THE ROLE OF LOCAL FISH AND WILDLIFE RESOURCES IN THE COMMUNITY OF SHAKTOOLIK, ALASKA

by
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The Norton Sound Eskimo village of Shaktoolik derives its economic base from the local harvest, distribution, and utilization of renewable fish, game, and plant resources, supplemented by local commercial fisheries and occasional participation in wage employment. This subsistence economy allows local residents to be largely self sufficient. There are no stable, locally based alternatives to involvement in this economic system available to Shaktoolik residents. In addition, strong cultural and social values continue to be placed on the harvest, exchange, and consumption of these local resources.

Shaktoolik is a coastal community, and its residents depend heavily on the harvest of marine-related species, such as salmon, herring, belukha, various seals, and several others. In addition to harvest for local use, the local commercial fisheries for salmon and herring provide the major stable source of income to most village households. The harvest areas vary from small, specific sites to large bodies of water, depending on the species.

The composition of the diet of Shaktoolik residents varies with the seasonal and yearly availability of local resources as well as with the availability of and ability to afford store bought alternatives. In the fall of 1980 a diet survey revealed that the animal protein and fat consumed by ten randomly selected households was primarily of local origin (56.5 percent subsistence harvest, 12.2 percent reindeer, and 31.3 percent store bought). Of this total animal protein and fat consumption, 51.6 percent was derived from the harvest of marine-related species. These data indicate the
importance of marine resources and the marine habitat to residents of Shaktoolik.

The history of Shaktoolik reveals a continual incorporation of aspects of Western technology into the local economy. In some cases this has resulted in an increasingly effective harvest methodology. However, the resultant activity of motor powered vehicles and the more effective pursuit of local game has altered the areas of resource availability for some species, particularly near the village, resulting in the expansion of harvest areas for certain species. Other resources such as fish are harvested in the same locations utilized for centuries.

Shifts in the particular species harvested and the extent and manner of their utilization have occurred throughout the history of Shaktoolik, in response to factors including availability of species, dietary preferences, economic needs of the community, available alternative resources, and others. Several species have been added and dropped from the assortment of local resources utilized consistently throughout the years.
CHAPTER I

STUDY PROBLEM AND METHODOLOGY

Study Problem

This study was conducted to provide documentation of the importance of locally available resource harvests to Norton Sound communities. In 1980 the Subsistence Division of the Alaska Department of Fish and Game determined this to be a priority project for its Nome office in view of the impending Outer Continental Shelf (hereafter referred to as OCS) oil and gas development planned for Norton Sound and scheduled to begin in 1983. A concern of equal importance is the planned lease sale of nearshore State waters in this area, also scheduled for 1983 (see Map 1). Such development has the potential for seriously impacting the sociocultural systems of Norton Sound villages. Marine species such as salmon, herring, seals, belukha, and others play an integral role in the subsistence economy of this area.

Despite the fact that oil spills or less acute problems associated with oil development could have destructive effects on these resources, there is a notable lack of data on resource harvests in this area and the significance of these harvests to the sociocultural systems which they support. Prior to this study, little relevant data existed other than some historical reports by early explorers, a few archaeological studies, some limited mapping efforts by various agencies, the Western Arctic Alaska Transportation Study, and a general overview of Bering-Norton sociocultural systems done on
SEWARD PENINSULA

Norton Sound Region
(including proposed OCS lease sale area)

Map #1

SCALE 0  50 miles
contract to the Bureau of Land Management Alaska OCS office in Anchorage (Ellanna 1980). Two relevant studies have been completed recently by the Subsistence Division -- a report on subsistence crabbing in Norton Sound and Bering Strait (Thomas 1981) and a sociocultural systems analysis of Yukon Delta villages and Stebbins (Wolfe 1981), done under contract to the Alaska OCS office. A study in progress that encompasses certain areas of Norton Sound is an Eskimo Walrus Commission survey of marine mammal harvest and utilization, being conducted by Kawerak, the nonprofit arm of Bering Strait Native Corporation. Kawerak also is preparing a BIA funded report on subsistence rights and data of Bering Strait and Norton Sound.

Methodology

Introduction

Due to staffing and budgetary constraints, the Nome Resource Specialist adopted a research approach which utilized index communities. That is, rather than attempting to study a large number of communities simultaneously, the researcher focused on certain communities believed to be representative of the area to be studied. This approach allowed the complex economic and cultural systems within a community to be researched in greater detail than would be possible if working with several communities at once. If the index community is indeed representative of others in the area, conclusions drawn from that community's research are likely to have applicability to other communities as well.
Shaktoolik (see Map 1) as an index community was chosen by the Nome Subsistence Division researcher to represent the villages of inner Norton Sound, (i.e., Shaktoolik, Koyuk, and Elim). It also has a lot in common with the village of Unalakleet to the south, although Unalakleet is much larger and has a more diverse population. The one factor that favored Shaktoolik as the choice, as opposed to Koyuk or Elim, was the archaeological evidence of ancient villages near Cape Denbigh (Giddings 1964), indicating a long-term occupation of the area (perhaps as long as 5000 years).

The research at Shaktoolik was conducted primarily in the months of September through December 1980. The researcher established a residence in the village and lived there for the major portion of these months. An introductory trip was made in July 1980 to lay the groundwork for the research project. The researcher met with the City Council as well as members of the IRA Council to explain the purpose of the project, how it would be conducted, and to solicit their approval. In addition, copies of the research design were sent to the Shaktoolik City Council and Village Corporation, as well as to various other concerned agencies and individuals within the Bering Strait-Norton Sound region.

In the course of the study a variety of different research tools were utilized. These included informal discussion, more formal interviews, observation, diet calendars, mapping, and literature review. Basic demographic information was also utilized. Each of these tools will be discussed below.
Informal Discussion, Interviews

A significant amount of data was gathered in social visits, informal encounters, and casual discussion peripheral to concentrated research efforts. Many Shaktoolik residents were willing to chat about subjects of interest to the researcher. A particularly productive method of gathering data was that of informal discussion during mapping sessions. Using the mapping of specific harvests as a focal point of discussion, a major portion of the data base was derived from casual conversation regarding each harvest. The older informants in particular offered large quantities of data in this manner, pertaining to harvest methodology, utilization, distribution, and other related topics. Informal discussion regarding the diet calendars yielded data on local dietary attitudes and utilization and preparation of foods.

In some instances, with mapping and the diet calendars as well as other informal conversations, the researcher would attempt to pursue topics of special interest, while at other times, the discussion would follow the direction determined by the informant; any data that was offered was considered potentially valuable.

Occasionally, when an individual appeared receptive to providing information or volunteered to help with the study, the researcher would propose a more formal interview, in which specific questions would be raised. Most of the more formal interviews were conducted toward the end of the research project when the researcher identified gaps in the data base for certain topics. In these instances, key informants that had been especially cooperative were approached and asked to participate in a more formal type of interview. The format of these interviews was basically a list of questions to be answered,
with the flexibility to allow informal discussion on related topics. Topics which required such interviews for clarification included crew composition, early caribou harvest patterns, early distribution patterns, and the specific dates of certain events, such as the crash of the reindeer herd and major technological shifts. Other types of information gathered in this manner included the utilization and identification of edible greens and the identification of species of waterfowl and fish. While compiling the field data in Nome the researcher identified a number of such topics that required clarification or additional information. A final trip to Shaktoolik consisted primarily of interviews with key informants to fill these data gaps. In conclusion, the more formal interviews served primarily as a means to wrap up the loose ends of the research when time constraints disallowed the use of informal discussion for this purpose.

Observation

As a result of the researcher living in the community, a lot of information was gathered by observation. The type of data obtained in this manner includes, but is not limited to, the level of harvest activity, composition of hunting crews, food processing, distribution patterns, and composition of diet. These observations were primarily passive rather than participatory. With the exception of a moose and waterfowl hunt up the Shaktoolik River, cranberry picking, and tomcod hooking, the researcher did not have the opportunity to participate in actual harvest efforts.
Diet Calendars

In the analysis of Shaktoolik diet, a form of diet calendar was the primary tool (see Appendix 1). Ten Shaktoolik households were asked to record on a specific form what food that household consumed each day and in what quantities. For most of these households the calendars were completed for three weeks, one week each in late September, mid-October, and early December.

The 10 households were chosen randomly by taking every third or fourth household from a map of the village to equal 10 of the 36 Shaktoolik households. Each of these ten households were approached, the diet calendar and general research project explained, and the cooperation of each household requested. With one exception, each household agreed. The exception was a widower who felt that the diet of his household would not be appropriately representative of the community. In response to his reluctance to participate, the next household on the map was substituted for the diet calendar study. In the researcher's assessment, the resultant sample provided representatives of all sectors of the community, including young and elderly couples, large and small families, and households with low and higher incomes.

A specific individual in each household was contacted to fill out the calendars; in almost all cases this was the person who cooked for the family. This individual was asked to estimate the weight of meat and fats or to give the number of fish or birds consumed. In addition, amounts of drinks, fruits, vegetables, and other carbohydrates were estimated, using volume, number of units, or weights taken from labels of store bought goods. At the onset the households were visited frequently to insure that the calendars
were being kept in proper detail; later a brief perusal of the calendars at the end of the week was all the monitoring that was necessary. The recorder was paid for each week of calendars completed.

The purpose of the diet calendars was to analyze what proportion of the diet was locally harvested as opposed to that purchased from the store. Due to time constraints and the research focus on marine-related resources, only the animal protein/fat portion of the diet was compiled for this report. The exception to this was those vegetable fats that were occasionally substituted for animal fats. Examples include margarine and shortening substituted for butter, vegetable oil substituted for seal oil in fish or berry agutuk ("Eskimo ice cream"), and shortening substituted for reindeer tallow in agutuk.

For those smaller animals -- fish and birds -- that were recorded on the calendars as units, the researcher derived estimated weights for each animal. These estimates came from a variety of sources, including Nowak (1977), Wolfe (1979), and Foote (1965) who listed average weights of fish and mammals in their respective studies. This researcher weighed some species that were available. The weight of fish was obtained or estimated without the bones in order that fresh fish could be added to dried fish. Most of the salmon consumed was dried or otherwise processed without bones. Due to the fact that drying a salmon substantially reduces its water content, resulting in more protein per unit of weight, the weight of a dried salmon was replaced by an estimate of what it would have weighed before being dried. This was necessary to make dry fish comparable to non-dried meats, all of which have a considerable water content. For birds, the bones were included in the
weights, as both local fowl and store bought chickens are processed and cooked with bones intact. For both store bought and local mammal meat, almost all quantities consumed had no bone content or the bones were disregarded (for a list of weight estimates for local species, see Appendix 2).

Weights of milk and yogurt, having a water content significantly higher than other protein/fat, were multiplied by a .7 conversion factor to make them comparable to meat (for an example of typical water content in different types of meat and dairy products, see Appendix 3). Other dairy products such as canned milk, ice cream, and butter did not require this conversion due to a lower water content.

Small amounts of foods, such as butter on bread and pancakes and milk on berries, cereal, and in coffee, were computed by soliciting an estimate from the diet recorders of the average amount per piece of bread, bowl of berries, etc. If such an estimate was not obtained, the researcher arrived at his own estimates (see Appendix 4 for a list of such estimates).

For food mixtures, such as fish or berry agutuk, in most cases the recipe was available. When it was not given, an estimate of the composition was derived from those recipes that were described.

Most of the weights for store bought foods were taken from the book *Nutritive Value of American Foods in Common Units* (Adams 1975). This book also was the source of other information, such as the water content in meats as compared to dairy products, the bone content in fish, and weights that were used in estimating the weight of local foods, such as burbot and tish.
eggs. For canned goods with only a fraction of animal protein content, such as spaghetti and meatballs or corn beef hash, the meat content was estimated using composition breakdown from the book as well as personal estimates of the researcher. The weights of some store bought foods such as game hens and beef tongue were determined by observing the average weight of these meats at the local grocery store (for a list of the weights used for computation of store food, see Appendix 5).

In addition to the above methodology, additional factors affecting the diet analysis should be noted. Two households had babies, and infant diet was not considered in the total. Only the food consumed within the household was recorded, so therefore school lunches and meals consumed while visiting other households were not included. On the other hand, if the recording household had guests at meals, all the food consumed was recorded on the calendars. Household composition fluctuated in some cases, as members and guests moved in and out.

It is the researcher's intent that this diet study be repeated at different seasons of the year to analyze the shifts in diet that occur in response to resource availability and other factors that change in the course of a year.

Mapping

Mapping of resource harvest areas proved to be a very useful tool in facilitating information exchange, yielding large quantities of data regarding harvest methodology, distribution of the harvest within the community, historical shifts, and many other topics.
The sample of hunters to be mapped was originally intended to be derived from a list of the more active hunters, including representatives from each age group. However, several Shaktooik sources felt that most of the heads of households were active hunters, and there was no particular agreement as to which were more active than the others. Because of this and the fact that the random sample chosen for the diet analysis was representative of the various sectors of the population, the researcher decided to use the diet analysis sample for the mapping as well. This decision was supported by the fact that the heads of households of this sample for the most part were considered to be or have been active hunters. However, two changes were made in the sample for two elderly hunters. One elder was partially deaf to the point that it would have seriously interfered with communication, whereas the other had spent a major portion of his life living outside of the Shaktooik area. For these reasons, two other elderly hunters of the village were substituted. For another household, the maps were completed by the providing hunter, although he was actually part of a separate household.

The resultant sample was composed of ten hunters. The age groups represented were as follows:

<table>
<thead>
<tr>
<th>Age in years:</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
<th>85</th>
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</tr>
</thead>
<tbody>
<tr>
<td># of hunters:</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

One final change in the sample was the addition of one hunter who was known to have travelled farther than most in his search for belukha. He was asked to complete maps for belukha hunting only. As was the case with the diet study, the cooperation of each hunter was requested after the research
project had been explained. All of the hunters thus contacted were willing to participate.

The base map chosen for the project was the 1955 version of the USGS Norton Bay map, with a scale of 1 to 250,000. This map was described by several hunters to include all of the basic harvest areas of Shaktoolik residents.

Due to research time constraints and the primary focus of the research project on marine-related species, it was decided to complete maps only for those harvested species that were associated with marine environments. A list of these species was compiled through extensive discussion with various Shaktoolik residents. The list that resulted includes most but not all of the marine-related species currently utilized.

Walrus, ribbon seal, and bowhead whale were not mapped, as these species are rarely encountered. Commercial salmon and herring fishing was included in addition to the subsistence harvest of these species. Burbot, locally termed "lingcod," was mapped because of the local belief that this species migrates in and out of marine waters. There was some difficulty identifying the actual species of some animals, such as clams and wolffish (for a list of the local names, common names, and Latin names of species mapped, see Table 1 in Chapter 4).

The purpose of this mapping effort was to establish the importance of local areas to the subsistence economy of Shaktoolik. The maps were supplemented with discussion to illustrate the relative importance of different species. The researcher used a variety of mapping approaches to show the extent of use
of specific areas. These included the mapping of harvest areas for each species for different time periods and seasons as well as camp sites associated with the harvest effort.

Following the example of Freeman's Inuit Land Use and Occupancy Project (Freeman 1976), time periods were identified representing basic land use patterns that applied to the community as a whole. Extensive discussion with Shaktoolik elders revealed that Shaktoolik land use patterns had shifted within the remembered past in response directly or indirectly to technological changes in methods of transportation (i.e., the shift from manually propelled boats/kayaks to outboard motors and from dog teams to snowmachines). These shifts occurred over a period of years. However, more or less arbitrary time periods were chosen by the researcher to identify the beginning of each new technological era in order to clarify the chronological perspective. After much discussion with various Shaktoolik sources, the dates chosen were 1935 for the inception of outboard motor use and 1960 for snowmachines. The year 1960 was also identified as roughly the time when commercial salmon fishing began in the area.

For those species that are harvested in more than one season, different maps were drawn for each season, as harvest methods and areas often varied.

Mapping sessions were prearranged and usually took place at the home of the hunter in the evenings due to other activities occupying his time during the day. Sessions usually did not extend beyond two hours in length unless the informant specifically expressed his willingness to continue. The total length of time required per informant ranged from a little over one hour to

-13-
six or eight hours, depending on multiple factors. Due to the large amount of data offered through this process, the researcher was reluctant to cut short any informant.

The method used to produce the maps was to ask the informant to draw a line to enclose the area in which he had harvested the species in his lifetime. Following Freeman's suggestion in *Inuit Land Use and Occupancy Project* (Freeman 1976), the wording usually used was "Where do you look for _____?" or "Where do you find _____?". With some species, such as salmon, tomcod, and herring, the areas identified were usually very specific, whereas with marine mammals, the areas were often very broad. In the case of belukha, the lines drawn denoted the routes travelled, while scanning the water for several miles in every direction. The informants were asked to identify all the areas used, even those used only occasionally. In some cases the primary hunter of the household would be assisted by his wife in determining the areas utilized for the harvest of salmon, herring, seagull eggs, and other harvests in which the wife had participated. With the two eldest hunters, failing eyesight was a problem. In these cases, the wife would help with those harvests with which she was familiar, and the researcher or a younger hunter of the household would draw the lines for some of the hunting areas following descriptions given by the elder. These areas were cross checked with the elder using landmarks and verbal estimates of distances. The number of maps produced by each household varied depending on how long and in which seasons the informants had been involved in harvest of each species. No hunter had actively participated in the kayak harvest of belukha, so the areas identified were based on the informants' own observations or descriptions presented by elders in the past. Such informants were all older men
-- the youngest was approximately 60 years old. In the case of belukha netting, the informants who described these areas had participated in this harvest themselves, but the areas that had been used by other people were also described. All other harvest areas mapped were based on the actual experience of the informants.

The materials used in mapping sessions included one base map, mylar overlays, and colored pencils. To avoid confusion, a separate overlay was used for every five to ten harvest areas delineated, resulting in five or six overlays per household. The maps were compiled so that each species had a separate map or maps for each time period and season. The areas given by the various informants for that species, time period, and season were compiled onto one or two maps, thus showing the variation in harvest areas between the different households. A distinct type of line was used for each household. Two maps for each topic were often necessary for clarity. For harvest areas in rivers, the various lines denoting fishing spots were set off from the river slightly to avoid confusion. If one household used the same area as another, one type of line was used to denote both households. Different camp locations were labeled with letters of the alphabet and identified for specific households by year.

Each final map was keyed for species (common and local names), time period, season, and method of harvest it was representing. In addition, the number of sources (i.e., households with areas delineated on the map) was given. Those households with time periods or seasons in marked contrast to the others were also identified and explained. Some lines represent the harvest area of more than one household and are identified as such. It should be noted
that the description of a household's area on the map for a specific time period does not mean that the household engaged in harvest activity throughout that time period; it means only that the household did so at some point during that time period. For example, elders have noted their areas on waterfowl maps for the time period 1935-1980, even though they may not have hunted for the last ten years. Also, young men may have denoted their areas on arctic char maps for the time period 1960-1980, even though they have only fished for char since 1965. In the case of camps, most are identified with the specific years that each household used them. However, some hunters currently using camps did not state when they began using them; these camps were identified with the time period "up to 1980" for those households.

**Crab Survey**

Much of the data gathered on crabbing was obtained through a separate research project, also conducted during the fall of 1980. This project involved the use of a combination of survey, informal discussion, and mapping as its primary tools. For a description of this methodology, see *Norton Sound-Bering Strait Subsistence King Crab Fishery* (Thomas 1981).

**Demographic Data**

The study of basic demographic data proved useful in analyzing kinship patterns and their role in such aspects of village social interaction as distribution of harvested resources, composition of hunting crews, and cooperative harvest efforts. A copy of a 1979 community census conducted by the Shaktoolik health aide was obtained from Norton Sound Health Corporation and...
helped to identify the specific households of Shaktoolik and their composition (Norton Sound Health Corporation 1979). The researcher continually inquired within the village about the genealogy of various Shaktoolik families. One informant was particularly helpful in clarifying the kinship relationships of Shaktoolik residents.

Literature Review

Several relevant documents and studies were reviewed in the course of this research project, including historical accounts by early explorers to the region (Nelson 1899; Michael 1967; Ray 1966), archaeological studies of Cape Denbigh and Cape Nome (Giddings 1964 and 1973; Bockstoce 1979), Dorothy Jean Ray's articles on the history of the region (Ray 1964, 1967, and 1975), several of the OCS reports for the Bering-Norton area, including the Socio-cultural Systems Analysis (Ellanna 1980), and a variety of other studies relating to diet, subsistence economies, subsistence harvest methods, etc. Few of these studies provided any data specific to Shaktoolik, but all were useful in broadening the perspective of the researcher.
CHAPTER II

DESCRIPTION OF AREA

The village of Shaktoolik is located a few miles southeast of Cape Denbigh on the coast of inner Norton Sound (see Maps 1 and 2). Shaktoolik consists of roughly 37 occupied buildings in the new village and a few additional "households" at the old site, about three miles down the coast. The new village, occupied since 1974, is arranged as two rows of houses, one on either side of the village street, which runs parallel to the coast between the ocean and the Tagoomenik River. A census conducted by the Norton Sound Health Corporation in 1979 indicated a population of 165. The village has such modern conveniences as AVEC generators for village electricity, a village water tank, an ANICA village store, and public showers, washers and dryers. Seven households own pickup trucks. There are mail flights into Shaktoolik almost every day.

The village sits on a narrow sand and gravel spit separating Shaktoolik Bay and the Tagoomenik River from the ocean waters. The Shaktoolik and Tagoomenik Rivers converge at Shaktoolik Bay and empty into the Sound just two or three miles northwest of the village. This location allows Shaktoolik residents easy access to their boats beached on the coast as well as providing a sheltered harbor in the Tagoomenik River. The heavily utilized Shaktoolik River is nearby, as is the productive Cape Denbigh area. There is limited road access as far south as Beeson Slough. Fresh water for the village is pumped in from a spot further up the Tagoomenik or hauled from
holes in the river ice in the winter. Driftwood for fuel is abundant along the coast, although timber further inland is also utilized.

Most of the landscape in the immediate vicinity of Shaktoolik is bare of timber, consisting mainly of tundra with some small willows and extensive marshy areas with lakes and ponds. These "flats" extend to the hills about 15 miles inland. Starting two or three miles from its mouth, the Shaktoolik River has spruce groves up to three miles wide along its course, interspersed with various deciduous species.

The Shaktoolik River extends about 60 aerial miles to the northeast, with its headwaters in the hills which separate the coastal drainages from that of the Yukon River. River travel by boat into the foothills becomes difficult and eventually impossible due to shallows.

Northwest of Shaktoolik are the estuarine Malikfik and Sineak drainages, with a maze of waterways in the marshy flats. Beyond these are the Cape Denbigh cliffs which extend along the west coast of the Denbigh peninsula, known as the Reindeer Hills. To the north is Norton Bay.

Norton Sound climate is characterized by cool, cloudy summers and frozen winters, mild in comparison to those in the interior or areas to the north. The summer months of July and August are followed by a windy fall, with the rivers freezing in October and the sea ice forming in late November on the coast. The winter usually has a few weeks of -20° to -30° F temperatures, sometimes nearing -40° F, with the rest of the winter being milder. Inland areas have colder winters and warmer summers than does the coast. The
climate varies depending on the location within Norton Sound. For instance, Koyuk, at the head of Norton Bay, has less windy winters than Shaktoolik, for it is more sheltered by hills and trees. Shaktoolik is more exposed and tends to be buffeted by winds from the north. As winter progresses, stable shore ice forms out from the coast, usually in December. At the edge of this ice is an unstable area where ice forms, opens, or breaks off, depending on the wind and current. Beyond this area, floating sea ice moves in and out, back and forth. Breakup comes as early as late April or as late as June depending on the year, but timing also varies by village. Koyuk remains enclosed in Norton Bay ice long after Shaktoolik and Elim have ready access to open water. Floating ice may remain in the area for a few weeks or may be carried away immediately. Following breakup are several weeks of rapidly melting ice and snow and swollen rivers. Summers are often wet but do get warm, with occasional temperatures as high as 70° to 80° F.

Shaktoolik residents are aware of some climatic shifts that have taken place in their area. One major shift is that in the last several years the shore ice has not set up as far out from the coast as it did in the past. Whereas the shore ice used to occasionally extend all the way to Besboro, this has not happened in several years. Now the shore ice often is only about one mile wide. A number of Shaktoolik residents believe that this change is due to more wind in the winter. Before, there would be several days of calm which would allow the ice to set up. Now the calm lasts only a day or two, and the north wind blows the young ice away. Other sources felt that winters are milder now. One older man described how winters are starting later and ending earlier than when he was young. Several people stated that the murres
were laying their eggs almost a month earlier than they had done several decades ago.

Two environmental phenomena were described by Shaktoolik residents which would have special significance to any offshore oil development -- namely fall storms and violent ice action. October and November often bring storms to Norton Sound. When the winds are from the south or southwest, high water is the result, with sea level rising and salt water entering the river systems. Every several years this phenomenon increases to the point where sea level rises dramatically by as much as fifteen feet. In combination with violent wave action, such conditions wreak havoc with low-lying coastal villages. In fact, Shaktoolik was moved to higher ground in the mid-1970's partly in response to concerns over its hazardous location. Due to the low elevation of the Shaktoolik area, such high water conditions flood much of the coast. A long time ago a flood deposited a line of driftwood almost at the center of the flats behind the Reindeer Hills. During a flood, the tundra inland from Tagoomenik is covered with water. The last major flood occurred in the fall of 1974. According to Hans Nelson of USGS, there have been seven major storm surges since 1900 (presentation, Norton Sound Synthesis meeting, October 1980).

Another environmental phenomenon known to have occurred in the area is also associated with winds from the south or southeast. There is an old story in Shaktoolik of the destruction of a village which existed near the mouth of the Shaktoolik River. The story relates that one winter when the sea ice was about two feet thick, the conditions were such that the ice shot up over the tundra and bulldozed the village flat, carrying the iglus a considerable
distance onto the flats. The people drowned in the high water which accompanied this ice action. There was a similar occurrence about 40 or 50 years ago, when Shaktoolik was located at its old site a few miles down the coast. The young sea ice, about 1½ to 2 feet thick, broke loose from the shore ice, moved up on top of the shore ice, and surged up the beach, coming to a stop near the tundra line. One elder explained that if there is ice all the way out to Besboro, when that ice starts to move, there is a lot of force involved.
Prior to the introduction of Western civilization to the Norton Sound region, the inhabitants of the area lived primarily in small groups scattered along the coast, often moving on a seasonal basis. With the establishment of schools, churches, and stores, most of these smaller settlements were abandoned and their populations concentrated into larger communities, resulting in the villages of today. Many of these former village sites continue to be utilized as seasonal camps due to their proximity to harvestable resources and fresh water. A number of these old sites in the Shaktoolik area were known by Shaktoolik elders. One old village existed on the coast one mile southwest of the recently abandoned Shaktoolik village site. This ancient village has been identified by the archaeologist Giddings (Giddings 1964) as "Ditchahak" and was unusually large, perhaps having as many as 99 concurrent households. There also was an old village near the mouth of the Shaktoolik River (Giddings identified two sites here [Giddings 1964]). Shaktoolik sources described the old village site of "Ganigak" near Cape Denbigh, which corresponds to Giddings' "Nukleet" site. Along the north half of the coast of the Reindeer Hills are a number of small coves where villages existed. A Shaktoolik source described the site of "Itkusinak" at the first cove south from Pt. Dexter. Giddings did not identify this spot to be a site but did describe "Iyatayet" at the next cove to the south, as well as "Madjujuinuk," a few miles further down the coast (Giddings 1964). Other old villages further removed from Shaktoolik include Egavik, about 25 miles to the south,
and two villages on Besboro Island, one on the north side of the island, the other on the southeast coast.

The location of Shaktoolik has shifted several times in this century. The earliest site remembered by elders today was located several miles up the river at a spot known now as Robertvale. This was where the first school was built, which pulled together some of the smaller coastal villages or camps. The main village had previously been located near the mouth of the Shaktoolik River. In approximately 1916, the village was moved a few miles down the river due to the hardship of pulling freight up the river from the BIA supply ship Northstar. In 1932 the village council decided to move the village to the coast. One reason for this move was to further alleviate the freight problem. In addition, firewood was more readily available in the form of driftwood, seal hunting areas were more accessible, and that site was closer to the reindeer corral. The site currently occupied by Shaktoolik was almost chosen at that time, but it had the problem of high water causing the adjacent stretch of the Togoomenik River, the source of fresh water, to become salty on occasion, so the site further up the Togoomenik was chosen instead. Finally, in response to problems of flooding and wave erosion, the village was moved in the mid-1970's two or three miles along the coast to its present location. Giddings gives a slightly different account of the village moves in this past century, stating that the village was located for some time at the mouth of the Shaktoolik River, then moved a few miles up the Shaktoolik River, then back down to the mouth, then up the river again, and finally to the Togoomenik site (Giddings 1964). Apparently, not everyone lived in the main village in the 1930's, as one elderly couple described living at the mouth of the Shaktoolik with three other households.
Giddings identified three separate cultures from his archaeological work: the Nukleet culture, which is relatively recent; the Norton culture, which is older; and the ancient Denbigh culture, which may be as old as 5000 years (Giddings 1964).

The present population of Shaktoolik has a variety of origins. Shaktoolik and Koyuk present an anomaly to the pattern of language distribution along the Alaska coast, in that they historically were predominately speakers of the Malemiut dialect of Ifupiaq surrounded by villages speaking the Unaluk dialect of Yu'pik. Dorothy Jean Ray explains this phenomenon as the result of Malemiut expansion south from Kotzebue Sound (Ray 1975). In 1839 Shaktoolik was the only Malemiut village in Norton Sound, as Koyuk had not yet been established. Ray states that prior to the influx of Malemiut during the nineteenth century, Koyuk and Shaktoolik were small or abandoned. Today Shaktoolik residents consider their village a "mixing pot" of different languages, with people of Malemiut and Kauwerak origin, as well as some Yu'pik speakers.

The history of the Norton Sound region has been described in detail by other researchers (Ray 1975; Ellanna 1980), and such a description will not be undertaken as part of this report. However, it will be useful to briefly review some of the major economic and technological shifts that took place in the Shaktoolik area to clarify the chronological perspective of subsequent discussions regarding trends in resource utilization and availability.

Shifts in technology and harvest methodology were occurring long before exposure to Western culture. For instance, the Denbigh culture flints of
4,500 years ago were very different from the implements of the more recent cultures in the Cape Denbigh area. Sometime in the 14th century a major revision took place in the design of bows and arrows. Cooperative drives of belukha with kayaks were apparently a recent practice in Norton Sound (Giddings 1964). Archaeological evidence suggests that little or no use of dogs for transportation existed in Norton Sound prior to 250 years ago, presumably introduced by Malemiut culture from the north (Giddings 1964; Ray 1975).

Contact with Western culture in the 18th and 19th centuries, in the form of explorers, traders, whalers, etc., brought the introduction of Western technology. The use of firearms no doubt increased the efficiency of Eskimo hunters considerably. The demand for furs as a trade item must have had a large impact on Eskimo harvest activities.

Sometime in the late 19th century the size of dog teams increased. Shakttooilik elders recalled their parents describing the average team in years before as three dogs. One elder stated that hostility between neighboring villages had discouraged extensive travel in earlier times, and larger dog teams were therefore not needed. It's probable that an increased Malemiut influence played a major role in this shift. Another factor which may have prompted an increase in dog team size was that more dog food was available due to the use of guns. The larger dog teams of perhaps 7-8 dogs (sometimes as large as 14-16 dogs) that became popular necessitated a harvest of large quantities of salmon, seals, and a variety of other resources for dog food.
By the early 1900's, wooden boats of Western design had replaced the smaller kayaks to a large extent as the mode of water transportation. These boats were rowed or pulled along the shore and up the rivers.

A major shift in resource abundance occurred in the latter half of the 1800's, when caribou, which had been abundant along the coast of Norton Sound, became scarce. Evidence exists at Cape Denbigh of organized caribou drives, although the time period in which this occurred is unknown (Giddings 1964). The absence of caribou on the coast forced Shaktoolik hunters to pursue them further inland. Near the turn of the century Sheldon Jackson introduced reindeer herds to the region. Shaktoolik eventually had quite a large herd, which made caribou hunting unnecessary. The herd crashed in the 1930's.

Shaktoolik's first missionary school was probably introduced near the end of the 19th century, as such schools went into operation at Unalakleet and Golovin at that time (Ellanna 1980). This school, according to a Shaktoolik elder, caused a number of the coastal villages to be drawn into that community. With the operation of this school came an increased flow of outside goods into Shaktoolik and contact with non-Native people and culture in general.

Meanwhile, the gold rush of the early 1900's was having its impact. Many Norton Sound Eskimos became involved in cash employment associated with mining activity. This often involved full time work from breakup to freezeup and increased the ability of these workers to obtain outside goods, as well as their need for those goods, as they had to neglect their subsistence harvest to work for the miners. With the mining activity came an era of intense
dog team travel in the area. During the frozen months, large numbers of travelers would hire drivers with their dog teams to take them to Unalakleet, then through the mountains to Kaltag, then up the Yukon River to the terminus of the railroad, which went on to the ice-free port of Seward. In addition, there were the mail runs, as mail was transported by dog team along the same route. At least two of Shaktoolik's elders can recall their experiences as mail carriers running mail from Golovin to Unalakleet. Roadhouses were constructed along the trail roughly a day's travel apart. One major impact that this increased level of dog team travel had on local resource utilization was the creation of a great demand for dried salmon for dog food. The roadhouse mining camps and local trading posts/stores bought or bartered for large quantities of "dry fish." This level of dog team travel began to decrease as mining activity slowed, and it abruptly declined in the early 1930's when airplanes took over the mail transport.

The first store in Shaktoolik was started in 1936, when the village sold a quantity of reindeer to ship south. With the $800 earned, a quantity of surplus goods were ordered along with the teachers' BIA order. This venture paid off, and loans were received to further expand the new store. Around 1950 the statewide corporation ANICA assumed control. Prior to having their own store, Shaktoolik people would travel by dog team to trade their furs and dry fish for groceries, etc., at the trading posts at Unalakleet, Egavik, Dime Landing (up the Koyuk River), and Golovin.

The introduction of outboard motors had a major impact on resource harvest at Shaktoolik. The first outboard arrived in the early 1930's, and by 1943 there were five outboards in the village. In 1947 several Shaktoolik men
began going to Bristol Bay in the summers to work at a fish cannery. Outboards were readily available at low prices at Bristol Bay, and soon most households at Shaktoolik had them. The hunting methods and areas for some species changed drastically as a result, as did the level of camping activity. People were able to go farther faster, and many were less inclined to stay in camps when they could return promptly to the village.

Cash assistance from government agencies began to be made available. BIA cash assistance programs to the area were started sometime in the 1940's (personal communication, Lilly Rose, BIA). Assistance currently administered by the State began in different years, depending on the program; for example, Old Age Assistance began in 1937, Aid to Families with Dependent Children in 1945, and Food Stamps in 1965 (personal communication, Kimberly Busch, Alaska Department of Health and Social Services). These programs had substantial impact on Norton Sound village economies, providing a source of cash where previously cash had been very scarce.

Sometime around 1960 commercial fish buyers began to come to Shaktoolik offering a market for salmon, and commercial salmon fishing became a major summer activity. Today it remains the major source of income for many Norton Sound village households.

Also in the early 1960's, snowmachines were made available to Shaktoolik. Dog teams soon became inactive, and most gradually died off. This resulted in major shifts in resource harvest, as the massive quantities of salmon and seals were no longer needed for dog food, as well as other species such
as tomcod and arctic char. Snowmachines provided the impetus for major changes in the hunting methods of land mammals such as caribou and fur bearers.

In recent years Shaktoolik has gained a number of expensive modern conveniences. These have included: oil stoves; new houses; electricity; an expanded store; bigger and better outboard motors, snowmachines, and boats; trucks; etc. The year 1981 is expected to bring a new high school/grade school building, phones for individual homes, and satellite television. Everyday living is definitely becoming increasingly cash dependent.

In recent years seasonal construction of new houses, schools, etc., has provided sporadic cash employment for many households. Since 1978, another source of income has been created by the commercial herring fishery.

These trends toward dependency on imported technology and energy are not necessarily irreversible. After several years of using oil stoves to heat their homes, most Shaktoolik residents have shifted back to burning wood, in response to rising oil prices. Households that are temporarily unable to pay their electric bills return to the use of gas lamps for lighting when their power is cut off. There is much local interest in raising dog teams, although only one functional team existed at the time of this study. Several hunters discussed the possibility of returning to the use of nets for the harvest of belukha after an unsuccessful hunting season in the fall of 1980.
CHAPTER IV

RESOURCE HARVEST AND UTILIZATION

Introduction

Assessing the importance of resource utilization to a specific community or region is a very complex task. The researcher must examine a myriad of factors: nutrition; social and cultural aspects of the harvest activity and distribution; alternative resources, both local and non-local, their comparative costs, and the ability of residents to afford them; dietary preferences; cultural values related to subsistence species; and others. Each study of subsistence has its own approach to the topic and concentrates on certain aspects of the problem. A primary thrust of this research project was to examine the timing, methodology, and area of resource harvest, including utilization, the shifts that have occurred in the past, and social aspects of the harvest such as cooperation and distribution. This material will be presented by species in this section of the report. The species discussed in this chapter are presented in Table 1.

The Seasonal Round

Subsistence harvests in Shaktoolik occur primarily in the spring, summer, and fall. Commercial salmon fishing dominates the summers of most households, and harvest efforts decrease in the cold, dark winter months. Caribou hunting picks up in the spring as days grow longer. With breakup come the
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<th>LATIN</th>
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<td>Delphinapterus leucas</td>
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<tr>
<td>uzruk</td>
<td>bearded seal</td>
<td>Erignathus barbatus</td>
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<td>ringed seal</td>
<td>Pusa hispida</td>
</tr>
<tr>
<td>spotted seal</td>
<td>spotted seal</td>
<td>Phoca vitulina</td>
</tr>
<tr>
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<td>including:</td>
<td></td>
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<td>Anas acuta</td>
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<td>green winged teal</td>
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<td>common eider</td>
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<td>Grus canadensis</td>
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<tr>
<td>seagull &amp; waterfowl eggs (mapped collectively)</td>
<td>including:</td>
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<td>glaucous gull</td>
<td>Larus hyperboreus</td>
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<tr>
<td>eider</td>
<td>common eider</td>
<td>Somateria mollissima</td>
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<td>cliff eggs</td>
<td>common murre</td>
<td>Uria aalge</td>
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<td>king salmon</td>
<td>king salmon</td>
<td>Oncorhynchus tshawytscha</td>
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<td>dog salmon</td>
<td>chum salmon</td>
<td>Oncorhynchus keta</td>
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<td>humpy</td>
<td>pink salmon</td>
<td>Oncorhynchus gorbuscha</td>
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<tr>
<td>silver salmon</td>
<td>coho salmon</td>
<td>Oncorhynchus kisutch</td>
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<tr>
<td>trout</td>
<td>arctic char</td>
<td>Salvelinus alpinus</td>
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<tr>
<td>herring &amp; herring eggs</td>
<td>Pacific herring</td>
<td>Clupea pallasii</td>
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<tr>
<td>tomcod</td>
<td>saffron cod</td>
<td>Eleginus gracilis</td>
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<td>burbot</td>
<td>Lota lota</td>
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<td>wolffish, rockfish</td>
<td>Bering wolffish (?)</td>
<td>Anarchias (?)</td>
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<tr>
<td>cigarfish</td>
<td>capelin</td>
<td>Mallotus villosus</td>
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<tr>
<td>crab</td>
<td>red king crab</td>
<td>Paralichthodes camtschatica</td>
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<td>mussels &amp; clams</td>
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migrating marine mammals and waterfowl, followed by herring and then salmon. In mid-August, as commercial salmon fishing slackens off, subsistence salmon harvest increases, with berry picking and moose hunting, followed in September by belukha, waterfowl, fall salmon, and arctic char. With freezeup, seals and ugruk (bearded seal) arrive, and ice fishing for tomcod, grayling, and arctic char begins. Soon it is winter and trapping season, with some harvest of ptarmigan and rabbits. Then caribou hunting begins again. For an example of a typical year, see Figure 1. The timing of the various harvests can shift by as much as a month or more from year to year, as some years have a late spring, an early winter, a mild winter, or other seasonal variations. This is particularly true for those migratory species that are available in the spring and fall as well as those which require particular environmental conditions for their harvest (e.g., ice cover for crabs).

It should be noted that Figure 1 describes the timing of the current harvest. Therefore, some species rarely or no longer harvested are not listed, and certain seasonal harvests that no longer occur are not included. In addition, for simplification certain species are grouped together, although they are harvested at slightly different times (e.g., "ducks, geese, and cranes" and "berries"). The salmon seasons denoted include both commercial and subsistence effort. The commercial season is June 15 through August 30, although subsistence harvest also takes place during this period.

In the past Shaktoolik residents would move to seasonal camps to facilitate the harvest of various species. Today many households have given up camping and return each evening to the village. This is due to a large extent to the new technology of outboards and snowmachines which allow rapid transit
## FIGURE 1

**SHAKTOOLIK SEASONAL ROUND**

<table>
<thead>
<tr>
<th>Animal Type</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
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<td>Rabbits</td>
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<td>Fur bearers</td>
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-35-
between areas. However, several people continue to camp in the same spots used by their forefathers. Prior to outboards, in the spring most of the village would move to camps at Ganigak and other spots near Cape Denbigh for several weeks to harvest belukha, ugruk, wolffish, greens, herring, cliff eggs, etc. The meat and fish would be dried on racks, the greens stored in seal oil. Following the cliff egg harvest in early July, the people would return to Shaktoolik for a brief lull in harvest activity. Then, when the salmon were up the river, the people would move to their upriver fish camps. In the fall the move was back to the coast for the harvests of that season. Caribou hunters would camp up in the hills at the headwaters of the Shaktoolik River in the winter and early spring, as would some of the ardent trappers. Today the older hunters/fishermen are more inclined to camp than the younger generations. Several individuals continue to camp as part of the harvests of belukha, waterfowl, caribou, and berries, whereas few maintain their upriver fish camps. Camping for upriver salmon was greatly reduced with the inception of the commercial salmon fishery, which tied most households to the coast during the summer. Some camping occurs as part of commercial salmon and herring fishing.

**Marine-related Species**

The main focus of this study is on those species that have some relationship to marine waters and would therefore be most vulnerable to impacts from offshore oil development. This includes marine mammals, sea birds, migratory waterfowl, marine fish, anadromous fish, and shellfish. The following discussion is primarily of those species most important to Shaktoolik subsistence users for which harvest maps were produced. In addition, there are
very limited data presented on some species that are utilized to a lesser extent than are the marine-related species which serve as the focus of this study.

Belukha or White Whale

The belukha or white whale is a resource highly valued by Shaktoolik residents. When belukha are in the area and weather conditions are good, the pursuit of muktuk -- blubber and skin of the whales -- takes precedence over most other harvest activities. For instance, in September of 1980, there were at least two weeks in which up to five Shaktoolik boats were hunting belukha practically every day.

Some dramatic shifts have occurred during the remembered past regarding local belukha harvest patterns. Shaktoolik residents felt that these shifts have occurred primarily as a result of changes in harvest technology. The three major harvest methods that have existed in this area in the remembered past are as follows:

1. Up until the onset of the use of outboard motors (roughly 1935), the predominant harvest method was with the use of belukha nets. Elders in Shaktoolik can also remember a couple of old men that hunted by kayak during this period.

2. In the early days of outboard motors (1935-55), belukha could be easily taken by boat in the shallow waters near Shaktoolik. The use of nets died out for the most part as a result.
3. As the use of outboard motors increased (1955-1980), it became necessary for hunters to venture further out from the village to encounter belukha, expanding their hunting areas to include Norton Bay and waters near Besboro Island.

Hunting by kayak may have been the primary method of belukha harvest in the distant past. However, even in the childhood memories of Shaktoolik's oldest residents, hunting belukha by kayak was a dying art practiced by only a couple of old men. Although by the early 1900's most of the belukha harvested by Shaktoolik were caught in nets along the coast, there are indications that kayaks at one time were used much more frequently for this purpose. For instance, one man in his late 80's recalled a belukha drive that occurred about 1900 in upper Norton Bay. This elder had spent his early childhood in a small village about seven miles east of Bald Head, later moving to Shaktoolik, by which time belukha hunting by kayak was dying out in the Shaktoolik area. One spring when he was a boy, hunters from the small village spaced 10 to 12 kayaks out to the east and herded several belukha into the shallow water by making lots of noise. The belukha were kept in the shallow water until the tide went out. Then several were killed, the hunter on the end of the line of kayaks getting his first. The whales could be chased in the shallow water by following their wake. In shallow water the whales are unable to swim at their normal speed. A special killing harpoon was used, with which a whale could be killed instantly with one thrust if the correct spot was hit. At least 24 whales were taken; the hunters waded home in waist deep water pulling kayaks and whales. One Shaktoolik man in his 60's recalled his grandfather describing kayak hunting during his life. Another elder described that in earlier years when a herd of belukha was seen approaching...
along the coast, four or five kayaks would paddle out and herd the whales into shallow water and then harvest them.

The technique of actually dispatching a belukha by kayak was to initially harpoon the whale with an attached float line. Traditionally, inflated seal pokes were used as floats. Once the whale had a float line attached, the hunter would be joined by other kayaks in pursuit of the whale, eventually killing it with rifles. Another method was to wait for the whale that you wanted, kill it with one shot, and quickly harpoon it before it sank. One informant described that a belukha was too much for one kayak to tow, so two kayaks would be lashed side by side, using a cross piece, and paddled home together towing the whale. The elders used to say that a belukha in shallow water makes three waves; if the hunter can maneuver his kayak onto the second wave, the wake of the whale will pull the kayak along with minimal effort by the hunter. Thus the hunter is able to follow the whale and harpoon or dispatch it at the appropriate moment.

More than one harvest strategy for an individual kayak was described. One method used was to wait for the whales to move to shallow waters along the coast to feed on tomcod and herring. The hunter would be on the lookout for whales that were coming, possibly glassing (searching with a telescope or binoculars) from higher elevations near the Cape. When a herd of whales was seen coming, the hunter would maneuver his kayak into their path and harpoon the one he wanted as it swam by.

The last old man to hunt belukha by kayak had a different technique. In the spring he would wait for belukha to come into the shallows near Ganigak to
feed, not pursuing those that were traveling. When a herd had come in to feed, he would move upwind in his kayak and allow himself to drift into them with the wind. He would harpoon one and let loose his seal poke float. Then the other people would go out in their kayaks to help him retrieve the whale. This strategy required much patience and skill. A few years earlier there had been another old man who hunted by kayak, but he had been killed when his float line had tangled around his wrist and the harpooned whale had pulled him from his kayak.

Belukha were present during all ice free months but were harvested only during the spring and fall. This was due in part to the other harvest activities that occupied the people during the summer, particularly salmon fishing up the Shaktoolik River. The areas utilized for kayak hunting were shallow waters near Ganigak and between Sineak and Malikfik where the whales would stop to feed, as well as the other coastal waters from Beeson Slough to the Cape where the belukha would pass through as a part of their migration up and down the coast (see Map 3). As no one alive today participated in the belukha hunting by kayak described above, the areas shown on Map 3 are based on what the three informants had heard from elders in the past.

Another method of harvest used in the days of kayaks as well as recently was to trap a herd of whales in a river. Belukha will occasionally go up into river systems at high tide. In the past hunters would position their kayaks between the whales and the river mouth and keep the herd in the river system until the tide had gone out and left the whales vulnerable to harvest in the shallow water. At least two such harvests have occurred in recent years. In one of these harvests in the early 1970's, a herd was trapped by boats in
Map #3 Belukha Harvest
local name: whale
time period: up to 1935
season: spring & fall
method: kayak
# of sources: 3
--- up to 1900
a slough just inside the mouth of the Shaktoolik River and 14 were killed. A few years earlier another harvest yielded over 20 belukhas. At present hunters will occasionally attempt to herd whales into the rivers and up into the shallow water. However, harvest in coastal waters was the more common method in the days of kayaks, and this has remained the case up to the present.

Traditionally belukha were occasionally taken by hunters from the edge of ice until breakup as an activity incidental to seal hunting. If a belukha passed close to the ice edge, a hunter would kill it with his rifle and quickly harpoon it before it sank. One source described how when belukha were seen approaching the ice edge, the hunter would rush to the ice edge to intercept them. The whales would invariably surface three times immediately before diving under the ice. On the third time, just as one neared the edge, the hunter would shoot it. The whales would often surface again in the same spot as they reemerged from under the ice where they were feeding. It was desirable to shoot the old, pinkish, larger ones, for they were fat and would float more frequently, whereas the smaller ones would sink. This hunting practice died out with ice seal hunting after the introduction of snowmachines in the early 1960's, largely due to the decreased need for seal meat and blubber for dog food. (For maps of the areas where this harvest occurred, see Maps 13, 14, 21, and 22 for ice hunting areas of ugruk and ringed seal.)

In the remembered past nets were the primary method of belukha harvest until the introduction of outboards in the 1930's. Although traditionally made of seal hide, nets that people have seen in their lifetimes were made
of some sort of white man's twine, with a large mesh. One source described nets as having small floats which were burnt to blacken them and make them less visible. The nets were constructed with the mesh a substantial distance below the floats, so that whales would see the floats but not the net itself. Another man used a shiny buoy that he believed the whales would mistake for ice, and therefore they would be less likely to avoid the net.

The nets were set primarily from mid-August to freezeup, since it was believed that the whales would see and avoid nets during the long spring days. However, at least one source did remember setting his net in the spring. Another reason given for the lack of belukha hunting in the summer was that the warm weather and flies would readily spoil meat being dried, and there were no freezers at that time. In addition, involvement in other harvest activities during the summer would preclude belukha netting. The nets were set at various spots along the coast, the primary areas being near Ganigak and out from the old and new village sites (see Map 4). There were belukha hunting camps used at Ganigak, Beeson Slough, and Little Mountain.

At Ganigak the nets were set close to the shore, whereas by the village they were often set further out. One elder described how he would go out by boat, checking the depth with a pole until he would reach a spot about two miles out where the bottom dropped off to deeper depths. This was where his net would be most successful. Another man recalled that four or five individuals would stagger their nets in a line straight out from the coast. The nets were only approximately 30-40 feet long, and a person might have more than one. One particular individual would set four or five at a time. When
Map #4 Belukha Harvest
local name: whale
season: ice free months
method: net
# of sources: 4
camps
-----A, up to 1935, mid-August to freezeup
-----B, up to 1935, fall
-----C, up to 1930, fall
-----D, up to 1930, summer & fall
a whale was seen splashing in a net, the net owner would go out and kill it. Seals and *ugruk* (bearded seals) would also be caught in the nets.

With the introduction of outboards, the use of nets for belukha gradually died out, although some elders continued to use them for several years. In recent years, two older men have occasionally set belukha nets in the fall. Only one belukha was mentioned as having been caught this way recently. Infrequently, belukha are caught in commercial salmon nets. However, often such an encounter results merely in a damaged salmon net.

Shaktoolik people felt that more belukha were caught by nets in the past than are harvested at present. One elder recalled catching 12 in his nets in one season. Some felt that this greater level of harvest was due to more whales being present in earlier years, whereas several believed that whales have become wary of outboards and learned to evade them. There are indications of a possible renewed interest in belukha nets for this reason. In the fall of 1980 when no belukha were harvested despite extensive effort by hunters in boats, some hunters discussed the possibility of setting king salmon nets to capture whales. If anchors are light and lines loose, a whale will roll itself up in a salmon net if it swims into one. Another man felt that the best approach would be to set a belukha net at the spot a few miles southwest of Point Dexter, where nets had been set in the past (see Map 4). His feeling was that the constant outboard activity near Shaktoolik would prevent success in netting efforts near the village.

In the early 1930's outboards were introduced to Shaktoolik, and by 1941 five different households had them. Gradually, boats with outboards
supplanted nets as the primary mode of belukha harvest. During the initial 15 to 20 years of outboard hunting, the belukha continued to come into the shallow waters near the coast and were hunted primarily in the shallows between Shaktoolik and the Cape. One man also described hunting them as far south as Beeson Slough as well as in the shallow waters between Point Dexter and Little Mountain. Two of the hunters interviewed had used camps while hunting (see Maps 5 and 6). As was the case with kayaks and nets, most of the outboard belukha hunting took place from mid-August to freezeup for the same reasons given earlier, although some occurred in the spring as well.

The hunters would wait until a herd of whales was sighted coming up the coast and then race out at top speed to drive the herd into shallow water. Another method was to drift in the boat with the motor stopped until the herd was in the desired location and then drive the whales in. One elder stated that the strategy was to hold the whales in the shallow water until the tide went out and left the whales vulnerable. In the early days of outboard use, a common size of motor was nine horsepower, but this was adequate for belukha chase activities. Once in shallow water, the whales could be easily chased following their wake. The technique was to keep to the outside of them and a certain distance behind. If the boat got too close to a whale, the whale would double back on its path. If the whales could not be successfully herded with the boat alone, a 22 rifle would be fired into the water, causing the whales to veer off in the opposite direction. One source stated that belukha did not swim very fast, moving just fast enough to keep the desired distance away from the outboard.
Map #5 Belukha Harvest
local name: whale
time period: 1935-1955
season: spring, August
to freezeup
method: outboard
# of sources: 4
camps
A, 1935-55, August
Map 35 Belukha Harvest
local name: whale
time period: 1935-1955
season: spring, August to freezeup
method: outboard
# of sources: 3
 camps
A, up to 1980
spring & fall
B, up to 1980,
all ice free months
C, up to 1980, fall
There was general agreement that whales were more plentiful near Shaktoolik in those days. Huge herds would migrate along the coast, and herds of belukha could be heard splashing in the river mouths at night. Hunting was so easy that the hunters could choose which whale they wanted and what number they felt like harvesting at that time. The whales would be harpooned with a float line and then shot or shot and immediately harpooned so they wouldn't sink. Hunters would leave one belukha tied to a float and race off to get more, returning to retrieve their catch when the rest of the herd had escaped to deeper water. One hunter remembered his boat getting four in one day using this technique.

In the mid-1950's as outboards became more numerous and their use more prevalent, belukha began to frequent the coastal waters near Shaktoolik in lesser numbers than they had in the past. There are a number of explanations given by Shaktoolik residents for this phenomenon. The predominant opinion is that the increased level of outboard activity had caused belukha to avoid the noisy areas. With the onset of commercial fishing in the early 1960's, outboard activity along the coast greatly increased. One source felt that the large engines of commercial processor-tender vessels were especially disruptive to belukha migration patterns. Others felt that the introduction of diesel generators in the villages had produced a noise level that belukha avoided. Several hunters believed that the whales had learned which areas were likely to cause them problems (i.e., harvest effort) and therefore avoided those areas. This is an opinion also shared by several residents of Golovin, Teller, and Brevig -- communities near estuarine water systems where belukha were common in the past but have not been present in significant numbers for several decades. Another factor described was the absence of
killer whales in recent years. In the past killer whales were often seen in large numbers in the deeper waters out from Shaktoolik. Their presence would cause the belukha to move into the shallow waters where they were safe from killer whale attack. The absence of killer whales is believed to have removed some incentive for the belukha to stay in the shallow areas.

As a result of fewer belukha being present in the waters between Shaktoolik and the Cape, hunters have greatly expanded their hunting areas in the last 25 years. However, belukha are still occasionally sighted from the village itself. Hunters may use binoculars to scan the ocean from the roofs of their houses. Sometimes pilots flying in the area will inform the village by radio of the presence and location of belukha. If belukha are sighted passing by the village, hunters rush to get their crews and equipment together and take off in pursuit. If hunters are aware that belukha are in the area but none are sighted near the village, hunters have fairly standard routes that they travel in search of the whales.

The routes traveled in search of whales vary somewhat depending on the season. In the spring (see Maps 7 and 8) two basic areas are hunted. Most hunters will travel a loop out around Besboro Island, possibly stopping there to climb the cliffs and glass the surrounding waters, and if no whales are spotted, they will proceed north to Cape Denbigh. The other area consists of a loop from Cape Denbigh up along the coast of Norton Bay, possibly stopping to glass at the point about three miles southwest of Point Dexter as well as at Little Mountain. The route traversed into Norton Bay depends on the extent of the sea ice that remains in the bay at that time. Therefore, some of the routes described on the maps do not extend very far into Norton Bay.
Map #7 Belukha Harvest
local name: whale
time period: 1955-1980
season: spring
method: outboard
# of sources: 5
camps
- A, 1955-1980
- B, up to 1980
- C,D, 1935-1980
Map #8 Belukha Harvest
local name: whale
time period: 1955-1980
season: spring
method: outboard
# of sources: 6
camps
- - - - A,B, up to 1980
- - - - C,D,E,F,G, up to 1980
- - - - H, 1955-1980
In any event, the hunters do not proceed beyond the mouth of the Inglutalik River, cutting west from that point to Haid Head, also known as Reeds Point. Here the bay is perused with binoculars again, whereupon the hunters cut across toward Cape Denbigh or proceed farther to the west before heading home. A variety of different spots are used as overnight camps, as can be seen on the maps. One hunter stated that he pursues belukha in the spring only incidental to the ugruk hunt.

In the fall the routes traveled are slightly different (see Maps 9 and 16). Fewer hunters travel out around Besboro. Most prefer to stay closer to the coast due to the more dangerous weather conditions that occur in the fall. Choppy water and winds can pick up quickly and catch the hunter off guard. For this reason, hunters must move fast to take advantage of conducive weather when it occurs. By way of contrast, the water is often "glassy" calm in the spring, especially during breakup. Additionally, more of the hunters proceed all the way to the Inglutalik River in Norton Bay in the fall due to the lack of ice at this time. The reason given for not traveling further north than the Inglutalik is that the water becomes quite shallow beyond that point. The same spots are used to glass the area as in the spring, and several of the spring camp sites are also used.

Belukha can be sighted from two to four miles away when glassing from a boat, whereas they can be spotted from eight to ten miles away from a hill or bluff. The distance at which belukha can be seen depends on the condition of the water; if it is calm, visibility is best, but if the surface is bright from reflected sunlight, visibility is decreased. These distances should be
Map #9 Belukha Harvest
local name: whale
time period: 1955-1980
season: fall
method: outboard
# of sources: 4
camps
A, B, 1955-1980
Map #10
Belukha Harvest
local name: whale
time period: 1955-1980
season: fall
method: outboard
# of sources: 6
camps
--- A, up to 1980
--- B,C,D, 1955-1980
--- E, 1955-1980
kept in mind when considering Maps 7, 8, 9, and 10, as the lines drawn indicate the routes traveled and do not take into account the areas the hunters scan beyond these routes.

Belukha are usually hunted in the spring starting in April and early May and into June. One hunter stated that belukha come into the area to feed on the herring run, which usually occurs soon after breakup. Fall hunting occurs primarily in September and October. Belukha have been seen in the area as late as November, but the weather has usually deteriorated to the point of precluding hunting by then.

There are a number of factors which differ between spring and fall hunting. Spring hunting is generally considered to be better, one reason being that there seem to be more whales during this season. Hunters agreed that in the spring there are more whales in Norton Bay than south of Cape Denbigh. As mentioned earlier, in the spring the weather is more inclined to be calm. Choppy water makes the chase more difficult, as well as making it harder to shoot accurately. In the spring the long days make darkness less of a problem, whereas in the fall whales being chased are occasionally lost because of nightfall. One hunter thought that the larger swells in the fall made whales harder to spot. Several sources mentioned that belukha are more likely to float in the spring due to a thick layer of blubber (particularly in the case of large, older whales). One source felt that this increased buoyancy in the spring also caused the whales to surface more often, making them easier to hunt. In the fall large numbers of herring are known to attract belukha into Norton Bay.
Norton Bay is regarded by many hunters to be a better hunting area than south of Cape Denbigh. In addition to the large numbers of whales that frequent the Bay, the water there is more shallow than much of the area south of Cape Denbigh and therefore provides better hunting success. One hunter mentioned the Inglutalik area as being particularly good due to its shallow water. One problem mentioned for Norton Bay was the distance Shaktoolik hunters have to travel to get there. Norton Bay is also hunted by Koyuk and Elim boats, so that on some days during the belukha season, boats from all three villages will be hunting in the Bay. Koyuk hunters often harvest belukha in Norton Bay during the summer as well. Shaktoolik hunters have a special cooperative effort worked out for hunting in Norton Bay. The Shaktoolik boats will travel abreast on their circuit around the Bay. The boat closest to the coast will travel close enough to shore to see anything between itself and the beach, whereas the other boats will be spaced a considerable distance apart, keeping the adjacent boats in sight of each other. Traveling around the Bay in this manner with four or five boats allows the hunters to cover a major portion of the Bay. Therefore, when viewing the belukha hunting maps, it must be understood that the middle of Norton Bay is hunted as well as the perimeter. If one boat suddenly sights whales and takes up the chase, other boats will see this activity and rush over to participate. One hunter described another method to determine where the action is; that is, boats will stop their motors and listen for rifle shots.

The depth of the water where whales are encountered has great impact on harvest success. There continues to be some effort to herd the whales into shallow water as in the past, but often the whales are encountered too far out to make this strategy practical, and other strategies are used. One
middle-aged hunter felt that it was not possible to herd whales in deep water as they would scatter, and two older hunters stated the chances of being successful hunting in deeper water were so reduced that they wouldn't even bother. In deeper water the hunter must anticipate the movement of whales under water, basing his judgement on the direction the whales are heading when they surface to breathe. When a group of whales is seen surfacing the hunters race up to them at top speed. In deeper water it is very difficult to get close enough to a whale to harpoon it before it dives. Therefore, the common method is to wound the whale with rifle bullets, weakening it so that it will slow down and surface more often. One active hunter stated that the boats will follow the whales until the herd starts traveling in a straight line. Then the hunters will begin shooting. Belukha will usually sink when killed outright; therefore, the hunters aim for the mid-section rather than the brain, attempting to hit the lungs or other vital organs. A belukha will usually surface to breathe three times in rapid succession before sounding. Therefore, when the hunters see some whales surface the first time, they try to get within accurate shooting range before the whales have sounded again.

The harpoon follows the traditional design of a detachable head tied to a float line. This harpoon head must penetrate the belukha skin so that the head will turn sideways and be firmly lodged under the skin. If the boat is moving too fast when the harpoon is thrown, the harpoon head will not penetrate far enough to turn sideways and will therefore slip out. Once the float line has been attached to the whale with a harpoon, the whale is shot through the brain as soon as possible. The traditional local hunting ethics require that a boat not pursue any other whales until the one that the boat
has wounded is caught or lost. Usually, there are other whales present, and the other boats will race off to pursue their own whale, leaving the boat which has wounded a whale to chase that one and hopefully retrieve it. However, if there are few whales, the boats will work together to harvest one wounded whale. Sometimes, boats may help pursue a whale until it has been killed and then go after their own. If a boat has lost the whale it was chasing, it will go help another boat with its whale.

A type of boat commonly used for belukha hunting today is the 18-21 foot aluminum skiff, although some hunters own wooden boats such as those used previously. Outboards today are generally no larger than 55 horsepower, although some hunters use two outboards for greater speed.

In the fall of 1980 no belukha were taken, although some were sighted on several different occasions, and much effort was expended in pursuit of them. Some hunters traveled farther than usual in their search for the whales, such as hunting to the west of Bald Head. This was not the first time that this phenomenon of no hunting success had occurred. One hunter recalled a spring a couple of years previously in which hunting had been poor. Several reasons were given for the lack of success that fall, including fewer whales than usual, choppy water, and losing wounded whales in the dark. One middle-aged hunter felt that some younger hunters had failed to herd whales into the shallows properly on at least one occasion and had lost them as a result. However, the opinion most frequently expressed was that the whales were getting smarter and had used a variety of tactics to evade the hunters, including simply not coming in close to shore very often. It was thought that at the first sound of an outboard, the whales would scatter and head for deeper
water. Several hunters described how whales being chased would submerge and remain in one spot until the boat had moved on to another area. One hunter believed that the whales had made an attempt to hide by barely surfacing when they breathed. Another man thought that the herds had been chased by several villages along the coast on their way to Shaktoolik and were wary of outboards by the time they reached Shaktoolik waters.

Shaktoolik belukha hunting crews do not necessarily have a specific, formalized division of labor, such as occurs with bowhead hunting crews on St. Lawrence Island. The three roles include the man who runs the motor, the one that harpoons the whale, and those that shoot. Boat crews are usually composed of three or four people but can be as few as two. Running the motor is very important as this person is responsible for following the whale and getting close enough to harpoon it. The harpooner also plays an important role as a properly placed harpoon often saves a whale that has been killed and is about to sink. Everyone shoots except the man at the motor. The hunters frequently exchange these distinct roles. They take turns running the outboard, and whoever is at the bow when the opportunity arises will be the one to grab the harpoon and throw it. One source stated that the man running the motor was the one with final authority, whereas another hunter described decisions as being democratic regarding which direction to travel, etc. The researcher's impression is that this process varies depending on the crew.

Crew composition does not follow any specific formula and apparently may fluctuate depending on who is available at the time. Crew members may be related to each other or be unrelated friends that have hunted together often.
in the past, or they may merely be those people that were handy when the
hunt begins. When belukha are sighted, owners of boats will scramble to
prepare their equipment and to get a crew together. They will call poten-
tial crew members by citizen band radio or these hunters may come and tell
the boat owners that whales have been sighted. One source stated that he
does try to select a crew that can shoot straight, handle a harpoon ade-
quately, etc. Crews may be organized beforehand when a hunt is being
planned.

Although belukha are usually taken as a result of a planned belukha hunt,
they are sometimes taken incidental to other subsistence activities. A
couple instances were described in which belukha were taken when encountered
while hunters were camping in Norton Bay with their families. In these
cases the wife would run the outboard while the husband shot and harpooned
the whale.

Expenses for the hunt are often shared equally. One hunter described how,
prior to a hunt, the crew would get together and decide how much gas, etc.,
was needed. On the day of the hunt each crew member would bring their own
tank of gas.

The pattern of division and distribution of the belukha has changed over the
years. Traditionally, there was a very specific way to cut up the whale;
one elder stated that this was the same way that a killer whale would cut
up a belukha. One "arm" would be cut off, then the other. Then there was a
strip about a foot wide around the middle behind the "arms" -- the "belt" --
which was removed. There also was a traditional way that the whale was
divided among those people who helped to harvest it. If a man got a belukha in his net and he asked someone to help him, he would give that person niniak. Niniak was the specific portion that was traditionally given to someone who helped. If one person helped, he would get the "belt." If there were three people who helped, two would each get an "arm" and "shoulder," and the other would get the "belt." Those were the three principal niniak shares. The "owner" of the whale (the one who owned the net or had originally harpooned the whale by kayak) would get all the rest of the whale. Other niniak shares may have existed for larger numbers of participants. One source had a different recollection of the traditional method of division; he stated that the hunter who took the whale would get the hind half, up to and including the lowermost rib. There was general agreement that the "owner" of the whale would get the tail, which was regarded as a delicacy. He also would get the valuable sinew along the backbone near the tail (important for skin sewing) as well as the stomach (used for storing food such as greens). The sinew was considered precious as it was hard to obtain and not very abundant. One elder also recalled that the "owner" would get the head of the whale. The hind half of the whale was an important share as it had a lot of meat and muktuk (skin and blubber) in addition to the sinew. It is interesting to compare these descriptions with that of the Russian explorer Zagoskin who observed belukha hunting at Pastol Bay, just north of the Yukon Delta, in 1842-1844. In addition to descriptions of massive belukha drives by kayaks, he observed that if a hunter succeeded in harpooning a belukha when an organized drive wasn't taking place, all the villagers were obliged to help. The first helper to arrive received the right "shoulder," the second received the left, the third and
fourth got the sides with the back fin, and the others got nothing. The original hunter kept the head, tail, and bladder (Michael 1967).

This method of division continued for some time after outboard motors were introduced. Two elders recalled that the "owner" share would go to the hunter who first shot the whale, the rest being divided in niniak fashion to other hunters of that boat. This division took place regardless of how seriously the first shot wounded the whale. The owner of the boat was likely to be the one operating the outboard and therefore was seldom the first to shoot the whale. Thus the owner of the boat usually only received the smaller niniak share.

At some point the niniak method of division was replaced by a more equal division which has persisted to the present. People agree that the traditional system gave the major portion of the whale to the hunter who first shot it. Today the belukha is divided equally among the hunters involved in the kill. However, some Shaktoolik sources stated that those people with whale in the past were more inclined to share their portions than they are now. Before, the "owner" of the whale (i.e., the man with the major portion), would give pieces to several different people, which does not happen as often today. Elders recall that in the old days, when a whale was taken, there would be a public feast on the beach, an event which reportedly no longer occurs.

The present method of division is for the crew to divide the belukha equally among themselves, regardless of who fired the shots or who owns the boat. Two systems of division were described for the situation in which two or
more boats kill a whale. One source stated that if a boat helps another boat to kill a belukha, the belukha goes to the first boat that shoots it, regardless of how seriously that first shot hurt the whale. If the boat that helped the original boat asks for a share, then it will get a share. Another hunter stated that if two or three boats all participate in killing a whale, the whale will be divided equally between the boats. However, this division of a whale between boats rarely occurs, because usually other whales are present. If a boat helps another boat, once the whale is dead, the helping boat will rush off to find its own whale. Boats have to be in on the actual chase or kill to get shares. The implication was that they also have to be present when the whale is divided. The boat that has the whale will haul it to shore, cut it up, and divide it. A specific cutting procedure is no longer followed. One source stated that an exception to the rule of equal division between the crew was that the hunter who actually killed the whale gets the tail, locally termed the "flipper."

Belukha was a traditional trade item. Indians from Yukon villages would come through the mountains to the coast by dog team to trade furs for belukha muktuk and other marine mammal products. Today, intervillage transaction of local resources is dominated by muktuk, as that is the item most desired by other villages. The large village of Unalakleet to the south is the main recipient of Shaktoolik muktuk that is sold. Shaktoolik hunters occasionally will bring a load of muktuk to Unalakleet and have no problem selling it, usually to the stores which in turn sell it to Unalakleet residents. One Shaktoolik household stated that this transfer of muktuk to Unalakleet had occurred less in recent years than in the past, although it still does happen. It was this researcher's impression that only a minor
portion of the total muktuk harvest is sold and that most hunters do not participate in this sale. In addition to traditional sharing, barter of muktuk between Shaktoolik households also occurs; for instance, muktuk might be exchanged for a quantity of highly valued salmonberries, between a household with an abundance of muktuk and one with none.

Belukha muktuk is a favored food at Shaktoolik. In the fall of 1980 several individuals expressed their anticipation of a meal of muktuk and regretted the fact that none was harvested. Although bowhead muktuk, left over from the bowhead harvest the previous spring, was available to some households, several people expressed their decided preference for belukha muktuk. When asked how they would fare without belukha muktuk this winter, a number of people stated that they would survive as they had seal oil which they regarded as a potential substitute.

As mentioned earlier, certain portions of muktuk are regarded as more desirable, in particular the tail. Blubber is occasionally eaten by itself, although usually it is eaten as a part of muktuk. Young grey belukha have a more tender muktuk than older ones. Belukha meat is eaten in lesser quantities than the muktuk and is sometimes used as dog food. Muktuk is eaten boiled or raw and is usually stored by freezing. Sometimes it is allowed to age to create a special delicacy. The meat is usually dried on racks in the spring. Belukha oil, though eaten in the past, is now generally considered too strong tasting for human consumption, but a few elders still like it.
In summary, belukha is a highly valued local resource, with a high level of effort being devoted to its harvest. The harvest, consumption, and distribution of belukha are an important element of Shaktoolik culture and the seasonal round.

Seals

Seal oil, rendered from the bludder, is a primary staple of the traditional and contemporary Shaktoolik diet. The predominant opinion of Shaktoolik residents regarding seal oil is that their diet would be severely lacking without it. In the past there were many other ways that the various parts of seals were utilized, some of which continue today.

A number of different species of seals are harvested by Shaktoolik. They include ugruk (bearded seal), "hair seal" (ringed seal), spotted seal, and, rarely, ribbon seal. In many ways the harvest and utilization of these species are similar, but there are enough substantial differences that a separate discussion of each is warranted.

Ugruk or Bearded Seal

Ugruk are the largest of the seals found in the Shaktoolik area, growing as large as 8 feet long and 750 pounds. A differentiation is made between the older, larger ugruk and the maklasoak or "young ugruk" -- the juvenile which has parted from its parents, having been born in the spring and on its own in the summer and fall. The young ugruk are more commonly found near the coast, whereas the older ones stay out in deeper waters where their diet of
shrimp and clams is more readily available. As with the other seal species, the harvest and utilization of ugruk have changed considerably in the past century. A major use of seals in the past was for dog food. When dog teams were replaced by snowmachines, seal hunting on the ice in winter and spring died out for the most part, and outboard hunting in spring and fall became the primary mode of harvest.

Traditionally there were at least four methods of harvesting ugruk: seal hole hunting, seal nets, kayak hunting, and stalking the basking ugruk on the ice. In the memories of Shaktoolik's oldest hunter, seal hole hunting had been done only by the elders. The hunter would go out by dog team on thin young ice and look for an ugruk breathing hold. Then the hunter would wait for the ugruk to appear and harpoon it in the nose. This method was used when young ice had set solid between floating ice cakes, and no wind was present to blow it away. This condition has not occurred for many years due to windier weather. This young ice would be so thin (three inches) that it would bend and wobble as the hunter walked over it. Sometimes when a hunter walked out in the middle of a thin area, the ice would sink down and begin to fill up with water. Occasionally the dogsled would break through. This activity naturally required great skill. Elders today recall being thoroughly frightened when they went out as young men with old hunters that knew the technique. A special type of pointed pole was used to test the ice. In addition, one elder described a special snowshoe made for the purpose of walking on young ice. The snowshoes were about a yard long with weak bindings designed to kick loose from the hunter's boots if he encountered problems with breaking through the ice. This young ice condition occurred prior
to March, with the ice becoming more solid and safer to travel on later. It appears that this knowledge of hunting techniques on the young ice has been lost.

As was discussed in the preceding belukha section, both belukha and ugruk were caught in large mesh nets set along the coast (see Map 4). This netting harvest sometimes involved complex systems of cooperation among the hunters. For instance, long ago at Ganigak there was a particularly fruitful spot for fall time netting. If a man had his seal net set there, he would have to give up that spot after he caught five ugruk. The next person to put his net at that spot had to do likewise, and so on, until everyone had five ugruk.

The hunting method by kayak varied depending on the environmental conditions. When hunting swimming ugruk in open water along the edge of the sea ice, for example, the traditional technique was to chase the ugruk in the kayak and to use a variety of harpoon types. One type was the "throwing harpoon," a light missile that was hurled with a throwing board. These missiles are documented to have had a maximum effective range of 120 feet (Laughlin 1980). When the seal popped its head out of the water, the harpoon would be thrown into the water below the head, where the body would provide a much larger target. To hunt a distant seal with this type of harpoon, the hunter would give chase by kayak, and every time the seal surfaced, the hunter would create a lot of noise, causing it to dive again. Eventually the seal would have to stay up a while to catch its breath, allowing the hunter to paddle swiftly to within throwing distance. A second type of harpoon was used in shallow water. Pursuing a seal in shallow water by following its wake, the
seal could be struck by throwing the harpoon into the fourth wave of the wake. Thus thrown, the harpoon would always strike the seal between the shoulders. This "shallow water harpoon" had a short line attached, about three or four fathoms long. The third harpoon used was the "killing harpoon," a heavy harpoon with a line. Once the seal struck by a throwing harpoon had weakened to allow the hunter within range, the killing harpoon would be used with the hunter firmly holding the end of the line. A large ugruk can pull with great force, but if the hunter or hunters could withstand its initial efforts, the ugruk would tire and be dispatched with a club.

The kayak was also used to pursue young ugruk in the river systems of the Malikfik and Sineak areas and the Shaktoolik River (see Map 11). During a lull in summer activity between salmon and berry harvests, men would hunt birds and young ugruk by kayak. One elder recalled getting four in one day in this manner. In the remembered past it was primarily a few older men who hunted this way. Some hunters continued to hunt young ugruk by kayak after outboards were introduced, but this method was dying out even before use of outboards began.

Other than the presence of young ugruk in the ice free waters of the rivers and along the coast in early fall, ugruk usually are found in the winter and spring with the floating ice and sometimes along the edge of the shore ice (see Maps 12 and 13). Due to the close association of ugruk with the floating ice, some Shaktoolik sources thought that the hunting effort along the ice edge was primarily for ringed seals, with ugruk being taken when encountered. One older hunter believed that ugruk found along the ice edge
Map #11
Bearded Seal Harvest
local name: ugruk
time period: up to 1935
season: fall
method: kayak
# of sources: 1
camps
A, up to 1935
Map #12
Bearded Seal Harvest
local name: ugruk
time period: up to 1960
season: freezeup to breakup
method: dogsled/kayak
# of sources: 3
Map #13
Bearded Seal Harvest
local name: ugruk
time period: up to 1960
season: freezeup to breakup
method: dogsled/kayak
# of sources: 4
camps
A, up to 1960
B, up to 1960
C, E, F, up to 1960
D, 1951, March
are usually in transit. A common statement made by hunters was that one
does not hunt for a specific type of seal but rather goes out to take what-
ever species that is encountered. However, specific spots were known
where ugruk were inclined to haul out on the ice near Besboro and on the
far side of the Cape. They would rarely haul out along the ice edge be-
tween Besboro and the Cape, but if seen in the water, they were shot and
efforts made to retrieve them. The primary ugruk harvest would take place
when a steady west wind would bring floating ice cakes in against the shore
ice, and the hunters would go out on the floating ice to look specifically
for ugruk.

The edge of the ice would move out from the coast as the winter progressed;
in some years it would extend even west of Besboro but more normally would
form a crescent to the east between Besboro and the Cape. Since this edge
moved over a considerable distance in the course of a winter, Maps 12 and
13 illustrate broad hunting areas for the most part, rather than narrow
strips. The areas on the far side of the Cape were not accessible every
year but only when enough shore ice was present at the tip of the Cape to
allow dog teams to travel around it. According to one source, hunters did
not normally proceed up into the middle of Norton Bay to hunt because of
thin ice.

A number of camp sites were identified on Besboro and in the vicinity of
Ganigak. However, some hunters would leave home early in the day and return
that night. One source stated that in those years when people had dog teams
to feed, hunters would harvest as many ugruk as possible when conditions
were right (i.e., in March and April when a west wind had brought in the
floating ice). During these ideal conditions hunters would camp for two or more days on the ice edge out from the old village site. The most common use of the kayak that occurred in the lifetimes of contemporary Shaktoolik elders was to cross the leads and open water to get to the floating ice and to harpoon and retrieve ugruk and seals shot in the water from the ice edge. One type of kayak hunting for ugruk recalled by elders was to paddle among the floating ice in April and May. Special environmental conditions were required for this type of hunting. People would camp at Ganigak for a number of weeks, drying ugruk meat and storing it in seal pokes. In the small kayaks they did not go very far out from the ice edge -- no more than three or four miles -- in an area around the Cape (see Map 14). This use of the kayak ended after outboards were introduced in the 1930's. However, kayaks continued to be used to reach the floating ice when it was not far from the ice edge.

Preferably, ugruk are taken when basking out on the ice, because ugruk killed in the water often sink. Ugruk tend to sleep right next to the ice edge. The hunter would try to kill the ugruk with his first shot to prevent it from rolling off into the water. Therefore, a lot of care was taken in approaching within accurate shooting range of a sleeping ugruk. This approach was by kayak if the ugruk was sighted on a floating ice cake out from the shore ice. If the hunter was approaching on foot, a white "snowshirt" or parka cover was worn for camouflage, the drawstring of the hood drawn tight so that only a small portion of the face was exposed. The hunter would put a bullet in the chamber of his rifle before getting very close to avoid unnecessary noise. The technique of crawling included keeping the arms tight against the body and trying to maintain the same stance relative to the ugruk, so
Map #14
Bearded Seal Harvest
local name: ugruk
time period: up to 1935
season: April, May,
before breakup
method: kayak
# of sources: 1
camps
A, up to 1980
that when the ugruk looked up and the hunter froze, the ugruk would always see the same silhouette. If a number of hunters were hunting together, one or two would stalk the ugruk while the rest waited behind. This technique is much the same as that used long ago, but in early times the hunter had no rifle and would have to get quite close, then rush up and harpoon the ugruk and hang on vigorously to the harpoon line. Since rifles have been available, the harpoon has been used to retrieve a dead ugruk or to secure a wounded one.

If an ugruk was shot in the water or had escaped from the ice into the water, the primary method of retrieval was to harpoon it from a kayak brought along for that purpose. If the ice edge was not far from the village, the hunter would walk out pulling his kayak on a special sled, which was approximately five feet long with ivory runners. The hunter also would pull the sled and kayak across the floating ice in search of ugruk. If the ice edge was too far to walk, the kayak would be taken out by dog team, but the dogs would be left behind when ugruk were sighted.

As mentioned before, dead ugruk often sink. Those that floated were harpooned promptly, for even they would frequently sink in a matter of minutes. Sometimes ugruk could be harpooned from the ice edge without the use of a kayak. One method of retrieval that was used long ago was the seal hook -- a wooden float with metal hooks that was thrown from the ice edge over the floating seal and dragged back across it with a line and tugged to set the hook when it touched the seal.
One hunter described being taught long ago by his grandfather to shoot a swimming seal in the nose. When the seal dived, a body shot might cause it to die underwater and be lost, whereas a nose shot would force it to the surface where it could be harpooned.

Ugruk hunting on the ice occurred during most of the time that sea ice was present and safe to walk on. The primary harvest occurred later in the season (i.e., in March, April, and May), when the ice was safer, days longer, and floating ice present. Today very few hunters hunt off the ice edge. The primary reason is that most households lack dog teams and can meet their needs for ugruk with the spring and fall outboard hunts. However, some households do have several dogs, and ice hunting for dog food and human consumption does occur to a limited extent. There are no longer any kayaks present in the village.

The introduction of outboards in the 1930's expanded the harvest of ugruk considerably. In years recalled prior to this, the harvest of ugruk during the fall and in rivers had been limited to nets and the efforts of a few older men in kayaks. The use of outboards facilitated the fall harvest of ugruk and other seals. In addition, outboards had considerable effect on ugruk hunting among the floating ice. In the past kayaks had a very limited range, and hunters had to wait for the floating ice to come close to the land fast ice edge. With outboards, hunters could traverse much greater distances to reach the floating ice in spring, whether out to the west or up into Norton Bay. One problem with the heavy wooden boats that replaced kayaks was the difficulty involved in hauling them out to the ice edge.
Travel patterns relating to hunting effort have changed since the days of the first outboards. Heavy boats with nine horsepower motors could move only half as fast as the equipment used today. This, and the comparative scarcity of gasoline in those early days, made people more inclined to camp when in distant locations such as Norton Bay, rather than returning to Shaktoolik. Another method of conserving gas was to anchor in a particular spot during the fall hunt and wait for game to approach.

The basic technique of catching a seal from a boat is to shoot the seal and quickly harpoon it before it sinks. If the seal is on the ice, it may die before reaching the water. If the seal is swimming, once it is headed in one direction, it can be successfully followed. If the boat follows at the right speed, when the seal surfaces, it will not be far off.

A form of drag hook is sometimes used in an attempt to retrieve sunken seals and belukha. One design is a metal shaft with four (four inch) hooks, whereas another is a metal bar with a hook on either side. If the animal sinks, the boat will immediately anchor at the spot, and the hook will be flung out in various directions. Sometimes oil will rise to the surface from the dead seal or whale, and if the current is considered, this oil can help indicate the animal's location. The hook is dragged along the bottom; if it encounters resistance, a sharp tug is given to set the hook. One source recalled a hunter hooking a sunken ugruk in the middle of Norton Bay in about six fathoms of water. A more common depth in which the hook can be used successfully is three fathoms.
Although the use of kayaks died out, the hunting of young ugruk in the rivers has continued with the use of outboards. The young ugruk will move up into the Sineak, Malikfik, and Shaktoolik drainages with the incoming tide and then go back out with the tide in the early morning. The river hunting strategy in the fall is to travel by boat two or three miles up into the drainages early in the morning and meet the ugruk as they came back out (see Maps 15 and 16).

Young ugruk and other seals move into the Shaktoolik area in the fall as the weather freezes and slush ice begins to form along the coast. Seal hunting in the fall usually begins in October or late September. As the Shaktoolik River ices over, seals will haul out on the ice just inside the river mouth. The seals tend to stick around the river mouth due to the tomcod, smelt, and other food there. Therefore, the primary hunting areas are around the river mouths and the shallow coastal waters between Shaktoolik and the Cape (see Maps 15 and 16). Some hunters will hunt along the coast of the Reindeer Hills, even up into Norton Bay; one man had specific spots out by Besboro. Also some harvest has occurred south along the coast to the foothills. One hunter stated that the colder weather makes the long trip up into Norton Bay less appealing. Unstable weather no doubt plays a role in limiting the fall hunting areas as well.

One environmental condition which must be closely watched is the interaction between the wind and the slush ice. An onshore south wind can pack the slush in against the beach, particularly in the late fall (November). This layer of slush can be up to one foot thick. This condition prevents boating as boats cannot move through it. This can be dangerous if a boat gets stuck.
Map #15
Bearded Seal Harvest
local name: ugruk
time period: 1935-1980
season: fall
method: outboard
# of sources: 5
Map #16
Bearded Seal Harvest
local name: ugruk
time period: 1935-1980
season: fall
method: outboard
# of sources: 5
camps
- - - camps anywhere
or cut off from the beach. A north wind will blow the slush out and allow the boats to be launched, but choppy seas also often prevent hunters from going out boating in the fall.

Some hunting of ugruk and ringed seals does occur in the winter months (December, January, and February) by a few individuals if conditions are right. The light aluminum boats are hauled to the ice edge if the edge is not too far from shore and the ice not too rough. This type of winter hunting is only attempted if the weather is above freezing, for if it is colder, thick layers of ice form wherever water contacts the hull of a boat. The result is a heavy, slow boat, which can be very dangerous. In addition, in cold weather outboard motors become difficult or impossible to start. Moving through a layer of young ice can cut an aluminum hull. Days of above freezing temperatures are few and far between in most winters and do not occur every year. However, one hunter described a recent winter so mild that people were able to hunt by boat for a major part of the season. Hunting activity by boat increases as the weather warms in March.

Only four of the ten hunters interviewed gave areas for winter hunting. The others either never had hunted by boat in the winter or had done so rarely and felt that a map of their effort would be unwarranted. The areas identified ranged widely depending on the individual, from Besboro Island to Cape Denbigh (see Map 17). Winter weather can become adverse quickly. Hunters do not camp overnight, in part because a shift in weather could prevent their return to the village the next day. It is the researcher's impression that hunting in the winter by boat may have increased in recent years due
Map 17
Bearded Seal Harvest
local name: ugruk
time period: 1935-1980
season: winter
method: outboard
# of sources: 4
to the availability of aluminum boats that are light enough to haul across the ice as well as due to the occurrence of relatively mild winters.

The spring hunt begins as the weather warms and days get longer in March, April, and May. The ugruk are hunted as they lie on the floating ice or in the water amongst the ice. As is the case with belukha, spring offers better hunting conditions than fall, because long days and calm water make for easier and safer hunting. Ugruk are the main seals hunted in the spring, primarily harvested for their oil and meat. The primary spring hunting areas are around Besboro Island, along the coast from Beeson Slough to the Cape, and up along the Reindeer Hills into Norton Bay (see Maps 18 and 19). A number of different camps are used but only by three of the ten hunters interviewed. One hunter described climbing at Besboro to glass the area. Those areas that stretch north into Norton Bay follow the edge of the land-locked Norton Bay ice.

The uses of ugruk have changed considerably in the past century. The hide was in high demand for the soles of the traditional mukluks (boots). These are currently made by only a few women and are rarely used by hunters, whereas in previous times each man had several pairs. In the days of kayaks, an essential piece of equipment was a waterproof raincoat made of ugruk intestines sewn together. The base of this garment was wide so that it could be tied around the opening of the kayak, keeping waves from splashing inside.

Today the primary use of ugruk is human consumption of the meat and oil. Ugruk is the preferred seal for meat; people cut and hang the meat to dry
Map #18
Bearded Seal Harvest
local name: ugruk
time period: 1935-1980
season: spring
method: outboard
# of sources: 5
camps
*****A.B. 1947-1952
Map #19
Bearded Seal Harvest
local name: ugruk
time period: 1935-1980
season: spring
method: outboard
# of sources: 5
camps
- A, up to 1980
- B, C, D, up to 1980
- E, up to 1980
on racks in the spring. The dried meat may be stored as is or in seal oil. Fresh ugruk meat is highly regarded, and the method of preparation usually is to boil it rare. A few people like it well done or fried. The liver is eaten a number of ways, including fried, frozen, or raw (as part of a special hunters' snack, chopped up with intestine muscle). Ugruk flipper is aged in a special manner, then boiled and eaten as the delicacy "stink flipper."

People hunt ugruk for oil although many prefer the clearer oil of ringed seal and spotted seal. Ugruk oil is always yellow, and one source stated that it spoils faster than other seal oil. Oil and meat from young ugruk are preferred by some people to that of the larger ones. Whatever the source, seal oil has many uses including the following: a dip for meat, fish, and vegetables; and ingredient in fish and berry agutuk; preparation of different types of dried salmon and dried seal meat; and storage of greens and roots.

In the days of dog teams, seals were important as dog food. By April most people would have used up their supplies of "dry fish" (salmon) and would have turned to seal hunting for their dog food. Today only a few households have more than a few dogs. However, at least two households were raising pups in the fall of 1980 to produce dog teams, so that an increase in seal harvest by Shaktoolik residents for dog food is quite possible.

People agreed that seal harvest in general is much less than it used to be, because of fewer dogs, a decrease in skin sewing, and a decline in the human consumption of seal meat. The number of seals now required per household from the fall hunt for a winter supply of seal oil ranges from one to four seals. Each young ugruk or ringed seal yields about five gallons of oil,
according to one source. One household with a high level of traditional food in their diet estimated that they require four or five seals to provide seal oil for the year, depending on the amount of greens and dry fish that they put away in seal oil.

One factor which has impacted the timing of the harvest effort is the effect of the season on the condition of the seal. After breakup in May, the seals begin to shed their fur. At this time the quality of the hide is no longer waterproof; ugruk hide becomes useless for boot soles as water will go right through them. In the past when ugruk hide was heavily utilized, people would not harvest them when this shedding began. Today this factor is less likely to affect the harvest effort, as the hide is less important than the meat and oil. Additionally, during breakup ugruk have developed a thick layer of blubber, and one source stated that fat ugruk have better tasting meat as well. In the summer ugruk are skinny and will definitely sink when shot, so few or none are harvested. In the fall seal hides are in prime condition.

Traditionally specific shares -- niniaq -- were given by a hunter to those hunters that helped him to kill an ugruk. This was done only with ugruk and belukha, not with the smaller seals. Two different descriptions of this division were given. One elder described hunting with harpoons: the first hunter to strike the ugruk got one side of the ribs and haunch, the second got the same from the other side, and the third got a part of the lower back. The alternative description given by two other elders was that the person who first shot the ugruk would get the top half down to the flipper or lowest rib. The remaining hind portion would be divided among the other
hunters. One man recalled that if there were several people, each of the flippers would be a share. The hide would go to the first shooter. One other elder stated that the **niniak** division would occur between two men hunting as partners, the first to shoot the **ugruk** giving **niniak** to the other. If both shot it at the same time, the blubber and meat were split in half lengthwise. After the hide was stretched and dried, it also would be divided in half. This type of division no longer occurs. One middle-aged source thought that today younger hunters are less likely to divide an **ugruk** between different boats or to expect a share from another boat, since now everyone is fairly well assured of getting one or two themselves. In the past, prior to outboards, **ugruk** were more difficult to harvest. Today the division of **ugruk** within a crew is much more equal than the previous **niniak** system.

Most Shaktoolik households have their own hunter or hunters to provide them with seals. However, some households do not, being elderly or otherwise unable to hunt. These people are provided for by active hunters of other households so everyone can have seal oil for the winter. If a hunter has a butchered **ugruk**, friends and relatives may be invited to help themselves to a piece of meat.

Marine mammal products, including **ugruk**, were a valuable trade item in the past in the Norton Sound area. Indians from Kaltag, Koyukuk, and other Yukon villages would come in dog team caravans over the mountains to trade their furs with coastal villages for such products as seal oil, blubber, and hides. The early trading posts would barter for such things as dry fish, belukha, seal oil and blubber, and **ugruk** hides. The blubber was sold
by the trading posts in two inch cubes as dog food. More recently, women would bring home groceries by sewing mukluks to sell.

Barter or sale of seal products occurs occasionally today. Ugruk hide soles for mukluks are prized items for skin sewers and are sometimes bought from those who have a surplus. One Shaktoolik elder described bargaining with a hunter for a price on a whole seal. That elder recalled selling eight seals to individuals in Koyuk several years ago during a time when Koyuk had had poor luck seal hunting for some reason, and people were low on seal oil.

Ringed Seal

Much of the discussion in the preceding ugruk section also applies to the ringed seal. However, a few points specific to ringed seal should be mentioned.

Ringed seals are smaller than ugruk or spotted seal, rarely exceeding 200 pounds or five feet in length. Those caught by Shaktoolik hunters are usually substantially smaller. The Eskimo names for ringed seal are niksak in the Kauwerak dialect and natchik in Malemiut. Shaktoolik residents usually refer to ringed seal as "hair seal" or simply "seal." "Seal" is commonly used to refer to all seals other than ugruk, sometimes including ugruk as well.

Ringed seals have often been hunted in much the same areas as ugruk, as the hunting effort commonly is directed at seals in general rather than a particular species. For instance, before 1935 ringed seals were hunted by
kayak in April and May prior to breakup around Cape Denbigh -- the same area utilized for ugruk (see Map 20). Ringed seal were hunted by kayak and harpooned in the river systems along with young ugruk. This is remembered by elders as being a dying art even before the era of outboards, practiced only by a few old men. The seals would be chased by kayak in the fall as they entered the rivers with the incoming tide.

Ringed seal was the seal hunted on the ice in addition to ugruk. Unlike ugruk, ringed seals frequent the ice edge. Thus, when floating ice was absent, ringed seals were often the primary seal harvested. They are more likely to float than ugruk and were commonly shot in the water from the ice edge and retrieved with harpoon and kayak. As the days grew warmer in March and April, ringed seals would begin to haul out on the ice. Unlike ugruk which lie right next to the edge, ringed seals make holes in the ice and haul out further in from the edge. Hunters would stalk them in the manner described for ugruk.

A condition which would impact the harvest occurred when there was a breeze from the south or west in cold weather. A thin layer of ice (one inch thick) would set up at the ice edge, and although you could see the seals busting up through the ice to breathe, you couldn't reach them on foot or by kayak. If this occurred, hunters would not bother to go out. However, with a north wind this layer of ice is continually blown away, and hunting is good along the edge. If the ice horizon was "smoking," that indicated the presence of open water.
Map #20
Ringed Seal Harvest
local name: hair seal
time period: up to 1935
season: April, May
before breakup
method: kayak
# of sources: 1
camps
--- A, up to 1935
Ringed seal could be found along the ice edge at all times. However, about 20 families, each with seven or eight dogs to feed, would be hunting along that edge between Besboro and the Cape (see Maps 21 and 22), so even though the seals were abundant, sometimes they would become scarce or wary. When this happened, some hunters would travel by dog team across the flats behind the Reindeer Hills and hunt along the ice edge up into Norton Bay and south from Point Dexter (see Maps 21 and 22). This would occur in March and April when the days were long enough for the trip to be made by dog team. Seals were often plentiful in Norton Bay.

Fall hunting by outboard occurs primarily in the shallow waters between Shaktoolik and Cape Denbigh (see Maps 23 and 24), with some effort south toward Beeson Slough and up along the coast of Norton Bay to Ungalik. Ringed seals come into the area as the ocean begins to develop slush; the seals tend to concentrate at the river mouths where food such as tomcod and smelt is present. Some people continue to hunt them in the Sineak, Malikfik, and Shaktoolik drainages.

Only one hunter of the ten interviewed reported hunting ringed seal in the winter by outboard (see Map 25). This indicates that those hunters that did hunt by outboard in the winter were primarily after ugruk. The area described by the hunter for ringed seal was the waters encircling Besboro.

The area hunted for ringed seal in the spring by outboard differs from the fall in that some effort is made in the Besboro area, and more individuals hunt up along the Reindeer Hills and into Norton Bay (see Maps 26 and 27).
Map #21
Ringed Seal Harvest
local name: hair seal
time period: up to 1960
season: freezeup to breakup
method: dogsled/kayak
# of sources: 3
Map # 22
Ringed Seal Harvest
local name: hair seal
time period: up to 1960
season: freezeup to breakup
method: dogsled/kayak
# of sources: 4
Camps
- A, up to 1960
- B, up to 1960
- C, E, F, up to 1960
- D, 1951, March
Map # 23
Ringed Seal Harvest
local name: hair seal
time period: 1935-1980
season: fall
method: outboard
# of sources: 5
Map #24
Ringed Seal Harvest
local name: hair seal
time period: 1935-1980
season: fall
method: outboard
# of sources: 5

- camps anywhere
Map #25
Ringed Seal Harvest
local name: hair seal
time period: 1935-1980
season: winter
method: outboard
# of sources: 1
Map #26
Ringed Seal Harvest
local name: hair seal
time period: 1935-1980
season: spring
method: outboard
# of sources: 5
camps
A,B,C, up to 1980
D, 1935-1980
Map #27
Ringed Seal Harvest
local name: hair seal
time period: 1935-1980
season: spring
method: outboard
# of sources: 3
The traditional and current uses of ringed seal differ from that of ugruk. Traditionally, meat, greens, and other foods, were mixed with seal oil and stored in pokes made of ringed seal hides. Each spring four or five seal pokes were blown up and hung to dry outside of every household. The hide was also used for mukluk uppers, leggings, and parkas. One special type of boot was made from the oil saturated skin of an emptied poke, sewn with sinew. The upper part was sewn with the fur out. They were hip high and waterproof. Rawhide was utilized for rope and such uses as sled construction. One particular preparation of the hide was called "whiteskin." This was made in the following manner: the hide was stored in a barrel for awhile until the hair came off, then the blubber was cleaned off and the hide hung over a pole for the summer; during the following winter, the hide was soaked, stretched, and left to bleach in the cold. The resulting white leather was used as straps for mukluks and skin sewing. Little skin sewing occurs in Shaktoolik today compared to the past, and seal pokes have been replaced by barrels and jars.

Not much ringed seal meat is eaten by Shaktoolik residents today, ugruk being preferred by most. However, some households did express anticipation of fresh seal meat in the fall. Unlike ugruk, which is cooked rare, a common method of cooking ringed seal is to boil it well done. Some people do like it rare, and a very few elders may eat it frozen. One method of storing a ringed seal carcass when the weather has cooled is to strip it of the blubber, drain off the blood, and hang it outside on a rack. Ringed seal liver is highly regarded by some. A snack of hunters is raw liver which has been lowered by a line to soak in the ocean; when it has become salty, it may be eaten with seal oil and snow. A primary use of ringed seal in the past was
for dog food, and a few households with several dogs continue to harvest substantial numbers of ringed seal for this purpose.

As mentioned in the ugruk discussion, several Shaktoolik households prefer ringed seal or spotted seal oil to that of ugruk, because the oil of these smaller seals is clearer and develops a strong taste more slowly. Seal oil is prepared by placing several small pieces of blubber in a container, taking care to remove all the blood, and leaving the blubber to sit and render. The strips of rendered blubber that remain are often eaten along with the oil.

As with ugruk, the time of year affects the condition of the seals. In the spring ringed seals grow thin and begin to shed. The hide is no longer good for skin sewing but can still be used for pokes, rawhide, and "whiteskin." Ringed seals taken when thin and with poor hides are usually used for dog food.

Spotted Seal

Much of the discussion in the ugruk section applies to seal hunting and utilization in general. The following section will present data specific to spotted seal.

The spotted seal is the third species of seal hunted by Shaktoolik residents in significant numbers. Spotted seals have an average weight of about 200 pounds and a length of five to six feet. Shaktoolik hunters regard them as
usually being substantially larger than ringed seals and sometimes as large as ugruk. The local Eskimo name for spotted seal is kasigiaq.

Spotted seals differ from ugruk and ringed seals in that spotted seals are not present in Norton Sound during the winter months, making their first appearance in the spring. During their stay in the area, they tend to congregate and haul out in certain areas, the area nearest Shaktoolik being Besboro Island.

Prior to the days of outboards, few spotted seals were taken. Spotted seals are faster swimmers than are other seals, and successfully chasing them by kayak was very difficult or impossible. However, one elder recalled them being taken by kayak occasionally in the fall in an area outside of the mouth of the Shaktoolik River, where the seals would feed on tomcod (see Map 28). Spotted seals were sometimes caught in belukha or seal nets, but this was rare since spotted seals, unlike other seal species, would chew their way out. They continue to do this today with salmon nets. One source stated that young spotted seals could be caught in salmon nets, but the older ones chewed themselves loose.

Another method of hunting spotted seals in the past was described by one elder. Prior to snowmachines, hunters would go by dog team to Besboro in the spring to hunt them in the same area where they haul out in ice free months (see Map 29). The distance involved was such that the hunters would travel out one day, camp overnight, and hunt the next day. This hunt would occur near breakup so that hunters had to watch the ice carefully to insure
Map #28
Spotted Seal Harvest
local name: spotted seal

<table>
<thead>
<tr>
<th>time period: up to 1935</th>
</tr>
</thead>
<tbody>
<tr>
<td>season: fall</td>
</tr>
<tr>
<td>method: kayak</td>
</tr>
<tr>
<td># of sources: 1</td>
</tr>
</tbody>
</table>
Map #29
Spotted Seal Harvest
local name: spotted seal
time period: up to 1960
season: spring
method: dogsled
# of sources: 1
camps
- A, up to 1964
their return to the mainland. Apparently, few contemporary elders have participated in this Besboro harvest, for only one of the hunters interviewed could remember hunting in this manner.

Since the introduction of outboards, most spotted seal harvesting has occurred in the fall. The primary area for this activity is from the mouth of the Shaktoolik to the Sineak where tomcod are present for food (see Maps 30 and 31). Hunting also occurs as far south as Beeson Slough, as well as at a sandy beach on the north end of Besboro where the seals haul out. Boats are able to approach close to the haul out area before the seals will move into the water. Spotted seals will also haul out on floating ice chunks and are hunted along the Reindeer Hills as they float out of Norton Bay. Another area, used less now than in the past, is the waters west of Little Mountain where spotted seals feed on fall herring (see Maps 30 and 31). Hunters in this area would camp at Little Mountain. Today spotted seals may be taken in this area by Shaktoolik or Koyuk hunters incidental to the belukha hunt.

Several of the hunters interviewed did not hunt for spotted seals in the spring. Historically, this was due in part to the abundance of other game during this season, the lack of refrigeration, and the shedding of the hide which occurs in late spring. In the fall meat was less likely to spoil, the larger older ugruk were not available, and the hides were in good condition. However, some spotted seals are taken currently in the spring. The areas are similar to those of the fall, with less effort near the river mouths (see Map 32). One elder stated that one advantage to hunting spotted seals in the spring was that they are fatter than in the fall.
Map #30
Spotted Seal Harvest
local name: spotted seal
time period: 1935-1980
season: fall
method: outboard
# of sources: 5

A, 1935-1980
Map #31
Spotted Seal Harvest
local name: spotted seal
time period: 1935-1980
season: fall
method: outboard
# of sources: 5
Map #32
Spotted Seal Harvest
local name: spotted seal
time period: 1935-1980
season: spring
method: outboard
# of sources: 4
camps
----- A,B,C, up to 1980
Even with outboards, spotted seals are not easy to hunt when swimming due to their speed, particularly when the water is choppy. In shallow water they can be chased by following their wake. Several sources mentioned that spotted seals sink when shot, unlike the other species of seals which will sometimes float. One source stated that he was reluctant to hunt swimming spotted seals for this reason and preferred to hunt the ones floating out of Norton Bay on ice chunks. One elder described how hunters will chase a spotted seal by boat. In addition to the wake that can be seen in shallow water, a winded spotted seal will leave a stream of bubbles that can be followed. By being constantly forced to dive, the seal eventually runs out of breath and will remain at the surface to breathe even as the boat approaches. During this process, the seal will also have swallowed some air and will be more likely to float briefly after being shot.

Spotted seals usually remain in their haul out area on Besboro all summer, although they are not hunted in the summer because they are skinny. When walrus are present at Besboro, the spotted seals vacate the area and move to other haul out beaches in the Moses Point-Bald Head area.

In 1927 a bounty was placed on spotted seals throughout Alaska in an effort to lower their numbers. The seals were apparently causing trouble for commercial fishermen by raiding their nets. Shaktoolik residents recall an initial bounty of $6.00 per hide, later decreased to $3.00, for both spotted and ringed seals. One source recalled that the bounty ended sometime in the 1940's. The hides were initially sold to the local store and later sent directly to Juneau. This bounty represented a large amount of money to local residents, and the harvest of spotted seals substantially increased.
People would hunt them along the coast in areas not normally hunted. Substantial effort was made to retrieve those that sank through the use of a drag hook. However, spotted seals remained difficult to harvest, and large numbers were not taken even during this time.

A major demand for spotted seals in the past was for their attractive hides. These hides were preferred over other seals for local use as bags for furs or clothes and as knapsacks. They were also used for parkas and other skin sewing. Today the hides no longer have the allure they had in the past, and the demand for spotted seals has declined as a result.

Spotted seal meat is not very popular in Shaktoolik. Many of the households interviewed regard it as having a "different," undesirable taste, although one man stated that he liked it. The oil is considered the best of all the seals by some people and comparable to ringed seal oil by others.

Ribbon Seal

Ribbon seals are uncommon in the Shaktoolik area, seen infrequently and only in association with floating ice. They are sometimes harvested for seal oil. Some hunters will not shoot them due to this unfamiliarity, whereas others will harvest them out of curiosity.

Bowhead and Grey Whale

In May of 1980, Shaktoolik surprised the people of Norton Sound by taking a small, 33 foot bowhead whale. This was the first bowhead taken by Shaktoolik
residents for as long as anyone can remember, although at least one previous
attempt had been made. The large "black" whales, as opposed to belukha, are
rarely seen by Shaktoolik hunters.

The extent of whaling in the past for these larger whales in the Shaktoolik
area is uncertain. Artifacts such as whaling harpoon heads, heavy harpoon
parts, and boat sled runners, which would indicate the organized pursuit of
larger whales, were not found in the archaeological digs at Cape Denbigh
(Giddings 1964). In addition, little evidence exists of the large skinboats
(umiak) necessary for this whaling. Large whale bones and baleen were found
throughout the Nukleet remains; Giddings postulates that these may have come
from stranded whales or trade. Thus, the archaeological evidence indicates
that the Nukleet people were never true whalers. However, Giddings relates
that in the 1940's the Shaktoolik villagers stated that baleen whales were
formerly hunted occasionally at the Cape and Besboro areas (Giddings 1964).

Of the elders interviewed by this researcher, only one man (originally from
Unalakleet) had heard of baleen whales being taken in the Shaktoolik area in
the past. His father had described Cape Denbigh bowhead whaling in his
father's grandfather's lifetime. According to this story, in those days
there was one whaling boat crew for each small village. The boat had eight
paddlers, a harpooner in front, and a captain in back. The harpooner had a
very prestigious position in the village but would be severely criticized
if a whale was lost due to an error on his part. The harpoon line was of
walrus hide and attached to seven seal poke floats. When a struck whale
tired, the young men would jump on its back and stab it with spears, return-
ing to the boat when the whale sounded. Eventually, the whale would die.
A similar story was told to the researcher by a man in his 70's from Golovin, another Norton Sound village. He stated that baleen whales had been hunted out from Cape Darby in his grandfather's time.

Four Shaktoolik sources recalled another hunt several years ago in which a bowhead was sunk. One man recalled that in late June a Shaktoolik hunter and one from Unalakleet had pursued a bowhead of the same size as the one caught in 1980. The whale dived after being shot and apparently died, for they saw it sink despite their efforts to harpoon it.

In May of 1980 a herd of four bowhead were sighted by Shaktoolik hunters as they were searching for belukha in Norton Bay. Three aluminum boats encountered the whales near Bald Head, on the north side of Norton Bay. Initially disappointed that the whales were not belukha, one boat of hunters decided to attempt to kill the smallest bowhead. Once the whale had been wounded, the hunters were committed to complete the harvest effort. The technique used was basically the same as for belukha hunting. The whale was pursued, anticipating its path and speed when it was underwater, then firing point-blank at its head when it surfaced for air. Oil and bubbles rising from the depths helped to indicate the location of the whale. Hunters adjusted their pace to match the speed of the whale -- faster than a belukha. Twin outboard engines allowed the hunters of one boat to rapidly approach the surfacing whale; it was observed to always surface three times. Unlike a belukha, the whale would not double back on its path when closely pursued but would continue to travel in a straight line. Once a float line was attached, they had no problem following it. Initially hesitant to approach the whale too closely, the hunters eventually were firing at point-blank
range. The major drawback the hunters acknowledged in their harvest technique was ignorance of where to shoot the whale. About 200 rounds were shot but most struck the front of the whale. On a belukha this is the appropriate area, but a bowhead has a long jaw, with its brain further back. One hunter described searching for and shooting at the blowhole. He later learned from Barrow hunters that the correct spot is one foot behind the eye. Other hunters told of looking for the eye or the ear of the whale, not knowing where that anatomical part was located. Towing the dead whale home took seven hours with the help of other Shaktoolik boats, followed by three days of butchering. Some Barrow residents were in Shaktoolik for an Assembly of God church conference and helped direct the butchering and passed on some instructions on how to kill a bowhead and tow it properly.

According to one hunter, other bowhead whales were seen a few days later, but the weather was too rough to pursue them. Three sources stated that some Shaktoolik boats sunk a grey whale later in the season. One hunter said that Elim boats had also been involved. He described how the grey whale had been harpooned but had sunk, taking the harpoons with it. In general, Shaktoolik hunters felt very positive about taking the bowhead. One man stated that it would not be difficult to take another, since the whales are easy to follow and the hunters could easily shoot at the correct spot now that they know where it is.

The division and distribution of the bowhead caused some conflict within the community. Despite the desire of some residents to divide the whale equally within the community, the final distribution was a relatively small portion of muktuk to each household (about 1½ feet by 2½ feet), with greater
quantities divided among those hunters who had helped pull the whale home. One source complained that he had worked hard butchering for two days but had received only the share given to all households. In the fall of 1980 one family expressed some resentment that the households that had gotten the larger shares still had some, whereas others had used up their precious supply. One of the hunters who had received a larger share had urged an equal distribution and expressed regret at how the division had been accomplished. He had given away substantial amounts of his share. In another effort to compensate for this imbalance, he had shared a belukha caught by his boat later that spring with the other boats that were hunting that day, in contrast to the usual practice of sharing only with those boats participating in the actual kill. Contrary to the prevailing dissatisfaction with the distribution, one elderly couple positively described the fact that every household received a share and stated that they had been given a good sized piece of muktuk. A younger couple disapproved of the fact that two hunters had sold their large shares in Unalakleet.

In addition to the distribution of the muktuk within the community, substantial amounts were shared with friends and relatives in neighboring villages. For instance, one hunter described sending large quantities of muktuk to a relative in Koyuk. One household expressed the desire to save some to offer guests during the Covenant Church "get-together" that coming January.

Bowhead muktuk is a favored food in Shaktoolik. Although regarded as distinctly different from belukha in taste, it is comparable in desirability for most households. One elderly couple stated that Shaktoolik residents will buy bowhead muktuk for $6.00 per pound at a Nome grocery store.
Another group mentioned that Shaktoolik people have developed a taste for bowhead muktuk in part due to amounts of muktuk obtained at Barrow during Assembly of God church conferences. One couple stated that their children loved "black" muktuk and would eat it for every meal if they could. Only one household known to the researcher did not care for bowhead muktuk; in the fall of 1980 when belukha muktuk supplies had dwindled, this household actively sought to trade their "black" muktuk for belukha muktuk. Another family traded dried salmon and salmonberries to obtain bowhead muktuk.

Utilisation of bowhead is similar to that of belukha. "Black" muktuk is usually eaten raw sliced thin and dipped in salt and possibly seal oil. At least two households rendered bowhead blubber for oil; it is eaten in the same manner as seal oil, and one man described it as preferable to seal oil. Several people dried bowhead meat, but much of this was spoiled by rain.

Walrus

Utilization of walrus by Shaktoolik residents in the past has fluctuated in response to availability. Giddings postulates that walrus were probably never important to Cape Denbigh cultures, because of their remoteness from the main walrus migration routes. Walrus ivory and baleen found in the older Nukleet strata indicate either a more active trade in these materials or different hunting patterns (Giddings 1964). However, the elder hunters of Shaktoolik recall particular years in which walrus migrated into the area and were harvested. One elder stated that long ago people would take walrus whenever they were available, but the walrus were only present in significant numbers every few years. Another elder recalled that walrus had always been...
present to some degree in the Shaktoolik area in the summer. He remembered a large herd that had entered Norton Bay around 1940. In 1960 several Shaktoolik hunters had harvested walrus, and a big feast had taken place at Cape Denbigh. In the spring of 1979 large numbers of walrus were present in Norton Bay, and several were harvested by Shaktoolik hunters. Some walrus were in the area in the spring of 1980, but the researcher heard of only one hunter who had harvested any. Another man lost one walrus later that fall.

Other than their occasional presence in Norton Bay, walrus are also known to haul out in some years on Besboro Island. One source stated that a herd of perhaps 100 had been at Besboro for the past two years, with roughly 1000 walrus in Norton Bay in 1979.

There was disagreement among Shaktoolik sources regarding the local status of walrus as a food. Most households interviewed agreed that the majority of Shaktoolik residents did not care much for walrus. However, at least three couples expressed a very positive attitude toward eating walrus, particularly the skin. A preferred preparation was to ferment the skin slightly to tenderize it and achieve a particular flavor. Two of the couples expressed a lack of interest in the meat, describing it as tough. One man believed it to be infested with trichinosis. One younger hunter described bringing walrus home to eat, but his family found it undesirable, being unaccustomed to walrus in their diet. One older man's description of a walrus feast at Cape Denbigh in 1960 suggested that walrus had been more accepted as a food in earlier years. In general, the older people were more likely to regard walrus as a desirable food. One elder stated that Shaktoolik people will
eat walrus whenever the opportunity arises. One Shaktoolik walrus hunter stated that he carves ivory for a living in the winter, and therefore walrus harvest provides him with an important source of raw material.

Ducks, Geese, and Cranes

Migrating waterfowl have an important place in the diet of Shaktoolik residents, particularly in the spring and fall when they first become available. The various species come into the area in the spring in roughly mid April and are hunted for about three weeks. In the fall they are hunted as they pass through from mid August to the end of September. During these periods, waterfowl hunting is a major activity, and the hunting as well as the resulting meals are looked forward to with great anticipation.

The species identified as harvested locally include the following: sandhill cranes, Canadian geese, white fronted geese (called "yellow footers"), snowgeese, black brants, pintails (also called "sprigs"), mallards, green winged teals, and a variety of other ducks. Most of the hunters interviewed did not indicate different hunting areas for each species; rather, they would harvest whichever species that made itself available. However, some hunters at times did make a special effort to harvest a certain species, most notably cranes in the fall. In general, hunters would map areas for all species together.

The areas hunted have changed very little over the remembered past and are generally the same for spring and fall, concentrating around the Sineak,
Malikfik, and Shaktoolik drainages, up around Little Mountain and Ungalik, and south along the coast from Shaktoolik to the foothills (see Maps 33 through 36).

Methods of transportation have changed considerably over the years, but most of the hunters interviewed believed that this factor had not caused any significant change in areas hunted. As was done in the past, hunters may walk to their fall time hunting areas or take their boats up the Sineak and Malikfik drainages and proceed on foot to the desired location. Whereas today outboards are used to travel by boat to the harvest areas, as well as some use of trucks to drive down the coast toward Beeson Slough, in the days before outboard motors, kayaks or rowboats were used. Even the distant areas such as Reindeer Cove and Ungalik were hunted by men who would paddle their kayaks up the Sineak and cut across the flats to the coast. Dog teams, used prior to snowmachines for spring hunting, could go anywhere snowmachines can go today. However, a few changes did occur with the major technological shifts. For instance, one hunter stated that with a snowmachine he was unable to hunt cranes in the spring at some little creeks at the head of Reindeer Cove, because snowmachines cannot traverse bare tussocks or overflowing creeks as successfully as can a dog team. Another man mentioned that he no longer camps at Ungalik as he did when he traveled by dog team. One or two hunters began to hunt in the fall in the Reindeer Cove area when they got outboards, whereas they had not done so before.

One source pointed out that these species are hunted in the same areas as in the past simply because they have continued to frequent certain areas to feed, and the hunters go to these areas. For instance, in the fall birds
Map #34
Duck, Goose, & Crane Harvest
time period: up to 1980
season: spring
method: dogsled/snow-machine
# of sources: 5
camps
- A, 1969
- B,C, up to 1980
- A,D, up to 1980
Map #35
Duck, Goose, & Crane Harvest
time period: up to 1980
season: fall
method: kayak/outboard
# of sources: 5
camps
- A, 1935-1980
- B, 1935-1980
Map #36
Duck, Goose & Crane Harvest
Time period: up to 1980
Season: fall
Method: kayak/outboard
# of sources: 5
camps
--- A, up to 1980
   E, 1932
--- B, up to 1980
--- C, D, up to 1980
will land at certain spots where berries are plentiful. However, some shifts in areas frequented by the birds have occurred over the past several decades. One hunter described how ducks had once been plentiful along a slough connecting the Malikfik and Sineak drainages, but since the late 1950's he has not been able to get many there. His opinion was that reindeer in the area had destroyed the nests or the feed. In addition, heavy boat traffic may have caused the ducks to move. Another source also mentioned the decrease in waterfowl in the Malikfik-Sineak area; he felt that this was due to the disappearance of several "egg islands" there -- small islands where waterfowl lay their eggs. He had seen seven such islands sink, dry up, or otherwise become unsuitable for the birds' nests. Another shift mentioned was that geese no longer frequent the area adjacent to the Shaktoolik River up toward Punuk near the hills due to the heavy boat traffic (see Map 35). One hunter believed that hunting for cranes along the coast from the old site to the foothills had occurred primarily in the last decade, for cranes had never gone to that area in earlier years.

The various species of ducks, geese, and cranes arrive in the Shaktoolik area at approximately the same time. Unlike many of the ducks and geese which may remain in the area, cranes are present only briefly as they travel through, and only a few spend the summer in the area. Although ducks and Canadian geese are present all summer long, they are rarely hunted in that season, since they lose their fat a few days after their spring arrival as they begin to mate and become generally undesirable for eating (skinny, dry meat, and a less palatable taste). Snowgeese and cranes retain their fat longer and can be hunted much later. Snowgeese and brants are present in the spring as they travel through, but they do not remain to lay their eggs.
in the area. An old belief is that the brants fly by in the fall out on the ocean. Snowgeese don't come through in the fall, with the exception of perhaps a couple of flocks. One elder thought that possibly the rest fly by through the hills further inland. In the fall cranes often fly in from the direction of Cape Darby to the west. A cold north wind is known to cause the cranes to travel through the Shaktoolik area. One source mentioned that if the cranes fly through the Koyuk area, sometimes they will bypass Shaktoolik.

Today the shotgun is the primary hunting implement used. The grandmother of one Shaktoolik elder described to him how snares had been used long ago. Snares would be set in the fall along pathways ducks and geese used between lakes. A hunter in Unalakleet had been known to use steel traps in the same manner. Bow and arrow were another method for hunting waterfowl. An elder described three types of arrows used: one was a double pronged arrow for diving animals including ducks; another was a club arrow with a blunt head and hooks along the shaft so that a glancing blow would shatter bone or rip off a wing; the last was also a club arrow, but with smooth sides for shooting waterfowl floating in water -- the smooth sides allowed the arrow to skim along the surface and be retrieved on the opposite shore if the bird was missed. He also described a type of bolo used for ptarmigan which may have been used for waterfowl as well. The early explorer Edward Nelson observed bird spears being used to capture waterfowl. These were launched with throwing boards from kayaks and had triple points (Nelson 1899).

The primary hunting technique today is to wait at strategic locations for ducks, geese, or cranes to fly within shotgun range. Dawn or dusk are the times when the birds are most likely to move. Cranes will often fly right
next to the village. It is common practice to hide among the driftwood along the coast or at the old driftwood line several miles up into the Sineak and Malikfik drainages, perhaps constructing a blind from the wood. The birds (in particular, geese) are very sensitive to movement, and the hunter must keep out of sight or completely still and low to the ground. Even a movement of the head can cause a flock of geese to veer away from the hunter's position. It is very difficult to stalk cranes or geese, for flocks of cranes maintain lookouts that will see you coming, and geese can see you a mile away. However, if a person is in the right place at the right time, large numbers of birds can be harvested as they fly over. One hunter recalled getting 32 cranes in one day a few years ago. Another hunter said one time he caught 30 geese in just a few hours, but he believes waterfowl are no longer very abundant and that now a person will often hunt all day and bring home only a few or none at all.

One hunter described a special technique he used in the fall to harvest ducks at the slough connecting Sineak and Malikfik. He would sneak up on a flock by moonlight when they were in the shallow water. Rather than shoot them when their heads were down, which would have wounded several, he would make a small noise such as a whistle and shoot when the ducks raised their heads. One time he got 14 with one shot using this method. On the Malikfik channel there was no way to sneak up on the ducks out on the mud flats, so the hunter would simply rush right up to them with his outboard.

One additional manner in which waterfowl are sometimes harvested is to shoot them in the summer when they are molting and flightless. Ducks, such as sprigs, are occasionally hunted this way in July when they are molting and
have grown fat. Back in the old days people would hunt molting geese while berry picking. Today, ducks and geese are harvested in this manner only occasionally by a few households and in small quantities (just enough for a meal). One elder related that there used to be a traditional "law" against harvesting ducks and geese when they are molting and helpless. He felt that "law" was still in effect up to present time. However, he said that other reasons why people don't harvest them are because the birds are crafty and hide from you and there are many other foods to eat in the summer such as fish. He stated that if there wasn't abundant alternative foods, then people would go after the molting waterfowl.

The hunting of ducks, geese, and cranes is an important way in which hunting skills are acquired by boys and young men. Whereas few hunters younger than their late 20's participate in marine mammal hunting, several young males from age ten on up participate in the hunting of waterfowl and cranes.

In the past large numbers of ducks had been put away for the winter by salting. Ducks were particularly important after the reindeer herd crashed in the 1930's, and Shaktoolik was just beginning to harvest caribou again. Up until the time when caribou hunting had increased to make up for the lack of reindeer, ducks were a main winter food along with dry fish and seal meat.

Some individual variation exists in Shaktoolik regarding preference for certain species and preparation methods. The main method of cooking ducks and cranes is to boil them into a soup, whereas geese are often roasted. Crane soup is the most popular dish for some, but geese are the favored bird for others. Today ducks, geese, and cranes are stored by freezing.
The harvest of waterfowl eggs will be discussed along with seagull eggs in the following section.

**Seagull and Waterfowl Eggs**

In late May or early June a variety of different eggs are gathered from tundra nests. These are primarily seagull eggs, but some households interviewed also described gathering the eggs of eiders. One family reported harvesting the eggs of several other species as well, including geese, sprigs, loons, and arctic terns. Some households described this harvest as a casual, occasional activity, although others devoted a significant amount of time and effort to obtaining eggs.

The eggs are gathered from tundra nests, located on "seagull islands" (i.e., small islands in tundra lakes or the Sineak-Malikfik drainages) and on the tundra near river banks. The birds tend to lay on islands for protection of their eggs from such egg eaters as the red fox and the smaller white fox (known to swim out to the islands to eat eggs). One elder explained that seagull eggs are generally not gathered from cliffs since seagulls build their nests out of mud on the face of the cliff. These nests are inclined to fall when the egg hunter steps on them while climbing. Seagulls are capable of laying three batches of eggs, so that if egg gatherers take one batch, the seagulls will replace it with another.

The areas harvested span a considerable area, including the Sineak-Malikfik drainages and areas along the Shaktoolik River, Little Mountain and Beeson Slough (see Maps 37 and 38). In recent years a few belukha hunters gathered
Map #37
Seagull Egg Harvest
time period: up to 1980
season: spring
method: outboard, on foot
# of sources: 4
camps
A, up to 1980
R, 1969
C, up to 1940
D, up to 1980
Map #38
Seagull Egg Harvest
time period: up to 1980
season: spring
method: outboard, on foot
# of sources: 5
camps
-----A, up to 1980
.....B, up to 1938
eggs from Besboro Island. Each household has its own islands and/or areas which often do not appear to overlap with those of other households interviewed. Two households mentioned that Koyuk people sometimes would beat them to the egg islands in the Little Mountain area. People mentioned checking out new areas for eggs when stormbound while boating.

The introduction of outboards does not seem to have had much effect on the areas utilized for this harvest. A couple of households stated that outboards gave them access to areas for egg hunting which they had not previously utilized, but all of the general harvest areas identified for the days of outboards were also identified for pre-outboard times with the exception of Besboro Island. Whereas two households had not gathered eggs at the Little Mountain area prior to outboards, two others reported doing so.

Some shifts in harvest areas have occurred as particular areas have become nonproductive. For instance, some egg islands have dried up in the remembered past, thereby becoming vulnerable to foxes, while others have sunk. One source felt that reindeer grazing along the slough connecting Sineak with Malikfik had ended the availability of eggs in that area.

Boats are usually used to reach egg islands. If a large boat does not have access, people may use small skiffs or rafts. At least one household hauls a small boat by truck down to Beeson Slough. One elderly couple recalled gathering eggs by kayak in earlier times.
Cliff Eggs and Murres

A popular spring harvest is the gathering of murre eggs from the cliffs of Cape Denbigh. The timing of this harvest can vary from early to late June and in earlier years was often as late as the first part of July. A variety of different birds nests on the Denbigh cliffs, including murres, puffins, cormorants, and gulls. Murre eggs are the primary type harvested. Puffin eggs were also harvested in previous years, but according to one couple, puffins have been more scarce in the area recently. One elder stated that cormorant eggs were never harvested in the past because they would never solidify when cooked. Gull eggs were rarely harvested from cliffs due to the tendency of the nests to fall when disturbed by cliff climbers.

Harvest areas are concentrated on the cliffs at the very tip of Cape Denbigh and at one or two spots along a three mile stretch of the west coast just north of the Cape (see Maps 39 and 40). These areas have been used for all known time periods. Eggs also can be harvested at other areas, but these particular spots are where they are most concentrated and accessible. Prior to the introduction of outboards, people would camp at Ganigak to harvest a variety of resources including cliff eggs.

Timing of the harvest is important to ensure that the eggs are in the desired state of development. One way to readily determine if the eggs are still good (i.e., without developing chicks) is to check a few from a lower elevation with easy access. Knowledgeable harvesters can tell when the eggs are ready to gather by watching birds, for a murre sitting on an egg will face
Map #39
Murre Egg Harvest
Time period: up to 1980
Season: June
Method: climbing cliffs
# of sources: 4
--- = also area for
Camps
A, up to 1932
Map #40
Murre Egg Harvest

time period: up to 1980
season: June
method: climbing cliffs
# of sources: 6

= also area for ---- , and ---

= also area for --- camps

A, up to 1930
the water. When a large number begin facing in, this indicates that numerous eggs have been recently laid.

Murres lay one egg, usually on a bare rock ledge. The egg is shaped like a pear so that it won't roll off but spins in a tight circle. However, when murres are startled from their "nests," the eggs will sometimes fall. In the warm days of June, the sun beating down on the cliffs causes the cliffs to become quite hot. If the murres are frightened away from their eggs under these conditions, the eggs will soon "cook" and die. To prevent this and to avoid working in the heat, people will wait until sundown before engaging in any intensive egg gathering effort.

Climbing the cliffs is a very strenuous and dangerous activity and is done primarily by the men and older boys. Experienced egg gatherers grow very familiar with the cliffs and teach the young men successful climbing techniques. Certain spots can be reached only from above by ropes. The gatherers climb to the top at a spot with a less steep slope and then move above a choice egg gathering site. Footholds, possibly chopped in the sod by earlier inhabitants of Ganigak, lead down a steep slope to the sheer edge. At the edge are posts driven into the sod. Ropes are tied to these posts, and an egg gatherer is lowered over the edge. The cliff climber will fill a container to be hauled by rope to the top or will fill his tucked-in shirt with eggs. One informant recalled a time he had 80 eggs in his shirt and barely made it back up the rope to the top.
Puffin eggs were gathered from nests inside hollow places in the rock. The gatherer would have to stick his arm way up inside these hollows to reach the eggs and risked receiving a nasty bite from the puffin.

Household may gather as many as 100 or 200 eggs at a time. The eggs are consumed fairly soon after being gathered. The archaeologist Giddings observed feasts of boiled cliff eggs that occurred at Cape Denbigh immediately following the gathering activity (Giddings 1973).

In the past murres were an important part of the diet, but today only one family eats them on a regular basis. Shaktoulik elders recall that murres boiled in saltwater with seal oil made a very delicious broth. One elder man stated that he liked murre meat, but since his sons did not, the household no longer ate murres. Another elderly couple eat murres only when storm-bound away from the village with minimal food.

Several decades ago murres would be hunted in the spring in the early morning. The hunter would sneak stealthily along the old shore ice at the base of the cliffs until he was directly below the murres. This had to be done at the coldest part of the day just at sunrise, so that the murres’ wings would be too stiff to fly properly. When the hunter was below the birds, he would shout, and the murres would flutter to the ground as they tried to fly. The hunter would club them as they ran for the water. This technique required the air to be perfectly calm, for the murres would be able to fly if there was a breeze.
In the past murre skins were used in addition to the meat. One elder stated that these skins made the best type of parka. The prepared skins would be sewn together with the feathers intact on the outside and pointing down. A liner was worn inside to protect the skin of the wearer from the quills poking through. Murre skin is tough and thick, and the oils in the feathers enable the parka to shed water. This type of parks was good for seal hunting and for use in wet snow. These parkas were also very decorative, exhibiting the various feather colors. When reindeer were introduced, people started to use reindeer and fawn hides for parkas, and the use of murre skins declined.

Salmon

Of all the marine-related resources utilized by Shaktoolik residents, the various salmon species are probably the most important in terms of quantity consumed. Drying, the traditional preparation method, continues to be popular, and therefore, salmon is available to the village diet for a good part of the year and is consumed regularly by most households. Dried salmon, known as "dry fish," may be comparable to seal oil as an acknowledged essential of the local diet.

The history of salmon utilization in Norton Sound has been one of dramatic fluctuation in levels of use. Archaeological evidence indicates that Norton people subsisted to a very high degree on fish, most notably on salmon (Giddings 1964). With the expanded use of dogs in the 18th century, it can be assumed that salmon utilization increased substantially, since dry fish was (and is) a primary source of dog food. Mining activity in the early
1900's brought an increase in winter travel by dog team in the area, as travelers moved about the region with hired dog teams and drivers, and the mail was transported along the coast. Travelers and mail proceeded to Unalakleet, over the mountains to Kaltag, and up the Yukon to the terminus of the railroad, which ran to the ice free port of Seward. Huge quantities of dry fish were necessary to support dog team traffic. During this same period, local dog teams increased from two or three dogs up to as many as fourteen or sixteen, further enhancing the need for salmon harvest by local residents.

In response to this great demand for dog food, dry fish became a major barter item. Elders recall that dry fish was just like cash in days when cash was scarce. Local people would spend most of the summer drying large amounts of salmon, retaining enough for their own use (human and dog consumption) and bartering or selling the rest to mining camps, roadhouses, and trading posts or stores. Each household had a cache which was filled with dried humpies and dog salmon for their own use. A dog requires about half a dried dog salmon per day when tied up and more when pulling a sled.

The Haycock mining camp on the Koyuk River would buy two tons of dry fish each year, and other mining camps also bought some. There were roadhouses at Egavik, the foothills (south of Shaktoolik), Robertvale, Ungalik, Isaac's Point, Moses Point, Walla Walla, Golovin, and other locations. The roadhouses bought bundles of dry fish from local residents at 10¢ per pound and sold these fish to mail carriers that passed through by dog team. Dog salmon were the main species thus utilized although humpies were also acceptable for dog food. A bundle, which held 50 dry fish, was the unit of
of transaction. One older source felt that local people did not sell very
many dry fish compared to what they retained for their own use, with the
average household selling perhaps five to ten bundles.

The other major market for dry fish was the local stores. This market con-
tinued after the mining camps and mail runs died out. Dog team mail carriers
were put out of business by the introduction of mail planes in the early
1930's. There were a number of different stores that would barter for dry
fish in the region -- one each at Shaktoolik, Saint Michael, Unalakleet, and
Golovin. These stores would stockpile large quantities of dry fish, for ex-
ample, the Shaktoolik store at the old site had a cache 8x20x40 feet which
would be filled to the top with dry fish. In those days there were as many
as three locally owned "schooners" -- 35 foot boats powered by sails and
later by inboard engines -- that would haul loads of dry fish to sell to the
stores at other locales. The stores bought the fish for 6¢ a pound and sold
them for 10¢, according to one elder. Another elder recalled the price to be
35¢ per pound at a later data. People would rarely receive cash for their
fish; rather, they would receive the equivalent in groceries and other sup-
plies for the winter. Other than through the sale of furs, this was practi-
cally the only way to obtain store goods for most people. The stores would
sell the fish to anyone who wanted them, including trappers who needed dry
fish for dog food, people from the villages, and those households that had
not put away their own dry fish. Some people would run low on dry fish in
winter and would buy back the fish they had sold. One source recalled that
the store would sell back fish at the original purchase price. The demand
would be so great that by April all the dry fish were gone. Again, dog
salmon and some humpies were the primary species thus exchanged. One elder
recalled putting up 40 bundles of fish each summer in the 1950's to pay off his debts at the store and purchase gas and groceries. The average household was more likely to barter six or seven bundles. In conclusion, the general consensus was that mail carriers had created the largest market for dry fish until the introduction of airplanes diminished this demand, but a substantial market continued as long as people had dog teams and cash was scarce.

The next major shift in demand for dry fish occurred in the early 1960's, when commercial salmon fishing became a source of summer cash. At roughly the same time the introduction of snowmachines contributed to a rapid decline in the use and existence of dog teams, which had been the major dry fish consumers. Dry fish was no longer a major trade item, since cash was now available from other resources and the market for dry fish had declined (for a discussion of the history of the dry fish market on the Yukon Delta, see Wolfe 1979).

Prior to the inception of the commercial salmon fishery, beach seines were the main type of gear used to harvest salmon, although a few short gillnets were also used. Setting involves pulling one end of a weighted net by boat out around a school of fish while the other end is pulled along a parallel course on the river bank. When the desired number of fish has been concentrated into the space partly enclosed by the net, the boat brings its end of the net to the bank, and the net is quickly hauled ashore. This process must be rapid to prevent the fish from escaping. One method of keeping the fish in the desired area is to slap the water with an oar at the open part of the closing net. One source described seven households that camped in
the same area and seined together using two boats and seines. Seining involves considerable work but can be very effective, and one good seine can yield as many as 300 salmon. Specific spots are recognized where salmon congregate and topography is conducive to seining. One drawback to seining is that it requires numerous able-bodied people. In addition, swift, high water can make seining impossible under conditions in which gillnets are still functional. The use of an outboard does make seining easier and requires fewer people.

Gillnets became a more common subsistence gear type in association with commercial fishing. The traditional salmon gillnet was short and used primarily to catch salmon on the coast when they first arrived in spring. It could be set even in rough water by the use of a series of poles lashed together into one long pole. The anchor of the net was looped over the tip of this long pole and pushed along the surface of the water to the desired location. Then the pole would be yanked back, and the anchor would drop off, thereby setting the net. Today gillnets are used in the ocean as well as for river fishing. Gillnets have some advantages over seines in that they require fewer people and less work. The drawbacks are that they must be regularly tended and catch fish at a slower pace. Also, undesired fish cannot be thrown back unharmed as is often possible with a seine. Another potential problem is that bears will occasionally help themselves to fish caught in a gillnet.

Occasionally significant numbers of salmon are caught by rod and reel. This could be regarded as a more contemporary method of subsistence harvest as the salmon taken are utilized in the same manner as those taken by seines or
gillnets. Salmon were harvested individually in the past as well, as is indicated by archaeological evidence of fish spears and arrows (Giddings 1964).

Traditionally the entire village would move to fish camps to spend the summer. Today this is no longer the case, and only a few, primarily older couples stay at their fish camps. Some sources state that they gave up camping for salmon when they got their outboards. Prior to the use of outboards, the heavy, wooden rowboats loaded with family members and camping supplies were pulled up the river to the camps by men with ropes. One source described how it would take his parents a week to pull their boat to their camp, whereas now with an outboard he can get there in just a few hours. Even with outboards many people continued to camp largely because of the wear and tear that occurs to motors in shallow water. In the early days of outboards, spare propellers were difficult to obtain, and many people were reluctant to make round trips. Today most households will make a round trip despite the high cost of gasoline and the struggle through shallow water. A number of people mentioned that jet units would make things much easier. Another factor that discouraged camping was the commercial salmon fishery, which kept most households busy during the summer. A State Fish and Game regulation further discourages camping by commercial fishermen in that they are prohibited from subsistence fishing during closures of the commercial salmon season.

The areas where salmon are fished have changed very little over the years. Salmon still are present in the same spots, and those spots continue to be
utilized. The only shifts that have occurred have been minor ones in response to changes in the river channel.

Kings are generally caught for subsistence when they arrive in early June until June 15, which is the beginning of the commercial season. Dog salmon and humpies show up in the latter part of June. The humpies are upriver in harvestable condition primarily during the month of July and into the first part of August. Dog salmon are present in the rivers up through the end of August and into the first part of September. Silver salmon arrive in August and remain until freezeup. Some even have been caught after freezeup through the ice when jigging for char. Most subsistence fishing by commercial fishermen occurs before and after the commercial season (before June 15 and after August 30). Their subsistence fishing will begin earlier in August if the fish buyers stop buying early. A possible exception to this is the harvest of humpies. In 1980 when buyers were refusing male humpies, hundreds from the commercial nets were dried for home use.

Most households usually take king salmon from the coast and the lower Shaktoolik River, with the exception of one household that fishes kings a few miles upstream from the others (see Maps 41 and 42). Kings caught in the lower river still have most of their fat, including those that have turned red, and therefore are good for smoking and salting. Elders agreed that in recent years there has definitely been an increase in numbers of king salmon in the area. Many years ago it was noteworthy if a king was caught at Egavik. One elderly couple recalled that if a king was spotted in the Shaktoolik River, there was a rush of seiners to pursue it. If one household got as many as three kings, there was social pressure for them to share their good
Map #41 Subsistence King Salmon Harvest

- Time period: up to 1980
- Season: June/July
- Method: gillnet/seine
- # of sources: 4

Camps
- A, up to 1968
- B, up to 1977
Map #42 Subsistence King Salmon Harvest
time period: up to 1980
season: June/July
method: gillnet/seine
# of sources: 4
camps
- A, up to 1980
- B, up to 1942
(coastal areas fished only up to 1942)
fortune by giving one away. In recent years kings have been much more com-
mon, although one source believed that they do not spawn in the Shaktoolik
River but rather go back out and proceed to some other destination. Large
numbers of kings occasionally can be caught by seines; in 1980 one group of
fishermen had obtained 30 in one seine.

Humpies and dog salmon tend to be caught together, since they often run
simultaneously. For some people, the dog salmon are caught only incidental
to the humpy harvest, since they prefer to catch their dog salmon later in
the fall when the fish are leaner and the weather is better for drying.
Humpies lose their fat faster than dogs once they reach freshwater and are
no longer good in the fall. One couple stated that they preferred male
humpies as they were bigger than the females. When seining, they would let
the females and the dog salmon go if the fish were not too tired.

The areas where humpies and dog salmon are taken during July and August
ranged widely for those households interviewed, from the mouth of the Shak-
toolik River to several miles upriver, with most of the harvest occurring
in the lower five miles of the Shaktoolik River (see Maps 43 and 44). The
distance upriver varies depending on how lean each household prefers its
salmon.

Silvers are harvested mainly in the fall months of September and October.
Some dog salmon are also taken at this time -- the collective term used
locally for these silvers and dogs is "fall salmon." Some silvers are taken
when fresh from the ocean and silver in color for smoking, but most are taken
for drying after they have turned red and lost much of their fat. The main
Map #43 Subsistence Chum & Pink Salmon Harvest
local name: dog salmon and humpies
time period: up to 1980
season: July, August
method: gillnet/seine
# of sources: 5

- A, up to 1968
- B, up to 1935
Map #44  Subsistence Chum & Pink Salmon Harvest
local name: dog salmon and humpies
time period: up to 1980
season: July, August
method: gillnet/seine
# of sources: 5

camps
--- A, up to 1932
--- B, up to 1980
--- C, up to 1980
area in which they are harvested is a few miles upriver from where humpies and dogs are caught earlier in the summer (see Maps 45 and 46). One household that lacks a limited entry permit for commercial salmon fishing harvests silvers on the coast in August. One elder stated that silvers are taken at their spawning grounds; in Inupiaq the term for this area translates as "end of the road." Some silvers are caught after they have spawned when they have become very thin. As with kings, silvers have increased in the area in the last several years. One village informant suggested that this was due to the 200 mile closure which reduced the offshore harvest of salmon.

Only one household reported harvesting salmon in the Tagoomenik River (see Map 43), and this was a harvest of humpies. The head of this household felt that few salmon spawn in the Tagoomenik but rather retreat and head for another destination, perhaps up the Shaktoolik River. He recalled silvers spawning in the Tagoomenik in the past but had not seen any doing so in recent years; he believed that beaver activity had destroyed the silver spawning grounds in that river. Other sources stated that only a few people fish for salmon in the Tagoomenik. Young boys catch a number of humpies right below the village with rod and reel or makeshift lines that they throw out and pull back in by hand.

Drying is the most common manner in which salmon are processed and prepared for eating. The basic technique is to chop off the head and then slice the meat away from the bones, cutting in above the backbone and slicing down along the rib cage on both sides. The two halves are left attached at the tail. The bones and entrails are detached from the meat at the tail; some
Map #45 Subsistence Chum & Silver Salmon Harvest
local name: fall salmon
time period: up to 1980
season: fall
method: gillnet/seine
# of sources: 5

Camps
- A, up to 1938
- B, up to 1980
- C, up to 1980
- D, up to 1980
Map #46 Subsistence
Chum & Silver Salmon
Harvest
local name: fall salmon
time period: up to 1980
season: fall
method: gillnet/seine
# of sources: 5

camps
--- A, up to 1968
--- B, up to 1935
----- E, up to 1978
----- C, up to 1980
D, 1935-80 (coastal areas = silvers in August)
parts may be retained for food, such as the heads, eggs, and meaty bones, or they may be discarded. The meaty part of the cut fish is sliced several times crosswise so that more surface area is exposed to the air. The cut fish is then draped over a pole of a fish rack so that the sides dangle down with the tail above. The fish is dried with the skin toward the outside for a day or two and then turned so that the meat is facing out. One woman stated that fish have to be turned every two days to prevent spoilage under the tail. Occasionally people may soak some cut fish in saltwater for a few minutes before hanging to give them a salty taste.

Weather has a great impact on the drying process. If the weather is too hot, fish left exposed to the sun get "sunburned" and become spoiled. Warm weather also promotes maggot growth, and fish must be picked clean of fly eggs and maggots on a regular basis. For this reason, the preferred season in which to dry fish is the cool days of fall, but humpies are no longer available in a desirable condition at that time. Windy weather speeds up the drying process and helps keep bugs away. Excessive rain can spoil entire batches of dry fish, which will mold and become good only for dog food. For this reason, many racks are covered, and fires are kept burning under the covered racks. To a large extent, the smoke will prevent spoilage, and a "smoked" dry fish is less likely to develop mold and will keep longer. Cutting a boatload of dry fish can involve several hours of hard work, because the fish must be hung immediately to prevent spoilage. One household described how they could conduct their harvest in the past in a leisurely fashion, waiting for dry, windy days and seining a few salmon at a time. Recently, however, the head of the household has been working full time on construction during the summer, so that the household is forced to rush up the river and harvest
and cut up all their salmon in just two trips. Dry fish continues to be stored in outdoor caches, to be retrieved as needed through the fall and winter.

Dry fish is almost always eaten with seal oil. The chunks of dried meat are torn from the skin, dipped in salted seal oil, and chewed vigorously. Those persons with dentures or lack of teeth often pound the chunks with a hammer to tenderize them. A few households have adopted mayonnaise as an occasional substitute for seal oil. The skin of dry fish is sometimes toasted and eaten. Dry fish continue to be used for dog food to a limited extent by some households, particularly those dry fish less desirable for human consumption due to mold or spoilage.

A preference for flavor is not the only reason why lean fish are favored for drying. Another important reason is that oily dry fish becomes rancid more readily than do less oily ones. Other problems mentioned with oily dry fish were that they get "sticky" and "dirty." One method described to make oily humpies more palatable is to salt and smoke them in the drying process. An opinion expressed by one household was that if one invests all the time and effort required to dry salmon, the quality of the product should be as good as possible. While most households definitely prefer lean upriver salmon for drying, a few find the fatter fish acceptable. The area of the river that a household fishes depends to a large degree on the condition of salmon at that particular point, along a continuum from ocean-fresh to upriver-lean. As mentioned earlier, kings and silvers for smoking are desired with fat intact and are harvested on the coast or the lower river. Humpies lose their fat fast and are caught lower on the river than are silvers, which take longer
to get lean. In the case of humpies caught in commercial nets on the coast, many people would cut and dry them rather than let them go to waste, even though the fish were fatter than they would prefer.

Fall silvers and humpies are the preferred salmon for dry fish, although dog salmon are often caught in significant numbers with the humpy and silver harvest or as an alternative to silvers if those are not available. The species most commonly mentioned as the best for dry fish was silvers, their positive qualities being good taste and a soft texture compared to dogs which dry hard. This softer quality was described as resulting from the silvers retaining a greater portion of their fat. Another point in favor of silvers is their presence in the fall when cool weather ends maggot activity. Humpies are also popular, considered the best by some people, due to their good taste and small size, which facilitates cutting and drying.

A variety of other methods of preparation are used in addition to simple drying. Two popular alternative forms of dry fish are called animaak and okromutak. Animaak is half-dried, so that it is softer than more thoroughly dried fish. It is frozen for storage, then boiled and eaten with seal oil. Okromutak is dry fish that has been about three-fourths-dried and then stored in seal oil and eaten with no additional preparation. Smoking is a common method of preparation, primarily for kings, silver salmon, and sometimes dog salmon. One method for smoking silvers is to cut them like dry fish, let them dry for a couple of days, and then cut them lengthwise into strips. The strips are sprinkled with salt and smoked. Some people salt kings and silvers in barrels, perhaps pickling them as well. Kings, silvers, and, less frequently, dogs and humpies are also eaten fresh, baked or fried. They are
eaten when caught or frozen for future use. They are preferred ocean fresh with fat intact for this use. Dogs and humpies are also boiled occasionally. Salmon heads and eggs are sometimes allowed to ferment to yield the delicacy referred to as "stink eggs" or "stink heads." The eggs are prepared by putting raw eggs in a jar with holes punched in the lid and keeping this jar in a warm place for a few days. The eggs are eaten raw, whereas the heads are boiled. In addition, the heads are eaten without fermentation also.

Dry fish is probably the most common food item shared within the community. Several households mentioned that they often ran short of dry fish due to the large amounts they gave away. Some strategies contemplated to deal with this problem included harvesting a larger number to accommodate this sharing or giving away less. A small number of dry fish continue to be sold within the village, but this is usually a household buying enough for a meal from another household. At least one household has a commercial license to sell smoked strips and fills orders from Nome.

The number of salmon caught varies depending on the household. Some families rely heavily on dry fish, whereas others have it only occasionally. A subsistence salmon harvest survey conducted in the fall of 1980 by the Division of Commercial Fisheries, Alaska Department of Fish and Game, resulted in the following average harvest for those households surveyed: 3 kings, 44 silvers, 190 humpies, and 107 dog salmon. Many of the households surveyed caught substantially more than this average; for example, one household had 6 kings, 80 silvers, 306 humpies, and 250 dogs. Another had 7 kings, 5 silvers, 500 humpies (retained from the commercial catch), and 125 dog salmon (Len Schwarz,
ADF&G, personal communication, 1981). One household of average size reported to this researcher a catch of 200 silvers and 300 humpies.

In summary, salmon continues to be a staple of the Shaktoolik diet as it has been in the past. The local subsistence harvest increased substantially in the past century in response to larger dog teams and an increased demand for dry fish as a barter item. This shift was followed by a decline in harvest when the market for dry fish diminished. Then in the 1960's a major portion of the harvest shifted from subsistence utilization to commercial sale, as dog teams died out and a commercial fishery began. Further research would be needed to attempt to compare the total volume of the current salmon harvest with that of earlier periods.

The Commercial Salmon Fishery

Shaktoolik residents recall that commercial buyers began to purchase salmon in their area in the early 1960's. The ensuing commercial fishery brought about significant changes in the local economy, providing a source of cash previously unavailable and occupying the time of many Shaktoolik households in summer months. Today 28 limited entry permits are held by Shaktoolik residents. For the most part they are evenly distributed among the various households, and only three or four households have more than one. Of ten households interviewed for purposes of mapping, only two lacked a permit. According to one source, in the past approximately seven Shaktoolik residents commercial fished at the Yukon River, but today only two fishermen have permits for that area. Two other fishermen are attempting to obtain Yukon River
River permits in addition to the permits they have for Shaktoolik, using their previous fishing experience at the Yukon as justification.

The species composition of the commercial harvest shifts throughout the season. Kings are caught beginning in early June, the commercial season usually opening June 15. The run can continue into early July. The dog salmon and humpies arrive in the latter half of June, whereas silver salmon come in August. The timing of the king run in relationship to the June 15 opening of the commercial season determines the extent to which kings are available for commercial harvest. In some years there has been a lack of available buyers during the early and late periods of the commercial season. For example, in some years buyers have left the area in mid-August, whereas in 1980 buyers remained at Shaktoolik until August 31, resulting in a record silver salmon harvest.

In addition to the timing of the runs and the availability of buyers, the success of the local commercial salmon fishery is dependent on other factors. The price per pound offered by the buyers for different species can fluctuate substantially from year to year. The market for humpies fluctuates as well. In 1979 buyers were accepting humpies, and approximately 19,000 were sold by Shaktoolik fishermen. In 1980 only female humpies were purchased, but male humpies made up the bulk of the harvest due to their larger size and the large gillnet mesh being used. As a result, a large number of male humpies were caught in commercial nets, but there was no market. In some years winds from the south and resulting waves can prevent fishing on the coast for a substantial portion of the season.
In 1979 the average income for Shaktoolik commercial salmon fishermen was $3,941 (ADF&G records). However, some fishermen made substantially more than this, with such incomes as $6,000 and $10,000. Although dog salmon bring much less per pound than kings and silvers, their greater numbers make them the most profitable species.

The areas fished vary depending on individual fishing strategies. Some fishermen will move their nets to different locations in search of better fishing, especially if they hear of an abundance of fish being caught in a particular site. Others prefer to stay at one spot. Many fishermen confine their efforts to specific areas regardless of the species being harvested, whereas a few have distinct areas for fishing the different species. Dog salmon and humpies generally are harvested simultaneously and in the same areas, largely because of concurrent runs. The areas fished for the various species are distributed along the coast from Ganigak to Junction Creek (see Maps 47 through 52). Three fishermen stated that they fish at Ganigak for dogs and humpies but that silvers and kings were less likely to be present in that area. Two sources mentioned problems with particular areas: one fisherman stated that salmon and herring were not harvested at the Cape because of diving murres that would get tangled in the nets; another mentioned that later in the season, the "eelgrass" at Ganigak grows so long that salmon cease to frequent the area. One man described fishing in Norton Bay one summer but returning to the Shaktoolik area because of poor harvest success.

Camps are used by several households when fishing in the more distant locations, particularly when there is a large number of fish being harvested.
Map #47 Commercial King Salmon Harvest

time period: 1960-1980
season: June
method: gillnet
# of sources: 4

- A, up to 1980
- B, 1960-1980
Map #48 Commercial
King Salmon Harvest
Time period: 1960-1980
Season: June
Method: Gillnet
# of sources: 3
Camps
A, 1960-1980
B, 1960-1980
Map #49 Commercial Chum & Pink Salmon Harvest
time period: 1960-1980
season: July, August
method: gillnet
# of sources: 4 camps
A, B, up to 1980
C, 1960-1980
Map #50 Commercial Chum & Pink Salmon Harvest
time period: 1960-1980
season: July, August
method: gillnet
# of sources: 3
camps
--- A, 1960-1980
---- B, 1960-1980
----- C, 1975-1976
..... C, 1960-1980
Map #51 Commercial Silver Salmon Harvest

time period: 1960-1980
season: August
method: gillnet
# of sources: 4
camps
- A, up to 1980
- B, 1960-1980
Map #52 Commercial Silver Salmon Harvest
time period: 1960-1980
season: August
method: gillnet
# of sources: 3

camps

- A, 1960-1980
- B, 1960-1980
Other households will remain based in the village and travel to their nets to tend them.

**Arctic Char**

Arctic char, locally known as "trout," are another anadromous species utilized by Shaktoolik residents. Although less important than salmon in terms of total biomass harvested, char can be harvested through the river ice during most of the winter and thus provide a source of fresh fish during those months. Jigging char through the ice is a major winter activity, and fishermen travel upriver to fish every day during the peak of this season.

In addition to jigging char through the river ice, they are caught with seines in the fall before freezeup, often simultaneously with the harvest of fall salmon. The harvest can take place from early September to mid-October, depending on the household and environmental conditions. One source stated that the best time was when the river started to develop slush. Seining will continue until travel by boat is precluded by ice. One household stated that char congregate above the ripples in the river where the bottom is smooth and conducive to seining. The river would have a sandbar on one side and a steep bank on the other, and the fishermen seine from the sandbar as the other side may have snags. Another source described how in the past, people would move down the river seining at different spots until their boat was full.

All households interviewed for mapping seined for char on the Shaktoolik River (see Maps 53 and 54). The areas identified encompass about ten linear
Map #53
Arctic Char Harvest
local name: trout
time period: up to 1980
season: fall before
freezeup
method: seining
# of sources: 5

camps
A, up to 1938
B, up to 1980
(occasional)
Map #54
Arctic Char Harvest
local name: trout
time period: up to 1980
season: fall before freezeup
method: seining
# of sources: 5
camps
--- A, up to 1968
----- B, C, up to 1935
------ D, up to 1980
------- E, up to 1955
miles of the river, but the fishing spots utilized varied widely between households.

Only two of the households interviewed stated that they currently use camps for this harvest. One of these households occasionally would use their fall salmon camp if they had it already set up. Three older sources stated that they gave up camping when they obtained outboards and could make round trips for char from the village.

One type of seining which took place in the past but no longer occurs was the harvest of char in the spring as they left the rivers and moved along the coast. This occurred in June prior to the herring harvest. The char would be present all along the coast and were seined primarily between the village and Beeson Slough, at the mouth of the Shaktoolik River, and at Ganigak (see Map 55). One elderly couple described using camps at Ganigak and Beeson Slough to simultaneously harvest seals, herring, and char. Not everyone would seine char in the spring; this apparently was an occasional activity, engaged in by those households with a desire for fresh fish. One elderly couple interviewed described their taking of char as being incidental to the herring harvest, with no effort made specifically to seine char.

Those elders that had seined char in the spring recalled a special technique used. The char could be seen jumping on the surface as they approached along the coast. The seine would be stretched out from the beach by the boat; the seine would remain in place by a weighted bottom and possibly the use of a small anchor. The fishermen would wait until the approaching char
Arctic Char Harvest
local name: trout
time period: up to 1966
season: after breakup
method: seine
# of sources: 2
- up to 1935
- up to 1966

Map #55
Arctic Char Harvest
camps
A,D,C, up to 1966
were in the desired location, whereupon the outer end of the seine would be drawn to the shore with a long rope.

There was some disagreement among elders as to when this coastal harvest died out. One man thought that it had ended at roughly the same time that outboards came into use. Another couple stated that the introduction of electricity and freezers had ended this harvest, since fresh char caught through the ice in late winter could be stored and therefore were available in the spring.

Seining in the rivers is not possible during breakup due to high water. As sediment settles and the water clears, it becomes possible to harvest char with rod and reel. This method is also used later in the year, particularly in the fall in conjunction with silver salmon harvest by rod and reel.

As soon as the river ice is solid in the fall, the taking of char through the ice becomes a major harvest activity. One area can be reached on foot by walking across the tundra to the Shaktoolik River. The most productive spots require snowmachine transport. For this reason, inadequate snowcover can delay or hamper char jigging. Ice jigging usually begins in mid-October and continues until December, at which time the harvest effort virtually ceases and begins again in February or March to continue until breakup. One household related an excursion they took one spring in which the women caught numerous char while the men were hunting waterfowl.

One reason given for the decrease in jigging effort in the dark winter months of December and January is that the char stop biting. A traditional belief
is that during the cold, dark months, the jaws of the char "freeze" or become stiff, and the char are unable to open them wide enough to bite the hook. One man claimed to have witnessed this phenomenon by observing char caught in a fish trap; these char would only open their mouths about one-half an inch. As the days grow longer, the belief is that the jaws of the char loosen up again and the jigging harvest can resume. Another reason given by a few sources for the decrease in jigging effort in December and January was that harvest success decreased as the ice became thicker. This factor was not mentioned as inhibiting char harvest in the later months, however.

The usual gear for jigging char through the river ice is commercial lures such as a daredevil or a pixie. A type of lure used in the past was described by an elder to be carved out of ivory, shaped so that it would "wiggle like a bug." The hole is chopped with an axe or an ice chipper, depending on the thickness of the ice. At least one household uses a gasoline powered ice auger.

Following freezeup the char move to new locations, so that jigging usually takes place at different spots than seining. One couple stated that in the fall the char can be caught all along a certain stretch of the river, but that later in the winter one must know the specific holes where the char congregate. Certain holes are known to always have char. Two sources mentioned that as the winter progresses, the char seem to move to areas further downstream. The areas identified for jigging char range from three miles above the mouth to immediately upstream from Punuk, with three spots several miles further upstream (see Maps 56 and 57). Two sources mapped stated that
Map #56
Arctic Char Harvest
local name: trout
time period: up to 1980
season: freezeup to breakup
method: jigging through the ice
# of sources: 5
Map #57
Arctic Char Harvest
local name: trout
time period: up to 1980
season: freezeup to breakup
method: jigging through the ice
# of sources: 5

- Camps
  - A, up to 1960
  - B, C, up to 1960
they had used camps for this harvest up until the time snowmachines replaced dog teams. In the fall of 1980 at least one household for which there is no mapped data was camping upriver to jig char.

At present the Shaktoolik River is the primary river utilized for jigging char, as no other rivers were identified by the households interviewed. However, one old man related that long ago when he was young, his mother would walk across to the Tagoomenik River (Shaktoolik was located upriver in the timber at that time). She would jig char for a week there by herself and then walk back. Her son would then go by dog team to pick up two sled loads of frozen char from her caches.

For both seining and jigging char, Shaktoolik sources agreed that changes in technology have had little effect on harvest areas. The exception to this is the three jigging sites identified several miles upstream from the others (see one site on Map 56 and two sites on Map 57). These spots have been utilized only since snowmachines have been available due to the greater distances involved. One effect outboards have had on the seining effort is that the harvest that took three days in the past can now be completed in one day.

In the past fish traps were used for char harvest. A "fence" of sticks was arranged along the river bottom through the ice so that char and other fish would be funneled into the trap. These traps could successfully capture char even in the cold, dark months when jigging was unsuccessful. In the winter of 1980 one local elder was planning to construct and use such a fish trap.
The char harvest yields an incidental catch of a variety of other species. Seining will also yield silvers, grayling, and whitefish. Jigging through the ice and fish traps catch grayling, lingcod, and whitefish. Grayling are the fish caught in the greatest numbers incidental to char.

Char are usually prepared by boiling or baking. Another popular method of preparation is to "barbecue" fresh char over a campfire while on a trip up the Shaktoolik River. It is possible that char are also eaten frozen, since this is a form of preparation elsewhere in Norton Sound. One couple described drying char one April after having consumed all of their dry salmon. They stated that the dry char were acceptable.

In the days of dog teams char were important as a source of dog food. One source described how owners of dog teams would seine as many char as possible in the fall. These char would freeze as the weather became colder and would be available for dog food during the winter. He stated that char and seal were the best dog food, second only to beaver meat. Dogs cannot be maintained on dry fish alone because of their need for dietary variety. He recalled that no matter how many char were caught, they would all have been consumed by springtime. Another source described seining about 1,000 char for dog food for a local dog team. The char were put into barrels and buried.

Char are harvested in substantial quantities at present, although probably greater quantities were taken when dog teams were being used. One source stated that char are seined by the hundreds in late September. At least two sources said that char are brought home from ice fishing by the gunny sack. In November 1980 a Shaktoolik woman caught 86 char through the ice in one
day. The general opinion expressed was that Shaktoolik had large quantities of char available, more so than do other areas. Koyuk residents interviewed by the researcher agreed that Shaktoolik has more char than the Koyuk area. In one instance, a group of Koyuk people described a certain quantity of char as "a lot," whereas the Shaktoolik household that had harvested those char thought that it was not a particularly large amount. Koyuk people have come to Shaktoolik on occasion to jig for char.

Like most other resources harvested, char are shared within the community. The researcher was informed of several instances in the fall of 1980 in which char were given away but is unaware of any local selling of char. However, one elderly man recalled selling several gunny sacks of char in the 1940's to a plane which had landed at Shaktoolik to purchase char for a store in Nome.

Herring

Herring and herring eggs are one of the many resources harvested by the residents of Shaktoolik in the spring. Herring arrive to spawn on the coast soon after the departure of the shore ice, which is usually in early June. A preferred substrate for spawning is _Fucus_ kelp beds.

The primary harvest area used today for herring and herring eggs is roughly three miles of coast centered around Ganigak (see Maps 58 and 59). This area has been utilized for thousands of years for the harvest of a variety of species in the spring, including herring, seals, belukha, and cliff eggs. Five of the households surveyed have continued to use their Ganigak camps.
Map 58 Subsistence Herring & Herring Eggs Harvest
time period: up to 1980
season: after breakup
method: seine, gillnet
# of sources: 5

- - - - - A, up to 1980
- - - - - - B, up to 1980
- - - - - A, up to 1930
Map #59 Subsistence Herring & Herring Eggs Harvest
time period: up to 1980
season: after breakup
method: seine, gillnet
# of sources: 5
also area for
1935-1980

camps
--- A, up to 1980
--- A, up to 1980
***** A, up to 1980
for their herring harvest. One person also described harvesting herring on the coast south of Beeson Slough (see Map 58). Several of the sources interviewed stated that they had always taken herring and herring eggs at Ganigak. One exception was an elder who recalled that prior to the use of outboards, the distance from the village to Ganigak had discouraged this harvest by his family at that area.

One area not currently utilized but important for harvesting herring for dog food when dog teams were still used is a stretch of coast from the village to Beeson Slough (see Map 60). One elderly couple identified two camp sites they had used prior to 1960 for harvesting herring, seal, and char. The herring were harvested with beach seines, often immediately below the village. One method was to use a boat to work the seine; another was to set the seine out using a sandbag as an anchor. Schools of herring would be seen splashing as they approached along the coast. When the fish were in the right area, the seine was pulled in with a rope. The people would be busy all night processing the fish they had caught in the previous day. One elderly couple recalled that sometimes the village could harvest all the herring that it needed in one 24 hour period. Elders agreed that herring eggs were not available along this stretch of coast next to the village but had to be gathered at Ganigak. One man explained that herring intercepted along the coast between the village and Beeson Slough were in transit and not spawning.

A variety of reasons were given to explain the cessation of subsistence herring harvest along the coast south of Shaktoolik. Two sources believed that the introduction of outboards had provided easier access to Ganigak,
Map 60 Subsistence Herring & Herring Eggs Harvest
time period: up to 1960
season: after breakup
method: seine
# of sources: 4
- A, B, up to 1960
- - - - - up to 1951
- - - - - - up to 1940's
- - - - - - - up to 1935

camps
- - - - - - - A, B, up to 1960
which had always been the preferred site for herring harvest. An older
couple thought that harvest along this stretch of coast had continued up
until the 1960's, when the disappearance of the dog teams reduced the demand
for herring. Another man stated that Ganigak was a preferred spot because
beaches were not sandy. Herring seined onto a sandy beach are less desir-
able due to the sand which adheres to them. He also felt that shore ice
had remained late along the coast by Beeson Slough in recent years and had
therefore discouraged herring harvest.

In the past a major use of herring was for dog food. One elderly couple
interviewed recalled that herring had been caught primarily for dog food,
with a smaller portion being retained for human consumption. The herring
were woven into grass ropes--"strings"--and dried but apparently were not
buried for storage as they were in villages further north. One older woman
thought that the weather was too warm in the Shaktoolik area -- buried
herring would deteriorate completely due to lack of permafrost.

One source stated that as recently as ten years ago many households would
string herring (grass ropes), but that now this activity is conducted by
only four older couples. When dried, the herring are stored in barrels in
seal oil or frozen in plastic bags. A more recent method of preparation is
to salt herring in barrels. Salted herring are then pickled by some Shak-
toolik households. Several sources described salted herring as a highly
desired addition to the winter diet. Herring eggs can be stored by salting
or freezing. To cook salted eggs, they are washed several times in fresh
water and boiled. Boiled eggs are preferred still attached to kelp. Today
several Shaktoolik households of primarily older people continue to harvest
significant amounts of herring for food. Two elderly couples described
drying several "strings" of herring in 1980. Three households salted 50
pound barrels of herring. At least four other households stated that they
continue to harvest herring, and it is probable that there are other house-
holds in the community using herring not known to the researcher.

Although the harvest of herring may have declined in popularity with the
younger people, herring eggs continue to be a desired food item for most
Shaktoolik households. Several described herring eggs on "seaweed" (Fucus)
to be a delicious dish. The eggs are harvested in much the same area as the
herring themselves. Timing is very important, for the eggs get "slimy,"
wash off the kelp, or start to hatch a few days after they are spawned.
Therefore, people will regularly check the Cape Denbigh area to see if the
herring have spawned. If someone discovers that an adequate amount of eggs
have been spawned, village residents will be informed, and soon several
people will arrive to join in the harvest. The harvest method described
involved the use of a garden rake to pull the kelp loose from the bottom.
Giddings (1973) describes the harvest of kelp to take place in the inter-
tidal region at low tide.

Interviewed residents made the common observation that the "seaweed" or kelp
had been depleted from areas near the Cape, leaving several previously pro-
ductive locations denuded. Several households stated that herring were
spawning on the rocks and grass where the kelp was no longer present. Most
people believed that large boats associated with the commercial herring
fleet from outside of the region had used suction to harvest the egg laden
kelp in 1979 and had wiped out a substantial portion of the kelp beds.
However, no one interviewed by the researcher had actually witnessed this activity. Apparently two people from Unalakleet had observed large boats at the Cape with large diameter hoses in the water and kelp and eggs being pumped up into the boats through these hoses. However, one Shaktoolik man believed that the local use of rakes had denuded the areas by pulling the kelp out by the roots. Another source stated that during cold winters, the shore ice will freeze to the bottom, encasing the kelp and tearing it out by the roots during breakup. However, he did not think that this was the case in this instance, and another person stated that in her lifetime, she had never seen an area denuded of kelp by ice. One household observed that the kelp seemed to be growing back.

The Commercial Herring Fishery

Although herring have been harvested commercially in Norton Sound since as early as 1916 (ADF&G Division of Commercial Fisheries 1980), it is only recently that this harvest has become important to Shaktoolik residents. In 1979 a domestic herring fishery for sac roe began in Norton Sound on a large scale. During that year 70 percent of the catch was taken by purse seines originating from outside the area. In 1980 and 1981 purse seines were not legal because of a regulatory change. The commercial harvest of herring became an important part of the Shaktoolik economy, as Norton Sound residents obtained commercial herring gillnets and local participation increased. In 1980 19 Shaktoolik fishermen were actively involved in this fishery, harvesting herring at an average price of $205 per metric ton and earning a combined total of $52,623. The average income was $2770 per fisherman,
ranging from a high of $5166 to a low of $205 (ADF&G records 1981). The divergence of cash income earned per fisherman was primarily a function of effort expended.

The areas of this commercial harvest correspond roughly to the sites of the subsistence harvest of herring and herring eggs. The commercial and subsistence harvest occur simultaneously to some extent, with some fishermen retaining part of their commercial catch. The harvest areas near the Cape extend from the Cape itself to the mouth of the Sineak; one fisherman also harvested herring at the south end of Beeson Slough (see Maps 61 and 62). Most of the fishermen interviewed used camps at their traditional sites at or near Ganigak. There are two coves in that area which are utilized for camping.

The commercial herring harvest occurs at a fast pace, with fishermen working around the clock with very little rest for several days. One source described the 1980 harvest to have lasted five days. When the herring are present, vast quantities are harvested in short periods of time. For example, one fisherman described harvesting 15 metric tons in one night. The volume of fish becomes so great that people combine their efforts. One man described how he and his partner had started out using two 50 fathom nets; they had been forced to cut back to one net because of the large volume of fish being caught and had ended up working that net with two other fishermen and an additional boat. One problem experienced by local fishermen is the limited size of their boats, since most have only their boat used for other harvests (typically an 18 to 21 foot aluminum Lund). These boats can be filled with herring quickly — one source claimed his was full in 20 minutes.
Map #61 Commercial Herring Harvest
Time period: 1979-1980
Season: after breakup
Method: gillnet
# of sources: 0

= also area for camps
-- A, 1979-1980
--- A, 1979-1980
----- B, 1979-1980
***** A, 1980
This causes loss in fishing time due to the frequent transporting and unloading of the small boat catch. Only one Shaktoolik fisherman had a boat with substantially greater carrying capacity. The larger gillnetter boats from outside the region easily out compete the local boats and were believed by Shaktoolik fishermen to have been given preferential treatment by the buyers in the 1981 season.

This fishery is subject to factors that greatly affect the fishermen's success. Shore ice that is late in leaving the area can delay the harvest, as occurred in 1981, and could conceivably completely prevent the fishery from occurring. The market for the roe can fluctuate considerably. The average price for herring fell from $600 per metric ton in 1979 to $205 in 1980. The price offered by buyers varies depending on the roe content of the herring brought in. If the herring are immature or spawned out, they may be totally worthless to the buyer. In 1981 20 tons of herring were discarded by Shaktoolik fishermen due to low roe content (Len Schwarz, personal communication, 1981). In conclusion, the commercial herring fishery represents a major new source of income to the Shaktoolik economy, although this income is potentially unreliable.

Tomcod

Tomcod -- the local name for saffron cod -- were traditionally a staple of the winter diet in Norton Sound. Tomcod harvest continues to be an important activity at certain times of the year, particularly directly following the freezeup of rivers when tomcod first become available. In a single day in mid-October 1980, the researcher was informed of at least six households
that had members jigging tomcod. Later in mid-November eight fishermen were observed one day engaged in this activity. It is likely that this harvest had occurred off and on for that entire period. This harvest in October and November is when most tomcod are caught. Only one elderly couple described catching tomcod in the month of December. Three of the ten households interviewed for mapping stated that they caught tomcod in the spring prior to breakup, whereas all ten caught tomcod in the fall. Significant quantities continue to be harvested; for example, one boy caught more than 100 in a particular day. The researcher observed roughly 60 pounds of frozen tomcod at one household and a minimum of 100 fish drying outside another house. This is a harvest in which children and elders actively participate.

The fall harvest occurs through the river ice at a variety of sites, from directly below the village to the mouth of the Shaktoolik River (see Maps 63 and 64). If the tomcod are not found in one spot, the fishermen will try other sites until the fish are located. The lure, often locally made, is jigged through a hole chopped in the ice. The hooks lack barbs so that the fish will easily slip loose when brought to the surface. Tomcod harvest in the spring, from March to breakup, occurs on the coast directly in front of the village and out from the mouth of the Shaktoolik River (see Map 65.) One reason why more effort is invested in the fall harvest as compared to the spring is that tomcod are in the preferred condition in the fall, for they are fat, with numerous eggs and fat livers, both of which are regarded as especially delicious. In the spring they are thin and without eggs.
Map #63
Saffron Cod Harvest
local name: tomcod
time period: up to 1980
season: late fall, early winter
method: jigging through the ice
# of sources: 5

 allowable area for
Saffron Cod Harvest

local name: tomcod

time period: up to 1980

season: late fall, early winter

method: jigging through the ice

# of sources: 5
Map #63
Saffron Cod Harvest
local name: tomcod
time period: 1960-1980
season: spring
method: jiggling through the ice
# of sources: 3
Unlike the fall harvest areas, which have always remained the same, the spring areas changed somewhat when snowmachines replaced dog teams. Tomcod were once an important source of dog food. One elder recalled that dog team owners would hook large quantities of tomcod in the fall. Another elder described how people would search for productive tomcod sites in the spring all along the coast from the village to the foothills to the south (see Map 66). He told how people would jig for tomcod, boil some for lunch, and return with a gunny sack full. Another man recalled that if people ran out of dog food in the spring (e.g., in March) and couldn’t catch any seals due to windy weather, they would travel by dog team to a cove south of Point Dexter and find numerous tomcod available. People would camp at a cove two miles to the north (see Map 66).

A common method of preparing tomcod is drying. They are dried outside in clusters, several tied together in a loop by a string through their gills. The bellies are ripped open so that the eggs and entrails are exposed to the air. Tomcod dried in the cold by the wind are preferred because of their soft, chewy texture. Tomcod hung in the fall are ready to eat by December or January. When eaten, the meat of the dried tomcod is separated from the bones, sometimes by the use of a hammer. In general, dried tomcod are a popular food and considered delicious. Tomcod are also eaten frozen with seal oil after being stored in a cache or a porch open to the outside. Less common methods of preparation include boiling and frying. One elder stated that frozen tomcod that have become "old" occasionally are eaten boiled. The meat is a little bit firmer and comes off the bones easier. He recalled that when he was younger, the older people would thaw "old" tomcods and eat them raw, but he found this unappetizing.
Map #66
Saffron Cod Harvest
local name: tomcod
time period: up to 1960
season: spring
method: jigging through the ice
# of sources: 4
camps: A, up to 1960, March
Lingcod

Lingcod (burbot) is highly regarded as a food for some Shaktoolik residents. However, only six of the ten households mapped had harvested lingcod, and two of these had not done so in recent years. This harvest apparently is confined primarily to the older people, since none of the people mapped that were under 50 years of age had ever caught lingcod. However, in the past lingcod apparently were more important. One elderly couple recalled that when they were younger, the older people had names for every bone in a lingcod's head, and stories were told about how each bone got its name. It was recalled that several years ago one old man caught 60 in one day.

All of the lingcod fishermen interviewed caught lingcod in the same general area, upstream from where the Tagoomenik River turns inland from the coast (see Map 67), and this has always been the area utilized in people's memory. Lingcod are always caught in the fall immediately following freezeup when the river ice is thin--generally in the months of October and November. In early November 1980 the researcher heard of a group of fishermen that had harvested lingcod. Lingcod can be caught in summer but are thin and less desirable at that time.

The primary harvest method for lingcod at present is jigging through holes in the ice. Two sources stated that tomcod was the type of bait used. Rather than using an aggressive jig action, the hook is moved only occasionally. Jigging is usually only successful if done at night, because lingcod apparently lie still during the day. One elder thought that this fact might have deterred the younger generations from fishing. The lingcod seem to move
Map #67
Burbot Harvest
local name: lingcod
time period: up to 1980
season: fall after freezeup
method: jigging, spearing
# of sources: 6
*****=also area for ---
about in schools, as is indicated by catches that fluctuate widely from
day to day. Another type of gear that has been used is a forked spear.
Lingcod can be speared during the day. One source described how lingcod
would congregate, and the fisherman could choose the one he wanted and spear
it through a hole in the ice. Lingcod are caught occasionally incidental
to the tomcod harvest. In the past when nets were set under the ice to
catch whitefish, lingcod would also be caught.

Lingcod are especially valued for their eggs and liver (the latter is large
and fat in the fall). A method of preparation used in the past was to chop
the liver and mix it with blackberries or blueberries. Lingcod meat makes
good fish agutuk, locally referred to as nikilik. The boiled meat is mashed
and mixed with reindeer fat, seal oil, and water. Sometimes masu -- a sweet
root -- is finely chopped and added to the other ingredients. Generally the
lingcod is eaten boiled but one source stated that he liked it deep-fried.

**Wolffish**

One of the species harvested at Cape Denbigh is the wolffish, also known as
"rockfish". This exotic fish possesses the characteristics of the wolffish
family **Anarhichadidae**. One of Shaktoolik's oldest residents stated that the
name "rockfish" actually referred to a much smaller fish, a type of cod.
However, other sources interviewed thought that "rockfish" and "wolffish"
were interchangeable terms. The traditional local name is kasuluk.

As was the case with lingcod, wolffish are harvested primarily by the older
people. Of the ten households interviewed for purposes of mapping, three of
the four couples under 50 years of age had never fished for wolffish, and the fourth had only caught one in his life. The older people considered wolffish to be a desirable food source or, for some, primarily a delicacy.

According to current residents, wolffish have always been taken in the same area—at the tip and either side of Cape Denbigh (see Maps 68 and 69). A traditional method of harvest is to jig for them through cracks in the ice that open up in May. They are also harvested by jigging from a boat (from kayaks in earlier years) in the open water in June. The fish are thought to lurk among the boulders on the ocean floor. One elderly couple stated that they cannot be caught in the winter as they will stay down under the rocks. One source mentioned that people jig for wolffish at the same time as they harvest crab after breakup. Another man described jigging for wolffish to pass the time during a belukha hunt. Only two households interviewed for mapping continue to camp while harvesting wolffish, although two others had camped prior to the 1930's. In the past wolffish had been only one of the many resources harvested by people camping at Ganiqak in the spring.

Wolffish at Cape Denbigh reach a length of 2½ feet and possess a large, ugly head and powerful, well-fanged jaws. Two sources mentioned that wolffish will audibly "crunch" a piece of wood when they bite it. Children are warned to keep away from wolffish that are still alive. One elder recalled that in the days of kayaks fishermen were careful not to put living wolffish into their kayaks lest a fish in their lap cause them fatal injuries. Residents of the village of Stebbins relate a story about how a kayaker bled to death as a result of such an encounter (Sue Smith, ADF&G, personal communication, 1981).
Map #68
Wolffish Harvest
local name: wolffish, rockfish
time period: up to 1980
season: spring after breakup
method: jigging
# of sources: 5
——= also area for camps
A, up to 1935
A, up to 1980
B, up to 1980
Map #69
Wolffish Harvest
local name: wolffish, rockfish
time period: up to 1980
season: spring after breakup
method: jigging
# of sources: 2
 camps
A, up to 1930
Utilization patterns of wolffish have changed considerably over the years. Currently wolffish are eaten boiled and are occasionally stored by freezing. In the days prior to the use of outboard motors when several households camped at Ganigak in the spring, wolffish are dried on racks. The fish would be gutted and the meat on both sides sliced several times so that it would protrude when the fish was hung by its tail to dry. Traditionally, pieces of black skin from wolffish were valued for use as fancy trim on squirrel parkas.

Cigafish

Cigafish, the local name for capelin, are harvested in early June. This harvest has been sporadic over the years and is engaged in by only a portion of Shaktoolik households. Several households stated that they were unaware of cigarfish having been harvested prior to 1980, but others recalled a harvest taking place annually or every few years, depending upon whether the fish were available in the Shaktoolik area. In 1980 there were larger quantities of cigarfish than usual, and the local harvest increased as a result with at least 11 households participating. The harvest area is mainly the beach adjacent to the village where the fish are scooped from the surf by children with buckets. One man reported that in 1980 he harvested some from the rocks at Cape Denbigh (see Map 70). The last major harvest occurred about four years ago at the beach by the old site, but apparently substantially fewer households were involved than in 1980.

Cigarfish have always been utilized in limited numbers for as long as people can remember. Elders recall that only certain people would harvest them
Map #70
Capelin Harvest
local name: cigarfish
time period: up to 1980
season: June
method: gather from beach
# of sources: 6

- 1975-1980
- 1980
- 1975-1980
in earlier years. One older couple explained this to be due to the abundance of other foods available at that time of year (e.g., dried ugruk). Often the harvest was only enough for one meal.

In the past cigarfish were often eaten fresh by boiling or frying, although some people braided them into grass ropes for drying. Today several different methods are used to dry cigarfish. One person reported braiding them into a grass rope, another hung them on a rack, and yet another family dried them on a board. Frying continues to be a popular method of preparation.

King Crab

The importance of king crab in the Shaktoolik diet seems to vary significantly among households. Several households do not harvest crab. Some families will go crabbing only occasionally — when they desire a taste of crab — and will harvest only small quantities, whereas others may invest more effort and obtain larger numbers of crab. The researcher was able to identify at least 16 households that had harvested crab; several of these had gone crabbing only in certain years. A survey conducted by the Eskimo Walrus Commission in Shaktoolik in February 1981 indicated that 55 percent of the surveyed households had participated in crabbing during the preceding year (EWC unpublished research 1981).

Two methods of crabbing can be identified at Shaktoolik, and the areas utilized differ for each. Crabbing through the ice with handlines or crab "baskets" is one harvest method; the primary area for this activity, both
historically and contemporarily, has been Cape Denbigh. For the most part this effort has taken place along a stretch of coast on the side of the Cape nearest to the village although some effort was described one or two miles along the coast on the far side of the Cape (see Maps 71 and 72). In the early 1900's Shaktoolik residents would occasionally spend a day or two crabbing along the coast a few miles south of Egavik, and until the 1940's a few families lived at Egavik and crabbed there. Some crabbing has occurred in the past through the ice near Besboro Island. Up until a few years ago, people crabbet through the ice in front of the old Shaktoolik village site (see Map 73). The harvest effort here was most intense around 1949. There is no crabbing in front of the current village site. One elder explained that the water is too shallow.

Besides crabbing through the ice, Shaktoolik residents harvest crab by dipping them from the shallows along the shore by boat after breakup. Both sides of Cape Denbigh are popular spots, and one person interviewed found crab all along the west coast of the Cape Denbigh peninsula. Crab have also been harvested in this same manner all around Besboro Island (see Maps 74 and 75).

Crabbing through the ice is done primarily with handlines, involving a weighted line with bait tied on the end. The bait is lowered to the bottom through a hole in the ice. When the line feels heavy, this indicates that a crab is holding onto the bait below, and it is carefully pulled to the surface. Two people mentioned using crab "baskets" (wire hoops perhaps 18-20 inches wide with netting stretched across and bait in the middle). One of these crabbers described using a crab basket 30 years ago, indicating that
King Crab Harvest
local name: crab
time period: up to 1980
season: before breakup
method: hand lines
   crab "baskets"
# of sources: 3

Map #71
King Crab Harvest
local name: crab
time period: up to 1980
season: before breakup
method: hand lines
   crab "baskets"
# of sources: 3

camps
   A, up to 1960
   B, up to 1980
Map #72
King Crab Harvest
local name: crab
time period: up to 1980
season: before breakup
method: hand lines
crab "baskets"
# of sources: 4
-----also area for-----
Map #73
King Crab Harvest
local name: crab
time period: up to 1972
season: late winter
method: hand lines
  crab "baskers"
# of sources: 4
  up to 1964
  1949
Map #74
King Crab Harvest
local name: crab
Time period: up to 1980
Season: spring after breakup
Method: dip from shallows
# of sources: 4
Map #75
King Crab Harvest
local name: crab
time period: up to 1980
season: spring after breakup
method: dip from shallows
# of sources: 4
also area for camps
A, 1975-1980,
B, up to 1930,
May & June
it is not necessarily a recent innovation. The basket requires a larger hole than a handline. One person described pulling up two or even five crab at a time in such a basket. Another crabber stated that he had switched from handlines to a crab basket because of the number of crab that drop off a handline when they bump the edge of the hole while being hauled up. A couple of people had tried homemade pots with no success. Various implements are used to catch crab by boat after breakup including long poles, oars, and hook and line.

Crabbing through the ice can occur as soon as the winter ice is safe to traverse, which may be in late December or as late as March at Cape Denbigh specifically. However, most crabbers prefer to commence crabbing later in the year (i.e., February, March, or April). Crabbing can continue into May, depending on when snow and ice conditions preclude snow-machine travel. When crabbing occurred in front of the old village site, it was within a similar seasonal time frame. Some Shaktoolik crabbers prefer to wait until the crab have been located by other residents before going out themselves.

Crabbing success is dependent on current. During a period of slack current very few crab can be caught. Two crabbers mentioned that the best currents for crabbing were in the evening. One man described how he would go out after work and crab until the current slacked off or sometimes remain until around midnight. Another person stated that a north wind results in a slack or slow moving current. A south wind yields a strong current and the best crabbing.
Ice conditions have a great impact on Shaktoolik crabbing. In the past the ice would regularly freeze solid out to Besboro Island and from Besboro Island to Cape Denbigh. In recent years this has not occurred in part due to a stiff north wind which has continually blown the ice away. In effect, no crabbing has been possible out in front of the old village site for several years due to lack of ice. One person stated that crabbers must be able to get far enough out on the ice to reach the area where the currents are sufficiently swift to yield a successful harvest. In the past people would crab anywhere from 3/4 mile to 3 miles out. Due to this lack of ice, all crabbing through the ice in recent years has occurred at Cape Denbigh, where people crab as close to shore as 40-50 feet.

Another ice condition that affects crabbing is rough or piled ice resulting from southerly winds. In some years rough ice has prevented crabbing because its thickness makes chopping holes difficult or impossible. This occurs in front of the village as well as at the Cape. In many years crabbing out from the old site has been prevented by such rough ice conditions. At the Cape moving ice has some impact on crabbing. One household described losing its handlines when forced to retreat to stable shore ice when the ice on which they were crabbing began to leave the area.

Crabbing by boat follows breakup in late May or June. The sea is calm and the days are long, so that people often stay out all night searching the coastal shallows for crab. Crab are more accessible at low tide, which occurs during the evening in June. Crab caught in June were described as very meaty. They are often brought up in male and female pairs, one hanging
onto the other. Since the females are smaller than the males, some people throw all the females back, whereas others may keep some of the larger ones.

Crab harvest patterns have varied widely in the remembered past. Crabbing by Shaktoolik residents prior to the late 1940's had occurred primarily at Cape Denbigh, usually in conjunction with seal hunting efforts. Prior to the 1930's when the village was located several miles up the Shaktoolik River, seal hunters would travel by dog team down to the Cape to hunt seal, putting a few crab lines down at the same time. One elder believed these hunters did not get many crab and that more than three crab was considered a large catch. About 40 years ago one person recalled that four or five families would camp near the Cape in the spring to hunt seal and crab through cracks in the ice. Two elders could not remember any crabbing occurring in their childhood (45-50 years ago) but did recall that the older people in those earlier times would mention being hungry for crab in the springtime. Another elder did remember crabbing as a child (55-60 years ago). A common opinion was that crabbing effort had dropped off for several years and recently had become more popular. One person thought that the younger folks had just become interested in crabbing at the Cape in the last three years. One hunter described crabbing in conjunction with belukha hunting; if belukha hunting was poor, he would crab at his spring belukha camp near the Cape.

According to contemporary residents crabbing in front of the old coastal village site had occurred rarely prior to 1949. In that year crab were discovered there by a hunter who had put down a crab "basket" as an experiment.
Shortly after he found that crab were present, two other crabbers went out and came back with large quantities of crab, thereby inspiring a large portion of the village to also participate. The prevailing opinion was that this was an outstanding year and that the crab were never found there again in similar quantities. One man remembered that there had been many crab everywhere that year, since crabbing had been excellent at Cape Denbigh and Eqavik as well. People continued to look for crab in this location during ensuing years but with limited success. On the other hand, one elder believed that crabbing had been good in front of the old site, with crab being brought back by the sled load until recently when ice conditions had changed. Another person recalled that the older folks used to crab in front of the old site fairly regularly, bringing back six or seven crab each per day. Another crabber mentioned that rough ice had prevented crabbing for several years before and after 1949. Eventually, due to the factors mentioned above, many crabbers directed their effort back to Cape Denbigh.

Most people interviewed considered crabbing by boat after breakup to be a recent phenomenon, having become popular only in the last three to five years. However, one elder recalled that he and others had done it to a limited extent in the past. In the last few years there has been greater participation equal to or in excess of crabbing efforts through the ice. Crabbing by boat is often combined with other harvests after breakup, such as searching for herring eggs and jigging for wolffish. A few people thought that crabbing by boat had not been done much before because nobody knew that crab were present in significant quantities at that time of year.

As mentioned earlier, a large segment of Shaktoolik’s residents do not crab. However, those that do go crabbing often give crab to those that do not.
Those crabbers that are able to harvest numerous crab also give part of their take to crabbers who have had poor luck. One crabber mentioned that his household gives crab to relatives in Shaktoolik and Unalakleet. Another stated that people never sell crab but would rather give them away. One factor that influences the amount of crab shared rather than retained is that crab are difficult to store. One active crabber stated that he gives many away for that reason. Two households do preserve crab in their freezers for eating later in the year. In June when the weather is warm and crab will spoil quickly, people will harvest only enough crab for that day's meal. It is common for families to turn the excursion into a picnic and to cook and eat the crab on the beach somewhere along the coast.

The harvest of crab at Shaktoolik has fluctuated widely over the years, in response to such factors as crab availability, ice conditions, and the community's awareness of crab availability. For instance, in 1979 an unusually large amount of crab was harvested through the ice, whereas much smaller quantities were harvested in years prior to that and little or none in 1980. A similar surge in crab availability and harvest effort apparently occurred in 1949 on the ice adjacent to the old site.

**Mussels and Clams**

Mussels have been a part of the local diet for a long time as indicated by abundant archaeological evidence of mussel shells in Norton Culture remains in the Shaktoolik area (Giddings 1964). Today mussels and clams continue to be regarded as a delicious food by many Shaktoolik residents and half of the ten households interviewed for mapping had participated in this harvest.
A variety of harvested species were described, including blue mussels that grow in clusters, cockles, small white clams (called "butter clams") and larger "horseclams" (three to four inch shells). The "horseclams" are dug from the mudflats near the mouth of the Shaktoolik River, whereas the mussels, cockles, and other species of clams are gathered from the beach (see Map 76).

The traditional method of harvest was to gather mussels, cockles, and the smaller white clams from the beach following storms from the south in the summer and fall. The storm and high water would break the clumps of mussels loose and deposit them and other shellfish on the beach. The activity of seagulls would indicate the presence of the shellfish on the beach. Mussels are reportedly no longer present in numbers comparable to earlier years, and residents interviewed agreed that not many had been harvested in recent years. One man described checking a group of mussels shells in the summer of 1980 but with no luck (the shells were empty). The last time he had harvested mussels was in 1976. An elder proposed the theory that ice action could have damaged the population; he believed that in some years the ice will freeze to the bottom, encasing the mussels and ripping them loose at breakup.

The other method of harvest is to dig for clams on the mudflats. These mudflats are exposed only when a steady, brisk north wind has blown the coastal water offshore, resulting in a drop in sea level. This occurs occasionally in September. There was no clear consensus as to when this method of harvest began. Sources agreed that the harvest of the large "horseclams" began in recent years. Two recalled that a church pastor had "discovered" the clams about three years ago and had filled a five gallon bucket, and his success
Map #76
Mussel & Clam Harvest
- time period: up to 1980
- season: summer, fall
- method: dig, gather from beach
- # of sources: 5
- camps
- A, up to 1974
had inspired several local people to also participate. One elder recalled that in 1973 a person who had dug clams in Homer had gone out and dug up several. The elders interviewed stated that people had been previously unaware of presence of these clams, which live about nine inches down in the mud with only a "bubble hole" to indicate their location. However, one older woman recalled her parents' description of another type of clam they had harvested from mudflats at Ganigak in the fall. In September 1980 the researcher observed only one day in which the mudflats were exposed to allow clam harvest. Clam diggers from at least five households took advantage of these conditions. However, a survey conducted by the Eskimo Walrus Commission in Shaktoolik in February 1981 indicated that 45 percent of the surveyed households had gone clamming in the preceding year (EWC unpublished research 1981).

One traditional method of eating mussels is to pour hot water on them so that they will open and then eat them with seal oil. Another method is to chop them up for chowder. The species of clams are also made into chowder, preferred by several residents to store bought clams. Giddings described boiled mussels eaten "with great relish" (Giddings 1964).

Smelt

Smelt are occasionally caught in small numbers incidental to the tomcod harvest through the ice. Most Shaktoolik residents do not make a special effort to harvest smelt specifically. However, one man reportedly once caught several during the tomcod harvest by fishing at a greater depth. In December 1980 another individual expressed the desire to jig for smelt at the mouth of
the Shaktoolik River. He stated that cold weather (-20°F) was conducive to smelt harvest. He described smelt as very delicious fried whole in egg and flour batter. He agreed that people do not pursue smelt very much at present but thought this harvest effort had been greater in the past.

Bullheads

All sources agreed that bullheads (sculpins) are no longer eaten. Only one of the oldest Shaktoolik residents could remember when bullheads were eaten in significant quantities. He recalled how bullheads had provided a welcome supplement to a winter diet of ugruk. If seal hunters were trapped when floating ice closed in, they would jig for bullheads while they waited for the ice to move. Another elder stated that bullheads were eaten in earlier times when not many alternative foods were available. Another man in his 60's could recall only one elder during his life who had jigged bullheads in substantial numbers. Today bullheads are sometimes caught incidental to tomcod jigging and in salmon nets. Local bullheads can grow to be as long as 1½ feet, and at least two species are present.

Whitefish

Whitefish were an important subsistence resource in the past but are not harvested in significant quantities at the present time. Giddings described a spring harvest at Nukleet in the 1940's and suggested that in earlier times whitefish had been a major fish resource, harvested primarily by means of fish traps (Giddings 1964). Today whitefish usually are caught incidental to other harvests, such as the seining of char and ice fishing for char and
grayling. One man stated that he would bring along a small gill net when
camping in the spring and use it to catch an occasional whitefish in sein-
ing efforts at Sineak and Malikfik. He didn't care for them especially,
because he thought they tasted like mud when caught in those areas. An el-
der stated that whitefish tasted like mud except when caught in clear river
water, and he thought that there were not many whitefish in the Shaktoolik
area.

Harvest methods described as used in the past included seining in the fall,
when the whitefish were especially fat, and gillnetting in the spring, prior
to the arrival of herring and salmon. An older man recalled using a char
net set under the ice to catch whitefish in the past. The net was set when
the river ice in the fall was about one foot thick or less. A string of
holes five feet apart was chopped through the ice. A line was pushed through
one hole with a pole so that it was below the adjacent hole, where the line
would be snagged with another pole and the process repeated. Then the net
was drawn under the ice by attaching it to the line. The net was stretched
tight by a pole at each end, deep enough so that the net would not get frozen
into the ice. To check the net, it was pulled by the line out through one
end hole, then pulled back from the other end to set it again. This elder
was unaware of anyone using this method currently.

Terrestrial and Freshwater Species

In addition to the marine-related species already discussed in length, Shak-
toolik residents utilize a variety of resources that have little or no contact
with marine environments. In many cases data presented in the following
discussions were gathered only incidental to information on marine-related species and are therefore quite limited. It is readily apparent from these discussions and from dietary data presented in following chapters that marine-related species dominate the diet and harvest activity of ice free months whereas terrestrial species increase in importance in the winter and early spring. Caribou in particular is integral to the winter and spring diet, replacing salmon as the primary food source for most Shaktoolik residents as salmon supplies dwindle. Other species such as ptarmigan, hares, and grayling are also harvested and of significance to the local diet and activities but are not included due to inadequate data.

Reindeer

Although reindeer is not generally regarded as a "subsistence" resource, this discussion has been included because reindeer does constitute a local food source and has played a significant role in historical resource utilization patterns in the Shaktoolik area.

Reindeer were introduced to the Norton Sound region by Sheldon Jackson in the early 1900's and have played a part in the local economy for many decades. Initially, the herd in the Shaktoolik area prospered and is remembered to have numbered over 10,000 at one time. One elder recalled that the herd exceeded 14,000 head, whereas another man recalled a roundup in the 1930's in which 15,000 deer were counted and estimated that the herd totaled approximately 30,000. Koyuk and Unalakleet also had herds. Shaktoolik elders agreed that this abundance of reindeer had significant impact on the local harvest of other resources, particularly caribou. Caribou had become scarce
in the coastal areas of Norton Sound by 1867 (Ray 1975). Although Shaktoolik hunters had continued to travel inland to harvest caribou in the early days of the reindeer, eventually the growing numbers of reindeer supplied the food and materials previously obtained from caribou and the local caribou harvest sharply declined. One Shaktoolik elder recalled that belukha had not been harvested in the spring during this period; he gave the abundance of reindeer as one of the reasons for this. This availability of reindeer for general local use appears to contrast with the situation in other parts of the Bering Strait-Norton Sound region where local use was usually limited to the local herders or the missionary teachers, Lapp herders, other local whites, and non-local markets (Linda Ellanna, personal communications, 1982).

Sometime in the 1930's the Shaktoolik herd crashed. The most frequent explanation given by Shaktoolik sources for this was that a freezing rain in the fall had put a two inch ice crust on the tundra, followed by a hard winter with abundant snow. This created conditions which made reindeer feeding difficult. This situation was exacerbated by numerous wolves which came into the area, and most of the herd was wiped out. One elder thought that overgrazing of the area had contributed to this disaster. Another believed that wasteful reindeer harvest practices had brought on this calamity as a punishment from God. Shaktoolik sources disagree as to the date of the crash, with estimates ranging from the late 1920's to 1936 or 1938. One of the oldest men recalled that the herd had already begun to decline in the late 1920's and had dwindled in numbers by the time of the move to the coast in 1932. Later in the 1930's it reached even lower numbers.
Following the crash of the reindeer herd, Shaktoolik people were forced to turn to other resources to compensate for this loss of food supply. One older man recalled that the government had bought some more reindeer from various independent herd owners in an attempt to restock the area, but these reindeer were only available as food to the four or five local men hired as herders. The harvest of caribou was reestablished as a significant source of meat sometime in the 1940's. One man recalled that large number of ducks were salted to add to the winter diet during this period, constituting an important winter meat in addition to dry fish and seal. Another hunter described how he and others had begun to harvest grizzly bears for food, something which had not occurred much for several years.

Today the Shaktoolik herd is managed by a local herder and contains about 380 reindeer. The herder looks after the reindeer by boat and a six-wheeled all terrain vehicle in the summer and herds them by snowmachine in the winter. The herd is corralled in November of each year for castrating, butchering, and notching of ears for identification.

The butchering of reindeer occurs at several different times in the fall, usually in September, October, and November. The researcher was aware of roughly 30 reindeer butchered on a total of four occasions in the fall of 1980. Some were shipped to Unalakleet for sale, while others were sold locally or given to people who participated in the corralling. The herder stated that the herd could support a yearly harvest of 70 deer due to high fawn production. One source stated that the local price for reindeer had gone up considerably in recent years due to Reindeer Herders Association agreements, reaching the current level of $1.25 per pound. A major portion.
of the reindeer meat obtained by Shaktoolik residents is received as payment for helping with the November roundup. The roundup is a popular community activity involving anyone who wishes to participate.

Reindeer continues to be an important part of the Shaktoolik diet. Like most of the "wild" resources harvested, its utilization is seasonal, reaching its peak in the fall following butchering and prior to the caribou harvest. A diet calendar survey conducted by the researcher in the fall and early winter of 1980 revealed that an average of 12 percent of the protein/fat consumed by the households surveyed was reindeer, ranging from 28 percent for one family to none for another.

Caribou

Caribou were plentiful along the Norton Sound coast in the past, as was recorded by various early explorers in the region (Ray 1975). Cairns of piled stones arranged in straight lines near Cape Denbigh indicate that caribou drives took place here in earlier times. Other evidence of caribou harvest includes abundant caribou bones in the Nukleet archaeological remains as well as numerous projectile points in Norton culture layers that may have been arrowheads and spearheads for the hunting of caribou and other land mammals. The ancient Denbigh culture of the Cape Denbigh coast probably concentrated on caribou as a principal food source for most of the year (Giddings 1964).

In addition to arrows and spears, snares were a principal method of caribou harvest used in the winter in valleys and ravines (Ray 1975). An elder originally from Shaktoolik recalled stories of corrals used long ago at Cape Denbigh and Unalakleet into which two fast runners would herd the caribou.
As the caribou ran out of the corral, they were caught in snares. One elder described arrowheads used for caribou and bear hunting. One was a long range arrow -- the head was about six inches long with several barbs on both sides. The base of the head was pointed so that the head could be stuck into the shaft. This design was such that the head would come loose from the shaft when the caribou or bear bit the shaft and attempted to pull it out. The head would then work its way in deeper with each movement of the animal. A similar but broader and heavier arrowhead was designed for short range use.

In the last half of the 1800's caribou disappeared from the coast of Norton Sound. One popular theory links this occurrence to the increased use of firearms by the Eskimos of the region, but this could also have been due in part to a shift in migratory patterns of the caribou (Ray 1975). Another possible factor is the harvest of caribou for the commercial whalers which occurred during this period. For whatever reason, caribou were no longer readily available to the coastal villages, and Shaktoolik hunters were forced to travel many miles inland for their caribou. One Shaktoolik elder recalled his parents and another family travelling by snowshoe with small dog teams of five or less dogs around the turn of the century from a village near Moses Point to the head of the Ungalik or Inglutalik River. They would camp there for two months in late winter and early spring when the days were longer, trapping and hunting caribou. Due to the small size of dog teams in those days, people were unable to bring substantial quantities of meat back to the main village. Therefore, they would remain where the caribou were until it was time to return to the main village in the spring. Another elder stated that caribou were relatively few in those times and were encountered only in small, scattered groups. This harvest of caribou continued when reindeer
were new to the area and still few in number. One elder recalled Shaktoolik men hunting caribou in the winter as late as 1915.

Prior to the introduction of reindeer an additional season of caribou harvest occurred in the summer and fall, often combined with the harvest of squirrels. The hunters would travel by kayak to the heads of rivers and hike back into the hills. Because the hunters had to pack their harvest substantial distances and transport it by kayak, they would kill the caribou primarily for the fat, sinew, and hides, which had short hair at that season and were good for parkas. One elder recalled two hunters who had once returned with 20 hides.

Once reindeer became abundant and readily available, the arduous trip to "caribou country" -- the headwaters of the Shaktoolik River -- was no longer necessary, for reindeer provided meat and materials comparable to that of caribou, and caribou hunting virtually ceased. However, in the 1930's the reindeer herd crashed. Following the crash, Shaktoolik hunters once again began to pursue caribou, and at some point in the 1940's, caribou hunting was reinstated as an important winter and spring activity. Hunters would travel by dog team to the hills at headwaters of the Shaktoolik River and spend up to two or three weeks hunting caribou. The method described was to approach the caribou stealthily on snowshoes and then shoot them. These hunts are remembered as being extremely arduous--the hunters could walk for days or weeks without seeing caribou and would run out of food for themselves and their dogs. One younger man recalled that some hunters would return home swearing never to go back, but when the next winter came, they would depart for "caribou country" once again. One elder stated that the caribou
were scarce in those days compared to pre-reindeer years or to the present. Hunters agreed that the harvest was much more difficult than it is today with more numerous caribou and the availability of snowmachines. One significant change over caribou hunting of the past was that the larger dog teams of seven to eight dogs or more allowed hunters to haul substantial quantities of meat home to the village, something not possible in earlier years.

With the introduction of snowmachines in the early 1960's, the hunting of caribou underwent some significant changes. However, the areas hunted did not change and continued to be the hills at the headwaters of the Shaktoolik River. One of the oldest Shaktoolik hunters recalled that in the past if caribou couldn't be found in the Shaktoolik area, hunters would make a day's journey to Koyuk and hunt caribou from there, up into the Granite Mountain area. However, a younger hunter in his 60's, who had been one of the most active dog team caribou hunters, stated that this had not occurred in his lifetime.

One major effect the use of snowmachines has had is the length of time required to travel to the hunting area. Whereas a snowmachine can make the trip (70 to 100 miles) in as short a time as three hours if conditions are good, a dog team would take three days. In the days of dog teams numerous camps were used along the trail, whereas now the only campsite is at the end of the trail in "caribou country." Shaktoolik hunters recently built a cabin at this site to be used for trapping as well as for caribou hunting. In the past dog mushers would have to haul numerous dry fish for dog food and camp early every night to prepare a meal for the dogs. In contrast, snowmachiners haul a drum of gas up to the caribou camp.
The routes travelled by dog teams differ from those used by snowmachines. The dog teams would cut across the hills by Christmas Mountain since that route was shorter, whereas snowmachines usually follow the Shaktoolik River. The river is smoother because the snow is blown away and snowmachines maintain a packed trail. Also the route through the hills is steep at certain locations where a snowmachine pulling a sled would probably get stuck, but dog teams did not have this problem. Deep snow in the hills can bog down a snowmachine as well. However, one person stated that occasionally younger hunters will take the Christmas Mountain trail today.

If conditions are good, the Shaktoolik River serves as a highway, allowing rapid travel to the caribou hills. However, overflow and deep snow can cause travellers serious difficulties. One person described an incident when he struggled for a day and a half to return with a load of caribou. Overflow -- the seepage of water up on top of the river ice -- occurs throughout the winter on the upper Shaktoolik drainages. This layer of water/slush is often concealed by snow or a thin layer of ice. When a snowmachine drives over it, the snow or ice can collapse, dropping machine and sled into the overflow. If the overflow is deep enough (e.g., one foot or more), the machine can get stuck and will require extensive efforts to be extricated. The hunter usually gets wet when this occurs, which is a dangerous condition in cold temperatures. If spare boots are not available, the hunter must make a fire and dry his clothing before proceeding. In December 1980 one Shaktoolik hunter seriously frostbit his foot as a result of overflow. One person described overflow to be most frequently associated with small creeks and canyons. Deep, soft snow can also cause a snowmachine and sled to get thoroughly stuck. Due to these conditions, the trip sometimes takes all day.
However, hunters described occasions in which they were able to go to the hills and return with caribou the same day.

Another form of overflow occurs on the lower river when a wind from the south pushes water up against the coast. This saltwater overflow can freeze over and cause similar problems for snowmachine travel as described above. Generally, overflow will occur first along the edges of the river, so snowmachiners will travel along the center of the river to avoid it.

Another problem for snowmachine travel is adverse weather. If the weather is too cold, hunters may be reluctant to travel, although the perception of acceptable conditions varies between hunters. In December 1980 a group of hunters departed in conditions of $-20^\circ F$ and stiff winds; several other hunters felt that this was too cold. In addition to problems of frostbite, snowmachines are hard or sometimes impossible to start in extreme cold. Blowing snow can reduce visibility to a few feet, increasing the risk of becoming lost or driving over cliffs or into obstacles. One source described a caribou hunting party that was caught in those conditions a few years ago. They could not see the ground in front of them, and the temperature was $-55^\circ F$. In blowing snow one course of action is to construct a shelter and wait out the storm. One source stated that it is possible to return to Shaktoolik in these conditions by following the treeline that follows the river. Search parties of snowmachines are occasionally organized to look for hunters that are late in returning home and will search the area even in blizzard conditions.

Local hunters agree that snowmachines have greatly facilitated caribou harvest. Caribou can be harvested faster and in larger numbers than was possible by dog team. One hunter who was formerly a very active dog team caribou hunter
described a typical dog team hunt to have taken 19 days. Several hunters stated that a person is assured of harvest success by snowmachine, whereas when they hunted by dog team and on snowshoes, they might walk for day without seeing a caribou. Today snowmachines are able to cover a large area quickly in search of caribou.

Three informants stated that caribou are more plentiful now than they had been before and that this was another reason for increased harvest success. Particularly large numbers of caribou have been available in the area over the last two years. One hunter estimated one herd seen in the spring of 1980 to have been as large as 5,000 caribou. The general consensus was that caribou are always present in the hunting area during the months when access is possible.

Caribou hunting begins soon after the ice on the Shaktoolik River is safe for travelling and continues until the spring melt prohibits snowmachine traffic. Therefore, access is sometimes possible as early as December and can extend to the end of April. January is the most common month for the hunt to begin. March and April are viewed as the prime hunting months because of their longer days and generally warmer temperatures. In 1980 one group of Shaktoolik hunters hunted in mid-December, but the next group to go went in mid-January.

Harvest strategies have changed since the introduction of snowmachines. Initially hunters continued to use the method of stalking caribou on snowshoes, but eventually, easier methods were adopted. One method described by two hunters is to herd the caribou by snowmachine so that they will pass
near waiting hunting partners. Another technique is to chase the caribou until the hunter is close enough to shoot successfully. One person observed that a herd will stop and not know where to go if the leader is killed.

Hunters will usually hunt in pairs or in larger groups. Travel to and from the area is also done in groups, as hunters travel together in order to be available to help each other in the event of problems with overflow, soft snow, and mechanical problems. If someone encountered insoluble mechanical difficulties, other hunters would pull his snowmachine home and possibly his sled as well. The members of the group will make sure that all of the person's gear and meat is eventually brought back to the village. One hunter stated that during one recent winter, he and his hunting partner had spent a week harvesting and butchering one or two caribou each daily and bringing them back to camp. They ended up with a total of 16 caribou.

Unalakleet hunters frequently hunt caribou in the same area utilized by Shaktoolik residents. It is common for Shaktoolik hunters to join a Unalakleet group that is enroute to the hunting grounds. Unalakleet hunters may occasionally also reach the area by airplane. A few Nome residents also travel to Shaktoolik to join local hunters in the caribou harvest.

Shaktoolik people agree that caribou is the most important meat harvested from the land. It was described as the main meat consumed in the winter as well as an important supplement to the primarily fish diet in the summer. In July 1980 the researcher observed one household that was eating caribou regularly for one or two meals a day. Of the ten households that participated in a diet survey in the fall of 1980, five reported eating
caribou harvested the previous spring. One younger man thought people harvest less now than in previous years, possibly because of the availability of reindeer and a well-stocked store. Prior to the availability of freezers (approximately ten years ago), caribou were salted or dried in the spring for summer use. Two Shaktoolik people stated that they currently put away more caribou by freezing than they did by these other methods and utilize more caribou in their summer and fall diet as a result. One household described freezing six caribou, almost enough to last to the following winter.

Caribou make up an important part of intracommunity distribution of food in Shaktoolik. One elder described a shift that had occurred in the distribution of caribou among hunters during the hunt. Previously, each hunter was entitled to the animals that he shot. Today hunters will divide the caribou killed equally among the men participating in that harvest. Caribou is shared extensively. One hunter stated that when he killed a caribou, he would give a piece to every household at the end of the village where his house is located. Another active hunter stated he would make several hunting trips back to caribou country before storing any for his own family, due to the large amounts he gave away, primarily to elderly people, as well as to families without hunters or snowmachines. By April 1980 he still hadn't put any caribou away for this same reason, causing his wife concern about their food supply for the summer. He explained that caribou primarily is shared rather than traded. When one woman requested to buy some from him, he refused to discuss such a transaction and gave her the meat instead. A family that did not own machine related how they were given caribou in January 1980. Three informants described the importance of having caribou to feed guests during church conferences and "get-togethers" when large numbers of people from villages of the region would come to stay in Shaktoolik for several days. These
sources were eager to harvest caribou in time for the Covenant "get-together" scheduled for January 1981.

At least two hunters stated that the bag limit of three caribou did not provide adequate meat to carry out traditional sharing patterns within the community and that hunters therefore would take what they needed (the bag limit for the Western Arctic Caribou Herd was increased by the Alaska Board of Game to four caribou in the spring of 1981). Another hunter stated that in some cases the amount of caribou harvested is limited by the amount of effort hunters are willing to invest.

One hunter addressed the issue of caribou waste, an issue which has arisen in previous years in rural areas to the north. He and another source described diseases occasionally found in caribou and which resulted in the sick animal not being utilized. The symptoms of one disease familiar to reindeer herders include swollen joints and a yellow discharge. The liver "looks like salt was sprinkled on it," and white thread-like fibers run through the muscles. A hunter cannot necessarily detect this disease until the liver is examined. Another condition described resulted in the meat having a yellowish appearance. One man described killing a caribou with a large lump on its neck. These sickly carcasses are abandoned. Hunters also have seen unmistakable evidence of wolves that have killed caribou and have eaten only the tongue or part of the throat or belly and have drunk the blood. One person said that a limited amount of waste by hunters did occur occasionally, but this sometimes resulted from the prohibitive amount of hard work necessary to achieve full utilization. However, his message was that unused caribou carcasses are most likely to be either diseased or wolf victims.
Today caribou are hunted primarily for their meat. The fat, valued for such dishes as berry and fish *agutuk*, is not available due to the fact that caribou are only harvested during the winter and spring when they are lean. As described earlier, long ago people would travel far into the hills in the summer and pack out caribou fat on their backs. Today this has been replaced by reindeer fat or vegetable shortening. The meat is often boiled as a soup or stew and is also eaten roasted or in gravy. One man claimed that both caribou and reindeer are eaten frozen by some people.

Moose

Moose are much less important as a source of food than caribou but can be harvested in the fall when caribou are not accessible due to lack of snow cover. Moose and reindeer therefore are important as sources of meat in the fall than is caribou. However, moose are only taken occasionally due to problems of access and low population density. Moose have only been available in the Norton Sound region in recent decades. One older Shaktoolik hunter recalled that he had taken his first moose as early as 1933, whereas others gave such dates as 1942, 1947, and the 1950's. Two elders stated that moose bones or antlers had been found at old village sites at Cape Denbigh, although Giddings makes no mention of this in his work (Giddings 1964).

The usual area of moose harvest is the Shaktoolik River, particularly, the portions upstream from Punuk. However, moose are taken occasionally on the lower river as was the case in 1980. Low water in the river can prevent hunters from reaching the more productive areas upstream. One older man stated the Shaktoolik people have also hunted moose on the Ungalik River,
the Koyuk River, and the Kwik and Tibutilik rivers (in the Moses Point area). Another source stated that in the winter moose are taken along the snowmachine trail on the coast to the south where they frequent the small valleys in the foothills.

Moose are taken in limited numbers in the Shaktoolik area; one hunter estimated a typical harvest to be four or five moose per year for the entire village. However, most Shaktoolik hunters have taken moose at one time or another. One younger man stated he had harvested a moose every fall up until the last few years. In the fall of 1980 only two or three moose were taken by the village hunters. Alaska Fish and Game regulations impose the bag limit of one bull moose from August 1 to December 31. Therefore, the harvest of moose occurs primarily in August and September before the bulls go into rut and become strong tasting. During this period access to hunting areas is by boat. The fall hunting method involves travelling the river, preferably at dawn or dusk, and looking for moose on gravel bars or along the riverbanks. From Punuk upriver, hills are available to allow the hunters to climb to higher elevations and glass the surrounding area. If moose are sighted from a distance, the hunters may sneak up to the moose until it is within shooting range. If a moose is encountered in close proximity, it is shot as it attempts an escape; this often occurs with the hunter still in the boat. Moose are usually lost once they penetrate the dense willows that line river banks. Hunters also will leave boats to walk sloughs and old river channels. A common opinion is that moose are quite difficult to locate. The harvest that occurs is often when moose are encountered on river-banks incidental to other harvest activities.
Few moose are taken after freezeup, although one man mentioned a bull he had taken in December. Bulls are considered to have regained an edible condition in December. Two hunters interviewed offered opinions regarding the harvest of moose in that month. One thought such a harvest was very difficult if the moose were in the willows where soft snow would prevent snowmachine access. He remembered a man who had tracked a moose all day through the willows and never found it. If a moose was encountered out in the open, it could easily be caught. The other man stated that moose were regularly encountered in the winter on the Christmas Mountain trail. Even if the moose do go into the trees, he believed that they could be retrieved if the hunter was willing to invest the required effort of carrying it out or packing down the snow for a snowmachine trail. Another man stated that moose are still difficult to find in December. All of these hunters agreed that few hunters pursue moose after freezeup in early winter.

One hunter described how the first moose of the season was shared throughout the village. Another person stated the village was composed of certain extended families, each incorporating several households, and that moose were shared within the extended family of which the harvesting household was a part. A diet survey conducted of ten households in the fall of 1980 indicated that two households consumed moose that they had not harvested themselves. One of these households was composed of a widow and her children and moose accounted for six percent of the animal protein/fat recorded on diet calendars by this family. The woman stated that everybody in the village received some of the moose harvested that fall. A parallel situation was observed in the neighboring village of Koyuk when the first moose of the season in 1980 and 1981 was widely distributed.
Moose is prepared in much the same manner as are caribou and reindeer. One household described drying a moose, then salting strips and smoking them with delicious results. Other Shaktoolik households also use drying as a preparation of moose meat. Moose harvested before the weather turns cold are also stored in freezers. One man stated that the advantage to taking a moose after freezeup was that it could be kept frozen outside in quarters without the work of cutting and wrapping it to put into a freezer. Another hunter related a method of preparation he learned from his father -- a large bull moose could be tenderized by bleeding it and leaving it intact for 24 hours before skinning and gutting. He tried this approach and found it to have the desired effect (i.e., tender meat).

**Grizzly Bear**

The grizzly bear, although utilized in the past, is generally regarded by contemporary Shaktoolik residents as a destructive pest or a dangerous threat. Two hunters were of the opinion that all bears encountered should be killed. Others expressed the desire to eliminate particular bears that had been plaguing their camps. Seven Shaktoolik households described damage to property or harassment of campers by bears in the past year including such actions as destroyed tents, broken cabin windows, damaged fishing gear, gillnets pulled to shore by bears, and bears walking into camps despite efforts to scare them away.

Grizzlies were harvested several decades ago for such products as their hides to be used for mattresses and their fat and meat for food. Several households, including two couple in their 50's, recalled eating bear
meat and/or fat but only on a very limited scale. Utilization of grizzly apparently had dwindled by the time of the large reindeer herds of the early 1900's. One man recalled that some older Shaktoolik residents had begun to harvest grizzlies for food in the years of scarce meat following the crash of the reindeer in the 1930's. These elders previously had hunted bears for food, but bears had not been eaten in significant quantities for some time. He stated the bears harvested at that time were killed only when encountered rather than a special effort being made to hunt them. This renewed harvest occurred prior to the availability of moose, sometime in the 1940's. Another source suggested that perhaps bears presently were not harvested in part due to the availability of moose.

In the times when grizzlies were more frequently harvested, they usually were taken a considerable distance inland in the hills, since grizzlies taken on the coast or near salmon spawning areas would have an undesirable taste due to their diet of dead walrus, salmon, and other carrion. Seasons of harvest were primarily the early spring and late fall when bears were fat and in prime condition.

Prior to the availability of firearms, bears were killed with bow and arrow and spears (see the description of arrows in the caribou section). Shaktoolik's oldest hunter described the traditional bear spear -- it was about seven feet in length, with a long, smooth tip of ivory or antler. A ring of ugruk hide was attached about 1½ feet back from the tip to prevent the bear from pushing its way up the spear toward the hunter after being impaled. Attached to the butt was a looped thong with which the hunter could encircle the crook of his arm to serve as a brace. The technique used to kill a bear was to
thrust the spear into the base of the bear's neck in an attempt to hit the spinal cord. If the thrust was done correctly, the bear would die instantly. If the spinal cord was missed and the spear impaled the bear's neck, the hunter would hold the bear away with the ring of ugruk hide. The loop around the arm would allow the hunter to maintain a hold on his spear even if he was thrown into the air. Thus the hunter could hold off the bear until it expired.

Another man described a strategy of killing a bear with a rifle which also involved aiming for the spinal cord. As the bear charges, the hunter shoots for the neck bone when the bear's head is raised. If the bear turns its head, the shot can be aimed at the rear of the head.

Several Shaktoolik people stated that bears are more numerous now than in past years. One older woman recalled that when she was a child, the sighting of a bear was a rare event, whereas in a recent year a Shaktoolik resident counted 22 bears when floating down the Shaktoolik River in the fall. A possible explanation for this phenomenon that has been suggested by game biologists is that early reindeer herders may have depleted bears in the area (Carl Grauvogel, AD&G, personal communication, 1980). A former Shaktoolik herder from those early days recalled that herders were given a free box of rifle shells for each bear killed. He personally had killed 22 bears one summer when he was a herder.

In previous years bear fat was a highly valued food. One source described preparing it by boiling and storing it in jars for eventual consumption on bread. One method of storing the meat was to salt it. One elder recalled
that bear meat was known to carry disease (trichonosis) and consequently was well cooked. Another mentioned a delicious dish prepared by roasting kidneys and fat over a fire. The meat also could be roasted.

Several sources stated that black bear meat is preferable to grizzly. Although not present in the Shaktoolik area, black bears are harvested by Unalakleet residents on the Unalakleet River, and some people continue to eat them. Two sources related a belief that the vegetarian diet of black bears resulted in their better taste, since they were less inclined to eat dead salmon and other carrion.
The harvest of furbearers has long been integral to the economy of Shaktoolik, particularly prior to the establishment of other sources of income such as commercial fishing, cash employment, and government assistance programs. The trade of furs was the primary means by which people could obtain commercial goods prior to the gold rush. Shaktoolik's oldest hunter recalled that around 1900, rifles had been scarce and were procured by trading a stack of fox, muskrat, and wolverine furs as high as the rifle was long. At one time prior to 1900, Shaktoolik was located at the mouth of the Shaktoolik River. A trading post was established there where store goods were traded for furs, which were then transported to Saint Michael to the south and exchanged for more store goods. The coastal villages of Norton Sound would also trade sea mammal products for furs for their own use from Yukon River Athabascans.

In the early 1900's dried salmon became another barter item, and dry fish and furs were traded to trading posts or stores for goods such as groceries and equipment. In the 1930's when airplanes replaced dog teams as the mode of mail transport, furs once again became the primary source of cash for many households. One elder recalled that at that time the value of fox pelts rose to $40-45 each, and people could manage on the income from foxes they trapped. Another elder recalled that in his youth there had been an old man who had earned his living exclusively from trapping. This man had been able to regularly trap an average of two foxes a day.

The importance of trapping and the extent of local involvement in this
activity have fluctuated over the years in response to shifts in the mar-
et. One elder could recall a period many years ago when the price of
fox pelts had dwindled to the point where trapping no longer was profitable.
This probably occurred during the 1940's and 1950's (Wolfe 1979). Another
man remembered a crash in the mink market in the 1930's or 1940's. The
success of a trapper's season continues to depend on fluctuations in the
fur market.

Shaktoolik sources agreed that local involvement in trapping is on the in-
crease, particularly among the younger men. There are older trappers who
have been active all their lives. A survey conducted by the Eskimo Walrus
Commission in February 1981 indicated that 60% of the surveyed households
had participated in trapping in the preceding year (EWC unpublished re-

The trapping season for the Norton Sound area is from November 1 to April
15. By the end of November 1980 at least one Shaktoolik trapper had es-
tablished his trapline. Non-regulatory factors that impact the timing of
the trapping effort include the degree of snowcover required for access
to the trapping areas and the quality of the pelts, which deteriorates in
the spring.

The species trapped in the Shaktoolik area include fox, marten, wolverine,
mink, land otter, wolf, and possible lynx. The harvest method used and ease
of capture varies by species. Wolverine and marten were identified by two
trappers as easy to catch because they are less cautious of bait than are
foxes. Marten can be tracked in the early winter when they tend to remain
within a small area. Land otters also are relatively easy to trap due to their tendency to stay in one spot. Foxes will often circle a trap but remain clear of it. Foxes and wolves are also shot when encountered and sometimes pursued by snowmachine.

Two of the main areas in which trapping occurs are Christmas Mountain and the hills at the headwaters of the Shaktoolik River ("caribou country"). Trappers will occasionally camp for several days in these areas while trapping. In the winter of 1980-81 Shaktoolik trappers built a cabin at the campsite in "caribou country" and had plans for another at Christmas Mountain. In the past tents were usually used by campers. However one Shaktoolik trapper spends the winter trapping from a cabin on the Shaktoolik River.

One effect of technological change on trapping described by an older trapper (i.e., the shift from dog teams to snowmachines) was that wolves and wolverines cannot be found close to the village anymore. In the days when dog teams were used, the tracks of these species were regularly encountered near the village. According to this informant, snowmachine traffic has resulted in wolves and wolverines now being present only in "caribou country", which forces trappers to travel much further to obtain these species. Another elder mentioned that foxes also were regularly seen near the village before snowmachines were utilized, but apparently this is no longer the case.

Furs continue to be utilized locally. In particular, wolf hides are valued for parka ruffs, and land otter are desired for caps. These furs are often sold to local skin sewers. Ground squirrels and muskrats are trapped and
their pelts used in making traditional parkas. Beavers are another fur-
bearer that may be harvested for local use. Several hunters own cold wea-
thor mitts of dog hide, considered to be the best possible material for
this purpose. In the past lynx, porcupine, beaver, and ground squirrel
were eaten by local residents, but today this utilization occurs rarely
and primarily by elders.

Vegetation

Many traditional uses of local vegetation as a food source continue today.
Berries are by far the most extensively utilized plant food, but several
households also harvest greens and roots. Although the quantity consumed
of a particular plant product may be small, it is often an integral part
of a traditional meal (e.g., sira, seal oil, and dried ugruk meat).

Berries

Berries are basic to the local diet. They are highly valued as a choice
food and play an important role in social interaction. It is socially appro-
priate to always serve berries to guests if possible. Special occasions
such as feasts and holiday celebrations are not complete without berry
agutuk (Eskimo ice cream).

The species of berries available locally include salmonberry (also called
cloudberry), lowbush cranberry, blueberry, and blackberry (also referred
to as crowberry). Red currents are present upriver among the trees. Sal-
monberry harvests occur at the flats near Shaktoolik, along Reindeer Cove,
at Ungalik, and the Inglutalik and Koyuk area. Berry pickers will often camp when picking at the areas along Norton Bay. The best cranberry spots are near the village -- immediately to the north, past the old site to the south, and on the other side of the Tagoomenik River. People agreed that the best cranberry spot had been located right where the village now stands. One household described the upper portions of the Shaktoolik River accessible by boat to have the best blueberry spots.

Salmon berries ripen in mid-July, followed by blueberries and blackberries in August and cranberries in September. Cranberries are harvested until it is too cold to continue picking, although one woman was still picking in mid-October 1980. Cranberries are still edible if harvested the following spring.

The availability of various species of berries can shift from year to year, possibly because of environmental factors. For instance, a cold, windy June in 1980 was thought by one elder to have caused scarcity of blueberries that summer. She also stated that winter of heavy snowfall often results in a good berry year. Few salmonberries have been available for the last one to three years according to various sources. Another woman stated that 1980 was a poor year for blackberries, although cranberries were abundant that same year.

Certain villages carry reputations of having abundant berries in their vicinity, and residents of other villages will occasionally travel to neighboring villages to pick berries. Shaktoolik, for example, is known to have prime cranberry patches, and Unalakleet residents regularly come by boat
or plane to pick in the Shaktoolik area. Koyuk relatives also occasionally come to Shaktoolik to pick cranberries. However, there also may be social reasons for picking in Shaktoolik, as Koyuk has plenty of cranberries of its own. Koyuk's salmonberries are more abundant than those of Shaktoolik, prompting Shaktoolik residents to travel to that area by boat to camp and pick berries. A year in which berries are scarce in one village may prompt its residents to travel to another village's area to obtain this highly valued resource.

Berries are considered very important to the diet and also provide an important element to village social interaction. Large quantities are gathered, and the more active berry pickers put away enough to last the entire winter. The berry supply of a household may be rationed so that it will last longer, and particular packages of frozen berries are saved for special occasions. During the salmonberry season households often camp for days at a time with efforts directed exclusively at berry gathering. Women and young girls will spend all day for several days picking cranberries from the area by the village. For example, one young woman was observed to pick 24 gallons of cranberries in three hours in 1980.

Although berries are integral to the entertainment of guests and are usually served at feasts and parties, they are less likely than many other resources to be given to other households. This is partly because elders and widows are generally able to harvest berries for themselves and are involved in picking expeditions. It may also be related to the high value of berries and the large amounts of work involved in their harvest. In the fall of 1980 a Shaktoolik couple expressed their respect for a household that contributed
a large bowl of salmonberries to a local public celebration, especially
in view of the scarcity of salmonberries during the preceding summer.

The sale of berries occurs between villages on a limited scale. For in-
stance, at least one Koyuk woman has sold salmonberries in earlier years.
Three people mentioned the sale of cranberries to Unalakleet residents.

Currently berries are usually stored by freezing, whereas previously they
had been kept in wooden barrels. However, some use of barrels has continued.
One elder described how berries had been stored in barrels on a short plat-
form under a shelter of driftwood which kept them cool and out of the rain.

Cranberries are commonly served in the form of thick sauce, having been
cooked with sugar, water, and sometimes cornstarch. Salmonberries and blue-
berries are eaten raw or frozen and are sprinkled with sugar. Canned eva-
porated milk is often added to the berries. Agutuk, the popular "Eskimo ice
cream," is usually made of salmonberries, possibly mixed with blueberries
and/or blackberries, and combined with whipped reindeer fat, sugar, water,
and often seal oil. Vegetable shortening or oil is occasionally used as
a substitute for the fat or seal oil. One older woman described eating
blackberries with seal oil. Berries generally are served as a snack or
following a meal of Eskimo food and are accompanied by fresh bread and tea.
Data suggests that a traditional meal is not complete without this final
course.
Greens

A number of different species of greens are harvested. They generally are ready to pick in June and may remain in edible condition for two or three weeks. However, most species become fibrous or lose their palatability later in the summer. Greens traditionally were stored in seal oil in seal pokes or dried belukha stomachs. More recently wooden barrels were used, and now freezing is an alternative for preservation. When stored outside in barrels, the greens would ferment during the warm weather.

Sira (willow leaves - Salix pulchra cham.) - Sira is one of the most popular greens picked. The willow leaves are picked when small and tender and eaten with seal oil and meats such as dried ugruk and dry fish. Sira is sometimes stored mixed with other greens in seal oil or frozen fresh.

Kusimak (wild rhubarb - Polygonum alaskanum (small wight.)) - Kusimak is picked on the Cape Denbigh hills at Ganiqak and along the riverbanks. It is boiled and eaten with sugar. In the past it was cooked so that it wouldn't dry out and stored in barrels, whereas today it is often stored in jars. Sources agreed that even in the days when large quantities of kusimak were harvested, it was so popular that it would all be consumed by berry picking season.

Atchaluk (beach greens - Honckenza peploids l.) - Atchaluk is gathered from the beaches. One method of preparation is
to let it ferment mixed with blackberries. Another type of greens, aluigak, is sometimes mixed with atchaluk to raise the moisture content.

Tukayuk (wild celery - *Ligusticum hultenii* fern.) - The leaves and stems of this plant are eaten. One favorite preparation is to mix chopped tukayuk in with cooked aluigak and allow the mixture to ferment.

Igiutuk (wild celery - *Angelica lucida*) - Igiutuk are similar to tukayuk.

Aluigak (Sourdock - *Rumex arcticus* trautv.) - Aluigak is gathered from the beach. It has a long, narrow, fleshy leaf and is often mixed with a variety of other greens.

This list is by no means complete for a variety of other greens are harvested, including fireweed, "wild onions," and siutenoak (sourgrass). Informants agree that all of these greens are utilized considerably less today than in earlier times. Two households mentioned failing to harvest a particular green in 1980 due to poor weather or involvement in other activities. However, a survey conducted in February 1981 by the Eskimo Walrus Commission indicated that 90 percent of the households surveyed had engaged in green picking in the preceding spring (EWC unpublished research, 1981).
Masu (Eskimo potato - Hedysarum alpinum L.) is a sweet root harvested by Shaktoolik residents. It is said to become sweetest after the weather freezes, so the primary harvest takes place in the fall. It can also be harvested after the snow melts in the spring. It is eaten raw with seal oil in traditional meals. Another preparation is to mix it chopped in fish nikilik. The researcher was aware of at least one group of Shaktoolik women that was active gathering masu in the fall of 1980.

At least one other type of root harvested in the past was mentioned by a Shaktoolik person but was not positively identified by the researcher. The Eskimo Walrus Commission survey conducted in spring 1981 indicated that 60 percent of the households surveyed had participated in root harvest in the preceding year (EWC unpublished research, 1981).
CHAPTER V

THE NUTRITIONAL AND CULTURAL IMPORTANCE
OF THE HARVEST OF LOCAL RESOURCES

This chapter will demonstrate the importance of locally harvested resources to the nutrition of Shaktoolik residents. The data show that these resources, particularly those that are marine-related, make up a major portion of the Shaktoolik diet. However, these resources are not only of nutritional significance. The actual harvest activities that accompany each season are integral to the culture of the area. In addition, specific preparation methods of the various traditional foods as well as the manner in which they are consumed are of cultural significance. The role of distribution of local foods in Shaktoolik social structure is addressed in a following chapter. Any attempt to assess the importance of local species to Shaktoolik residents would be incomplete without an analysis of all these factors.

A Dietary Analysis

Table 2 presents an analysis of the dietary composition of a random sample of ten households derived from a diet calendar survey conducted in the fall of 1980. The table presents the weights of animal protein and fat consumed. Most households completed the calendars for three weeks -- one week each in late September, mid-October, and early December.

The dietary survey results only represent household diets at particular
TABLE 2
SHAKTOOLIK DIET CALENDAR DATA

Total households: 10
Total households days: 193
Periods of survey: late September 1980
mid-October 1980
early December 1980

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>19,823 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>total store bought</td>
<td>6,201 oz.</td>
</tr>
<tr>
<td></td>
<td>31.3% of total</td>
</tr>
<tr>
<td>total reindeer</td>
<td>2,428 oz.</td>
</tr>
<tr>
<td></td>
<td>12.2% of total</td>
</tr>
<tr>
<td>total subsistence harvest</td>
<td>11,194 oz.</td>
</tr>
<tr>
<td>total marine-related subsistence</td>
<td>10,232 oz.</td>
</tr>
<tr>
<td></td>
<td>51.6% of total</td>
</tr>
<tr>
<td>dog salmon</td>
<td>3,043 oz.</td>
</tr>
<tr>
<td></td>
<td>15.4% of total</td>
</tr>
<tr>
<td>humpy</td>
<td>2,450 oz.</td>
</tr>
<tr>
<td></td>
<td>12.4% of total</td>
</tr>
<tr>
<td>char</td>
<td>1,040 oz.</td>
</tr>
<tr>
<td></td>
<td>5.2% of total</td>
</tr>
<tr>
<td>seal oil (4.7 quarts)</td>
<td>792 oz.</td>
</tr>
<tr>
<td></td>
<td>4.0% of total</td>
</tr>
<tr>
<td>duck (sprig)</td>
<td>692 oz.</td>
</tr>
<tr>
<td></td>
<td>3.5% of total</td>
</tr>
<tr>
<td>silver salmon</td>
<td>633 oz.</td>
</tr>
<tr>
<td></td>
<td>3.2% of total</td>
</tr>
<tr>
<td>bowhead muktuk</td>
<td>364 oz.</td>
</tr>
<tr>
<td></td>
<td>1.8% of total</td>
</tr>
<tr>
<td>herring eggs</td>
<td>329 oz.</td>
</tr>
<tr>
<td></td>
<td>1.7% of total</td>
</tr>
<tr>
<td>tomcod</td>
<td>306 oz.</td>
</tr>
<tr>
<td></td>
<td>1.5% of total</td>
</tr>
<tr>
<td>king salmon</td>
<td>301 oz.</td>
</tr>
<tr>
<td></td>
<td>1.5% of total</td>
</tr>
<tr>
<td>lingcod</td>
<td>88 oz.</td>
</tr>
<tr>
<td></td>
<td>.4% of total</td>
</tr>
<tr>
<td>goose</td>
<td>80 oz.</td>
</tr>
<tr>
<td></td>
<td>.4% of total</td>
</tr>
<tr>
<td>ringed seal meat</td>
<td>56 oz.</td>
</tr>
<tr>
<td></td>
<td>.3% of total</td>
</tr>
<tr>
<td>belukha muktuk</td>
<td>32 oz.</td>
</tr>
<tr>
<td></td>
<td>.2% of total</td>
</tr>
<tr>
<td>ugruk meat</td>
<td>24 oz.</td>
</tr>
<tr>
<td></td>
<td>.1% of total</td>
</tr>
<tr>
<td>seal blubber</td>
<td>3 oz.</td>
</tr>
<tr>
<td></td>
<td>.02% of total</td>
</tr>
<tr>
<td>total non-marine subsistence</td>
<td>961 oz.</td>
</tr>
<tr>
<td></td>
<td>4.8% of total</td>
</tr>
<tr>
<td>caribou</td>
<td>480 oz.</td>
</tr>
<tr>
<td></td>
<td>2.4% of total</td>
</tr>
<tr>
<td>moose</td>
<td>416 oz.</td>
</tr>
<tr>
<td></td>
<td>2.1% of total</td>
</tr>
<tr>
<td>grayling</td>
<td>65 oz.</td>
</tr>
<tr>
<td></td>
<td>.3% of total</td>
</tr>
</tbody>
</table>
seasons in 1980, and these data should not be generalized to other seasons
and/or years due to seasonal and annual variation in the availability of
local resources. Diet may also vary between seasons and years depending
on the relative availability of local foods, cash, and store bought foods
and the quantity and quality of subsistence activities as contrasted with
other enterprises (e.g., construction and commercial fishing).

An example of the seasonal availability of certain foods is demonstrated
by the high percentage of salmon in diets for portions of the surveyed
period. Salmon constitutes a major part of the diet in the summer and
fall. Later in the winter as the supply dwindles salmon consumption drops.
The consumption of ducks, geese, and cranes peaks in the fall and spring
at the time of their harvest and declines to low levels or dissipates com-
pletely during the winter and summer. The percentage of these species in
the diet was probably much higher early in September, but by the time of
the survey the amount consumed had dropped. In 1980 lingcod and tomcod
entered the diet as they became available coincidental with freezeup.
Herring eggs had been stored from the previous spring but consumption un-
doubtedly fell as the winter progressed and supplies were depleted. The
consumption of seal oil probably remains at a stable level throughout the
year. This is related to its central importance to traditional meals and
its ready availability in substantial quantities in fall and spring. Moose
is a resource legally harvested only in the fall and early winter, although
freezing and drying it can extend its consumption into the winter months.
Caribou makes up the major portion of the diet as its harvest increases
in the longer, warmer months of March and April, replacing salmon from the
summer and fall harvest as the primary resource. This continues to be the
case until salmon is again available, at which time the two resources are consumed in similar quantities. The caribou supply dwindles in the fall as is indicated by the small percentage of the diet composed of caribou in the diet survey during these months. Reindeer are butchered in the fall, and the high percentage of the diet composed of reindeer drops as the reindeer supply is consumed.

The level of consumption of store bought food fluctuates in response to factors such as available cash, alternative local resource available and store stocks at any particular time. Due to the cash influx from commercial fishing and construction employment, it is reasonable to expect that more store foods are bought during periods of these activities. A related factor would be the amount of time available to pursue subsistence harvests when seasonal cash economy activities are occurring.

Consumptive variation between years is exemplified by the amounts of bowhead and belukha muktuk indicated in the survey. In a normal year bowhead consumption would be very low, derived entirely from muktuk bought or obtained from other communities through sharing networks. However, in May 1980 a bowhead was harvested by Shaktoolik hunters. In some years as previously discussed walrus might enter the diet in a similar manner. On the other hand, in a normal year Shaktoolik belukha hunters would have harvested belukha in the fall, but this did not occur in 1980. Therefore, the small amount of belukha muktuk indicated in the dietary survey was derived from the previous spring. The presence of muktuk (bowhead and belukha) in the fall diet indicated that this is a food that is stored (frozen) to last for several months. Moose is another resource which may vary widely in availability.
from year to year due to the uncertainty of harvest success. It is also available in larger quantities to some households as contrasted to the community as a whole. On the other hand, caribou and salmon are always available for harvest by households with the necessary manpower and equipment and constitute a major portion of the diet of most households every year.

The level of involvement in cash economy pursuits changes from year to year and will provide another impetus for variation in dietary composition. For instance, local and non-local construction work can occupy the heads of certain households for several weeks during important harvest periods. One result of these activities might be replacement of some locally obtained foods with groceries from the store. An unusually large amount of cash was available to Shaktoolik households in fall 1980 due to local construction work and substantial Native Land Claims dividends (several thousand dollars per household). This may have resulted in more food being purchased from the store than in an average fall.

Despite this variation between seasons and years, data indicated that under any of these conditions, marine-related species constitute a major portion of Shaktoolik residents. The dietary survey data indicated that marine-related species constituted 51.6 percent of the animal protein/fat consumed, as illustrated in Table 2. This level will drop as caribou consumption increases later in the year, but it may remain stable through the spring, summer, and fall. On the other hand, the percentage of marine-related protein/fat may be even larger in normal years when belukha are harvested in the fall.
The ten households surveyed displayed a considerable range of dietary variation. For example, one household derived 21 percent of its animal protein/fat from subsistence harvest, while another household derived 74 percent from subsistence. However, with the exception of these two extremes, other households were very similar in the percentage of their diet derived from subsistence, ranging from 45 to 60 percent (for the breakdown of diet composition for each household, see Appendix 6).

The age group represented within each household and the amount of cash available to each household did not seem to affect the percentage of the diet derived from the three possible sources -- store, reindeer, and subsistence. The two households where these factors may have affected the diet were the two extreme cases mentioned in the preceding paragraph. The household with only 21 percent of its diet derived from subsistence was composed of the youngest married couple surveyed and had considerably more cash available to its members than did the average Shaktoolik household. This household had the ability to purchase (and preference for) a large quantity of store bought food. The household with 74 percent of its diet from subsistence was having financial difficulties and lacked the cash to purchase many alternative foods. This family preferred a traditional diet but did express the desire to supplement it with some store bought alternatives. However, these examples do not prove a relationship between age or income and the level of subsistence in the diet; data on other households with comparatively high incomes and/or young household members indicated a high degree of subsistence in the diet of those household members.
The quantities of the different species consumed varied between households, with salmon species collectively maintaining the most consistent percentage of the diets of the various households. The type of commercially purchased animal protein/fat that was used also varied. Four households bought primarily dairy products (i.e., butter, eggs, and milk) and bacon, whereas the others bought mostly hamburger and chicken, in addition to dairy products. Eggs and bacon were consumed mainly for breakfast, whereas milk was used primarily with berries, cereal, and hot beverages.

In conclusion, a major portion of the Shaktoolik diet during this period was derived from locally harvested marine-related species. The factors resulting in this dietary composition are many, including a preference for local foods, a lack of affordable alternatives, and the cultural importance placed on the harvest and consumption of these foods. The period that these survey data represented had many idiosyncrasies, but if anything, the high level of cash available in the community during this time and the failure of the fall belukha hunt would have caused the percentage of marine-related foods in the diet to be artificially low rather than high.

The Cultural Value of Locally Harvested Foods

The harvest and consumption of traditional food are highly valued in Eskimo culture today. Former village residents, separated geographically from their traditional way of life and "home" villages, often continue to place great value on "Eskimo food." The value of such foods is both a matter of dietary preference and a source of cultural identity.
The interaction of traditional and store bought foods in a household's diet provides some indication of the cultural value of "Eskimo food." Data from this research suggest that when people decide to eat a traditional meal, it is usually exclusively traditional foods, with the exception of certain condiments and side dishes that have been incorporated and now often are included in these meals. Meals of favored dishes may involve a level of ceremony, social interaction, and enthusiasm similar to a Thanksgiving feast or Christmas dinner in Western culture. Guests are often invited to attend a meal of some choice delicacy. Even the consumption of such staples as dry fish and seal oil inspires a high level of enthusiasm when the persons involved have not partaken of that food for some time.

The content of the traditional meal has changed as certain introduced foods have been assimilated. For instance, vegetables such as turnips, carrots, and cabbage have been added to the traditional greens and roots which are eaten with seal oil as a supplement to the meat dish. Caribou or reindeer soup now may include ingredients such as macaroni, rice, potatoes, and onions. Meat may be dipped in worcestershire sauce or other commercial sauces. A recent innovation observed in two Shaktoolik households was the use of mayonnaise in addition to seal oil as a dip for dry fish. Vegetable shortening is sometimes substituted for reindeer fat in agutuk, and canned fruit is a popular substitute for berries. Some additions which have become integral to the traditional meal are tea, pilot crackers, canned evaporated milk for berries, and sugar for berries and tea.

Consumers of traditional "Eskimo food" are frequently emphatic about their desire and need for this component of their diet. Several middle-aged
Shaktoolik residents stated that dry fish and seal oil were essential to their diet. When deprived of seal oil, a craving develops that cannot be satisfied by "Western" foods. One man stated that he could never get full if he had no seal oil -- this is a statement the researcher has heard throughout the Bering Strait-Norton Sound region in reference to seal oil or "Eskimo food" in general. Another Shaktoolik informant stated that whenever she ate exclusively canned food, she would get hungry again immediately.

Seal oil also is believed to aid a person in surviving the winter cold; an older couple mentioned that their seal oil consumption would increase as the weather became colder. As the season of a particular resource harvest approaches, it is common to hear village residents express their craving for an anticipated food, such as duck soup, fresh salmonberries, muktuk, or dry fish. Each season brings its own harvests and foods -- the dietary frame of reference of the subsistence user changes with the season.

The typical traditional meal will usually begin with a main course of meat or fish, usually accompanied by seal oil, with greens or vegetables if available. The food is eaten with the hands, and the primary utensil used is a sharp knife or an ulu (the traditional, semi-lunar woman's knife). Each person generally has a small bowl of seal oil into which the meat and vegetables are dipped. When this course is completed, everyone will wash the seal oil from their hands. Then berries or canned fruit (if berries are unavailable) are served, with tea and perhaps pilot crackers or homemade bread. Tea and berries are highly desired to clear the mouth and throat of residual seal oil.
Although the traditional diet is preferred by most Shaktoolik households, commercially produced foods are bought from the store to provide variety. Variety in a diet was mentioned as desirable by several interviewed households. It is commonly stated that nobody wants to eat fish all the time. The large number of local species harvested and the different preparation techniques utilized gives some indication of the importance of variety. The seasonal availability of most local species is an important factor in the traditional diet, since species are consumed as they are harvested and for as long a period as they can be stored and the supply lasts. Freezers have altered these patterns significantly in that most foods may be frozen in any desired condition so that they are available to provide variety throughout the year. The local store has a very limited selection of fresh produce and frozen meats, although this selection has expanded in recent years. Since fresh produce and frozen foods must be flown into the small communities of this region, these foods are often bought out quickly as they become available. A subsequent shipment may take considerable time to arrive. Chicken and hamburger are the main meats provided by the store and fresh produce includes apples, oranges, potatoes, and onions. Thus the diet of the village is dependent in part on the food available at the store at any particular time. In the first part of July 1980 one household expressed the desire for meat (other than caribou and salmon) and canned fruit, but the store had none of these in stock. In September there was a period when no canned vegetables were available at the store, and one household stated that as a result there were no vegetables in their diet that week.
Some variation does exist in Shaktoolik in regard to dietary preferences of different age groups. Changing preferences for local foods have been occurring throughout the past century, for the oldest Shaktoolik residents recall harvest of certain species and their use in the diet which occurred only in the times of their parents (e.g. grizzly bear, murre meat, and bullheads). Today there are other species or specially prepared dishes that are consumed primarily by the older people. However, the young adults and children of several households interviewed demonstrated a decided liking for traditional foods such as dry fish, muktuk, and seal oil. Types of foods less like to be desired by younger individuals include fermented meats as well as meats and fish consumed frozen raw. However, "stink" muktuk and salmon eggs continue to be enjoyed by many young people. The age difference in diet preference varies widely between households. However, based on data derived from this research, there is not substantial difference between the current diets of the older and younger generations in Shaktoolik as a whole.

A cultural phenomenon of some relevance is the common attitude towards the gasak (Caucasian) in relation to traditional food. In most households throughout the region in which the researcher was a guest, the hosts were hesitant or reluctant to serve "Eskimo food" while Caucasians were present, due to an apprehension that the guests would refuse to eat or display some other unpleasant negative reaction. Families were observed to make special efforts to acquire store bought foods and prepare meals perceived as appropriate for these guests. If a gasak does participate in a traditional meal, he is often offered silverware and special store bought foods not provided to anyone else. Once the gasak is successful in overcoming this barrier
and has demonstrated the capacity to eat or even enjoy the traditional food, the hosts are often quite pleased. This can lead to a kind of "adooption" of the guest by that household. The guest is laughingly referred to as a "real Eskimo," as if eating the food imparts certain cultural qualities into the eater. The researcher has personally experienced this on several occasions and has heard of many similar examples involving other non-Eskimos.

Harvest as a Cultural Activity

Local attitudes towards harvest activity are usually inseparable from the value placed on the resource as a food, a source of raw materials or an item to be shared; it is in this context that the harvest activity derives its primary meaning. Hunters will often express great anticipation for an approaching season to harvest a particular species. Although a large amount of pleasure is derived from the harvest activities themselves, the anticipation of the resulting meals remains a major incentive. There were two interviewed informants, however, who participated in certain harvests (cliff eggs and winter seals) only for the pleasure of the activity and distributed their entire harvest to others.

In Eskimo society hunting success has traditionally played an important part in establishing the status of an individual within the community (Ellanna 1980). When active hunters of Shaktoolik (or elders previously active) were identified to the researcher, it was with implicit respect for their accomplishment and efforts, whereas those young men that did not hunt much were regarded in a less positive light. Several hunters interviewed derived noticeable satisfaction from their hunting success,
their ability to provide for their families, and the amount of their harvest that they were able to share within the community. Other hunters indicated pride or satisfaction in the fact that most of the Shaktoolik men in their late 20's and older were active hunters. Elderly hunters no longer active are respected for their previous productivity and abilities and for their established knowledge. Young boys secure considerable positive attention with their first hunting successes.

Division of labor in harvest activities varies depending on the resource. Generally the men and older boys will perform the tasks that require high levels of strength and endurance or mechanical knowledge such as the operation of outboards and firearms. The women and girls usually process the game brought home by men, such as marine mammals, waterfowl, and caribou. However, there have been cases of widows who have actively hunted to provide for their families. Many times wives help their husbands harvest belukha when a couple is alone on a boat trip. Men usually operate the outboard motors and are therefore more likely to be the ones to maneuver the beach seine around the fish, whereas women participate in working the seine from the riverbank. Both sexes participate in ice fishing. Some men will occasionally participate in predominantly female activities such as cutting fish and picking berries and greens.

Some division of labor occurs with regard to age. Young boys begin to hunt birds and ducks at approximately the age of ten. Of the Shaktoolik hunters active in marine mammal harvest in the fall of 1980, few were younger than 27; the hunting efforts of the younger hunters were usually restricted to waterfowl and cranes. Older men drop out of the vigorous hunting activity as they lose the physical capabilities that are required. However, in 1980 a
Shaktoolik hunter in his mid-60's participated in belukha hunts. The less demanding harvests of fish, shellfish, and plants are not linked to specific age groups as is hunting; children and elders as well as the other age groups participate in these activities. Gillnets are preferred over seines by some elders for the harvest of salmon because that method is less demanding physically.

Cooperation between several hunters occurs mainly in the harvest of two species -- belukha and caribou. In these hunts, a number of boats or snowmachines will work together to search for and/or herd the animals. This is not a mandatory interaction but improves the chances of success. Hunting and travelling with others have definite survival value for hunters using snowmachines. Unlike the Eskimo communities accustomed to the harvest of bowhead whales and walrus, Shaktoolik hunters do not work in formal crews while boat hunting. Crew members are not restricted to any particular role in the hunt nor are they necessarily chosen on the basis of specific kinship patterns (see the discussion of belukha). The researcher postulates that this is due to the traditional use of the kayak as opposed to the larger umiak. A kayak, which carries one hunter, would not have promoted the development of social mechanisms for crew based hunting such as crew cooperation and formalized boat roles typical of umiak hunting groups.

Although formal crews are apparently absent from local tradition and cooperation between hunters is considered beneficial primarily for belukha and caribou, hunters often go out with companions or "partners." These relationships can last for lifetime. As one hunter described it, "a man will hunt with someone that he enjoys hunting with." Women often do the same in their
harvest activities such as berry picking and root gathering. During the 
boating season, entire households will travel, harvest, and camp together. 
An analysis of the role of kinship in these relationships was not within 
the scope of this study.
CHAPTER VI

DISTRIBUTION AND EXCHANGE

Sharing patterns rooted in tradition remain very important to Shaktoolik economy and society. For the recipients, food received through sharing may provide most of the fresh meat of their diet; for the provider, sharing gives deep personal satisfaction and fulfills cultural responsibilities. For the community as a whole, such networks and their functioning insure local, community based self sufficiency and reaffirm important cultural values.

Field notes from this research are filled with actual cases of sharing that occurred during the fall of 1980 or earlier that year. Bowhead muktuk and moose had been distributed throughout the community; ugruk were cut up and disseminated; smaller seals were given away, as were quantities of char, salmon and tomcod. Hunters described large quantities of caribou shared. While temporarily residing in Shaktoolik, the researcher and his wife received two cranes, four char, one silver salmon, numerous dry fish and smoked strips, two loaves of bread, one goose, seal oil, five pounds of moose meat, a large caribou roast, ugruk, five pounds of bowhead muktuk, and animaak, from a total of ten households, with additional offers of ugruk, reindeer, moose, and char. In addition to the "giving away" of food, the entertainment of guests with berries and choice meals is another aspect of community sharing.

A major part of food shared goes to those households such as elders and widows that lack the ability to harvest certain resources themselves. One elderly couple stated that life in a small village was easier for them
than in a larger community, partly because they do not have to buy meat; people give them some, and they harvest some themselves. Another older woman said that her husband couldn't hunt anymore, but other hunters provided them with meat. An additional elderly couple mentioned that they were regular recipients of food from other households. A young widow stated that her father provided her household with meat.

Elders also will share what they have with others. For instance, elderly couples often put away large quantities of dry fish and will share them with younger people. Elders also exchanged food with each other or shared with people older or more incapacitated than themselves.

Other recipients of sharing include those households that did not participate in the harvest of a species when it was available. Such failure to participate may relate to such factors as the lack of a boat, outboard motor, or snowmachine; involvement in other activities such as seasonal or temporary wage labor; the absence of primary producers from the community because of education, skill training, or illness; the lack of cash to purchase needed gasoline, shells, etc.; and debilitation of primary producers due to injury or illness.

Sharing also occurs among the rest of the populace, although probably to a lesser degree, because people not in categories described above will be more likely to have harvested their own resources. If only a certain segment of the hunters are successful, as is always the case with moose, those animals harvested are likely to be shared widely within the community. As not all producers are successful in harvesting the same resource in similar
quantities, sharing is a mechanism for insuring resource availability to all households.

Sharing also occurs between the villages of Norton Sound, particularly through the exchange of resources not available to every community. For example, Shaktoolik ugruk may be shared with Koyuk when seals are not accessible to that village. Elim occasionally shares crab with Koyuk, for crab are not available in the Koyuk area. Bowhead muktuk from Shaktoolik went to several other villages of Norton Sound that rarely have direct access to bowhead whales. Intervillage sharing is especially apparent during church conferences and "get-togethers." These festive occasions will attract numerous residents of several other villages from as far away as Barrow to the host village, and the population of the host village may double in size. It is very important to households of the host community to be able to serve good food to their guests, who are often relatives. Food is also occasionally given to guests for them to take home. Three Shaktoolik hunters mentioned the importance of having such foods as ducks, muktuk, caribou, and ugruk available for the Covenant "get-together" in January 1981. Other intervillage activities which may involve similar sharing are the "carnivals" put on by various villages at different seasons.

Sharing often occurs between relatives, but this is not always the case. The time constraints of this research effort restricted the mapping of kinship networks and therefore provided insufficient data from which to derive conclusions regarding the role of kinship in sharing patterns. However, the data gathered suggest that kinship is an important factor in addition to inability to participate in the harvest. One Shaktoolik source described
that moose were shared with everyone. The composition of belukha hunting crews is not necessarily based on kinship and is the major factor in determining the distribution of belukha within the community. A Shaktoolik elder described the concept of sitna, which means "selfish" in Eskimo and is definitely not good. If someone shares with only their close relatives, that is sitna. He stated that he personally shares with people regardless of degree of kinship. There is a need for further research regarding kinship networks in Norton Sound communities and their role in sharing.

Two versions of a traditional story were related to the researcher that suggest cultural attitudes toward sharing. One version was told by a man in his 70's who had heard it from his aunt. Following is a reconstruction of this story version.

Long ago in an old village down the coast, there was an old woman and her granddaughter living alone at one end of the village. They had to live on what people gave them. One day the village got together and agreed not to feed them anymore. The grandmother sent the girl out to beg for food one day when they had nothing left; she went house to house with no success and returned crying to her grandmother. Her grandmother was a medicine woman and gave the girl two infant skulls, telling her to juggle them from one end of the village to the other. This she did, and each time she tossed a skull into the air, it would cry like a baby and would be heard by the people in their houses. When she was done, she dropped the skulls at her grandmother's doorstep. Then the village turned
inside out -- erupted -- and all were killed except for
the old woman and the girl.

A younger man gave a similar story, told to him by his grandmother, in
which it was an orphan girl, who, when no one gave her any food, walked
out on the ice, and a south wind came up and destroyed the village.

Barter or trade of local resources apparently has always been important
to the indigenous culture of the area. Trading occurred between coastal
peoples from the Yukon Delta to Kotzebue to the north and beyond, as well
as across the Bering Strait (see Foote 1965 and Ray 1975). Important trade
occurred between Yukon River Athabascans and coastal Eskimos of Norton Sound,
primarily including Yukon furs in exchange for coastal marine mammal products.
As increasing numbers of non-Natives moved into the Sound, outposts were
developed in the region, with trading posts established for purposes of
trading Western goods for furs, dry fish, and marine mammal products (e.g.,
belukha, seal oil, blubber, and hides). Trade in dry fish reached a high
level during the mining period, becoming integral to the local economy.

Today barter continues at a low level within and between Norton Sound vil-
lages. People within a village may ask a particular person to sell them
some dry fish, a fur pelt or wolf ruff, berries, a seal, or some other item.
In general, people prefer to share food items rather than trade or sell them.
However, if two households each have something the other household desires,
a trade may take place. For instance, one Shaktoolik household in the fall
of 1980 obtained bowhead muktuk on three different occasions by trading
salmonberries, dry fish, and moose to households that lacked those foods.
As previously mentioned, Shaktoolik residents occasionally will sell muktuk
and cranberries to Unalakleet. Salmonberries have been bought in the past from Koyuk people.

In view of the data derived from this research report, the argument can be raised that the exchange of dry fish for store goods or cash is traditional, having occurred for at least 80 years, and was once a mainstay of the local economy. In the past dry fish was regarded as the equivalent of cash and used to "buy" things or exchanged for cash itself. There are some stores in the region that continue to deal in dry fish, although this activity has declined at the present time.
CHAPTER VII

TRENDS IN RESOURCE HARVEST AND UTILIZATION

The harvest and utilization of local resources in Shaktoolik is a flexible, dynamic system. It is constantly changing in response to dietary preferences, resource availability, environmental variations, community awareness of the resources available, needs of the community, harvest technology, and other factors. Elements within this system which do not remain static include the characteristics of primary harvesters, the type of resources, the methods of preparation and storage, and the harvest areas of certain species.

The use of a number of different species by Shaktoolik residents has been discontinued over the years. Generally these species are described as less desirable than other available resources. In the past they provided variety to the diet or were available when other resources were scarce. As new foods have been incorporated into the diet, these less desirable foods have dropped out, while the preferred foods such as seal oil, salmon, caribou, and muktuk have continued to be utilized extensively. The cessation of use of a number of species (e.g., murres, grizzlies, bullheads) does appear to correspond chronologically with the increased availability of foods of Western culture which accompanied the mining era and the inception of reindeer herds in the early 1900's. Wolfish and lingcod are two species which appear to be losing popularity currently -- that is, younger households are less likely to participate in their harvests than are the older generations.
A variety of other foods are utilized much less frequently than in previous years, including ugruk, seal, belukha meat, and greens. However, these and several other species continue to provide variety to the diet of many households. The 1980 diet survey results gave a substantial list of species which did not comprise large percentages of the total diets but added to the variety of foods consumed (see Appendix 6).

Although the utilization of several species has declined, Shaktoolik's history indicates that this is not an irreversible trend. The examples of renewed or increased utilization of resources are numerous:

1. Following the crash of the reindeer herd in the 1930's, the utilization of ducks increased, and the harvest of grizzly bear was renewed for some households.

2. Caribou, once a mainstay of the local diet, were not harvested in significant numbers during the period in which there were large reindeer herds, but they regained their importance to the diet when the reindeer crashed.

3. Moose, previously not a resource available in the area, were gradually incorporated into the local diet as they migrated into the area.

4. The harvest of spotted seals for local use increased substantially with the introduction of outboard motors. This resource had previously been rarely harvested due to its speed and ability to chew itself out of nets.

5. Crab harvest has fluctuated widely over the years. In 1948 and 1978-79, an apparent increase in crab abundance and community awareness and interest inspired harvests far exceeding those of preceding years. The use of boats in harvesting crab after breakup
became quite popular in 1978-79, whereas crabs had been rarely harvested in that season or using that method in previous years.

6. In recent years a certain species of clams was discovered in the area, and an entirely new local harvest effort developed in response.

7. The local harvest of cigarfish (capelin) fluctuates with the availability of that species. In 1980 the cigarfish were unusually abundant, and the harvest far exceeded that of any year in several decades, with a number of families taking some for the first time.

8. A bowhead whale was harvested by Shaktoolik hunters in 1980; bowheads are rarely sighted in Norton Sound, and no previous harvest was remembered in this community.

9. The harvest of walrus in this area fluctuates with its abundance.

10. Shaktoolik has harvested large numbers of belukha whenever the opportunity presented itself.

An informant in Shaktoolik observed that involvement in local harvest activities among young people recently has begun to increase, following several years of apparent lack of interest.

An important factor in determining these trends has been the changing needs of the community. For example, the use of dog teams in this area, presumably resulting from Malemute influence and/or immigration in the 1700's (Giddings 1964; Ray 1975), produced the need for substantial harvests of resources for dog food. Around the turn of the century the size of dog teams increased, and so did the need for dog food. When the need for dog teams declined and ended for the most part with the introduction of snowmachines, the need for
such species as seals, salmon, char, herring, and tomcod was greatly reduced. The availability of large numbers of reindeer in the 1920's decreased the need for caribou. When the need for Western technology and supplies was incorporated into the local economy, trapping and production of dry fish for purposes of trade grew in importance, and the procurement of salmon for dry fish eventually became a major harvest occupying the entire summer of most households. The need for Western equipment and supplies also gave impetus to the harvest of spotted seals for cash (i.e., bounties). In recent decades the harvest of local salmon and more recently herring for commercial sale has provided a major portion of the income necessary to live in the modern village. Technology such as electricity, new housing, oil stoves, outboard motors, and snowmachines require sources of energy not supplied locally and exceedingly costly in small, rural communities. This technology contributes to a rapidly inflating cost of living for that segment of the local economy which is not cash based.

Another shift in the need for local resources which has taken place recently is the decline of the importance of skin sewing. Whereas the harvest of numerous ugruk and seals was necessary to provide hides for sewing in the past, today traditional clothing has been replaced for the most part by manufactured alternatives, and not many hides from local resources are required. A similar example is that of murre utilization; murre skins had been important in the past as material for parkas but were replaced by reindeer hides when that species became available.
The presence of a village store stocked with groceries and the increased availability of cash from commercial fishing, construction work, and governmental assistance have provided options for obtaining food from other than local sources and have influenced the demand for local resources. However, a continued cash scarcity, escalating living costs, little variety and sporadic availability of foods at the store, dietary preferences, and cultural traditions have limited the effects of the store on local harvest. Shaktoolik elders observed that local harvest effort has declined since stores were established in the villages, but the extent of this decline has not been quantified.

Shaktoolik hunters generally have continued over the years to adopt new harvest technologies and methods that save time and effort. Based on archaeological and ethnohistoric evidence, this trend has occurred since prehistoric times, including the adoption of new designs for bows and arrows, new techniques for fishing, and increased use of dog traction, and many other changes (Giddings 1964). The introduction of Western technology made available new harvest tools, many of which were assimilated by local hunters when they had the means to obtain them. Shaktoolik hunters today voice the opinion that technology such as firearms, outboard motors, and snowmachines generally made it possible to harvest resources faster, easier, and in greater quantities than before. Technology used locally continues to change, with the use of commercially produced items such as aluminum boats, larger outboards, and faster snowmachines. Of course, the use of these items is dependent upon substantial cash investments.
Another effect of the introduction of new technology has been a change in methods used in preparation and storage of foods. The traditional seal poke was replaced by wooden barrels which in turn have been replaced to a large extent by freezers. Salting was introduced as a method in the early years of Western contact and became important as an alternative to the traditional drying; to some degree freezing has replaced both of these processes. Smoking as a process may have been introduced by early Russian explorers.

Freezers have only been available in Shaktoolik for perhaps a decade because there was no village electricity before that time. Freezers have had a large impact on local diet and food preparation, since foods that were available previously on a seasonal basis can be stored in their initial condition for longer periods of time. For instance, all summer long people eat caribou that was frozen fresh in the spring, whereas in earlier years the meat would have been dried. Data from this research indicates that waterfowl, moose, muktuk, herring eggs, salmon, and wolffish had been frozen and thus were available for consumption in the fall of 1980 and early winter of 1981. One elderly woman stated that she could not imagine how she had been able to keep her family fed before freezers. Her husband recalled large amounts of all kinds of meat being dried in the fall when he was young.

The use of freezers has not meant the end of traditional preparation practices. Highly valued foods often require a certain type of traditional preparation to obtain the desired produce. For example, dry fish, dried ugruk, and "stink" muktuk or salmon eggs are all prepared following
traditional methods. One possible conclusion regarding changing trends in food preparation is that some processes were the result of necessity rather than preference and were abandoned when new methods became available, whereas other processes produce a desired product and continue to be utilized and valued. Freezers allow the meat, fish, berries, or greens to be kept in a condition more similar to the "fresh" state than do drying, salting, or fermenting -- this may be perceived as preferable to or as a desirable alternative to the more traditional processes. For instance, a household may desire "fresh" salmon as well as dry fish in its fall and winter diet. Freezers are also used to store traditionally prepared foods to prevent the quality of the food from deteriorating -- that is, "stink" muktuk, angimaak, seal oil, okromutak, and dry fish are all frozen on occasion.

Freezers also have had some impact on sharing patterns. Resources such as crab, belukha, and moose, when caught in the warmer months, were more likely to be shared and immediately consumed in the years before freezers were available. Crab spoil quickly in the spring, and in warmer months drying of meat is impeded by spoilage and maggots. The traditional solution was to distribute what the hunter's household could not immediately consume. Freezers now allow households to store large quantities of food that might previously have been shared.

Freezers do have their limitations since they will only hold a certain amount of food. Traditional drying of salmon remains necessary regardless of dietary preferences, because households lack the facilities to freeze
the large volumes of salmon that are consumed every year. Freezers also contribute to high electricity bills and sometimes "burn out" from the surging voltage that is common to village power supplies. Freezers require that the household be on good financial terms with the electricity supplier. In the summer of 1980 several Shaktoolik households were disconnected because of their failure to pay bills and were forced to plug into the electricity source of neighbors or use freezers in other households.

Changes in technology have had substantial effect on the harvest areas for certain species. The use of outboard motors and snowmachines is believed by Shaktoolik residents to have caused species such as belukha, foxes, wolves, wolverines, and, to some extent, waterfowl to avoid areas of heavy traffic or at least be present in smaller numbers in those areas. On the other hand, outboards and snowmachines allow hunters to travel quickly to areas not previously utilized and to cover larger areas than was possible by earlier modes of transport. The net effect of these technological shifts may include an absence of certain resources in areas closest to the village and an expansion of hunting areas for those species. One older Shaktoolik hunter made the observation that hunters cannot go back to earlier technology (e.g., abandon the use of rifles, outboards, and snowmachines) because harvest success with traditional technology had required the presence of numerous resources fairly close to the village, and this no longer occurs. Some harvest areas have changed negligibly, such as areas for all kinds of fish, moose, and caribou and most areas of waterfowl harvest. Residents explained that these resources are present at the same places as in earlier years and that people therefore direct their harvest efforts at those areas.
The use of outboard motors and snowmachines has greatly reduced the use of harvest oriented camps by Shaktoolik residents. In the days of the parents of contemporary elders, everyone spent May and June camping at Ganigak near Cape Denbigh and then moved to fish camps on the Shaktoolik River for the summer. Today only a few people spend a substantial amount of time camping. Informants agreed that many households abandoned spring and summer camping when it became possible to travel to the harvest area and return during the same day. Several households continue to camp to some extent for the harvest of various species, but this activity is much less frequent than in previous years.
There is a long history of involvement of the indigenous people of Norton Sound in the cash economy introduced by Western culture. The following list will briefly summarize some of the major components of Shaktoolik's involvement in the cash economy:

1. Trapping: trapped furs have been a major barter item or source of cash since the first contact with Western culture.

2. Dry fish: dry fish became a major barter item during the mining era; its importance declined when airplanes took over the mail runs from dog teams in the early 1930's and mining activity decreased.

3. Mining: several of Shaktoolik's older men worked for the miners, some during the ice free seasons of several years. Local involvement in mining took place throughout the mining era until the late 1950's. One source described how most of Shaktoolik's men had worked at the thaw field of a dredge at Ungalik during the 1938-40 period. This operation was interrupted by World War II; when the dredge became active again in 1947-48, the Shaktoolik men resumed their work at the thaw field.

4. Mail runs: at least two of Shaktoolik's elders participated in transporting mail by dog team during the mining period until the early 1930's. Two elders had done this on a regular basis for several years.
5. **Reindeer herding**: Shaktoolik people have been involved in reindeer herding since the introduction of the herds around the turn of the century, but currently this is the responsibility of one individual.

6. **Crafts**: in earlier years skin sewing and carving provided income to Shaktoolik residents, but not much of this activity occurs today. Two older Shaktoolik men currently make wooden berry buckets for sale, and some skin sewing is done by the older women; one younger man carves ivory.

7. **Bristol Bay cannery**: in 1947 several Shaktoolik men began going to Bristol Bay to work at a fish cannery; this occurred for a month each summer for perhaps five years.

8. **Spotted seal bounty**: a statewide market for spotted seal pelts opened in 1927 and provided an important source of income to Shaktoolik residents for many years.

9. **Cash assistance programs**: a source of income was introduced in the late 1930's and 1940's by programs currently administered by the Bureau of Indian Affairs and the State of Alaska.

10. **Commercial salmon fishery**: in the early 1960's a commercial fishery for salmon developed and has been integral to the Shaktoolik economy up to the present time.

11. **Armed Forces and National Guard**: many Shaktoolik residents have served with the Armed Forces; several are currently enlisted in the National Guard, which requires occasional time spent in training and provides monthly income to its members.

12. **Fire fighting**: the Bureau of Management hires firefighting crews from Norton Sound villages in summers when a high level of forest fires
occurs, but this source of employment is not available every year.

13. **Construction:** Various local construction projects provide a substantial amount of income to Shaktoolik residents in some years; some men have left the village for months at a time to work on projects elsewhere in the State, such as on the Trans-Alaska Pipeline.

14. **Local jobs:** a number of local jobs have developed in the village, providing the only steady major source of income available.

15. **Land Claims:** payments from the Alaska Native Claims Settlement Act (ANCSA) result in occasional income to Shaktoolik residents.

16. **Commercial herring fishery:** since 1979 the commercial harvest of herring has become a major source of income to Shaktoolik fishermen.

These examples indicate that cash income and its pursuit have been established for several decades as a part of the local economy. However, this income has always been sporadic, and for most households the major income sources are available only in certain seasons (e.g., commercial fishing and construction) and certain years (e.g., construction). The steady jobs of the village supply a stable income to only about half of Shaktoolik's households, and only half of these jobs are full-time.

Since cash income has always been sporadic, limited, and seasonal, the local "work ethic" has emphasized taking advantage of potential sources of income as they become available. One common effect of this phenomenon of sporadic income is a "boom-bust" cycle for household finances. A household will often develop large debts to such vendors as the village store, AVEC (Alaska Village
Electric Co-op), and the Shaktoolik Village Corporation (provider of fuel oil and gasoline) during the periods of low income, to be paid off when the next cash "boom" occurs. For instance, it is common for households to pay off their winter bills with income derived from commercial fishing. Another example was demonstrated in the fall of 1980 when large land claims checks allowed at least two Shaktoolik households to pay their debts. A Shaktoolik elder recalled that two years previously there were numerous Shaktoolik residents considerably behind in the payment of their AVEC bills. According to this source, AVEC arranged with one of the commercial salmon buyers to deduct payment for the electricity bills directly from the fish tickets of indebted commercial fishermen. A slightly different approach to the seasonal availability of cash was described by other elders; many years ago it was common for people to use their earnings from mining employment or their season's harvest of furs to purchase supplies for the slack season.

It is informative to compare the income derived from cash assistance programs ("welfare") with that derived from the commercial fisheries. The case loads of State public assistance programs are compiled only for the month of October of each year, which may give a total higher than the monthly average for the year since October is generally a month of low village income compared to the summer months. For Shaktoolik the combined October 1980 case loads -- six cases of Aid to Families with Dependent Children, six of Old Age Assistance, two of Aid to the Permanently Disabled, and nine of Food Stamps -- received a community total of $5906 (personal communication, Kimberley Bush, Alaska Department of Health and Social Services, 1981). The BIA (Bureau of Indian Affairs) assistance amounted to a total of $35,769 for 13 cases during the period September 1979 to September 1980 (personal
communication, Lilly Rose, BIA, 1981). The BIA program provides income primarily during the winter months. In 1979 29 Shaktoolik commercial salmon fishermen received a total of $114,290 for their catch (no compiled data is available for the 1980 season). The 1980 herring fishery provided a total of $52,623 for 19 Shaktoolik fishermen. These figures suggest that commercial fishing provides perhaps twice the income gained through public assistance programs.

Construction is an important source of income to many Shaktoolik households but does not occur every year. There has been a large amount of construction in Shaktoolik during the past six or seven years, since an essentially new village has been built since 1974 to replace the old site a few miles down the coast. The construction contractors generally hire a major fraction of their workers locally. In the summer and fall of 1980 a new high school was being built in Shaktoolik, constituting a substantial source of income for several households. According to the supervisor of the Bonner-Hegdahl construction firm that was contracted to do the work, local hire including the following:

1. Ten local men were hired to work for the month of July. At the mayor's suggestion, the supervisor initially hired the men without commercial salmon permits.

2. In the months of August, September, and October, 19-20 local men were working out of 22-24 total workers. There was local pressure to rotate the men hired for the working crews, and once the more urgent work had been completed, the supervisor began some rotation.

3. From mid-October until the work ceased in mid-December, six to eight local men were working.
The rotation was such that none of the original workers was still working at the end of the season, and perhaps 25 local men had participated overall. Some crews were hired only for specific tasks such as installing insulation and therefore did not work for more than two or three weeks. The wages were about $16.00 per hour for laborers and $18.00 per hour for carpenters. The supervisor anticipated that there would not be much local hire the next year when the school would be completed due to the local sparsity of the skills required. This construction project therefore resulted in substantial income to a major portion of Shaktoolik households, but the amount earned varied widely between workers, depending on when the individual was hired and how long he worked before being laid off.

The modern subsistence economy cannot function without cash. A study of subsistence economics conducted in the Yukon Delta village of Kotlik in the late 1970's determined that a plywood boat lasts an average of 4.8 years; an outboard motor, 2.8 years; and a snowmachine, 3.4 years (Wolfe 1979). In addition to the thousands of dollars spent on major equipment, there are the costs of gasoline, ammunition, nets, and so forth. Meanwhile, there are the household costs of electricity, groceries, fuel oil, etc. These costs are all much higher than those of Nome, the center of commerce for the region, and are increasing rapidly. One attempt of Shaktoolik residents to combat rising living costs has been the resurgent use of wood stoves as the most common method of heating homes, subsequent to a decade of use of fuel oil stoves and furnaces.

If a household lacks a boat, outboard motor, or snowmachine, or if its equipment is not functional, the resource harvest of that household is
crippled or prevented. There are numerous accounts of harvesters stranded for entire seasons in the village due to equipment problems and lack of cash to purchase replacements. The purchase of new equipment is a major focus of cash use when cash becomes available.

Time invested by a household in employment or commercial fishing conflicts with the local harvest activity that would normally take place during the same time period. Several instances of conflict with construction work occurred in the fall of 1980. One hunter described that working the schedule of six days per week had interfered with his harvest -- he had not been able to hunt belukha as often as he would have liked, and the harvest of fall salmon had not been possible. The construction supervisor would allow men to take off a day or two to hunt if requested. This hunter thought that the construction would continue all winter and would have negative impacts on his winter hunting. He anticipated that he would be forced to buy meat at the store or order it from Anchorage when his supply of meat was depleted. However, he planned to take time off to hunt caribou. Another man believed that people working five or six days a week could still provide for their families by hunting on the weekends. One hunter hoped to complete most of his required harvest before being called to work later in the fall. Another active hunter expressed his regret that he was too busy working to hunt seals; he stated that if he had not been working, he would have been hunting every day. One man described how he had been forced to complete seining of fall salmon in two days of intense activity, whereas if he had not been working, he would have gone about it in a more leisurely fashion -- that is, waiting for nice days and harvesting a few at a time.
In general, data suggest that the high amount of income to be gained from construction wages and the lack of other employment opportunities during the remainder of the winter made this opportunity to secure cash too attractive for most Shaktoolik men to pass up.

The subsistence activities of persons with full-time jobs are the most heavily impacted. People recall that in the past the store manager would be the only one left in the village in the spring and summer. The ex-post-master of Shaktoolik described how he was becoming actively involved in resource harvest again after many years of being tied to the village. One woman expressed regret that her full-time job prevented her from camping. Although, people with full-time jobs are often active in resource harvest on the weekends and during their vacations, people with part-time employment are more able to participate in harvest activities on a regular basis.

One problem with inflexible work schedules is that the periods of time an employee can take off do not necessarily correspond to resource availability or weather conducive to resource harvest and preparation. Migratory species are often present in the area (or present in adequately large numbers) for a limited time only; the timing of the harvest has a significant effect on its success. In addition, wind and waves limit boat activity, and blizzards, wind, and temperature limit snowmachine travel. The successful drying of fish requires particular weather conditions. The frustration of a cash employed person can be great when the weekends are stormy and the work days ideal for harvest. Full-time workers are generally able to harvest such important species as salmon, char, and caribou that can usually be found in certain areas, as long as the weather cooperates and their employment
allows time off for those harvests. However, other species may require several hunting trips before they are encountered and harvested in adequate numbers, such as belukha, waterfowl, and moose. Religious views about conducting harvest activities on Sunday may impact weekend harvest potential for some households, but this issue was not pursued in this study.

Commercial salmon fishing is another activity that impacts subsistence harvests. In addition to occupying the fisherman's time for two 48 hour periods per week, this activity also monopolizes the household boat during that time, and many households have only one boat. Alaska Department of Fish and Game regulations further restrict subsistence harvest by prohibiting commercial fishermen from subsistence fishing during the weekly closures of the commercial season. As a result many commercial fishermen wait until the end of the season before harvesting subsistence salmon in addition to harvesting some salmon for home use prior to the beginning of the commercial season. One problem with this strategy is that humpies are available in an acceptable condition only during the commercial season. In 1980 when there was no market for humpies, large numbers caught in commercial nets were retained for local use. Some harvest of other resources does occur during the commercial season. One fisherman described gathering cliff eggs during the commercial closures. The harvest of salmonberries and blueberries occurs during the commercial fishing season, since that is when they are available. A few households do not own commercial salmon permits and are therefore not affected by this factor.

Despite conflicts between subsistence harvest and the pursuit of cash and the increased ability to afford store food that comes with an increase in
cash, a greater involvement in the cash economy by a household does not necessarily mean a lesser degree of participation in subsistence harvest. On the contrary, the study described earlier (Wolfe 1979) suggested that an increase in cash income in Kotlik correlated with a higher level of subsistence harvest. The author of that study proposed that this could be explained by the increased ability of the household to acquire the necessary harvest oriented equipment.
CHAPTER IX

CONCLUSION

The data presented in this report were gathered to provide some indication of the significance of local fish, wildlife, and plant resources to the residents of the community of Shaktoolik. In addition to whatever importance these resources may have to the natural ecology of the region, they provide the foundation for the hunter-gatherer culture of the indigenous people of the area and the basis for the local subsistence economy. An assessment of the significance of a particular species must consider the many cultural, social, and economic factors involved.

The use of a species as a food source has many ramifications. Locally harvested foods provide Shaktoolik residents with high quality nutrition; the meats, oils, and plant products have not been industrially processed, and the original nutrients are largely intact, representing a much richer source of vitamins, minerals, and protein than is provided by canned foods which constitute the major alternative food source. Local foods are generally regarded as highly palatable and are the accustomed diet of most residents. Meals of local foods can involve extensive traditional processing and preparation. Older people frequently perceive the regular consumption of traditional food to be essential to their physical well being. The consumption of traditional foods provides a major source of cultural identity.
A species can also be assessed in the context of the harvest activity through which it is acquired. Although major shifts in technology have occurred in many cases, the harvest is a traditional activity. Usually, this is a tradition that links the harvester to a heritage of countless generations of ancestors who harvested the same species, often in the same geographical location.

Most Shaktoolik households continue to follow a yearly cycle of harvest activities and food preparation in response to the seasonal availability of the various local species. The household may focus its activities exclusively on a particular harvest(s) for days or weeks at a time. Some households continue the tradition of moving into a seasonal camp for the period of the harvest. The harvest provides opportunity for social interaction which may be important to the cohesion of the Shaktoolik community. Traditional roles are assumed in the process of the harvest and preparation of the food. Cooperative harvest efforts may involve numerous crews (as in belukha hunts) or many individual hunters (as with caribou harvest) or may be a joint effort by two or more households. As is traditional in Eskimo societies, harvest success and productivity as a provider is important in establishing an individual's status within the community. Success as a harvester remains a major source of cultural pride and self identity.

Local resources have significance as the object of exchange and distribution patterns within Shaktoolik as well as between the villages of the region. The distribution of the harvest among participants as well as sharing between households serves as a mechanism for reaffirming social ties. The
relationship being maintained may involve kinship, provision for the needy, or friendship, or the sharing may occur as an act of goodwill not necessarily in the context of an established relationship. A few Shaktoolik households lack the manpower to participate in the more strenuous hunts and rely heavily on other households for their supply of meat. On the other hand, active hunters derive a significant amount of satisfaction and self esteem from their ability to provide for others. The sharing of traditional foods is also important in the entertainment of guests.

The role of locally harvested species in the Shaktoolik economy is crucial. These resources provide the primary affordable source of high quality protein. Store bought alternatives are infrequently available, and the prohibitively high cost denies most Shaktoolik households the option of extensive utilization of these alternatives. The history of Shaktoolik is one of dependence on local resources for the community's livelihood with occasional opportunities for wage income since the turn of the century. These opportunities were usually seasonal and sporadic. Personal consumption and use of raw materials derived from local resources was complemented by the barter or sale of furs and salmon. The pattern of occasional wage employment has continued to the present for Shaktoolik has relatively few permanent full-time job opportunities. Local commercial fisheries for salmon and herring now constitute the major source of income for many Shaktoolik households. Additionally, trapping of furs continues to provide income. The local fishing and trapping industries with the harvest of fish, wildlife, and plant resources as a food source comprise virtually the only locally based means of self support currently available to most Shaktoolik households.
The people of Shaktoolik have a number of concerns regarding the future of local fish and wildlife resources and the availability of those resources for local harvest. When the research project on which this report is based was proposed to the Shaktoolik City Council in July 1980, the members had mixed feelings regarding the desirability of such research. The concern was voiced that documentation of harvest areas might provide sport hunters from outside of the region with information that would help to promote competition of resources needed by Shaktoolik residents. Another fear was that documentation of illegal harvests and harvest methods could result in increased enforcement efforts by "game wardens" in their area. On the other hand, a major concern of the Council, shared by most Shaktoolik residents, was the potential harmful impact on local resources of the scheduled OCS oil development in Norton Sound, as well as possible future nearshore drilling and onshore mineral exploration. Shaktoolik residents generally are apprehensive about marine oil development, and most would like to see it prevented but feel helpless to deal effectively with the bureaucracy of oil development planning. After much discussion, the Council voted to approve this research, having concluded that the documentation of dependency on local fish and wildlife was one way in which the community of Shaktoolik could attempt to protect those resources.
LITERATURE CITED


Freeman, Milton M. R. 1976. Inuit land use and occupancy project, Volumes I, II, and III. Minister of Supply and Services, Ottawa, Canada.


Thomas, Daniel C. 1981. Norton Sound-Bering Strait subsistence king crab fishery. Alaska Dept. of Fish and Game, Subsistence Division, Nome, AK.


____. 1981. Norton Sound/Yukon Delta sociocultural systems baseline analysis. Alaska Department of Fish and Game, Subsistence Section, under contract to the Alaska OCS Socioeconomic Studies Program, Bureau of Land Management, U. S. Dept. of Interior, Anchorage, AK.
# APPENDIX 1

## SEVEN DAY DIET CALENDER

<table>
<thead>
<tr>
<th>Time</th>
<th>Food Eaten</th>
<th>How Much</th>
</tr>
</thead>
</table>

Date: __________

Code of household: __________

Initials of recorder: __________
## APPENDIX 2

### WEIGHT ESTIMATES FOR LOCAL SPECIES

#### Fish (edible portion—without bones)

<table>
<thead>
<tr>
<th>Species</th>
<th>Estimated Weight</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>pink salmon (humpy)</td>
<td></td>
<td>researcher's est.</td>
</tr>
<tr>
<td>dried, <strong>okromutak</strong> - one fish</td>
<td>18 oz. wet equiv.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>chum salmon (dog)</td>
<td></td>
<td>researcher's est.</td>
</tr>
<tr>
<td>dried, <strong>animaak</strong> - one fish</td>
<td>46 oz. wet equiv.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>fish head</td>
<td>8 oz.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>silver salmon</td>
<td></td>
<td>researcher's est.</td>
</tr>
<tr>
<td>fresh - one fish</td>
<td>80 oz.</td>
<td>(compares to Wolfe, 1979)</td>
</tr>
<tr>
<td>dried, salted, <strong>okromutak</strong>,</td>
<td>46 oz. wet equiv.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td><strong>animaak</strong> - one fish</td>
<td></td>
<td>researcher's est.</td>
</tr>
<tr>
<td>smoked strip - six inches</td>
<td>1 oz.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>fish head</td>
<td>8 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>herring eggs - one cup</td>
<td>9 oz.</td>
<td>(weight given for caviar)</td>
</tr>
<tr>
<td>arctic char (trout), grayling</td>
<td></td>
<td>researcher's est.</td>
</tr>
<tr>
<td>- one large fish</td>
<td>20 oz.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>- one medium fish</td>
<td>15 oz.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>saffron cod (tomcod)</td>
<td>3 oz.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>burbot (lingcod)</td>
<td>22 oz.</td>
<td>Adams, 1975</td>
</tr>
</tbody>
</table>

#### Waterfowl (edible portion—including bones)

<table>
<thead>
<tr>
<th>Species</th>
<th>Estimated Weight</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>goose</td>
<td>5 lbs. dressed</td>
<td>Wolfe, 1979</td>
</tr>
<tr>
<td>duck</td>
<td>2.5 lbs. dressed</td>
<td>Foote, 1965</td>
</tr>
</tbody>
</table>

#### Other

<table>
<thead>
<tr>
<th>Species</th>
<th>Estimated Weight</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>seal oil - one cup</td>
<td>8 oz.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>seal blubber - one string</td>
<td>3 oz.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>reindeer fat - one cup</td>
<td>8 oz.</td>
<td>researcher's est.</td>
</tr>
</tbody>
</table>
APPENDIX 3

TYPICAL WATER CONTENT OF MEATS, FISH, AND DAIRY PRODUCTS

<table>
<thead>
<tr>
<th>Meat, Fish</th>
<th>Water Content*</th>
</tr>
</thead>
<tbody>
<tr>
<td>beef roast</td>
<td>50-60%</td>
</tr>
<tr>
<td>salmon</td>
<td>60-70%</td>
</tr>
<tr>
<td>beef steak</td>
<td>67%</td>
</tr>
<tr>
<td>hamburger</td>
<td>68%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dairy Products</th>
<th>Water Content*</th>
</tr>
</thead>
<tbody>
<tr>
<td>butter</td>
<td>16%</td>
</tr>
<tr>
<td>ice cream</td>
<td>63%</td>
</tr>
<tr>
<td>milk, canned evaporated</td>
<td>74%</td>
</tr>
<tr>
<td>milk, whole</td>
<td>85-90%</td>
</tr>
<tr>
<td>yogurt</td>
<td>89%</td>
</tr>
</tbody>
</table>

* These figures are from Adams, 1975.
APPENDIX 4

WEIGHT ESTIMATES FOR SMALL FOOD QUANTITIES AND MIXTURES

Seal Oil

1 oz. per 1 cup sira (greens)
1 oz. per 1 bowl berries
1 oz. per 1 cup agutuk
1 oz. per 18 oz. humpy okromutak
3 oz. per 46 oz. silver okromutak

Reindeer Fat

2 oz. per 1 cup agutuk

Canned Evaporated Milk

1/4 cup per bowl dry cereal = 4.4 oz.
1/4 cup per bowl cooked cereal = 2.2 oz.
1 tsp. per cup coffee = .2 oz.
1/4 cup per bowl berries = 2.2 oz.

Butter

1 tsp. per slice (bread, pancakes, pilot crackers) = .2 oz.
APPENDIX 5

WEIGHT OF STORE BOUGHT FOODS

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>bacon - 1 slice cooked</td>
<td>.5 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>beefaroni - 15 oz. can</td>
<td>6 oz.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>beef tongue</td>
<td>64 oz.</td>
<td>butcher's avg.</td>
</tr>
<tr>
<td>beef vegetable stew - 24 oz. can</td>
<td>6 oz.</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>bologna - 1 slice</td>
<td>1 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>butter - 1 cube</td>
<td>4 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>cheese, processed - 1 slice</td>
<td>.7 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>egg - 1 cooked</td>
<td>1.4 oz. edible</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>game hen</td>
<td>24 oz.</td>
<td>local grocery store</td>
</tr>
<tr>
<td>ham - 1 slice</td>
<td>1 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>ham, chopped - 12 oz. can</td>
<td>12 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>hash, corned beef - 15 oz. can</td>
<td>9 oz. beef</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>herring, kippered - 3.2 oz. can</td>
<td>2.8 oz. drained</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>ice cream - 1 quart</td>
<td>18.8 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>mayonnaise - 1 cup</td>
<td>7.8 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>milk, canned evaporated - 1 cup</td>
<td>8.8 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>milk, whole - 1 cup</td>
<td>6 oz.*</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>salami - 1 slice</td>
<td>.3 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>sausage, vienna - 5 oz. can</td>
<td>4 oz. drained</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>sardines - 2 oz. can</td>
<td>1.5 oz drained</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>spaghetti w/meatballs - 40 oz. can</td>
<td>16 oz. beef</td>
<td>researcher's est.</td>
</tr>
<tr>
<td>span - 12 oz. can</td>
<td>12 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>tuna fish - 1/4 cups</td>
<td>7.9 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>wieners - 1 package of 8</td>
<td>16 oz.</td>
<td>Adams, 1975</td>
</tr>
<tr>
<td>yogurt - 1 cup</td>
<td>6.1 oz.**</td>
<td>Adams, 1975</td>
</tr>
</tbody>
</table>

* 8.6 oz. x .7 (conversion factor)
** 8.7 oz. x .7 (conversion factor)
APPENDIX 6

BREAKDOWN OF DIET COMPOSITION FOR HOUSEHOLDS SURVEYED

Household #10

9 persons total: 5 adults, 1 teen-ager, 2 grade school age, 1 pre-school age
21 days total: 7 days - late September, 7 days - mid-October, 7 days - early December

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>3,855 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total store bought$^1$</td>
<td>455 oz.</td>
</tr>
<tr>
<td>Total reindeer</td>
<td>554 oz.</td>
</tr>
<tr>
<td>Total subsistence harvest</td>
<td>2,846 oz.</td>
</tr>
<tr>
<td>Total marine-related subsistence</td>
<td>2,438 oz.</td>
</tr>
<tr>
<td>humpy$^2$</td>
<td>773 oz.</td>
</tr>
<tr>
<td>dog salmon</td>
<td>621 oz.</td>
</tr>
<tr>
<td>duck (sprig)</td>
<td>288 oz.</td>
</tr>
<tr>
<td>char</td>
<td>248 oz.</td>
</tr>
<tr>
<td>seal oil (7.2 quarts)$^3$</td>
<td>230 oz.</td>
</tr>
<tr>
<td>bowhead muktuk</td>
<td>200 oz.</td>
</tr>
<tr>
<td>herring eggs</td>
<td>54 oz.</td>
</tr>
<tr>
<td>tomcod</td>
<td>24 oz.</td>
</tr>
<tr>
<td>Total non-marine subsistence</td>
<td>408 oz.</td>
</tr>
<tr>
<td>caribou</td>
<td>272 oz.</td>
</tr>
<tr>
<td>moose</td>
<td>136 oz.</td>
</tr>
</tbody>
</table>

$^1$ The store bought animal protein/fat was primarily butter, milk, eggs, bacon, and cheese.

$^2$ The salmon was approximately 90% dried and 10% animaak.

$^3$ The seal oil was approximately 80% for dipping foods, 15% for mixing with greens, and 5% for agutuk.
### Household #25

4 persons total: 2 adults, 2 pre-school age
14 days total: 7 days - late September, 7 days - mid-October

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>1,543 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total store bought¹</td>
<td>482 oz.</td>
</tr>
<tr>
<td>Total reindeer</td>
<td>56 oz.</td>
</tr>
<tr>
<td>Total subsistence harvest</td>
<td>1,005 oz.</td>
</tr>
<tr>
<td>Total marine-related subsistence</td>
<td>933 oz.</td>
</tr>
<tr>
<td>duck (sprig)</td>
<td>284 oz.</td>
</tr>
<tr>
<td>dog salmon²</td>
<td>230 oz.</td>
</tr>
<tr>
<td>humpy²</td>
<td>198 oz.</td>
</tr>
<tr>
<td>goose</td>
<td>80 oz.</td>
</tr>
<tr>
<td>bowhead muktuk</td>
<td>72 oz.</td>
</tr>
<tr>
<td>seal oil (1.1 quarts)³</td>
<td>36 oz.</td>
</tr>
<tr>
<td>char</td>
<td>30 oz.</td>
</tr>
<tr>
<td>seal blubber</td>
<td>3 oz.</td>
</tr>
<tr>
<td>Total non-marine subsistence</td>
<td>72 oz.</td>
</tr>
<tr>
<td>caribou</td>
<td>72 oz.</td>
</tr>
</tbody>
</table>

¹ The store bought animal protein/fat was primarily ground beef, with some butter, milk, eggs, and bacon.
² The salmon was approximately 85% dried and 15% animaak.
³ The seal oil was approximately 90% for dipping foods and 10% for agutuk.
APPENDIX 6--continued

Household #40
9 persons total: 8 adults, 1 infant
21 days total: 7 days - late September, 7 days - mid-October,
7 days - early December

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>3,903 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total store bought(^1)</td>
<td>1,152 oz.</td>
</tr>
<tr>
<td>Total reindeer</td>
<td>472 oz.</td>
</tr>
<tr>
<td>Total subsistence harvest</td>
<td>2,279 oz.</td>
</tr>
<tr>
<td>Total marine-related subsistence</td>
<td>2,234 oz.</td>
</tr>
<tr>
<td>dog salmon(^2)</td>
<td>920 oz.</td>
</tr>
<tr>
<td>humpy(^2)</td>
<td>508 oz.</td>
</tr>
<tr>
<td>silver salmon(^2)</td>
<td>230 oz.</td>
</tr>
<tr>
<td>herring eggs</td>
<td>176 oz.</td>
</tr>
<tr>
<td>seal oil (5.3 quarts)(^3)</td>
<td>169 oz.</td>
</tr>
<tr>
<td>lingcod</td>
<td>88 oz.</td>
</tr>
<tr>
<td>char</td>
<td>50 oz.</td>
</tr>
<tr>
<td>bowhead muktuk</td>
<td>48 oz.</td>
</tr>
<tr>
<td>tomcod</td>
<td>45 oz.</td>
</tr>
<tr>
<td>Total non-marine subsistence</td>
<td>45 oz.</td>
</tr>
<tr>
<td>grayling</td>
<td>45 oz.</td>
</tr>
</tbody>
</table>

\(^1\) The store bought animal protein/fat was primarily chicken and ground beef, with a small fraction of beef and lunch meats and some butter, milk, and other dry products.

\(^2\) The salmon was approximately 60% dried, 15% fresh, 15% animaak, and 10% okromutak.

\(^3\) The seal oil was primarily for dipping foods with a smaller amount for preparation of okromutak and mixing with greens.
APPENDIX 6--continued

Household #12
4 persons total: 4 adults
21 days total: 7 days - late September, 7 days - mid-October,
7 days - early December

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>1,430 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total store bought</td>
<td>411 oz.</td>
</tr>
<tr>
<td>Total reindeer</td>
<td>194 oz.</td>
</tr>
<tr>
<td>Total subsistence harvest</td>
<td>825 oz.</td>
</tr>
<tr>
<td>Total marine-related subsistence</td>
<td>825 oz.</td>
</tr>
<tr>
<td>silver salmon</td>
<td>311 oz.</td>
</tr>
<tr>
<td>humpy</td>
<td>192 oz.</td>
</tr>
<tr>
<td>char</td>
<td>98 oz.</td>
</tr>
<tr>
<td>dog salmon</td>
<td>69 oz.</td>
</tr>
<tr>
<td>seal oil (2.2 quarts)</td>
<td>69 oz.</td>
</tr>
<tr>
<td>ringed seal meat</td>
<td>56 oz.</td>
</tr>
<tr>
<td>tomcod</td>
<td>30 oz.</td>
</tr>
</tbody>
</table>

1 The store bought animal protein/fat was primarily butter, eggs, milk, and
   bacon, with some canned food, hot dogs, luncheon meats, ground beef, and
   one game hen.

2 The salmon was approximately 40% dried, 30% fresh, 20% salted, and 10%
   animaak.

3 The seal oil was approximately 60% for dipping foods and 40% for mixing
   with berries, agutuk, and greens.
### Household #33

6 persons total: 5 adults, 1 infant
18 days total: 4 days - late September, 7 days - mid-October, 7 days - early December

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>1,530 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total store bought&lt;sup&gt;1&lt;/sup&gt;</td>
<td>555 oz.</td>
</tr>
<tr>
<td>Total reindeer</td>
<td>112 oz.</td>
</tr>
<tr>
<td>Total subsistence harvest</td>
<td>863 oz.</td>
</tr>
<tr>
<td>Total marine-related subsistence</td>
<td>771 oz.</td>
</tr>
<tr>
<td>humpy&lt;sup&gt;2&lt;/sup&gt;</td>
<td>308 oz.</td>
</tr>
<tr>
<td>dog salmon</td>
<td>152 oz.</td>
</tr>
<tr>
<td>tomcod</td>
<td>105 oz.</td>
</tr>
<tr>
<td>king salmon&lt;sup&gt;2&lt;/sup&gt;</td>
<td>96 oz.</td>
</tr>
<tr>
<td>char</td>
<td>65 oz.</td>
</tr>
<tr>
<td>seal oil (1.3 quarts)&lt;sup&gt;3&lt;/sup&gt;</td>
<td>41 oz.</td>
</tr>
<tr>
<td>bowhead muktuk</td>
<td>4 oz.</td>
</tr>
<tr>
<td>Total non-marine subsistence</td>
<td>92 oz.</td>
</tr>
<tr>
<td>caribou</td>
<td>72 oz.</td>
</tr>
<tr>
<td>grayling</td>
<td>20 oz.</td>
</tr>
</tbody>
</table>

<sup>1</sup> The store bought animal protein/fat was primarily butter, eggs, and milk, with a small fraction of ground beef.

<sup>2</sup> The salmon was approximately 40% dried, 20% okromutak, 15% fresh, 15% heads, 10% animaak, and 5% eggs.

<sup>3</sup> The seal oil was approximately 75% for dipping foods and 25% for preparation of okromutak.
APPENDIX 6—continued

Household #21
7 persons total: 2 adults, 2 teen-agers, 2 grade school age, 1 infant
21 days total: 7 days - late September, 7 days - mid-October,
7 days - early December

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>1,568 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Store bought¹</td>
<td>452 oz.</td>
</tr>
<tr>
<td>Total reindeer</td>
<td>248 oz.</td>
</tr>
<tr>
<td>Total subsistence harvest</td>
<td>868 oz.</td>
</tr>
<tr>
<td>Total marine-related subsistence</td>
<td>660 oz.</td>
</tr>
<tr>
<td>dog salmon²</td>
<td>235 oz.</td>
</tr>
<tr>
<td>duck (sprig)</td>
<td>120 oz.</td>
</tr>
<tr>
<td>char</td>
<td>68 oz.</td>
</tr>
<tr>
<td>humpy²</td>
<td>64 oz.</td>
</tr>
<tr>
<td>seal oil (1.5 quarts)³</td>
<td>49 oz.</td>
</tr>
<tr>
<td>bowhead muktuk</td>
<td>40 oz.</td>
</tr>
<tr>
<td>herring eggs</td>
<td>36 oz.</td>
</tr>
<tr>
<td>king salmon²</td>
<td>32 oz.</td>
</tr>
<tr>
<td>belukha muktuk</td>
<td>16 oz.</td>
</tr>
<tr>
<td>Total non-marine subsistence</td>
<td>208 oz.</td>
</tr>
<tr>
<td>moose</td>
<td>192 oz.</td>
</tr>
<tr>
<td>caribou</td>
<td>16 oz.</td>
</tr>
</tbody>
</table>

¹ The store bought animal protein/fat was primarily milk, butter, and eggs, with some spam and canned tuna.

² The salmon was approximately 50% dried, 20% okromutak, 20% animaak, 7% fresh, and 3% smoked.

³ The seal oil was approximately 65% for dipping foods, 20% for mixing with greens, and 15% for preparation of okromutak.
### Household #29

4 persons total: 1 adult, 2 grade school age, 1 pre-school age
14 days total: 7 days - late September, 7 days - mid-October

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>672 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total store bought</strong>¹</td>
<td>331 oz.</td>
</tr>
<tr>
<td>No reindeer</td>
<td></td>
</tr>
<tr>
<td><strong>Total subsistence harvest</strong></td>
<td>341 oz.</td>
</tr>
<tr>
<td><strong>Total marine-related subsistence</strong></td>
<td>302 oz.</td>
</tr>
<tr>
<td>humpy²</td>
<td>126 oz.</td>
</tr>
<tr>
<td>silver salmon²</td>
<td>92 oz.</td>
</tr>
<tr>
<td>herring eggs</td>
<td>63 oz.</td>
</tr>
<tr>
<td>seal oil (.6 quart)³</td>
<td>20 oz.</td>
</tr>
<tr>
<td><strong>Total non-marine subsistence</strong></td>
<td>40 oz.</td>
</tr>
<tr>
<td>moose</td>
<td>40 oz.</td>
</tr>
</tbody>
</table>

¹ The store bought animal protein/fat was primarily ground beef and chicken, in addition to hot dogs, canned tuna, luncheon meat, butter, milk, eggs, and soup.

² The salmon was approximately 75% dried and 25% animaak.

³ All of the seal oil was for dipping food.
APPENDIX 6--continued

Household #14
6 persons total: 2 adults, 3 grade school age, 1 pre-school age
21 days total: 7 days – late September, 4 days – mid-October,
3 days – mid November, 7 days – early December

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>3,298 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total store bought</td>
<td>1,375 oz. 41.7% of total</td>
</tr>
<tr>
<td>Total reindeer</td>
<td>376 oz. 11.4% of total</td>
</tr>
<tr>
<td>Total subsistence harvest</td>
<td>1,547 oz. 46.9% of total</td>
</tr>
<tr>
<td>Total marine-related subsistence</td>
<td>1,451 oz. 44.0% of total</td>
</tr>
<tr>
<td>dog salmon</td>
<td>585 oz. 17.7% of total</td>
</tr>
<tr>
<td>char</td>
<td>440 oz. 13.3% of total</td>
</tr>
<tr>
<td>king salmon</td>
<td>168 oz. 5.1% of total</td>
</tr>
<tr>
<td>seal oil (4.3 quarts)</td>
<td>137 oz. 4.2% of total</td>
</tr>
<tr>
<td>tomcod</td>
<td>81 oz. 2.5% of total</td>
</tr>
<tr>
<td>ugruk meat</td>
<td>24 oz. .7% of total</td>
</tr>
<tr>
<td>belukha muktuk</td>
<td>16 oz. .5% of total</td>
</tr>
<tr>
<td>Total non-marine subsistence</td>
<td>96 oz. 3.0% of total</td>
</tr>
<tr>
<td>moose</td>
<td>48 oz. 1.5% of total</td>
</tr>
<tr>
<td>caribou</td>
<td>48 oz. 1.5% of total</td>
</tr>
</tbody>
</table>

1 The store bought animal protein/fat was primarily milk, butter, eggs, and bacon, with some ground beef, beef stew meat, canned tuna, and cheese.
2 The salmon was approximately 75% dried, 15% fresh, and 10% animaak.
3 The seal oil was almost exclusively for dipping foods.
**APPENDIX 6--continued**

Household #31  
2 persons total: 1 adult, 1 grade school age  
21 days total: 7 days - late September, 7 days - mid-October,  
7 days - early December

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>846 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total store bought¹</td>
<td>381 oz.</td>
</tr>
<tr>
<td>Total reindeer</td>
<td>88 oz.</td>
</tr>
<tr>
<td>Total subsistence harvest</td>
<td>377 oz.</td>
</tr>
<tr>
<td>Total marine-related subsistence</td>
<td>377 oz.</td>
</tr>
<tr>
<td>humpy²</td>
<td>281 oz.</td>
</tr>
<tr>
<td>char</td>
<td>41 oz.</td>
</tr>
<tr>
<td>seal oil (1.1 quart)³</td>
<td>34 oz.</td>
</tr>
<tr>
<td>tomcod</td>
<td>21 oz.</td>
</tr>
</tbody>
</table>

¹ The store bought animal protein/fat was approximately 40% canned (spam, sausage, herring, beef hash), the remainder being composed of butter, milk, eggs, bacon, beef, and one chicken.

² All of the salmon was dried.

³ All of the seal oil was for dipping foods.
APPENDIX 6--continued

**Household #19**
3 persons total: 2 adults, 1 infant
21 days total: 7 days - late September, 7 days - mid-October,
7 days - early December

<table>
<thead>
<tr>
<th>Total Ounces Animal Protein/Fat Consumed</th>
<th>1,178 oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total store bought&lt;sup&gt;1&lt;/sup&gt;</td>
<td>607 oz.</td>
</tr>
<tr>
<td>Total reindeer</td>
<td>328 oz.</td>
</tr>
<tr>
<td>Total subsistence harvest</td>
<td>243 oz.</td>
</tr>
<tr>
<td>Total marine-related subsistence</td>
<td>243 oz.</td>
</tr>
<tr>
<td>dog salmon&lt;sup&gt;2&lt;/sup&gt;</td>
<td>231 oz.</td>
</tr>
<tr>
<td>seal oil (.2 quart)&lt;sup&gt;3&lt;/sup&gt;</td>
<td>7 oz.</td>
</tr>
<tr>
<td>king salmon&lt;sup&gt;2&lt;/sup&gt;</td>
<td>5 oz.</td>
</tr>
</tbody>
</table>

1 The store bought animal protein/fat was primarily ground beef, beef, and chicken, with some pork, hot dogs, canned soup, butter, milk, and eggs.
2 The salmon was approximately 45% animaak, 40% dried, and 15% smoked.
3 All of the sea oil was for dipping foods.
### APPENDIX 7

**ESKIMO VOCABULARY**

Note: The orthography used to spell the words below for pronunciation purposes is that generally accepted in Alaska for Inupiat dialects. The source is *Inupiat Eskimo Dictionary*, by Donald H. Webster and Wilfried Zibell, 1970, Summer Institute of Linguistics, Inc., Fairbanks, AK.

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
<th>Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>agutuk</td>
<td>a mix of berries, seal oil, and reindeer tallow - &quot;Eskimo ice cream&quot;</td>
<td>agútk</td>
</tr>
<tr>
<td>aluigak</td>
<td>a type of edible green - &quot;sourdock&quot;</td>
<td>alúigak</td>
</tr>
<tr>
<td>animaak</td>
<td>a half-dried preparation of salmon</td>
<td>áñimaak</td>
</tr>
<tr>
<td>atchaluk</td>
<td>a type of edible green - &quot;beach greens&quot;</td>
<td>atcháłuk</td>
</tr>
<tr>
<td>gasak</td>
<td>a Caucasian person</td>
<td>gásak</td>
</tr>
<tr>
<td>igiutuk</td>
<td>a type of edible green - &quot;wild celery&quot;</td>
<td>igiutuk</td>
</tr>
<tr>
<td>iglu</td>
<td>the traditional Eskimo dwelling</td>
<td>íglu</td>
</tr>
<tr>
<td>imanak</td>
<td>blackfish</td>
<td>imáñak</td>
</tr>
<tr>
<td>kasígiq</td>
<td>spotted seal</td>
<td>kasígiq</td>
</tr>
<tr>
<td>kasúluq</td>
<td>wolffish/rockfish</td>
<td>kasúłuk</td>
</tr>
<tr>
<td>kayak</td>
<td>the small, traditional, one-or-two-man boat</td>
<td>káyak</td>
</tr>
<tr>
<td>kusimak</td>
<td>a type of edible green - &quot;wild rhubarb&quot;</td>
<td>kúsimak</td>
</tr>
<tr>
<td>masu</td>
<td>a type of edible root - &quot;Eskimo potato&quot;</td>
<td>másu</td>
</tr>
<tr>
<td>maklasóak</td>
<td>a young, juvenile bearded seal</td>
<td>maklasóak</td>
</tr>
<tr>
<td>máklak</td>
<td>the traditional boot</td>
<td></td>
</tr>
<tr>
<td>máktak</td>
<td>the skin and blubber of a whale</td>
<td></td>
</tr>
<tr>
<td>nátkhik</td>
<td>ringed seal (Malemiut dialect)</td>
<td>nátkhik</td>
</tr>
<tr>
<td>níksik</td>
<td>ringed seal (Kauwerak dialect)</td>
<td>níksik</td>
</tr>
<tr>
<td>níniak</td>
<td>the traditional share of belukha and ugruk issued to hunters who participated in the harvest</td>
<td>níniak</td>
</tr>
</tbody>
</table>
APPENDIX 7--continued

okromutak - a preparation of salmon that is dried and stored in seal oil

sira - a type of edible green - "willow leaves"

sitna - selfish

tukayuk - a type of edible green - "wild celery"

ugruk - bearded seal

ulu - the traditional, crescent-shaped woman's knife

umiaq - the large, traditional skin boat

Approximate Pronunciation

okromutak

síra

sitna

tukáyuk

úgruk

úlu

úmiak
APPENDIX 8

PLACE NAME PRONUNCIATION

Note: The orthography used to spell the words below for pronunciation purposes is that generally accepted in Alaska for Inupiat dialects. The source is Inupiat Eskimo Dictionary, by Donald H. Webster and Wilfried Zibell, 1970, Summer Institute of Linguistics, Inc., Fairbanks, AK.

<table>
<thead>
<tr>
<th>Place Name</th>
<th>Approximate Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egavik</td>
<td>igávik</td>
</tr>
<tr>
<td>Ganigak</td>
<td>gajíják</td>
</tr>
<tr>
<td>Inglutalik</td>
<td>iglutálik</td>
</tr>
<tr>
<td>Malikfik</td>
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