

THE ECONOMICS OF WILD RESOURCE USE
IN SHISHMAREF, ALASKA

by

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Technical Report No. 112

Alaska Department of Fish and Game
Division of Subsistence
Fairbanks, Alaska

March 1985

ABSTRACT

This report documents the economy and society of Shishmaref, Alaska in 1982-83. During this period, Shishmaref was a predominantly Inupiat community of 425 residents located along the northwest coast of Seward Peninsula in the northwestern part of Alaska. Shishmaref, together with the coastal communities of Deering, Wales, Teller, and Brevig Mission form what is collectively referred to as northern Seward Peninsula. Residents of these communities participate in a rural economy which emphasizes the harvest and use of fish, game, and plant resources. The report was prepared in response to a number of land and resource issues currently facing northern Seward Peninsula including federal and state land management, offshore and upland oil and gas exploration, and the management of marine mammal species.

Information in this report is based on research conducted in Shishmaref during 1982-83. Shishmaref was selected as a study community because it was anticipated that Shishmaref residents are heavily reliant upon wild resources for meeting their physical, social, and material needs. A human ecology approach, which centers on the interactive relationship between human populations and their physical and social environments, was applied in this study. The study addressed two interrelated questions regarding the economy and culture of Shishmaref: (1) what is the nature and extent of contemporary wild resource use?; and (2) to what extent do wage employment and other forms of cash income interact with wild resource use? In-depth mapping with key informants, structured household interviews with a 55 percent random sample of the community,

and participant-observation were among the techniques used to gather data.

The socioeconomic system of Shishmaref is characterized by a dual economic strategy which incorporates both a subsistence component and a cash component. The subsistence and cash components interact in a mutually supportive fashion to provide economic security to the community. The foundation of the socioeconomic system is the harvest and use of wild resources supplemented or underwritten by cash income. Cash income is generated through combinations of transfer payments and limited number and types of wage employment and self-employment opportunities. Research results showed there was no simple and direct relationship between household participation in the wage sector and the spectrum of fish and game resource categories harvested by the household. Working for wages was, for the most part, integrated and synchronized with the annual round of hunting and fishing activities.

Wage employment is viewed as only one of many socioeconomic factors which have the potential to affect individual household harvesting efforts for certain resources. Other factors affecting harvest outcomes, in addition to those which are socioeconomic, include environmental variables or characteristics of the resource. Because the harvest and use of wild resources are the centerpieces of the society and economy, adaptive strategies designed to cope with the dynamic social and natural environments have developed over time.

The residents of Shishmaref attempted to achieve and maintain economic security in the early 1980s through adaptive strategies which result in four community characteristics. These were (1) community-wide

networks works for resource distribution; (2) flexibility in resource activities; (3) transmission of knowledge about a defined geographic area; and (4) efficiency in patterns of procurement and processing. Based on this study, the interpretation of the available evidence suggests that fish and wildlife resources will continue to play a major role in the economy and culture of Shishmaref residents.

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ACKNOWLEDGEMENTS

I wish to acknowledge the support and assistance provided by the Division of Subsistence, Alaska Department of Fish and Game. In particular, a note of gratitude goes to Linda Ellanna for her unfailing encouragement and support for this project from start to finish. Richard Stern's and Linda Ellanna's insightful reviews of earlier drafts of this report undoubtedly improved the final product. Muriel "Gibu" Germeau made a significant contribution to the research and her companionship and assistance in the field were greatly appreciated. Also, additional graphics in the text and the cover drawing were expertly prepared by Betsy Sturm of Goldrush Graphics. Finally, a special note of thanks to the people of Shishmaref who made this study possible and who taught me a great deal about their way of life. Quyaana.

CHAPTER 1
INTRODUCTION TO THE STUDY

PURPOSE AND BACKGROUND

Shishmaref, Alaska is a predominantly Inupiat Eskimo community of 394 (U.S. Bureau of Census 1980a) located along the northwest coast of Seward Peninsula in the northwest corner of the state (Fig. 1). Shishmaref and the nearby coastal communities of Wales, Teller, Brevig Mission, and Deering constitute a geographic subregion sometimes referred to collectively as northern Seward Peninsula. The contemporary local economy in northern Seward Peninsula is centered around a seasonal cycle of hunting, fishing, trapping, and plant gathering supplemented by limited cash income. Today, as in the past, resources of the land and sea play an integral role in the lives of local residents.

The purpose of this report is to describe the economy and society of Shishmaref in 1982-83. It focuses on the economics of wild resource use. The economy of the community is analyzed as it relates to other aspects of Inupiat culture and with the natural environment. This approach and the resultant data have some general applicability to the other northern Seward Peninsula communities.

The Division of Subsistence, Alaska Department of Fish and Game, initiated the research effort in Shishmaref in keeping with its responsibility to conduct baseline studies on subsistence hunting and fishing (see AS 16.05.094, Chapter 151 of the Alaska Session Laws for full text). Land and resource management and development in this area could

potentially impact resource harvests and use. In the early 1980s there was little information about contemporary human use of wild resources of the area. The study was designed to provide community residents and land and resource managers, planners, and decision-makers with information regarding the nature of the rural economy and the harvest and use of wild resources by local residents.

The Division felt that more could be gained from an in-depth and prolonged study in one northern Seward Peninsula village rather than from a multi-community study within the same time frame. Shishmaref was selected as the study community because it has the largest population of the five northern Seward Peninsula coastal communities and may be the most reliant upon the harvest and use of wild resources (Ellanna 1980: 256). Given this possible reliance and its geographical proximity to proposed state and federal actions, Shishmaref may be particularly susceptible to the effects of land and resource use policies and related decisions. Findings of this study may also serve as a guide for understanding wild resource use in other northern Seward Peninsula communities.

The profusion of local, state, federal, and private entities with interests in northern Seward Peninsula (see overlay to Fig. 1) has raised competing and often conflicting voices for the future management and use of the land and sea and their vast resources. The complex of public and private interests includes the following:

-- Nearly 2.5 million acres of northern Seward Peninsula are incorporated into the Bering Land Bridge National Preserve. Managed by the U.S. National Park Service, current preserve regulations allow the continuation of sport hunting, trapping, subsistence activities, and

Base map adapted from: Alaska 1:1,000,000 Base Map Series © Copyright Arctic Environmental Information and Data Center, University of Alaska, 1978.

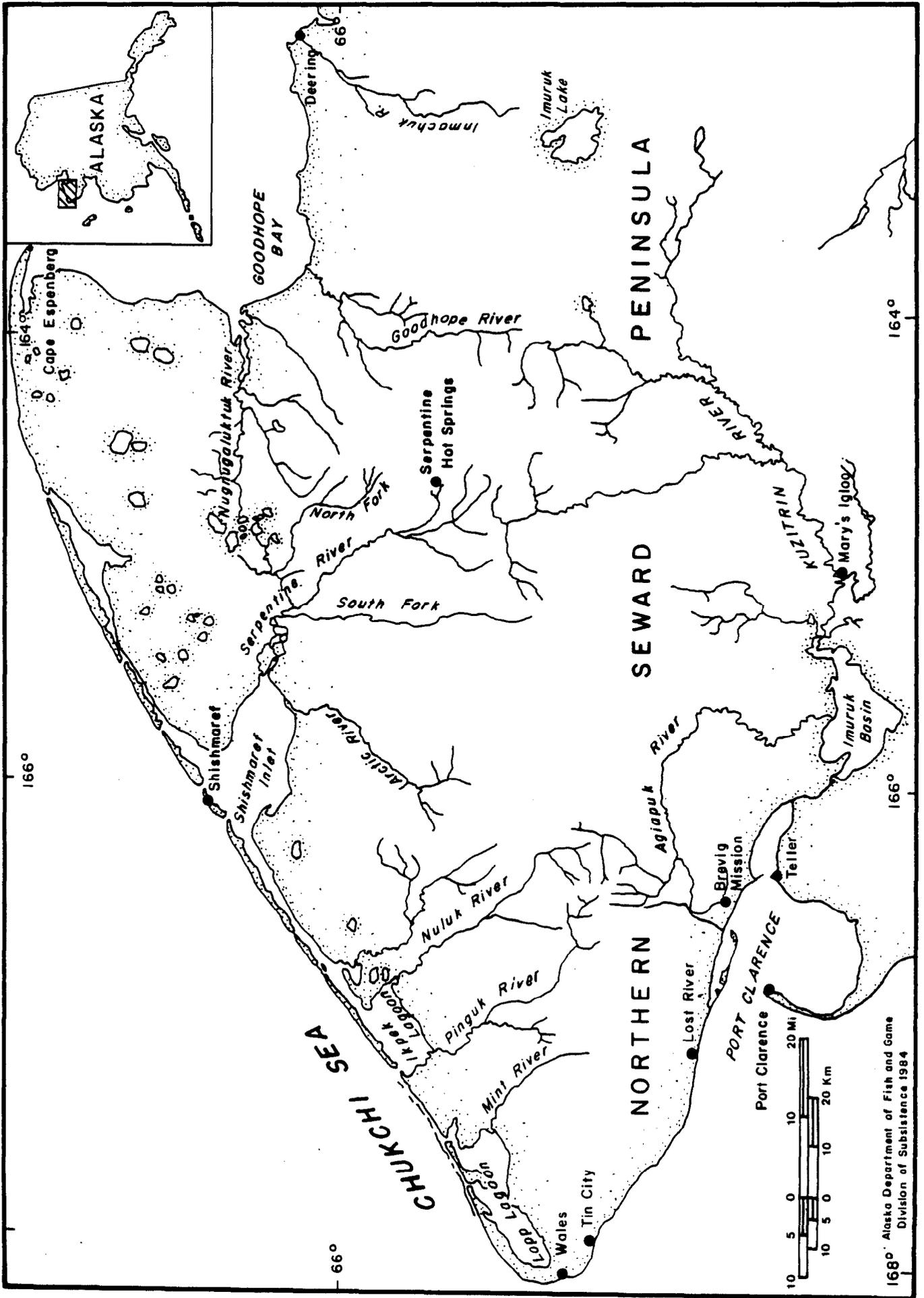


Fig. 1. Northern Seward Peninsula.

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Division of Subsistence 1984

Reindeer grazing subject to restrictions considered necessary to maintain the integrity of the preserve.

-- Public land in the form of islands, rocks, islets, and reefs comprise two units of the Alaska Maritime National Wildlife Refuge in the Chukchi and Bering seas adjacent to northern Seward Peninsula. Under the jurisdiction of the U.S. Fish and Wildlife Service, these units are managed for the preservation of fish and wildlife populations, including the continuation of subsistence activities.

-- Both federal and state agencies have identified tracts in the Chukchi Sea for exploration of offshore oil and gas reserves and onshore support facilities. The federal Minerals Management Service, Alaska Outer Continental Shelf, U.S. Department of the Interior, and the State of Alaska, Department of Natural Resources are proposing to offer a substantial number of tracts during lease sales scheduled within the next five years.

-- Acreage along the northwest coast and the interior of northern Seward Peninsula is managed by the U.S. Bureau of Land Management. Lands under its jurisdiction are managed for multiple uses. Depending on management decisions, areas may be opened or closed to specific activities. Land use proposals have considered opening lands for mineral entry, settlement, and range management.

-- The lands selected by village and regional corporations under the Alaska Native Claims Settlement Act (ANCSA) are currently in various stages of conveyance. Village corporations have been or are continuing to receive fee simple title to the surface estate of selected lands. In most cases, subsurface rights will be conveyed to the regional

corporation. Lands selected by regional corporations include title to both surface and subsurface estates.

-- Management plans for state lands in northern Seward Peninsula are to be included in the Northwest Alaska Area Plan. Planning efforts, scheduled to begin in July 1985, will be coordinated by the Alaska Department of Natural Resources with input from the Departments of Environmental Conservation, Fish and Game, and Transportation. The plan will classify state lands according to their suitability for a variety of uses including forestry, agriculture, parks and recreation, settlement, and mineral development.

-- A few isolated private land holdings are scattered throughout the area. These are mostly patents to individuals for placer mining.

The distribution of fish and wildlife populations in northern Seward Peninsula are not controlled by the changing land status factors described above. Primary responsibility for managing fish and game on all Alaskan lands lies with the Alaska Department of Fish and Game. The present mandate includes maintaining fish and game populations on a sustained yield basis with subsistence use a priority if restrictions on harvest levels are necessary. (See Appendix A for the State of Alaska's management policy with regard to subsistence.) Certain species of migratory waterfowl are managed by the U.S. Fish and Wildlife Service. Management of marine mammal species is presently under the jurisdictions of the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. The state is studying the feasibility of submitting an application to the federal government for transfer of management responsibility for ten marine mammal species back to the state.

RESEARCH FOCUS

In order to understand the role fish and game resources play in the lives and economy of Shishmaref residents, the research focus was developed around a human ecological orientation. Human ecology provides a theoretical framework for viewing the complex relationship between man and his environment. In this context environment includes both social and physical phenomena. Man and his social and physical environments comprise components of a dynamic, interactive system.

The approach of human ecology as proposed in recent anthropological literature (Bennett 1969, 1976; Hardesty 1977; Jochim 1981; Moran 1982; Netting 1977) is adapted from principles of biological ecology but also incorporates man's unique behavioral properties. Bennett (1976:95) notes that "Human ecology...is a mixed system - it is not wholly biological, although it includes some elements from biology. It is not wholly behavioral, although it recognizes the importance of social phenomena." In the anthropological sense human ecology is concerned with the study of "how human utilization of nature influences and is influenced by social organization and cultural values" (Bennett 1969:11).

Study Questions

To describe the economy and society of Shishmaref, the research addressed two questions concerned with how people make their living: what are the local patterns of contemporary wild resource use?; and to what extent do wage employment and other forms of cash income affect resource harvest activities?

Certain types of information had to be collected in order to adequately answer these questions, as reflected in the following objectives of the study:

1. A description of the demographic composition and social organization of the community.
2. A determination of contemporary animal, fish, and plant species used by Shishmaref residents.
3. A description of the seasonality of resource harvests, characteristics of the producers, and methods of harvest.
4. Maps of the land area used for purposes of resource harvesting.
5. An examination of factors which affect harvest effort.
6. A description of sources of cash income, including the sources and structure of wage employment opportunities.
7. A description of the seasonal round of reindeer herding activities.
8. An analysis of how hunting and fishing activities relate to reindeer herding.
9. A description of residents' strategies for integrating wild resource harvest and use and elements of the cash economy.

METHODOLOGY

Literature Review

Prior to initiating fieldwork, a review was undertaken of the relevant published, unpublished, and archival literature pertaining to

Shishmaref and northwestern Alaska. The available information could be classified into two types: (1) works focusing on a large geographical area or a broad topic, and (2) studies addressing a specific topic or research problem.

From the general references a partial picture of the early history and economy of Shishmaref can be pieced together. The journals of 18th and 19th century explorers, particularly von Kotzebue (1821) and Beechey (1831) provide the earliest records of Euroamerican contact with the Shishmaref people. These accounts along with oral history provided the basis for several insightful and provocative works by Burch (1975, 1980) and Ray (1964, 1967, 1975). These efforts constitute much of what we know about the social and political organization of northwest Alaska from the earliest recorded contact up to the end of the 19th century.

Studies by Ray (1971) and Koutsky (1981) contain information about Shishmaref historical sites and their use based on previously mapped data and interviews with local residents. A comprehensive history of reindeer herding in northwest Alaska by Stern (1980) and Stern, Arobio, Naylor, and Thomas (1980) provides some data on herding activities in Shishmaref spanning from the introduction of reindeer in the early 1900s through 1977. In addition, Edward Keithahn (1963) wrote an account of his experiences in Shishmaref as a school teacher in 1923. While punctuated with his personal impressions, the book is informative in that it contains a rare description of daily life during the early 1920s.

Recent works dealing with contemporary resource use in Shishmaref have been largely the result of an agency's need for particular information either a very general or narrowly defined scope. Ellanna and Roche

(1976) conducted a comprehensive region-wide demographic survey for Kawerak, Inc. Sherrod (1982) compiled information on community marine mammal harvests within the Bering Straits Region for the same agency. A description of the historic and contemporary economy of Shishmaref is included in Ellanna's (1980) report on coastal areas adjoining the Bering Strait-Norton Sound outer continental shelf prepared for the U.S. Bureau of Land Management. Patterns of resource use in Shishmaref during the period 1976-77 are discussed in Eisler's (1978) preliminary report submitted to National Park Service as part of the planning efforts for what later became the Bering Land Bridge National Preserve. Furthermore, Shishmaref was included in a transportation and economic survey conducted by Louis Berger and Associates (1981) for the Department of Transportation and Public Facilities in connection with the Western Arctic Alaska Transportation Study.

The present study draws upon all of the above mentioned sources to bring together in this context what is known about Shishmaref in the early 1980s. The emphasis in this study is on describing the role of fish and game resources in the economy and society of Shishmaref residents. Recent economic studies such as those by Kleinfeld, Kruse, and Travis (1981, 1983); Kruse, Kleinfeld, and Travis (1981, 1982); Wolfe (1979, 1981); and Wolfe and Ellanna (1983) provide a basis for making social and economic comparisons between Shishmaref and other rural communities in northern and western Alaska.

The present study documents a dynamic and flexible economic system as it existed at one point in time (1982-83). Although the report discusses the "current" economic situation in Shishmaref, the past tense is

used to denote the impermanent nature of a single year's research results. Statistical interpretations, therefore, should be viewed as an expression of potentially significant relationships and patterns rather than as a characterization of a static situation.

Field Techniques

In April 1982 the proposed study was described to a joint meeting of the Shishmaref City and Indian Reorganization Act (IRA) councils. After considerable discussion, a vote was taken by the council members and permission to conduct the study was granted. Representatives from both councils formed the Shishmaref Subsistence Committee, designed to oversee the research activities. Throughout the course of this study, the researchers maintained contact with the Shishmaref Subsistence Committee through occasional oral presentations and written quarterly updates. The committee, in turn, was extremely helpful in guiding research efforts and providing support and encouragement.

Prior to the commencement of fieldwork, a research technician was hired to assist with data collection and occasional language translations. The technician was an In̄upiaq-speaker from another village in the region who spoke a dialect similar to that spoken in Shishmaref. The In̄upiat orthography was later reviewed and amended as necessary by a bilingual speaker from Shishmaref.

Fieldwork began in July 1982 and a total of 7 visits, ranging from 2 days to 5 weeks, were made to Shishmaref by either the primary researcher, the technician, or both over the next 13 months. This amounted to a

total of 116 person days of fieldwork. Visits were scheduled to coincide with critical seasonal resource harvest and use periods. During each visit, researchers stayed in a vacant house rented from local residents. Fieldwork techniques included a combination of key informant interviews, structured interviews with randomly selected households, informal conversations, and participant observation.

Interviews with Key Informants

The initial visits concentrated on obtaining information on the nature and extent of wild resource harvest and use. A knowledgeable local resource assistant was hired to help compile a list of plants, animals, and fish used by Shishmaref residents. Four contiguous 1:250,000 scale U. S. Geological Survey quadrangle maps (Bendeleden, Shishmaref, Teller, Kotzebue) were taped together to create a large base map of northern Seward Peninsula. Households considered to be active and knowledgeable resource users were then contacted and asked to participate in mapping and interview sessions. Researchers were accompanied by the local resource assistant who made the introductions and served as an interpreter when needed.

The method used for mapping resource use areas was developed from a technique devised by Freeman (1976) with one major exception. Freeman's methodology covered the lifetime of informants. In the Shishmaref study only resource use areas utilized during 1982 were mapped. The mapping technique followed was the same for each interview conducted. A sheet of clear acetate was placed over the base map and secured with tape.

The map and several colored pens were provided to interview participants to mark resource harvest areas. For most interviews, an attempt was made to have all adults in the household participate in the mapping activity. Participants were not identified by name either in the interview notes or on the map legend. Confidentiality was ensured by assigning a number to each individual interviewed.

Beginning with a season (usually the season in which the interview was occurring), the researchers asked participants to describe the hunting, fishing, trapping, and gathering activities which their household might engage in during that year. When a new fish, game, or plant resource was mentioned, participants were asked, "In 1982, where did you (or where would you) look for _____?" They were then asked to outline the area on the map with a different colored pen. In this manner a household's entire year of resource harvesting activity was recounted. The result was a "map biography" which delineated the resources harvested by a household and the land area where household members might search for these resources. In addition, there were written interview notes which described the activities involved for each resource. A separate map biography was created for each household interviewed.

After the first few mapping sessions, it became evident that certain individuals were considered to be more knowledgeable about particular areas. On several occasions during the course of an interview, an individual would point to a part of the map and say, "I don't know much about that area, you have to talk to so and so -- he's from there." In every case, "from there" referred to the winter village occupied by the individual's closely related kin or "local family" (Burch 1975) prior

to the establishment of Shishmaref village. From the literature and interview information, it was determined that most of the present population of Shishmaref was descended from three major local families which had winter settlements established along the Chukchi Sea coast. In addition to mapping interviews with more recent migrants to the area, at least two interviews were conducted with descendants of varying ages from each local family group.

A total of 11 "map biographies" were completed. The individual acetate overlays were combined to form composite maps which showed the land area used by all those interviewed for eight distinct resource categories. The maps were then redrawn to show only the outer boundary of compiled individual land use areas. In this way the confidentiality of key informant information was protected. Reviewing mapped information with the Shishmaref Subsistence Committee and other residents provided the opportunity to amend the maps as needed to more closely reflect community land use patterns. Thus, the outer boundary of each composite map represents the community's core land use area for each of the following resource categories: seals, polar bear, moose, fish, waterfowl, small mammal hunting and furbearer trapping, plants, and walrus (see Chapter 3, Figs. 9-12). Readers should note, however, that land use patterns are determined by a variety of factors including resource population levels, migrations, scheduling, availability, and climatic conditions. When interpreting these maps, it should be kept in mind that the maps are based on the land use patterns for a selected sample of Shishmaref residents during 1982 only.

Additional information concerning many aspects of resource use was obtained through key informant interviews with individuals considered by others in the community to be experts or specialists regarding certain species. These individuals had an especially high level of knowledge about certain species or geographic areas. Interviews with both men and women experts provided a great deal of specific information.

Structured Interviews

Interviews using a written interview schedule were conducted with a random sample of 55 percent of Shishmaref households. The purposes of the interviews were to collect household census data and to expand upon the information obtained in key informant interviews. Questions were designed to elicit information from randomly selected households pertaining to:

- the spectrum of resources harvested,
- the identification of factors affecting harvest,
- the degree of resource sharing and primary resources exchanged,
- the relative proportion of wild resources in the diet, and
- the structure of household wage employment.

Numerous drafts of the questionnaire were reviewed by knowledgeable local individuals to ensure question clarity and content accuracy. The final survey instrument (Appendix B) was then pretested on nine households and minor modifications made in the phrasing. A detachable receipt was included on a cover letter which explained the purpose of the interview and how the information would be used.

For purposes of this study, a household was defined as any group of either related or non-related individuals who consider the same dwelling their principal place of residence (Burch 1975:237). The recent construction of 40 new housing units and the subsequent abandonment of other houses as living quarters precluded the use of a village housing map as the pool from which to draw a sample. Instead, the sample was selected from an up-to-date telephone listing which proved to be reliable since all of the new housing came with telephones installed and nearly all of the still occupied housing already had phone service. The few households without phones were identified and included in the alphabetic listing.

There were 78 names contained on the telephone listing. Each name on the list was considered to represent a discrete household and was assigned a number from 1 to 78. The representative sample of households to be interviewed was selected by means of a simple random sampling technique. Slips of paper, each containing a number from 1 to 78, were placed in a bag. They were then drawn one at a time and their order recorded, until all 78 slips had been drawn. This method allowed each household an equal chance to be selected. It was decided a minimum of 39 household interviews or a 50 percent household sample was an acceptable indicator, although researchers were to strive to conduct as many interviews as time would permit.

The structured interviews were scheduled to begin in March 1983 in order to take advantage of the winter season when many activities take place indoors, thereby increasing the chances of finding people available to talk. Interviews were conducted by either one or both researchers between March and July 1983. In the original project design, two local

bilingual assistants were to be hired to carry out the majority of the interviews either in English or Inupiaq. The two individuals hired proved extremely capable and conducted one interview together in the company of the researchers. However, for reasons unrelated to the project, the assistants did not complete the surveys. Inupiaq translations, when necessary, were provided by the research technician.

After the interview, the household's name was written on the receipt at the bottom of the questionnaire's cover letter. The receipt was then detached and the cover letter was left with the household. Participating households received ten dollars for assisting in the interview. The receipt, which was used for purposes of payment, was the only place where the household's name appeared. Households were identified by a numerical code everywhere else on the questionnaire. In total 43 surveys were completed representing 55 percent of the total households in Shishmaref. The questionnaires were brought to Fairbanks, coded, and analyzed by the Division's data management staff using the Statistical Package for the Social Sciences (SPSS).

Informal Conversations and Participant Observation

During the course of fieldwork, the feedback between casual conversations, observations, and other research techniques provided a powerful tool for monitoring and checking data. The first ten days of the initial visit to Shishmaref were spent meeting people and becoming familiar with the cultural and environmental settings. Many of the preliminary insights before any interviewing began became the basis of formal interview questions.

Residence in Shishmaref, although limited, afforded the researchers an opportunity to observe and participate first hand in many aspects of daily life. Throughout the course of fieldwork, participant observation played an important role in data collection. Just as the purpose of most interviewing was to understand the way local residents conceptualize and explain phenomena, the intent of participant observation was to seek field verification of abstracted patterns of human behavior (Pelto and Pelto 1978:62). Participant observation provided an opportunity to relate human behavior to aspects of the physical, cultural, and biotic environments and to ideals or conceptual patterns of behavior verbalized by respondents.

In a small community like Shishmaref, newcomers are quickly noticed. A variety of reasons brings visitors to Shishmaref on a regular basis, but seldom do they stay more than a day or two. Almost all residents are friendly and open with visitors and curious about what brings them to their community. Most visitors are welcomed and residents extend numerous hospitalities during their stay. The researchers found, almost without exception, support from community residents when the nature of the research project was explained. Most expressed a willingness to assist in the project. People spoke openly and articulately about many topics, but particularly about the importance of wild resource use.

ORGANIZATION OF THE REPORT

The report is divided into five chapters. The first two chapters provide a background for understanding the economy and society of

Shishmaref. The purpose of the study and the methodology employed for data collection was discussed in Chapter 1. A description of the physical and cultural environment is given in Chapter 2. The information contained in Chapters 3 and 4 was developed from the results of the household survey. These chapters explore the interrelated components of the socioeconomic system. In Chapter 3 the structure of the population and the nature and extent of wild resource use are described. In Chapter 4 the cash component of the socioeconomic system is examined, with particular attention to the structure of wage employment. Ways in which cash and resource use are integrated are illustrated by household case examples. A discussion of the dynamics of wild resource use and adaptive strategies for maintaining economic security appears in Chapter 5.

CHAPTER 2

THE PEOPLE OF SHISHMAREF

DEFINITION AND SETTING OF THE STUDY AREA

Residents of Shishmaref refer to themselves as Tapkakmiut¹ which means when translated "people of the sandy strand" (Ray 1975:6). Prior to the establishment of Shishmaref village, the Tapkakmiut had permanent winter settlements located along a stretch of coastline from about 25 miles north of Wales to Cape Espenberg. People ranged east to the Goodhope River and inland as far as Serpentine Hot Springs to hunt and fish (Fig. 1) (Ellanna 1980:69; Ray 1967:373). This entire area roughly corresponds to the land which is economically and culturally important for the Tapkakmiut of the early 1980s. For purposes of the present study it also comprises the general boundaries of the study area.

Shishmaref is located on Sarichef Island, known originally by the Inupiat name, Kigiqtaq. Surrounded by the waters of the Chukchi Sea and Shishmaref Inlet, it is five and one-half miles long and one-half mile wide. The island lies at 66° 15' north latitude and 166° 05' west longitude. From Shishmaref's westernmost point, it is a little over 60 miles to the Asiatic coast.

Situated along an extensive coastal plain marked by thousands of lakes and numerous rivers, Shishmaref lies on the northwestern border of Seward Peninsula, a 20,000 square mile land mass extending westward from the Alaskan mainland. The communities of Shishmaref, Wales, Teller, Brevig Mission, and Deering, form the northern Seward Peninsula geographic

subregion. The subregion is distinct not only because of certain similarities in topography, geology, and climate, but also because the northern Seward Peninsula communities are culturally, economically, and politically allied. Although each of the communities maintains a distinct sense of "home territory", the boundaries tend to be flexible and overlapping. Alliances formed through kinship, trading networks, hunting partnerships, and population movement have historically linked residents of the northern Seward Peninsula communities. Today, most residents of a village have relatives in other northern Seward Peninsula communities with whom they may also share economic bonds.

The climate of northern Seward Peninsula is transitional between the maritime arctic and the more continental temperature extremes found in the Alaskan interior (Selkregg 1976). Weather in Shishmaref is characterized by long, dark, and cold winters and short, cool summers. Winter temperatures range between 2°F (-17°C) and -12°F (-24°C) with snowfall measuring 33 inches a year. Summers tend to be foggy with temperatures ranging between 54°F (11°C) and 47°F (8°C). The frequently fierce north and west winds plunge the effective temperature lower by as much as 20 or 30 degrees Fahrenheit. The wind can also act as the determining factor in the placement of buildings so as to minimize snow drifting.

Wind coming off the Chukchi Sea creates forceful waves which commonly batter Seward Peninsula's northern shore, eroding the coastline. This pattern is characteristic of a barrier island such as Sarichef which is composed primarily of sand deposited by wave action and is continually being eroded and built up at different points. Erosion

presently poses a great potential hazard to the residents of Shishmaref as it has in the past.

In 1974 wind driven waves caused the sea to rise 10 to 15 feet, higher than anyone could remember. Many buildings were destroyed or damaged by the resultant flooding. Another severe storm the following winter caused even more damage, removing over three feet of coastline. The village has considered moving to higher ground, but lack of a suitable site and cost have prevented relocation. Sandbagging of the shoreline failed to keep raging waters from eroding a portion of the village in November 1983.

PHYSICAL ENVIRONMENT

The physical environment of the study area and northern Seward Peninsula supports a vast array of floral and faunal species. The biotic resources important to residents of the Bering Strait-Norton Sound area, which includes northern Seward Peninsula, are listed in Table 1 (adapted from Ellanna 1980:241-243). Not all of the resources listed in Table 1 are harvested by residents of Shishmaref or are found within the study area. However, as Ellanna (1983:88) notes:

...residents of communities in which certain resources are not accessible may travel to other areas to hunt, fish or gather desired resources or they may indirectly participate in fish, game, or plant foods and raw materials obtained by another community through regional trade networks.

The village of Shishmaref is situated in an "ecotone", that is, a transitional area between two habitats -- tundra and maritime. The following discussion focuses briefly on describing the tundra and maritime

TABLE 1. BIOTIC RESOURCES UTILIZED BY RESIDENTS OF THE BERING STRAIT-NORTON SOUND AREA¹.

Common Name	Scientific Name
<u>Primary Food and Raw Material Sources</u>	
whale, bowhead	<u>Balaena mysticetus</u>
whale, belukha	<u>Delphinapterus leucas</u>
walrus, Pacific	<u>Odobenus rosmarus</u>
seal, bearded (ugruk or mukluk)	<u>Erignathus barbatus</u>
seal, harbor or spotted	<u>Phoca vitulina</u>
seal, ringed	<u>Phoca hispida</u>
salmon, king	<u>Oncorhynchus tshawytscha</u>
salmon, silver	<u>Oncorhynchus kisutch</u>
salmon, chum	<u>Oncorhynchus keta</u>
salmon, humpback	<u>Oncorhynchus gorbuscha</u>
salmon, sockeye	<u>Oncorhynchus nerka</u>
moose	<u>Alces alces</u>
caribou or reindeer	<u>Rangifer tarandus</u>
whitefish, broad	<u>Coregonus nasus</u>
whitefish, humpback	<u>Coregonus pidschian</u>
sheefish	<u>Stenodus leucichthys</u>
<u>Secondary Food and Raw Material Sources</u>	
seal, ribbon	<u>Phoca fasciata</u>
whale, gray	<u>Eschrichtius robustus</u>
bear, polar	<u>Ursus maritimus</u>
bear, black	<u>Ursus americanus</u>
bear, grizzly	<u>Ursus arctos</u>
beaver	<u>Castor canadensis</u>
squirrel, arctic ground	<u>Spermophilus parryii</u>
porcupine	<u>Erethizon dorsatum</u>
hare, arctic	<u>Lepus arcticus</u>
hare, snowshoe	<u>Lepus americanus</u>
auklet, least	<u>Aethia pusilla</u>
auklet, crested	<u>Aethia cristatella</u>
auklet, parakeet	<u>Cyclorhynchus psittaculus</u>
eider, common	<u>Somateria mollissima</u>
eider, king	<u>Somateria spectabilis</u>
eider, spectacled	<u>Somateria fischeri</u>
eider, Stellar's	<u>Polysticta stelleri</u>
oldsquaw	<u>Clangula hyemalis</u>

¹Ellanna 1980, pp. 241-243.

TABLE 1. BIOTIC RESOURCES UTILIZED BY RESIDENTS OF THE BERING STRAIT-NORTON SOUND AREA (continued).

Common Name	Scientific Name
<u>Secondary Food and Raw Materials Sources (continued)</u>	
pintail	<u>Anas acuta</u>
black brant	<u>Branta nigricans</u>
snow goose	<u>Chen caerulescens</u>
white-fronted goose	<u>Anser albifrons</u>
sandhill crane	<u>Grus canadensis</u>
murre, common (particularly eggs)	<u>Uria aalge</u>
murre, thick billed (particularly eggs)	<u>Uria lomvia</u>
ptarmigan, willow	<u>Lagopus lagopus</u>
ptarmigan, rock	<u>Lagopus mutus</u>
crab, king (blue)	<u>Paralithodes platypus</u>
crab, king (red)	<u>Paralithodes camtschatica</u>
crab, tanner	<u>Chionoectes opilio</u>
clams	unknown
blackfish	<u>Dallia pectoralis</u>
char, arctic	<u>Salvelinus alpinus</u>
cod, saffron	<u>Eleginus gracilis</u>
tom cod, Pacific	<u>Microgadus proximus</u>
cod, arctic	<u>Boreogadus saida</u>
grayling	<u>Thymallus arcticus</u>
pike, northern	<u>Esox lucius</u>
least cisco	<u>Coregonus sardinella</u>
herring, Pacific	<u>Clupea harengus pallasii</u>
halibut, Pacific	<u>Hippoglossus stenolepis</u>
rainbow smelt	<u>Osmerus mordax</u>
mussels (several species)	unknown
slimy sculpin	<u>Cottus cognatus</u>
burbot	<u>Lota lota</u>
whitefish, least cisco	<u>Coregonus albula</u>
whitefish, arctic cisco	<u>Coregonus autumnalis</u>
seaweed	unknown
greens	<u>Rhodiola rosea</u>
potato	<u>Claytonia tuberosa</u>
willow leaves	<u>Salix sp.</u>
sourdock	<u>Rumex archius</u>
salmonberry (cloudberry)	<u>Rabus chamaemorus</u>
crowberry	<u>Empetrum nigrum</u>
blueberry	<u>Vaccinium uliginosum</u>
cranberry	<u>Vaccinium vitis-idaea</u>

TABLE 1. BIOTIC RESOURCES UTILIZED BY RESIDENTS OF THE BERING STRAIT-NORTON SOUND AREA (continued).

Common Name	Scientific Name
<u>Raw Material</u> ¹	
fox, arctic	<u>Alopex lagopus</u>
fox, red	<u>Vulpes vulpes</u>
lynx	<u>Felis lynx</u>
marmot, hoary	<u>Marmota caligata</u>
mink/weasel	<u>Mustela sp.</u>
muskrat	<u>Ondatra zibethicus</u>
wolf	<u>Canis lupus</u>
wolverine	<u>Gulo gulo</u>
driftwood	unknown
willow	<u>Salix sp.</u>
alder	<u>Alnus sp.</u>
spruce, black	<u>Picea mariana</u>
spruce, white	<u>Picea glauca</u>
birch	<u>Betula sp.</u>
sod	unknown

¹Traditionally most furbearers were not used for food except in times of food shortage. Today they are primarily harvested for use on clothing, for barter, and for limited sale.

habitats of the study area and noting certain key species important for human use in these environments. More detailed information on the physical setting may be found in references listed in Selkregg (1976). Human use of the wild resources by Shishmaref residents in these environments is discussed in greater detail in Chapter 3. However, it is important to note that this setting is related to two relevant points regarding human use:

- both terrestrial and marine species contribute to year-round resource use, and
- all major animal resources migrate seasonally.

Tundra Habitat

An underlying layer of permanently frozen ground provides Sarichef Island with some stability against the processes of erosion. Permafrost found commonly throughout the northern Seward Peninsula contributes to the tundra vegetation type. Most of the study area is a combination of moist and wet tundra interspersed with isolated spots of alpine tundra and barren ground.

The low annual temperature, in conjunction with other features of the environment, produces a brief growing season, yet allows a vast array of plant types to proliferate. A thick band of sedges, mosses, lichens, herbs, and dwarf shrubs carpet the ground. Several varieties of berries, such as salmonberry, cranberry, crowberry, bearberry, and blueberry, as well as beach grasses, plant leaves, and tubers are collected each summer by residents of the area. The generally scant and seasonal nature of

most plants, however, tends to limit the amount and variety of plant foods found in the local diet.

The tundra vegetation provides a rich habitat for varied animal and bird life, many of which are important resources for the people of Shishmaref. Animal populations presently found within the study area include large mammals such as moose, reindeer, musk ox, and grizzly bear; small game such as hare, marmot, ground squirrel, and ptarmigan; and furbearers such as wolverine, white and red fox, wolf, marten, muskrat, mink and weasel, and lynx. Caribou, once found within the study area, disappeared from northern Seward Peninsula in the mid-19th century. In recent years, larger numbers of the Western Arctic Caribou Herd are migrating further westward into northern Seward Peninsula. In late 1982 caribou traveled as far west as the Goodhope River. The study area is also on the major flyway route for several species of migratory waterfowl. Waterfowl include black brant, several species of goose, oldsquaw, several species of eider and auklet, and pintail.

The study area is dotted with freshwater lakes and numerous rivers. Two major ones, the Serpentine and the Arctic, flow directly into Shishmaref Inlet. Freshwater and anadromous fish provide year round resources for residents of Shishmaref. Fish found within the study area include grayling, herring, smelt, trout, sculpin, and several species of whitefish, salmon, and cod.

Maritime Habitat

The ocean is clearly one of the most dominant features of the landscape; not only because of the effect of wave action, but also because

of the significance of its resources to the people of Shishmaref. Climatic conditions play a critical role in shaping human use of the ocean. Freezing of the river waters in September spreads downriver toward the coast, first to the inlets and then to the ocean which freezes at lower temperatures. Freeze-up of the Chukchi Sea near Shishmaref usually occurs around November 10 and break-up does not normally occur until around June 22. For seven months of the year the waters of the study area are covered with ice in its various forms.

Ice cover, however, does not limit human use of the rivers, Chukchi Sea, or Shishmaref Inlet. Snowmachines, snowshoes, three-wheelers, and dog teams permit people to travel great distances on the frozen surface. During the winter months, hunters can take advantage of the leads that open in the sea ice. Fishers cut holes in the ice to drop a line or to set nets under the ice in order to gain access to over-wintering species. In the summer months residents travel in boats designed especially for the shallow waters of the sea and rivers. There are few times in the cycle of advancing and retreating ocean ice when people are restricted in their use of the waterways. Travel is limited only during intermediate periods when newly formed ice or old "rotten" ice are unstable.

Marine waters adjacent to the study area abound with sea life, although not all are important as food resources. Marine mammal species include polar bear; walrus; ringed, spotted, ribbon, and bearded seals; and killer and gray whales. Many species of marine fish including flounder, herring, cod, whitefish, and smelt also enter freshwater. Belukha whale migrate through the Chukchi Sea and some concentrate in the summer months to calve in Eschscholtz Bay, east of Deering. Rarely do belukha

whales stray close to Shishmaref. In 1976 a pod swam too far into the pack ice and became trapped in the channel north of the village (Eisler 1978:51). When accessible, belukha are actively hunted. Invertebrates occasionally found in the study area include clams, mussels, and crabs.

HUMAN ENVIRONMENT

Ancestors of the present inhabitants of northwest Alaska were probably well established in the area by the time of Captain Cook's expedition in 1778 (Ray 1975:40-41). The English explorer recorded in his written observations, sightings of and encounters with people along the coast from southern Seward Peninsula to where the community of Wales is today. From the combined notes and journals of members of Cook's expedition, the existence of at least semi-permanent villages is suggested by their descriptions of well built log and sod dwellings (Ray 1975:44).

The economy and society of Shishmaref in the early 1980s are inextricably tied to the early history of northwest Alaska. Before describing the contemporary culture of Shishmaref, it is worthwhile to briefly trace historical developments and events in northwest Alaska which led up to and helped shape present circumstances. What were the patterns of settlement and subsistence prior to the introduction of cash, modern means of air transportation, snowmachines, and formal education? And what has been the impact of these events on people of the region?

Burch (1975, 1980) and Ray (1964, 1967, 1975) provide an insightful and comprehensive picture of the early social, economic, political, and demographic structure of northwest Alaska Inupiat society. Much of the

following discussion on the human environment is developed from their detailed reconstructions. Burch's and Ray's research was based on exhaustive examinations of historic and ethnohistoric accounts in conjunction with oral traditions and the recollections of Inupiat elders. The researchers differ slightly on their geographic coverage, but both include northern Seward Peninsula in their discussions. Burch traces development from the early 1800s to the 1970s for an area defined as the traditional homeland of the Inupiat extending from the northern coast of Norton Sound to the mouth of the Colville River, east of the present community of Barrow. Ray's focus of concern for the period 1650 to 1898 is the Bering Strait region, which by her definition, includes all of Seward Peninsula and the coast of Norton Sound.

From the available evidence, it is clear that prolonged and direct contact with Euroamericans permanently altered the traditional patterns of Inupiat settlement and subsistence. The events leading up to permanent contact between Euroamericans and the Inupiat are summarized below for northwest Alaska in general and Shishmaref specifically. The developments and changes which subsequently followed are also described. The first part of this section discusses the period from the early 1700s until approximately 1890 (termed the "traditional period" in this context). The end of this period roughly coincides with the influx of miners to Seward Peninsula and the beginning of extended involvement in northwest Alaska by the United States government. The modern period from 1890 up to the early 1980s is described in the following part.

Traditional Period

Much of what is known about the patterns of settlement and subsistence in northwest Alaska prior to European contact is reconstructed from the written accounts of explorers, archeological remains, and recollections of Iñupiat elders. Although the first apparent sighting of northwest Alaska is recorded on an obscure 1732 Russian map (Ray 1975:21), the discovery of what would later become Shishmaref occurred comparatively late. The first reported sighting of the Tapkakmiut occurred in 1816, when a Russian expedition led by Otto von Kotzebue was searching for a water route from the Pacific Ocean to the Atlantic. As the expedition traveled north from the Yukon River, von Kotzebue noted in his journal that the coastline from Wales to Cape Espenberg was inhabited (von Kotzebue [1821] cited in Ray 1975:57-59).

On July 4, 1816 the party landed at an island and approached several dwellings which appeared to be deserted. The inhabitants may have fled at the sight of the intruders or they may have been at seasonal camp sites. In his records, von Kotzebue named the island after Gavriil Sarychev (Sarichef), the vice-admiral of Russia, and attached the name of his lieutenant, Gleb Shishmarev (Shishmaref), to the village. After leaving the village, von Kotzebue and his party went on to explore the northern Seward Peninsula coastline.

By the time of von Kotzebue's explorations, and most likely much earlier, northwest Alaska was inhabited by people who referred to themselves as Iñupiat, meaning "the authentic people" (Burch 1975:1). The term Iñupiat refers not only to the group of people, but also has broader

linguistic, cultural, and geographic implications. Two dialects of the Inupiaq language were spoken. According to Ray (1964:61), the line separating the dialects was drawn through northern Seward Peninsula. Shishmaref and settlements to the south spoke Central Bering Straits dialect consisting of two sub-dialects, Kauwerak (Igloo) and Wales. To the north, including the area around Deering, people spoke the Malemiut dialect.

Slight linguistic variations within the two dialects served to distinguish the members of one group from another. The individual groups were actually autonomous socioterritorial units or "societies"² (Burch 1975, 1980). A society was composed of several large bilaterally extended families ("local" families), which were linked to one another through kinship ties (Burch 1980:263). Until the mid-19th century, societies in northwest Alaska were largely economically and politically self-sufficient. They also exhibited the following characteristics: (1) kin-based membership with marriage usually within their own group (endogamy); (2) association with a particular home territory; and (3) a distinctive annual cycle tied to regional differences in the animal species represented.

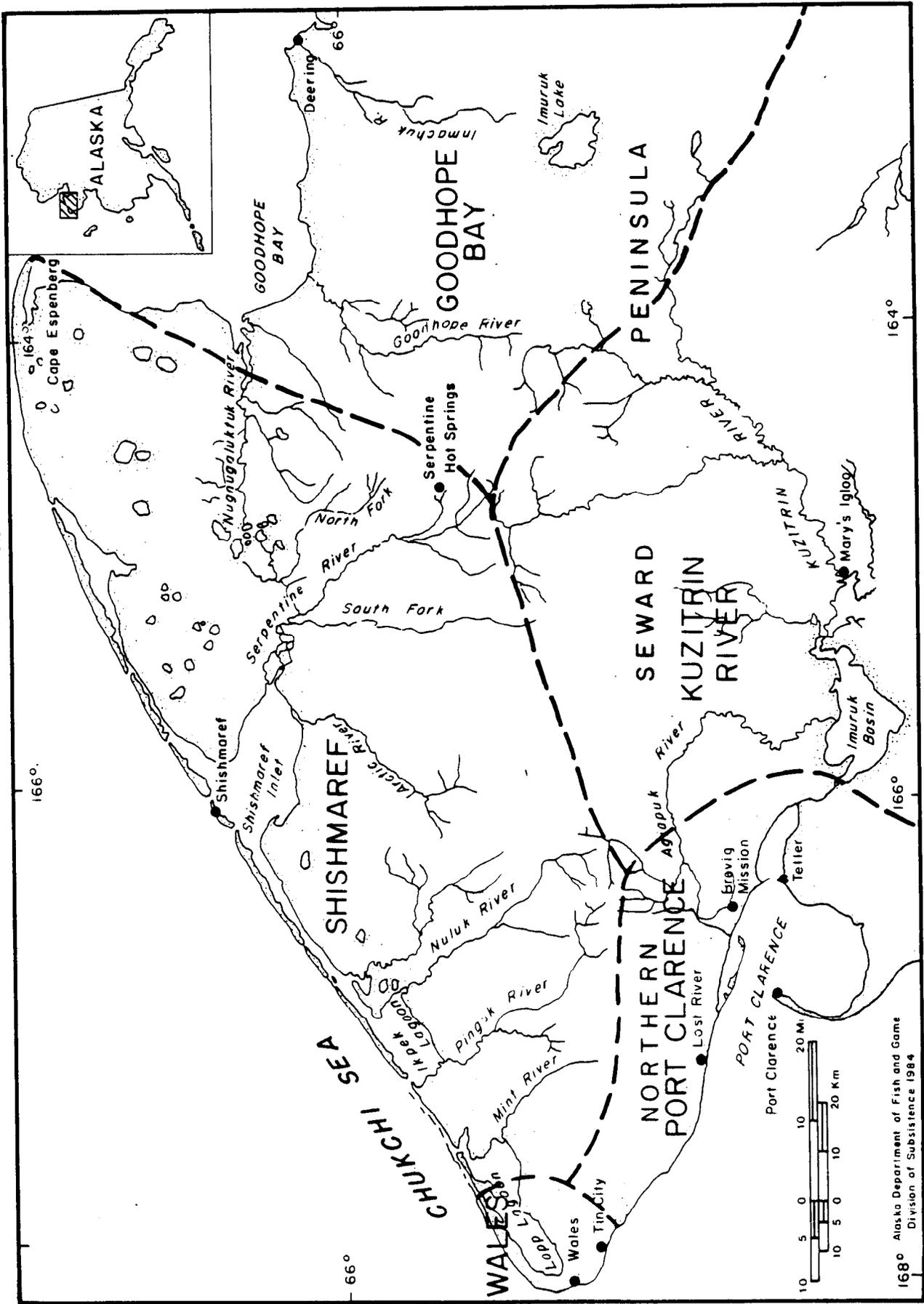
In the late 1830s, according to Burch (1980:282), societies began to experience the indirect effects of the Euroamerican presence in Alaska. In his view, this was the beginning of a trend which ultimately concluded by the end of 1800s in the demise of the traditional societal system. Until approximately 1910, the five northern Seward Peninsula societies were Shishmaref, Wales, Port Clarence, Kuzitrin River, and Goodhope Bay (Fig. 2).

In the nineteenth century Inupiat societies, or "tribes" as Ray (1964:62) has called them, practiced variations of three basic subsistence patterns. All three patterns were represented in northern Seward Peninsula. For residents of Goodhope Bay, caribou hunting was emphasized, while inhabitants of Wales concentrated on large marine mammals such as bowhead whales and walrus. Shishmaref and the residents of Port Clarence focused on small marine mammals.

Although a wide range of local resources were exploited by the Tapkakmiut, they relied primarily on seal species supplemented with belukha whale, fish, and caribou. The flexibility of the economic base and species variety allowed the periodic loss of one resource; however, the prolonged absence of one, or severe temporary fluctuations in two or more resources, could have resulted in economic hardship and the population being forced to relocate (Bockstoece cited in Ellanna 1980:81), as appears to have happened in the 1880s.

Traditional northwest Alaskan societies exhibited a settlement pattern characterized by a large village with several small satellite villages located nearby (Ray 1964:61). In order to take advantage of more than one habitat, villages were situated either on the coast, a large river, or an island. The settlements were semi-permanent, in that, residents would range within the associated territory during various seasons to take part in subsistence pursuits. By freeze-up, however, most residents were back in the winter settlement. Wales was probably an exception. Because of abundant, nearby resources, it was occupied year-round and was able to support one of the largest early historic populations in the Bering Strait area.

Base map adapted from Alaska 1:1,000,000 Base Map Series © Copyright Arctic Environmental Information and Data Center, University of Alaska, 1978.



168° Alaska Department of Fish and Game
Division of Subsistence 1984

Fig. 2. Northern Seward Peninsula Eskimo societies, ca. 1816 - 1842.
(Adapted from Burch 1980:261)

The indirect effects of Euroamerican presence in Alaska were felt in northern Seward Peninsula long before actual prolonged contact with the residents began. Shortly before the United States purchased Alaska from Russia in 1867, American commercial whalers began to visit the Bering Strait area in large numbers. Whalers apparently did not contact the northern Seward Peninsula coast around Shishmaref because the water was shallow and there were usually fewer whales close to shore (Ray 1975:140). But with the eventual establishment of commercial whaling stations near the northern communities of Point Hope and Barrow, some Iñupiat from northern Seward Peninsula signed on for jobs. The demand for bowhead whale and walrus products and their subsequent overharvest resulted in near decimation of both populations. Also, although there is some debate as to the connection with Euroamerican influence, caribou populations in northwest Alaska began to severely decline and by 1880 had almost disappeared from Seward Peninsula (Skoog 1968:243).

Direct contact between the Iñupiat and outsiders began to bring about profound changes in the traditional way of life in northwest Alaska. Resource decline, introduced diseases, and alcohol were factors which contributed to a drastic reduction in the human population of northwest Alaska. The population in some areas of northwest Alaska may have declined by as much as 50 percent between 1850 and 1885 (Foote and Williamson 1966:1046). What remained of traditional societies was further disrupted by population relocation beginning in the 1870s (Burch 1975:28).

Commercial whaling declined due to the drop in the price of primarily bowhead whale and walrus products. But commercial whaling contact was quickly followed by an influx of miners commencing with the first

gold strike in Nome in 1898. The lure of gold drew thousands to the beaches of Nome in 1899-1900. As other gold discoveries were made, mining interests spread into northern Seward Peninsula. The promise of good harbor facilities for transporting supplies to the mines resulted in Shishmaref's establishment as a village. A post office was erected in 1901. From Shishmaref Inlet, supplies could easily be transported in row boats or small steamers to within a few miles of mines at the head of the Kugruk and Serpentine rivers (Collier 1902:12).

Modern Period

The 1890s marked the beginning of the United States government's involvement in the lives of the Iñupiat of northwest Alaska. American missionaries arrived in large numbers to establish church schools and "educate" the Iñupiat in Christian ways. One of the first schools established was in Wales in 1890. Soon after, the U. S. Government assumed control from the church over establishing new schools. A close relationship, however, between local church missions and the schools continued to exist.

At the same time, significant changes were occurring in the economic and wild resource base. Domesticated reindeer were introduced in 1892 as a dietary replacement for caribou and, purportedly, to provide an economic base for Iñupiat. Sponsored by the U.S. Government, the stated concept was to train the Iñupiat as apprentice herders under the supervision of the mission or school and eventually develop locally owned herds. An increase in the price of furs around the turn of the century

also encouraged an increased commitment of time to furbearer trapping as opposed to subsistence hunting (Burch 1975:31). Cash was now becoming an increasingly important commodity in the socioeconomics of resource use.

In 1906, five years after the establishment of a permanent village, a government school was authorized in Shishmaref. The same year the village received a herd of 389 reindeer from the Congregational Church in Wales (Jackson 1908:14). Missionaries of various denominations visited Shishmaref on an annual basis, but it was 1929 before the Norwegian Lutheran mission was founded (Anderson and Eells 1935:207).

The interests of the missions and schools and the mobility requirements of pursuing wild resources and herding reindeer were incompatible. Whereas the Christian teachings emphasized sedentary life and the importance of formal education, extended periods away from the village were required for trapping and reindeer herding. By the 1920s the typical settlement pattern in northwestern Alaska communities was that a core of permanent residents stayed year-round in the village, while another group spent at least winters away from the village (Burch 1975: 31).

Shishmaref was no exception to this pattern. When Edward Keithahn, accompanied by his new bride, arrived in Shishmaref to assume his teaching post in early August 1923, he discovered the village virtually deserted (Keithahn 1963:19). By the end of the month, residents began to trickle back in, returning from seasonal hunting and fishing camps. He quickly learned that completion of the summer fishing season determined the day when school was opened.

Residents of Shishmaref also attempted to integrate their traditional subsistence pursuits, which centered around hunting for seals and waterfowl and fishing, with the newly important resource harvest activities, which emphasized cash remuneration. "The first of December found every able bodied man and even some women taking off for their trapping grounds" (Keithahn 1963:40). The high prices paid for certain pelts was an incentive for trapping. During the 1920s, fur prices ranged from \$25 for red fox up to as much as \$250 for a high quality blue or silver fox.

Reindeer herding also proved to be a lucrative enterprise and flourished for a short time before running into difficulties. In 1915 Shishmaref had five locally owned reindeer herds and many other men in the village were working as apprentices (Stern et al. 1980:31). As part of his duties as teacher in the early 1920s, Keithahn found himself in charge of managing the growing reindeer herds. The original herd of 389 had grown to several thousand and it was already becoming evident that the range around Shishmaref was overgrazed (Keithahn 1963:98). By 1923 local herd owners and apprentices, discouraged by the declining market for an excessive number of reindeer, were beginning to lose interest (Keithahn 1963:88).

In the 1930s, with associated impacts stemming from the Great Depression, the market fell out of the fur and reindeer industry. Within another ten years, the reindeer herds had all but disappeared. Eisler (1978:35) reports that notes and records kept by Pastor Dahl of the Lutheran Church indicate a great disruption of the Shishmaref population during the 1930s. Diseases and accidents took many lives. Some

families moved from Shishmaref and were replaced by families from Deering, Wales, and Brevig Mission. By the early 1940s, populations were centered permanently in communities. The supply of goods and services to the villages began to grow. This growth was facilitated in part by increased communication and contact with areas outside the community and maintained through regular mail and airplane service.

The expanded mobility and relative ease of travel in the 1940s, combined with increasing involvement in organizations and opportunities outside the village, also served to draw some residents from their homes for extended periods of time. Village residents left for reasons which included the need for hospitalization and opportunities for schooling or employment. The entrance of the United States into World War II called still others away. The U.S. Census figures for Shishmaref reflect the substantial shift in residency which occurred in some parts of northwest Alaska between 1940 and 1950 (Fig. 3). During that ten-year period, Shishmaref's population declined by 25 percent.

The population of Shishmaref, like the majority of communities in northwest Alaska, has steadily increased since the 1950s. A number of factors have contributed to the continued growth. Many of the individuals and families who left for one reason or another during the 1940s returned. The establishment of local schools meant that children did not have to leave home in order to obtain an education. Construction of new schools, houses, and other buildings, along with the continued expansion of local services, provided some residents with opportunities for employment. Reindeer herding, reintroduced in the late 1940s and 1950s, also provided employment opportunities for a few herd owners and their workers. In

addition, better health care lessened the need for long-term hospitalization and decreased overall mortality rates.

Finally, population growth was influenced by a deep sense of commitment to village life which continues to exist today. Village residents are motivated to stay in part because of a desire to be close to family and to participate in the local socioeconomic system. The use of local wild resources has remained an integral component of this system. The pursuit of fish and game resources continues to occupy a position of critical importance in the lives of most Inupiat in northwest Alaska. Today, the subsistence economy incorporates components of a cash economy. In Shishmaref, as in the majority of northwest Alaskan communities, residents now schedule wage employment to minimally conflict with subsistence activities.

CONTEMPORARY SETTING

As the population of Shishmaref has continued to grow in recent decades (Fig. 3), residents have adapted to changes in their physical and cultural environment. Yet they maintain close and intimate ties to the land and sea. The primary economic emphasis on marine resources allows Shishmaref residents to maintain a relatively sedentary settlement pattern compared with other, more nomadic hunting societies. The ability to harvest large packages of food, such as seals, relatively close to the village and the optimal winter conditions for the storage of harvested resources permit the community, as a whole, to retain a permanent home base throughout most of the year.

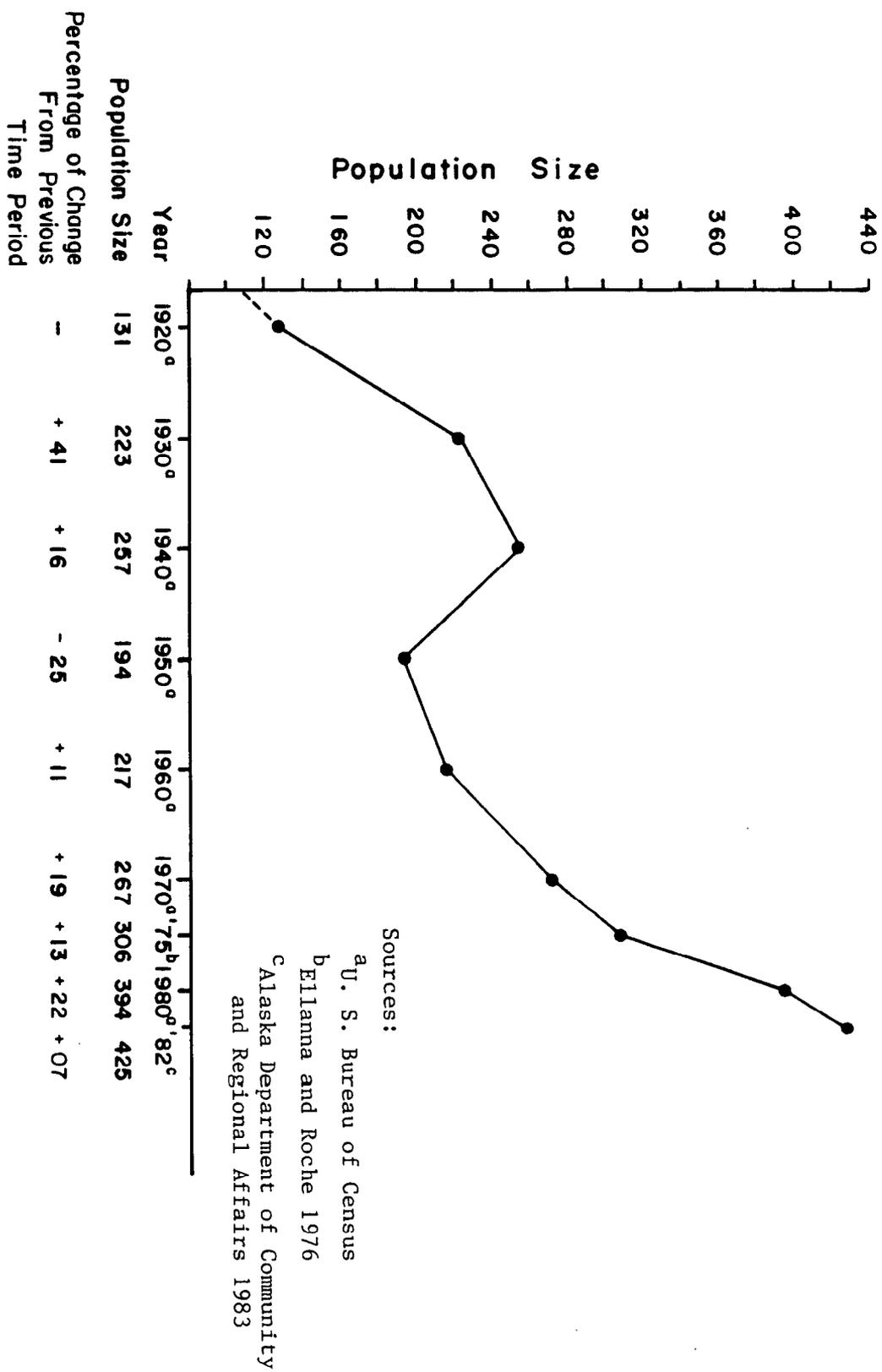


Fig. 3. Population trends in Shishmaref, 1920 - 1982.

In 1969 Shishmaref was incorporated as a second-class city (a minimum 400 residents are required for a first-class designation). As an incorporated city, Shishmaref conducts regular city council meetings with an elected mayor and seven council members. The city may also codify city ordinances and establish local election procedures. Revenue is raised through an one percent city sales tax. For non-municipal matters, the seven member Indian Reorganization Act (IRA) council administers state and federal programs including health care, social services, and employment assistance.

For its residents, the village of Shishmaref serves as the center for a variety of activities and functions. The Lutheran Church has provided for the religious and spiritual needs of many individuals since its establishment in 1929. It served as the focal point for community holiday gatherings until it was destroyed by fire in 1983. Full-time resident pastors provided personal counseling services and religious education, in addition to their regular functions. A public elementary school (grades kindergarten through 8th) and a high school school (grades 9th through 12th) serve the school age community. A new grade school, to accommodate the growing school age population, was under construction during 1983. The high school, built in 1976, has a gym with a full basketball court, showers, and a kitchen.

Most of the homes in Shishmaref are owner-occupied, single family dwellings. The majority of houses were constructed with assistance by regional, state, or federal housing authorities. Few are privately built. Usually of wood frame construction, some homes are pre-fabricated and brought to the village on barges. The number of rooms averages three or

four, which usually means close living conditions for the generally large households. Most of the homes constructed through housing authorities lack the insulating features which compensate for the arctic climate. Oil burning stoves are the primary heat source and fuel costs can be high, especially in the winter months. The homes constructed during 1982-83 came equipped with wood burning stoves. Although wood is less costly than fuel oil, the scarcity of driftwood in the tundra environment makes wood stoves an unreliable heating source.

In 1982 other buildings in Shishmaref included a U. S. post office, a village health clinic, a community building, a Native corporation building, National Guard Armory and a community workshop building. Three stores, two privately owned and one operated by the Alaska Native Industries Cooperative Association (ANICA), stocked a limited selection of foodstuffs and goods. An Alaska Village Electrical Cooperative (AVEC) plant supplied power to the city and subscribing households. During 1983, a "washateria" was under construction in order to provide residents with an automated facility and water supply to wash clothing and shower.

Because of its location, Shishmaref has experienced difficulty in obtaining a source of fresh water for drinking. Wells have proven too saline and desalination is not economically feasible. For drinking water, residents rely on rainwater collected from gutters or travel to the Serpentine River (a distance of some 20 miles) or 4 other creeks, the closest of which is 6 miles from the village. In winter, residents cut ice on or near the mainland and melt it for drinking water. There is no central sewer system in the village. Most residents use outdoor pit privies or "honeybuckets." A central dump for solid waste is located

southwest of the village (Alaska Department of Community and Regional Affairs 1980).

Modern communication links established in Shishmaref in recent years connect the village with the outside world. During the 1970s, Alascom installed a satellite station to provide for long distance calls. Recently installed direct dial local telephone exchanges have resulted in most homes having individual telephone service. Satellite transmission brings Anchorage television stations into many homes. Radio stations in Kotzebue and occasionally Nome are received in Shishmaref. The stations provide a source for receiving up-to-date weather and news and transmitting local messages. Shishmaref is a state legislative affairs teleconference site. Teleconferences allow residents to participate in on-the-air exchanges with political representatives and individuals in other parts of the state regarding current affairs issues.

Shishmaref's primary transportation link to the rest of the state is by air. An asphalt runway, which extends the full width of Sarichef Island, has been a problem during storms when severe crosswinds prevent smaller planes from landing. Several Nome-based airlines provide regular passenger and cargo service to Shishmaref, as well as air charter services. Among the air carriers, at least one, and usually two, have scheduled flights that land in the village every day.

Most residents utilize the air services for one reason or another at various times of the year. They often travel to the regional center of Nome, located 126 air miles to the south, or to Anchorage for medical services, regional functions, business or personal matters, visiting or shopping, and other functions. Most trips to Nome and Anchorage are short-term, usually undertaken to accomplish a specific activity.

During certain times of the year, however, temporary community-wide shifts in residence occur which coincide with the peak availability of particular fish and game resources. Today, as in the past, the Tapkakiut annually move to seasonal camps during spring and fall, which are critical resource periods. Individual, temporary residential shifts occur at other times of the year as well. For example, hunters, furbearer trappers, and reindeer herders frequently stay in seasonal camps for up to two weeks or more during winter.

In the spring, and to a lesser extent in the fall, seasonal camps located along the Chukchi Sea coastline and around the perimeter of Shishmaref Inlet serve as the base of operations for seal hunting activities. Many seal camps are located just southwest of the village, enabling people to walk from their homes. Other camps are a short distance from the village, easily accessible by boat. During the daylight hours, men, usually in crews of two to four, pursue migrating seal species, delivering their catch at the camps for the women to begin the labor intensive work of processing and preparation of the meat and hide. At the height of the bearded seal (ugruk) season from late May through June, some people prefer to remain at camp in wall tents (or in shelter cabins along the coast). The physical structure of seal hunting camps varies but all camps contain work stations and driftwood drying racks.

Some seal camps located at the mouths of certain rivers also serve as a base for fall time activities. Other fall time camps are located inland along waterways. Shishmaref residents may spend up to six or eight weeks in August and September before the rivers freeze at fall campsites, picking berries, fishing, and hunting for moose, waterfowl,

and squirrels. Because these resources fluctuate in availability and are not abundantly concentrated in any one particular area, campers spend part of the time plying the waterways, seeking out the most productive areas. They may move several times over the weeks, usually setting up camp in areas they have used in the past. Often the whole family, including children before school begins in September, is involved in the camping effort. People look forward to the camping experience, as relatives and friends from other areas will frequently join family groups. However, it is also an intensive and crucial time when much of the impending winter's food supply is collected.

The composition of family groups using seasonally occupied campsites is flexible and varies depending on the time of year and the nature of resource activities involved. Camps serving as the focal point for seal hunting are commonly used by adult members of one or two households. The fall campsite may be occupied by all members of a single household or several households which come together at that time of year. Winter hunting and trapping camps are typically used by a solitary male hunter or hunting partners. Many seasonally occupied camps are located on Native allotments. The allotments are parcels of land up to 160 acres selected under the now extinguished 1906 Native Allotment Act. Members of a local family may have their allotments spread over the Tapkakmiut territory in such a way as to take maximum advantage of seasonally available resources. In many instances, allotments are also significant historic sites which were utilized by the family's forebearers for the same purposes.

In most hunting societies, there exists a close harmony between patterns of settlement and patterns of resource exploitation (Damas 1968: 117). Temporary shifts in residence are most often designed to maximize resource production opportunities. Locations of seasonal camps are selected in order to take advantage of cyclical variation and distribution of the resource base. For Shishmaref residents, the timing and scheduling of seasonal movements reflect their knowledge and understanding of their environment. In the early 1980s, as in the past, the harvest and use of fish and game resources constitute the cornerstone of the Shishmaref economy.

ENDNOTES

1. The suffix "-miut" can refer to any group of people in any area (Ray 1975:106). -miut, loosely translated, means both "people of" and "place of." See Ray (1967:375) for further explication on the meaning and use of this suffix.
2. D. J. Ray uses the term "tribe" to describe the sociopolitical groupings which are essentially synonymous with what Burch calls "societies." Burch (1980:261-262) prefers "society" because of its implications for broader comparisons with data from other parts of the world. This report follows Burch and uses the term "society" when referring to these groups.

CHAPTER 3

SUBSISTENCE-BASED ECONOMY IN 1982-83

THE SOCIOECONOMIC SYSTEM

In 1980 the 394 residents of Shishmaref included 368 Eskimo, 25 Caucasian and 1 American Indian (U. S. Bureau of Census 1980b). Nearly all the Eskimo population is of Inupiat origin, the majority of whom still trace their descent through Tapkakmiut ancestry. Much like their forebearers, the Tapkakmiut of the early 1980s retain intimate ties with the land and sea. Hunting, fishing, trapping, and the gathering of edible plants form the core of the contemporary economic system. Cash income, an integral component of the economy since its influence was first felt in the early 1900s, supplements and supports wild resource harvest efforts.

Many of the recent studies of Eskimo societies in rural Alaska have examined the complex relationship between patterns of resource use and other community characteristics such as demography, economy, and social structure (cf. Jorgensen and Maxwell 1983; Kruse et al. 1981; Wolfe 1979, 1981; Wolfe and Ellanna 1983). Taken as a whole, the interrelationships among social organization, the available technology for production, distribution and consumption, and the effective environment comprise the nature of a rural community's socioeconomic system. Socioeconomic systems in rural Alaska are characterized by a "mixed" economic strategy which incorporates both a subsistence (non-market) component and a cash (market) component (Wolfe and Ellanna 1983:252-53). In a mixed strategy,

cash and subsistence components interact in a mutually supportive fashion to provide economic security to the community.

Hunting and fishing activities comprise the primary economic focus. Cash, as a secondary, yet integral, aspect of the economy, interacts with resource production and use in generally complementary ways by providing income which supplements and underwrites the subsistence sector. In most rural communities, monetary income is generated from combinations of state and federal assistance and various forms of wage employment and self-employment. However, the limited number, and generally seasonal, short-term nature of wage paying opportunities, combined with the uncertainty of transfer payments, create sources of economic insecurity. Unstable cash flow, in tandem with the routinely cyclical and the more or less predictable distribution of fish and game populations, contribute to the "subsistence-based" socioeconomic systems found in many rural communities in Alaska (Wolfe and Elianna 1983:251-52). Of the two components of the economic system, wild resource use is more reliable.

The contemporary subsistence-based socioeconomic system is, in fact, a single economic strategy with dual components. The cash and subsistence components are interdependent and integrated such that neither one alone could provide adequate long-term economic security for the community. However, in order to illustrate the articulation of the contemporary socioeconomic system in Shishmaref, the subsistence and cash components are examined independently in Chapters 3 and 4. The characteristics of the population in the early 1980s and the nature of the subsistence (non-market) component of the socioeconomic system are described in Chapter 3. The cash (market) component is described in

Chapter 4, followed by an examination of ways in which the two components are integrated.

STRUCTURE OF THE POPULATION

Most of the discussion in the following chapters concerning the contemporary community was developed primarily from the statistical results of a Division of Subsistence household survey. This information was supplemented with additional data compiled by the University of Alaska, Institute of Social and Economic Research, from the 1980 U.S. Census. The Division survey consisted of structured interviews with Shishmaref households conducted between March and July 1983. As described in Chapter 1, households were randomly selected from a total sampling pool of 78 housing units.

As previously described, in the Division of Subsistence survey, a household was defined as a group of any related or non-related individuals who consider the same dwelling their principal place of residence (Burch 1975:237). The identification of residential housing was made more difficult by the completion of 40 new houses just prior to implementation of the Division of Subsistence survey. The new housing was designed to be replacement homes for some residents and first-time homes for others. In a small clustered community where space is at a premium, older housing is rarely abandoned. The previous residence may continue to serve as a storage space, work area, or "guest house" for visitors and relatives. In other instances, the old house may be disassembled and the lumber reused elsewhere. For purposes of the survey conducted

in 1983, the new dwellings were considered to be the occupants' principal residence. The previous residence, unless someone continued to live there, was not counted as a discrete household.

It is important to note, however, that the total number of 78 households counted in 1983 differs markedly from the 86 households counted in the 1980 U. S. Census. In the case of the U.S. government survey, the number of households was determined on the basis of a count of structures defined as occupied housing units. The disparity between the Division of Subsistence and U.S. Census methods lies in distinguishing "principal" from "occupied" housing, taking into consideration the construction of new housing. In other words, structures which could be defined as housing may continue to be occupied and used for various purposes, although they do not serve as the principal residence for the household. The Division of Subsistence survey determined the number of households from a count of principal dwellings.

The sample population consisted of 43 households, 55 percent of the total principal dwellings in Shishmaref (Table 2). Since the questionnaire was designed to elicit information regarding persistent community-wide economic and demographic trends, only permanent residents were included in the sample population. For the most part, school teachers and clergy were considered nonpermanent residents and, thus, excluded from the sample population if selected. Incorporated into the sample population were individuals originally from other communities who were integrated in the community either through marriage or long-term residency. If a selected household was unable or declined to participate in

the interview for any reason, the next randomly chosen household was contacted.

TABLE 2. SHISHMAREF POPULATION AND HOUSEHOLDS, 1982.

	Sample	Community
Number of Households	43	78
(%) Percentage of Total Households	55	100
Number of Individuals	213	425 ^a
(%) Percentage of Total Population	49	100

^aAlaska Department Community and Regional Affairs (1983).

It is assumed that the random method of drawing the sample as discussed in Chapter 1 ensured that the 43 selected households were representative of the community. Differences in the resource base and in economic conditions, however, preclude making sweeping generalizations or predictive statements about other communities based on the Shishmaref data. Furthermore, it should be noted that the demographic composition of a community is shaped by its resident population which can change as people move in or out. The present survey results document the structure of a representative sample of the community which existed at the time the survey was conducted. Therefore, quantification of data should be viewed as an expression of general patterns and overall trends which occur over time rather than documenting a static and unchanging situation.

The Division of Subsistence survey included information about 213 individuals or 49 percent of the total 1982 population. In the sample group, 114 (54 percent) were male and 99 (46 percent) female. The percentages of males and females in the sample population are consistent with the 54 percent males and 46 percent females counted in the 1980 U.S. Census. Individuals ranged in age from 2 months to 79 years old; the median age was 20. Of the sample group, 119 people (56 percent) were over the age of 16 years. The demographic composition of the sample population by age and sex is shown in Figure 4.

As might be expected, average household size declined in 1983 from 1982 as members of some households moved into separate homes. In the year prior to completion of the new housing, average household size was 5.37 individuals. In 1983 the number of people residing in a discrete household spanned from 1 to 11 people (Fig. 5), an average of 4.95 persons per household. Of the 43 households included in the Division of Subsistence survey, 36 (84 percent) had a male head of household; 7 (16 percent) had a female household head. These percentages are consistent with the 84 percent male and 15 percent female heads of Native households counted in the 1980 U. S. Census.

Household composition stressed conjugal family relationships. In the Division of Subsistence survey, 31 households (72 percent) were married couple households. Twelve households (28 percent) had either a single male or single female household head.

Twenty-six (60 percent) of the surveyed households were comprised of a nuclear family, defined by either a conjugal pair with or without children or a parent with at least one unmarried child residing at home

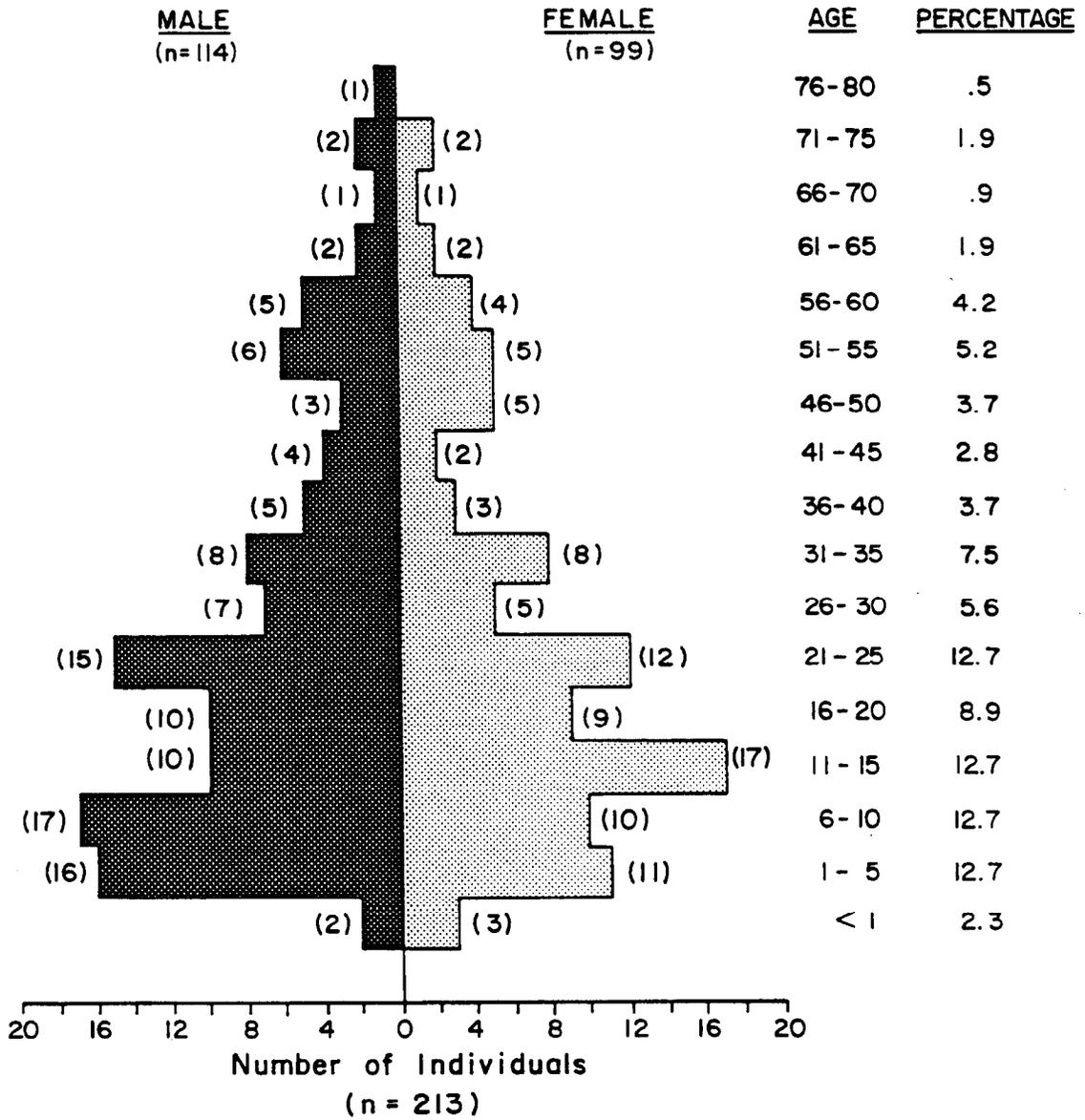


Fig. 4. Composition of sample population by age and sex.

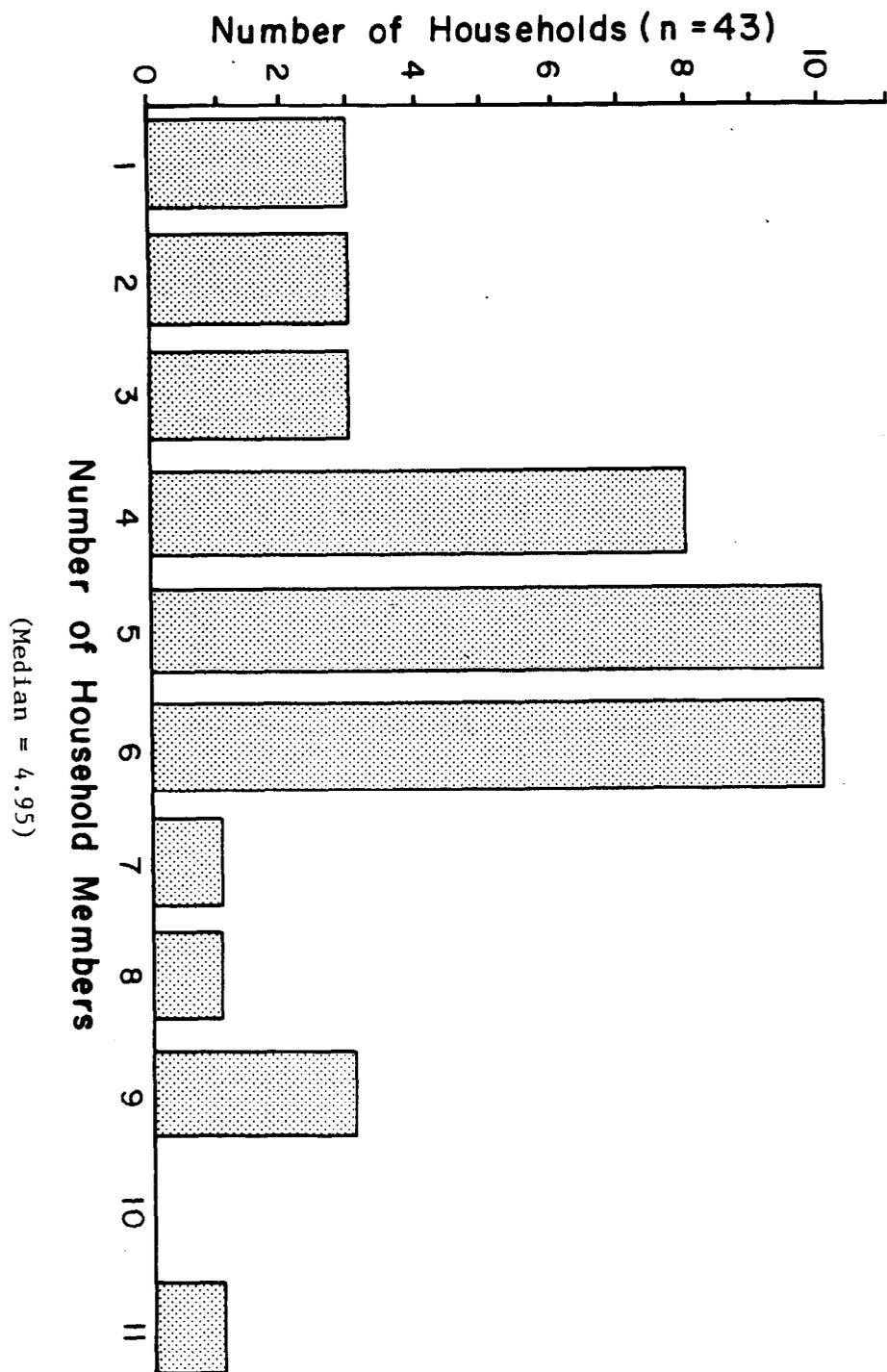


Fig. 5. Number of household members in the sample population.

(Arcury 1984:681). Fourteen households (33 percent) were extended families and 3 (7 percent) were one person households. Membership in extended family households extended both lineally to include two or three generations and collaterally to second cousins. Relationship to the household head or spouse commonly included maternal and paternal parents, grandparents, children, siblings, nephews, nieces, cousins, or grandchildren.

Households comprised of "a family organization whose members occupy a single dwelling" constitute what Burch (1975:237) [following Carrasco (1963)] has termed a "domestic" family. The domestic family represents one level of family organization recognized among the Tapkakmiut. On another level, one or more domestic families are coalesced into a "local" family. The domestic families comprising the local family may live in separate dwellings, but they remain physically, psychologically, and in most cases, economically close together throughout most of the year. In most situations, members of a local family operate, usually under the direction of a senior couple, as a single family organization.

An example of the connection of domestic families to the local family in Shishmaref is illustrated in the kinship diagram shown in Figure 6. In this example, persons 3, 6, and 7 frequently hunt together. They occasionally borrow equipment from person 1 who has a full-time, year-round job and is not well enough to hunt. The women, persons 2, 4, 5, and 8, usually process the harvest under the direction of person 2. Meals are often taken at the home of persons 1 and 2.

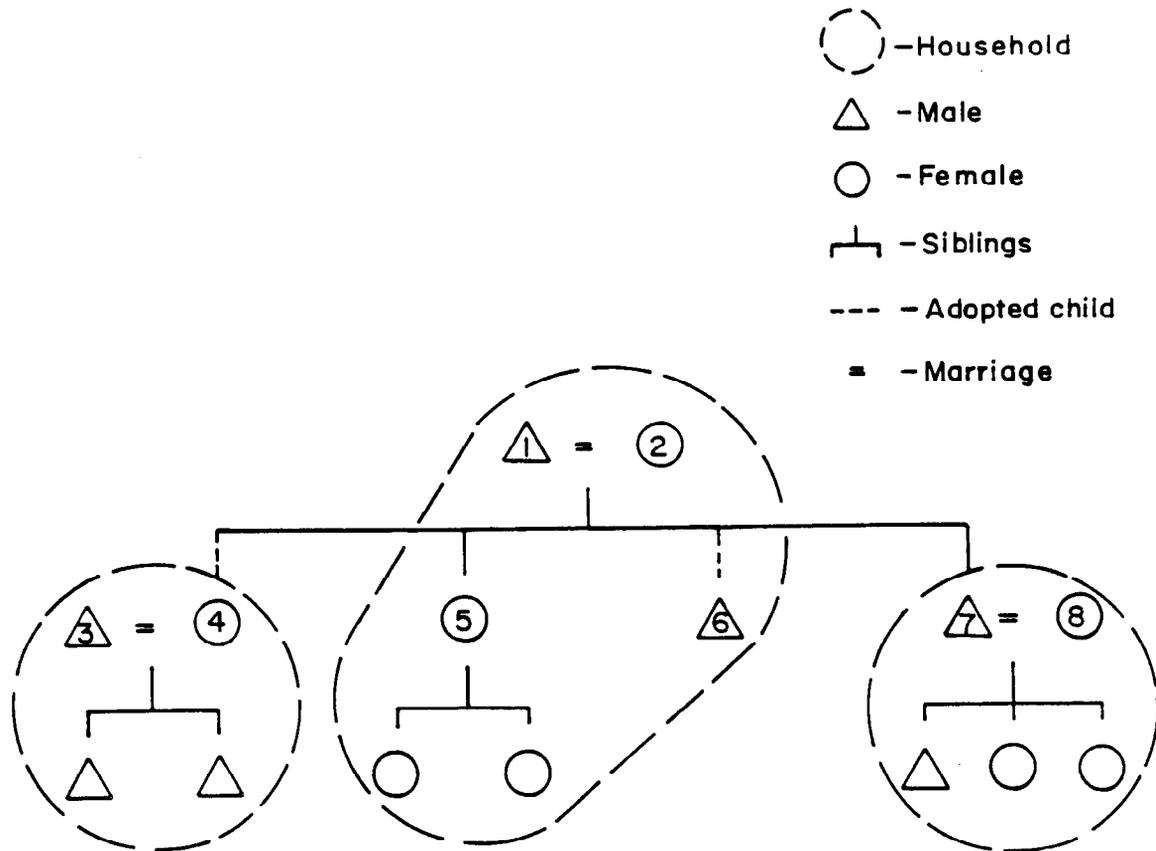


Fig. 6. Example of a local family in Shishmaref.

THE NATURE OF LOCAL RESOURCE USE

In a subsistence-based economy, the community is reliant upon the procurement and use of fish and game resources to meet their biological, social, and material needs. One aspect of this dependence evident in Shishmaref is the extent to which fish and game resources satisfy nutritional requirements. A recent study estimated that as much as 75 to 80 percent of the total protein, fat, and vegetable intake in Shishmaref is derived from locally procured resources (Ellanna 1980:256). For example, seal oil, a multi-purpose dietary staple served with almost every meal other than breakfast, contains nearly 2,000 calories per cup (University of Alaska 1974). Besides an extremely high caloric value, seal oil also provides high quantities of fat, which is considered essential for survival in northern latitudes.

The expressed need for "Native foods" (nigipiat) in order to promote physical and psychological well-being may be closely linked to subjective taste preferences as well as to satisfying biological requirements. The high fat content of certain wild foods, such as seal and fowl, may account for their desirability over other less fatty foods (Jochim 1981:81-82). A strong association also exists between high fat content and a high level of protein in some wild foods. Furthermore, many commonly eaten wild resource foods, although not necessarily high in fat, contain high levels of protein. By way of comparison, good grade beef contains only 16.5 grams of protein per 100 grams of meat, while bearded seal contains 26.7 grams and moose contains 25.1 grams of protein in the same amount of meat (University of Alaska 1974). Table 3

TABLE 3. COMPOSITION AND NUTRITIVE VALUE FOR SELECTED WILD RESOURCES^a.

Wild Resource ^b	Calories	Protein (gms) ^c	Fat (gms)	Carbohydrates (gms)
Polar bear, meat	130	25.6	3.1	---
<u>ugruk</u> , dried meat	110	26.7	2.3	0
<u>ugruk</u> , oil	900	----	100.0	---
Ringed seal, meat	143	28.3	3.2	0
Walrus, meat	200	19.2	13.6	0
Moose, meat	123	25.1	2.5	---
Reindeer, meat	117	26.6	1.2	---
Ptarmigan, meat	---	24.8	2.5	0
Hare, meat	129	21.0	5.0	---
Grayling	---	20.7	20.2	0
Herring, dried	---	44.7	10.6	0
Tom cod	---	64.3	2.0	---
Salmonberry	---	2.4	0.8	8.6
Willow, leaves	---	6.1	1.6	20.7
Sourdock, leaves	---	2.3	0.7	6.5

^aTable adapted from University of Alaska, Cooperative Extension Service (1974) and Heller and Scott (1967).

^bPer 100 grams or almost 1/2 cup.

^c1 gm = 1,000 milligrams.

shows the composition and nutritive value for selected primary animal, fish, and plant resources eaten by members of the community.

Maintenance of a primary reliance upon fish and game resources requires that hunters effectively exploit their resource base. Hunters generally rely on their extensive accumulated knowledge of the local physical and biotic environment to guide land and resource use decisions. This knowledge is predicated on the belief that within a range of variability, the resource base is expected to be reliable and routine in terms of the distribution and seasonality of available foods. In Shishmaref, hunters note the trends and annual cycles of fish and game populations, but because wide and unexpected fluctuations in resource availability sometimes occur, they are reluctant to make predictions about subsequent years. By most accounts, 1982 was considered "an average year" for harvest success, but as residents stated, "We just can't be sure year to year if there will be enough animals."

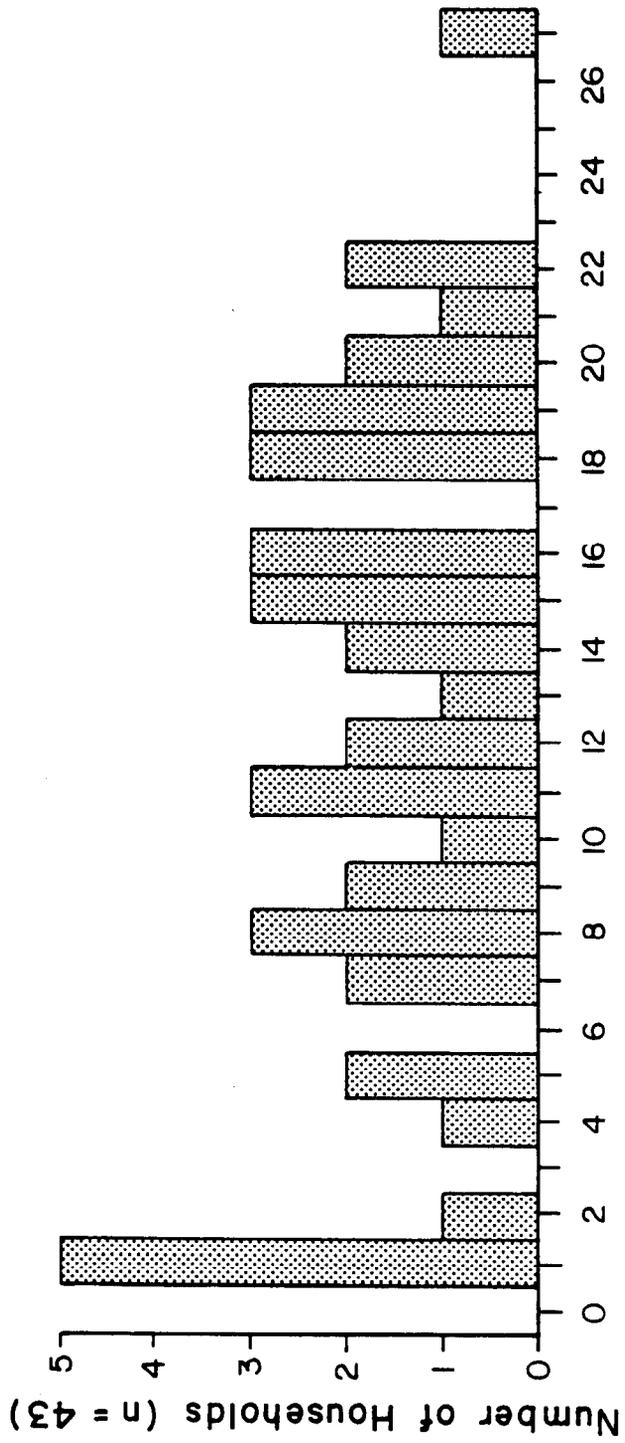
Shishmaref residents exploit and utilize a vast array of the fish, game, and plant resources located within the Tapkakmiut territory. Given the spectrum of available resources, understanding how community-based decisions are made regarding what resources to harvest -- as well as when, where, why, how, and by whom -- is a complex and problematic task that will be considered in Chapter 5. There are, however, certain underlying goals which tend to shape resource harvest and use decisions. Evidence from hunter-gatherer studies suggests that for most subsistence-based economies, production strategies are usually influenced by choices which will promote stability and security for the community rather than an accumulation of individual wealth or production for commercial purposes (Jochim 1981).

In the Division of Subsistence survey, households harvested between 1 and 27 resource categories (Fig. 7). The 27 resource categories listed represent only major resource types and do not reflect the variety of plant and fish species utilized nor do they include resources harvested infrequently by only a few individuals. The level of participation among surveyed households for each of the resource categories is depicted in Table 4. It is also important to note that the range of resources harvested is not necessarily synonymous with the range of resources used. Because of sharing and other mechanisms for distribution, the list of resources used by a household is usually greater than what they actually harvest themselves.

ANNUAL ROUND OF RESOURCE ACTIVITIES

The community-wide annual round of resource harvest activities for the major fish and game resources used by Shishmaref residents is depicted in Figure 8. Timing and scheduling of resource harvest activities are tied to two major seasons determined by the presence or absence of sea ice. Access to available resources, technology utilized, and mode of transportation are dictated by conditions of "open" or "closed" water. Transitional periods of new thin ocean ice (siguliaq), slush ice (ginu), and rotten soft ice limit travel, and hence, often curtail hunting and fishing excursions.

During the open ice and ice-free months from mid-April to mid-November, boats are the principal means of travel outside the village. Most residents continue to build their own boats to meet specifications



Number of Resource Categories (n = 27)

Fig. 7. Number of resource categories harvested by surveyed households.

TABLE 4. HOUSEHOLD^a PARTICIPATION IN RESOURCE HARVEST, 1982.

Resource Category	-----Household Harvest Participation-----					
	Har- vested	%	Did Not Harvest	%	Tried No Success	%
Seals						
Bearded Seal	34	79.1	8	18.6	1	2.3
Ringed Seal	22	51.2	21	48.8	0	0.0
Spotted Seal	26	60.5	15	34.9	2	4.7
Ribbon Seal	2	4.7	39	90.7	2	4.7
Walrus	13	30.2	22	51.2	8	18.6
Polar Bear	2	4.7	36	83.7	5	11.6
Fish						
Herring	20	46.5	23	53.5	-	----
Blue cod	12	27.9	31	72.1	-	----
Tom cod	29	67.4	14	32.6	-	----
Smelt	25	58.1	17	39.5	1	2.3
Sculpin	23	53.5	17	39.5	3	7.0
Flounder	6	14.0	37	86.5	-	----
Burbot	11	25.6	31	72.1	1	2.3
Whitefish	31	72.1	12	27.9	-	----
Grayling	19	44.2	23	53.5	1	2.3
Chum salmon	17	39.5	26	60.5	-	----
Pink salmon	18	41.9	25	58.1	-	----
King salmon	3	7.0	40	93.0	-	----
Silver salmon	3	7.0	40	93.0	-	----
Char	2	4.7	41	95.3	-	----
Moose	27	62.8	15	34.9	1	2.3
Furbearers						
Fox	11	25.6	31	72.1	1	2.3
Wolverine	2	4.7	39	90.7	2	4.7
Arctic hare	23	53.5	18	41.9	2	4.7
Squirrel	12	27.9	30	69.8	1	2.3
Mink	2	4.7	41	95.3	-	----
Caribou	5	11.6	38	88.4	-	----
Wildfowl						
Ducks/geese	35	11.4	8	18.6	-	----
Ptarmigan	29	67.4	13	30.2	1	2.3
Wildfowl eggs	15	34.9	27	62.8	1	2.3
Berries/Greens	39	90.7	4	9.3	-	----

^aN = 43; Division of Subsistence 1983.

of the shallow ocean and river waters. During the summer of 1982, 12 or more boats were under construction and about half that number were being built the following summer. Constructed from plywood and covered with a coat of fiberglass, most boats are built with slightly rounded or flat bottoms to reduce drag in shallow waters. Locally built boats also tend to be large, some approaching 28 feet in length. Builders report that the longer boats allow them to carry bigger loads and more people and to travel greater distances. Two motors, between 25 to 75 horsepower, are considered a safeguard against getting stranded a long ways from home.

Once the ice along the coast is frozen solid (tuaq) and the ground is covered by a blanket of snow, then snowshoes, snowmachines, and dog teams become the mode of transport. Most households have at least one form of transportation for getting around on the land and ice-covered sea during the winter months. In 1977 Eisler reported that a distemper epidemic in the early 1970s destroyed most of the dog teams, but that many people were once again breeding dogs (Eisler 1978:39). During 1982 most households had at least one "pet" dog and many had working dog teams. No doubt the presence of locally bred, champion racing dog teams has encouraged the revival of the use of dogs for transportation purposes as well. For traveling intermediate distances year-round, three-wheel motorized all-terrain vehicles are used. In addition, a few households or businesses own trucks, and three light aircraft are owned by local residents.

In the spring, usually by late April, with lengthening daylight and warmer temperatures, the ocean ice becomes softer and leads begin to appear in the ice close to shore. This signals the approach of the

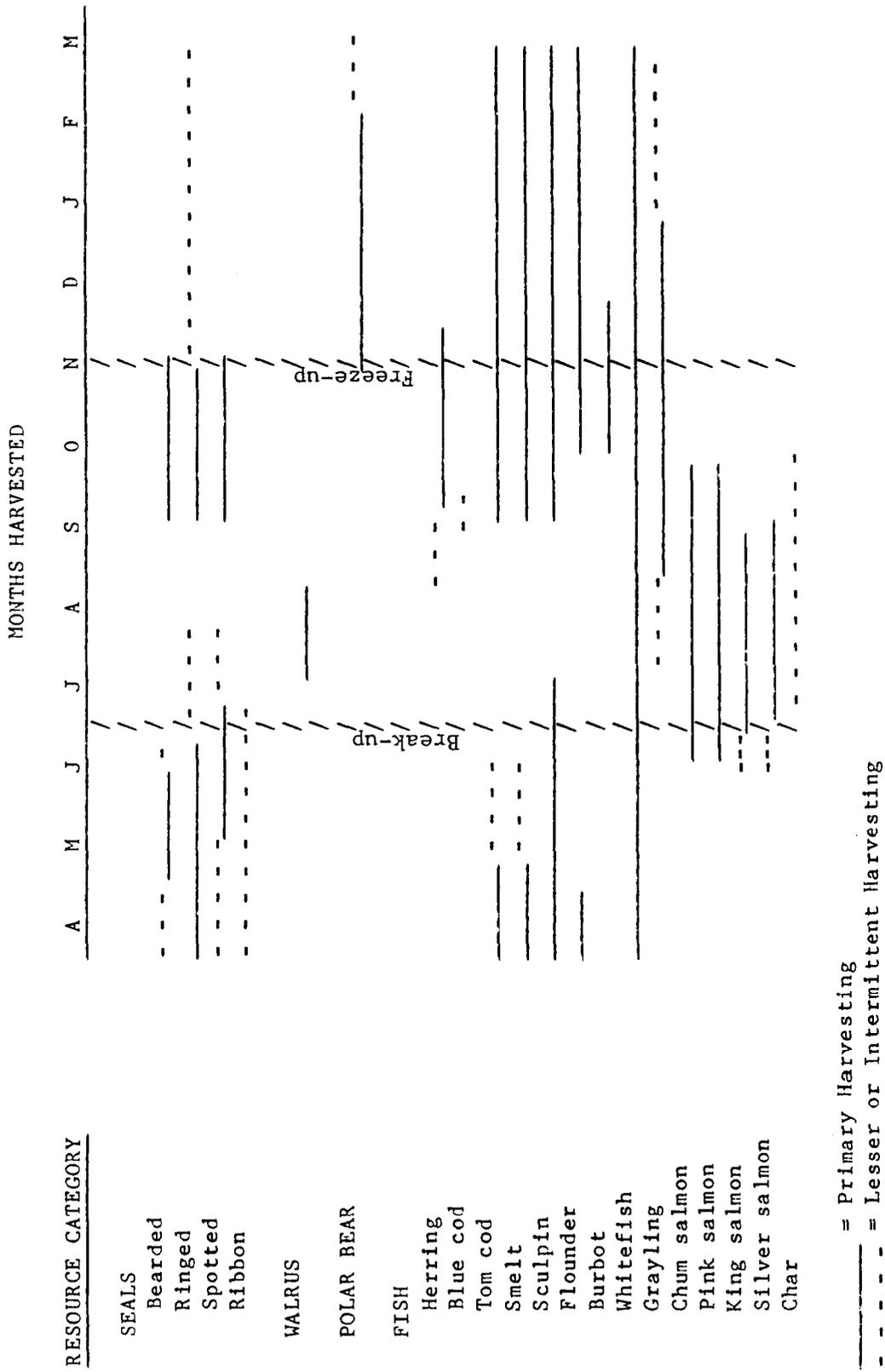
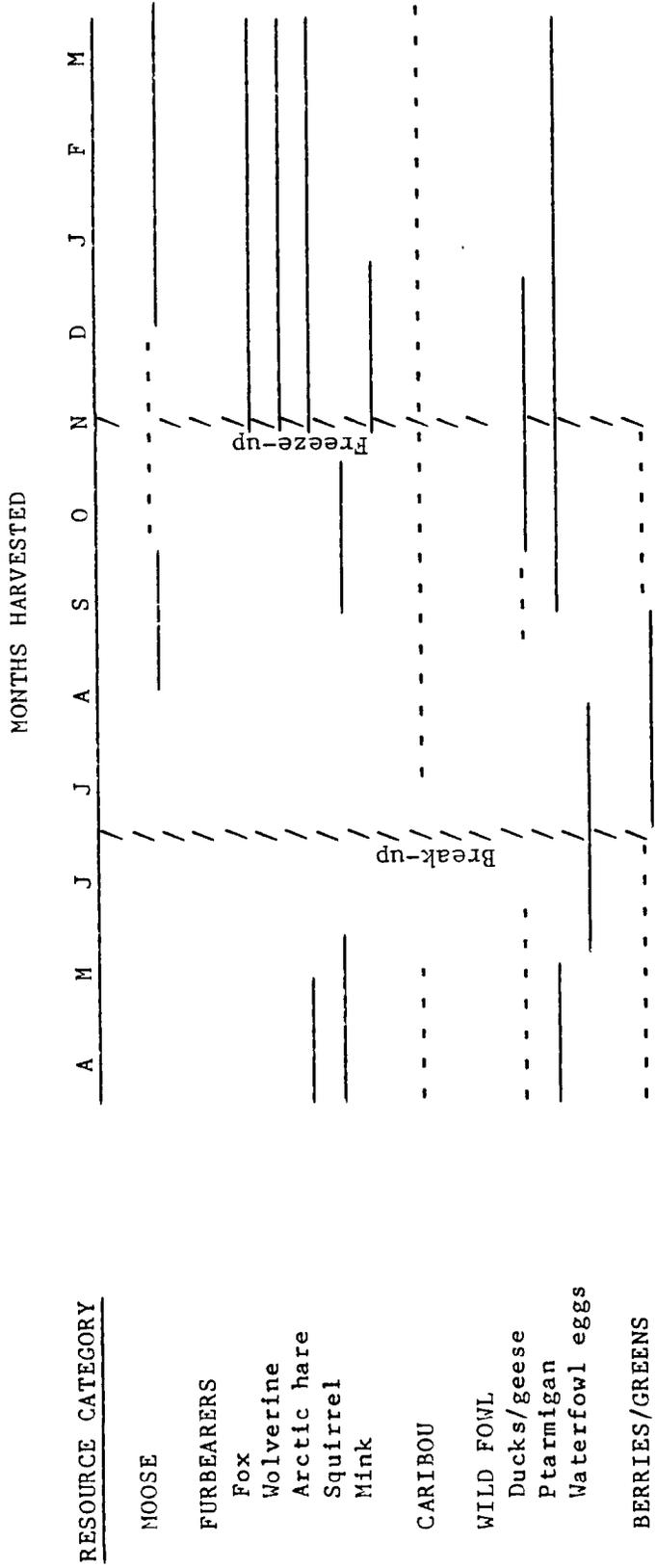


Fig. 8. Seasonal round of harvesting activities at Shishmaref, 1982.



_____ = Primary Harvesting
 - - - - - = Lesser or Intermittent Harvesting

Fig. 8. Seasonal round of harvesting activities at Shishmaref, 1982.

spring seal harvest, probably the most intense resource harvesting period of the annual round. Four species of ice seals -- bearded, ringed, spotted, and an occasional ribbon -- are found in spring associated with the Bering and Chukchi seas. Early in the seal hunting season, Shishmaref hunters travel by snowmachine to the opening leads. As the water passages widen and open water separates the shore ice (tuaq) from the pack ice (ianik), hunters switch to boats. Men shoot the seals either on the ice or in the water, retrieving them with specialized sink hooks (manat) or floating hooks (ilikhaq). After gutting, the harvest is delivered to the seal camp for processing.

Bearded seal (or ugruk as it is most commonly referred to by both Inupiaq and English speakers) is the largest of the four species and is also of primary economic importance to the community. "We eat everything from internal organs to meat and blubber and use the skin -- no part of the ugruk is wasted." Methods of preparation are complex and labor intensive. Women, working alone or in pairs at the seal camps, separate the meat from the blubber and hang the various cuts of meat and internal organs on racks to dry or partially dry. Hides are cleaned and staked on the ground to dry during the coming months. Meat, which is to be partially cooked before storage, is often boiled in large containers directly at the seal camps.

Although not as important for human consumption, the other seal species are considered valuable resources by the community. The hides in particular are used in a variety of ways, providing raw material for clothing, footwear, accessories, and crafts. Ringed seal skins are left intact after the meat has been removed and then used as storage

containers for other wild resource foods. After filling, the seal skin containers or "pokes" are usually frozen in sod-covered pits dug into the ground, to be retrieved during the winter months. Ringed seal "pokes" are preferred over other types of storage containers, such as barrels or buckets, because they are said to keep food fresher and better tasting. Residents report spotted seals "taste bad and leak."

The cultural and economic significance of ugruk to the community is clearly apparent in the reported level of hunting activity. Survey data revealed that 81 percent of the households reported hunting for ugruk, the most of any single resource category. Ugruk is accorded a high priority when making harvesting decisions. In a few cases, hunters limited their participation in the seasonal round of harvesting activities to only the spring ugruk harvest. One hunter confirmed, "If we can't get any other game, we will get ugruk first."

Annual resource requirements for ugruk vary, but hunters will take enough to feel "safe." As an example, for an extended family of 11, a harvest of 8 ugruk for one year may be sufficient. "If we don't finish [preparing the harvest], we give to someone else." And, indeed, survey results showed that ugruk was the resource most frequently shared with others. It was also one of the resources most often received by households (see Chapter 5, Tables 17 and 18). For many households, the amount of ugruk stored serves as a gauge by which to measure the amount of other resources needed. The success of the harvest will determine the level of effort expended to secure other resources during the course of the annual round.

During the spring, other sources of fresh meat, including wild fowl and squirrels, are eagerly sought by some residents after the long winter. Squirrels are trapped by fewer than one-third of the households surveyed; those who trap squirrels also tended to be elders. Both men and women engage in squirrel trapping (an activity referred to as nanig'iaqtuq) by placing size #0 traps with no bait at the burrow's entrance. Although the fur is a desirable clothing material, squirrels are difficult to skin. Also, the meat of the squirrel must be cooked for a long time in order to make it tender.

Ptarmigan and a few species of migrating waterfowl, such as brants, eiders, white-fronted geese, and pintails, may be hunted, especially during days when weather or ice conditions prevent seal hunting. Hunters watch for waterfowl which may be nesting and are careful to avoid hunting ducks and geese with young (Eisler 1978:71). Some households harvest eggs from gulls, terns, ducks, and geese, taking care not to disturb too many eggs.

Fishing is an activity which occurs year-round, partaken in by old and young, women and men alike. During the ice free months from July to September, several species of salmon migrate near the village on their way to spawn. These include an occasional silver or king, but are mainly chum (dog) and pink (humpy) salmon. Some families set nets in the ocean close to the village to catch salmon and also whitefish. Checking the net daily tends not to conflict with the more intensive demands of seal harvesting, yet provides fresh fish for immediate consumption. In good years the excess can be dried or frozen in household freezers for later use.

Walrus hunting usually occurs after seal hunting is over. The increased popularity of walrus hunting over the last 15 years (Eisler 1978:63) may be a reflection of the increased size and expanded distribution of the walrus population since the 1960s (Kenyon 1978:181). Occasionally, walrus drift closer to shore and may be encountered by seal hunters, but walrus are usually ignored until sufficient quantities of seal have been harvested. Almost half (49 percent) of the surveyed households reported hunting walrus in spite of the high rate of failure. Of the 21 households which hunted walrus, 8 (38 percent) were unsuccessful in their quest. Walrus migrate through the vicinity for only a couple of weeks from mid-June to mid-July and hunters are well aware of the dangers involved in pursuing walrus. Walrus are extremely large sea mammals which may weigh up to two tons. They are usually found far from the Shishmaref coast in association with the pack ice.

Walrus hunting requires the cooperation of an able crew. Usually, hunters prefer to travel in two boats, equipped with two motors on each, because of the distance involved in reaching the walrus herd. If a motor breaks down 40 miles from shore, the availability of another boat can be a safeguard against disaster. Also, the round or flat bottomed boats so well adapted for shallower water and rivers are not as functional in the open sea or in pack ice where walrus are usually found. To minimize the risks and maximize their efficiency, hunters may take a couple of drums of gas and food and supplies for several days. Some crews plan on staying out for two or three days at a stretch and camp on the ice floes or in the boat if it is foggy. But a sudden and unexpected shift in wind can shut off access to open water, leaving hunters stranded

for much longer. An awareness of wind and ice conditions is critical while walrus hunting.

Most of the walrus are encountered in herds on the ice. The hunters in the crew aim for the neck and head area for a clean shot. If a walrus slips into the water after being hit, it is extremely difficult to retrieve because of its weight. Because of the chances of getting caught on the ice due to changing weather and ice conditions and the labor involved in handling and transporting walrus, hunters will typically take only one walrus at a time and gut the harvest right away.

The extensive utilization of the walrus and the variety of preparation methods provide culinary diversity. Back meat, flippers, heart, intestines, and liver are especially enjoyed. Walrus often consume large quantities of clams and the clams found in the walrus stomach are also eaten. The outer layer of skin (kauk) is a particular delicacy as well as some of the meat which is buried after harvest and allowed to ferment slightly before it freezes (usrravak). In addition, walrus tusks are highly prized and serve as the raw material for local carvers.

When the last of the seal harvest has been processed and prepared for storage, many families depart the village for fall season campsites. In 1982, as in recent years, fall camping roughly coincides with the opening of the moose hunting season around the first of August in Game Management Units (GMU) 22D and 22E. Fall is also an important time for gathering berries and greens, fishing, squirrel trapping, and waterfowl hunting. Some Shishmaref residents go out for the day only, while others leave for up to eight weeks, returning to the village for short periods to restock their supply of gasoline and food.

Moose did not begin migrating onto the Seward Peninsula until the 1950s; Shishmaref hunters recollect that the first moose was taken in 1956. Since then, moose have become one of the primary resources, yet are also one of the most elusive. Over 65 percent of the surveyed households hunted moose during 1982 and households reported it was among the resources most often received through sharing (see Chapter 5, Table 18). Although the 1982 season was open until March 31 in GMU 22E, many hunters attempted to get their moose as early as possible, before the rivers freeze up and travel by boat became impossible. The first moose of the season is treated with a good deal of importance and inspires friendly competition among the hunters. The first moose is shared with the entire village, the choice pieces being reserved for the elders. The hunter's household may actually end up with very little of the meat from the first moose, but a certain amount of prestige will be accorded the hunter.

Harvested moose are usually dressed in the field, the stomach and guts left behind. After butchering, the meat is dried or frozen. The moose hide is either removed whole or cut with the meat. Perhaps because of the relatively recent introduction of moose into the economy, the hides are not used as raw material for clothing or crafts. Some women remarked that they do not know how to prepare the hides but would like to learn.

During August some families feel it is more important to first pick berries before intensively moose hunting, since moose will be around longer. Berry picking is an activity which is accompanied by excitement. Predictions are made on the magnitude of the year's crop based on the

previous spring's weather and wind. Men, women, and children all participate, choosing their ground carefully before sweeping out across the tundra, buckets in hand. The beloved salmonberry (or cloudberry), oily and rich in vitamin C, is the first to ripen, followed by blueberries, crowberries (also known as blackberries), bearberries, and cranberries. The berry harvest, particularly salmonberries, will be either frozen in zip-lock bags or in seal pokes and enjoyed as a special treat with winter visitors.

In addition to berries, other edible plant greens, roots, stems, shoots, and buds are eaten. Edible plants such as Eskimo potato, marsh-marigold, wooly lousewort, sourdock, dwarf fireweed, wild rhubarb, beach greens, wild celery, and willow leaves are gathered at various times during the spring, summer, and fall months. Most will be combined in meat dishes or eaten with fish or seal oil. While not constituting a major proportion of the diet compared to meat and fish, plant foods are a welcome and important source of vegetable fiber, carbohydrates, and vitamins.

While berry picking, residents sometime place a gill net in the river or ocean and check it for fish at least once a day. Depending on the run location and strength, whitefish, herring, char, ling cod (or burbot), smelt, blue cod, and chum (dog) salmon are caught from July through October. Grayling and tom cod may be caught with a rod and reel, but this method is not as productive as setting a net. Much of the catch is for immediate consumption; the remainder is dried or salted in barrels or pokes, frozen, and eaten throughout the winter months. Clams or crabs are also harvested by a few households from August through October.

By the second week in August, waterfowl are usually considered fat enough to hunt. Waterfowl contain especially high levels of fat and protein and are a valued resource, both in terms of nutrition and taste preference. Much of the area near the village, particularly around Shishmaref Inlet, is considered key waterfowl habitat (Selkregg 1976). Over 81 percent of the households reported hunting migratory species during 1982, the majority of the hunting occurring in fall months. Hunters reported that during the fall they hunt for ducks and geese the same time they are looking for moose; "that way we don't waste gas." Commonly hunted species of migratory waterfowl include: pintails (also called sprigs); black brants; eider ducks; mallards; teals; oldsquaws; and white-fronted, Canadian, and Emperor geese. Some of the harvest is consumed right away while the rest is cleaned, usually plucked, and then frozen for winter eating.

The appearance of young ice (siguaq) in late September or early October signals the approach of freeze-up, and activity centers around the village once again. Some families will have already returned by this time for the commencement of the school year. As the river waters start to freeze, and the ocean ice begins creeping southward, attention is refocused on marine mammals and fish. Seal hunters pay close attention to the herring run as the seals will be close behind.

The spotted seals are the first to arrive, followed by ringed seals and a few young bearded seals. Juvenile ugruk (or anmiaq), found only in the fall, will occasionally enter the mouths of some rivers before the rivers freeze (Burns 1978:197). Hunters describe themselves as "very lucky" to get a young ugruk as they are considered quite a delicacy --

"the prime seal meat." The meat will usually be enjoyed frozen (referred to as quaq) and dipped in fresh seal oil. Fall seal hunting, while not given the same emphasis as the spring hunt, can nevertheless, make the difference between having a sufficient supply of winter food or not. In years when the spring harvest of bearded seal has been insufficient, more ringed and once in awhile spotted seals are stored for human consumption. (Ringed seals are preferred over spotted seals.) The surplus will be skinned and frozen whole to provide food for an increasing dog population. For winter sewing projects, the fall seal skins are especially prized.

Depending on the weather and water conditions after freeze-up, men and women will travel short distances to anchor nets under the icy rivers or to "jig" for herring, tom cod, sculpin, smelt, grayling, ling cod, and other overwintering species. Jigging is done with an iq̄ait, a short driftwood pole tied with fishing line and weighted with a sinker and brightly colored object. Nets must be checked at least every two days or else they may freeze to the ice. After Shishmaref Inlet has frozen, some people, primarily elders, cut holes in the ice to "jig" for flounders, tom cod, herring, smelt, sculpin, or whitefish. A good day's fishing effort can yield a full gunny sack.

After the rivers are solidly frozen, hunters will pursue moose with renewed effort on snowmachines. Although the 1982 moose hunting season remained open from August first until the end of March, hunters report difficulty in locating moose after freeze-up. Many moose hunting households expressed their frustration that moose are close to the rivers in fall time, but are inaccessible because of shallow water. After freeze-up

the moose are dispersed and hard to find. As the end of the moose season draws near, some unsuccessful hunters may shift their efforts to caribou. Five households (12 percent) surveyed indicated that they had hunted caribou during 1982, even though it often required traveling as far as Buckland. "If we don't get moose, we hunt caribou" was typical of the explanation given in most instances. For these few households caribou may have served as a substitute for moose when moose were considered unavailable.

By mid-November, solid ice (tuag) covers the Chukchi Sea around Shishmaref, but until December there continues to be areas of open water. Even after freeze-up is complete, offshore winds during the winter months can force leads in the ice to develop. Seal hunters use these occasional opportunities to follow the leads in search of the breathing holes made by ringed seals, the only overwintering seal species. The arctic or white fox also can be hunted on the frozen ocean or along the beach. The highly mobile arctic fox is a valuable fur resource and considered by most hunters to be a very smart animal.

From freeze-up until early spring, a few hunters will seek polar bear. Aerial hunting was discontinued in 1972 with the passage of the federal Marine Mammal Protection Act. Since then, Shishmaref residents have noticed that the polar bear population appears to be increasing. In recent years, bears have been coming in closer to shore and are occasionally encountered along the beach feeding on dead walrus. The majority of polar bears sought by Shishmaref hunters, however, are found with the pack ice up to two miles out and along the coast as far west as Wales.

Some opportunistic hunting occurs on the beaches, but many hunters prefer to pursue polar bears in their ocean habitat. The challenge of polar bear hunting requires a specialized skill and knowledge which results in the prestige accorded individuals known as "polar bear hunters." Of the seven households which reported hunting polar bear during 1982, only two were successful in their efforts. Among other things, polar bear hunters rely heavily on their traditional knowledge of the behavior of their prey and an understanding of ocean and ice conditions. Much of this knowledge has been passed down from hunters of one generation to the next.

Polar bears rely primarily on a diet of ringed seals (Lentfer 1978: 222). The bears will spend long hours crouched over seal breathing holes, waiting for a seal to surface for air so they can swipe at them with their powerful paws. Traveling by snowmachine in the early morning hours, the hunters may begin their search by looking for areas where the ice is thin. Thin ice or ice that is "mixed up" (broken ice) may indicate where a polar bear had been hunting ringed seal at an open breathing hole. Also, hunters in pursuit of polar bear may follow a bear's tracks. Experienced hunters are aware that water-filled tracks are still fresh.

Hunting is usually a solitary endeavor, although once in awhile two hunters will travel together. When encountered, polar bears are considered naturally shy creatures and are usually not aggressive, but the huge animals must be approached cautiously. The hunter will wait and watch until he is able to get a clean shot, often aiming for the heart. The following recollection from a polar bear hunter illustrates a traditional knowledge of bear behavior and the skills involved in the hunt:

Polar bears are real smart, even they don't see people, they know where they are. I learn from polar bears. I first started learning from an 11-footer. He was just standing there, can't go nowhere. I leave my dogs and walk to that bear. There was no wind. I think in my mind for it to go after me and I go behind on iceberg and think and wait and when it got closer, I climb on top of the iceberg. When it saw me, it stood up and I aim at the heart. I shoot it and it took off real fast. Even though I hit it, it run and then I run after it about 100 yards. I climb an iceberg and I never see it. I think I miss it. Then I use my binoculars and I see the bear inside an iceberg. He had gone another 100 yards.

Hunters use small bore cartridges when hunting so as not to ruin the hide. The bears are skinned and butchered on the ice, all the internal organs are left behind. It is well known that the polar bear liver contains dangerously high levels of vitamin A and is thus strictly avoided. The polar bear meat, well liked by some, is boiled for a long time to tenderize it. After the hide is carefully washed with soap, it is rubbed in the snow to further clean the fur and then stretched on racks to dry. The large hide with its thick coarse fur is used for sewing ruffs, mukluks, hats, and mittens.

During the winter months, slightly over one-fourth of the households reported trapping or hunting furbearers. Although the meat is no longer eaten, furbearer trapping and hunting is an efficiently integrated feature of the annual round of resource activities. Small furbearing land mammals provide much of the fur used in garments. Their trapping and hunting is frequently done in conjunction with food extractive activities. Since the early 1900s, with the introduction of a commercial market for furs, furbearer hunting and trapping often includes an income producing component. The pelts of white or red foxes are sometimes sold to a dealer in Seattle or elsewhere for 50 to 75 dollars for a good

quality pelt. A few hunters will be fortunate enough to find a wolverine, lynx, or mink. Because of its dense, water-resistant fur, wolverines are highly valued locally and rarely sold. They are usually used as ruffs or trim on parkas.

When daylight hours get longer in February, men traveling from the village on snowmachines or with dog teams to check their traps or to search for moose, also may use the opportunity to hunt for ptarmigan or arctic hare. The soft, snow white fur of arctic hares is a popular trim on sealskin slippers. Neither the hare nor the ptarmigan meat freezes well, so they are usually hunted for immediate consumption. As the winter stockpile of wild food resources begins to dwindle, ptarmigan and arctic hare are a welcome source of fresh meat.

RESOURCE DISTRIBUTION AND LAND USE

The knowledge held by local residents concerning the cyclical variation and geographical distribution of fish, game, and plant resources plays a major role in influencing land and resource use decisions. The types of resources exploited and the scheduling of production activities are components of an adaptive strategy designed to take advantage of particular resource concentrations. Resource harvest strategies have been outlined in the preceding section. The following section provides a brief discussion of land use for eight major resource categories (Table 5) based on the geographic distribution and habitat requirements of some of the individual species. It is not intended to be a comprehensive discussion of all areas used or species harvested. The general

extent of human land use for the eight resource categories is depicted in Figures 9-12.

TABLE 5. RESOURCE CATEGORIES USED IN LAND USE FIGURES.

Resource Category	Major Resources Included	Figure Number
Spring and fall seals	ringed, ribbon, bearded, and spotted seal	9
Winter seals	ringed seal	9
Fish	herring; blue and tom cod; smelt; sculpin; flounder; burbot; whitefish; grayling; chum, pink, king, and silver salmon; arctic char	9
Waterfowl	ducks, geese, cranes	9
Moose	moose	10
Small game hunting and furbearer trapping	white and red fox, wolverine, mink, lynx, squirrel, arctic hare, ptarmigan, grouse	10
Polar bear	polar bear	10
Plants	berries, greens, roots, stems, bark, shoots, grasses	11
Walrus	walrus	11
All species	composite of all of the above mentioned resources	12

As previously discussed, patterns of land use depicted on these figures are not attributes of individuals. Rather, they represent community-wide knowledge of where resources might be expected to occur. Land use boundaries remain flexible over time to accommodate variability in the resource base. Therefore, the land use areas depicted on

Figures 9-12 correspond principally with areas used during 1982; yet, they may also represent the general core area of land use over time. The reader is referred to Chapter 1 for a more detailed discussion of the methodology used in compiling mapped information.

Seals (Fig. 9)

All four species of ice seals -- bearded, spotted, ringed, and ribbon -- are associated with sea ice at some time during the year in the Bering and Chukchi seas. The migratory behaviors of ice seals are responses to conditions of advancing and retreating ice. The ice seals travel through the Bering Strait in their annual migrations and at certain times of the year are in the vicinity of Shishmaref.

In the arctic region, ringed seals are the most common and widespread of the ice seals. Of the four species, only the ringed seal is associated year-round with heavy drifting ice (Alaska Department of Fish and Game 1978). They are, therefore, usually the only seal available to Shishmaref hunters during the winter months when the Chukchi Sea is covered with ice. Ringed seals tend to remain close to shore in shallow waters with the shore fast ice. The ringed seal is capable of breathing under a solid cover of stable, thick, snow-covered ice anchored to land by cutting holes through the ice with their sharp claws. During winter sealing hunters look for seals at their breathing holes and at leads that open in the ice. The majority of winter sealing by Shishmaref hunters occurs along the coastline near the village.

As the pack ice begins to move north in the spring, the ringed seals follow, heading into the north Chukchi Sea or the Arctic Ocean. There they will spend the summer out of hunting range for Shishmaref. Also in the spring, the spotted seals begin their migration north, following the retreating ice from the Bering Sea. While the ringed seal is closely associated with the heavier ice, the spotted seal is only seasonally associated with ice in the Bering and Chukchi seas.

Hunters from Shishmaref pursue ringed and spotted seals during the spring and fall migrations as the seals pass near the village. Like ringed seals, spotted seals prefer the shallow, warm water close to shore. During the summer months spotted seals more or less occupy the habitat vacated by the ringed seals (Burns 1978:202). They also occasionally swim into the mouths of rivers and a short ways upstream. Spotted seals tend to concentrate near rivers where anadromous fish go to spawn (Burns 1978:202). Shishmaref residents also observe the passing of herring in the fall and know that the spotted seals will not be far behind.

Ribbon seals are also only seasonally associated with sea ice conditions. The population of ribbon seals is centered in the Bering Sea and only a small proportion will migrate during the spring through the Bering Strait into the Chukchi Sea (Burns 1978:205). Their scarcity in the area is reflected in the small number of ribbon seals taken by Shishmaref hunters. Most ribbon seals harvested by Shishmaref are taken opportunistically by hunters who encounter them in the spring and fall when hunting other species of seal.

The Pacific bearded seal (ugruk) is the largest of the ice seals. The male of the species can weigh up to 750 pounds compared to the 150

pounds of the typical male ringed seal (Rearden 1981:77). Bearded seals are mainly a subarctic species and are only associated with the edge of the sea ice (Burns 1978:197). The most intensive bearded seal hunting by Shishmaref residents occurs in late spring as the seals pass north through the Chukchi Sea. In the fall only a few seals, mainly juveniles, swim close to the shore enroute to their wintering area in the Bering Sea and northern Pacific Ocean. The few juvenile bearded seals taken by Shishmaref hunters in the fall are encountered in the channels and inlets close to the village.

Fish (Fig. 9)

Shishmaref residents catch fish in both marine and freshwater habitats throughout the year. Four species of salmon -- silver, king, chum, and pink -- are found within the Shishmaref use area. Salmon are caught with gill nets along the coast or after they enter spawning streams. Favored locations include the mouths and downstream areas of rivers emptying into Ikpek Lagoon and Shishmaref Inlet. The Serpentine River, far into the upper branches, is an important location during the fall camping period before freeze-up. One resident stated that west fork of the Serpentine River was the only place king salmon spawn in the area.

At the same time or shortly before the salmon begin to run, whitefish are caught in nets close to shore and also at the mouths of rivers. Whitefish are abundantly distributed, with the humpback and broad whitefish present in most, if not all, of the rivers draining into the Chukchi

and Bering seas (Morrow 1980). Adult whitefish are more or less anadromous, although they do not venture far from brackish waters. During fall camping on the Serpentine or Arctic rivers, grayling, and occasionally arctic char, are caught in the whitefish net. A few chum salmon may also be found, but they are generally not considered palatable after they enter the rivers to spawn.

Pacific herring also are caught in gill nets set in fall at the mouths of several rivers and the channels north and south of the village. In the fall herring concentrate in large schools and move inshore to winter in deep bays (Morrow 1980:18). After freeze-up herring and whitefish are caught with nets placed under the ice on the Serpentine River. Some residents reported that the Arctic River is not used after freeze-up because the river is shallow and nets may freeze to the bottom.

Members of the cod family, primarily burbot (ling cod), arctic cod (blue cod), and saffron cod (tom cod), are also important fish resources for residents of Shismaref. Tom cod are considered most tasty in the fall and winter months. They are primarily a marine species which may also enter streams and rivers (Morrow 1980:188). Burbot is found more often in freshwater. They are best for eating in the winter.

Ice fishing or jigging occurs from December until April close to the village in Shishmaref Inlet and along several rivers. Because of the high water in the Inlet some residents prefer to fish on the rivers. The Serpentine River and Nuluk and Grayling creeks are productive ice fishing locales for grayling, arctic char, saffron cod, and burbot. In addition, sculpin, smelt, and flounder are caught during the winter months in Shishmaref Inlet.

Waterfowl (Fig. 9)

Families of birds known to migrate through or inhabit areas near Shishmaref include loons, cranes, sandpipers, gulls, terns, and alcids (Armstrong 1980). However, the most commonly hunted bird species taken by Shishmaref residents are members of the family of waterfowl which include ducks and geese. The most common species of geese include the Lesser Canadian goose, Emperor goose, White-fronted goose, and the brant. Surface feeding duck species inhabiting or migrating through the areas used by local hunters include the mallard, pintail, Green-winged teal, and American wigeon. Diving duck species include the greater scaup, oldsquaw, and several sub-species of eiders. A fish-eating duck, the merganser, is found in the vicinity of Shishmaref but mergansers are rarely hunted as their fish diet is said to taint the taste of the meat.

Shishmaref is located within the major migration route taken by many of the waterfowl species (Selkregg 1976). Brants, pintails, and Emperor and Canadian geese are the most commonly hunted waterfowl. Hunters generally pursue ducks and geese as the waterfowl fly south in the fall. Waterfowl hunting is one of the activities engaged in during fall camping which also includes other activities such as moose hunting, berry picking, and fishing. Especially popular areas for waterfowl hunting are around Shishmaref and Cowpack inlets and along the Arctic and Serpentine rivers. The hunting of waterfowl occurs to a much lesser extent in the spring. Residents have noted that since 1974 when a major storm occurred, waterfowl on their migration northward in the spring appear to be traveling further inland. Hunters in Wainwright, located along

the Arctic coast north of Shishmaref, have noticed similiar changes in migratory patterns (Nelson 1981).

Moose (Fig. 10)

It has only been in recent decades that moose have become abundant for the first time in recorded history in the Seward Peninsula (Rearden 1981:86). Shishmaref hunters recollect that the first moose taken by a village resident was in 1956. Moose do not migrate in the classic sense, however, they do travel considerable distances seasonally between high and low elevations (Alaska Department of Fish and Game 1978). Their diet at various times of the year consists mainly of willows, birch and aspen twigs, sedges, and grasses.

The land area used by Shishmaref residents hunting moose falls primarily within Game Management Unit (GMU) 22E. The 1982 moose hunting season in GMU 22E opened on August 1, 1982 and closed March 31, 1983. Some moose also were harvested from GMU 22D where the season closed earlier on December 31. Hunters are limited to one moose per season in either GMU. For the 1982-83 season antlerless moose could be taken by registration permit only from September 10 to December 31 in GMU 22D and from September 15 to March 31 in GMU 22E.

In the early months of the fall, moose come down from the hills to feed on willows along the drainages. The Serpentine River all the way to the Hot Springs is a common route for hunters pursuing moose by boat before freeze-up. The south and north forks of the Serpentine River and the Arctic River are also popular routes. Hunting slackens as the rivers

begin to freeze in late September and early October. This period also coincides with the moose rutting season, when the meat from the male moose is less desirable.

Moose are pursued with renewed interest after freeze-up and when male moose begin eating again after the rut. Hunters may spend many days or weeks traveling by snowmachine during the winter months looking for moose in GMU 22E. Hunters report that the more likely areas for finding moose are around major waterways including: the upper reaches of the Serpentine and Nuluk rivers, Grayling Creek, Cowpack River, Cowpack Inlet, Nugnugaluktuk River, near Cape Espenberg, and Goodhope River. One hunter reported prioritizing three moose hunting areas. He began by traveling the main and north forks of Serpentine River early in the season, then moved toward the South Fork of the Serpentine and Arctic rivers, and finally to the south of Ear Mountain, including the areas near the Nuluk and Kugrupaga rivers.

Small Game Hunting and Furbearer Trapping (Fig. 10)

Most of the small game hunting and furbearer trapping engaged in by Shishmaref residents occurs during the winter months. These months coincide with when furbearer pelts are in prime condition. Although a wide range of small game and furbearers are known to occur in the vicinity of Shishmaref, only a few species are encountered with any regularity. The species included in this resource category also occupy diverse habitats. Habitats preferred by these species range from the windswept

rocky slopes and upland tundra of the arctic hare, to the coastal and offshore areas of the arctic fox, to the foothills and mountains of the red fox.

The 1982 ptarmigan hunting season in the vicinity of Shishmaref extended from August 10 to April 30. The majority of ptarmigan are taken during the winter and early spring, when along with arctic hare, they become important sources of fresh meat. The soft fur of the arctic hare also is used in sewing projects. Both the arctic hare and ptarmigan include willow in their winter diet. The arctic hare prefers the windswept slope and upland tundra while the ptarmigan is often found near sheltered slopes (Alaska Department of Fish and Game 1978).

Also found in these same general areas are carnivorous or omnivorous furbearers that may feed to some degree on arctic hare and, in some cases, ptarmigan. The most commonly encountered of the furbearers found in the Shishmaref use area include the red fox (especially the cross phase), and to a lesser extent, the wolverine. Other furbearers such as lynx, mink or weasel, muskrat, wolf, and marten are infrequently encountered and thus, only incidental trapping or hunting of these animals occurs. During the winter months, hunters may pursue furbearers and moose at the same time so much of the inland use areas for these two resource categories overlap.

The wolverine is the largest land dwelling member of the weasel family. Like the wolf, wolverine are classified for management purposes as both big game and furbearer. Because of the durability and quality of its fur, wolverine are considered a highly valued furbearer. Although wolverine occupy a wide variety of habitats, they require a large territory

and have a low reproductive rate (Rearden 1981:44). They are never abundant compared to some other furbearers.

One of the more abundant furbearers in the Shishmaref area is the arctic or white fox. Because of their rather unique relationship with the polar bear, arctic foxes are sometimes found during winter far from shore out on the sea ice (Alaska Department of Fish and Game 1978). Arctic fox venture out onto the sea ice to eat the remains of seals killed by polar bears. Some trapping and hunting of arctic fox occurs along the coastline stretching north and south from the village. Arctic fox also are found along major drainages and in the hills south of Shishmaref with the red fox. In areas where the red and white fox overlap, the red fox is dominant (Alaska Department of Fish and Game 1978).

Polar Bear (Fig. 10)

Although the polar bear is related from an evolutionary standpoint to the brown bear, it is considered a marine species because it is closely associated with the sea ice and depends on the arctic marine food chain (Lentfer 1978:220). The habitat of the polar bear spans five countries, corresponding with the flow of the polar ice cap. The highest concentration of bears, however, is found along the southern edge of the ice cap (Rearden 1981:22). In the winter months off the coast of western Alaska, the range of the polar bear extends as far south as St. Lawrence Island in the Bering Sea. In the spring, after female polar bears and their new cubs emerge from their dens in April, the bears move northward ahead of

the receding ice pack through the Bering Strait and Chukchi Sea. Most of the population spends the summer in the northern portion of the ice cap.

The diet of polar bears consists primarily of ringed seals and occasionally walrus or bearded seals. The bears seek areas where sea ice is kept in motion by winds and currents and where open water and newly frozen ice facilitate seal hunting (Kenyon 1978:220). When on land, the bears tend to stay close to the coast and they can sometimes be found along the beach feeding on dead walrus or at garbage dumps.

Polar bears are in the vicinity of Shishmaref during the winter and early spring. Hunters from Shishmaref pursue polar bear both on the sea ice and along the coastline. The majority of hunting, however, occurs away from shore as the larger and older bears tend to be found further out on the pack ice. When traveling south from Shishmaref, hunters occasionally encounter polar bear hunters from Wales approximately 25 miles north of Wales.

Plants (Fig. 11)

Residents usually have several favorite locations where they gather edible plants, but the abundance for any particular area may vary from year to year. Berry pickers and plant gatherers often rely on word of mouth for locating productive areas. The many types of berries and plants collected by Shishmaref residents are found in a variety of habitats, including along the coast and riverbanks, on the open tundra, in marshes, and on hillsides. Especially productive areas for willow, sourdock, wild rhubarb, and dwarf fireweed are along the rivers. Cape

Espenberg and the Serpentine and Arctic rivers are especially good areas for finding sourdock. Along the coast wild celery, beach grasses, and some varieties of berries may be plentiful. Blackberries are generally found in good supply along the coast north and south from the village. Salmonberries and blackberries are also found on the Serpentine River, Quartz Creek, Grayling Creek, and Punguk River. Berries along the river ripen first; those found along the coast, especially at Ikpek, ripen later in the summer.

Walrus (Fig. 11)

The Pacific walrus is one of the largest pinnipeds, the order of marine mammals which includes seals and sea lions. A mature male walrus can weigh over four thousand pounds. Their large protruding tusks also make them unique among the pinnipeds. After near decimation due to commercial exploitation in the late 1800s, the walrus population in the Bering Sea has been slowly recovering in number (Rearden 1981:65). Since 1960 the walrus population has increased steadily in size. Evidence of overpopulation has lead some biologists to speculate that a crash of the walrus population may be inevitable (Rearden 1981:65).

In recent years, major changes have occurred in their geographic distribution as well. Walrus are directly associated with the advance and retreat of ice in the Bering and Chukchi seas (Alaska Department of Fish and Game 1978). They typically winter with the seasonal ice in the Bering Sea. As the ice begins to retreat northward in April, May, and June, many walrus follow it to summer in the Chukchi Sea, mostly west of

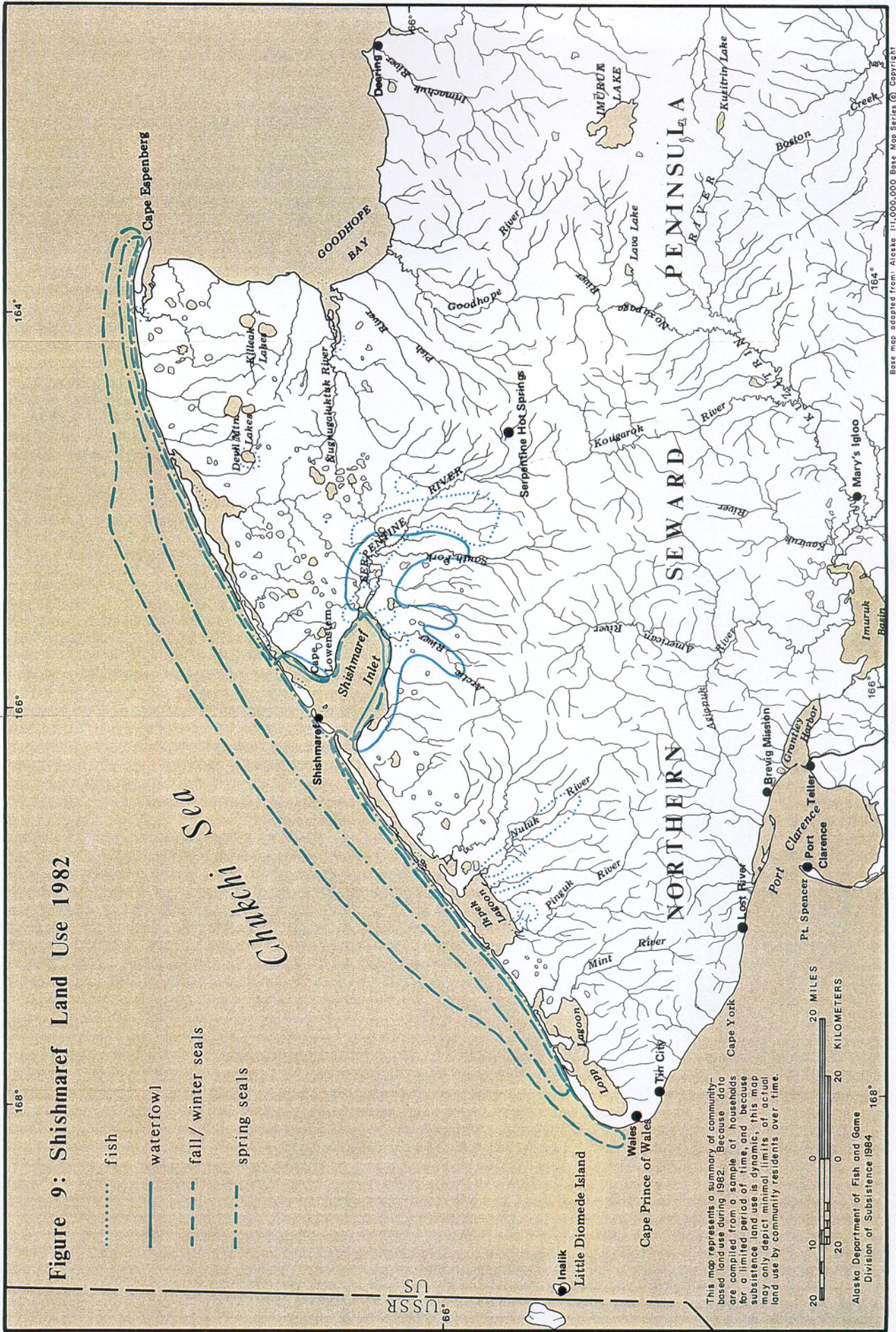
the International Dateline and as far north as Wainwright (Rearden 1981:62). Many of the "bachelor" walrus stay to summer near Round Island in the Bering Sea. In late fall-early winter months of October, November, and December, the herd passes through the Strait heading south. Recent studies, however, have noted that a portion of the walrus population, instead of heading into the Chukchi Sea, stayed to summer in the area between Bering Strait and St. Lawrence Island (Lowry, Frost, and Burns 1980:340).

As the walrus population has expanded in size and geographic distribution, Shishmaref hunters have found walrus to be more accessible for harvest. There has been a concomitant increase in the importance of walrus in the spectrum of wild resources utilized by village residents. The migration pattern of walrus tends to be far from the shores of Shishmaref. As a result, in order to encounter walrus, the range covered by Shishmaref hunters in the Bering and Chukchi seas is widened.

The most favorable hunting period for walrus is in the late spring or early summer. Walrus typically pass through the waters near Shishmaref between mid-June and mid-July. Hunters commonly travel 50 miles or more in the area, covering an area between Little Diomedé on the west, Kotzebue Sound on the north, and Wales on the south. One hunter reported traveling as far as Pt. Hope in pursuit of walrus. In the fall, as the herd returns south, only a few stray walrus are taken.

Figure 9: Shishmaref Land Use 1982

- fish
- waterfowl
- - - fall/winter seals
- · - · - spring seals



This map represents a summary of community-based land use during 1982. Because data are compiled from a sample of households for a limited period of time, and because subsistence land use is dynamic, this map may only depict minimal limits of actual land use by community residents over time.

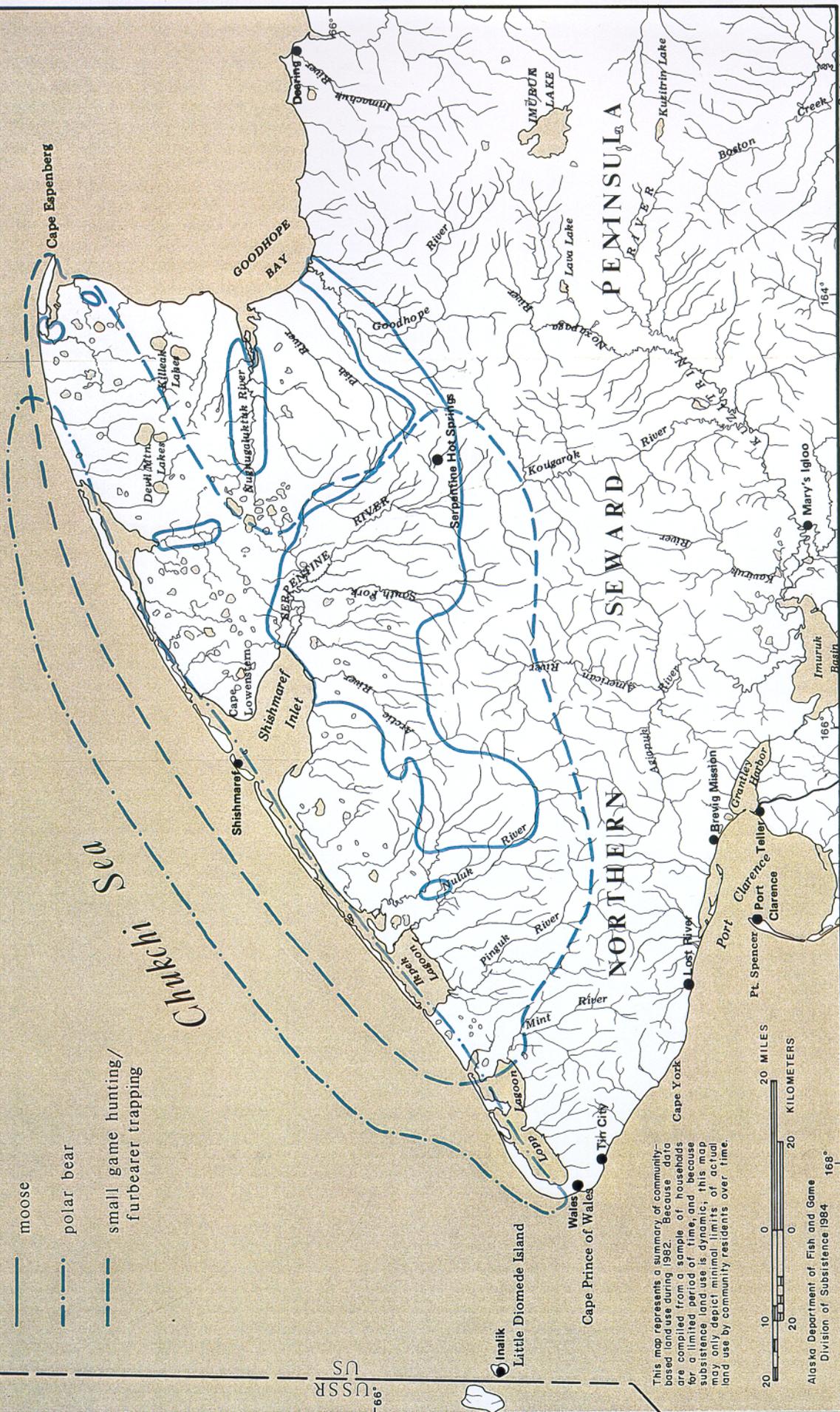
20 10 0 0 20 20 MILES
 20 10 0 0 20 20 KILOMETERS

Alaska Department of Fish and Game
 Division of Subsistence 1984

Base map adapted from Alaska Topographic Base Map Series, Copyright © U.S. Geological Survey, 1978. All rights reserved, including reproduction in whole or in part in any form.

Figure 10: Shishmaref Land Use 1982

- moose
- · - · polar bear
- - - - small game hunting/
furbearer trapping



This map represents a summary of community-based land use during 1982. Because data are compiled from a sample of households for a period of time and because subsistence land use is dynamic, this map may only depict minimal limits of actual land use by community residents over time.

20 10 0 0 20 20
MILES KILOMETERS

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Figure 11: Shishmaref Land Use 1982

- plants
- - - walrus



This map represents a summary of community-based land use during 1982. Because the data are compiled from a sample of households for a limited period of time, and because subsistence land use is dynamic, the actual map may only depict minimal limits of actual land use by community residents over time.

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Figure 12: Shishmaref Land Use 1982

— all species

Wairus hunting extends 50 miles out from coastline

Chukchi Sea



This map represents a summary of community-based land use during 1982. Because data are compiled from a sample of households for a limited period of time, and because subsistence land use is dynamic, this map may only depict minimal limits of actual land use by community residents over time.

20 10 0 20 20 MILES
20 0 20 KILOMETERS

Alaska Department of Fish and Game
Division of Subsistence 1984

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CHAPTER 4

THE INTEGRATION OF CASH IN THE ECONOMY

INTRODUCTION

As described in Chapter 3, the focus of everyday life in Shishmaref in the early 1980s centered around the cyclical pattern of fish and game resource availability. Primary reliance upon aspects of the natural environment formed the foundation of the subsistence-based socioeconomic system. Hunting and fishing provided the most stable and reliable means for attaining economic security. While relegated to a subsidiary position, cash was interrelated with the subsistence component in a way which supported or supplemented wild resource harvest and use activities.

Cash, the less stable component of the subsistence-based economy, is described in this chapter. In the first section, the role of cash and sources of income in Shishmaref in 1982 are examined. In the second section, the structure of wage employment as one aspect of the cash component is more closely examined. In the final section of this chapter, the mutually interdependent nature of cash and subsistence-based activities is discussed, illustrated by case examples taken from Shishmaref households. The reader should bear in mind that the distinction made between the subsistence component and the cash component is for purposes of analysis only. It is both wild resource use and monetary income in articulation which comprises the socioeconomic system. But in order to understand how the system functions as a whole, cash and

subsistence components were isolated and discussed as though they were separate entities.

THE ROLE OF CASH

The influence of cash is entwined with every aspect of daily life as an integral component of the economy. It does not, however, constitute the foundation of economic security. "I may not have any money in my wallet, but I have food from the land, and that is what's important," is a prevailing sentiment among Shishmaref residents. Instead, cash has become integrated in such a way as to supplement or underwrite the resource harvest effort. One way in which subsistence-based efforts are enhanced by cash is through the ability to purchase the technology necessary to effectively carry out certain activities. Money buys the ammunition, rifles, motors, gasoline, and snowmachines vital to harvesting activities. While the majority of meat, fish, and fowl consumed by residents are subsistence derived, cash also provides the means to supplement and nutritionally round out the low carbohydrate and fiber content of wild foods (Heller and Scott 1967) through the purchase of such staples as flour, bread, tea, and sugar.

The cost of those items in a rural community can be substantially higher than in regional or urban centers. Supplies and goods destined for Shishmaref are usually air freighted first to Nome, then brought to Shishmaref via contracted cargo planes or regularly scheduled passenger and mail flights. Residents often find it less costly to make the expensive flight to Anchorage or Nome to make bulk purchases.¹ Or they can

mail order groceries from Nome or Anchorage and pay the shipping costs. Once a year, during the ice free months, the Bureau of Indian Affairs cargo ship, North Star III, arrives to deliver ordered goods to village residents and supplies and fuel for the village. In addition, barges from Kotzebue operate twice a year bringing fuel and supplies.

Locally, people can shop for supplies and groceries at two family owned stores or the Shishmaref Native store. Prices for a sample of items found in the Native store in July 1983 and the cost of the same items in Fairbanks in December 1983 are presented in Table 6. The total cost for the sample of groceries was nearly 40 percent more in Shishmaref and fuel costs were double. It should be noted that Fairbanks' prices are generally ten percent higher than those of Anchorage.

In addition to the higher cost, supplies available locally are limited, and some items, such as fresh fruits and vegetables, are seldom available. When they are, the extremely limited stocks of fresh produce are quickly depleted despite their high cost and poor quality. Shortages of many nutritionally important food items occur, particularly before a scheduled delivery. As an example, for three weeks in October and November 1982, no meat other than frozen chicken was commercially available in Shishmaref stores.

Cash income is consistently lower in most households in rural communities than in the more urbanized areas of the state. The median annual income for all Shishmaref households in 1979 was \$11,875 (U.S. Bureau of Census 1980b). By way of comparison, average household income in Anchorage in 1979 was \$30,730. In Nome, it was \$27,467. And for the state as a whole, median household income was \$25,414 (Wolfe and Ellanna 1983).

TABLE 6. SAMPLE OF FOOD AND FUEL PRICES
IN SHISHMAREF AND FAIRBANKS 1983.

Food	Shishmaref ^a	Fairbanks ^b
Sugar (5 lbs)	\$ 3.25	\$ 2.27
Milk (5 oz can)	.95	.37
Flour (25 lbs)	11.25	6.64
Coffee (3 lbs)	10.65	7.65
Bread (1 loaf)	1.75	1.13
Eggs (dozen)	2.00	1.21
Bacon (1 lb)	5.39	2.17
Crackers (1 lb box)	2.60	1.32
Potatoes (10 lbs)	5.05	4.07
Onions (1 lb)	.65	.56
Butter (1 lb)	<u>4.05</u>	<u>2.17</u>
Total	\$47.59	\$29.56
<u>Fuel</u>		
Gasoline (1 gal.)	\$ 2.51	\$ 1.26
Oil (1 gal.)	2.29	1.12
Heating Oil (55 gal. drum)	<u>125.75</u>	<u>61.60</u>
Total	\$130.55	\$63.98

^aShishmaref data from July 1983.

^bFairbanks data from December 1983.

Also, Native households usually have incomes considerably lower than non-Native households². In Shishmaref the average annual income for half of all Native households tallied in the federal census was under \$10,000, while half of the non-Native households reported incomes which exceeded \$20,000 (Fig. 13).

SOURCES OF INCOME

The measure of household income includes both earned (wage employment and self-employment) and unearned sources (state and federal transfer payments). Because these two sources are interdependent and may fluctuate from month to month, it is difficult to accurately estimate their individual contributions on an annual basis for Shishmaref. In most northwest Alaskan communities, however, households depend on a combination of earned and unearned income with emphasis between the two sources shifting during the year in synchrony with natural resource cycles.

Unearned Income

The high costs associated with rural life and the comparatively low annual income mean that many households receive, for at least part of the year, some form of state or federal funds. Transfer payments come in the form of direct monetary assistance or through other types of aid such as assistance with expensive energy costs or low interest home mortgage loans. Four public programs comprise the major financial contributors to household incomes in rural communities (Alaska Department of Health

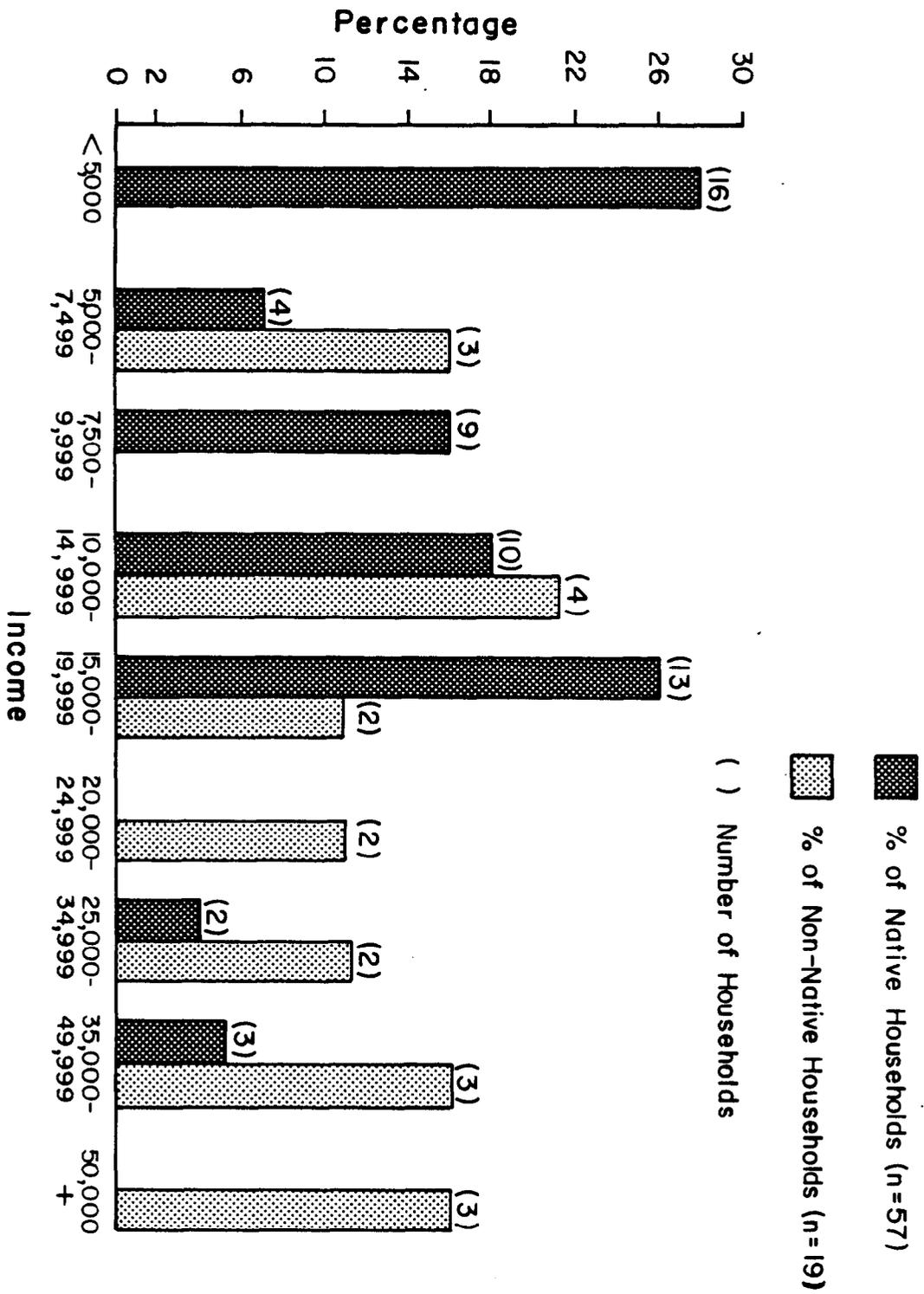


Fig. 13. Levels of household income, Shishmaref, 1979.

and Social Services 1984). The amount of money distributed under three of these programs -- Old Age Assistance, Permanent Disability, and Aid to Families with Dependent Children -- is determined primarily according to household income, but these programs may have other requirements as well.³ In 1982 an average of 35 Shishmaref households per month received some form of financial aid through 1 of the 3 public assistance programs listed in Table 7. The fourth program, known as the Longevity Bonus, is not based on financial need, but rather on age and length of residency in Alaska.⁴ In addition, households which meet the low income standards can receive certain services, such as Medicaid and Food Stamps.

TABLE 7. 1982 MONTHLY AVERAGE NUMBER OF HOUSEHOLDS THAT RECEIVED FINANCIAL AID FROM THREE MAJOR PUBLIC ASSISTANCE PROGRAMS.

Program	Funding Source	Number of Households
Old Age Assistance	State	7
Aid to Permanently Disabled/Blind	State	6
Aid to Families with Dependent Children	State/Federal	22

Source: Alaska Department of Health and Social Services, Division of Public Assistance, 1982.

These programs are not without complications. Some people, particularly the elderly, may be unaware that they qualify for certain benefits. In addition, receiving benefits may exclude a household from other programs. For example, households which receive Old Age Assistance or a Longevity Bonus are, in most cases, over the allowable income level and ineligible to receive Food Stamps. Furthermore, many programs are

dependent upon the current state or federal administration's budget allocations and, consequently, subject to increases or cutbacks in funding levels from year to year. The variable funding level and the lack of local involvement in the federal or state decision-making process on budget allocations cast a cloud of uncertainty over the anticipated support. Despite this, federal and state transfer payments are often the most stable form of cash income for many households.

Earned Income

Public funds also assist the community as a whole through programs which either directly or indirectly stimulate employment. In some cases, employment generating programs are administered through local government or the non-profit regional corporation. In Shishmaref, community support programs such as Adult Basic Education, Infant Learning Program, and Comprehensive Alcohol Program provide a service to the community while including training and employment for local administrators, counselors, and teachers. Additionally, during 1982 the federally funded Community Employment and Training Act (CETA) program provided 20 short-term employment opportunities for Shishmaref residents. The CETA program was replaced by the Job Training Partnership Act in 1983.

Some of the CETA positions were involved in locally contracted, but federally or state funded, construction projects: a garage for city equipment, erosion control sandbagging, and a "washateria". Other construction projects in 1982 were handled by non-local building

contractors. Although local hire policies exist in Shishmaref, they are not always followed, in part, because some of the construction positions require specialized skills. Nevertheless, wage employment in connection with the construction of 40 new homes and an elementary school accounted for a sizable portion of the income earned by many Shishmaref households in 1982. Construction jobs, when available, often constitute the most substantial source of earned income; however, the work is neither steady nor long term. The majority of construction jobs are described as "one shot deals."

Opportunities in Shishmaref for more dependable full-time or part-time permanent jobs are also scarce. Most of these jobs are community support or service oriented positions such as postmaster, airport maintenance personnel, power plant operator, Native store clerk, health aide, secretary-clerical, and public safety officer. The schools provide stable employment for some residents, although few local residents fill the full-time professional positions. Privately owned businesses located outside the community, but with local interests, are another source of reliable earned income. Regional air carriers and the privately owned (non-local) telephone company have local representatives who handle many of the day-to-day responsibilities on a part-time basis.

Some form of self-employment is common compared with wage employment. Few households are able to derive the majority of their income from self-employment. The sale of pelts from certain furbearers brings in some income for hunters and trappers. However, the highly prized pelts of such furbearers as wolverine, lynx, mink, and wolf are not

found within the Tapkakmiut territory in great numbers, so most of these pelts are locally used.

The manufacture of the tools, clothing, and sleds used in daily life have long been a regular activity of most households. Cottage industries include the manufacture of these items and other handicraft products from skin sewing, ivory carving, and doll making. The market for these products requiring such skill and craftsmanship is growing, but commercial outlets in the village are few. Most locally made items are sold through craft shops in Nome, Anchorage, or Fairbanks. The sale of handmade products contributes to many household's income. This type of self-employment is often accomplished in conjunction with a full-time or part-time wage paying job.

Privately owned family businesses in Shishmaref are, overall, the least common form of self-employment. They tend to be full-time occupations for the individuals in charge, but are more flexible in terms of scheduling fishing and hunting activities than most types of full-time wage employment. Family run businesses may be a source of wage employment for residents as well. Two family stores which sell groceries and other supplies provide employment for approximately ten individuals, usually members of the local family. Two family owned and operated reindeer herds also provide periodic employment for residents throughout the year.

As a component of the cash sector, reindeer herding is characterized as a commercial endeavor, a form of self-employment, and a source of wage employment. Yet reindeer herding occupies an unique position in

the village economy by also embodying many of the traits of subsistence-based activities -- division of labor, production within kin-based units, and patterns of sharing. The benefits accrued through herding extend beyond the herd owner and his family and filter to the rest of the community by providing employment, meat, and raw materials as well as producing spendable income. To best explain the dual role reindeer herding plays in the economic makeup of Shishmaref, it is worthwhile to briefly digress and trace the commercial development of the industry since its revival on the Seward Peninsula in the late 1940s. (For a more detailed discussion of the history of the reindeer industry in northwest Alaska see Lantis 1950; Olson 1969; Ray 1975; Stern 1980; Stern et al. 1980.)

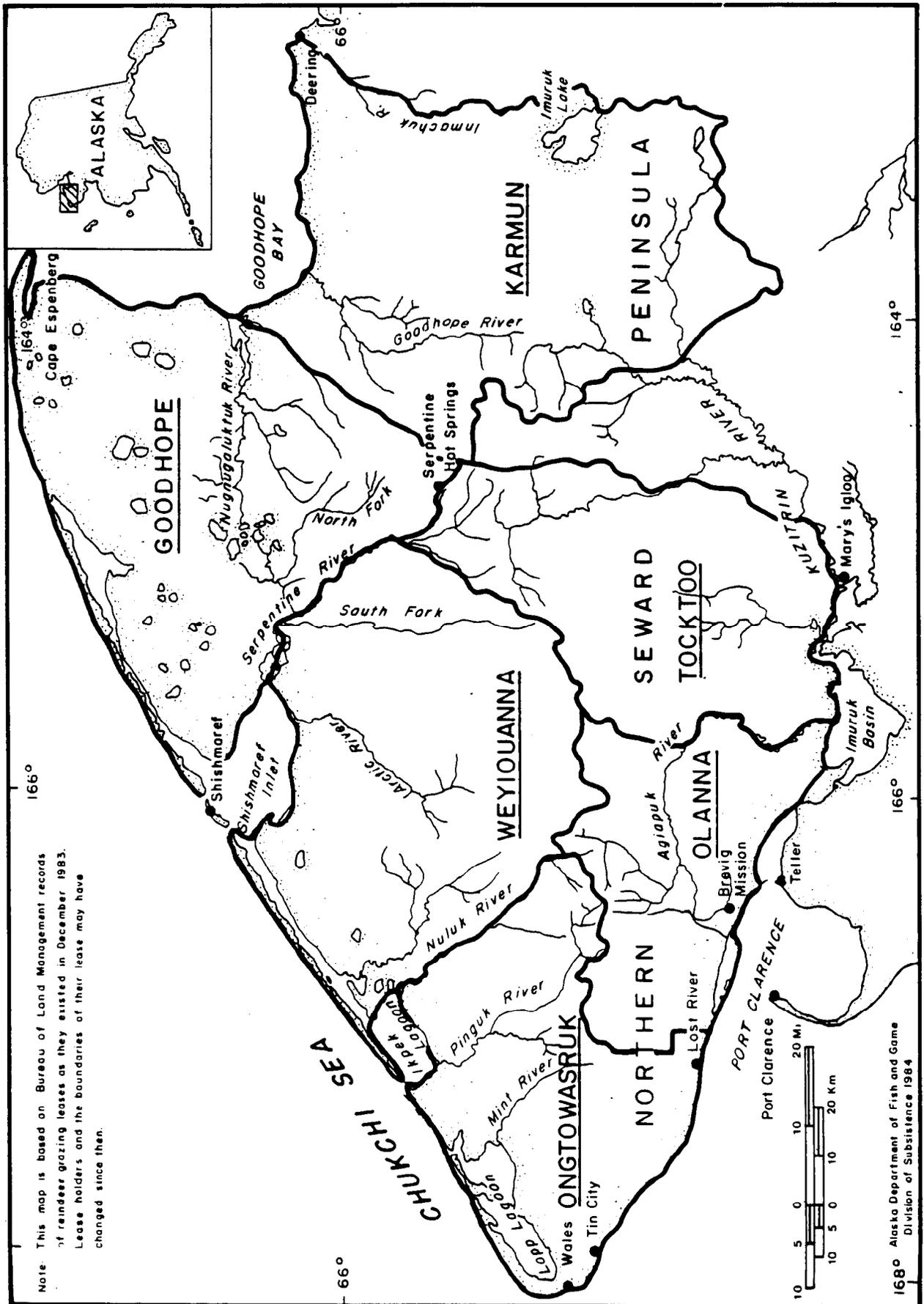
THE ECONOMIC ROLE OF REINDEER HERDING

As mentioned earlier, reindeer were introduced in northwest Alaska in 1892 by missionaries and the federal government as part of a program to educate Alaskan Natives in the ways of Western economy and culture. The expressed hope was that reindeer, by providing a source of food, clothing, and employment for Eskimos, would facilitate in the establishment of permanent year-round settlements. The industry flourished for a time, but by the mid-1940s the number of reindeer had dwindled to the point where there was little active participation on the part of most herd owners. The majority of deer that remained in northwest Alaska were under the supervision of the Bureau of Indian Affairs (BIA). Since 1937 federal law had restricted the ownership of reindeer in Alaska to Alaskan Natives.

In the late 1940s the BIA attempted to revive the industry by loaning reindeer to experienced herders for a specified number of years. When that time had elapsed, the herder was expected to repay the loan of reindeer. This "trial and error" program produced, at best, mixed results. One factor contributing to the rate of failure in areas to the north and east of Seward Peninsula was the return of the Western Arctic Caribou Herd (WACH) to northwest Alaska at approximately the same time (Skoog 1968). With caribou herds easily accessible, the local demand for reindeer meat declined, and herding became less profitable. Perhaps more importantly, as the caribou herds began moving further west, herders experienced large losses of reindeer to the migrating caribou herds. By 1968, with few exceptions, herding was confined to the area around Seward Peninsula.

In 1982 there were 14 reindeer herds located on or adjacent to the Seward Peninsula and most were privately owned. The total number of animals in the summer of 1981 was estimated to have reached 20,500 (Thomas and Arobio 1983:63). Six reindeer grazing leases covered the northern portion of the peninsula: Goodhope and Weyiouanna based in Shishmaref, Karmun in Deering, Ongtowsruk in Wales, and Tocktoo and Olanna in Brevig Mission (Fig. 14). The grazing area for all the northern Seward Peninsula herds except those of Olanna included a portion of the Bering Land Bridge National Preserve. While revisions in the permit system are pending, in 1982 herders were still required to obtain grazing permits to use Preserve land from both the National Park Service and the Bureau of Land Management, which assumed responsibility for managing the grazing areas from the BIA in 1968.

Base map adopted from Alaska 1:1,000,000 Base Map Series © Copyright Arctic Environmental Information and Data Center, University of Alaska, 1978.



Note: This map is based on Bureau of Land Management records of reindeer grazing leases as they existed in December 1983. Lease holders and the boundaries of their lease may have changed since then.

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Fig. 14. Reindeer grazing permits on northern Seward Peninsula, 1983.

The reestablishment of herding in Shishmaref began with the Goodhope herd. During the 1920s Fred Goodhope Sr. worked as a herder for the Deering Reindeer Stock Company and, thus, had the experience required under the BIA program. In 1958 he and Harold Dimmick received a loan of 1,500 BIA deer and moved them to the area around Cape Espenberg. Dimmick quit the business in the fall of 1963, leaving Goodhope the sole owner. Five years later, the herd had grown to 2,782 reindeer and Goodhope had moved his base of operations to Shishmaref (Stern et al. 1980:88). He sold a portion of the herd a few years later to Clifford Weyiouanna of Shishmaref. As the grandson of Allockeok, a successful herder from Shishmaref in the 1930s, Weyiouanna was part of a family with a long tradition of reindeer herding, and the herd prospered in the following years. When Goodhope Sr. died in 1979, ownership of his herd passed into the hands of his son, Fred Goodhope Jr. Today, both the Goodhope and Weyiouanna herds are viable and independent businesses -- much the way the BIA had envisioned the industry in the 1940s.

In the 1940s commercial emphasis of the herding industry was on marketing reindeer meat. Development of a commercial outlet for reindeer antler in the late 1960s sent the industry off in another direction. Widely used as an ingredient in certain Oriental medicines, the soft, spongy ("velvet") antler possessed great economic value. Through the efforts of a Korean businessman, the velvet antler from Alaskan reindeer was exported and sold to foreign markets, primarily South Korea.

The development of the antler market had a major economic impact on the reindeer industry. In terms of total antler production, one animal on the average produces approximately one pound of harvestable antler

each year (Stern 1980:335). In 1969, the first year in which records were kept, herders received \$1 per pound. This figure did not include shipping and overhead costs. The price rose by 1977 to \$8 per pound, and by 1980 herders received around \$40 per pound of antler. Although still considered the dominant source of income, the future of the Alaskan antler market is somewhat uncertain. One contributing factor is the number of large scale commercial red deer farms targeting the antler market is expanding, both in the United States and abroad.

Harvesting of reindeer antler for commercial export has also affected the seasonal round of activities associated with reindeer herding. During several months of the year, herders on Seward Peninsula do not closely monitor the herd, although they are usually aware of the herd's location at any time. Corralings or "handlings" when the herd is rounded up are extremely intensive periods of activity which may last several days and nights. In order to cut the antler when it is largest, yet still spongy in texture, a corraling of the herd near the end of June or early July is required. Also during the summer corraling, new fawns are marked, bulls castrated, and a few deer are butchered for immediate consumption.

Besides the summer corraling for procuring antler, the reindeer are usually corralled two other times during the year. In the winter months, generally around late October to late November when the deer are in their prime, the major butchering for meat occurs. By early spring, the herd is moved from the winter grazing ground to the fawning area. Reindeer fawning usually occurs from April 15 to May 30, and this is a critical time for the herder as the young deer will need to be watched

and protected from predators. At certain other times of the year, northern Seward Peninsula herders may organize a corralling to separate out the various herds and return them to designated grazing lands.

In contrast to the rapid growth of the antler market, the demand for reindeer meat has remained steady. The distribution of reindeer meat by the Shishmaref herders occurs at three levels. The most important use of the meat is for home consumption, meat-wage payments, and sharing. Second is the sale to local stores. And last, any remaining meat will be sold to regional outlets in Nome, Bethel, and Kotzebue. In the past, commercial outlets besides local stores and regional centers also have included restaurants in the continental United States which cater to tastes for "wild meats."

Shishmaref residents relish the taste of reindeer. After a butchering, meat from the local herds will usually find its way into many people's homes. Herders typically give workers a choice of payment -- cash or reindeer meat. Many men, particularly those with families, prefer to receive meat. The meat received by workers is often shared with other households. In addition, the herders themselves distribute meat in the community. In the days following a corralling, guests visiting the herder's home are commonly served a meal of reindeer.

Residents can also purchase various cuts at the Native Store. In 1982, when reindeer meat was available, it sold for \$1.20 a pound, far cheaper than other fresh meat choices. Reindeer by-products, including the antler, hide, and leggings, can be purchased directly from the herder and are used locally in a variety of crafts.

Despite the requirements of reindeer herding, Shishmaref herders and their families actively partake in wild resource harvests and use throughout the year. Much like subsistence-based activities, reindeer herding involves a seasonal round and many of the activities associated with herding are easily integrated with hunting and fishing. For example, excursions to check the location of the herd in winter may provide an opportunity to hunt arctic hare and ptarmigan. Herders also rely on close relatives to share wild resource harvests and to assist with herding jobs when needed.

Members of the herder's family are most closely involved in herding activities. During certain phases of the seasonal round, however, it sometimes becomes necessary to hire individuals who may be non-kin. The reindeer herder in this role is an employer, but the structure of the job is usually quite different from conventional types of employment. Hours of employment are flexible and designed around the time needed for hunting and fishing. The summer corralling for antler is the time of greatest economic importance to the herder. But it is scheduled after ugruk hunting has ended so as not to interfere with this critical resource harvest period.

THE STRUCTURE OF WAGE EMPLOYMENT

In the preceding discussion, the role of cash income as a secondary, yet necessary, supplement to the subsistence-based economy in the early 1980s has been stressed. The various types of wage employment opportunities for the community of Shishmaref have been described. But what are

the present patterns of wage employment participation and how are they geared to other aspects of the economy?

A commonly held assumption contends that working for wages is incompatible with the diverse cycle of resource harvesting activities. Support for this notion often comes from directly applying economic models derived from complex industrialized or market-based societies to subsistence-based societies. A chief distinction between the two stems from differences in the nature of economic transactions (Dalton 1968). In market societies, cash or other forms of money are the principal means of exchange used to conduct most economic transactions. Cash plays a critical role in maintaining economic security by providing a means for meeting the biological, social, and material requirements of individuals in the society. The primary avenue for the acquisition of cash is through the use of labor or wage employment. Because of its prominent position as a source for attaining economic security, wage employment is characteristically the focus of economic activity in market societies.

In a subsistence-based society, primary economic security is derived through the procurement and use of wild resources. Reciprocity, sharing, and other forms of resource distribution are important vehicles for conducting economic transactions. Cash tends to play a less prominent role in subsistence-based societies. Wage employment, while a major source for acquiring cash, is not the central focus of economic activity. Many of the recent studies in rural Alaska suggest that wage employment in most subsistence-based communities tends to be integrated at some level with other aspects of the economy and society (Chance 1966; Foote and

Williamson 1966; Jorgensen and Maxwell 1983; Kleinfeld et al. 1981, 1983; Kruse et al. 1981, 1982; Sonnenfeld 1957; VanStone 1960; Wolfe 1979, 1981; Wolfe and Ellanna 1983). Although the level of integration may vary depending on the number and type of positions available and the specific ecological setting, working for wages is not necessarily incompatible with resource use and harvest.

To examine the relationship between wage employment and resource use in Shishmaref, the Division of Subsistence survey conducted during 1983 recorded employment patterns over the course of an entire year (1982) for a sample of households. Every individual between the ages of 16 to 65 with a "yes" response to the question, "employed during 1982?" became part of a subset defined as the employed labor force. Based on this definition, the employed labor force was composed of people in the sample population between the ages of 16 and 65 who engaged in a wage paying job for one month or more during 1982. An employment profile describing each job held was completed for each member of the employed labor force.

When interpreting the employment data for Shishmaref it is important to bear in mind that the definition of employed labor force used in the 1983 survey differs markedly from that used by the U.S. Bureau of Census. For the U.S. Census, the labor force is defined as individuals between 16 and 65 years of age who are either (a) employed or (b) unemployed and looking for work. This classificatory scheme does not lend itself well to an examination of employment patterns in subsistence-based communities for two major reasons. First, according to the definition, in order for unemployed persons to be counted as part of the labor force, they must be actively seeking employment (Kleinfeld et al. 1983:5). In most small

communities where people know one another and news travels quickly, residents often rely upon other means for acquiring a job. Most residents do not participate in actively looking for work since they are usually already aware of what jobs are available locally (Kleinfeld et al. 1983: 5).

Second, and more importantly, the U.S. Census presents a glimpse of the employment picture at only one point in time. When the census is taken, usually around April 1, only those presently working are counted as employed. Because of the short-term nature of many wage employment opportunities in subsistence-based communities, this count excludes a large number of individuals who are currently unemployed but may have worked at other times during the year. Additionally, April is characteristically a month of relatively lower employment rates in subsistence-based communities because of the lack of construction projects. It was concluded that labor force participation rates might appear artificially low for these communities given the U.S. Census definitions and data collection methods. The Division of Subsistence survey, which measured monthly levels of employment for 12 months, should reflect a more complete picture of the employed labor force in 1982.

For purposes of the 1983 survey, the stricter definition of wage employment as the "performance of work at stipulated rates under the supervision of an employer" (Robbins 1968:90) was expanded to include self-employment as well. It encompassed all permanent, seasonal, or temporary jobs, either part-time or full-time. On the one hand, wage employment was defined by the respondents. Reindeer herding was considered by herders as an occupation and full-time job. On the other

hand, reindeer "helpers," who occasionally worked during the year, did not consider their work to be a job they held. Positions with non-profit agencies or the school board as representatives or members and which required occasional and limited involvement were not considered a wage paying job by the holders of these posts. Also, not considered wage employment were most cottage industries and other forms of self-employment, unless it was a major source of income for survey respondents. In general, sporadic or infrequent wage paying or income producing incidents were not considered wage employment as defined by the survey.

Before continuing on to a discussion of the employed labor force in Shishmaref the reader should keep in mind that inferences based the percentages and numbers represented here should be made with some caution. There is no indication that 1982 was in any way a "typical" year in terms of community employment patterns. In addition, although more than half the households in the community are represented in the sample, it is still a small population by statistical measures.

Characteristics of the Employed Labor Force

The majority of surveyed households in Shishmaref participated in the employed labor force at some time during 1982. Thirty-six (84 percent) of the 43 households included in the survey had members who held a wage paying job (Table 8). This figure does not include numerous individuals under the age of 16 who were employed during the summer months under the Summer Youth Employment Program. In over half of the

cases, only one person in the household had worked. A notable exception was the household with eight members which reported five working individuals. It was not always the case that the individual designated as household head was one of the employed. In 1982 the household head held a job in only 27 (47 percent) of the sampled households with working members.

Nearly half (49 percent) of the 119 persons in the sample population between the ages of 16 and 65 held a job of one month or more during 1982. This percentage stands in marked contrast to the 32 percent employed labor force counted in the 1980 U.S. Census. The discrepancy is most likely not the result of more people working in 1982, but rather is due to the difference in survey methodology discussed earlier. Among the 57 individuals in the employed labor force of 1982, the majority held only one job during the year (Table 9). Seven persons reported having two or more jobs. Of those cases, two persons reported holding two jobs concurrently. For example, he or she could be employed part-time as an airline ticket agent while also being employed part-time as an adult education instructor.

A total of 68 jobs were held by the 57 individuals comprising the employed labor force. Employers for the 68 jobs are shown in Table 10. City government, responsible for much of the hiring for short-term construction jobs, accounted for one-quarter of wage paying positions.

Fifty-eight (85 percent) of the 68 jobs were located in Shishmaref. Of the ten jobs located elsewhere, seven were in Nome, two in Anchorage, and one was located several places in Alaska. It is not unusual for one or more members of a household to travel or even move to regional or

TABLE 8. NUMBER OF PERSONS IN HOUSEHOLD EMPLOYED IN 1982.

Number of Persons Employed	Number of Households	Percentage of Total Sample Population (n=43)	Percentage of Employed Households (n=36)
0	7	16	--
1	20	47	56
2	13	30	36
3	2	5	5
5	1	2	3

Source: Division of Subsistence 1983.

TABLE 9. NUMBER OF JOBS HELD PER PERSON IN 1982.

Number of Jobs Held	Number of Persons (n=57)	Number of Jobs (cumulative)
1	50	50
2	4	58
3	2	64
4	1	68

Source: Division of Subsistence 1983.

TABLE 10. EMPLOYERS FOR 1982 EMPLOYED LABOR FORCE.

Employer	Number of Positions	Percentage of Employed Labor Force
City	17	25
State	3	4
Federal	2	3
Regional corporation	7	10
School district	12	18
Private enterprise	13	19
Owner-operator	4	6
Construction (private)	10	15
Totals	68	100%

Source: Division of Subsistence 1983.

urban centers for purposes of employment. Nome is the center of wage employment for the region, and during 1982, a sizable portion of the population was comprised of village residents who had come for short-term employment (Ellanna 1983:94-96). Almost all of the Native households from villages living in Nome had some form of wage employment.

The total length of time a person was employed for all of their jobs ranged between 1 and 12 months. However, over 60 percent of the employed labor force worked for 10 months or more. The majority of individuals also tended to stay with a job through its duration (Table 11). The most frequently cited reasons for leaving a position was that the job ended or was temporary. At the end of 1982, almost 40 percent of the employed labor force were still at their jobs.

Differences Between Men and Women in the Employed Labor Force

Thirty-four men (60 percent) and 23 women (40 percent) comprised the employed labor force. The majority of positions held by men were laborer jobs associated with construction projects. Other jobs held by men included work in the fields of maintenance or service, private enterprise, and education. The 34 men who worked sometime during 1982 represented 51 percent of all men between the ages of 16 and 65 in the sample population. National labor force participation (which includes both employed and unemployed looking for work) in 1982 averaged 76 percent (Alaska Department of Labor 1984). Although the Shishmaref data are not directly comparable with the national statistics, they do suggest that the

participation rate of Shishmaref men in the labor force fell well below the national average.

TABLE 11. REASONS GIVEN FOR LEAVING JOB IN 1982.

Reason	Number of Responses (n = 70) ^a	Percentage of All Responses	Percentage of Responses From Those Not Still Employed (n=43)
N/A (still employed)	27	39	--
Job ended	10	14	23
Summer or seasonal	19	27	44
Got better job	3	4	7
Not enough money	2	3	5
Family duties	1	1	2
Other reasons	8	11	19

^an=70 because two persons gave two reasons for leaving their jobs. Source: Division of Subsistence 1983.

For Shishmaref women employment patterns in 1982 reflected a different situation. The 23 women who held jobs represented 41 percent of all women between 16 and 65 years of age in the sample population. While this rate of participation in the employed labor force is ten percent lower than their male counterparts, it more closely approaches national employment figures. In 1982 over half (53 percent) of the U.S. female population were in the labor force (Alaska Department of Labor 1984).

According to national employment trends, women's involvement in the wage economy in recent decades has been increasing commensurate with new employment opportunities. Employment opportunities for Inupiat women in northwest Alaska also have clearly increased in recent years. Economic growth in northwest Alaska and the expansion of local governments have created wage paying jobs which, in large measure, have been filled by women. Many of the positions held by Shishmaref women were in the fields of clerical support, education, health, and social services and were affiliated with government supported projects or programs.

When the male and female employed labor forces are broken down by age and the number of months worked (Table 12) other interesting contrasts appear. The group of men ages 16 to 25 comprised fully one-third of the male sample population, yet this group represented only 9 percent of the employed labor force. For the four other age groups of men, a much larger proportion of the sample population worked for wages at some point during 1982. Well over half (56 percent) of the male employed labor force held jobs for 9 months or more. As the average number of months of men's employment decreased so did the rate of participation. Employment of the shortest duration (1 to 4 months) did not include any men from the youngest or oldest age groups.

While the 16 to 25 age group represented the smallest group in the male employed labor force, the opposite was true for women. The 9 women ages 16 to 25 who held jobs during 1982 accounted for 34 percent of the total. Together with women from 26 to 35 years of age they represented 65 percent of the employed labor force. In general, women tended toward either high (9 to 12 months) or low (1 to 4 months) involvement in the

TABLE 12. A COMPARISON OF MEN AND WOMEN IN THE 1982 EMPLOYED
LABOR FORCE BY AGE AND NUMBER OF MONTHS WORKED.

Number of Months Worked	-----Age-----					Total Employed	Total Employed (Percentage)
	16-25	26-35	36-45	46-55	56-65		
Men (n=34)							
9-12	0	9	3	3	4	19	56%
5-8	3	1	1	3	1	9	26%
1-4	0	2	2	2	0	6	18%
Total Men Employed	3	12	6	8	5	34	--
Total Men Employed (Percentage)	9%	35%	18%	23%	15%	--	100%
Total Men in Sample Population	25	15	9	9	7	--	--
Male Sample Population Employed (Percentage)	12%	80%	67%	89%	71%	--	--

Women (n=23)							
9-12	5	5	2	3	0	15	65%
5-8	0	1	0	0	0	1	4%
1-4	4	1	0	1	1	7	30%
Total Women Employed	9	7	2	4	1	23	--
Total Women Employed (Percentage)	34%	30%	9%	17%	4%	--	99%
Total Women in Sample Population	21	13	5	10	6	--	--
Female Sample Population Employed (Percentage)	43%	54%	40%	40%	17%	--	--

Source: Division of Subsistence 1983.

employed labor force. Only 1 woman (4 percent) was at the middle level of 5 to 8 months duration of employment. By way of comparison, nearly two-thirds (65 percent) of women in the employed labor force worked 9 months or more.

Keeping in mind that the 1982 employment results are based upon a very small sample for each age group, gender and age differences in the employed labor force can be summarized. Shishmaref men outnumbered women in the employed labor force by a ratio of 3 to 2. Over half of the men and women held jobs for nine months or more. Most men in the sample population tended to wait until at least age 26 before entering the labor force. After that male participation in the employed labor force for the various age groups ranged between 67 and 89 percent. For women, on the other hand, the age group of 16 to 25 represented the largest share of the female employed labor force. The participation rate of women in the sample population in the employed labor force was between 40 and 54 percent for all age groups except for the oldest group (56 to 65). Then involvement in the employed labor force dropped off considerably.

There is some evidence to suggest that the 1982 employment picture in Shishmaref does not dramatically differ from other Inupiat communities in north Alaska. The most comprehensive quantitative examination to date of wage employment among Inupiat men and women was conducted in the Arctic Slope Region (commonly called the North Slope) by the Institute of Social and Economic Research in cooperation with the North Slope Borough (Kleinfeld et al. 1981, 1983; Kruse et al. 1981, 1982). The 1977 study was initiated, in part, in response to increased wage employment opportunities created through oil development. Many of the employment

opportunities were available through the Borough. In general, the jobs tended to be high paying and culturally adapted by allowing for subsistence leave and work absences (Kleinfeld 1983:1).

Results of the North Slope study were based primarily on interviews with 290 Inupiat adults, representing 59 percent of the Inupiat households in Barrow and 5 major North Slope villages. Researchers collected employment histories from survey respondents for a period covering one year. Labor force participation among the 88 North Slope Inupiat men between the ages of 18 to 54 who lived in the villages averaged 53 percent annually. Participation averaged 38 percent for the 64 women in the same age and geographic group (Kleinfeld et al. 1981:8-9).

When Barrow, the regional employment center was included, labor force participation rose to 58 percent for men and 52 percent for women. These figures compare with national labor force averages for 1977 of 91 percent for men and 61 percent for women. Based on these figures, the participation rate of Inupiat men in the North Slope labor force was substantially lower than national averages while Inupiat women's participation more closely approximated national averages.

An examination of all persons in the North Slope sample who worked sometime during the study year (defined as the employed labor force in this study) reveal other similarities with the Shishmaref data. Men outnumbered women by a clear majority in the North Slope employed labor force. Ninety-two percent of the men aged 18 to 54 held a job for at least 2 weeks of the year compared to 74 percent of the women in the same age group (Kleinfeld 1981:8-9). In part, the extremely high level of

employment compared to Shishmaref is due to the response of North Slope residents to the proliferation of "good" jobs created by the Borough.

The high employment participation rate of Inupiat men must also take into account the fact that nearly one-half of the men were classified as intermittent workers. That is, they were not employed or looking for work for at least some part of the year, and during which time, they were not counted as part of the labor force. The dominant explanation for the high incidence of intermittent workers is that many men in the sample population choose to remain out of the labor force in order to participate in the subsistence sector (Kleinfeld et al. 1983:8). A vast majority of the men of employment age participated to some degree in certain primary hunting and fishing activities. Most stated a preference for moderate levels of activity in both the employment and subsistence economies (Kleinfeld et al. 1983:16).

Across all age groups in the North Slope sample men maintained a higher level of participation in primary subsistence-related activities than their female counterparts (Kleinfeld et al. 1983:16). This relationship was most apparent for the youngest age groups. Men ages 18 to 24 exhibited one of the highest participation levels in the subsistence sector of all age groups, yet they also had the lowest level of involvement in the labor force. By way of contrast, young women ages 18 to 24 had one of the lowest levels of involvement in subsistence effort and the highest rate of employment participation (Kleinfeld et al. 1983:15-16).

In general, Inupiat women in the North Slope sample tended to be employed longer than Inupiat men. Among those who had worked, the average length of employment was 8.5 months for women and 7 months for men (Kruse et al. 1981:42). While slightly lower, the Shishmaref data mirror this ratio. The average length of employment for Shishmaref women was 8 months and for men it was 6.4 months. Additionally, women in the North Slope study who were not wage earners at all tended to be older women from the villages (Kleinfeld et al. 1983:7). The Shishmaref data were consistent with these findings. The level of participation in the employed labor force of Shishmaref women in all age groups remained fairly steady until it reached the oldest group and then it dropped sharply.

The North Slope study concludes that the apparent differences in men's and women's employment patterns are the result of different cultural adaptations to the wage economy. As jobs became available on the North Slope, Inupiat women surged into the labor force, mirroring a nationwide trend of increased female labor force participation. Women have assumed a more important economic role providing regular cash income to households and financially supporting the subsistence economy.

Women's wages are not only a significant source of income for household expenses, but they help to finance household activities in the subsistence sector. Increased female wage employment in Inupiat households allows other household members to spend more time on subsistence activities. This in turn results in greater contributions of subsistence foods to other Inupiat households (Kleinfeld et al. 1981:32).

In contrast, Inupiat men's low labor force participation compared to national averages is attributed to both economic and cultural reasons (Kleinfeld et al. 1981:15). The primary factor accounting for the low level of participation in the labor force is the lack of jobs. But also playing a major role is a personal preference for intermittent work in order to remain active in the subsistence sector. Data compiled in the study led the authors to conclude that "...Inupiat men will maintain this dual pattern of economic activity in the future rather than shift strongly into the wage economy" (Kleinfeld et al. 1981:29).

Conclusions from the North Slope study may have some application for interpreting the 1982 employment patterns among Shishmaref men and women and in forecasting employment trends. They also suggest that the introduction of increased wage employment opportunities into a subsistence-based economy does not necessarily signal an abrupt shift toward a market economy. The different cultural adaptations of men and women in the integration of wage employment, in fact, may reflect a continuing interest in maintaining the subsistence-based economy.

INTEGRATING WAGE EMPLOYMENT WITH RESOURCE USE

In general, participation in the wage economy can be integrated with the activities associated with the harvest and use of wild resources as long as the job does not restrict a person's time excessively. For the most part, persons engaged in long-term employment were able to participate in hunting and fishing activities, largely by scheduling these activities for weekends, evenings, and vacations (Jorgensen and

Maxwell 1983:263-4; Kruse et al. 1981:14). Some employers, such as the North Slope Borough, allow employees to schedule subsistence leave during resource procurement periods.

Especially when viewed from the perspective of the household, wage employment may often complement the subsistence component. Cash derived from wage work may provide a source of capital that is directed into hunting, fishing, and trapping efforts. Although some workers themselves may not be active resource harvesters, their cash contribution to the household may underwrite the activities of other members. In fact, some forms of wage employment may serve to enhance overall subsistence efforts. Wolfe (1981:89-90) reported that "the most successful producer in the economic system was one who brought in a steady monetary income and reinvested a portion of it into fishing and hunting for local consumption."

The relationships between wage employment and resource use for Shishmaref households were analyzed using the number of months worked and the number of resource categories harvested by the household as measures (Table 13). The sample was broken down into five groups based on the number of months worked by the household. The mean number of resource categories harvested was then compared among the five groups.

An analysis of variance was performed to determine whether or not there was a significant difference among the means of three or more groups with respect to a given variable. Analysis of variance showed that no significant difference existed among the five employment groups with respect to the number of resource categories they harvested. It was interesting to find that there was no difference between households where

combined employment exceeded 19 months and households with no wage employment workers.

TABLE 13. HOUSEHOLD WAGE EMPLOYMENT AND THE NUMBER OF RESOURCE CATEGORIES HARVESTED.

Months Worked	Number of Households	Mean Number of Resource Categories
0	7	10.1
1-6	6	9.0
7-12	17	13.8
13-18	4	15.5
19+	9	11.2

Source: Division of Subsistence 1983.

An explanation for the lack of a statistically significant difference between the months worked by Shishmaref households and the number of resource categories harvested may lie in the flexible, yet cyclical way in which employment is integrated with the seasonal round of hunting and fishing activities. For instance, average monthly unemployment rates among the employed labor force in 1982 peaked during June and July (Fig. 15). These two months represent the most intensive resource harvesting period of the year as ugruk hunting and processing time is at its peak. Two months later, unemployment is at its annual low. Cultural preferences rather than economic reasons seem to account for this pattern. Although this employment pattern could be due to some people who are employed by the school district receiving the summer months off, one might expect that these figures would be countered by

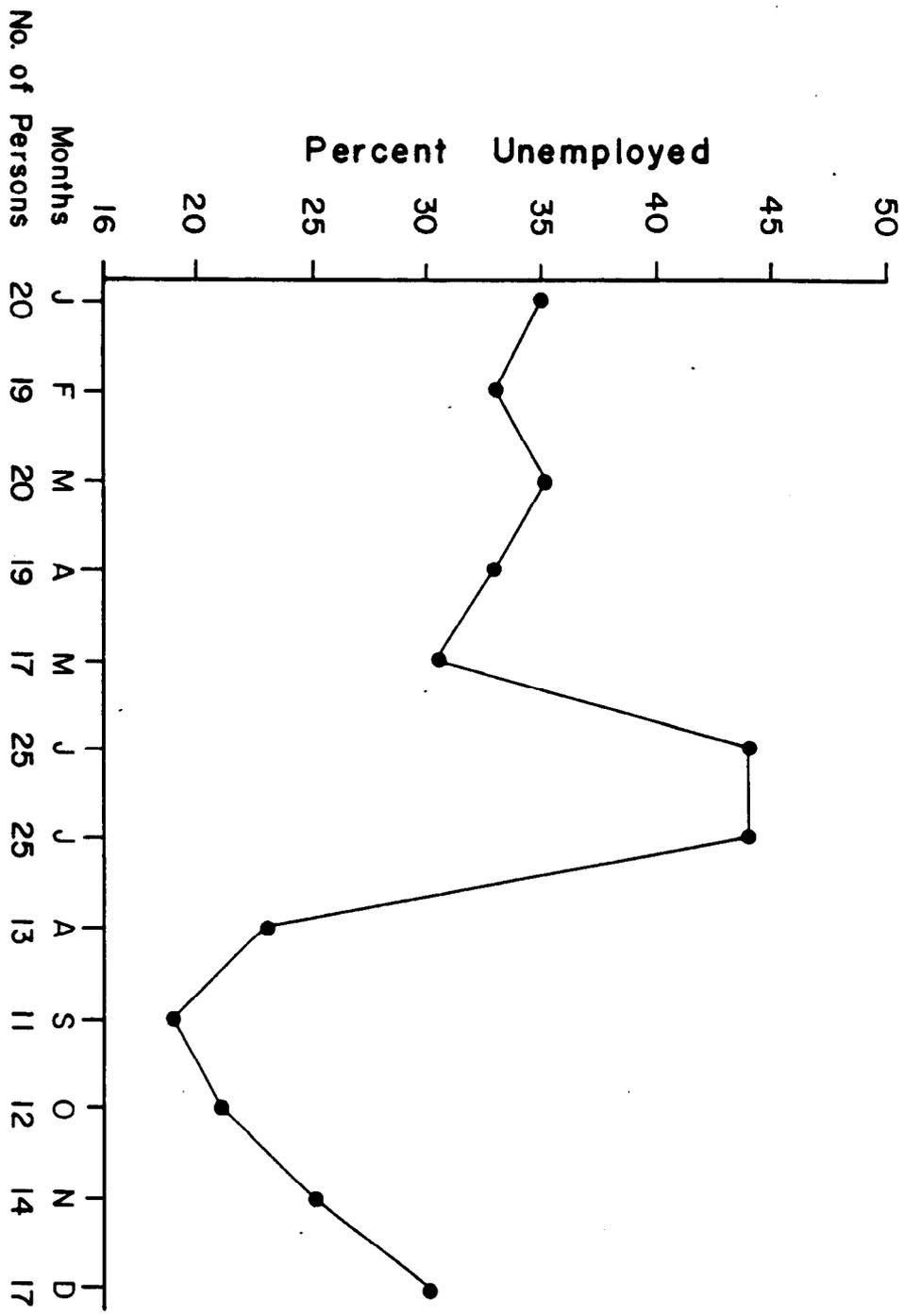


Fig. 15. Unemployment among the employed labor force, Shishmaref, 1982.

the availability of construction work. It is more likely that employment is deferred until after more immediate resource demands are met. In this way, wage employment is synchronized with resource use activities.

Wage employment does not always accommodate the subsistence effort. For example, throughout the year there were months when people in the employed labor force indicated that they had been unemployed but wanted a job. There were those who wanted to work during 1982, but were unable to for one reason or another. In all cases, compromises had to be made when employment was incompatible with periods of resource harvest activity. Some construction schedules during the summer months required that workers made a decision between working for wages and participating in harvesting activities.

The variety of strategies employed by households for integrating wage employment with the harvest and use of wild resources is illustrated by the following three household case examples from Shishmaref.

Household A was composed of a married couple in their mid-60s, their daughter in her 30s, and their daughter's two young children. In 1982 the husband had two year-round, part-time jobs which totalled almost full-time employment. The household harvested nine resource categories, mostly waterfowl, fish, and berries. Although once an active hunter, the husband's health and jobs prevented him from seeking larger game. The household shared less than half of their harvest with other households. They received about half of the wild foods they ate in 1982 from others. Most of the meat and fish they ate were subsistence derived. The couple's other adult offspring living in other households actively partake in a wide range of resource activities. The husband and, especially, the wife

of Household A spent a great deal of time assisting their offspring in processing and preparing the harvest. The husband also loaned his offspring or their spouses hunting equipment. Much of their children's harvest was stored at the home of Household A. The extended family, including their offsprings' families, took many of their meals there.

Household B was composed of a married couple in their late 50s and their 9 children who in 1982 ranged in age from 12 to 24. This household harvested 26 resource categories. They were almost totally self-sufficient, reporting that they received few wild resource foods from others. Because of the number of household members, Household B shared little of its harvest with other households. Relative to household size, cash income was low. The majority of food harvesting activities were conducted by the sons. None of them were employed during 1982. The husband trapped furbearers and later sold the pelts. The wife derived some income from skin sewing. The eldest of the two daughters was the only household member who held a wage paying job during the year, working full-time for eight months. She reported that she would like to be employed throughout the year, yet finds that her job leaves her little time to devote to subsistence activities. The majority of her income was channeled back into the household to underwrite and support the harvesting efforts.

Household C was composed of the husband in his mid-30s, his wife in her mid-20s, their three small children, and the husband's younger brother in his 20s. The husband is an experienced carpenter. Although he makes good money when employed, work opportunities are sporadic and usually of short duration. During 1982 he worked a total of three months on three

separate construction projects. The household's procurement strategy in 1982 was to concentrate their harvesting efforts on a small range of resources. Eleven resource categories were harvested, which included seals, walrus, moose, small game, waterfowl, berries, and greens. Fish was obtained in quantities enough to provide variety. The husband prides himself on being self-sufficient. The majority of the meat and fish they ate in 1982 were wild foods. The husband is also considered a skilled and proficient seal and walrus hunter and he obtains enough for his household as well as others. The household shares about half of its harvest with others.

To summarize, one function of wage employment in many northwest Alaskan communities is to underwrite resource harvesting or to provide an economic supplement for the household rather than to accumulate personal wealth. Jobs, although not the centerpiece, are a necessary and critical component for supporting the present socioeconomic system. For Shishmaref, like most other northwest communities, the opportunities for employment vary in number and type from year to year. When jobs are available, they tend to be short-term or seasonal.

In characterizing the employed labor force in Shishmaref for 1982, the majority of households had at least one member who worked for wages. In half of the cases, it was someone other than the designated household head. There was a higher frequency of men than women in the employed labor force although women tended to work more months of the year. In most cases, workers had only one job during the year and it tended to be located in the community. The majority of jobs available during 1982

were seasonal or temporary, and most workers stayed with the job through its duration.

The strategy adopted for coping with the variable employment situation centers around the household. An examination of employment patterns in Shishmaref indicated that average length of employment for 1982 for individuals in the employed labor force was eight months. However, the annual length of employment for households averaged 10.98 months for the sample population as a whole and 13 months per household for the employed labor force -- close to the equivalent of one person with a full-time, year-round job in each household.

ENDNOTES

1. In July 1983, round trip airfare between Shishmaref and Nome was \$120; between Shishmaref and Anchorage \$376. By January 1985, round trip between Shishmaref and Anchorage had risen to \$546. These prices do not include additional costs for excess baggage.
2. For the U.S. Census, Native or non-Native household designations are determined on the basis of the ethnic affiliation of the household head.
3. For example, disability payments are determined by a person's ability to carry out a job for which he is qualified. As is the case with many rural communities, a person would be considered disabled if he could not perform the activities required for hunting and fishing (Alaska Department of Health and Social Services 1984).
4. Individuals at least 65 years of age who have resided in the state for 1 year or more become eligible to receive payments up to \$250 a month. As of April 1985, the future of the Longevity Bonus program was in question.

CHAPTER 5

RESOURCE DYNAMICS AND ADAPTIVE STRATEGIES

INTRODUCTION

Wage employment as an aspect of the cash component of the economy was isolated for the purposes of analysis in Chapter 4. There was no simple and direct relationship between household participation in the wage sector and the spectrum of fish and game resource categories that households harvest. Most of the surveyed households had at least one member who had a job during 1982. However, as the mean number of months of wage employment within a household increased, there was no corresponding decrease in the mean number of resource categories harvested (see Table 13). Working for wages was, for the most part, integrated and synchronized with the annual round of hunting and fishing activities.

The point was made in Chapter 4 that, in general, the cash income from wage employment positively affects household resource harvest and use. However, for certain individual households, wage employment may be one of the socioeconomic reasons which keeps a household from obtaining the level of harvest it needs. Besides socioeconomic reasons, other factors which may influence harvest outcomes include environmental or resource-related reasons. In the first section of this final chapter, the concept of relative need is explored and some of the factors which affect or influence the harvest of certain categories of resources are examined.

People learn or adopt patterns of behavior for coping with a dynamic social and natural environment. This is especially true when the harvest and use of fish and game resources are the centerpiece of the economic system. In the second section of this chapter, specific behavioral responses of residents to fluctuations in the environment are discussed as being adaptive strategies designed to achieve and maintain economic security. Some of the adaptive strategies geared for the ecological conditions of Shishmaref are presented. These strategies may have some application to other arctic marine mammal hunting societies as well. The chapter concludes with a brief summary of contemporary resource use in Shishmaref.

THE CONCEPT OF RELATIVE "NEED"

In a subsistence-based economy, the underlying procurement motivation is to provide adequate sustenance. Virtually every household in Shishmaref expressed the concept that the level of harvest was determined by acquiring sufficient resources to meet its needs: "We take just what we need to live on." Yet determining what individuals need, and consequently, harvest, is more complex than simply measuring biological, social, and material requirements. Magnitude of harvest, as it relates to need, is also guided by desire. Traditional taste preferences, a longing for fresh meat, and desire for dietary variety all make a significant contribution to the harvest equation.

Thus, harvest levels are keyed to relative need which, in turn, is contingent upon other related variables such as diversity of resources

used, opportunities for harvest, and size and composition of the group consuming the resource. A household which harvests a small number of resources may require more of a particular resource to meet their dietary needs than a household which exploits a wide range of resources. Other households may be unable to harvest ample quantities of one resource. Such households may need to obtain greater quantities of alternative resources.

Another important determinant of harvest levels is the ratio of producers to consumers. The number of individuals considered part of the consumptive unit relative to the number of providers for that unit weighs in people's decisions (Sahlins 1972). While the focus in earlier chapters has been on the household as the basic unit of production, resource distribution frequently extends beyond the immediate household. In a subsistence-based economy, other less productive members of the community are provided for. Networks for distribution are usually based on ties of kinship; although, this is not always the case. The determination of harvest levels incorporates the needs of the consumptive group into the decision-making process.

Factors Which Affect Resource Harvest

The ability to harvest adequate levels of needed resources can be hampered by many factors. One objective of this study was to examine some of the factors influencing the hunting and fishing activities of Shishmaref residents in 1982. This inquiry dealt not with the magnitude of harvest but, instead, focused on natural and social factors which

constrain producers from meeting their perceived levels of need. The perception of users concerning how the local environment affects resource harvest is crucial to understanding the dynamics of economic behavior from a human ecological perspective.

In the Division of Subsistence survey, households which either harvested or attempted to harvest primary categories of resources in 1982 were asked additional questions about their level of harvest. Respondents were asked if they were satisfied with the amount they had obtained. For each resource to which respondents answered "no," they were asked to indicate which, if any, of the 12 reasons listed on the questionnaire accounted for not getting enough of the resource. Respondents also could specify other reasons not listed. A total of 20 distinct responses was recorded (Table 14). Reasons given were then grouped on the basis of being most closely attributable to one of the following factors: environmental, resource-related, or socioeconomic (Fig. 16).

Environmental -- These are reasons which derive from weather and topographic impediments of the terrestrial and marine habitats. The arctic environment is a significant factor affecting almost all harvest activities, most notably marine mammal hunting. The exigencies of both weather and ice require that producers take advantage of the limited periods of favorable hunting conditions. All 13 households which were dissatisfied with the amount of spotted seal they obtained identified the weather as one of the primary factors affecting harvest success.

Resource-related -- These relate to the abundance and mobility of the resource. Of these reasons, the availability of the resource is a major influence in determining the harvest outcome. In other words,

people are not prevented from seeking the resource, but they may not be successful in their quest. Because of the uncertainty involved in the search for highly mobile species, hunting is a more risky resource-related venture than plant gathering. Shishmaref residents often say with a shrug, "no luck" or "bad luck" when expressing their lack of success or control over the outcome.

Socioeconomic -- These are reasons that relate primarily to economy, demography, technology, or cultural values. In general, socioeconomic factors were given less often as reasons for dissatisfaction with harvest amount than environmental or resource-related factors. Socioeconomic factors tended to be an impediment to harvesting for the categories of resources which involved: (1) large blocks of time; (2) traveling long distances; or (3) working with a group. For example, having a job or the lack of a crew could potentially interfere in more time and labor intensive activities, such as marine mammal hunting, than more solitary activities close to home, such as fishing. Also included in this group of reasons were regulatory restrictions. Many federal and state wildlife regulations are externally imposed constraints beyond the control of the producers. Regulations were perceived as playing a major role in moose and waterfowl hunting success.

Figure 16 is presented to illustrate the multiplicity of factors which come into play in influencing the outcome of resource harvest. No single factor can be pinpointed as the determining cause for any resource. Rather, a lack of harvest success can usually be attributed to interrelated factors which cross-cut all categories. "No fish" may be given as a reason for not acquiring enough salmon; however, weather

TABLE 14. REASONS GIVEN FOR INSUFFICIENT HARVEST.

Environmental	Resource-Related	Socioeconomic
A - Weather conditions	F - Too far to go	M - No crew
B - Water conditions	G - No fish or no game (no resource)	N - Family responsibilities
C - Trail conditions	H - Went too late	O - No time
D - Snow conditions	I - Bad location	P - Did not have right equipment
E - Ice conditions	J - Scheduling conflict with other subsistence activity	Q - Job
	K - Regulations	R - School
	L - Bad luck or no luck	S - Age
		T - Health

Source: Division of Subsistence 1983

conditions or family responsibilities could have prevented producers from engaging in the activity when fish were available. Together, a job, no crew, and ice conditions can restrict hunters from harvesting enough seals.

While there are no simple cause and effect relationships, certain aspects of the physical and social environment are perceived by residents as more important than other aspects in influencing harvests of particular resources. The salient features of the environment interact and affect one another so that a change in any one component of the system may produce a change in the others. The perspective adopted in this analysis is that all relevant parts of the system, including people, are interrelated. It is this holistic view of human interaction with the environment that constitutes the foundation of a human ecological approach for understanding the nature of resource use.

ADAPTIVE STRATEGIES

Human ecology provides a theoretical framework for examining the relationships between economic activity and other relevant aspects of the physical and social environment (Vayda 1967). From a human ecological perspective, economic activity may be viewed as the means by which members of a human population "interact with their physical and social environment in the calculated attempt to acquire, directly or indirectly, a living" (Cook 1973:810). Certain forms of human behavior are designed to obtain goals and satisfy needs and wants in the face of an active and changing

environment. Human behavior is adaptive if it adjusts means to ends and accomplishes objectives (Bennett 1976:271).

Over time, some adaptive behaviors become standard practices for coping with the dynamic environment. Bennett (1969:14) has termed these patterns of behavior devised to obtain and use resources "adaptive strategies." But adaptation, according to Bennett, must also be dynamic as new problems arise and new relationships are established to provide solutions. Adaptive strategies may be modified according to changes in the environment and by individually diverse goals, but are driven by an underlying motive to achieve and maintain economic stability and security.

Particular attention is given here to adaptive strategies employed by the residents of Shishmaref in the early 1980s. These strategies can be compared to the adaptations of other northwest Alaskan coastal communities with subsistence-based economies which emphasize the use of marine mammals. Many examples of adaptive strategies have already been briefly touched upon in earlier chapters discussing the nature of the subsistence-based economy in Shishmaref. Here they are described in more detail under four broad community characteristics:

- community-wide networks for resource distribution
- flexibility in resource activities
- transmission of knowledge about a defined geographical area
- efficiency in patterns of procurement and processing

Community-wide Networks for Resource Distribution

Entwined with the subsistence-based economic system are cultural values which promote and support community-wide cooperation. Decisions

relating to fish and game harvest and use are usually not made by households or individuals in isolation. Often the economic behavior of individuals is governed by rules of reciprocity. Maintaining economic viability for the community as a whole through the harvest and use of wild resources socially binds residents together. In small communities, where the standards or "norms" of behavior support those who do not hoard wild resources, acts of generosity do not go unnoticed. Social reinforcement for generous behavior comes from the prestige accorded the giver. By the same token, someone who is considered "stingy" or "lazy" may be thought of critically. Although not all Shishmaref households in 1982 had active and intensive hunters, virtually every household contributed in some way to the overall resource harvesting effort.

The primary mechanism for distributing fish and game surpluses is through sharing and exchange. This allows the unequal harvesting efforts of individual households to be counterbalanced. Despite uneven efforts, 72 percent of the surveyed households indicated that most of the meat and fish they ate were wild foods, that is, foods not purchased in the store (Table 15).

Sharing occurs on various levels. Networks of food distribution connect families, friends, and neighbors. The majority of households reported sharing at least a little of the household's harvest with others (Table 16). When asked to report the wild foods they shared most often, surveyed households generally did not specify the types of food. Instead households stated that "all fish" or "all game" are shared with other households (Table 17).

TABLE 15. AMOUNT OF MEAT AND FISH IN HOUSEHOLD DIET WHICH IS SUBSISTENCE DERIVED.

Amount	Number of Households (n=43)	Percentage of Total
Most	31	72.1
More than half	3	7.0
About half	5	11.6
Less than half	3	7.0
Little	1	2.3
None	0	0.0

Source: Division of Subsistence 1983.

TABLE 16. AMOUNT OF WILD FOODS SHARED WITH AND RECEIVED FROM OTHER HOUSEHOLDS.

Amount	Number of Households Who Shared (n=43)	Percentage of Total	Number of Households Who Received	Percentage of Total
Most	6	14.0	4	9.3
More than half	2	4.7	1	2.3
About half	8	18.6	3	7.0
Less than half	11	25.6	5	11.6
Little	9	20.9	23	53.5
None	7	16.3	7	16.3

Source: Division of Subsistence 1983.

TABLE 17. TYPES OF WILD FOODS MOST OFTEN SHARED WITH OTHER HOUSEHOLDS.

Resource Category Shared	Number of Responses (Total = 66) ^a	Percentage of Total Responses	Percentage of Households (n = 43)
All fish	16	24.2	37.2
<u>Ugruk</u>	14	21.2	32.5
All game	10	15.2	23.2
Waterfowl	7	10.6	16.3
Moose	6	9.1	13.9
Walrus	4	6.1	9.3
Berries/greens	4	6.1	9.3
Ringed seal	1	1.5	2.3
Ribbon seal	1	1.5	2.3
Herring	1	1.5	2.3
Caribou	1	1.5	2.3
Did not share	1	1.5	2.3

^aRespondents were asked to name up to three resource categories.
Source: Division of Subsistence 1983.

Household harvesting effort, as measured by number of resource categories harvested, ranged between 1 and 27 in 1982. In the 36 cases with a male household head, the mean number of resource categories harvested was 13.7. Households headed by females harvested an average of 4.2 resource categories. The difference between these means was statistically significant ($P < 0.01$). The importance of an adult male is not unexpected in hunting societies where the primary harvesting emphasis is on large mammals. The households with male hunters typically provide subsistence foods to those needing it. Close relatives are usually accorded the highest priority in the chain of distribution, but others are included without regard to kin ties. Several hunters stated emphatically: "We take care of the families without hunters -- we provide for those that need it." Indeed, the five households which reported receiving more than half their subsistence foods through sharing were households headed by women.

In addition to providing resources to households without harvesting capabilities, sharing also occurs on a community-wide level. Soon after the first walrus, ugruk, and moose of the season are taken, they are shared with the entire community. Because of the prestige accorded them, hunters do not lament the fact that they will be able to keep little or none of the harvest for themselves. Word of the successful hunt spreads quickly through the village and during the next few days, residents stop by or are brought a portion of the harvest. The choice pieces are saved for the elders. Residents state that long ago communal sharing ensured that people would not starve.

Communally shared foods find wide distribution. When asked to report the three resources most often shared with their household in 1982 (Table 18), moose, ugruk, and walrus were among the three mentioned most often. The persistence of this traditional custom is deeply rooted in the norms of behavior which reinforce sharing big game resources and generosity among hunters in particular. Moose, ugruk, and walrus each occur in different seasons, comprise large packages of edible food and raw

TABLE 18. TYPES OF WILD FOODS MOST OFTEN RECEIVED BY HOUSEHOLDS.

Resource Category Received	Number of Responses (Total = 79) ^a	Percentage of Total Responses	Percentage of Households (n = 43)
Moose	22	27.8	51.2
<u>Ugruk</u>	15	19.0	34.9
Walrus	15	19.0	34.9
All fish	11	13.9	25.6
All game	5	6.3	11.6
Waterfowl	5	6.3	11.6
Seal oil	2	2.5	4.6
Arctic hare	1	1.3	2.3
Berries/greens	1	1.3	2.3
Caribou	1	1.3	2.3
Reindeer	1	1.3	2.3

^aRespondents were asked to name up to three resource categories.
Source: Division of Subsistence 1983.

materials, and exhibit high rates of household participation in the hunting effort. In many hunting societies, the sharing of the largest resources, which are often those with the greatest harvesting risks, gives the greatest amount of status to the hunter (Jochim 1981:89-90). Moose and walrus hunts both show high rates of failure.

Distribution of wild foods in the community also occurs through commensality. Family members may reside in another household, yet take all of their meals at the home of the hunter. When guests drop in, they usually end up dining on subsistence foods before the visit has ended. Again, generosity is an important cultural value sustaining this pattern of behavior.

Other forms of resource distribution include trading, partnerships, bartering, and gift giving between households within the village as well as in other villages. In many instances, this expands the range of resources used by the participating households. For example, one household in Shishmaref gives salmonberries to a household in Deering. These berries usually grow in great quantities around Shishmaref. In exchange the Shishmaref household receives a quantity of northern pike, which is only found at a distance from Shishmaref. The result is that both households receive a resource they might not otherwise have.

When family members are away from Shishmaref and unable to participate in local food harvests, it is not uncommon for them to receive fish, meat, or berries regularly through the mail. A reciprocal exchange sometimes occurs when cash to subsidize hunting and fishing is provided by a family member who is working away from Shishmaref in return for a portion of the harvest. This type of exchange is almost always based on

loose and informal arrangements between kin. In most subsistence-based societies the sale of subsistence foods is rare because of their value in providing sustenance (Sahlins 1972:218).

Flexibility in Resource Activities

Knowledge about the cyclical predictability of the resource base has resulted in an orderly seasonal round of harvest activities. During an outing, hunters may pass up a harvest opportunity if they know the animal will be in prime condition and available later or if they are concentrating on another, more critical species. However, because of factors affecting hunting and fishing, producers must remain flexible in their procurement strategies. The seasonal round incorporates mechanisms for harvesting alternative or substitute resources when unexpected shortages arise.

From the contemporary Tapkakmiut seasonal round, an average of 14 distinct resource categories are available for harvest each month. Harvest decisions sometimes are made based upon opportunities which present themselves from the range of resource options. The inability to accurately predict long-range production frequently results in exploiting resources as they are encountered. For example, during winter months a hunter may go out in search of moose; unable to locate a moose, he may opt to hunt hare or ptarmigan instead. Also, the intensity of certain hunting activities varies according to the success of earlier outcomes and an assessment of the alternatives which might be available later. Ugruk is used as a gauge by which to assess the hunting effort for other

resources. Fall hunting may be intensified, or other resources may be substituted, if an insufficient amount of ugruk was harvested in the spring.

A diversified resource base ensures that producers have alternatives or emergency options. The majority of marine and terrestrial faunal resources found in the Tapkakmiut territory are included in the spectrum of food resources. Certain primary resources are emphasized because they are the most reliable and abundant. Economic security is enhanced also by a generalist strategy which avoids specialization. But, as both the unpredictability and the importance of certain cultural or social factors increase, certain harvesting activities may be more likely to become the province of specialists (Jochim 1981:209).

For certain species such as walrus, where costs are high, specialization, in fact, may serve to minimize risks for the community as a whole. Walrus hunting showed a high level of household participation in terms of harvesting attempts but a low success rate. The majority of successful hunting attempts included a specialist among the crew. Specialists have a high degree of knowledge concerning their area of expertise. The specialist also may invest his financial resources on technological advantages and devote more time to a particular species to the exclusion of other activities.

On hunting expeditions, the walrus specialist frequently provides the equipment, boat, rifles, shells, and gas for the crew and therefore he takes the majority of the harvest. The crew provides the majority of hunting and related labor and receives a relatively small proportion of the harvest in return. But the economic and physical risks to the crew

members are lowered by the higher probability of hunting success through their association with the specialist. The specialist, in many cases, has a particularly high level of individual harvest. However, the distribution networks are extensive, and the specialist does not necessarily consume more of his own harvest than does the average community member.

The specialist and his crew are only one example of a work group which forms for a particular purpose. Flexibility in the structure of labor means that the size and composition of work groups may vary according to the nature of the activity. For procuring particular resources which are dispersed, flexibility in the size of the work group may also be more advantageous. Including more members in the work group may result in greater quantities being harvested when time is limited.

The reckoning of kin through the bilateral descent system recognized by the Tapkakmuit means that an individual can usually count on many relatives for cooperation and aid. In general, work groups are formed along kinship lines. But composition of the work group does not always fall along household or even kinship lines. The potential for hunting success is increased by recruiting members who exhibit special qualifications such as being a good shot or someone who is a hard worker or who will stay awake during a long night's watch. The cooperative effort of skilled hunters also increases the survival chances of the individual (Moran 1982:123).

Transmission of Knowledge About a Defined Geographical Area

Nearly all Shishmaref residents trace their ancestry to the Tapkakmiut who lived in permanent winter villages along the Chukchi Sea coastline from north of Cape Prince of Wales to Cape Espenberg. Historic accounts report that the 19th century Tapkakmiut identified with a "home territory" within which they exploited land and sea resources (Burch 1975; Ray 1975). After the establishment of Shishmaref village in 1901, the Tapkakmiut continued to utilize the same general geographical area from their centralized location, seeking most of the same resources for their sustenance.

Alterations in the range of resources sought have been due to various natural and social factors which have resulted in changes in population size or geographic distribution for certain species. Caribou, as mentioned, have not returned to their 1800s distribution and moose are relatively recent arrivals. In addition, muskrat and belukha, once important resources, are rarely found today in the Tapkakmiut territory. The walrus population has been increasing since the 1960s (Kenyon 1978:181). The increased availability and expanded geographic distribution of walrus have resulted in their becoming a valued resource for many Shishmaref residents.

Identification with a home territory is instilled in Shishmaref residents of the early 1980s. The geographical core area utilized by the Tapkakmiut in 1982 is little changed from the home territory of the period 1816-1840 (Fig. 17). The outer boundaries of land use have been

slightly altered through time and they may overlap in some places with the resource use areas of other communities. However, residents of Shishmaref retain a distinct and recognized notion of a geographical core area in which the majority of harvesting activities occur.

In order to effectively exploit the local environment a detailed body of specialized knowledge has evolved which focuses on the local terrain and natural history of the area. This knowledge includes details regarding the intricacies of animal behavior and plant requirements. A portion of this knowledge is expressed in terms of the environmental factors which can ultimately influence the outcome of harvesting activities. The vocabulary, such as the Inupiaq terms used to describe various ice conditions (Table 19), can be elaborate. The precise meanings serve as conceptual cues for determining when particular harvesting activities should be initiated.

While land and resource use decisions are based largely on accumulated knowledge, patterns of exploitation may change as new information becomes available. With the input of new information, the outer boundaries of the core area remain flexible, not rigid. Informal communication networks are critical devices for transmitting vital pieces of information related to the success of harvesting. This is especially true for more inaccessible species (due to travel restrictions), such as moose or walrus. When a hunter encounters a moose or walrus, whether or not he successfully harvests it, he usually will pass the locational information along to others.

Information is also shared with younger hunters. A hunter's education includes the knowledge and skills necessary to be a successful

TABLE 19. PARTIAL LIST OF INUPIAQ TERMS RELATING TO ICE CONDITIONS.

Ice Conditions	Inupiaq Term
Big cake of ice	<u>iluqnauq</u>
Little chunks/but big enough to go on	<u>sigimaq</u>
Dirty ice	<u>anaglu</u>
White, clear ice	<u>sigugktuaq</u>
Ice pack	<u>iunik</u>
Slush ice	<u>qinu</u>
All ice along coast/solid	<u>tuaq</u>
Lagoon, other than shore ice	<u>imagzruum sigua</u>
Thin new ice, oceanside	<u>siguliaq</u>
Made by north wind	<u>qinu</u>
Pressure ridge (large)	<u>iunhit</u>
Pressure ridge (small)	<u>iunigaurat</u>
Thin unsafe ice (bottomless)	<u>qilaituaq</u>
Moving ice pack	<u>iyualazruaq</u>
Large chunk of ice trapped under larger ice	<u>issiaq</u>
Near perfect round ice formations	<u>sauza^huat</u>

Source: Village of Shishmaref.

hunter. As noted in Chapter 4, male participation in the employed labor force is lowest for the 16 to 25 year old age group. In some instances, young men may be deferring entrance into the labor force until they have acquired hunting experience. But the absence of some young men because of school or jobs during the period when training usually occurs has resulted in a lapse in opportunities for hunting experience for these individuals. This is a cause of growing concern, especially for the elder hunters.

There was, however, little evidence to indicate that the harvest of fish and game resources in Shishmaref has diminished from older to younger generations. The sample was divided into four groups based on the age of the head of the household (Table 20). Analysis of variance was used to compare the mean number of resource categories harvested by each group. There were no significant differences found among the groups with respect to resource categories harvested ($P > 0.05$). Thus, young families appear to be no less active in resource activities than the generations preceding them.

TABLE 20. MEAN NUMBER OF RESOURCE CATEGORIES HARVESTED AND AGE OF THE HOUSEHOLD HEAD.

Age of Household Head	Number of Households	Mean Number of Resource Categories Harvested
26-35	11	11.63
36-45	9	13.00
46-55	9	10.11
56+	14	13.28

Source: Division of Subsistence 1983.

As a result of long-term association with the land and the continued need for high levels of production, a young hunter's education includes customary laws of conservation. The recognized rules and customs governing allocation and use of the resource are aimed at preventing resource loss or wastage and ensuring continued resource productivity. Principles of conservation dictate that animals be harvested according to need. There are sanctions against wasteful practices. These basic tenets have long been recognized and documented among hunter and gatherer societies in the northern Arctic (Jochim 1981:174; Usher 1981). As long as production remains primarily for use value, rather than monetary value, principles which conserve essential resources will remain a part of the traditional knowledge (Usher 1981:58).

Efficiency in Patterns of Procurement and Processing

The timing and scheduling of the annual round of harvest activities are regulated by the seasonal availability of critical resources. Although harvest activities in Shishmaref span the 12 months of the year, the actual time when a particular resource is available for harvest may be limited. Most of the species upon which marine mammal hunters depend are migratory. Seals, for example, travel north in the spring and south in the fall. Most of the year they are outside the territorial range utilized by Tapkakmiut hunters. A limited harvesting window requires that hunters conduct procurement activities in an efficient manner in order to derive the highest productive yield for their efforts.

Opportunities for higher productivity are strengthened through an efficient use of time, labor, land, and capital. For critical resources with a limited period of availability, time efficiency may override the other concerns. In Shishmaref, changing weather conditions can impose additional time constraints, particularly for marine mammal hunting. In order to derive the maximum benefits from making the greatest use of time at the expense of labor efficiency, people may end up working very hard for short intense periods of time (Jochim 1981:67). An efficient utilization of time is evident during the spring ugruk season in Shishmaref, when both men and women involved in the harvesting effort spend most of their waking hours hunting or processing the harvest. Other activities, such as seasonal wage employment, may be deferred until after the ugruk season has ended.

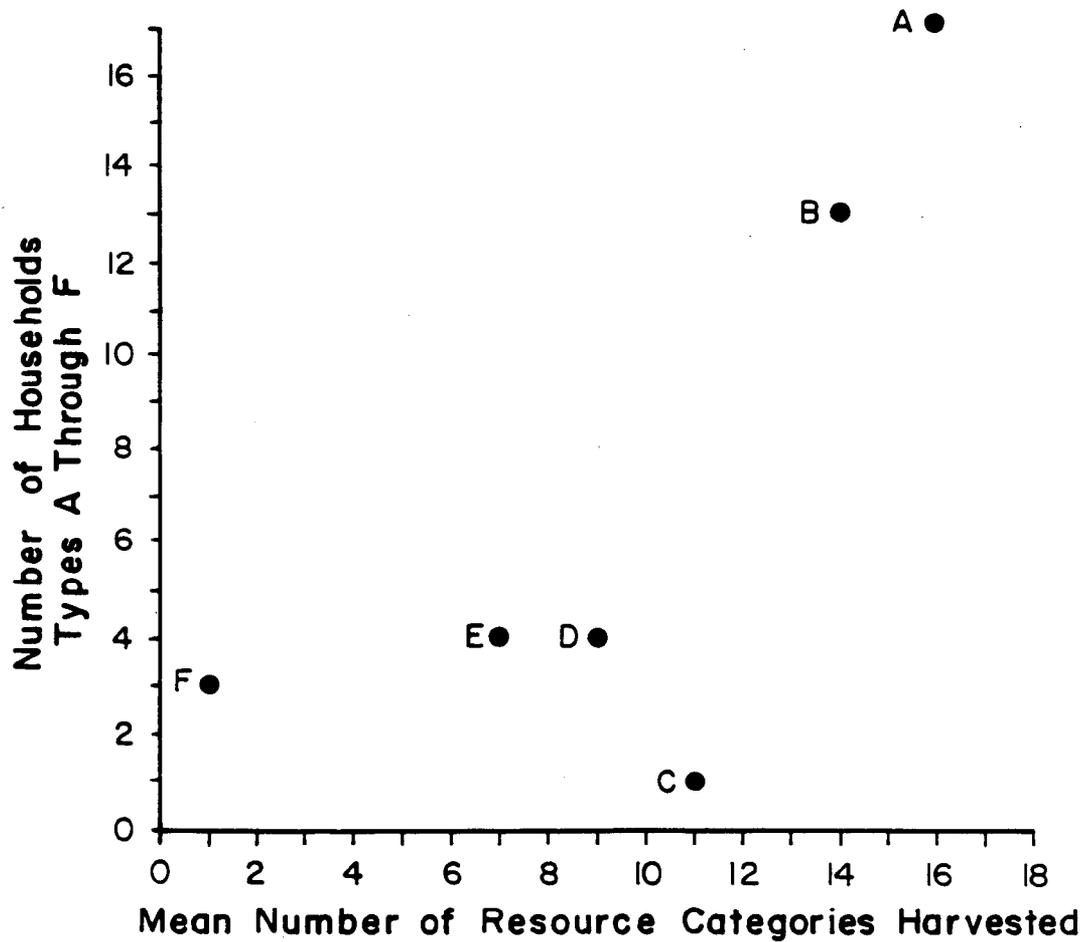
Increased labor input is most efficient for plant or animal species which tend to be found in clusters or groups. A larger group of people involved in berry picking expeditions will yield greater quantities of salmonberries. Increased manpower may not be advantageous, however, for more solitary species such as hare or moose. Increased labor input for purposes of accumulating greater quantities of a resource is efficient only if the surplus can be stored for later consumption. Resource surpluses increase security through the months when residents anticipate diminished harvest opportunities.

An efficient use of time and labor is also achieved through the assignment of specific tasks. In Shishmaref, a clear sexual division of labor exists which tends to follow typical hunter-gatherer patterns (Service 1966:10). Men are responsible for hunting larger mammals,

women for processing and preparing the harvest. Some small game hunting and most fishing efforts are collaborations between both sexes. Women, aided by men and children, are the major plant gatherers. In some instances, gender specific roles allow for simultaneous harvesting activities. During fall time camping after the fish net has been set out or checked, men will typically hunt for moose while women pick berries.

The contribution of women to the overall resource procurement effort is significant; yet it has been largely neglected in studies of predominantly hunting societies. Although hunting large mammals has traditionally been the exclusive domain of men, women play a key role in determining the harvest outcome. For instance, once the ugruk is delivered to the processing site by the hunter, the labor intensive work of processing and preparing the parts for storage falls mainly to women. Women may spend more time and work harder in the total range of activities directly related to ugruk than do men. In fact, the ability to process and store the harvest, rather than hunting success, in some cases may be the limiting factor in the number of ugruk taken.

The importance of shared responsibilities is made clear in a comparison of household composition to the range of harvest activities. Figure 18 depicts the average number of resource categories harvested for each of the six household types described. Several relationships suggested by this figure proved to be statistically significant upon analysis. In the 31 households with a conjugal pair, the mean number of resource categories harvested was 14.3. Households headed by a single male or female harvested an average of 6.5 resources. The difference between these means was statistically significant ($P < 0.01$).



Household Types

- A : Conjugal Pair and others ≥ 16 years old
- B : Conjugal Pair and others < 16 years old
- C : Male Head and others ≥ 16 years old
- D : Male Head and others < 16 years old
- E : Female Head and others ≥ 16 years old
- F : Female Head and others < 16 years old

Fig. 18. Number of households, types A through F, versus mean number of resource categories harvested.

And, as was previously described, households headed by a male had a significantly larger mean harvest than households with a female head. This suggests that the presence of an adult male may be a prerequisite for participation in certain categories of resource harvesting activities. This is not surprising given the economic emphasis on large mammals. The male hunter without a female partner or other adult female in his household can usually rely upon female members of his extended family for assistance in processing the harvest.

A specialized technology comprised of implements functionally designed for harvest activities increases efficiency by cutting down on time, labor, and wastage. In Shishmaref, the traditional technology has continued to serve a purpose and, in many cases, has not been improved upon. Despite the widespread availability and use of plastic and metal containers for other purposes, seal skin pokes have not been surpassed as a superior storage container for certain foods. A diversified and specialized set of tools including floats, driftwood flensing boards for separating blubber from meat, and various types of retrieval hooks used according to whether the seal is sinking or floating are used in the hunting and processing of seals.

Hunters have been receptive to some modern technological innovations that help to achieve increased efficiency. But new equipment is not readily accepted without first weighing its advantages and disadvantages. There is little doubt that snowmachines and boat motors decrease travel time; yet they may require greater outlays of cash than do traditional means of travel. Some hunters still prefer to use dog teams because they are cheaper to maintain, more reliable, and less prone to accidents

which result in broken bones or frostbite to the hunters. Some modern forms of equipment are accepted only after modification using traditional technology or knowledge. Wooden boats have almost completely replaced umiak as a means of travel, but the majority of boats in the community are locally built for local, unique water conditions.

The acceptance of modern equipment while retaining traditional methods does not compromise the importance of the activity. On the contrary, the substantial monetary investment and degree of technological knowledge required to maintain new equipment must be offset by a decrease in economic risk or an increase in harvest efficiency or both. Introduced technology becomes permanently incorporated only after it has proven to be advantageous in the way people make their living. In describing the adoption of modern equipment among hunting societies in the Canadian north, Peter Usher (1981:62) wrote, "If hunting is seen in contemporary social terms, [however,] and as a viable economic pursuit, it becomes no more appropriate to restrict hunters and trappers to an archaic technology than to so restrict farmers or loggers." A Shishmaref hunter expressed the same sentiment another way: "The technology has changed over the years, but not the importance of the hunt."

RESOURCE USE IN SHISHMAREF IN THE EARLY 1980S

The intent of this report was to describe aspects of the subsistence-based economy and society in Shishmaref in the early 1980s. Specifically, it examined those aspects most related to how Shishmaref residents interact with their physical and social environment to make a living.

Summarized from the discussion in preceding chapters, the major features of the socioeconomic system in Shishmaref are reviewed below.

1. The contemporary subsistence-based socioeconomic system in Shishmaref encompasses both a subsistence component and a cash component. Hunting, fishing, and the gathering of edible plants comprise the primary economic focus of the community. Cash as a secondary, yet integral aspect of the economy interacts with resource production and use in generally complementary ways by providing income which supplements and underwrites the subsistence effort. The cash and subsistence components are interdependent and integrated in such a way that neither one alone could provide adequate long-term economic security for the community.

2. The household represents the primary economic production unit in the community. There was an average of five people per household in 1983. Household composition stressed relationships consisting of married couples with children. It was common for two or more households related through kinship ties to remain physically close and economically linked throughout much of the year.

3. Wild resource harvest and use patterns in 1982 reflect long-term utilization of a geographical core area that predates the establishment of Shishmaref village in 1901. Nearly all Shishmaref residents trace their ancestry to the Tapkakmiut who lived in permanent winter settlements along the Chukchi Sea coastline from north of Cape Prince of Wales to Cape Espenberg. The geographical core area utilized in 1982 is little changed from the ancestral home territory of the period 1816-1840.

4. The community of Shishmaref is reliant upon the procurement and use of fish and game resources in order to meet their nutritional

needs. Seventy-two percent of the households in the survey estimated that most of the meat and fish they consume are derived through subsistence activities.

5. Wage employment makes a critical contribution to the cash sector by providing one source for acquiring spendable income. The opportunities for wage employment in Shishmaref vary in number and type from year to year as well as throughout the year. Most households had at least one member who worked for wages in 1982. Length of employment for those who held jobs averaged seven months. The majority of jobs held by workers were temporary or seasonal.

6. In general, patterns of wage employment were integrated in complementary ways with the seasonal round of harvest activities. As the mean number of months of wage employment within a household increased, there was no corresponding decrease in the mean number of resource categories harvested.

7. Levels of resource harvest are keyed to relative need, which in turn are contingent upon other related variables such as diversity of resources used, opportunities for harvest, and size and composition of the group consuming the harvest. A multiplicity of environmental, resource-related, and socioeconomic factors can affect the ability of households to harvest sufficient quantities to meet their resource needs.

8. The cyclical predictability of the resource base has resulted in an orderly seasonal round of harvest activities. The timing and scheduling of the annual round of harvest activities is regulated by the seasonal availability of critical resources. Wild resource harvest

activities span the 12 months of the year with an average of 14 distinct resource categories available for harvest each month.

9. A diversified resource base ensures that producers have alternatives or emergency harvesting options. A wide range of the marine and terrestrial faunal resources found within the Tapkakmiut territory are included in the spectrum of subsistence foods.

10. Many of the methods and means used to harvest wild resources represent adaptive strategies developed over time for coping with a dynamic physical and social environment. Adaptive strategies may be modified according to changes in the environment and by individually diverse goals, but are driven by an underlying motive to achieve and maintain economic security and stability.

11. Opportunities for greater productivity in harvesting activities are strengthened through an efficient use of time, labor, land, and capital. The adoption of certain types of modern equipment has increased efficiency by cutting down on time expenditures, labor costs, or wastage.

12. Maintaining economic viability for the community as a whole through the harvest and use of wild resources socially binds residents together. Customs related to reciprocity create networks for food distribution which extend beyond members of the kin group to include non-kin as well.

13. Sharing and other forms of exchange are the primary mechanisms for distribution of food. This allows the unequal harvesting efforts of individual households to be counterbalanced. Nearly 42 percent of the

households surveyed reported sharing at least half of their subsistence derived foods with others in 1982.

14. In order to effectively exploit the local environment a detailed body of specialized knowledge has evolved which focuses on the local terrain and natural history of the area. This knowledge includes details regarding the intricacies of animal behavior and plant requirements. Young hunters are instructed in the knowledge required to become a successful hunter and to conserve and maintain the resource base. Young families appear to be no less active in resource harvesting activities than the generations preceding them.

The interpretation of available evidence suggests that fish and wildlife resources will continue to play a major role in the lives and economy of Shishmaref residents. Yet many of the threats posed to economic security are outside the control of local residents. As demands on the resource base continue to grow and land use and management scenarios develop, external pressures have the capability of permanently altering the present rural economy.

Primary among the concerns of Shishmaref residents are management plans and development schemes which could have direct impacts on their core use area by drastically altering the delicate balance of human ecological relationships. In particular, residents worry about management regulations that could restrict their access to subsistence resources, cabin sites, or Serpentine Hot Springs. They also worry about transportation development which could make access to remote areas easier for non-local residents. Impacts associated with oil and gas exploration in the vicinity of the community are another major concern.

Because of the heavy dependency on marine species, residents are particularly concerned about any disturbances which could affect productivity.

One hunter expressed his frustration this way:

For people in Shishmaref, subsistence is the number one priority. Without it, the culture would change. Jobs don't matter much if they destroy the culture. If there were oil rigs out there, maybe people would have jobs for a little while, but it would change the culture. It would affect the migration of the sea mammals and we wouldn't be able to hunt them around here any more. An oil rig out there might provide jobs, but after it's gone -- then what?

Whether the changes anticipated by this hunter, in fact, would occur, is not the point made by his statement. Competing voices for the land and sea and their natural resources impose potential threats to maintaining economic security and stability. It should not be assumed that residents are opposed to any or all management plans or development schemes. Most residents recognize the need for resource management and would agree that opportunities for infusing cash into the economy are welcome. But decisions should not be made which compromise either the resources or the environment for these constitute the foundation of Shishmaref's economic well-being.

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APPENDIX A.

STATE OF ALASKA'S MANAGEMENT POLICY REGARDING SUBSISTENCE

Both the state and federal governments, in meeting their management directives, have recognized the importance of protecting the subsistence economies of many of Alaska's residents. In 1978 the Alaska Legislature passed a bill which established subsistence use as a priority use in the allocation of fish and game resources. The U.S. Congress enacted similar legislation in 1980 for federal lands. As long as state management practices concur with those of the federal government, the state will continue to have the primary management responsibilities for fish and game throughout the state. The 1978 state law defined subsistence uses as the following:

...the customary and traditional uses in Alaska of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter, or sharing for personal or family consumption. A.S. 16.26

The policy of the State of Alaska is to manage renewable resources on a "sustained yield" basis. After assessing the biological status of the resource, subsistence uses must be accorded first consideration if uses are to be restricted. Responsibilities for adopting regulatory measures for implementing the subsistence priority lie with the Board of Fisheries and the Board of Game. While subsistence uses are recognized as a priority use, increased demands on some resources have required that the Boards more clearly define "customary and traditional uses."

In December 1981 the Boards adopted eight criteria which identify customary and traditional subsistence uses:

1. a long term, consistent pattern of use, excluding interruption by circumstances beyond the user's control such as regulatory prohibitions;

2. a use pattern recurring in specific seasons of each year;

3. a use pattern consisting of methods and means of harvest which are characterized by efficiency and economy of effort and cost, and conditioned by local circumstances;

4. the consistent harvest and use of fish or game which is near, or reasonably accessible from, the user's residence;

5. the means of handling, preparing, preserving and storing fish or game which has been traditionally used by past generations, but not excluding recent technological advances where appropriate;

6. a use pattern which includes the handing down of knowledge of fishing or hunting skills, values and lore from generation to generation;

7. a use pattern in which the hunting or fishing effort or the products of that effort are distributed or shared among others within a definable community of persons, including customary trade, barter, sharing and gift-giving, customary trade may include limited exchanges cash, but does not include significant commercial enterprises; a community for purposes of subsistence uses include specific villages or towns, with a historical preponderance of subsistence users, and in addition encompasses individuals, families, or groups who in fact meet the criteria described in this subsection; and

8. a use pattern which includes reliance for subsistence purposes upon a wide diversity of the fish and game resources of an area, and which provides substantial economic, cultural, social, and nutritional elements of the subsistence user's life. (5 AAC 99.010. Joint Boards of Fisheries and Game Subsistence Procedures)

APPENDIX B.

RESOURCE USE/WAGE EMPLOYMENT QUESTIONNAIRE

Dear Household:

We are asking for your help in answering some questions about your household's use of fish, game and plants and the importance of these resources in your lives. We are also interested in learning about your household's experience with jobs and how jobs affect subsistence activities. This study is sponsored by the Division of Subsistence, Alaska Department of Fish and Game.

Your help in this study is voluntary - you can answer as many of the questions or as few as you wish. The questionnaire should require only 30 - 45 minutes to complete and your household will receive \$10 as payment for your time.

Please note that you will not be identified in this information. The only time your name appears is on this top sheet and this is for purposes of payment - this top sheet will be separated from the rest of the questionnaire.

Thanks for your help

Sandra Sobelman
Muriel Germeau

[DETACH RECEIPT AND LEAVE THE REST OF THIS SHEET WITH HOUSEHOLD]

RECEIPT: RESOURCE USE/WAGE EMPLOYMENT SURVEY

HOUSEHOLD: _____

INTERVIEWER: _____

DATE: _____

HOUSEHOLD CODE # _____

TIME BEGIN: _____

(Page 1 of 5)

SECTION A - HOUSEHOLD PROFILE:

1. Would you like us to ask the questions in Inupiaq or English? [CIRCLE]

1. Inupiaq

2. English

2. We would like to know who normally lives in this household and a little about them. No names are used; instead each individual will be coded by "Person Number".

[INTERVIEWER: PLACE A "*" NEXT TO THE PERSON NUMBER OF THOSE INDIVIDUALS HELPING IN ANSWERING QUESTIONS]

Person Number	Relationship of each person to head or oldest adult in household	[CIRCLE] Sex	Age	Birthplace	Occupation	[CIRCLE] Employed in 1982?
1	Head or oldest adult	M / F				Yes / No
2		M / F				Yes / No
3		M / F				Yes / No
4		M / F				Yes / No
5		M / F				Yes / No
6		M / F				Yes / No
7		M / F				Yes / No
8		M / F				Yes / No
9		M / F				Yes / No

3. Are there people who were considered part of your household last year but are not staying here now?

Person Number	Relationship of each person to head or oldest adult in household	[CIRCLE] Sex	Age	Birthplace	Why not here? (moved, job, school, hospital, etc)
10		M / F			
11		M / F			
12		M / F			

HOUSEHOLD CODE # _____

(page 4 of 5)

2. Of all the meat and fish your household ate last year (January - December 1982) how much of it would you say were wild foods (that is, not purchased in a store)? [CIRCLE ONE]

1. Most
2. More than $\frac{1}{2}$
3. About $\frac{1}{2}$
4. Less than $\frac{1}{2}$
5. Little
6. None

Was this amount more or less than usual or was it about average? [CIRCLE ONE]

1. More
2. Less
3. Average

3. How much of all wild foods (meat, fish, and berries/greens) that your household obtained last year (1982) did you share with others not in your household? [CIRCLE ONE]

1. Most
2. More than $\frac{1}{2}$
3. About $\frac{1}{2}$
4. Less than $\frac{1}{2}$
5. Little
6. None

If you shared, which wild foods did you share most often? [LIST UP TO 3 FOODS]

4. How much of all wild foods (meat, fish, and berries/greens) that your household had last year (1982) was obtained from others outside of your household? [CIRCLE ONE]

1. Most
2. More than $\frac{1}{2}$
3. About $\frac{1}{2}$
4. Less than $\frac{1}{2}$
5. Little
6. None

If wild foods were shared with your household, which wild foods did you most often receive? [LIST UP TO 3 FOODS]

5. Do you have any comments you would like to add about subsistence that we have not covered in this questionnaire?

HOUSEHOLD CODE # _____

(Page 5 of 5)

SECTION C - WAGE EMPLOYMENT PROFILE:

1. We would like to know about jobs that members of this household had last year (January to December 1982). Try to remember from your most recent job and work back toward the beginning of the year.

[INTERVIEWER: FILL OUT SEPARATE EMPLOYMENT PROFILE FOR EACH ADULT WHO WAS EMPLOYED DURING 1982]

- ① Person Number [CODE FROM HOUSEHOLD PROFILE]
- ② Month(s) employed [CIRCLE]
- ③ Job title (For example, reindeer herder, carver, store clerk, etc)
- ④ Who did you work for? [IF WORKED FOR SELF, PUT "SELF-EMPLOYED"]
- ⑤ Was it fulltime, parttime, and/or seasonal? [CIRCLE]
- ⑥ Was in in the village or somewhere else? [CHECK BOX]
- ⑦ If elsewhere, where?
- ⑧ Reason for leaving [INTERVIEWER: CIRCLE RESPONSES]
 - A. No reason, still employed
 - B. Summer or seasonal
 - C. didn't like job
 - D. had enough money
 - E. didn't like location
 - F. got better job
 - G. wanted to go home
 - H. job ended
 - I. not making enough money
 - J. to go hunting
 - K. family responsibilities
 - L. other reasons

① Person Number: _____

② [CIRCLE] Month(s) Employed	③ Job title	④ Employer	⑤ [CIRCLE] Type	⑥ [CHECK] V R		⑦ Where, if elsewhere	⑧ Reason for leaving
J F M A M J J A S O N D			F/T P/T Seas				A B C D E F G H I J K L
J F M A M J J A S O N D			F/T P/T Seas				A B C D E F G H I J K L
J F M A M J J A S O N D			F/T P/T Seas				A B C D E F G H I J K L
J F M A M J J A S O N D			F/T P/T Seas				A B C D E F G H I J K L
J F M A M J J A S O N D			F/T P/T Seas				A B C D E F G H I J K L

2. Were there months during 1982 when you wanted a job but didn't have one? [CIRCLE]

- 1. yes
- 2. no

If yes, what months? [CIRCLE]

J F M A M J J A S O N D

3. Did the jobs that you have/had last year affect the time you could spend hunting, fishing, trapping or making crafts?

- 1. yes
- 2. no

In what ways? _____

THANK YOU FOR YOUR ASSISTANCE!

TIME ENDED: _____

INTERVIEWER: _____