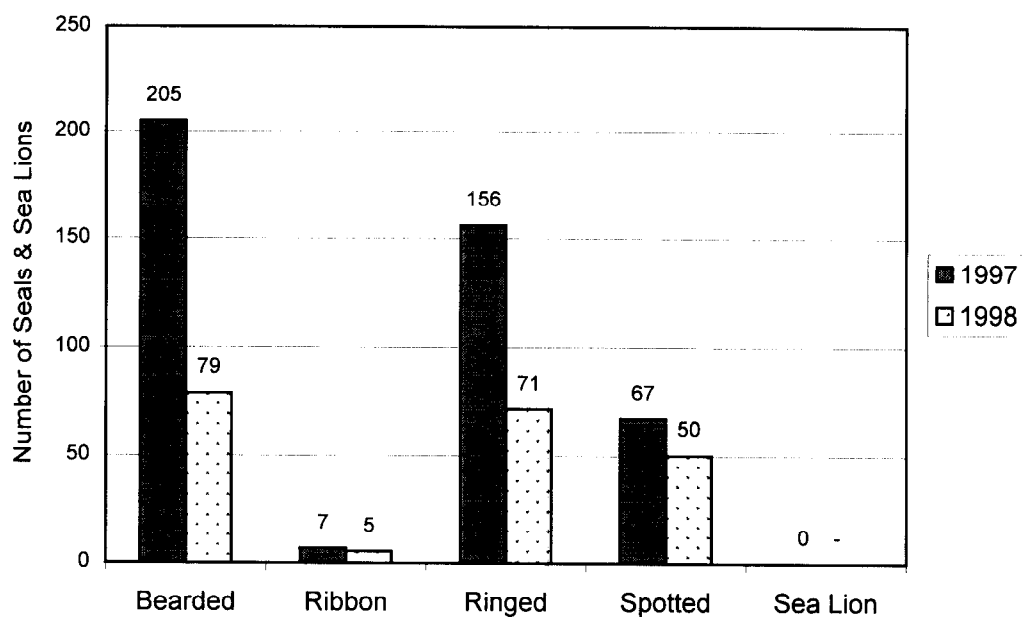


Fig. 15. Percent of Alaska Native Households in Emmonak Hunting Seals, 1997 - 1998

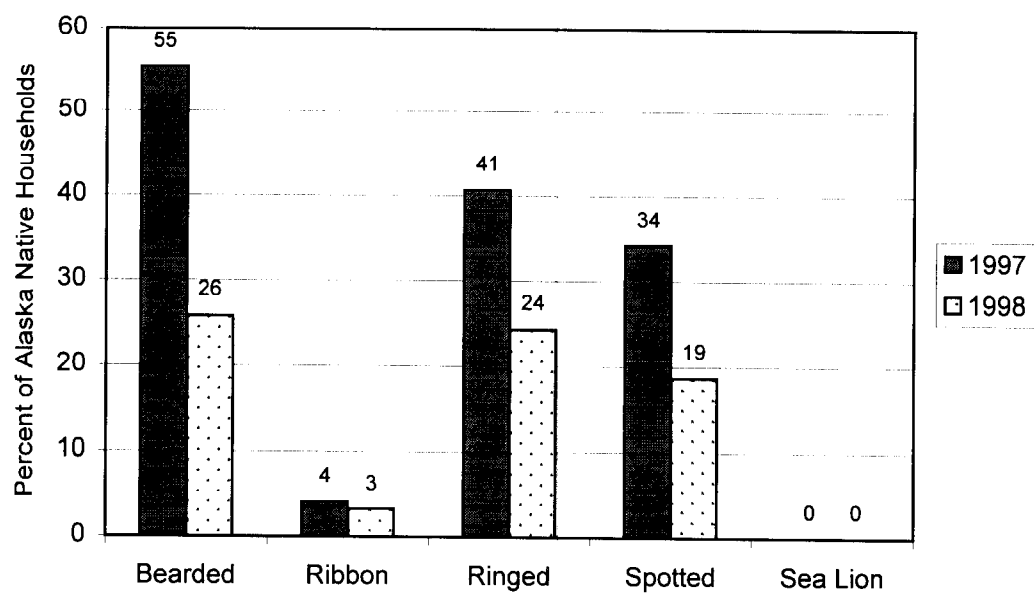


Fig. 16. Estimated Takes of Seal and Sea Lion by Alaska Natives in Hooper Bay, 1997 - 1998

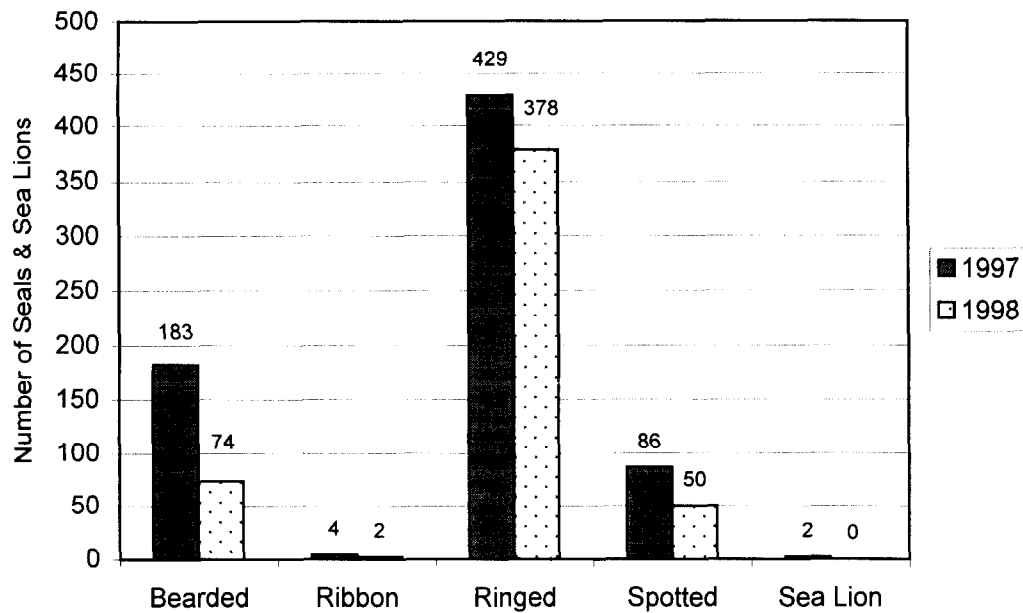


Fig. 17. Percent of Alaska Native Households in Hooper Bay Hunting Seals, 1997 - 1998

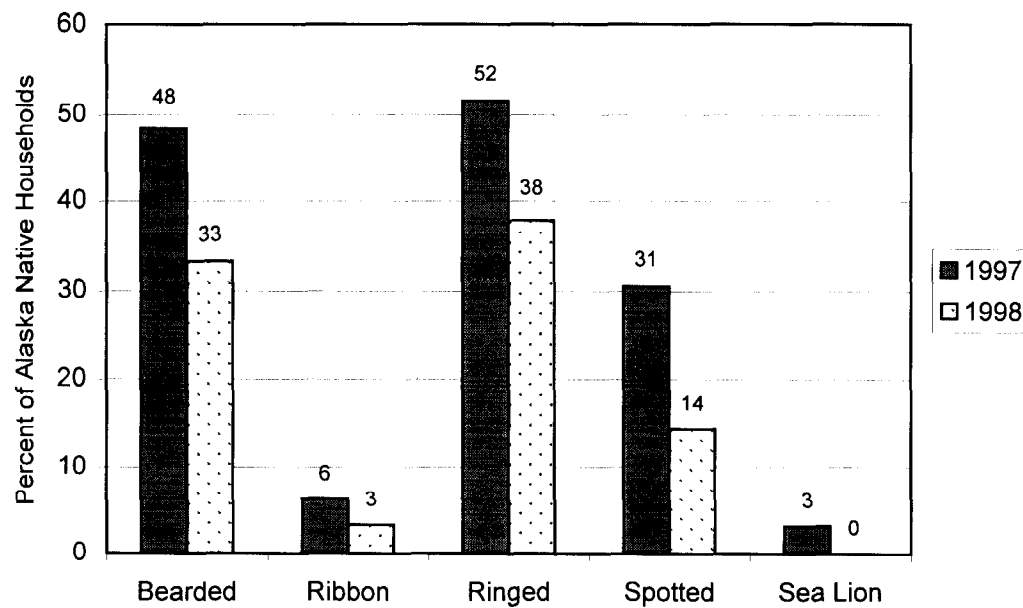


Fig. 18. Estimated Takes of Seal and Sea Lion by Alaska Natives in Quinhagak, 1997 - 1998

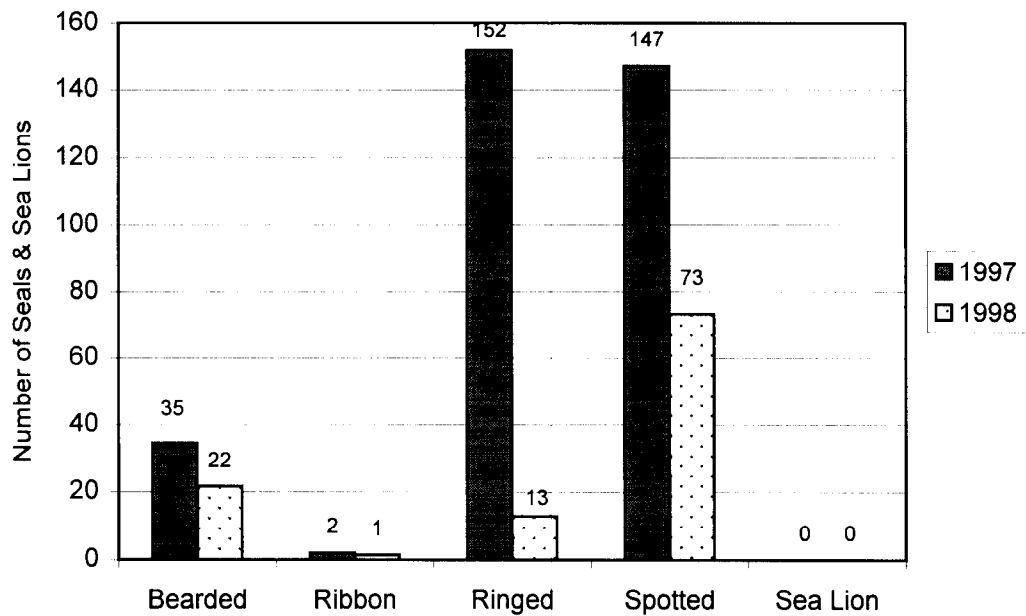


Fig. 19. Percent of Alaska Native Households in Quinhagak Hunting Seals, 1997 - 1998

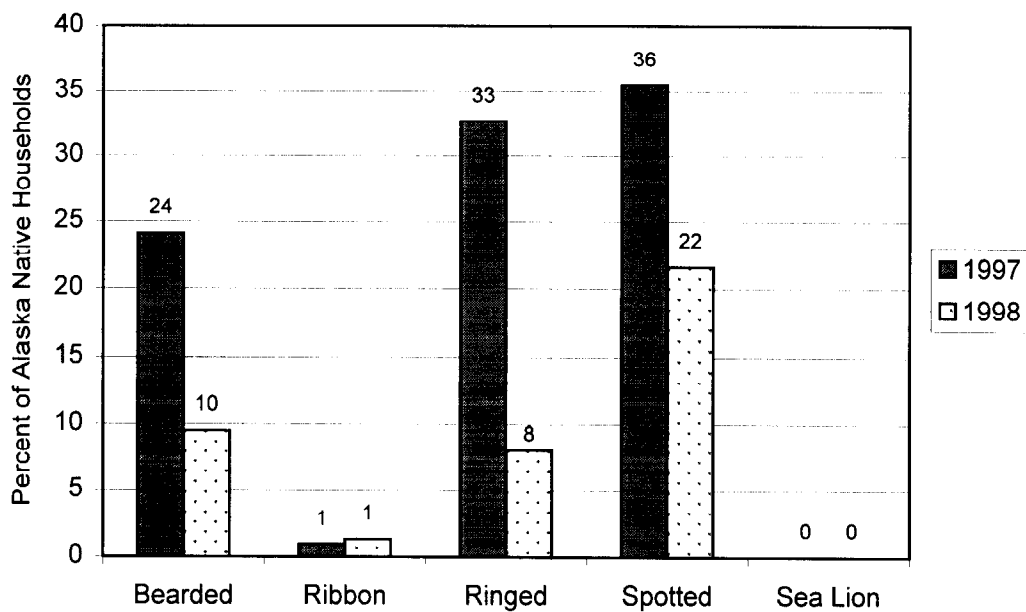


Fig. 20. Geographic Distribution of Bearded Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

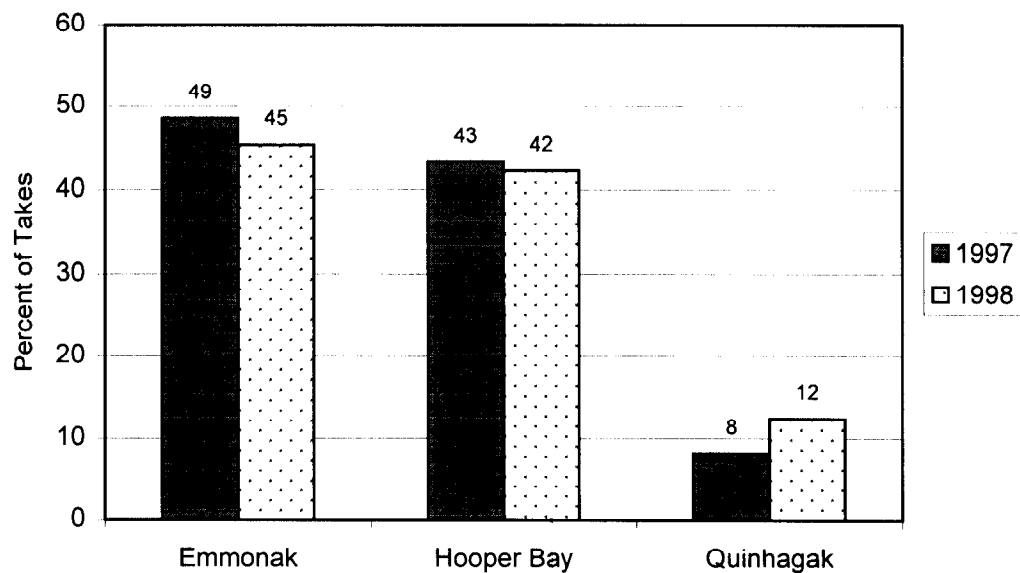


Fig. 21. Geographic Distribution of Ribbon Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

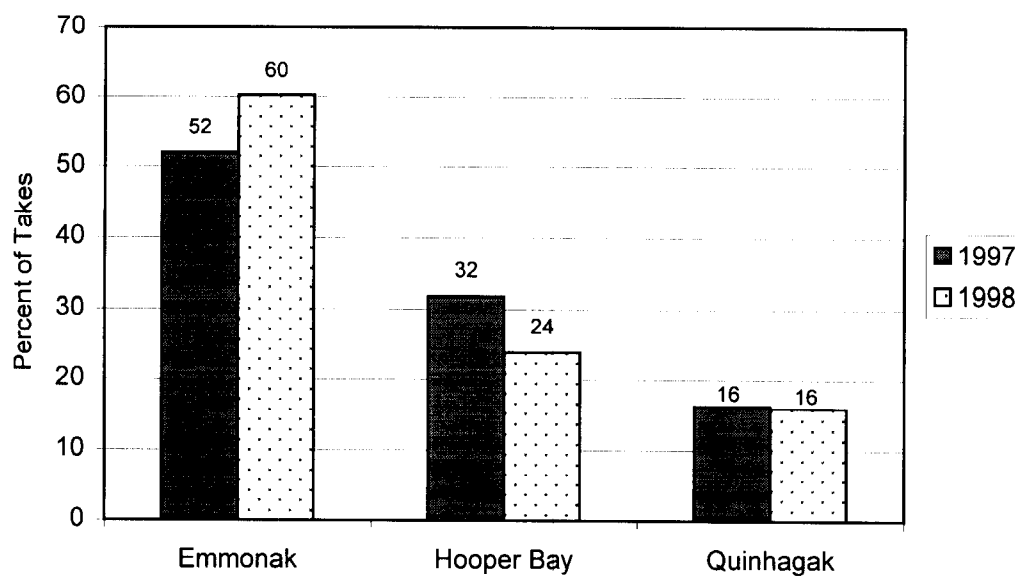


Fig. 22. Geographic Distribution of Ringed Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

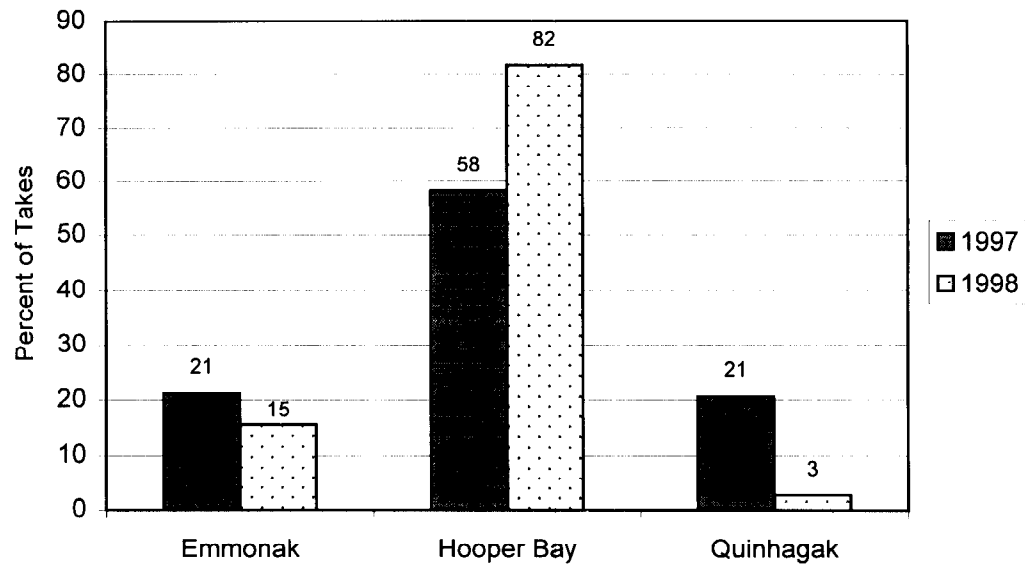


Fig. 23. Geographic Distribution of Spotted Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

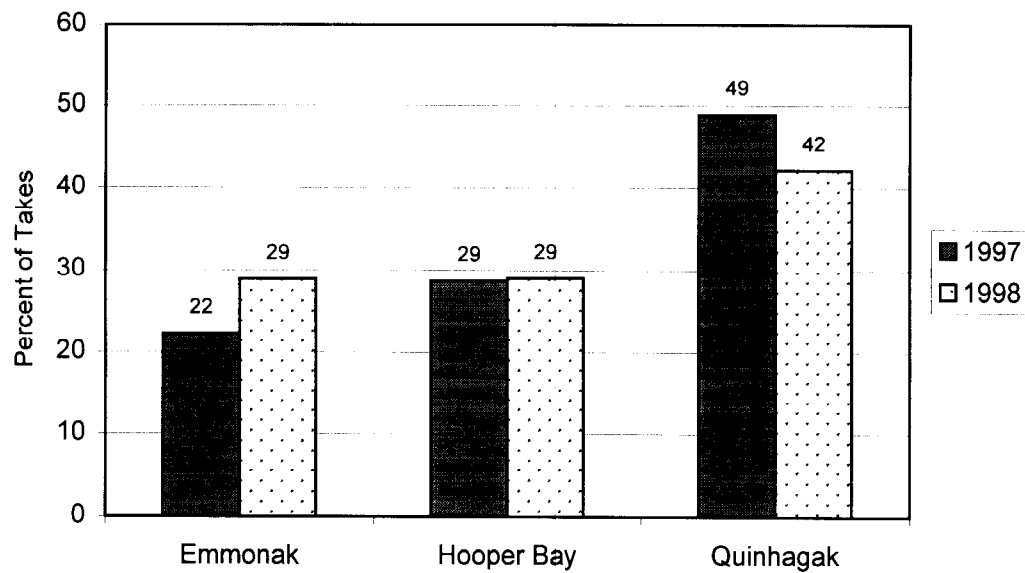


Fig. 24. Seasonality of Bearded Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

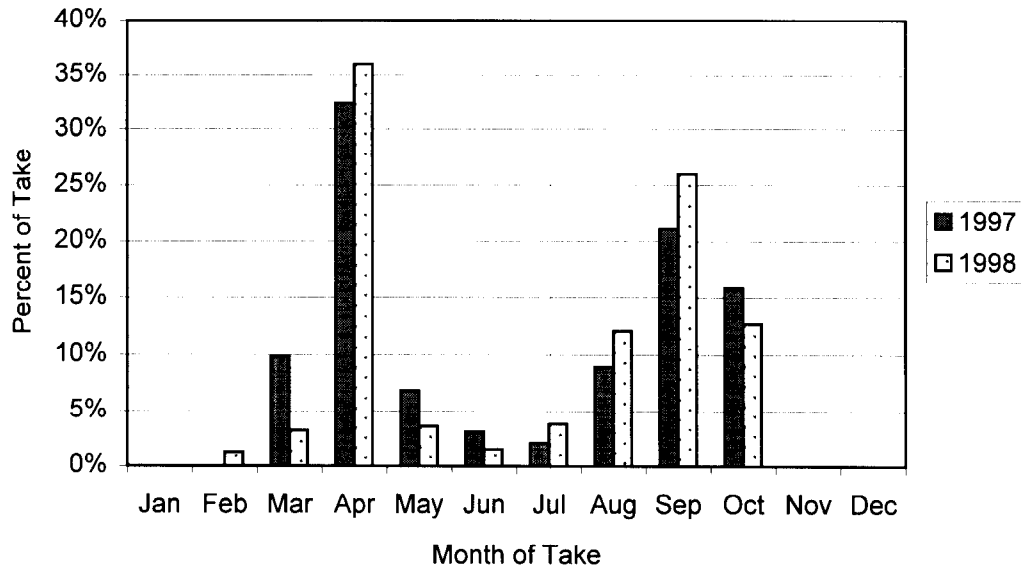


Fig. 25. Seasonality of Ribbon Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

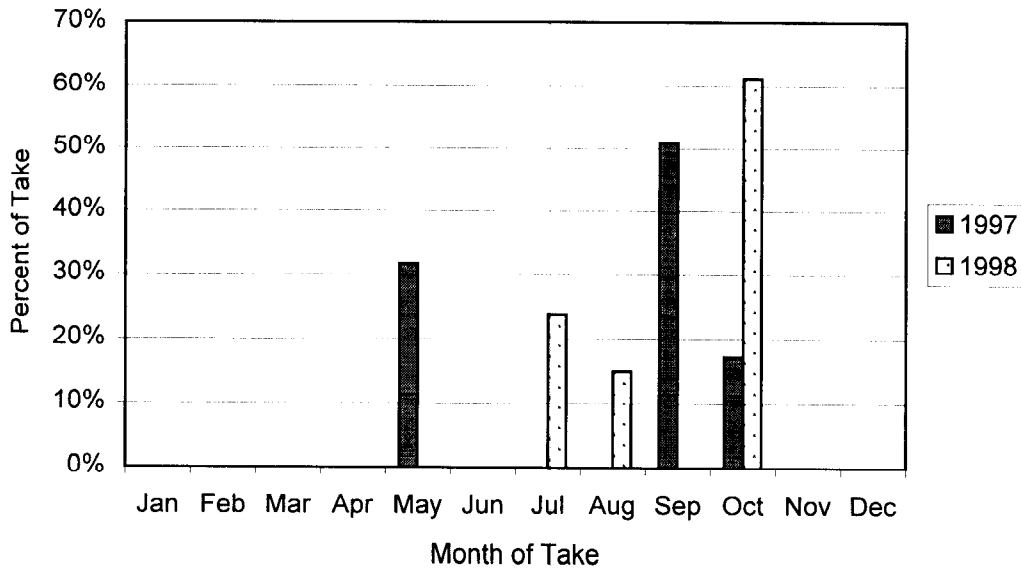


Fig. 26. Seasonality of Ringed Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

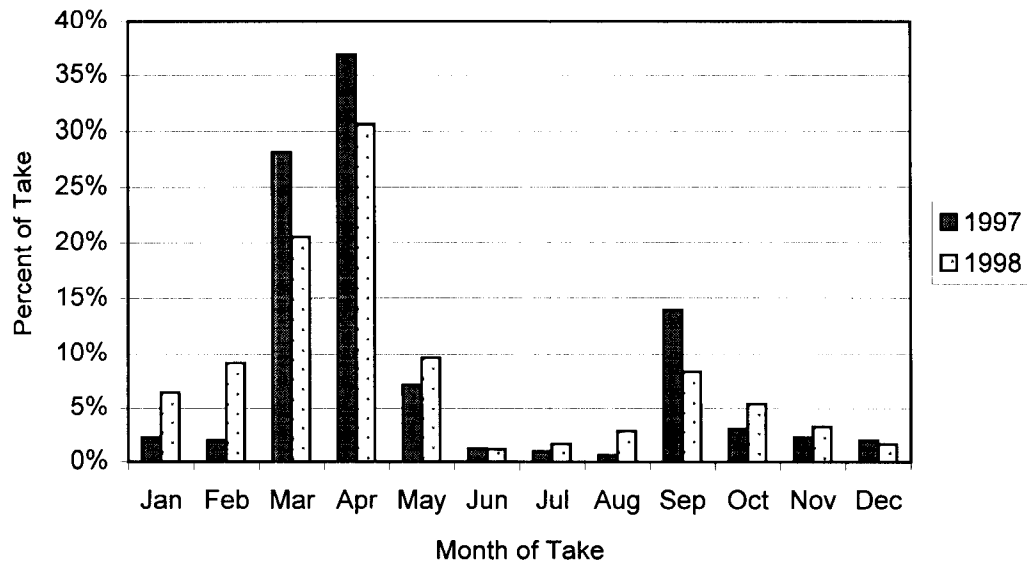


Fig. 27. Seasonality of Spotted Seal Takes by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

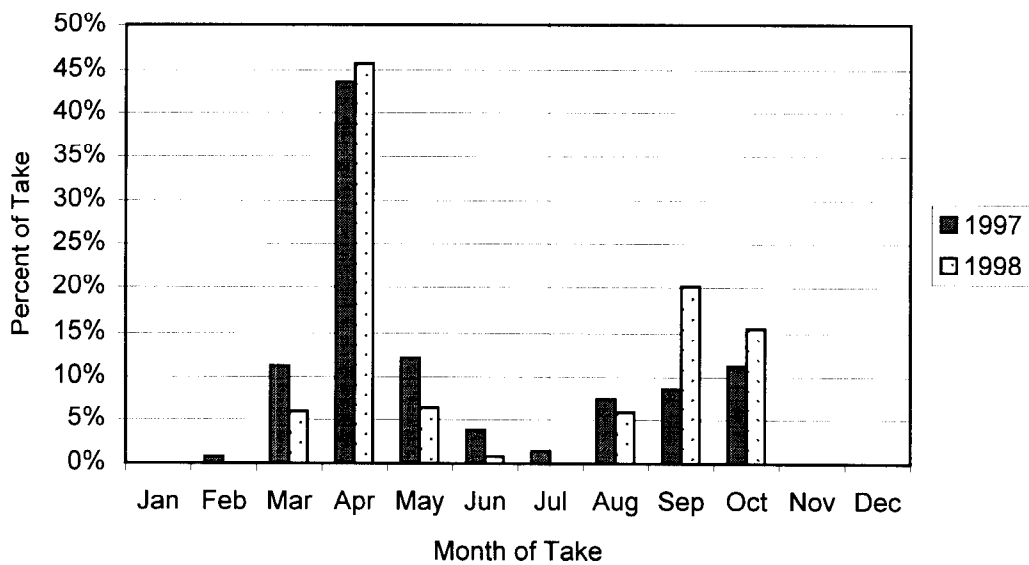


Fig. 28. Age of Bearded Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

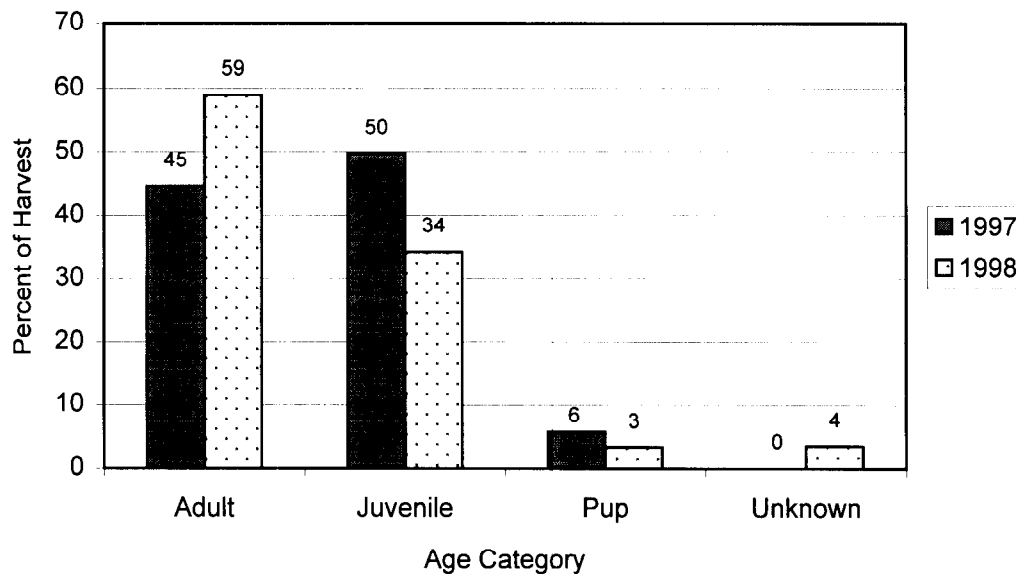


Fig. 29. Age of Ribbon Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

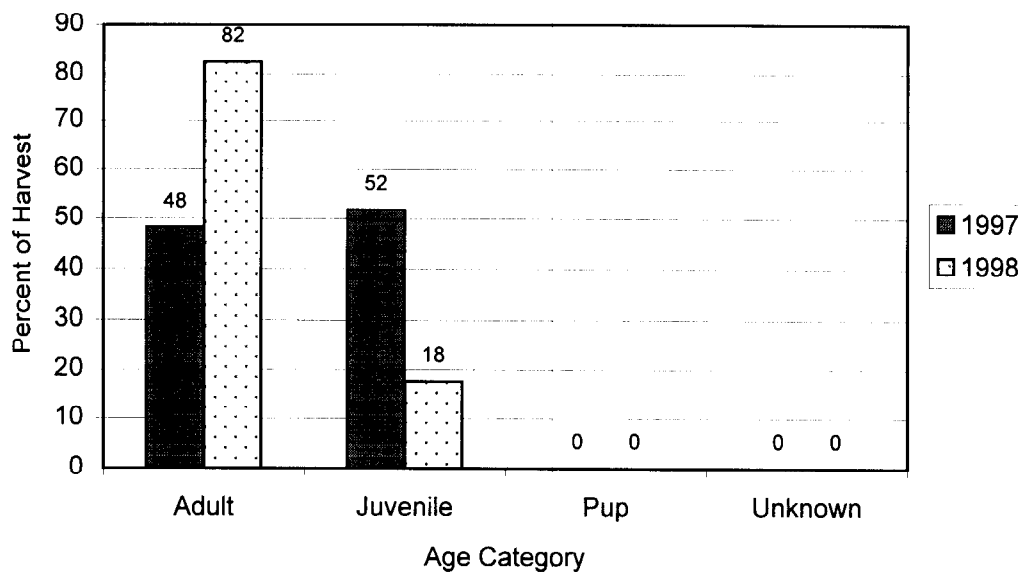


Fig. 30. Age of Ringed Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

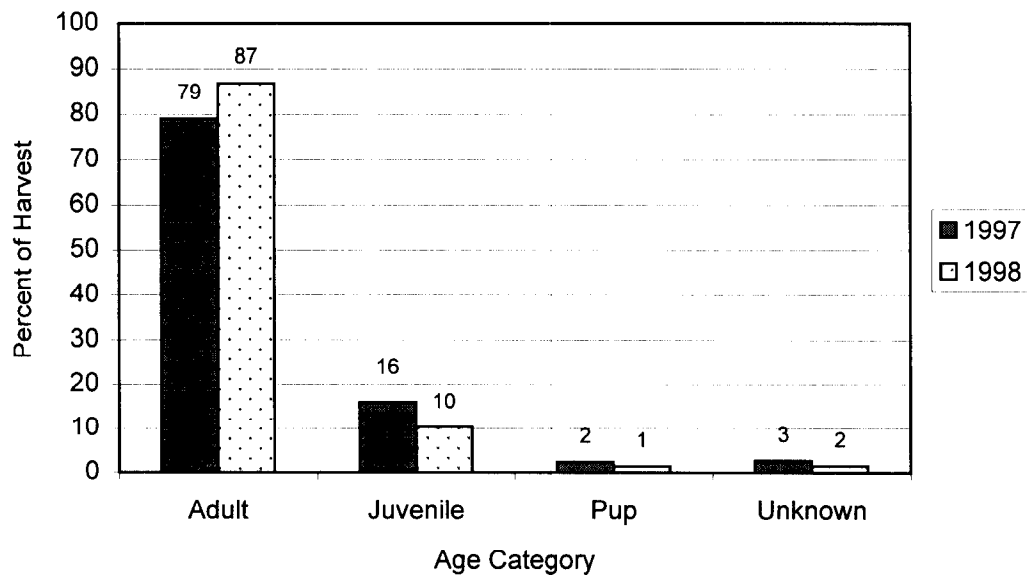


Fig. 31. Age of Spotted Seals Harvested by Alaska Natives in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

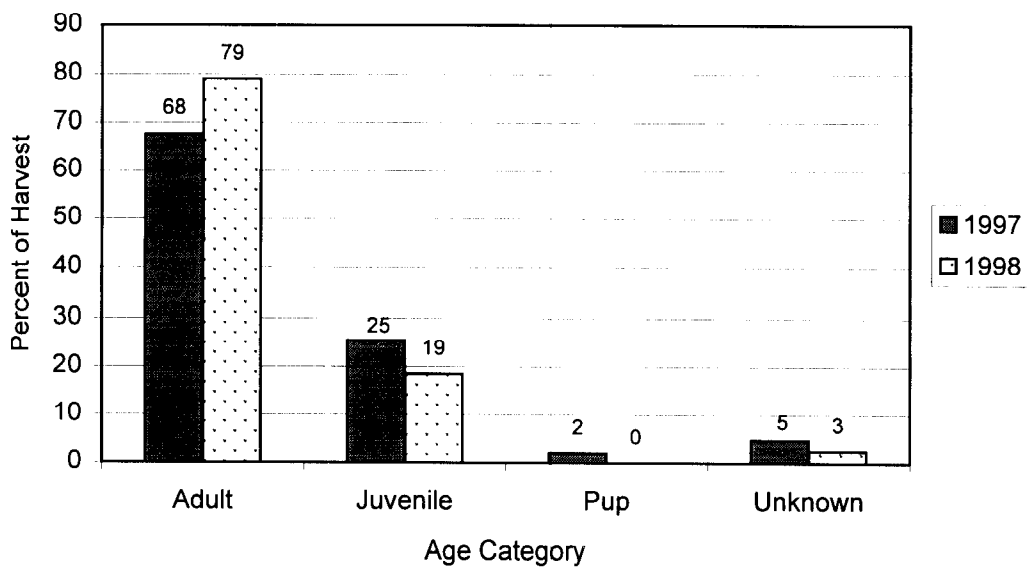


Fig. 32. Sex Composition of Bearded Seals Harvested by Alaska Native Households in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

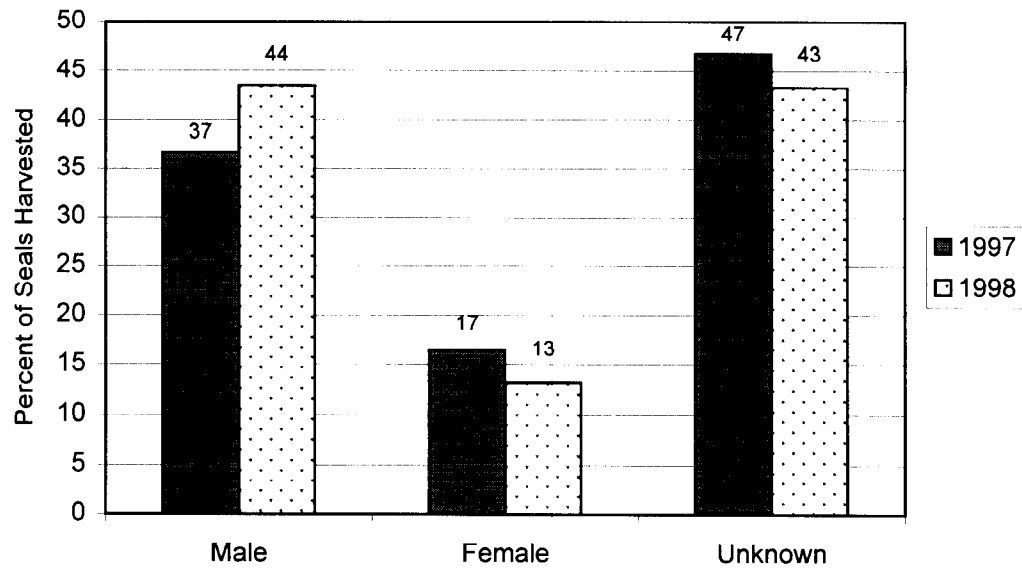


Fig. 33. Sex Composition of Ribbon Seals Harvested by Alaska Native Households in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

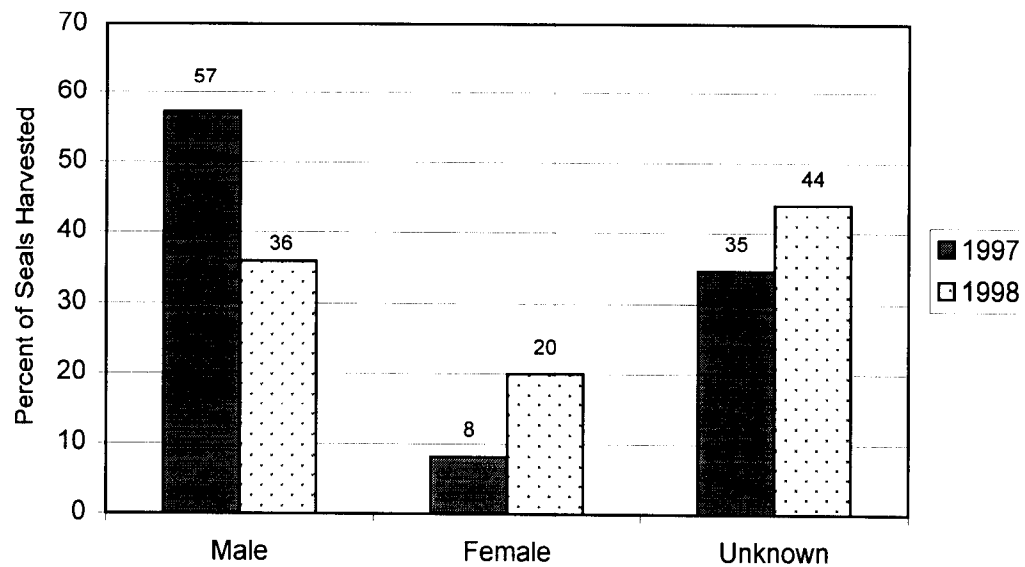


Fig. 34. Sex Composition of Ringed Seals Harvested by Alaska Native Households in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998

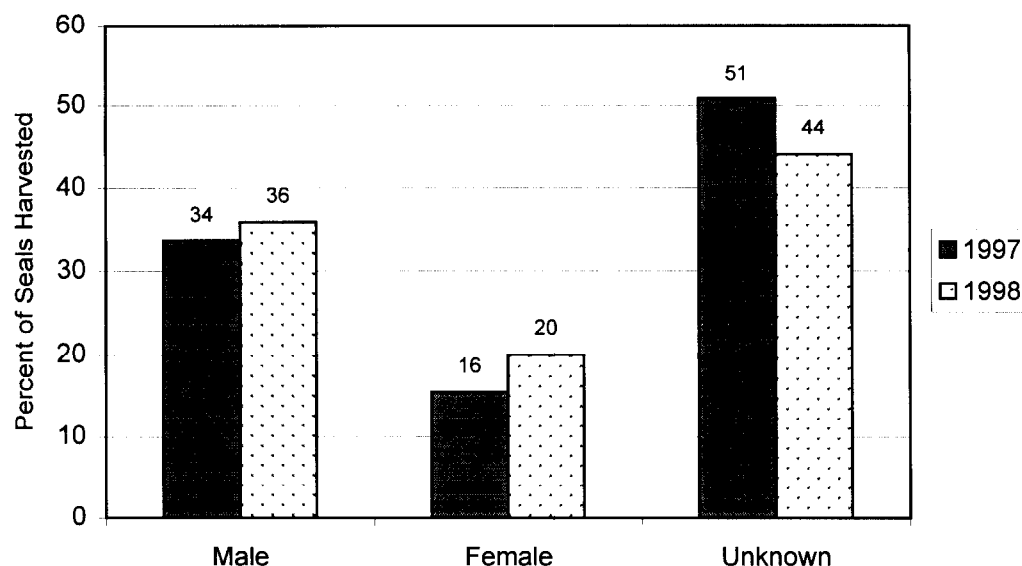
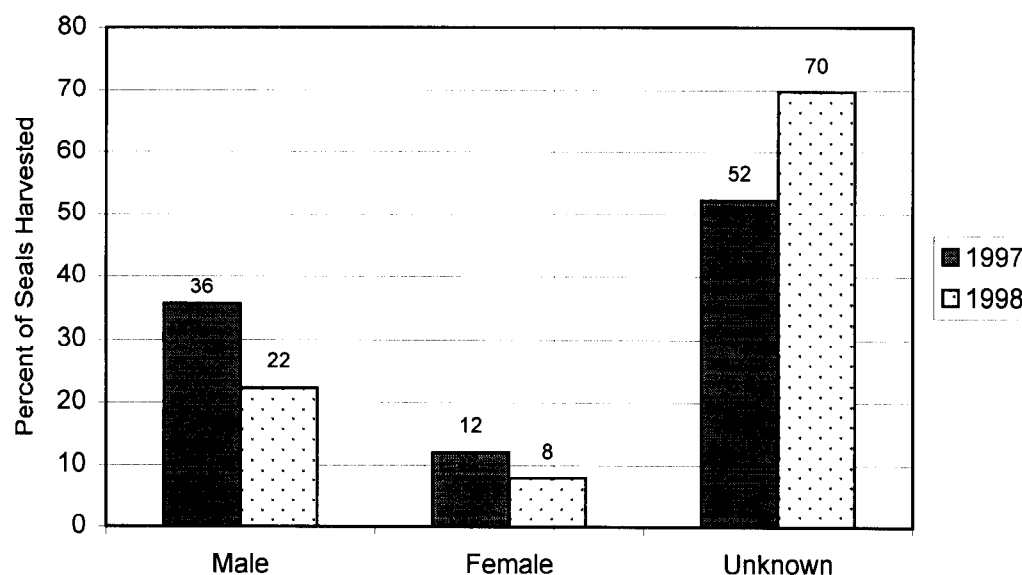


Fig. 35. Sex Composition of Spotted Seals Harvested by Alaska Native Households in Emmonak, Hooper Bay and Quinhagak, 1997 - 1998



APPENDIX A.

**SEAL AND SEAL LION HARVEST SURVEY INSTRUMENT USED FOR
HOUSEHOLD INTERVIEWS, 1999**

→ ARE ANY MEMBERS OF YOUR HOUSEHOLD ALASKA NATIVES ? YES: _____ NO: _____ If NO, the survey is finished.

→ HOW MANY PEOPLE LIVED IN YOUR HOUSEHOLD DURING 1998 ? _____

→ DID YOU OR MEMBERS OF YOUR HOUSEHOLD HUNT OR USE SEALS OR SEA LIONS IN 1998 ?

— NO - "Thank You" — YES -- WHICH TYPE OF SEALS DID YOU HUNT OR USE?
If NO, the survey is finished. If Yes, continue with the survey.

	YES	NO
BEARDED SEAL?		
RINGED SEAL?		
SPOTTED SEAL?		
RIBBON SEAL?		
SEA LION?		

(Fill out a survey form for each yes)

BEARDED SEAL (maklak, maklaaq, maklassuk, nemercuk)

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

In 1998, 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?		

BEARDED SEAL

IF YES TO QUESTION 2 OR 3 ABOVE, GO TO QUESTION 6.

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 1998	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN. 99	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?
[Enter the numbers by month.]

BEARDED SEAL (Detail)	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN. 99	UNKNOWN	TOTAL
ADULT														
MALE														
FEMALE														
UNKNOWN														
JUVENILE														
MALE														
FEMALE														
UNKNOWN														
PUP														
MALE														
FEMALE														
UNKNOWN														
UNKNOWN														
MALE														
FEMALE														
UNKNOWN														

During 1998, 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	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN. 99	UNKNOWN	TOTAL
STRUCK AND LOST														

Community: _____ () HHID: _____

Interviewer: _____

Date: _____
Alaska Dept. of Fish and Game, Mike Coffing 543-3100

RINGED SEAL (nayiq, negak)**PLEASE ANSWER THE FOLLOWING QUESTIONS IF YOU ANSWERED YES FOR RINGED SEAL**

In 1998, 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 RINGED SEALS WERE NOT HUNTED, COMPLETE FORMS FOR OTHER SPECIES WHICH WERE HUNTED OR USED**IF YES TO QUESTION 2 OR 3, GO TO QUESTION 6.**

6. How many ringed 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	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN.99	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)	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN.99	UNKNOWN	TOTAL
ADULT														
MALE														
FEMALE														
UNKNOWN														
JUVENILE														
MALE														
FEMALE														
UNKNOWN														
PUP														
MALE														
FEMALE														
UNKNOWN														
UNKNOWN														
MALE														
FEMALE														
UNKNOWN														
AGE														
MALE														
FEMALE														
UNKNOWN														

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	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN.99	UNKNOWN	TOTAL
STRUCK AND LOST														

Community: () HHID:

Interviewer: Date:

SPOTTED SEAL (issuriq)**PLEASE ANSWER THE FOLLOWING QUESTIONS IF YOU ANSWERED YES FOR SPOTTED SEAL**

In 1998, did you or your household:

Yes No

1. Use spotted seals (meat, 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 SPOTTED SEALS WERE NOT HUNTED, COMPLETE FORMS FOR OTHER SPECIES WHICH WERE HUNTED OR USED**IF YES TO QUESTION 2 OR 3, GO TO QUESTION 6.**

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.]

RIBBON SEAL	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN.99	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)	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN.99	UNKNOWN	TOTAL
ADULT														
MALE														
FEMALE														
UNKNOWN														
JUVENILE														
MALE														
FEMALE														
UNKNOWN														
PUP														
MALE														
FEMALE														
UNKNOWN														
UNKNOWN														
MALE														
FEMALE														
UNKNOWN														

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	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN.99	UNKNOWN	TOTAL
STRUCK AND LOST														

Community: () HHID:

Interviewer:

Date:

RIBBON SEAL (qasruliq)

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

In 1998, did you or your household:

Yes No

- | | | |
|---|--|--|
| 1. Use ribbon seals (meat, 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 RIBBON SEALS WERE NOT HUNTED, COMPLETE FORMS FOR OTHER SPECIES WHICH WERE HUNTED OR USED

IF YES TO QUESTION 2 OR 3, GO TO QUESTION 6.

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	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN. 99	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)	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN. 99	UNKNOWN	TOTAL
ADULT														
MALE														
FEMALE														
UNKNOWN														
JUVENILE														
MALE														
FEMALE														
UNKNOWN														
PUP														
MALE														
FEMALE														
UNKNOWN														
UNKNOWN														
MALE														
FEMALE														
UNKNOWN														

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	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN. 99	UNKNOWN	TOTAL
STRUCK AND LOST														

Community: _____ (_____) HHID: _____

Interviewer: _____ Date: _____

SEA LION (uginag)**PLEASE ANSWER THE FOLLOWING QUESTIONS IF YOU ANSWERED YES FOR SEA LION**

In 1998, did you or your household:

Yes No

- | | | |
|---|--|--|
| 1. Use sea lion (meat, hides, or oil)? | | |
| 2. Hunt sea lions? | | |
| 3. Kill and retrieve sea lions? | | |
| 4. Receive sea lion from other households or communities? | | |
| 5. Give sea lion to other households or communities? | | |

IF SEA LIONS WERE NOT HUNTED, COMPLETE FORMS FOR OTHER SPECIES WHICH WERE HUNTED OR USED**IF YES TO QUESTION 2 OR 3, GO TO QUESTION 6.**

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 LIONS	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN. 99	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?

[Enter the numbers by month.]

SEA LIONS (Detail)	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN. 99	UNKNOWN	TOTAL
ADULT														
MALE														
FEMALE														
UNKNOWN														
JUVENILE														
MALE														
FEMALE														
UNKNOWN														
PUP														
MALE														
FEMALE														
UNKNOWN														
UNKNOWN														
MALE														
FEMALE														
UNKNOWN														

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 LIONS	FEB. 98	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOVEM.	DECEM.	JAN. 99	UNKNOWN	TOTAL
STRUCK AND LOST														

Community: _____ HHID: _____

Interviewer: _____ Date: _____

APPENDIX B

TOTAL SUBSISTENCE TAKE OF SEAL AND SEA LION

BY THREE COMMUNITIES IN THE

YUKON-KUSKOKWIM DELTA REGION

1998-99

**APPENDIX B. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES:
EMMONAK, HOOPER BAY AND QUINHAGAK, 1998/99**

		<u>Active</u>	<u>Other</u>	<u>Total</u>
<i>SAMPLING DESIGN:</i>	Total Native Households	164	295	459
<i>STRATIFIED</i>	Surveyed Households	121	141	262
	Sampling Fraction	73.8%	47.8%	57.1%
	Sample Household Members	554	633	1187
	Estimated Household Members	749.8	1,328.6	2,078.5

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	<u>Seals</u>				<u>Sea Lion</u>
	<u>Bearded</u>	<u>Ribbon</u>	<u>Ringed</u>	<u>Spotted</u>	
Used	42.4%	2.5%	43.0%	32.7%	0.0%
Hunted	25.1%	2.8%	29.3%	21.3%	0.0%
Harvested	17.5%	1.6%	25.2%	17.6%	0.0%
Received	31.2%	1.2%	24.7%	20.3%	0.0%
Gave Away	12.8%	0.9%	15.4%	11.8%	0.0%

Estimated Community Harvest and Take (Expanded):

	<u>Seals</u>				<u>Sea Lion</u>
	<u>Bearded</u>	<u>Ribbon</u>	<u>Ringed</u>	<u>Spotted</u>	
Total Number Harvested	149.9	7.5	448.5	159.4	0.0
Total Number Struck and Lost	<u>24.1</u>	<u>1.3</u>	<u>13.7</u>	<u>14.5</u>	<u>0.0</u>
Total Number Taken	174.1	8.8	462.1	173.9	0.0
Number Harvested Per Capita	0.07	0.00	0.22	0.08	0.00

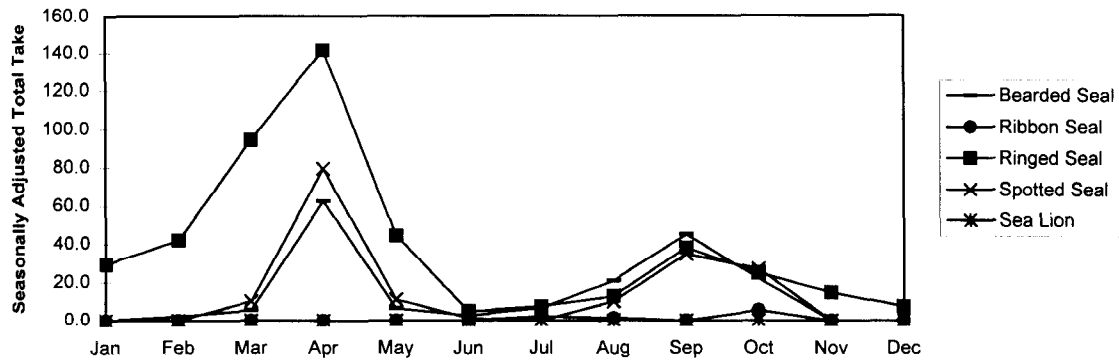
SEAL AND SEA LION HARVEST BY AGE AND SEX - COMMUNITY ESTIMATE (EXPANDED)

	<u>Seals</u>								<u>Sea Lion</u>	
	<u>Bearded</u>		<u>Ribbon</u>		<u>Ringed</u>		<u>Spotted</u>			
	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>
Adult Male	44.1	29.4%	1.3	17.6%	135.7	30.3%	21.0	13.2%	0.0	---
Adult Female	13.0	8.7%	0.0	0.0%	80.9	18.0%	12.6	7.9%	0.0	---
Adult Unknown Sex	31.2	20.8%	4.8	64.8%	172.7	38.5%	92.3	57.9%	0.0	---
Juvenile Male	18.9	12.6%	1.3	17.6%	20.7	4.6%	14.6	9.1%	0.0	---
Juvenile Female	3.9	2.6%	0.0	0.0%	8.8	2.0%	0.0	0.0%	0.0	---
Juvenile Unknown Sex	28.5	19.0%	0.0	0.0%	16.6	3.7%	15.0	9.4%	0.0	---
Pup Male	2.1	1.4%	0.0	0.0%	2.1	0.5%	0.0	0.0%	0.0	---
Pup Female	2.9	1.9%	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%	4.2	0.9%	0.0	0.0%	0.0	---
Male Unknown Age	0.0	0.0%	0.0	0.0%	2.6	0.6%	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	5.3	3.5%	0.0	0.0%	4.1	0.9%	3.9	2.5%	0.0	---
Total	149.9	100.0%	7.5	100.0%	448.5	100.0%	159.4	100.0%	0.0	---

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, 1999.

**APPENDIX B. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES:
EMMONAK, HOOPER BAY AND QUINHAGAK, 1998/99 (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	1	2	27	4	2	5	16	25	14	0	0	0	96
Struck & Lost	0	0	1	5	0	0	0	0	6	2	0	0	0	14
Total Take	0	1	3	32	4	2	5	16	31	16	0	0	0	110
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	2.1	3.4	52.1	6.3	2.6	6.6	21.1	36.3	19.4	0.0	0.0	0.0	149.9
Struck & Lost	0.0	0.0	2.1	10.5	0.0	0.0	0.0	0.0	8.9	2.6	0.0	0.0	0.0	24.1
Total Take	0.0	2.1	5.5	62.6	6.3	2.6	6.6	21.1	45.2	22.1	0.0	0.0	0.0	174.1
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	2.1	3.4	52.1	6.3	2.6	6.6	21.1	36.3	19.4	0.0	0.0		149.9
Struck & Lost	0.0	0.0	2.1	10.5	0.0	0.0	0.0	0.0	8.9	2.6	0.0	0.0		24.1
Total Take	0.0	2.1	5.5	62.6	6.3	2.6	6.6	21.1	45.2	22.1	0.0	0.0		174.1
Total Take (%)	0.0%	1.2%	3.2%	36.0%	3.6%	1.5%	3.8%	12.1%	26.0%	12.7%	0.0%	0.0%		100.0%
Cum. Take	0.0	2.1	7.6	70.3	76.5	79.2	85.7	106.8	152.0	174.1	174.1	174.1		
Cum. Take (%)	0.0%	1.2%	4.4%	40.4%	44.0%	45.5%	49.3%	61.4%	87.3%	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	0	0	1	1	0	3	0	0	0	5
Struck & Lost	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Total Take	0	0	0	0	0	0	1	1	0	4	0	0	0	6
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.3	0.0	4.1	0.0	0.0	0.0	7.5
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	1.3
Total Take	0.0	0.0	0.0	0.0	0.0	2.1	2.1	1.3	0.0	5.4	0.0	0.0	0.0	8.8
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.3	0.0	4.1	0.0	0.0		7.5
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0		1.3
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.3	0.0	5.4	0.0	0.0		8.8
Total Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	23.9%	15.0%	0.0%	61.2%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	2.1	3.4	3.4	8.8	8.8	8.8		
Cum. Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	23.9%	38.8%	38.8%	100.0%	100.0%	100.0%		

NOTE: Numbers on these tables and figures reflect a study period from March 1998 through February 1999.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, 1999.

**APPENDIX B. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES:
EMMONAK, HOOPER BAY AND QUINHAGAK, 1998/99 (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	12	19	40	63	19	2	3	7	22	13	6	3	25	234	
Struck & Lost	0	0	2	1	0	0	0	1	3	1	0	0	0	8	
Total Take	12	19	42	64	19	2	3	8	25	14	6	3	25	242	
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)															
Harvest	25.2	36.8	79.2	122.8	38.6	4.2	6.3	10.8	32.1	21.1	12.6	6.3	52.5	448.5	
Struck & Lost	0.0	0.0	4.2	1.3	0.0	0.0	0.0	1.3	4.7	2.1	0.0	0.0	0.0	13.7	
Total Take	25.2	36.8	83.4	124.1	38.6	6.3	6.3	12.1	36.8	23.2	12.6	6.3	52.5	462.1	
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)															
Harvest	29.4	42.0	90.4	140.2	44.5	4.9	7.3	11.5	33.5	22.9	14.7	7.3		448.5	
Struck & Lost	0.0	0.0	4.2	1.3	0.0	0.0	0.0	1.3	4.7	2.1	0.0	0.0		13.7	
Total Take	29.4	42.0	94.6	141.5	44.5	4.9	7.3	12.8	38.2	25.0	14.7	7.3		462.1	
Total Take (%)	6.4%	9.1%	20.5%	30.6%	9.6%	1.1%	1.6%	2.8%	8.3%	5.4%	3.2%	1.6%		100.0%	
Cum. Take	29.4	71.4	165.9	307.4	351.9	356.8	364.1	376.9	415.1	440.1	454.8	462.1			
Cum. Take (%)	6.4%	15.4%	35.9%	66.5%	76.1%	77.2%	78.8%	81.6%	89.8%	95.2%	98.4%	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	6	47	7	1	0	7	19	15	0	0	0	102	
Struck & Lost	0	0	0	3	0	0	0	0	4	3	0	0	0	10	
Total Take	0	0	6	50	7	1	0	7	23	18	0	0	0	112	
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)															
Harvest	0.0	0.0	10.2	75.2	10.9	1.3	0.0	10.0	28.9	22.8	0.0	0.0	0.0	159.4	
Struck & Lost	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	6.0	4.2	0.0	0.0	0.0	14.5	
Total Take	0.0	0.0	10.2	79.5	10.9	0.0	0.0	10.0	34.9	26.9	0.0	0.0	0.0	173.9	
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)															
Harvest	0.0	0.0	10.2	75.2	10.9	1.3	0.0	10.0	28.9	22.8	0.0	0.0		159.4	
Struck & Lost	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	6.0	4.2	0.0	0.0		14.5	
Total Take	0.0	0.0	10.2	79.5	10.9	1.3	0.0	10.0	34.9	26.9	0.0	0.0		173.9	
Total Take (%)	0.0%	0.0%	5.9%	45.7%	6.3%	0.8%	0.0%	5.8%	20.1%	15.5%	0.0%	0.0%		100.0%	
Cum. Take	0.0	0.0	10.2	89.8	100.7	102.0	102.0	112.0	146.9	173.9	173.9	173.9			
Cum. Take (%)	0.0%	0.0%	5.9%	51.6%	57.9%	58.7%	58.7%	64.4%	84.5%	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 March 1998 through February 1999.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, 1999.

APPENDIX C.

SUBSISTENCE TAKES OF SEAL AND SEA LION

BY COMMUNITY, YUKON-KUSKOKWIM DELTA REGION

1998-99

Emmonak.....	4
Hooper Bay.....	4
Quinhagak.....	4

Appendix C. TABLE 1. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Emmonak, 1998/99

<i>SAMPLING DESIGN:</i>		<u>Active</u>	<u>Other</u>	<u>Total</u>
<i>TWO-STRATA</i>	Total Native Households	104	59	163
	Surveyed Households	79	21	100
	Sampling Fraction	76.0%	35.6%	61.3%
	Sample Household Members	371	90	461
	Estimated Household Members	488.4	252.9	741.3

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Used	47.5%	2.4%	41.9%	22.8%	0.0%
Hunted	25.8%	3.2%	24.3%	18.7%	0.0%
Harvested	23.4%	2.4%	21.9%	18.7%	0.0%
Received	37.0%	0.0%	26.5%	10.7%	0.0%
Gave Away	22.7%	1.6%	22.8%	17.9%	0.0%

Estimated Community Harvest and Take (Expanded):

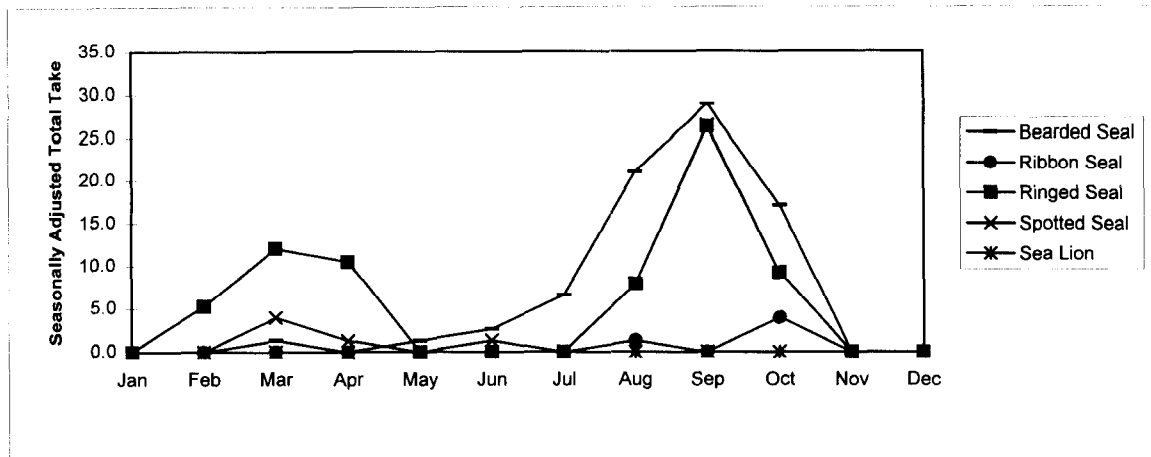
	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Total Number Harvested	72.4	3.9	66.0	44.9	0.0
Total Number Struck and Lost	6.6	1.3	5.3	5.3	0.0
Total Number Taken	79.0	5.3	71.3	50.2	0.0
Number Harvested Per Capita	0.10	0.01	0.09	0.06	0.00

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

	Seals								Sea Lion	
	Bearded		Ribbon		Ringed		Spotted		Lion	
	Number	%	Number	%	Number	%	Number	%	Number	%
Adult Male	10.5	14.5%	1.3	33.3%	11.8	18.0%	3.9	8.8%	0.0	---
Adult Female	5.3	7.3%	0.0	0.0%	5.3	8.0%	1.3	2.9%	0.0	---
Adult Unknown Sex	19.7	27.3%	1.3	33.3%	26.3	39.9%	19.7	43.9%	0.0	---
Juvenile Male	10.5	14.5%	1.3	33.3%	8.1	12.2%	5.3	11.7%	0.0	---
Juvenile Female	3.9	5.5%	0.0	0.0%	5.3	8.0%	0.0	0.0%	0.0	---
Juvenile Unknown Sex	17.1	23.6%	0.0	0.0%	3.9	6.0%	10.7	23.8%	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%	2.6	4.0%	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	5.3	7.3%	0.0	0.0%	2.6	4.0%	3.9	8.8%	0.0	---
Total	72.4	100.0%	3.9	100.0%	66.0	100.0%	44.9	100.0%	0.0	---

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, with assistance from the community of Emmonak, 1999.

Table 1. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Emmonak, 1999/99 (cont.)
SEASONALLY ADJUSTED TAKE BY MONTH



BEARDED SEAL HARVEST BY MONTH													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)													
Harvest	0	0	1	0	1	2	5	16	19	11	0	0	0
Struck & Lost	0	0	0	0	0	0	0	0	3	2	0	0	0
Total Take	0	0	1	0	1	2	5	16	22	13	0	0	0
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)													
Harvest	0.0	0.0	1.3	0.0	1.3	2.6	6.6	21.1	25.0	14.5	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	2.6	0.0	0.0	0.0
Total Take	0.0	0.0	1.3	0.0	1.3	2.6	6.6	21.1	29.0	17.1	0.0	0.0	0.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)													
Harvest	0.0	0.0	1.3	0.0	1.3	2.6	6.6	21.1	25.0	14.5	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	2.6	0.0	0.0	0.0
Total Take	0.0	0.0	1.3	0.0	1.3	2.6	6.6	21.1	29.0	17.1	0.0	0.0	0.0
Total Take (%)	0.0%	0.0%	1.7%	0.0%	1.7%	3.3%	8.3%	26.7%	36.7%	21.7%	0.0%	0.0%	0.0%
Cum. Take	0.0	0.0	1.3	1.3	2.6	5.3	11.8	32.9	61.9	79.0	79.0	79.0	79.0
Cum. Take (%)	0.0%	0.0%	1.7%	1.7%	3.3%	6.7%	15.0%	41.7%	78.3%	100.0%	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
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)													
Harvest	0	0	0	0	0	0	0	1	0	2	0	0	0
Struck & Lost	0	0	0	0	0	0	0	0	0	1	0	0	0
Total Take	0	0	0	0	0	0	0	1	0	3	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	1.3	0.0	2.6	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	1.3	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	3.9	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	1.3	0.0	2.6	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	1.3	0.0	0.0	0.0
Total Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	3.9	0.0	0.0	0.0
Total Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	75.0%	0.0%	0.0%	0.0%
Cum. Take	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3	5.3	5.3	5.3	5.3
Cum. Take (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	25.0%	100.0%	100.0%	100.0%	100.0%

NOTE: Numbers on these tables and figures reflect a study period from March 1998 through February 1999.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, with assistance from the community of Emmonak, 1999.

Table 1. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Emmonak, 1998/99

RINGED SEAL HARVEST BY MONTH													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)													
Harvest	0	4	8	7	0	0	0	5	18	7	0	0	0
Struck & Lost	0	0	0	1	0	0	0	1	2	0	0	0	0
Total Take	0	4	8	8	0	0	0	6	20	7	0	0	0
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)													
Harvest	0.0	5.3	12.0	9.2	0.0	0.0	0.0	6.6	23.7	9.2	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	1.3	0.0	0.0	0.0	1.3	2.6	0.0	0.0	0.0	0.0
Total Take	0.0	5.3	12.0	10.5	0.0	0.0	0.0	7.9	26.3	9.2	0.0	0.0	0.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)													
Harvest	0.0	5.3	12.0	9.2	0.0	0.0	0.0	6.6	23.7	9.2	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	1.3	0.0	0.0	0.0	1.3	2.6	0.0	0.0	0.0	0.0
Total Take	0.0	5.3	12.0	10.5	0.0	0.0	0.0	7.9	26.3	9.2	0.0	0.0	0.0
Total Take (%)	0.0%	7.4%	16.9%	14.8%	0.0%	0.0%	0.0%	11.1%	36.9%	12.9%	0.0%	0.0%	0.0%
Cum. Take	0.0	5.3	17.3	27.8	27.8	27.8	27.8	35.7	62.1	71.3	71.3	71.3	71.3
Cum. Take (%)	0.0%	7.4%	24.3%	39.0%	39.0%	39.0%	39.0%	50.1%	87.1%	100.0%	100.0%	100.0%	100.0%
SPOTTED SEAL HARVEST BY MONTH													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)													
Harvest	0	0	3	1	0	1	0	6	16	6	0	0	0
Struck & Lost	0	0	0	0	0	0	0	0	3	1	0	0	0
Total Take	0	0	3	1	0	1	0	6	19	7	0	0	0
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)													
Harvest	0.0	0.0	3.9	1.3	0.0	1.3	0.0	7.9	22.6	7.9	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	1.3	0.0	0.0	0.0
Total Take	0.0	0.0	3.9	1.3	0.0	1.3	0.0	7.9	26.5	9.2	0.0	0.0	0.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)													
Harvest	0.0	0.0	3.9	1.3	0.0	1.3	0.0	7.9	22.6	7.9	0.0	0.0	0.0
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	1.3	0.0	0.0	0.0
Total Take	0.0	0.0	3.9	1.3	0.0	1.3	0.0	7.9	26.5	9.2	0.0	0.0	0.0
Total Take (%)	0.0%	0.0%	7.9%	2.6%	0.0%	2.6%	0.0%	15.7%	52.8%	18.4%	0.0%	0.0%	0.0%
Cum. Take	0.0	0.0	3.9	5.3	5.3	6.6	6.6	14.5	41.0	50.2	50.2	50.2	50.2
Cum. Take (%)	0.0%	0.0%	7.9%	10.5%	10.5%	13.1%	13.1%	28.8%	81.6%	100.0%	100.0%	100.0%	100.0%
SEA LION HARVEST BY MONTH													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown Month
REPORTED HARVEST AND TAKE BY SAMPLED HOUSEHOLDS (UNEXPANDED)													
Harvest	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
Total Take	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
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
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	0.0
Cum. Take (%)	---	---	---	---	---	---	---	---	---	---	---	---	---

NOTE: Numbers on these tables and figures reflect a study period from March 1998 through February 1999.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, with assistance from the community of Emmonak, 1999.

Appendix C. Table 2. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Hooper Bay, 1998/99

<i>SAMPLING DESIGN:</i>	Total Native Households	189
<i>RANDOM</i>	Surveyed Households	90
	Sampling Fraction	47.6%
	Sample Household Members	422
	Estimated Household Members	886.2

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Used	51.1%	3.3%	58.9%	32.2%	0.0%
Hunted	33.3%	3.3%	45.6%	23.3%	0.0%
Harvested	17.8%	1.1%	37.8%	14.4%	0.0%
Received	34.4%	2.2%	30.0%	18.9%	0.0%
Gave Away	7.8%	0.0%	15.6%	3.3%	0.0%

Estimated Community Harvest and Take (Expanded):

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Total Number Harvested	58.8	2.1	369.6	48.3	0.0
Total Number Struck and Lost	14.7	0.0	8.4	2.1	0.0
Total Number Taken	73.5	2.1	378.0	50.4	0.0
Number Harvested Per Capita	0.07	0.00	0.42	0.05	0.00

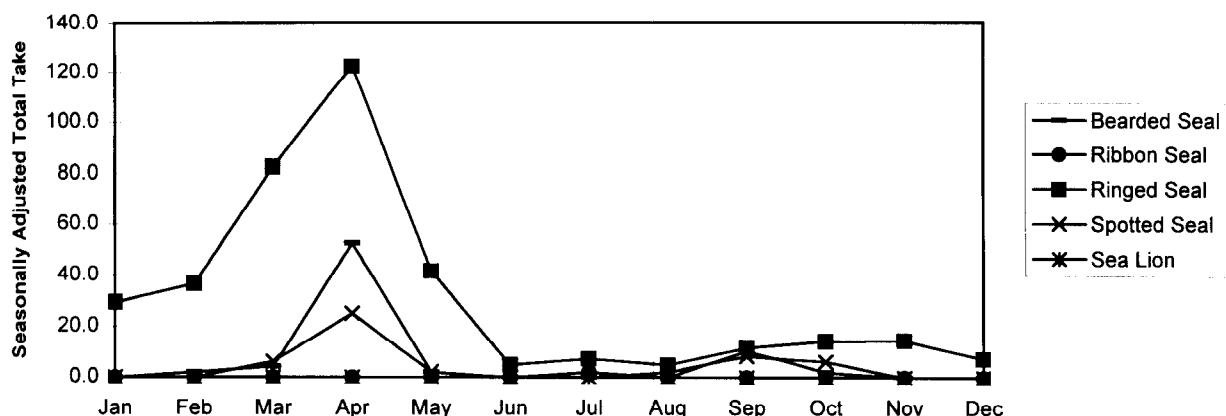
SEAL AND SEA LION HARVEST BY AGE AND SEX - COMMUNITY ESTIMATE (EXPANDED)

	Seals								Sea Lion	
	Bearded		Ribbon		Ringed		Spotted			
	Number	%	Number	%	Number	%	Number	%	Number	%
Adult Male	33.6	57.1%	0.0	0.0%	123.9	33.5%	12.6	26.1%	0.0	---
Adult Female	6.3	10.7%	0.0	0.0%	75.6	20.5%	8.4	17.4%	0.0	---
Adult Unknown Sex	4.2	7.1%	2.1	100.0%	140.7	38.1%	21.0	43.5%	0.0	---
Juvenile Male	8.4	14.3%	0.0	0.0%	12.6	3.4%	6.3	13.0%	0.0	---
Juvenile Female	0.0	0.0%	0.0	0.0%	2.1	0.6%	0.0	0.0%	0.0	---
Juvenile Unknown Sex	4.2	7.1%	0.0	0.0%	8.4	2.3%	0.0	0.0%	0.0	---
Pup Male	2.1	3.6%	0.0	0.0%	2.1	0.6%	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%	4.2	1.1%	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	58.8	100.0%	2.1	100.0%	369.6	100.0%	48.3	100.0%	0.0	---

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, with assistance from the community of Hooper Bay, 1999.

Table 2. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Hooper Bay, 1999/99 (cont.)

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	1	1	20	1	0	0	0	4	1	0	0	0	28
Struck & Lost	0	0	1	5	0	0	0	0	1	0	0	0	0	7
Total Take	0	1	2	25	1	0	0	0	5	1	0	0	0	35
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	2.1	2.1	42.0	2.1	0.0	0.0	0.0	8.4	2.1	0.0	0.0	0.0	58.8
Struck & Lost	0.0	0.0	2.1	10.5	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	14.7
Total Take	0.0	2.1	4.2	52.5	2.1	0.0	0.0	0.0	10.5	2.1	0.0	0.0	0.0	73.5
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	2.1	2.1	42.0	2.1	0.0	0.0	0.0	8.4	2.1	0.0	0.0	0.0	58.8
Struck & Lost	0.0	0.0	2.1	10.5	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	14.7
Total Take	0.0	2.1	4.2	52.5	2.1	0.0	0.0	0.0	10.5	2.1	0.0	0.0	0.0	73.5
Total Take (%)	0.0%	2.9%	5.7%	71.4%	2.9%	0.0%	0.0%	0.0%	14.3%	2.9%	0.0%	0.0%	0.0%	100.0%
Cum. Take	0.0	2.1	6.3	58.8	60.9	60.9	60.9	60.9	71.4	73.5	73.5	73.5	73.5	
Cum. Take (%)	0.0%	2.9%	8.6%	80.0%	82.9%	82.9%	82.9%	82.9%	97.1%	100.0%	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	0	1	0	0	0	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	1	0	0	0	0	0	0	1
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	2.1
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	2.1	0.0	0.0	0.0	0.0	0.0	0.0	2.1
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	2.1
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	2.1	0.0	0.0	0.0	0.0	0.0	0.0	2.1
Total Take (%)	0.0%	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	0.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
Cum. Take (%)	0.0%	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 March 1998 through February 1999.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, with assistance from the community of Hooper Bay, 1999.

Table 2. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Hooper Bay, 1998/99 (cont.)

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	12	15	32	50	17	2	3	2	4	5	6	3	25	176
Struck & Lost	0	0	2	0	0	0	0	0	1	1	0	0	0	4
Total Take	12	15	34	50	17	2	3	2	5	6	6	3	25	180
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	25.2	31.5	67.2	105.0	35.7	4.2	6.3	4.2	8.4	10.5	12.6	6.3	52.5	369.6
Struck & Lost	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	2.1	2.1	0.0	0.0	0.0	8.4
Total Take	25.2	31.5	71.4	105.0	35.7	4.2	6.3	4.2	10.5	12.6	12.6	6.3	52.5	378.0
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	29.4	36.7	78.3	122.4	41.6	4.9	7.3	4.9	9.8	12.2	14.7	7.3		369.6
Struck & Lost	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	2.1	2.1	0.0	0.0		8.4
Total Take	29.4	36.7	82.5	122.4	41.6	4.9	7.3	4.9	11.9	14.3	14.7	7.3		378.0
Total Take (%)	7.8%	9.7%	21.8%	32.4%	11.0%	1.3%	1.9%	1.3%	3.1%	3.8%	3.9%	1.9%		100.0%
Cum. Take	29.4	66.1	148.6	271.0	312.6	317.5	324.8	329.7	341.6	356.0	370.7	378.0		
Cum. Take (%)	7.8%	17.5%	39.3%	71.7%	82.7%	84.0%	85.9%	87.2%	90.4%	94.2%	98.1%	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	0	0	3	12	1	0	0	1	3	3	0	0	0	23
Struck & Lost	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Total Take	0	0	3	12	1	0	0	1	4	3	0	0	0	24
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	6.3	25.2	2.1	0.0	0.0	2.1	6.3	6.3	0.0	0.0	0.0	48.3
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	2.1
Total Take	0.0	0.0	6.3	25.2	2.1	0.0	0.0	2.1	8.4	6.3	0.0	0.0	0.0	50.4
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	6.3	25.2	2.1	0.0	0.0	2.1	6.3	6.3	0.0	0.0		48.3
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0		2.1
Total Take	0.0	0.0	6.3	25.2	2.1	0.0	0.0	2.1	8.4	6.3	0.0	0.0		50.4
Total Take (%)	0.0%	0.0%	12.5%	50.0%	4.2%	0.0%	0.0%	4.2%	16.7%	12.5%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	6.3	31.5	33.6	33.6	33.6	35.7	44.1	50.4	50.4	50.4		
Cum. Take (%)	0.0%	0.0%	12.5%	62.5%	66.7%	66.7%	66.7%	70.8%	87.5%	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 March 1998 through February 1999.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, with assistance from the community of Hooper Bay, 1999.

Appendix C. Table 3. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Quinhagak, 1998/99

SAMPLING DESIGN:		Active	Other	Total
TWO-STRATA				
	Total Native Households	60	47	107
	Surveyed Households	42	30	72
	Sampling Fraction	70.0%	63.8%	67.3%
	Sample Household Members	183	121	304
	Estimated Household Members	261.4	189.6	451.0

SEAL AND SEA LION HARVEST AND USE INFORMATION

Percentage of Native Households:

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Used	19.3%	1.3%	16.4%	48.4%	0.0%
Hunted	9.5%	1.3%	8.0%	21.6%	0.0%
Harvested	8.1%	1.3%	8.0%	21.6%	0.0%
Received	16.5%	1.3%	12.4%	37.6%	0.0%
Gave Away	6.7%	1.3%	4.0%	17.6%	0.0%

Estimated Community Harvest and Take (Expanded):

	Seals				Sea Lion
	Bearded	Ribbon	Ringed	Spotted	
Total Number Harvested	18.7	1.4	12.9	66.1	0.0
Total Number Struck and Lost	2.9	0.0	0.0	7.1	0.0
Total Number Taken	21.6	1.4	12.9	73.3	0.0
Number Harvested Per Capita	0.04	0.00	0.03	0.15	0.00

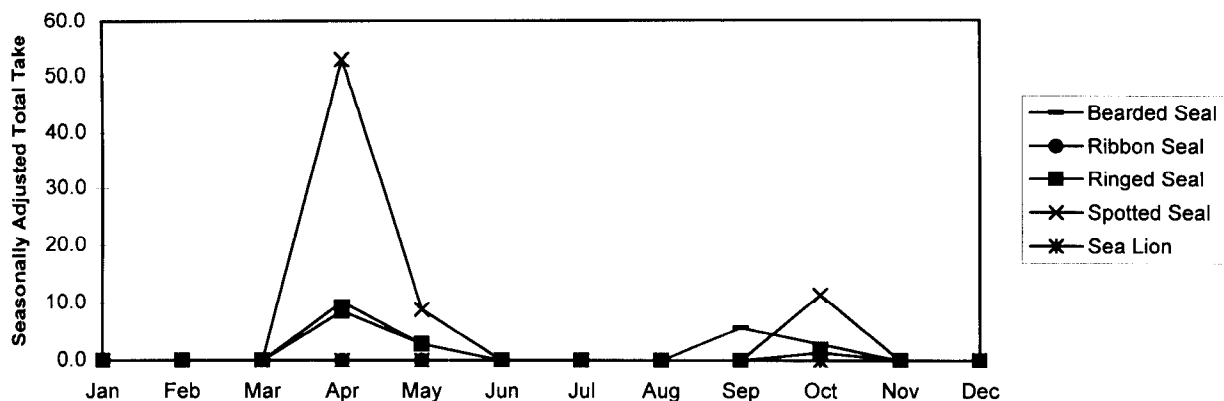
SEAL AND SEA LION HARVEST BY AGE AND SEX - COMMUNITY ESTIMATE (EXPANDED)

	Seals								Sea Lion	
	Bearded		Ribbon		Ringed		Spotted		Number	%
	Number	%	Number	%	Number	%	Number	%		
Adult Male	0.0	0.0%	0.0	0.0%	0.0	0.0%	4.4	6.7%	0.0	---
Adult Female	1.4	7.6%	0.0	0.0%	0.0	0.0%	2.9	4.3%	0.0	---
Adult Unknown Sex	7.3	38.9%	1.4	100.0%	5.7	44.4%	51.6	78.0%	0.0	---
Juvenile Male	0.0	0.0%	0.0	0.0%	0.0	0.0%	3.0	4.5%	0.0	---
Juvenile Female	0.0	0.0%	0.0	0.0%	1.4	11.1%	0.0	0.0%	0.0	---
Juvenile Unknown Sex	7.1	38.2%	0.0	0.0%	4.3	33.3%	4.3	6.5%	0.0	---
Pup Male	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	---
Pup Female	2.9	15.3%	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%	1.4	11.1%	0.0	0.0%	0.0	---
Total	18.7	100.0%	1.4	100.0%	12.9	100.0%	66.1	100.0%	0.0	---

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, with assistance from the community of Quinhagak, 1999.

Table 3. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Quinhagak, 1998/99 (cont.)

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	7	2	0	0	0	2	2	0	0	0	13
Struck & Lost	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Total Take	0	0	0	7	2	0	0	0	4	2	0	0	0	15
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	10.1	2.9	0.0	0.0	0.0	2.9	2.9	0.0	0.0	0.0	18.7
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	2.9
Total Take	0.0	0.0	0.0	10.1	2.9	0.0	0.0	0.0	5.7	2.9	0.0	0.0	0.0	21.6
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	10.1	2.9	0.0	0.0	0.0	2.9	2.9	0.0	0.0		18.7
Struck & Lost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0		2.9
Total Take	0.0	0.0	0.0	10.1	2.9	0.0	0.0	0.0	5.7	2.9	0.0	0.0		21.6
Total Take (%)	0.0%	0.0%	0.0%	47.0%	13.2%	0.0%	0.0%	0.0%	26.5%	13.2%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	10.1	13.0	13.0	13.0	13.0	18.7	21.6	21.6	21.6		
Cum. Take (%)	0.0%	0.0%	0.0%	47.0%	60.3%	60.3%	60.3%	60.3%	86.8%	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	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 March 1998 through February 1999.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, with assistance from the community of Quinhagak, 1999.

Table 3. SEAL AND SEA LION HARVEST AND TAKE ESTIMATES: Quinhagak, 1999/99 (cont.)

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	0	0	0	6	2	0	0	0	0	1	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	6	2	0	0	0	0	1	0	0	0	9
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	8.6	2.9	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	12.9
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	8.6	2.9	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	12.9
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	8.6	2.9	0.0	0.0	0.0	0.0	1.4	0.0	0.0		12.9
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	8.6	2.9	0.0	0.0	0.0	0.0	1.4	0.0	0.0		12.9
Total Take (%)	0.0%	0.0%	0.0%	66.7%	22.2%	0.0%	0.0%	0.0%	0.0%	11.1%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	8.6	11.4	11.4	11.4	11.4	11.4	12.9	12.9	12.9		
Cum. Take (%)	0.0%	0.0%	0.0%	66.7%	88.9%	88.9%	88.9%	88.9%	88.9%	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	0	0	0	34	6	0	0	0	0	6	0	0	0	46
Struck & Lost	0	0	0	3	0	0	0	0	0	2	0	0	0	5
Total Take	0	0	0	37	6	0	0	0	0	8	0	0	0	51
ESTIMATED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	48.7	8.8	0.0	0.0	0.0	0.0	8.6	0.0	0.0	0.0	66.1
Struck & Lost	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	7.1
Total Take	0.0	0.0	0.0	53.0	8.8	0.0	0.0	0.0	0.0	11.4	0.0	0.0	0.0	73.3
ESTIMATED SEASONALLY ADJUSTED HARVEST AND TAKE BY COMMUNITY (EXPANDED)														
Harvest	0.0	0.0	0.0	48.7	8.8	0.0	0.0	0.0	0.0	8.6	0.0	0.0		66.1
Struck & Lost	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0		7.1
Total Take	0.0	0.0	0.0	53.0	8.8	0.0	0.0	0.0	0.0	11.4	0.0	0.0		73.3
Total Take (%)	0.0%	0.0%	0.0%	72.3%	12.1%	0.0%	0.0%	0.0%	0.0%	15.6%	0.0%	0.0%		100.0%
Cum. Take	0.0	0.0	0.0	53.0	61.8	61.8	61.8	61.8	61.8	73.3	73.3	73.3		
Cum. Take (%)	0.0%	0.0%	0.0%	72.3%	84.4%	84.4%	84.4%	84.4%	84.4%	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 March 1998 through February 1999.

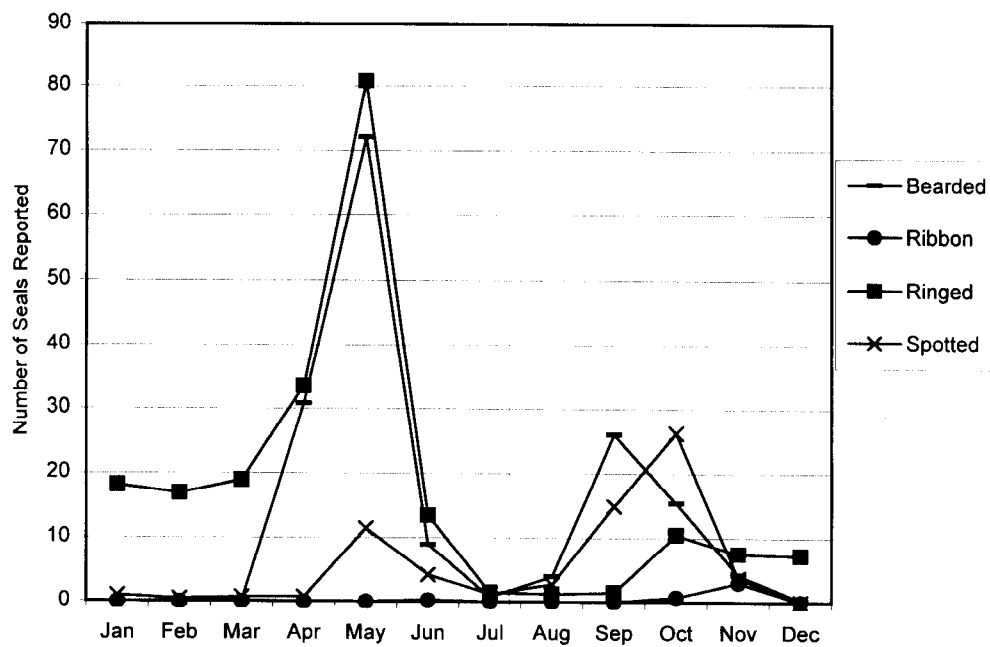
SOURCE: Alaska Department of Fish and Game, Division of Subsistence, The Subsistence Harvest of Seals and Sea Lions by Alaska Natives in Three Communities of the Yukon Kuskokwim Delta, Alaska, with assistance from the community of Quinhagak, 1999.

APPENDIX D.

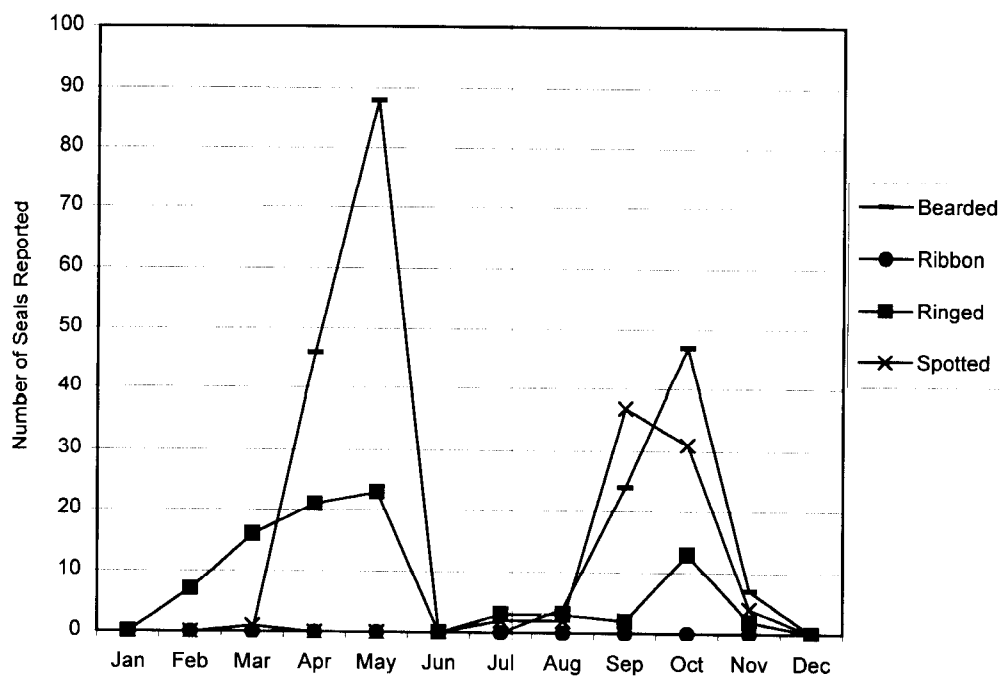
HOOPER BAY SEAL HARVEST DATA, 1973-1976

APPENDIX D. HOOPER BAY SEAL HARVEST DATA, 1973-1976

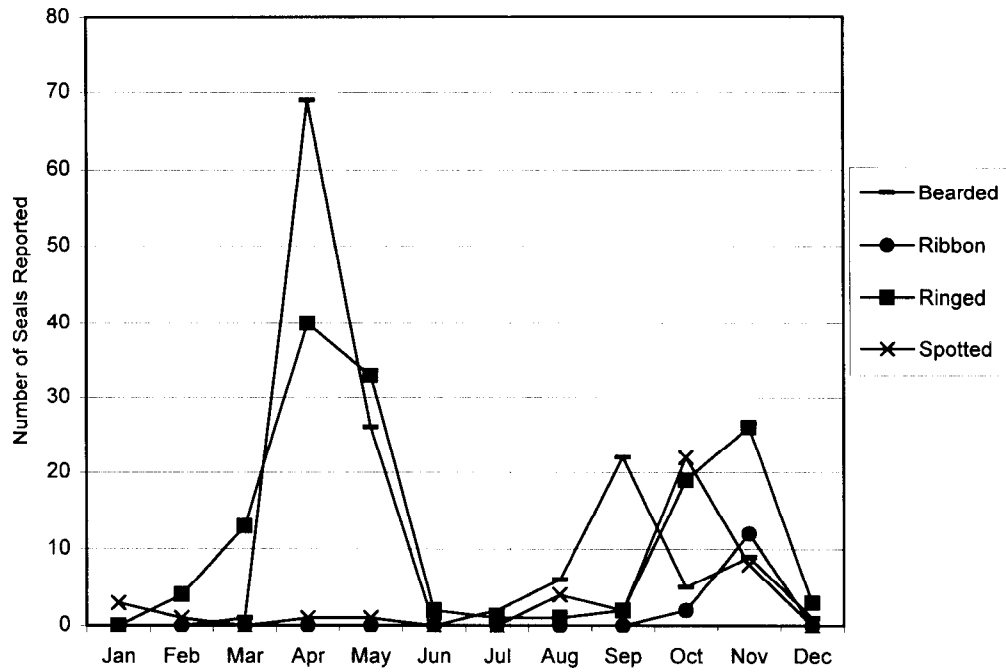
Average Seasonality of Reported Seal Harvests by Hooper Bay Hunters, 1973-1976



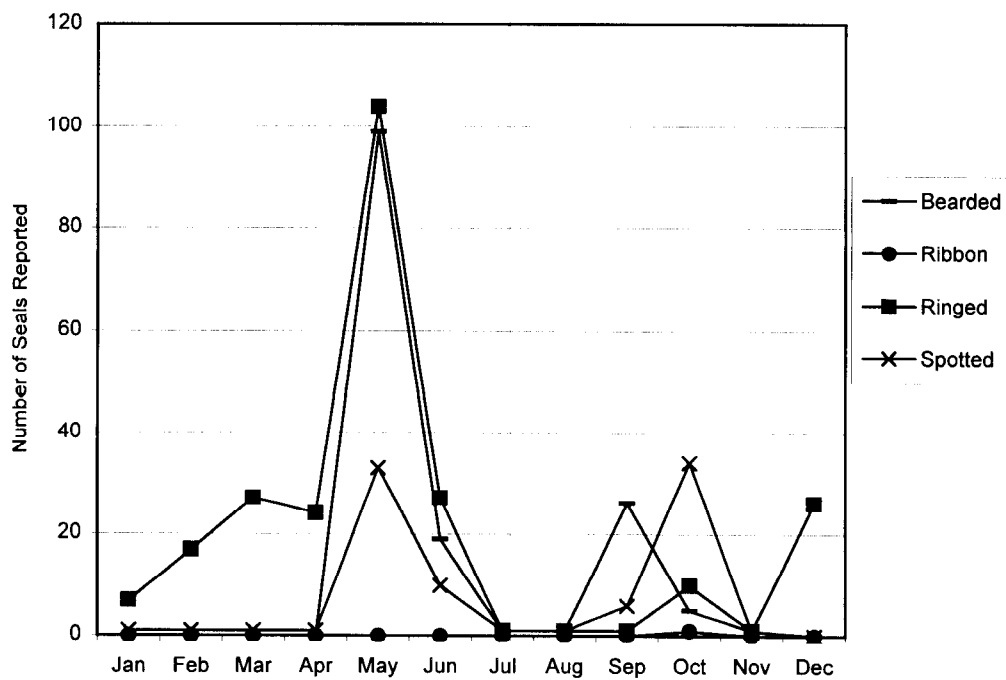
Seasonality of Reported Seal Harvests by Hooper Bay Hunters, 1973



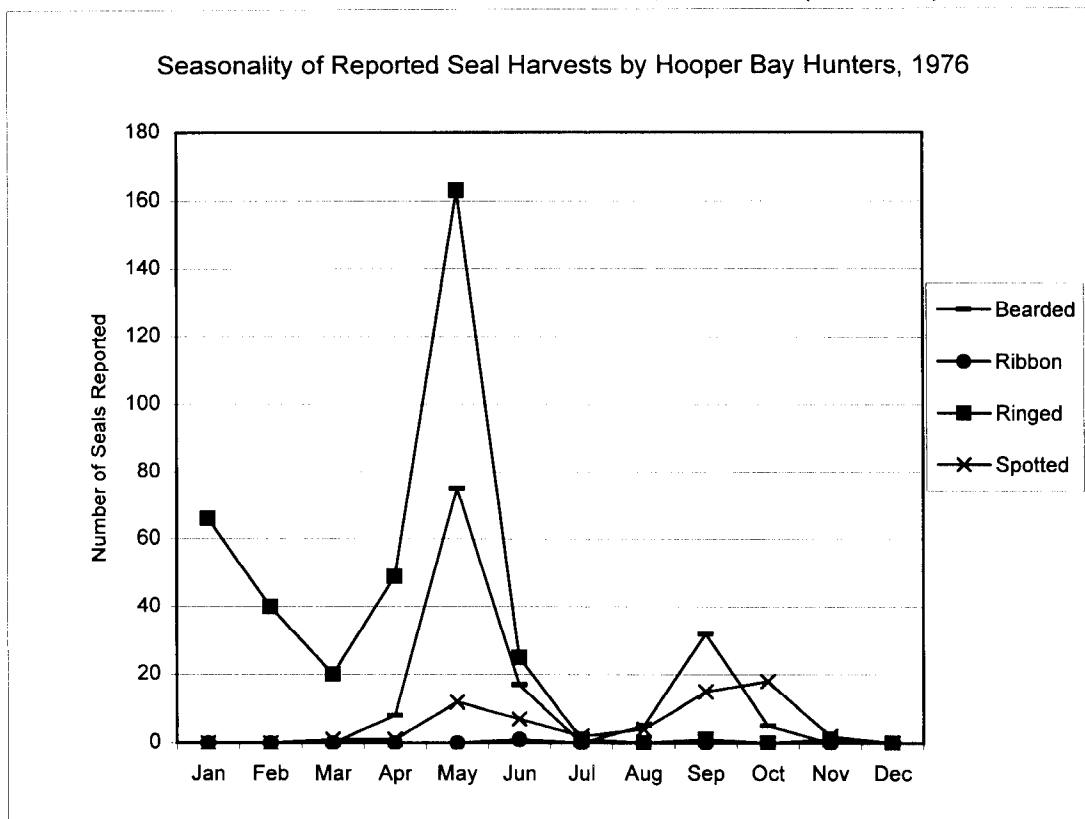
Seasonality of Reported Seal Harvests by Hooper Bay Hunters, 1974



Seasonality of Reported Seal Harvests by Hooper Bay Hunters, 1975



APPENDIX D. HOOPER BAY SEAL HARVEST DATA, 1973-1976 (Continued)



SPECIES COMPOSITION OF ANNUAL SEAL HARVESTS BY HOOPER BAY,
1973-1976 AND 1997-1998

Percent of Estimated Subsistence Seal Harvest				
Year	Bearded Seal	Ringed Seal	Spotted Seal	Ribbon Seal
1973	56	23	20	0
1974	41	42	12	4
1975	31	50	18	0
1976	25	64	11	0
1973-76 Average	36	47	15	1
1997	23	64	12	1
1998	12	77	10	1
1997-98 Average	18	70	11	1

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999 and Department of Fish and Game seal data collection fieldnotes for Hooper Bay, 1973- 1976