BERING STRAIT INSULAR ESKIMO: A DIACHRONIC STUDY OF ECONOMY AND POPULATION STRUCTURE

by

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Technical Paper Number 77

Department of Fish and Game
Division of Subsistence
May 1983

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BERING STRAIT INSULAR ESKIMO: A DIACHRONIC STUDY OF ECOLOGY AND POPULATION STRUCTURE

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The University of Connecticut, 1983

The purpose of this study was to systematically describe and analyze interrelated changes in population structures and ecological adaptations from 1650 to 1980 of five insular and insular-like Bering Strait Eskimo populations, including Gambell and Savoonga on St. Lawrence Island, King and Diomede islands, and Wales. More specifically, the problem was to assess interconnections between demographic characteristics and processes and ecological adaptations focused on the cooperative hunting of large marine mammals by boat crews. Data were derived from ethnohistoric and historic sources for the period prior to 1970 and from extensive fieldwork from 1970 to 1980.

Shared demographic characteristics of the study populations included relatively large and stable functional population size, with members occupying more than one community; a disproportionate ratio of males to females favoring males in the populations; a high level of population endogamy; relatively high birthrates which compensated for high death rates; patrilineality and patrilocality most well-developed on St. Lawrence Island; seasonal patterns of birth reflecting ecological cycles, although these were less marked in the youngest cohorts; an ecological base which provided support for non-productive members, although the ratio of non-productive to productive cohorts decreased from south to north; and mechanisms, in addition to

reproduction, for recruiting members, although female recruitment was more flexible than that of males.

Ecological adaptations were examined through time with a focus on crew marine mammal hunting. The demographic features of productivity were analyzed. It was determined that young to middle-aged males were the primary producers via crew hunting activities. They also exploited the greatest number of available ecological niches.

It was concluded that large populations with appropriate age and sex cohorts were a prerequisite for specializing in large marine mammal hunting. It is expected that King and Diomede islands and Wales were more intensive whalers prior to historic population decimations. Because of the its institutional nature and economic importance, crew hunting has been more stable than individual marine mammal hunting. Conversely, limits were placed on population expansion by constraints on male recruitment implicit in patterns of boat crew formation and composition.

ACKNOWLEDGEMENTS

This study spanned considerable time and space and involved the assistance and cooperation of many people. Although it would not be possible to mention them all by name, some deserve special note.

I would initially like to thank the residents of the study communities, many of whom I have known for in excess of a decade. Their patience in teaching me about their way of life, particularly hunting, boat crews, and their family histories, can never be adequately repaid. In particular I would like to thank Frank and Ursula Ellanna and their son Tom, who taught me as much as an outsider could probably learn about Bering Strait Iñupiat. They patiently endured my interest in skinboat hunting and allowed me to participate as a member of their crew for eight years in an activity generally confined to males. Ivan and Louisa Pungowiyi in Savoonga, Clement and Irma Ungott in Gambell, and Katie and Jonah Tokeinna in Wales deserve particular mention for their hospitality to me on numerous occasions.

Secondly, my sincere appreciation to Dr. William Laughlin for guidance in my doctoral program, for focusing my interests in hunting ecology and demography, and for helping me integrate my long-standing interest in the Bering Strait area into my graduate program. I would like to thank Dr. Albert Harper for his guidance and encouragement during the course of data analysis and write-up.

Since initial demographic data for the five villages were originally gathered in 1975-1976, they required updating and completion for 1980. I was aided in this task by Joan Galt, Bertie Walsky, Jackie

Lange, and Effie Ahkvaluk. I offer them my deepest appreciation. I would also like to thank Ralph Courtney and Valerie Sumida for their assistance in data analysis and data entry.

The Division of Subsistence, Alaska Department of Fish and Game, my current employer, and the University of Alaska, Anchorage Community College, my previous employer, both provided fiscal and moral support for completion of this ambitious endeavor. In particular, Dennis Kelso, previous Director of the Division of Subsistence, Carole Dindinger, Administrative Assistant, and all of the Division staff have provided unwavering encouragement and have tolerated my single-minded devotion to writing this manuscript over the last three months at the expense of many other responsibilities. Blesilda Bugayong has devoted her maximal energies and keen intelligence to typing, retyping, reformatting and proofing this manuscript throughout its many versions, with the assistance of Valerie Sumida and Joyce Hannan at the bitter end.

Mostly I wish to thank my five children and husband for tolerating my obsession with this task to the exclusion of all else over recent months and the dominating presence of the research in all its phases which has been hanging over our lives for several years. In particular, my husband, George Sherrod, has been devoted to helping me complete this dissertation by responding to my ideas and building upon them, by teaching me about the potentials of computer analysis, by listening to version after version of the text, by sharing his insights into Bering Strait hunting ecology, and mostly by never wavering in his support and sincere encouragement.

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CHAPTER I

INTRODUCTION

The Problem

The distribution of Eskimo and related Aleut populations has been extensive both latitudinally and longitudinally, from Prince William Sound in southcentral Alaska, 1,250 miles west across the Aleutian Islands, north along the western coast of Alaska to Point Barrow, and east along the coast of the Canadian arctic to the coasts of Greenland. This dispersion has been primarily linear and coastal. The most successful Eskimo ecological adaptations through time have been maritime, although riverine salmon fishing and inland caribou hunting adaptations have been relatively more recent variations on maritime themes (Giddings 1967; and Oswalt 1967). Additionally, these populations have demonstrated significant variations in population size; population density; age and sex composition; mortality rates; longevity; marriage patterns; reproductive rates; degree of isolation from other populations; frequency and extent of mobility; and their adaptations to diverse environments, including relatively harsh to more moderate conditions (Laughlin 1970: 5-6).

Although a substantial body of literature on Eskimos has emerged since the 1920s, the majority has been archaeological or ethnographic and group or community-specific. Research on Eskimos of a more problem focused or theoretical nature has emerged primarily during the last

two decades. These have included studies that explored the relationship between Eskimo populations and their ecological settings (such as Nelson 1969; Spencer 1959; and Burgess 1974); multidisciplinary studies of Eskimo population biology and genetics (such as Laughlin 1972; Johnston et al. 1982; and Crawford et al. 1981); kinship studies (such as Burch 1975a; and Heinrich 1963); studies of social and political institutions (such as Hughes 1960; and Bogojavlensky 1969); economic studies (such as Burgess 1974; and Wolfe 1979); and others. Noteworthy in this context is the relatively small data base on historic and contemporary Eskimo population structure, although Laughlin's (1972) work in the Aleutians, Taylor's (1966) work on Kodiak Island, Binford and Chasko's (1976) work at Anaktuvuk Pass, Freeman's (1971a) work in the Canadian arctic, and Milan's (1970) work at Wainwright have contributed to an understanding of Eskimo-Aleut demography.

As Laughlin (1970) has pointed out, there is significant correspondence between the ecological base, population density and distribution, and population structure of Eskimo populations (7). Additionally, data gathered on single archaeological, historic, and contemporary populations have provided examples of and contributed insights into the environmental limits which are conducive to population maintenance, expansion, and extinction (Laughlin 1970). However, comparability of data has hindered a systematic analysis of the relationships between ecological bases and population structures through time for Eskimo populations.

The nature of the relationships between environment and population size has been variously interpreted. Most commonly this relationship has been explained as a direct correlation between increased

productivity and population growth -- basically a Malthusian model of demography. Increased productivity is usually associated with technological innovations leading to a shift from hunting and gathering to food production or increasing the technological efficiency of populations which are already food producers. In regards to differential productivity between hunting groups, increased production and larger populations are usually associated with the richness and reliability of the environment -- that is, the availability and accessibility of adequate resources to provide constant, certain supplies of food and raw materials including storable surpluses and to support non-productive segments of the population (e.g. Laughlin 1972; and Birdsell 1953 and 1957). Technology is commonly seen to be an important linking variable between environmental potential and the productivity or level of exploitation and population size of the associated human group.

In this context, another related perspective is pursued. As Laughlin (1968b) has pointed out, technology possibly has been over emphasized as a key variable in arriving at an understanding of the ecological adaptations of hunters and gatherers. Conversely, too little attention has been paid to demographic variables -- not only population size and density, but the composition of populations; the dynamics of reproduction, mortality, and emigration; mate selection; and the organization of populations into economically productive units. Whereas it has been demonstrated that environmental factors play a significant role in features of human demography, it can be conversely argued that demographic characteristics in some cases may be seen as important variables in understanding if or how available resources are exploited by the population in a given area. Bockstoce (1976) and Freeman (1979)

have argued this point in regards to large marine mammal hunting -- that there is a set of demographic requirements associated with large marine mamal hunting which influences the successful exploitation of these species assuming they are available in the environment. This complex interrelationship between environment, human adaptation, and overall population structure is explored in this context.

The purpose of this study is to systematically analyze changes in population structure in relationship to changes in ecological adaptation through time for four insular and one insular-like Eskimo populations in the Bering Strait area, including Gambell, Savoonga, King and Diomede islands, and Wales. Bering Strait populations were selected for several reasons. If the inhabitants of St. Lawrence Island (Gambell and Savoonga) are considered as one of the Strait's populations, although the Island is geographically transitional between the northern Bering Sea and Bering Strait, this area includes two linguistically and culturally distinct Eskimo populations -- Siberian Yuit and Iñupiat. These populations have been characterized by relatively large, dense, and sedentary settlements through time given their northerly latitude and environmental potential associated with their mode of exploitation (hunting) at this latitude. These populations share a common ecological focus based on the taking of large marine mammals (whales and/or walrus, including seals taken in conjunction with the larger species) harvested by males organized into skinboat crews. Resource availability in addition to large marine mammals is diverse and abundant relative to that of other northerly Eskimo populations. Although the environments of these five populations vary to a limited degree, the similarities far exceed the disparities. The study communities share insularity (with

the exception of Wales), thus providing a means for easily identifying them as discrete populations with relatively greater isolation from other populations than is found on the mainland and a complex of ecologically-relevant features unique to islands. Although Wales is not an island, its geographic location on a headland which juts into the Strait at its narrowest constriction and topographic and geographic isolation from most flora, fauna, and physiographic characteristics of the Peninsula make it more insular-like than the mainland in its basic features. The proximity of the study populations to one another has resulted in several additional shared variables. These include access to and use of the same populations of migratory animals; a common history of contact with non-Eskimos; shared atypical variations in climatological patterns, including sea ice conditions, prevailing winds, heavy precipitation, seasonality of faunal migrations, and others; exposure to externally introduced diseases; and acculturative influences emanating from Euroamerican sources.

Given the constants described above, the study populations present the opportunity to examine some key variables, including population size and attendant characteristics, the presence or absence of whaling, cultural and linguistic distinctiveness, the influence of relocation, island size, and mainland/insular dichotomies if any exist. Figure 1 depicts the variables as they relate to each of the study populations. The effects of these variables on the demographic structure of the study populations through time will be examined.

The second part of the problem involves testing the applicability of certain demographic observations and hypotheses about hunters in general and large marine mammal hunters in specific to the study

	Variables[1]										
Population	Large Size (400+)	Small Size (<400)	Relocated	Walrus Hunting Only	Walrus Hunting/ Sporadic Whaling	Walrus Hunting/ Intensive Whaling	Siberian Yuit	Inupiat	Large Island	Small Island	Mainland
Gambell	+	-	-	-	-	+	+	-	+	-	-
Savoonga	+	-	+	-	-	+	+	-	+	-	-
King Island	-	+	+	+	-	-	-	+	-	+/-[2]	-/+[2]
Diomede	-	+	-	-	+	-	-	+	-	+	-
Wales	-	+	-	-	+	-	-	+	-	-	+

Figure 1: Study population variables in 1980.

1 The (+) indicates presence of variable, the (-) absence of the variable.
2 King Islanders were located on a small island until the mid-1960s. They resided on the mainland during the winter of 1980 but returned in part to their home island during early summer months.

populations. Laughlin (1968b) noted that in general hunting populations exhibited particular demographic characteristics, including relatively low effective population size; a tendency towards endogamy; population isolation; a common incidence of inbreeding; differential fertility favoring headmen, chiefs, or successful hunters; a high frequency of accidental deaths; high infant mortality and short life spans which vary with the resource-based richness of the exploitational area; frequent population "bottlenecks" during which the population size exceeds the temporary carrying capacity of the exploited environment because of fluctuations in food supply or other environmental factors; fusion of remnant groups subsequent to a population decimation; and gene flow predominantly from central to marginal groups. Additionally, Freeman (1971) noted that in accordance with demographic transition theory, societies which are characterized by a high degree of local self-sufficiency are also characterized by high birthrates which are necessary to compensate for the corresponding high death rates which fluctuate in response to varying and uncertain economic productivity and periodic health crises (216). He also noted that death rates decline with the onset of western medical practices and decreasing local economic self-sufficiency. The high fertility rates, stemming from ". . . peoples' recognition of the 'value' of children, because of, for example, their contribution to the household economy and their future role in providing security to aging parents" (Freeman 1971: 216), do not immediately decrease with declining local economic self-sufficiency bringing about population explosions, according to Freeman. Taylor (1966) noted a significant differential ratio between males and females in Karluk (Kodiak Island) which was associated with

female emigration for outmarriage rather than with female infanticide, high rates of female mortality, or differential birth ratios.

Data-based conclusions or hypotheses relating more specifically to large marine mammal hunting include the observation that the efficient hunting of large marine mammals requires a population base which provides multiple crews (5 to 8) of able-bodied males and a social structure adequate for coordinating intracrew and intercrew cooperation in production and distribution (Bockstoce 1976; and Freeman 1979). Additionally, there are indications that marine mammal hunters in northern latitudes opt for large game if they have a choice (Ernest Burch, Jr., personal communication, 1983; and Richard Nelson, personal communication, 1982).

> Among hunting peoples, securing the largest available game animals has evident advantage, more especially when the carcass products have high value in the economic, technologic and prestige-conferring systems of the culture. (Freeman 1970a: 169)

According to Bockstoce (1976) and Freeman (1979), the resource base of large marine mammal hunters has to allow temporary surplus accumulations of food to be utilized by the population during the period of exclusive commitment to the high-yield, high-risk activity of whaling. To a large degree, this generalization is also applicable to walrus hunting. Additional data-based observations derived from the ecological and demographic information compiled on Gambell, Savoonga, King and Diomede islands, and Wales populations which have relevance in this context will be systematically compared between the study communities.

The Study Hypotheses

Study hypotheses related to the problem described above include, but are not limited to, the following:

(1) Since it appears that large marine mammal hunting has remained the primary focus of the study populations of Gambell, Savoonga, King and Diomede islands, and Wales, it is expected that the demographic structures of these populations will demonstrate stability through time, similarities to one another synchronically, and diachronic consistency within any one of these populations.

(2) Due to the fact that cooperative (crew) marine mammal hunting is the focus of adaptation for these populations, it is expected that many features of the demographic process (such as mate selection, reproductive rates and timing, adoption practices, age-specific fertility, and others) will be structured to facilitate the success of this adaptive strategy.

(3) Because of the apparent productivity of large marine mammal hunting, it is expected that there will be a high ratio of dependents to hunters; that the potential to support relatively non-productive members (very young, very old, and infirm) of these societies will exist; that there will be differential fertility between successful hunters (particularly skinboat captains) and less successful hunters; that the intergenerational transmission of information related to crew hunting will be important, particularly between males; and that boat captains will have economic and social advantages over non-captains.

(4) It is expected that an analysis of the population structures of these groups will lend insight into an explanation for the presence or absence and intensity of whaling in these communities.

CHAPTER II

THE BERING STRAIT AREA AND ITS INSULAR POPULATIONS

The Study Populations

The Bering Strait area has been narrowly defined to include only the fifty-six mile stretch of water between Cape Prince of Wales in Alaska and East Cape Siberia and more broadly defined to include all of the Bering Sea from the northerly portions of the Yukon Delta to the Chukchi Sea north of Seward Peninsula (see Figure 2; Ray: 1975b). The focus of this study is the islands located within the Strait as broadly defined, from approximately 63° north latitude to just north of the narrowest point of the Strait proper.

Study populations inhabit (or have inhabited in the case of King Island) the islands of St. Lawrence (Sivoukak)[1], King (Ukiuvok), Little Diomede (Ingalik), and the mainland community of Wales (Kingigan) located slightly northwest of Cape Prince of Wales (see Figures 3 and 4 respectively). Big Diomede Island (Imaklik), located approximately three miles west of Little Diomede Island, is not directly a part of this study. It is now a part of the Soviet Union and contemporarily does not have an Iñupiat population. However, it is of historical interest in this context, because of interrelationships between Big Diomede and

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[1] Each study location and population will be introduced with both their English and Iñupiaq or Siberian Yupik name. Use of the English names will prevail in the study for the convenience of most readers with an apology, however, to the study populations.

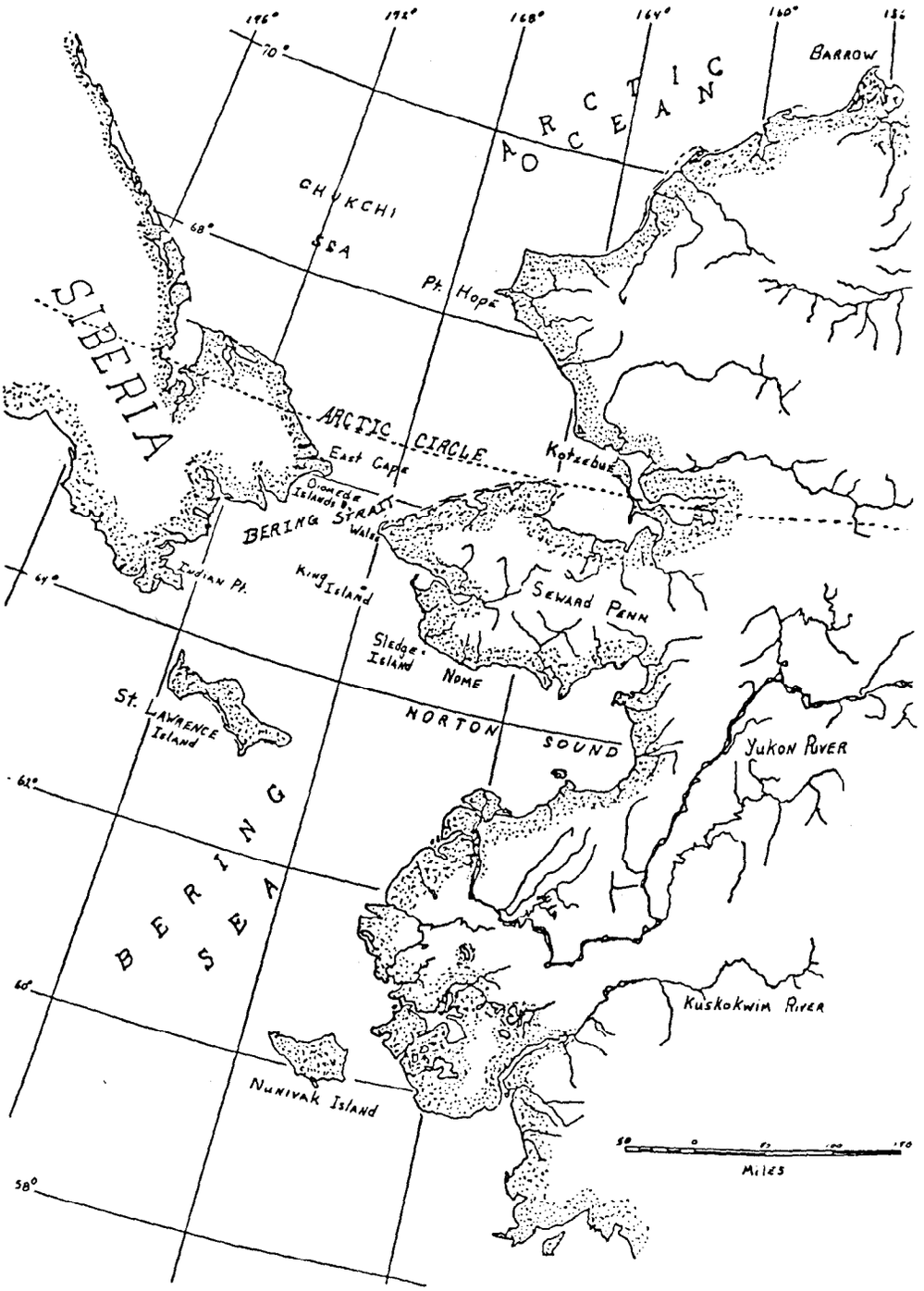


Figure 2: Northwestern Alaska and Bering Strait.

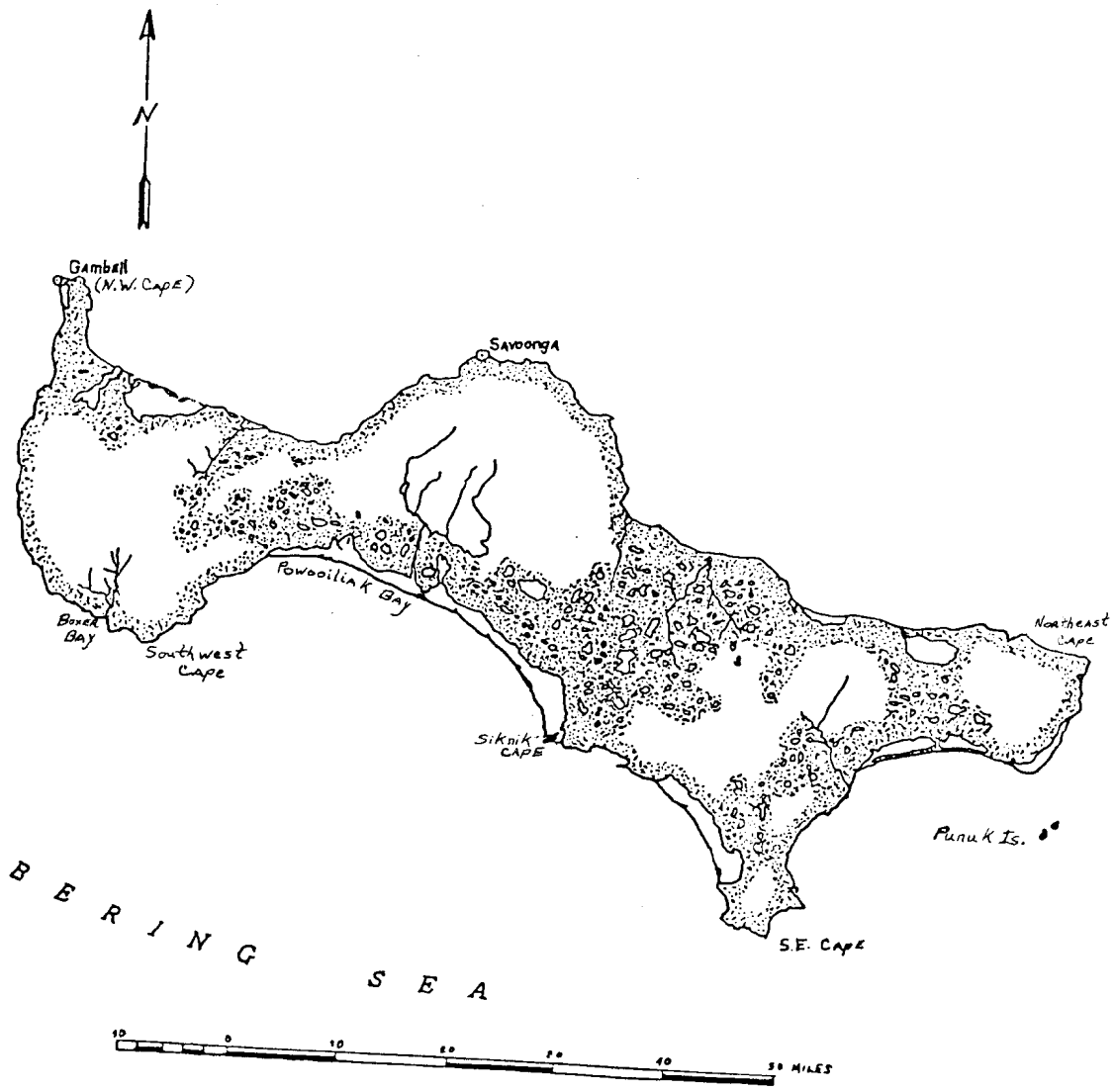


Figure 3: St. Lawrence Island.

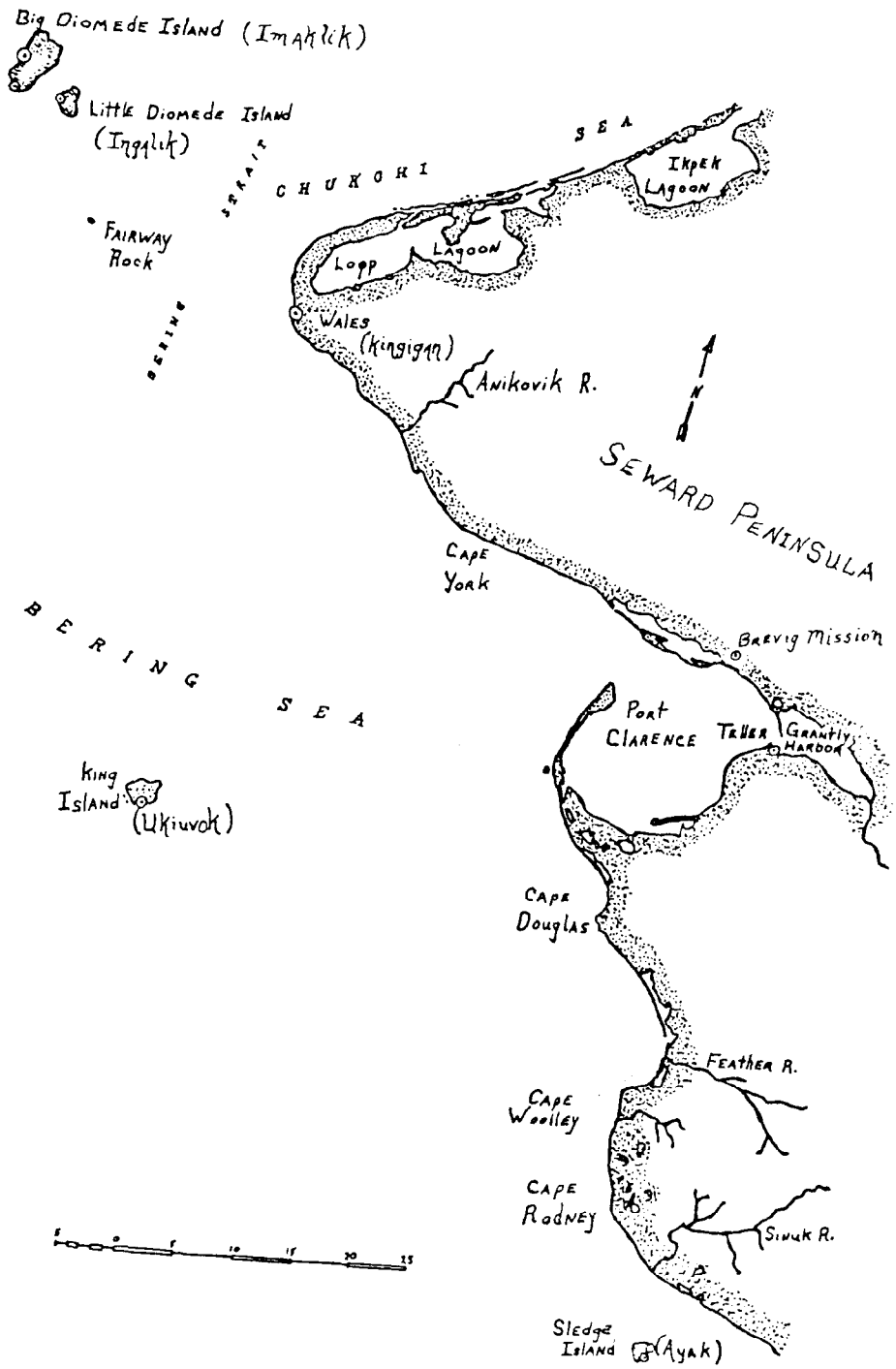


Figure 4: Bering Strait area.

other Bering Strait communities in the past and because of the relocation of some of Big Diomede's population to Little Diomede prior to World War II. Sledge Island (Ayak), located near Nome (see Figure 4), has no contemporary resident Iñupiat population, but its history is known through ethnohistorical, historical, and archaeological sources. It will not be considered in this study. King Island has no year-round inhabitants today, but King Islanders (Ukiuvungmiut) have remained somewhat spatially, socially, and genetically discrete within Nome since their gradual relocation there which culminated in the mid-1960s. The continued ties of King Islanders to one another socially and genealogically, to their walrus hunting traditions, to a shared value system, to the Island and adjacent mainland hunting site (Cape Woolley), and to their conceptual distinctiveness vis-a-vis other Bering Strait populations make their inclusion in this study imperative. The King Island case is particularly important in analyzing the ecological and demographic shifts that have occurred in the process of community relocation. As previously discussed, the mainland community of Wales is included because its location near a jutting headland within the Strait proper provided an ecological setting similar to that of the insular communities. In addition, Wales has maintained both trading and some kinship ties to the insular populations and it contemporarily provides an interesting demographic contrast. It should be noted that St. Lawrence Island is spatially and culturally removed from the other populations of the study area.

The Bering Strait Context: An Ecological Overview

Since this study is focused on interrelationships between population structure and ecology, a brief description of major ecological features which would influence human adaptation is useful. Relevant features of geology, topography, climate, sea and sea ice conditions, marine fauna, terrestrial fauna, and some floral species are included. Since large marine mammal hunting is of particular interest in this context, there is an emphasis on ecological features related to marine mammals.

The islands of the Bering Sea and Bering Strait are the only prominent topographic features of the presently submerged Bering-Chukchi platform -- the most likely route of human migration from the Old World to the New. Geological evidence suggests the continuity of a single land mass including Siberia and Alaska, and most of the present islands in the Bering Sea and Bering Strait are composed of continental rocks typical of adjacent mainland areas to both the east and west (Hopkins 1967). The islands were islands during Pleistocene interglacials but became part of the Bering land mass during glacial periods, with the possible exception of the Diomedes which may have been surrounded by a land-locked sea. Hopkins (1967) suggested that there has been water in the Strait since approximately 10,000-11,000 years ago.

The following description of King Island provides information about the topography of the Island and suggests some of the complexities involved in launching and landing skinboats and moving meat and equipment from boats to homes within the village:

> The King Island village is built on the slope that adjoins the slight embayment in the southern coast. . . . At the shore below

> the village is a rock cliff 25 to 50 feet high. At higher levels, bedrock probably lies at a depth of 20 to 40 feet, overlain by an accumulation of granite blocks up to 15 feet across, mostly tightly wedged together, and embedded in silty sand. The slope beneath most of the village is 30° to 32° . . ., but it steepens to 45° in a local area below the school house, and it averages about 38° above the village, just below the base of the cliffs. . . . (Hopkins and Chapman 1966: 3)

There is permafrost on the Island at a depth of from 6-8 feet in the vicinity of the village, and tundra vegetation devoid of trees and large shrubs prevails. In areas where granitic boulders are on the surface, there is no vegetation. Areas that are soil covered ". . . support a discontinuous cover of grasses, sedges, herbs, and a few prostrate woody shrubs" (Hopkins and Chapman 1966: 3). There are 11 species of edible vegetation on the Island including tubers, salmonberries, and greens (Bogojavlensky 1969). Moss was used for multiple purposes including as wicks in seal oil lamps which provided both heat and light to village residents.

Little Diomede[1] is depicted in Figure 4. Although Diomede shows many topographic similarities to King Island, the slopes in the vicinity of the village are less steep and there is a beach area available for landing boats. The flora and fauna of the islands are similar. Diomede is more centrally located within the Strait proper.

St. Lawrence Island has a much more varied topography than do the islands previously discussed (see Figure 3). It also has geological features older than those of the smaller islands. St. Lawrence Island is located approximately 124 miles southwest of Seward Peninsula or 104 miles from the nearest point on the Alaska mainland (Flint 1958: 129; and Selkregg 1976). However, it is only 38 miles from Cape

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[1] "Little Diomede" will be referred to as "Diomede" in the remainder of this study. References to "Big Diomede" will be specific.

Chukotskiy in northeastern Siberia, which explains why the ties of St. Lawrence Island residents were primarily with Siberian rather than Alaskan populations prior to the last few decades. A volcanic upland dominates the center of the Island, and much of the southwestern and eastern parts of the Island are also relatively high topographically. The remaining two-thirds or so of the Island are low-lying, covered with tundra, and dotted with hundreds of very small lakes. The following quotation describes St. Lawrence Island climate and flora:

> Although St. Lawrence Island is located some 200 miles south of the Arctic Circle, all parts of the Island are covered by a true arctic tundra. The flora of the Island . . . contains less than half as many species as are found on the adjacent mainland coast of the Seward Peninsula. Even Cape Chaplino, Siberia, which is only about 40 miles from the nearest point on St. Lawrence, has a considerable number of species which are not known to occur on the Island. . . . The impoverishment of the flora of St. Lawrence Island is apparently caused by the climate, particularly the comparatively low summer temperature regime, which compares more closely with high arctic stations in Greenland, Spitzbergen or the Arctic coast of Alaska than with the temperature regimes of such stations as Nome. . . . (Young and Hall, Jr. 1969: 44)

Young and Hall, Jr. (1969) go on to say that, although wild berries are so rare that they are inconsequential dietarily to St. Lawrence Island residents, primarily females of all ages exploit minimally 24 species of terrestrial flora and an unknown number of seaweed and marine invertebrate species ("beach throw" or "seafood") for food and raw materials.

The existing community of Wales (see Figure 4) is located slightly north of Cape Prince of Wales, a granitic headland which juts into the narrowest portion of Bering Strait and which is the most westerly mainland point on Seward Peninsula. The village is located below the mountain on a lowland area composed of alluvial and marine sediments (Selkregg 1976: 65). In historic times, Wales was composed of two related villages, Agianamiut on the south and Kiatanamiut on

the north. A portion of the southerly of these villages has been abandoned and is being destroyed by wave action. Lopp Lagoon, an estuary with a high seasonal concentration of nesting migratory waterfowl, is situated northeast of the contemporary village site. The characteristic vegetation in the area consists of wet, moist, and alpine tundra, and the rocky outcrops in the vicinity of the village are barren. Flora in the proximity of the community are more diverse and abundant than is the case on King, Diomede, or St. Lawrence islands and include several species of berries, willows, alders, mosses, and other edible or otherwise useful plants.

Through time the adaptive focus of all study populations has remained maritime. Since all populations utilize maritime areas which are only seasonally ice-free, and since ice conditions play a major role in the strategies necessary for obtaining both large and small marine mammals, a brief discussion of sea ice conditions in the study area is relevant. All study communities except Wales have negligible shore-fast ice, although ice between the Diomede islands remains fast during portions of most winters. Strong currents, which result in highly dynamic pack ice and a range of ice concentrations from extremely dense to ice-free, characterize all insular study areas. The magnitude of energy exerted by moving ice in the Strait is demonstrated in a local account of a moving ice pan crushing an entire herd of walrus (Thornton 1931), the scouring of the sea floor by ice, the destruction of onshore boat racks at Savoonga by moving sea ice, or the destruction of a three-story concrete and timber lighterage derrick in Nome's roadstead during the winter of 1917-1918. During the spring of 1979, several aluminum boats carrying Savoonga walrus hunters were trapped

off the coast of St. Lawrence Island by moving ice. Although the hunters were rescued, some reported the ice hitting their aluminum boats, popping out all of the rivets, and crushing and sinking the craft. However, the speed of moving sea ice is a variable possibly more critical to the maritime hunter than that of energy. Whereas the speed of winter sea ice movement has yet to be calculated for this area, the mean summer sea current is from 1 to 2.5 knots/hour (Selkregg 1976: 37) and can increase greatly in intensity with winter storm activity. Oral tradition and historic documentation include accounts of hunters being carried off by moving sea ice.

There are some important differences in sea ice conditions between the study areas which influence maritime hunting. Since St. Lawrence Island is located south of the other insular communities and Wales, it is actually more functionally a part of the Bering Sea than it is of the Strait. St. Lawrence Island is surrounded by a much larger body of water, it effectively has two to three months less sea ice than do King or the Diomede islands and Wales, and the south side of the Island is an area of recurring polynyas (an area of open water and newly forming ice), thereby enabling boat hunting to take place year-round. The location of Gambell maximizes the accessibility of marine mammals because of the availability of open leads during winter months adjacent to both the community and to marine mammal migratory routes.

The following quotation provides relevant information regarding King Island sea ice:

> Hunting on foot is possible whenever there is enough ice to support a man. At King Island the ice begins to form in October and by November the prevailing northerly winds have piled enough of it up below the north cliffs of the Island to make the hunting of

> seals possible. The lunar month which comes at this time is called mayuaqtuvik ("climbing time") since the hunters have to climb over the Island from the village to reach ice on the north shore. At this time of the initial appearance of the ice, the four species of seals, the bearded seal (Erignathus barbatus); the harbor seal (Phoca vitulina); the ribbon seal (Phoca fasciata); and the ringed seal (Phoca hispida), also reappear as they migrate south with the advancing ice. Also, herds of walrus (Odobenus rosmarus divergens) may pass close by on their southward migration. . . .
>
> By December there is usually an extensive apron of shore-fast ice around the islands. In front of the village at King Island it usually forms a triangle. All through the winter, all around the islands, Bering Strait is clogged up with moving pack ice. If there is no wind, it is carried back to the north by the current. But even with a slight breeze, usually from the north, the ice moves with the wind. The hunting is done off the shore in the moving ice, where leads will periodically open and marine mammals can be spotted. . . . (Bogojavlensky 1969: 72-73)

The complex interrelationship between King Island hunters, marine mammals, and sea ice conditions is clearly articulated in this statement.

The ice conditions described above for King Island are largely applicable to Diomede with some exceptions. As previously mentioned, solid ice does develop between Big and Little Diomede islands during most winters, although the timing of such formation may vary from November to March, with December being the average month for formation. There is an accumulation of pack ice along the northern coast of the Island due to a combination of prevailing winds and currents. As a result of deep water and exposure to winds and currents, the east side of the Island is virtually ice free year-round and has only 20-30 feet of shore ice (Thomas 1981).

Ice conditions in Wales are influenced by the extraordinarily high winds that prevail in the vicinity of the Cape and the village. Consequentially the winds drive and break up sea ice on which winter marine mammal hunting takes place, and the risks of this occurring must always be considered by the Wales hunter (Bogojavlensky 1969: 12).

There is an apron of land-fast ice that extends into the Strait in front of the village that is more extensive than the ice adjacent to the insular villages of the study area. However, compared with other mainland ice configurations north and south of Wales, the sea ice conditions and associated ice-hunting patterns of Wales are more insular-like than mainland in character. Prior to approximately 1918, satellite communities were distributed along the coast north and south of Wales (Koutsky 1981), in part to take advantage of more stable shore-ice conditions during winter months.

To summarize what the sea ice means ecologically to marine mammal hunters of Bering Strait:

> The sea ice environment provides the greatest part of subsistence. . . . For the islanders the ice multiplies by many, many times the area of accessible terrain. Breakup shrinks the islands; freeze-up is eagerly awaited every year. (Bogojavlensky 1969: 13)

Table 1 lists primary and secondary biotic resources available to the study populations, including marine, insular, and adjacent mainland species. Inhabitants of Bering Strait insular communities have developed adaptive strategies that are dependent on marine fauna as opposed to having ready access to seasonally available terrestrial fauna. Terrestrial resources such as reindeer and caribou or, more contemporarily, moose have been obtained either by trade or through mainland hunting activities in the summer and early fall.

The few terrestrial fauna available on the islands should briefly be considered, however, as some furbearers provided pelts used for clothing and were important in eighteenth century trading relationships with Siberian populations. In the case of King and Little Diomede islands, the only terrestrial animal available on the islands

TABLE 1: BIOTIC RESOURCES USED BY RESIDENTS OF THE BERING STRAIT STUDY AREA [1] [2]

Common Name	Scientific Name[3]
Primary and Secondary Food and Raw Material Sources[4]	
whale, bowhead	Balaena mysticetus
whale, belukha	Delphinapterus leucas
whale, grey	Eschrichtius gibbosus
walrus, Pacific	Odobenus rosmarus
seal, bearded	Erignathus barbatus
seal, harbor or spotted	Phoca vitulina
seal, ringed	Phoca hispida
seal, ribbon	Phoca fasciata
sea lion, Stellar	Eumetopias jubata
bear, polar	Ursus maritimus
moose	Alces alces
caribou or reindeer	Rangifer tarandus
bear, black	Ursus americanus
bear, grizzly	Ursus arctos
squirrel, arctic ground	Citellus parryi
hare, arctic	Lepus arcticus
hare, snowshoe	Lepus americana
auklet, least	Aethia pusilla
auklet, crested	Aethia cristatella
auklet, parakeet	Cyclorhyncus psittaculus
eider, common	Somateria mollissima
eider, king	Somateria spectabilis
eider, spectacled	Lampronetta fisheri
eider, Stellar's	Polysticta stelleri
oldsquaw	Clangula hyemalis
pintail	Anas acuta
black brant	Branta nigricans
snow goose	Chen hyperborea
white fronted goose	Anser albifrons
crane	Grus canadensis
murre, common (particularly eggs)	Uria aalge
murre, thick billed (particularly eggs)	Uria lomvia
ptarmigan, willow	Lagopus lagopus
ptarmigan, rock	Lagopus mutus
salmon, silver	Oncorhyncus kisutch
salmon, chum	Oncorhyncus keta

TABLE 1: -- CONTINUED

Common Name	Scientific Name
salmon, humpback	Oncorhynchus gorbuscha
salmon, sockeye	Oncorhynchus nerka
salmon, king	Oncorhynchus tshawytscha
whitefish, Bering	Coregonus laurettae
whitefish, least	Coregonus sardinella
whitefish, round	Porsopium cylindraceum
whitefish, broad	Coregonus nasus
whitefish, humpback	Coregonus pidschian
sheefish	Stenodus leucichthys
blackfish	Dallia pectoralis
char, arctic	Salvelinus alpinus
cod, saffron	Eleginus gracilis
tomcod, Pacific	unknown
flounder, arctic	Boreogadus saida
grayling	Thymallus arcticus
pike, northern	Esox lucius
herring, lake	Coregonus sardinella
herring, Pacific	Clupea harengus
halibut, Pacific	Hippoglossus stenolepis
smelt	Osmerus mordax
sculpin	Cottus cognatus
burbot	Lota lota
crab, king	Chinoecetes opilio
crab, tanner	Paralithodes platypus
clams	Macoma calcerea
mussels (several species)	unknown
fox, arctic[5]	Alopex lagopus
fox, red	Vulpes fulva
lynx	Lynx canadansis
marmot, hoary	Marmota caligata
marten	Martes americana
mink	Mustela vison
muskrat	Onbotra zibethica
wolf	Canis lupus
wolverine	Gulo gulo
weasel, short-tailed (ermine)	Mustela erminea
weasel, least	Mustela rixosa

TABLE 1: -- CONTINUED

Common Name	Scientific Name
Vegetation[6]	
mountain sorrel	Oxyria digyna
greens	Rhodiola rosea
potato	Claytonia tuberosa
willow leaves	Salix pulchra
	Salix reticulata
	Salix artica
sourdock	Rumex archius
salmonberry (cloudberry)	Rabus chamaemorus
crowberry	Empetrum nigrum
blueberry	vaccinium uliginosum
cranberry	Vacconium vitis-idaea
whortleberry	Vaccinium uliginosum
seaweed	unknown

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1 Not all of these biotic resources are utilized by all communities within the study area because of their ecological and cultural diversity.

2 Adapted from Ellanna 1980: 241-243.

3 Eskimo names are not given because of linguistic diversity of the study area's population.

4 See Appendix I for average live weights of primary marine mammal resources.

5 Most of the furbearers were not used for food except in times of food shortages.

6 Other vegetation such as driftwood, alder, spruce (black and white), birch and sod, are used as raw materials by area residents but not listed here.

is the arctic fox. This fox travels great distances on ice floes and is found on all Bering Sea and Bering Strait islands in seasonal contact with moving sea ice. St. Lawrence Island has a greater diversity of terrestrial fauna than do the two smaller islands. Although there were no ungulates indigenous to the Island, reindeer were transplanted there from Siberia in 1900. The contemporary herd is composed of several hundred animals following an initial population boom and subsequent fall during its eighty year history. Reindeer have not played an important role in the diet of St. Lawrence Island populations. Rausch (1953) reported seven species of mammals indigenous to the Island and others that have come via moving pack ice. These species included tundra shrew (very uncommon in the 1950s); brown bear (a single occurrence was reported in 1933 and the bear was assumed to have been transported by pack ice); polar bear (an annual occurrence but not abundant); wolf (another single reported occurrence in 1927 transported via pack ice); red fox (was occasionally reported and found archaeologically but by 1953 were rare or nonexistent on the Island); arctic fox (abundant on the Island concurrently with a high population of voles); ground squirrel (common); lemming (at a low level of population density when the study was conducted); red-backed vole; and tundra vole (Rausch 1953: 18-25).

As could be expected, the population of Wales has had access to a more diverse range of terrestrial fauna similar to that found elsewhere on the mainland of the northwestern Alaskan coast. Because of the maritime emphasis of this study, only a few species most important to human populations will be discussed. Reindeer were transplanted to Wales in 1894 subsequent to the decline of caribou on Seward Peninsula

(Ellanna 1980). A privately owned herd remains and provides a source of protein when butchering occurs. Moose have occurred in the Wales area during the last decade. Numerous furbearers such as wolf, arctic fox, red fox, grizzly bear, and arctic hare are available. With the exception of caribou/reindeer and moose contemporarily, terrestrial fauna have played a markedly secondary role in the economy of Wales residents.

All study locations are associated with geographical features that provide excellent habitat for pelagic birds and migratory waterfowl, specifically cliffs and high bluffs for sea birds and coastal, tundra, wetlands for migratory waterfowl. King and the Diomede islands provide habitat that supports very concentrated and diverse sea bird colonies. For example, King Island is estimated to provide supporting habitat for 250,000 nesting sea birds, whereas Diomede and adjacent Fairway Rock -- an egg gathering location for Wales and Diomede residents -- support an estimated 1,300,000 such birds (Gusey 1979: 1-27). These birds provide a source of meat and eggs. However, the residents of both Diomede and King islands need to go to the mainland to obtain nesting migratory waterfowl, although waterfowl in flight are readily taken by hunters at sea. In contrast, St. Lawrence Island and Wales hunters have access locally to both major groups of avifauna. The low, wet coastal tundra areas of St. Lawrence Island and the Lopp Lagoon area near Wales support medium to high density migratory waterfowl populations (Selkregg 1976: 161). In addition, St. Lawrence Island and Wales also have the cliffs necessary for access to sea birds. St. Lawrence Island has seventeen known major sea bird colonies and unquestionably additional ones which have not been documented

(Selkregg 1976: 161; Gusey 1979: 1-31; and field data 1979-1980). For all study populations, the most important sea birds include two species of murres, two species of guillemots, five species of auklets, two species of puffins, five species of gulls, two species of cormorants, and two species of kittiwakes (Gusey 1979: 2-19). The most important migratory waterfowl include two species of geese, fourteen species of ducks, and a single species of swan (Gusey 1979: 2-13). Biological studies may not have identified all species important to Eskimos, and conversely, not all documented species were utilized by Eskimos. Since the focus of this study is marine mammal hunting, the harvest and use of avifauna will not be discussed in detail in Chapter V except to link production with appropriate population cohorts.

Although a detailed discussion of available fish species is not appropriate in this context, it should be noted that King and Little Diomede island populations have no salmon spawning streams. Therefore they have always been reliant on the mainland for any salmon they obtain. As Ray (1975b) states:

> The walrus-hunting tribes had few streams that permitted the large-scale salmon fishing of such areas as Fish River, Golovin Bay, Unalakleet, and Nome, though the Mint River near Wales had a few salmon and whitefish. Wales and the island tribes fished through the ocean ice for tomcods, sculpin, and flounder, and occasionally the King Islanders caught a favorite small blue cod-fish. The Wales people, moreover, obtained large quantities of salmon through their own efforts in Kotzebue Sound, where they went during the summers for trading and fishing. . . . King Islanders often fished in Kauwerak country, and the Sledge Islanders went to the opposite mainland during the summer (114-115).

The situation on St. Lawrence Island is somewhat different. St. Lawrence Island populations have access on the Island to salmon in spawning streams and lagoons, arctic char in lagoons, and cod, sculpin, and halibut from the sea or through sea ice (Hughes 1960). All of the

study area populations have access to king crab, which are usually taken through the sea ice (Thomas 1981).

Marine mammals are the central focus in the adaptative strategies of Bering Strait insular populations. Therefore the ecology of species used by populations of the study area warrants a somewhat more detailed description in the context of this study. These species include the Pacific walrus, bowhead whale, gray or summer whale, belukha or white whale, finback and minke whales, bearded seal, harbor or spotted seal, ringed seal, ribbon seal, and Stellar sea lion. Although polar bear are not a marine mammal biologically, they are considered in the context of marine mammals because of the habitat they occupy. They are also considered a marine mammal in state and federal regulations governing resource harvests.

The Pacific walrus is a migratory species which spends the winter in the Bering Sea and summer in the Chukchi Sea. It regularly migrates northward in the spring and southward in the autumn (Fay 1982). It is therefore available to most Bering Strait insular populations for only short periods of time seasonally during the course of these migrations. The walrus, ringed seal, ribbon seal, a subpopulation of spotted seal, and bearded seal are commonly associated with sea ice in the northern Bering and Chukchi seas and are therefore referred to as pagophilic ("ice loving" or "ice inhabiting") pinnipeds (Burns 1970a: 445). The Pacific walrus prefers to haul out on snow-covered ice floes rather than on land (Fay 1982: 7). Walrus consume primarily sedentary mollusks and are gregarious forming herds of a few to several hundred individuals.

There are at least two major concentrations of the Pacific

walrus during winter months in the Bering Sea, one near St. Lawrence Island and the other in Bristol Bay (Fay 1982: 26). They are comprised primarily of adult females and their young and a few adult males (Fay 1982: 26). These "nursery" herds are available to St. Lawrence Island hunters throughout the winter south and west of the Island. The animals from the St. Lawrence Island concentration are most likely the first to reach Bering Strait in late April (Fay 1982: 27); this group passes through the Strait in May. The Bristol Bay concentration reaches St. Lawrence Island by May and moves northward through Bering Strait mainly in June. Some females and young move east and north from the Gulf of Anadyr in late June and July, and occasional stragglers and herds of males have appeared irregularly along the coasts and at the islands throughout July (Fay 1982: 28). Some herds of males have remained at Big Diomede and, in recent years, at King Island for most or all of the summer months. The autumn migration has not been as completely documented or as well understood but seems to be the reverse of the spring migration (Fay 1982: 28). The herds which migrate south first pass along the eastern coast of St. Lawrence Island. Because of early spring ice conditions, it is likely that the vast majority of the spring harvest by King Island (and Nome) hunters and hunters using the eastern side of St. Lawrence Island comes from the Bristol Bay concentration, whereas St. Lawrence Island hunters have access to the St. Lawrence Island concentration during the winter months and on the western coast of the Island during the spring. Diomede hunters probably have access to animals from both concentrations. Access by Wales hunters varies from year to year depending upon ice conditions. Access to migrating herds

containing females is considered to be important by Bering Strait hunters since the female's hides are used for covering skinboats. All of the study populations focus on hunting the Pacific walrus for food and raw materials and hunt them primarily during the spring migration in association with sea ice and, less frequently, in the fall during their return migration.

Contemporarily the bowhead whale is hunted by all of the study populations except for King Island. There is little evidence of intensive large whale hunting by King Island populations either contemporarily or historically, although there is one documented catch and archaeological evidence that some level of whaling may have been conducted prehistorically. Diomede and Wales populations have hunted bowhead historically and contemporarily but have specialized in the hunting of the Pacific walrus. St. Lawrence Island populations specialize both in the hunting of bowhead and walrus. Although St. Lawrence Islanders are dietarily and nutritionally more walrus dependent, hunting of the bowhead is highly valued culturally and involves a complex cooperative social network necessary to successfully harvest this large species (see Chapter V). The bowhead frequents the ice front of the southwest Bering Sea from March to May while they are beginning their northward migration. Although little is known about their wintering patterns, it is believed that they winter north of the Aleutian Islands. Because of their wintering location, St. Lawrence Island populations are the first of the study populations to have access to the bowhead. Apparently the bowhead migration is distributed in both time and space, however, since the hunting of bowhead has occurred simultaneously from St. Lawrence Island to Pt. Hope. The majority of bowhead migrate along

the western shores of St. Lawrence Island and stay to the west in their northerly migration, although both St. Lawrence Island and Norton Sound informants report sporadic bowhead migrations to the east of the Island and even into Norton Sound, especially in years when the narrow Strait proper may be ice-choked as it was in the spring of 1980 (informant interviews and discussions with U. S. Fish and Wildlife Service biologists, 1980-1981). Prior to the institution of quotas, bowhead were also hunted during their fall migration south. Contemporarily there is no fall bowhead harvest by the study populations.

The gray whale, referred to as "summer whale" by study area populations, is not as actively pursued as the bowhead by hunters from these communities. The gray whale migrates from either southern California or Korean coastal waters where they winter to Chukchi and Beaufort sea summer feeding grounds. In their migration they tend to stay closer to land than do the bowhead (Gusey 1979: 3-3). Their migration temporally follows that of the bowhead making them available in the Bering Strait area after both the main migrations of bowhead and the Pacific walrus have concluded. Therefore the gray whale provides some backup to an unsuccessful or inadequate bowhead harvest. However, study populations claim that the gray whale is both more difficult and dangerous to hunt and less desirable as a food source. Nonetheless, they have continued to be hunted occasionally by all study populations except King Island up to the present time.

Belukha or white whales and finback and minke whales are not a major focus of hunting for any of the study populations and contemporarily are not hunted at all by King Islanders. Belukha occur most frequently in shallow bays and inlets, but are found throughout the Bering

Strait area. Belukha are a toothed whale so are frequently found in association with late spring and summer fish runs. They travel either individually or in large groups and winter along the fringes of the ice pack. Biologists have little definitive knowledge about the wintering patterns of belukha and note that hunters in boats rarely see them in leads or in open water during winter months (personal communication, Robert Nelson, 1981). Belukha are seen in the early spring in great abundance associated with open leads near Gambell. However, St. Lawrence Island populations report that they have not actively hunted belukha for nearly a decade. Finback and minke whales are baleen whales that frequent the northern Bering and Chukchi seas during summer months.

The bearded seal, referred to as ugruk by Iñupiaq-speaking populations and mukluk by Siberian Yupik-speaking populations, is a relatively major source of both food and raw materials for all of the study communities. Bearded seal are the most widely distributed of all pagophilic pinnipeds and are found in association with sea ice and walrus distribution. In late winter and early spring they are widely distributed throughout the pack ice of the northern Bering and southern Chukchi seas and are most abundant north of the ice edge zone and south of Bering Strait (Burns 1970a: 449). While bearded seal migrate in a northerly direction in spring, the migration occurs over a long temporal duration with no discernible migratory peak. Study area hunters encounter bearded seals on ice floes while in pursuit of walrus, so frequently these two species and other seals may be taken concurrently during the same hunting trip. Bearded seals do not have a propensity to form herds and therefore are usually encountered singularly or in

very small groups. Bearded seals of all ages are present near St. Lawrence, King, and the Diomede islands throughout winter and spring months (Burns 1970a: 452), thereby providing a fresh meat, fat, and raw material source during months when walrus and whale are not available.

Harbor or spotted seal populations include both those that are pagophilic and others that are land-breeding (pagophobic) (Burns 1970a: 448). Pagophilic spotted seals occupy the outer edge of the pack ice, and the extent of their southerly distribution in winter is dependent on the severity of the winter and resultant expanse of the ice pack. Spotted seals associated with ice bear their young, breed, and begin their annual molt during March and April along the margins of the southern ice pack. Spotted seals do not really migrate in the same sense as walrus. As the sea ice moves north, the pagophilic spotted seal populations disperse along the coast occupying mouths of rivers, bays, and isolated beaches (Gusey 1979: 3-18). Spotted seals and ribbon seals are the last to move into the Bering Strait area, and their appearance usually signals the end of the passage of ice. Some spotted seals will move through the Strait and others move towards the Alaskan and Siberian mainlands. This pattern reverses itself in the fall when ice formation and its advance to the south continues the annual cycle. Spotted seals are hunted by all of the study populations and provide meat, blubber, and hides. Whereas spotted seals are available to St. Lawrence Island hunters throughout almost all of the year except February and March, residents of King and Diomede islands and Wales would not have access to them during winter months when they are on the southerly ice margins.

The ringed seal has an ecological adaptation quite dissimilar from that of the spotted or ribbon seal.

> The ringed seal has a wide general range throughout the area of seasonal pack ice and also on the permanent pack ice. During late winter and early spring, adult ringed seals occupy the regions covered by extensive land-fast ice. This restricts the range of adults to the vicinity of the mainland coasts of Alaska and Siberia and the larger offshore islands. . . . Ringed seal pups are born in lairs excavated under the thick snow cover or in natural cavities in rough shore ice. . . . Ringed seal pups are born as "white coats," mainly during early April. . . . Some ringed seals are born in the drifting pack ice, as indicated by the presence of pregnant females during late March far from land. . . . White coats are also occasionally taken from the pack ice near Nome, St. Lawrence Island, King Island, and Little Diomede Island. . . . (Burns 1970a: 447)

While occupying land-fast ice or pack ice in the vicinity of islands, humans are one of the most effective ringed seal predators. Young and nonbreeding ringed seals are present near St. Lawrence, King, and Diomede islands throughout the winter and spring (Burns 1970a: 452). All study area populations report hunting ringed seal throughout the winter and early spring basically in association with the formation of land-fast ice. Savoonga and Gambell populations report a contemporary intensification of ringed seal hunting during the months of November and December not indicated by other study populations. Ringed seals are the smallest of the seals and are used as a source of meat, blubber, and hides.

Ribbon seal winter ecology exhibits considerable parallels to that of spotted seal, since they also inhabit the margins of the ice pack during the winter. Like the spotted seal, their appearance also signals the end of ice in an area. In the late spring, summer, and early fall months the ribbon seal becomes pelagic and remains in the Bering Sea. Ribbon seal are seldom seen in the vicinity of coastal hunting villages, and during most years ribbon seals do not migrate

through Bering Strait in large numbers (Burns 1970a: 448). Since ribbon seals, like spotted seals, prefer to breed and give birth to pups in areas of unstable ice (i.e., characterized by small ice floes), they are rarely taken by predators. Biologists report that ribbon seals are more easily approached and killed than are spotted seals. St. Lawrence Island populations contemporarily hunt ribbon seals, primarily in the summer and early fall, taking fewer ribbon seals than other seals but more than other populations of the study area. Ribbon seal are especially valued for their hides but also for meat and blubber.

Under normal circumstances, within the study area the Stellar sea lion is only available to St. Lawrence Island populations. Although occasionally seen to the north, they do not occur in a quantity that would be important economically to any other study population. Most sea lions are associated with land, but some do occupy the southern edge of the Bering Sea winter ice pack and haul out on large floes. Although most sea lions breed on or south of the Pribilof Islands, approximately 1,000 or more regularly reach St. Lawrence Island and a few go to Bering Strait. Sea lions that go to St. Lawrence Island arrive and remain from late June to late September usually in groups of five or six (Gusey 1979: 3-21). They most commonly haul out on the south side of the Island, particularly at Southwest Cape and South Punuk Island. Only males have been reported at the Island. Occasionally animals haul out in the vicinity of Big Diomede Island and Fairway Rock, but their occurrence is very irregular and they depart with the arrival of ice. Contemporarily very few St. Lawrence Island families hunt sea lion, and when harvested they are most frequently used for dog food unless they are young animals (field data, 1981).

The last mammal to be discussed in this context is the polar bear. The polar bear is virtually always associated with winter sea ice, and its distribution into the Bering Sea south of the Strait is directly related to the severity of the winter, prevailing wind direction, and the availability of a food source, primarily seals. In years of cold winters and prevailing northerly winds, the ice pack extends further to the south and so do polar bears. In previous years bears have been reported as far south as St. Matthew Island and the Pribilof Islands. A warm winter and prevailing southerly winds have the opposite effect on bear distribution. Although bears usually remain some distance from shore, available food sources and changing ice conditions may encourage their movement on or near shore for feeding and/or denning (Robert Nelson, personal communication, 1981). Since approximately 1975, insular study populations and the people of Wales have had annual access to polar bear during winter months. Harvests of polar bear have occurred at St. Lawrence Island for most years during the past two decades. Diomede and Wales have also had an annual harvest which has been on the increase since 1972 when the aerial sport hunting of polar bear was prohibited by federal regulation. King Islanders had not taken a polar bear since their relocation to Nome in the mid-1960s, but in 1976 two bears came into Nome and a small group of King Island hunters was successful in taking one of the two bears.

The Bering Strait Context: A Sociocultural Overview

The study populations maintained some contact with Alaskan and Siberian mainland populations and with one another at several different

levels. These contacts included trade networks that basically broadened the insular ecological bases; spouse recruitment and/or wife exchange related to trade networks; intergroup hostilities and related alliances; intergroup adoption; seasonal, temporary, and/or relocative movements into another group's territory of residence or resource use areas; and intergroup ceremonial exchange, again most usually related to trading activities. The remainder of this chapter places the study populations within the general demographic, social, and cultural context of Bering Strait. This background information is necessary for a meaningful interpretation of demographic and ecological data in subsequent chapters.

Territorial and Linguistic Boundaries

There has been controversy among anthropologists as to the appropriateness of the use of the term "tribe" in describing Alaskan Eskimo populations. The term "tribe" has generally referred to a social group, usually speaking a distinctive dialect, occupying and utilizing a specific geographic area, and possessing cultural characteristics that distinguish it from other groups. Usually some level of political organization is implied. Oswalt (1967) uses the term "tribe" for referring to groupings of Alaskan Eskimos which have a name for themselves that designates more than a single settlement and which have a sense of ingroup identification (Oswalt 1967: 2-3). Oswalt's groupings share dialectical similarities, but Oswalt denies the factor of political organization:

> It is acknowledged that the term tribe is inexact when applied to these people, and yet there is no more satisfactory designation.

> The Eskimos so classified did not form distinct political units; in fact, political structure might scarcely exist even at the village level. (Oswalt 1967: 2)

However, ethnohistoric and historic data suggest that at least in northwest Alaska, some level of political organization and concepts of territorial boundaries did exist among Eskimo populations at the time of early contact and more contemporarily (Ray 1964, 1967, 1975a, and 1975b; Burch 1975a; Bogojavlensky 1969; and Ellanna 1980). For purposes of this study, the term "tribe" will refer to people with a common language and dialect, sharing common cultural patterns, having some level of genealogical or quasi-genealogical linkages, and living within well-defined boundaries recognized by themselves and contiguous tribes. In the Bering Strait area, tribal territories were usually located around the drainage of one particular major river and its tributaries, a piece of distinct coastline, or an island. In light of the above discussion, there were approximately ten distinct traditional (i.e., late eighteenth century) tribes in the broad area described as Bering Strait including St. Lawrence Island. These tribes and their territoral boundaries are listed from north to south in Table 2.

Traditionally within any one of these tribal groupings there was usually one large, relatively permanent principal village with several smaller villages and numerous temporary camp sites within the tribal territory (Ray 1967: 375). The smaller islands (King and Diomede) had only one village each in historic times. The number of the communities that have survived to the present day is only a small percentage of those that existed traditionally in this area, although many abandoned village or camp sites, such as Cape Woolley, are utilized for resource harvest activities today. The vast majority of the village sites and

TABLE 2: BERING STRAIT TRIBES

	Contemporary Community(ies)	Territorial Boundaries
Tapqamiut[1] (Tapkakmiut)	Shishmaref	Cape Espenberg inland to Serpentine Hot Springs and southwest along the coast to Seward Peninsula to approximately Lopp Lagoon.
Diomede Islands (Ingalik and Imaklik[2])	Little Diomede	Little Diomede (Ingalik) and Big Diomede (Imaklik) islands.
Wales (Kingikmiut)	Wales	Tip of Seward Peninsula from Lopp Lagoon southwest and then southeast north of Port Clarence.
Port Clarence	Teller Brevig Mission	The area including and/or surrounding Port Clarence, Point Spencer, Grantly Harbor, and Tuksuk Channel.
Kuzitrin River, Igloo (Kauwerak)	Mary's Igloo[3]	Interior Seward Peninsula along the drainage of the Kuzitrin River.
King Island (Ukiuvok)	King Island[3]	King Island.
Nome (Sitnasuak)	Nome Solomon	Along the southeastern coast of Seward Peninsula north of Cape Rodney and south to the Bluff area.
Sledge Island (Ayak)	none	Sledge Island.
Fish River[4]	Council White Mountain	Drainage of the Fish River.
St. Lawrence Island (Sivoukak or Sevoukak)	Gambell Savoonga	St. Lawrence Island.

TABLE 2: -- CONTINUED

1 The suffix "miut" means "people of" and is used in conjunction with the geographical name to refer to a tribal unit.
2 Today Big Diomede, which is not directly part of this study, belongs to the Soviet Union and is devoid of its Iñupiat population.
3 Not occupied as a community year-round in 1980.
4 "During the early part of the nineteenth century it is uncertain whether the lower Fish River was occupied by the Unaluk-speaking [Yupik] people of Golovin or by the Rish River people, who spoke a Kauwerak-related dialect" (Ray 1975b: 105).

camp sites are coastal.

All of the traditional inhabitants of the Bering Strait area were speakers of Iñupiaq with the exception of the populations of St. Lawrence Island. Contemporarily the community of Unalakleet on Norton Sound divides Iñupiaq from Yupik speakers, (Hammerich 1958; and Krauss 1973). Populations on St. Lawrence Island traditionally and currently have spoken a dialect of Yupik referred to as Siberian Yupik. Other speakers of Siberian Yupik are located on the Siberian mainland coast. St. Lawrence Island residents have close affiliations with the people of the Chaplino (or Indian Point) area on the Chukotskiy Peninsula approximately 38 miles west of the contemporary village of Gambell. There are two major dialects of Iñupiaq spoken within the Bering Strait area. One of these is the Kauwerak or Igloo dialect spoken by all of the Iñupiat in this area, with the exception of residents of Diomede and Wales where the dialect varies. Interestingly, King and Sledge island residents speak the Kauwerak dialect rather than that of the Diomedes, although Bogojavlensky (1969) has isolated linguistic elements peculiar to both King and the Diomede islands and differing from the mainland. The second Iñupiaq dialect is Malemiut, the dialect spoken

by the residents of the Kotzebue Sound area. Some residents of eastern Norton Sound speak Malemiut as a result of the resettlement of this area by Malemiut trading populations in the nineteenth century (Ray 1975b).

Nineteenth century population estimates for the Bering Strait tribes provide some comparative perspective on the area as a whole and are presented in Table 3 with the dates and source for each estimate. Also, the number of communities estimated for the population period is also presented. The total maximum estimated population for the Bering Strait area in approximately 1850 was 4,747 including the people of Big Diomede. Chapter IV describes the demographic history of the study populations in considerable detail.

Settlement Patterns

In this study "settlement pattern" refers to the characteristic annual settlement or residence pattern of specific groups of people in the Bering Strait area. Traditional settlement patterns are important to discuss in this context because they are directly related to areas of land and sea use, they have continuity into the contemporary period despite some modification, and they have numerous and complex demographic implications. Although in a world-wide perspective, hunters/gatherers/fishers are usually more nomadic than populations which are food producers, Alaskan Eskimos as a whole were traditionally much more sedentary than were central Canadian Eskimos and considerably more sedentary with greater population densities than were hunters in areas of similar latitude with less reliable and available food, water, and raw material potential, such as some groups of Athabaskans of interior Alaska. As

TABLE 3: BERING STRAIT TRIBAL POPULATIONS

Tribe	Population Estimate	Number of Year-Round Communities	Year and Source of Estimate
Tapqaqmiut	375	5+[4 5]	(1850 estimate, Burch 1975a: 12)
Diomede	164	1	(1779 Ray 1975b: 110)
Big Diomede	398	2[4]	(1779, ibid.)
Wales[1]	500-600	2	(early 19th century, ibid.)
Port Clarence	275	12[4]	(1850 estimate, Burch 1975a: 12)
Kauwerak	200	4+[4]	(1850, ibid.)
King Island	275	1	(1850, ibid.)
Nome and vicinity to Cape Darby	900[6]	25+[4]	(1850, ibid.)
Sledge Island	50-60	1	(early 19th century, Ray 1975b: 111)
St. Lawrence Island	1500[2]	5+[3]	(pre-1878 estimate, Hughes 1960: 12)

TABLE 3: -- CONTINUED

[1] Actually composed of two villages, Agianamiut on the south and Kiatanamiut on the north with equal populations (Ray 1975b: 111). There were also multiple small, seasonal satellite communities, but the number occupied simultaneously is not certain (Koutsky 1981). These figures are only for the two related communities of Kingigan.

[2] It is estimated that the population of St. Lawrence Island decreased by two-thirds during the winter of 1878-79 (see Chapter IV) (Hughes 1960: 11-12).

[3] Hughes 1960: 11, quoting Elliott 1875. Elliott's population estimates were 300-400 in 1875 suggesting a sequence of significant mortalities during the 1870s. Hughes assessed Elliott's estimates as low because Hooper counted several hundred bodies the summer of 1879.

[4] Ray 1964; on the mainland there were numerous small settlements, some of which were not occupied year-round.

[5] Includes small villages from Lopp Lagoon to present day Shishmaref. Some were satellite villages to Wales (Kingigan).

[6] Burch (1975a) feels this estimate is questionable because it may include more than one "society" or tribal group.

Oswalt (1967) points out, ". . . community mobility is a function of subsistence resources, technological knowledge, and other sociocultural factors" and ". . . Alaskan Eskimos are best accommodated in the central-based wandering level." Central-based wandering is defined as a pattern in which communities spend part of each year wandering and the rest at a settlement or central base to which they may or may not return in subsequent years (Oswalt 1967: 88). There was considerable variation between Alaskan Eskimo groups. Among Bering Strait groups, failure to return to a more or less permanent settlement was usually the result of village shifts caused by coastal erosion resulting from storms, changing river bed patterns, animal migrations, or natural catastrophes. The extent to which traditional shifts resulted from trading and/or warfare has not been clearly determined for the prehistoric period in this area. Trading, seasonal employment, mortality

associated with epidemics, churches and schools were certainly factors in post-contact population shifts as will be discussed in subsequent chapters.

The larger village/satellite village configuration was characteristic of the Bering Strait area. The primary village of residence was frequently deserted in the summer for the seasonal activities of fishing, but ". . . a few old and young persons usually remained behind in large villages like Wales, Sinruk, and Cape Nome" (Ray 1975b: 106). This general pattern applied to King and Diomede island communities as well. Because of the Island's size, topography, fauna, and flora, St. Lawrence Islanders were probably less dependent on mainland seasonal migrations for obtaining resources, but residents did travel to the Siberian coast for trade, particularly for reindeer hides, and possibly for resource harvests. Fishing, berry picking, and other resource specific harvest activities were engaged in from camp sites within the territory of the resident population unless agreements for use of another tribe's territory were in effect. Demographic and social means for effecting such agreements for the smaller islands will be discussed in more detail in subsequent chapters.

Winter population movements were usually associated with intercommunity ceremonial feasting. Island residents rarely participated in such activities because the Strait was not normally traversable during winter months due to constantly shifting ice masses. During periods of mobility, village populations usually subdivided into camps with correspondingly fewer numbers of individuals per functioning group. Traditional interregional mobility, stimulated in expanse by Euroamerican trade, was substantial. It required the use of large

seaworthy skinboats for open water periods and dog traction during winter months in the case of mainland and St. Lawrence Island populations. Although residence, as such, on the ice was not characteristic of Bering Strait populations, temporary hunting sites from the edge of shore ice or leads occurred in both the spring and winter. Ice definitely was a key environmental feature distinct from those associated with land and open sea conditions (Nelson 1969).

Subsistence Patterns

This study employs the concept "subsistence system" to describe the patterns by which Eskimo hunters/gatherers/fishers have continued to derive a living from locally available resources. Additionally, it is maintained that the activities, values, and social units involved in resource harvest and use have continued to be central to Eskimo sociocultural and biobehavioral systems.

Bering Strait populations traditionally practiced three major subsistence patterns, which differed in their focus but were similar in deriving a large percentage of food and raw materials from locally available resources. Although the resource base and climatic conditions were omparatively richer and less harsh in more southerly areas of Eskimo distribution (such as on Kodiak Island), compared to most Canadian Eskimo habitat, the Bering Strait area was relatively abundant.

> The Bering Strait was one of the richest areas of the Eskimo world in fish, sea and land mammals, plant foods, fowl, and eggs. The comparatively high density of population reflected this abundance particularly on the small islands of the Strait and at Cape Prince of Wales, which were near the migration routes of the walrus and whale. (Ray 1975b: 111)

Traditionally, the major subsistence patterns of Bering Strait included: (1) the "whaling" or "arctic whaling" or "large marine mammal" hunting pattern; (2) the "caribou hunting" pattern, and (3) the "small marine mammal" or "Bering Sea hunters and fishermen" pattern (Oswalt 1967). The focus of the first subsistence pattern was either the bowhead whale and/or the Pacific walrus, the focus of the second was caribou, and the focus of the third included belukha, bearded seal, ringed seal, spotted seal (less frequently ribbon seal) or any combination of the above species depending on geography and local ecology.

The "whaling," "arctic whaling," or "large marine mammal" subsistence pattern, common in certain coastal locations north of the Strait, was traditionally characteristic of the islands of the Bering Strait (Little and Big Diomede, King, St. Lawrence, and, to a much lesser degree, Sledge), and of communities located on prominent points of land such as Wales and Cape Nome (Ray 1975b; and Bockstoce 1973). It is the pattern of most concern in the context of this study and is discussed in detail in Chapter V. A focus on whale, particularly the bowhead, as opposed to the Pacific walrus may have been a function traditionally of marine mammal migratory routes, area specific ice conditions, whale population levels, human population levels, and cultural patterns. With the possible exception of the populations of King and Diomede islands, whaling was traditionally more prestigious than walrus hunting and included extensive attendant ceremonial functions (Hughes 1960; Bockstoce 1973; Ray 1975b; and Thornton 1931). On the other hand, walrus were a more stable resource for Bering Strait communities, and there were years in which few or no bowhead were successfully harvested. As previously mentioned, walrus have remained

the focus of King and Diomede island hunting. There is some controversy over the extent to which Sledge Island residents whaled in the past, but there is some archaeological evidence that whaling did occur there (John Bockstoce, personal communication, 1977). Extensive archaeological studies by Bockstoce at Cape Nome and Safety Sound (Nuk) have indicated that Cape Nome was the dividing line between the large marine mammal focus of the Strait and areas north and a small marine mammal focus around Norton Sound and south along the Bering Sea coast (Bockstoce 1973). Other marine mammals were considered to be of secondary importance by large marine mammal hunters but provided substantial food and raw materials depending on species availability and community hunting traditions. In addition, a wide range of non-mammal marine resources discussed previously were also important to the overall adaptation of large marine mammal hunters.

The "caribou hunting" pattern was an inland adaptation focused on the cooperative and individual hunting of caribou by the people of the Kauwerak area (Kaweramiut). After approximately 1880, caribou no longer inhabited Seward Peninsula and this subsistence pattern came to a relatively abrupt end. Inland dwelling, caribou-hunting Iñupiat relied secondarily on salmon and whitefish and on small marine mammals such as seal and belukha. Marine mammals were critical for providing oil and fat for food and fuel and raw materials for waterproof clothing and skinboats. Whereas caribou meat and hides were traded for a portion of marine mammal products, there is ethnohistoric evidence that inland groups, such as the Kauwerak and Fish River peoples, had access to both seals and belukha that came into bays, lagoons, and up rivers, and to the territory of populations with whom they had alliances for

hunting seals and belukha.

> Therefore, the Kauwerak and Fish River people were able to get them [seals] in Imruk Basin and as far inland as the mouths of the Pilgrim River and the Fish River. The beluga and spotted seal that went into Grantly Harbor were captured in nets near the mouth of Tuksuk Channel. Moreover inland tribes also went to the territory of their alliances for sealing: Kauwerak to Point Spencer; Fish River to Atnuk [Cape Darby]. The Kauwerak people camped and hunted in their designated places, and returned home in June or in the early part of July with their meat and oil. (Ray 1975b: 114)

The "small marine mammal" hunting pattern was a coastal pattern characterized by a tripartite dependency on small marine mammals (seal and belukha), fish and caribou. The importance of one species or group of species over another was related to both geographic location and species availability during any given year. Shishmaref is an excellent example of a contemporary Bering Strait community with this subsistence pattern. Whereas a periodic loss of one segment of this three part economic base would probably not have been disastrous to these populations in the past, a continuous loss of one major resource or the simultaneous temporary loss of two would probably have caused major economic deprivation and possibly relocation (Bockstoce 1973). Other faunal and floral resources such as migratory waterfowl and pelagic birds and eggs were also available and utilized by populations with this subsistence focus.

Social Organization: Family and Community

> Each of the . . . traditional Northwest Alaskan Eskimo societies was overwhelmingly kinship oriented, apparently much more so than most Canadian Eskimo societies. . . . By this I mean that, both ideally and actually, kinship ties were emphasized at the expense of all others. In traditional Northwest Alaska, kinship formed the axis on which the whole social world turned. . . .

> most traditional "settlements" were in fact kinship units, and no one was ever voluntarily in a situation where no relatives were present. (Burch 1975a: 22)

Traditionally kinship categories were expanded to include consanguineal, affinal, adoptive, and other socially-defined categories of kinsmen embracing numerous generations and both living and deceased persons. From the point of view of an individual in Bering Strait society, his or her kin were the critical elements of the individual's network of interpersonal relationships. A person ending up in a group without kinsmen was indeed at a disadvantage and may have been perceived as a dangerous stranger and killed in earlier times (Bogojavlensky 1969; Burch 1975a; Oswalt 1967; and Weyer 1932). Kinship was the means by which mutual interdependence, obligations, alliances, and other rules of interpersonal behavior were defined. Burch (1975a) distinguished a basic set of 27 kin relationships which an individual could potentially have had (291). These kin included relatives in ascending and descending generations resulting from biological descent and/or sexual intercourse (e.g., comarriage), marriage, and other social means of defining both "real" (i.e., biological) and "fictive" (i.e., non-biologically based) kinship. In most of the Bering Strait area, an individual's kin included both mother's and father's consanguineal and affinal kin. Kinship at St. Lawrence Island was reported to be more patrilineally organized in the 1950s (Hughes 1960). Traditionally marriage between individuals tended to be endogamous within tribal units. Burch (1975a) referred to these units as "societies," and stated that endogamous trends in the past tended to result in "societies" being equivalent to demes -- clusters of individuals partially isolated genetically and spatially from other populations (11-12). There were culturally

proscribed rules of behavior consistent with particular kin-based roles. Since kinship patterns tend to be relatively conservative through time, "traditional" patterns have considerable applicability to understanding Bering Strait society today.

The domestic family unit or household traditionally included membership beyond that of the nuclear family. Multiple wives (usually in the case of households of exceptional hunters), one or two grandparents from either side, married siblings and their spouses and children, or other collateral relatives frequently were included within a domestic family unit. Since resource harvest activities in this area usually required a relatively balanced distribution of work between sex and age cohorts, household membership often expressed the need for young to middle-aged males to provide protein-rich foods; females to take care of meat and fish, prepare clothing, gather vegetable foods, and care for immature offspring; and elders to provide guidance for the less experienced adults and to contribute to the socialization and enculturation of young children. In actual daily life, kinship obligations and alliances defined and regulated the economic and social interrelationships between different domestic families, especially in regards to economic interdependency. Lastly, the size of a domestic family unit fluctuated by season or year depending on available food resources or the dominant resource harvest activity at any given time. As will be demonstrated in this study, the need for cooperation in some subsistence endeavors, such as whaling, walrus hunting, or caribou corralling, required a relatively large and well organized group.

Principal communities within Bering Strait tribes always had a "community house" ("men's house" or kazgi). St. Lawrence Island, which

apparently did not have the institution of the kazgi, was the exception (Nelson 1899; and Hughes 1960). For the remainder of the study area the kazgi was the forum for economic alliances, intergroup and intragroup politics, social control, and the socialization and enculturation of young males in the society. Among the study populations kazgi membership was traditionally associated with affiliation between skinboat crews and skinboat crew membership (Bogojavlensky 1969). Table 4 provides a list of communities and the number of kazgi reported for them by early historic sources. It is almost certain that other communities in the area, such as Kividluk (northeast of Shishmaref), Nusak or Nuk (Safety), and Sledge Island also had at least one kazgi each (Ray 1964).

The kazgi was both a structure and an institution. As a structure it provided a place for men and older boys to work and exchange knowledge primarily related to hunting. As an institution its membership was closely associated with skinboat crew participation, alliances between two or more skinboat crews, other political alliances, and, at times, community-wide or intracommunity ceremonialism. They were centers of "government" in that decision-making processes often involving skinboat captains and influential elder males were conducted as part of these institutions. These institutions often transcended kinship groups in both structure and function (Burch 1975a). Kinship groups and/or individuals could change membership if more than one kazgi existed in the community, although males most frequently entered their father's kazgi. Communities without kazgi were politically tied to a larger community within their tribal unit that possessed one. On St. Lawrence Island where the kazgi apparently did not exist, influential

TABLE 4: NUMBERS OF COMMUNITY KAZGI IN THE EARLY HISTORIC PERIOD, BERING STRAIT AREA[1]

Community	Number of Kazgis
Shishmaref	2
Wales	4
Little Diomede	2
King Island	2 to 3
Amilrak (Point Spencer)	1
Kalulik (Cape Douglas)	1
Sinruk	1
Kauwerak	1
Ayasayuk (Cape Nome)	1

[1] Ray 1964 and 1975b.

male hunters, who also headed what Hughes (1960) referred to as "patriclans," conducted similar sociopolitical processes within their households.

The kazgi was also the location of the "Messenger Feast." Although a powerful umealiq (skinboat captain) associated with a specific kazgi may be the prime sponsor who coordinated the accumulation of food and other goods from his family and crew members for distribution at the ceremony, the hosting of a "Messenger Feast" would provide the umealiq with considerable prestige (Oswalt 1967: 218-219). Guests were usually from a community that had trading relationships with the host village, and they were invited through a series of culturally proscribed gestures which have provided this ceremony with its name. It is apparent that the "Messenger Feast" was an institution that functioned to distribute or redistribute goods, bring about intra- and intercommunity solidarity, and form sociopolitical alliances between villages and skinboat crews. There are no ethnohistoric data to support the existence of this social institution on St. Lawrence Island, but similar functions may have existed between the Island and Siberian mainland communities.

Traditionally intracommunity social control was not exclusively nor overtly within the authority of skinboat captains or councils of elders. In fact, even these individuals and groups could not make coercive decisions. Many non-violent and some more violent internal mechanisms of social control existed traditionally. These traditional mechanisms included gossip, ridicule, social ostracism, socially designated custodial care of those seemingly unable to stay within the norms, and the extensive use of allegorical tales and praise, especially

in the socialization and acculturation of children.

In summary, it is clear that the complexity of traditional Bering Strait kinship and sociopolitical organization was considerable. The general outlines of sociocultural organization provided above were intended to provide a context in which the interrelationships between demography and hunting ecology could be explored for the large marine mammal hunters of Bering Strait in the chapters to follow.

CHAPTER III

METHODOLOGY

This chapter briefly describes the sources of data, the time period over which they were gathered, and their level of reliability; field methods and instruments; and an overview of techniques used in analyses. More specific details of demographic analysis are presented in the context of Chapter IV.

Data Gathering

Literary Research

Since this study is diachronic, it was necessary to research a wide array of both primary and secondary documented sources which included data on the study communities for the historic period. Research emphasis was placed on primary sources, including explorers journals (such as Cook 1784; Elliott 1886; Muir 1917; and von Kotzebue 1821); government reports (such as Jackson 1894, 1900-08; Cameron 1938; and Healy et al. 1887 and 1889); teacher and missionary accounts (such as Eide 1952; Lafortune 1940; and Thornton 1931); and early ethnographic and archaeological narratives (such as Collins 1935 and 1937; Curtis 1930; Geist and Rainey 1936; Hrdlička 1930; Nelson 1899; and Rasmussen 1927). In some cases well-documented and thorough secondary historical sources (such as Ray 1975b; Renner 1979; Bockstoce 1977a and 1977b; and

Golder 1914 and 1922) were of considerable utility.

More recent community-specific ethnographies or unpublished data (such as Bogojavlensky 1969; Hughes 1960; Leighton 1940; and Ross 1958) provided baseline information for the study communities for time periods preceding commencement of fieldwork. Other studies which focused on specific regions or on the State but included data on the study populations (such as Anderson and Wells 1935; Alaska Planning Council 1940; and U. S. Department of Commerce, Bureau of the Census 1970) supplemented community-focused ethnographies in providing demographic and hunting-related data.

During the decade of fieldwork (1970 to 1980) there were a few problem-focused research efforts which included data on the study communities, such as Eisler 1978; Ellanna 1980 and 1982; Peterson 1978; Burgess 1974; Braund 1981; Sherrod 1982; and Thomas 1981. These research efforts were useful in supplementing and substantiating field data for the study communities.

Biological studies, primarily originating from the Alaska Department of Fish and Game, National Oceanographic and Atmospheric Administration, and U. S. Fish and Wildlife Service, served multiple purposes. Some (such as Burns 1965b and 1970b; Fay 1955, 1957, 1958 and 1982; and Gusey 1979) provided information primarily on the ecology of species of particular relevance in this context. Others (Buckley 1958; Burns 1963, 1964, 1965a, 1966, 1967, 1968, 1969, and 1970b; Harbo 1959; Hinman 1980; Kenyon 1960; Lourie 1981 and 1982; Marquette 1977; Marquette and Bockstoce 1980; Marquette and Braham 1982; Nelson 1980; Rausch 1953; Schliebe 1981; Smith 1981; U. S. Department of the Interior 1980; and West 1980) provided data on the ecology of marine

mammals and harvest statistics for the specific study populations. Sociocultural information presented in the biological studies were, for the most part, observations conducted by researchers not trained in social science methodology and theory and in cross-cultural perspectives and frequently demonstrated cultural biases. Harvest data from these studies which were based on systematic observations were very relevant in the context of this research and provided the majority of information used in establishing harvest trends. However, these were validated by field data when possible. The quality of these data varied widely, but those gathered in more recent years were generally more complete and accurate because they were derived from systematic, on-site monitoring over longer periods of time.

Theoretical literature considered in the context of the study was reviewed in Chapter I. This discussion of literary research has provided examples rather than an exhaustive list of references in each category outlined above.

Field Data

Field data were gathered over the course of a decade -- 1970 to 1980. During this time residence in Nome was maintained for 3 months each in 1971 to 1974 and in 1977, 6 months in 1975, 8 months in 1978, 9 months each in 1970 and 1976, and 12 months each in 1979 and 1980 -- a total residence of 5 years and 11 months in the study region. Throughout this period field time was spent in all study communities. Research methodologies included participant observation, observation, informal interviews, formal interviews documenting family histories

and resource use data, household censuses, and resource harvest and use surveys.

Demography

Prior to 1975 demographic data for the study populations were not systematically gathered, although genealogies for the majority of living King Islanders had been developed. In 1975 household data were systematically gathered on the entire populations of the study communities (Ellanna and Roche 1976). This household census contained data on each member including designation of household head, relationship of each member to the head, birthdate and place of birth of each member, social security number (to be used as a code), percentage of Eskimo ethnicity, and employment and income data by individuals (see Appendix III). Adoptive relationships were noted with information presented on natural parents if available. Household members temporarily absent from the population for purposes of education, medical care, short-term employment, job training, and military service were included in the population. There were no data gathered on villagers who had emigrated. These data were cross-checked for validity as of December 1975.

The 1975 data were transferred to Laboratory of Biological Anthropology, University of Connecticut, "American Family History Study" instruments prior to 1978 (see Appendix II). In 1978 fieldwork commenced to complete family history forms on every living member of the five study populations residing in the communities, including data on deceased and emigrant relatives of the resident populations.

Data from transient teacher and missionary households were not included at this level of population description. Causes of deaths, degree of Eskimo ethnicity, and a designation for step, half, and adopted siblings were added to the family history format so that both genealogical and social family data could be generated in this context. These data were revised in 1980 and checked against health aide censuses, previous censuses completed for Gambell and King Island (1940 and 1955; and 1938 respectively), ANCSA (Alaska Native Claims Settlement Act) enrollments, and each other. These data were subsequently computerized for purposes of analysis. Raw data including names, date of birth, age, place of birth, and parents' names are on file at the Laboratory of Biological Anthropology, the University of Connecticut.

Hunting Ecology

Information on hunting ecology was gathered by participant observation, observation, and formal and informal interviews. From 1970 through 1977, walrus hunting data were gathered by annual spring participation as a non-hunting member of a King Island skinboat crew. During these years spring skinboat hunting was undertaken from Nome, from the King Islanders' camp at Cape Woolley, and from King Island. This participation provided contact with other King Island boat crews as well as occasionally with walrus hunters from Wales and Diomede. Data on St. Lawrence Island hunting were gathered from on-shore observation and interviews. Field visits to study communities spanned all seasons over the ten year period. Harvest data were not systematically gathered in the field except from the boat in which participation

occurred and from other crews who were actively hunting in the same general area or whose captains were closely related to the captain of the craft in which participation took place. Since bearded seal and smaller seal species were also harvested during walrus hunting periods, these hunting patterns were also observed. Participation in the skinboat crew context provided access to production groups during non-marine mammal harvest activities, both maritime and terrestrial, as well.

During the course of participant observation, observation, and formal and informal interview, data were gathered on many facets of marine mammal and other resource harvest; including technology, hunting strategies, crew composition, relationships between crew members, distribution of harvested resources, etc. However, in this context only those data with demographic implication have been included. In addition, the lengthy period of participant observation provided an empirically-derived information base by which data gathered from other sources could be evaluated, interpreted, and put into appropriate context.

Towards the end of the study period, systematically gathered marine mammal and other resource harvest, use, and distribution data were gathered from a sample of study community households by survey to provide quantitative verification of the more detailed descriptive data (see Appendices IV and V). The survey instrument in Appendix IV was administered in 1980 to an opportunistically-selected sample of household in the study communities. The sample was described as being "opportunistic" because the survey was administered on a household by household basis to individuals who were willing to cooperate by

providing information. Because it was not systematically random, the data it generated may not be representative of the communities as a whole. The survey in Appendix V was administered to a randomly selected sample of Nome households in 1982 for another publication (Ellanna 1982), but several King Island households were included. These data supplemented the small King Island sample from 1980. Lastly, from 1978 to 1980 interviews were conducted in all study communities to incorporate information on changes in marine mammal hunting ecology which had occurred in the latter part of the study period.

Data Analysis

Methods of analysis for the demographic and hunting-related ecological data varied and are considered separately. Initially the family history data by individual were grouped into household units -- individuals inhabiting the same domicile. These units were central to much of the analysis despite the qualification that in all study communities there were cases of households combining for a variety of functions, including production and consumption of food and raw materials, child care, formal and informal enculturation, and many others.

Although genealogies were not developed for the entire study population, genealogical data derived from family histories (including spouses, parents, adopted parents, maternal and paternal grandparents, siblings, adopted siblings, and natural and adoptive offspring) were applied to the reckoning of household and boat crew compositions.

Demographic variables were developed which had the potential

for revealing interrelationships between population structure and hunting ecology (see Chapter I). After these variables were refined, the data were computerized for analysis employing SPSS (Statistical Package for the Social Sciences). Details of specific analysis will be described in appropriate sections of Chapter IV.

Hunting data were described and quantitative characteristics compiled in tables and figures. Captaincy information was added to the computerized demographic characteristics of relevant individuals. The changes in numbers of crews through time; the composition and size of whaling and walrus hunting crews; average ages of captains; ratio of hunters to dependents; harvest participation and use; and other variables described in Chapter I were examined through time for each community and compared between communities.

Correlations between changing demographic patterns and large marine mammal hunting ecology through time for each study community, and comparisons and contrasts between demographic and hunting-related ecological variables for Iñupiat and Siberian Yuit populations and for insular and mainland (or relocated) Iñupiat populations, were examined in Chapter VI. Finally the implications of these correlations through time and space for northern large marine mammal hunting populations were briefly considered in light of these Bering Strait data.

CHAPTER IV

BERING STRAIT POPULATION HISTORY, 1650-1980

Introduction

In order to explore the interconnections between population structure and ecological adaptations through time, it is necessary to describe the population history of the study communities in some detail. The completeness and accuracy of population information are greatest in this context for the period 1975 to 1980, since these data were the product of intensive field-based demographic investigations. In general the quality of demographic data diminishes in direct relationship to the number of years which precede 1980. There are exceptions to this generalization, however, since systematically gathered demographic data were a component of Hughes' 1954 to 1955 and Burgess' 1972 to 1973 research efforts at Gambell and Bogojavlenskys' 1966 to 1967 research focused on King Islanders in Nome. As described in Chapter III, numerous other data sources of greater or lesser quality were used to reconstruct the population history of the study communities prior to 1970 and from the time of earliest documentation. Since genealogical data spanning four generations were elicited during the 1975 to 1980 fieldwork, some extrapolations to earlier periods of time are possible from these data sources.

The study communities had a limited range and frequency of contact with other populations prior to the 1800s. St. Lawrence

Islanders had mainland connections to Siberian Yupik-speaking populations and possibly Chukchi inhabiting the Siberian coast. Data from the 1900s suggest that they also may have had seasonal and sporadic contact with Diomeders and people from Wales during summer trading expeditions along the Siberian coast (Jackson 1904). Diomeders came into regular contact and intermarried with the populations of Big Diomede (Eide 1952). They also seasonally traded with Siberian coastal Eskimos and Chukchi and had alliances with the population of Wales. King Islanders had mainland contacts and alliances with the inland Kauwerak Iñupiat which have been documented and recounted in oral tradition (Ray 1975b: 88). Additionally, King Islanders had both friendly (trading) and hostile relationships with the populations of Wales and the Diomedes and seasonally traded with Siberian coastal Eskimos and Chukchi. However, based on demographic, linguistic, ethnohistoric, and historic data, these populations were largely endogamous and interrelationships were primarily economic in nature. Genetic data suggest that contemporary St. Lawrence Island residents of Gambell and Savoonga are basically a single population discrete from Alaskan, Canadian, and Greenland Eskimo and most closely related to Siberian Eskimo populations, particularly in the case of Savoonga (Ferrell et al. 1981: 357; and Crawford et al. 1981: 183). Genetic investigations based on red cell and antigen groups and serum protein marker systems of King Island and Wales populations in 1978 established their distinctiveness from one another (Crawford et al. 1981: 177). It is expected that additional genetic analyses of Diomede, Wales, and King Island populations would substantiate a high degree of community endogamy, although undoubtedly some gene flow between allied groups through comarriage

(wife-exchange) did occur on a limited and seasonal basis.

Early explorations in the 1700s and early 1800s were sporadic and resulted in no documented demographic impact through introduced diseases, interbreeding, or intermarriage for the study populations. However, records for this early period are sketchy and if Foote (1965) was correct in his reconstruction of a 4,000 population on St. Lawrence Island prior to contact, the 2,500 population estimates in the early 1830s suggest that there may have been introduced diseases to St. Lawrence Island earlier than elsewhere in the study area. In many cases, explorers' accounts of the study communities involved observations of the village from the decks of ships and either no contact with residents or trading interactions conducted aboard ship primarily between males. The absence of a beach at King Island made this village particularly inaccessible. An 1838 smallpox epidemic that reached the coast of Norton Sound did not affect the islands or mainland as far north as Wales (Ray 1975b: 126).

From the mid-1800s to early 1900s commercial whalers annually passed through the Bering Sea and Bering Strait areas in search of primarily the bowhead whale. These activities substantially increased the level of contact between the study populations and Euroamericans. The impact of the whalers on marine mammal species is discussed in Chapter V. Their impact on human populations is less clearly discernible from historic records. Population declines in the study area which are documented for the latter half of the 1800s and the first two decades of the 1900s were largely associated with introduced diseases. Insularity and the historic accidents of disease transmission had differential outcomes for the study populations. However, clearly

St. Lawrence Island suffered the greatest decimation between 1878 and 1880, with a population estimated at between 1,500 to 2,500 prior to 1878 to a population of 400 to 500 in 1880 (Foote 1965; and Petroff 1884). Wales experienced a major decline during the 1918 influenza epidemic. Details of the disease history of each of the study populations are described below. It is sufficient to state here that introduced diseases were a primary cause of demographic disruption during this period.

Oral history, documented accounts, and genetic evidence indicate that gene flow resulting from whaler liaisons with women from the study populations was not extensive (Ferrell et al. 1981; and Crawford et al. 1981). In 1890 Porter (1893) documented that Diomeders did not permit sexual liaisons with whaling crews (145). King Island was not accessible by long boat, although Port Clarence was a point of contact between Bering Strait populations, including King Islanders, and whalers usually in early July after walrus hunting had ended. Commercial whalers sometimes hired Iñupiat and St. Lawrence Island men on whaling crews. The people of Wales were greatly feared by the commercial whalers (Hooper 1881), and oral accounts claim that some whalers preferred the risks of drowning at sea to the risks of landing at Wales. Trading between whalers and St. Lawrence Islanders was well documented, but there were no accounts of crew members deserting to remain on any of the islands.

In the cases of Wales and St. Lawrence Island, the first non-Eskimo individuals to become residents of the study communities were teacher/missionaries, who first resided in the study communities during the last decade of the 1900s in association with Sheldon Jackson's

reindeer herding projects (Thornton 1931; Hughes 1960). Missionary/teacher activity at Diomede began in 1910 (Bogojavlensky 1969: 172) and at King Island in 1929 (Renner 1979). To the present day, teachers and missionaries remain virtually the only non-Native residents of the non-relocated study communities with the exception of two inmarried non-Native males and a female at Savoonga and two inmarried males at Wales. Missionaries and teachers have not intermarried with local residents in most cases, and teachers generally have a short tenure within the same village.

More important demographic changes have resulted from outmarriages primarily of Eskimo females to non-Native males and emigration related to economic and other social considerations. The location of military installations near Wales (Tin City) and at Gambell and Northeast Cape on St. Lawrence Island resulted in the emigration of primarily young females and some gene flow from non-Native males into the villages in cases in which the females failed to emigrate. Outmarriages and liaisons with non-Natives are still discouraged today in the study communities. The founding and growth of Nome during the gold rush and its regrowth during World War II increased the intensity of contact between non-Natives resident in the region and the study populations. The demographic effects of Nome on the study populations is most vividly illustrated in the King Island case.

Contemporarily the study populations have remained intact (even in the case of relocated King Island) and demonstrate continuity of patterns of endogamy and other demographic characteristics. Each population and its history will be presented in greater detail in the course of this chapter.

Population History of St. Lawrence Island

Demographic data from Gambell and Savoonga are discussed as a composite, since the two-community configuration, apparent on the Island today, is a relatively recent demographic phenomena. Additionally, Savoonga was established in 1916 in part by individuals who were residing in Gambell after the population decline of 1878 to 1880 and the subsequent consolidation of survivors primarily in a single community.

Community Demographic Characteristics

Table 5 presents population size and distribution by sex, number of households, and average household size between 1650 and 1980 for St. Lawrence Island. Based on archaeological, ethnohistoric, and early historic data, Geist and Rainey (1936) and Foote (1965) reconstructed that at time of earliest contact, the Island supported a large population -- possibly as many as 4,000 people -- dispersed in 35 different settlements, 5 of which were population centers of 200-400 inhabitants each. The population centers included Sivoukak (present-day Gambell) at Northwest Cape; Powooiliak (Southwest Cape); Kukulik (east of present-day Savoonga); Cape Siknik on the southeast shore of Powooiliak Bay; and Kialegak-Punuk Islands (Geist and Rainey 1936: 226-227). Since early explorers never surveyed all coasts of the Island during the same visit and documentation was sketchy, it is not certain that all major and minor settlements identified archaeologically or recorded at different time intervals during the early historic period were

TABLE 5: POPULATION SIZE AND DISTRIBUTION BY SEX, NUMBER OF HOUSEHOLDS, AND AVERAGE HOUSEHOLD SIZE, ST. LAWRENCE ISLAND -- 1650-1980

Year	Island Total	Gambell					Savoonga					Other Settlements
		Total	Males	Females	No. of Hhlds.[1]	Ave. Hhld. Size[2]	Total	Males	Females	No. of Hhlds.[1]	Ave. Hhld. Size[2]	
1980[3]	867	419	244	175	90	4.66	448	243	205	92	4.87	0
1980[4]	932	441	258	187	103	4.28	491	263	228	109	4.50	0
1976[13]	842	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0
1975[5]	777	367	211	156	71	5.17	410	227	183	70	5.85	ND
1974[13]	719	356	ND	ND	ND	ND	363	ND	ND	52[18]	6.98	ND
1973	747	366[7]	198[7]	168[7]	ND	ND	381[18]	213[18]	168[13]	ND	ND	ND
1972	736	354[26]	204[26]	150[26]	ND	5.20[26]	369[18]	206[18]	163[18]	ND	ND	13[26]
1971	718	349[7]	193[7]	156[7]	ND	ND	369[18]	201[18]	168[18]	ND	ND	ND
1970[6]	736	372	202	170	70(57[7])	5.32(6.5[7])	364	207	157	70	5.20	ND
1967[24]	799	402	ND	ND	71	5.70	397	ND	ND	60	6.62	35[27]
1962[28]	950	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1960[6]	648	358	ND	ND	ND	ND	290[18]	ND	ND	ND	ND	17[27]
1958	ND	349[26]	ND	ND	ND	5.10[26]	ND	ND	ND	ND	ND	ND
1955	ND	336[16]	176[16]	160[16]	53	6.34	ND	ND	ND	ND	ND	ND
1954[12]	575	300	ND	ND	ND	ND	250	ND	ND	ND	ND	ND
1953[23]	550	310	ND	ND	ND	ND	240	ND	ND	ND	ND	ND
1951	500	--	--	--	--	--	--	--	--	--	--	--
1950	558	309[7]	ND	ND	ND	ND	249[18]	ND	ND	ND	ND	ND
1940	502	293[15]	148[15]	145[15]	49[15]	6.18	209[18]	ND	ND	ND	ND	ND
1939[8]	505	296	ND	ND	ND	ND	209	ND	ND	ND	ND	ND
1935[21]	553	ND	ND	ND	59[22]	8.25[22]	ND	ND	ND	20[22]	8.00[22]	ND

TABLE 5: -- CONTINUED

Year	Island Total	Gambell					Savoonga					Other Settlements
		Total	Males	Females	No. of Hhlds.[1]	Ave. Hhld. Size[2]	Total	Males	Females	No. of Hhlds.[1]	Ave. Hhld. Size[2]	
1930	400+	250[7]	ND	ND	ND	ND	139[18]	ND	ND	ND	ND	11+[32]
1920[21]	304	ND	ND	ND	ND	ND	ND[17]	ND	ND	ND	ND	ND
1912[9]	219+	200+	ND	ND	ND	ND	--	--	--	--	--	19+
1910	293[20]	221[7]	ND	ND	ND	ND	--	--	--	--	--	72
1909[26]	285	237	ND	ND	ND	ND	--	--	--	--	--	48[31]
1908[26]	287	254	ND	ND	ND	ND	--	--	--	--	--	33[31]
1907[26]	281	252	ND	ND	ND	ND	--	--	--	--	--	29[31]
1906[26]	273	253	ND	ND	ND	ND	--	--	--	--	--	26[31]
1904[33]	276	255	134	121	ND	ND	--	--	--	--	--	19[31]
1903[29]	261	ND	ND	ND	ND	ND	--	--	--	--	--	ND
1902[29]	264	ND	ND	ND	ND	ND	--	--	--	--	--	ND
1901[29]	264	ND	ND	ND	ND	ND	--	--	--	--	--	ND
1900[29]	299	ND	ND	ND	ND	ND	--	--	--	--	--	ND
1899[26]	337	313	ND	ND	ND	ND	--	--	--	--	--	24[31]
1890[10]	267+	267	136	131	21	12.71	--	--	--	--	--	ND
1881[25]	500	ND	ND	ND	ND	ND	--	--	--	--	--	ND
1880[11]	400-500	ND	ND	ND	ND	ND	--	--	--	--	--	ND
1878[12]	1500(est.)	ND	ND	ND	ND	ND	--	--	--	--	--	ND
1874[19]	300-400	ND	ND	ND	ND	ND	--	--	--	--	--	ND
1830-33[30]	2500	ND	ND	ND	ND	ND	--	--	--	--	--	ND
1000-1650[14]	4000(est.)	ND	ND	ND	ND	ND	--	--	--	--	--	ND

TABLE 5: -- CONTINUED

[1] These are the number of inhabited domiciles. In recent years state and federal new housing projects have resulted in the spatial separation of individuals (usually extended family groups) into more than one domicile. Field data indicate that despite the spatial reorganization of the study populations, many related households continue to function as single units for purposes of food and raw material procurement, distribution, preparation, storage, and food consumption (i.e. common evening meals most frequently). New and old houses often function to provide separate sleeping areas for related groups which continue to act as larger units for other purposes. Most commonly, bachelor males will remain in the "old house." Children may alternate sleeping between the households of extended family members.

[2] These data include single individual households.

[3] Based on field data, 1980. There are no elementary or high school teachers or missionaries included in these data.

[4] U. S. Department of Commerce, Bureau of the Census 1980. These data include teachers, missionaries, and their respective residences. Additionally, since every occupied domicile was included in 1980 field data, the U. S. Bureau of the Census information may have included unoccupied structures. However, the 1980 update of the field data took place prior to the summer months. During the summer of 1980 approximately 25 new houses were constructed in each village. Household composition was not readjusted for purposes of this study when these houses were complete. Alaska Department of Community and Regional Affairs-funded community profiles for Gambell and Savoonga in 1980 reported 105 and 122 "homes" respectively, which further suggests that the U. S. Department of Commerce, Census Bureau domicile data included unoccupied structures or was high for other reasons not yet determined.

[5] Ellanna and Roche 1976: 7 and 9. These data include teachers and missionaries residing in the communities.

[6] U. S. Department of Commerce, Bureau of the Census 1970: 4. Of the 372 Gambell total for 1970, 356 (95.7 percent) were Eskimo, 15 (4.0 percent) were Caucasian, and 1 (.3 percent) was other. Of the 364 Savoonga total, 354 (97.3 percent) were Eskimo, 7 (1.9 percent) were Caucasian, and 3 (.8 percent) were of another ethnic affiliation.

[7] U. S. Department of the Interior, Bureau of Indian Affairs 1977a: 17, 19, 63, and 189-191. Source of 1910 to 1960 data is the U. S. Census. In some cases, these figures vary from those of other sources. These data usually included teachers, missionaries, and other outsiders who happened to be in the community during the census period and did not include local people temporarily away from the village for medical or other reasons. Population totals for 1971, 1972, and 1973 include only the Native population including individuals temporarily absent from the community.

TABLE 5: -- CONTINUED

8 Alaska Planning Council 1940: 22 and 25; based on U. S. Bureau of the Census 1940, data. The 296 Gambell population included 78 school-aged children and 2 non-Native teachers. The 209 Savoonga population included 65 school-aged children and 2 non-Native teachers.

9 Moore 1923: 340. There were 19 persons living at Southwest Cape. The number at Camp Collier varied by season, although Moore reported as many as 40 individuals at Camp Collier during summer months.

10 Porter 1893: 8 and 165. All 267 were Siberian Yuit. The 21 households were composed of 64 "families." Although Porter did not define criteria for "family" membership, he implied that "families" were nuclear family units as he was applying the concept to populations which he observed. Porter's data were gathered during the summer of 1890 and may therefore reflect seasonal movements to camps. Of the 267, 139 were designated "native born" and 128 "foreign born." The latter category may have been Siberian immigrants. The Siberian coast had also undergone famine and disease.

11 Petroff 1884: 6, 10, and 12.

12 Hughes 1960: 12, 14, and 15. Hrdlička (1930: 209) stated that this population was dispersed in six settlements.

13 Peterson 1978: 19. Peterson does not list data sources for the population table and some of his data do not concur with original sources.

14 Foote 1965. Using the observations of explorers and archaeological data, Foote summarized the precontact settlements (and their populations) to include: Sivoukak (Gambell area) and 8 outlying settlements (900); Southwest Cape area with 4 settlements (700); Kukulik and 11 outlying settlements (850); Cape Siknik area with 2 main settlements (400); and Kialegak-Punuk area with 6 outlying settlements (1250); with a total of 4,000 inhabitants.

15 Leighton 1940. These data included all Siberian Yuit families in the village but no non-Native households. Since this census was compiled over a several month period, it probably is more valid than the U. S. Census data.

16 Hughes 1954-1955. This total was derived from Hughes' raw census and is higher than the 317 he notes in his published work (50). The difference is probably a result of counting methods, since the 336 figure includes all babies born in 1955, individuals who were alive during some part of 1955, and individuals who emigrated or otherwise temporarily left the village in 1955.

17 Savoonga was established as a reindeer camp in 1916.

18 U. S. Department of the Interior, Bureau of Indian Affairs 1977b: 33, 65, and Appendices. Data for 1971, 1972, and 1973 included only Native residents of Savoonga.

TABLE 5: -- CONTINUED

19 Elliot 1886: 222-223. These data were estimates from the mid-1870s. This population was said to be in either 3 or 5 settlements, all of which were located on the south and east coasts. This estimate of population size was probably very low, because Hooper, who investigated the 1878-1879 "famine," counted several hundred bodies in 1880. Also, Elliott was only on the Island for a very brief period of time (Hughes 1960: 12). Elliott did not visit the north or west coasts of the Island.

20 U. S. Department of Commerce, Bureau of the Census 1913: 573. This was a mid-winter enumeration.

21 Geist and Rainey 1936. Most of the population lived at two villages, Sevoukak and Savoonga, but some families lived in permanent camps. At least six families resided in three houses at Southwest Cape (Powooiliak) while four families occupied two houses at Camp Collier. Other camps were used only during seasonal resource harvest activities.

22 Anderson and Eells 1935: 125.

23 Brooks 1953: 505.

24 Burns 1967: 26.

25 Muir 1917: 85, 86, 107, and 108. Muir reported that in 1878 there were 1,500 inhabitants on the Island in 10 villages located on the coast. By 1881 the majority were living at Northwest Cape (Gambell) and two-thirds of the population had died of starvation during the period 1878-79. Of the 10 villages in 1878, the populations of 7 either totally perished or relocated. In 1881 he recorded a village on the south side of the Island with only two men and one woman in two households. At a village on the southwest end of the Island, only 15 of 200 residents survived until 1881.

26 Burgess 1974: 34-35, 49, and 51.

27 Burns 1967. The individuals resided in Northeast Cape in 9 households in 1967.

28 Burns 1965a: 7. This is probably an overestimate.

29 Jackson 1904.

30 Burgess 1974: 23-25. Kobelev's data from 1779 included 5 settlements which he mapped but not any population totals. Tebenkof recorded 13 settlements, 4 of which were population centers, in the 1830-1833 period. Tebenkof's data preceded the majority of major population disruption.

31 Burgess 1974: 34. These were located at Southwest Cape (Powooiliak) in 1899 and 1904; 19 at Powooiliak and 7 at "Poropirtii" in 1906; 20 at Powooiliak and 9 at "Poropirtii" in 1907; 21 at Powooiliak and 12 at "Poropirtii" in 1908; and 21 at Powooiliak, 15 at "Poropirtii," and 12 at Kukulik in 1909.

32 Collins 1937: 15. In addition to Gambell and Savoonga, Collins reported several smaller settlements of a few families each near the southwestern end of the Island and along the coast between Gambell and Savoonga.

33 Jackson 1905: 84.

occupied simultaneously. Burgess (1974) systematically organized early explorer accounts to conclude that prior to 1878, the Island supported minimally 1,500 people, two-thirds of whom did not survive the period 1878 to 1880. This major population disruption has been attributed to starvation caused by inclement weather and excessive northerly and southerly winds resulting in poor fall and spring ice conditions; diseases, including measles and "black tongue" (possibly a nutritional deficiency); declines in walrus and whale populations brought about by commercial whaling; excessive use of alcohol; poor hunting conditions brought about by the improper treatment of walrus, disrupting the delicate balance of favorable relationships between the human and animal world; and, most likely, a combination of more than one of these factors. Since a large number of deaths occurred at settlements located on all coasts of the Island and on the Siberian mainland, and given the diversity of resources available to Island residents and the long time depth of a fairly substantial human population, it is unlikely that ecological factors alone caused this major demographic event. Whatever the causes, however, reconnaissances of the Island in 1881 provided direct evidence of hundreds of deaths (Elliott 1886; Hooper 1881; and Muir 1917).

Survivors recentralized primarily into the Northwest Cape settlement (Sivoukak), although a few families remained at or later returned to Southwest Cape (Powooiliak) and a couple of other settlements into the early 1900s (see Table 5, footnote 31). Prior to 1878 the population of the Island had been organized into numerous patriclans named after the territories occupied by their ancestors (Hughes 1960; and Geist and Rainey 1936). The recentralization of the

Island's surviving 500 or less population in 1880 is suggested by the fact that in the early 1930s, only two members of Gambell's 200+ population were descendants of the clan which originally had inhabited that area (Geist and Rainey 1936). Since immigrants were apparently recruited from the Siberian mainland after 1880, Siberian clans were represented in the Gambell population of the early 1930s. Recentralization did not eliminate the use of other parts of the Island for seasonal resource harvest, and camps at many previous settlement locations have been retained to the present time. Northwest Cape may have been the site of recentralization because of its advantageous location for harvesting large and small marine mammals year-round resulting from the combination of favorable ice conditions and open leads at this site. It was also the site closest to the Siberian mainland -- a connection important for trade and population recruitment. Recentralization was undoubtedly related to the need for multiple crews in the successful harvest of large marine mammals.

Diseases continued to take a toll of the Island's population until it reached a low of 261 in 1903 (Jackson 1904). In 1900 measles was carried to Gambell by Siberian coastal people from Indian Point at the end of May, and within approximately 10 days nearly 100 percent of the population was affected but only 2 infants had died (Wolfe 1981: 22-27). This was a key harvest period and many people already had resumed normal activities when an influenza epidemic struck approximately two weeks after the measles outbreak. By the end of June, 26 people had died primarily from respiratory complications. By early August, 44 people had died. Many of those who had been ill from the previous disease contracted tuberculosis causing 20 deaths during the winter

and following spring. Subsequently a milder influenza and smallpox epidemic, contained by vaccination, also affected the Island population. By June 1901 a total of 74 persons (or 22.0 percent of the population) had died of illnesses related to the sequence of epidemics (Wolfe 1981: 24).

From 1904 to 1980 the population of Gambell and the Island as a whole has continued to grow. In 1916 Savoonga was established as a reindeer herding camp and, although no population data are available until 1930, by that year Savoonga had a population of 139 (U. S. Department of the Interior, Bureau of Indian Affairs 1977b). Despite the relocation of some Gambell residents to Savoonga, the 1930 Gambell population had increased to 250. By 1940 contact with Siberian coastal populations was rare, there was negligible incidence of emigration of St. Lawrence Islanders to the Alaska mainland (Hughes 1960: 19), and teachers, missionaries, and a nurse were the only resident non-Natives on the Island. There continued to be limited residents located in smaller settlements (Table 5).

> . . . prior to 1940, . . . principal movements of populations were confined to the island itself. People moved to and from their trapping or hunting camps . . . or from one village to another. There had been almost no emigration of a permanent nature to the Alaska mainland, although a few men had worked on whaling vessels and others had made trading voyages to Nome. The annual trips to Siberia have also been mentioned. During the 1920s and 1930s, one or two families of King and Diomede island Eskimos came to Gambell from Nome to live for a year or two. Other immigrants of a more permanent nature were native orphan children adopted from Nome. (Hughes 1960: 70-71)

Population growth at both Gambell and Savoonga was limited by numerous factors in the 1940 to 1955 period, including male participation in the military, hospitalization of individuals with tuberculosis on the mainland or outside of the State, emigration to Nome

for mostly defense-related employment, possibly some outmarriage of Gambell women to military men, and high infant mortality (110.1 per thousand) (Hughes 1960: 58). Epidemics including influenza (1943-1944), measles (1953), whooping cough (1943-44) and tuberculosis accounted for in excess of 56 percent of the 143 deaths recorded during this period (Hughes 1960: 80). By 1954-55 population totals were 336 and 250 for Gambell and Savoonga respectively.

Burgess (1974) argued that Gambell's population dynamics between 1958 and 1972 and population level of 354 in 1972 indicated a leveling of the total number of inhabitants that could be supported at Gambell in specific and on the Island in general given the centralization which had occurred over the previous century. Although Burgess (1974) failed to discuss Savoonga in arriving at conclusions about the Island's human carrying capacity, similar population trends were apparent at this community as well. Additionally Burgess (1974) overlooked the impact of the seasonal absence of males and females from approximately the ages of 14 through 20 for purposes of attending mandatory secondary education on the mainland from the mid- to late-1960s to 1976 when high schools were constructed at both Gambell and Savoonga. Interestingly, Table 5 demonstrates a relatively rapid increase in population levels subsequent to 1975. The 1980 data suggest that Burgess' (1974) population leveling had not occurred and that the absence of population cohorts in their late teens and other factors to be explored below may have influenced overall growth rates of both communities in the intervening five-year period. As Table 5 demonstrates, Gambell had grown by 20.4 percent and Savoonga by 19.7 percent between 1975 and 1980.

For purposes of this study, population pyramids by 5-year cohorts provide useful, temporally-specific data regarding the age composition of the communities keyed to sex. This information can be used to assess the ratio of males to females by cohort, the ratio of producers to dependents, the availability of specific sex and age cohorts to fill culturally prescribed and economically important roles, potential changes in the compositions of cohorts through time, and the availability of potential mates and reproductive segments of the populations.

Figure 5 presents the age and sex composition of Gambell in 1955 based on field data gathered by Hughes (1954-55). These data illustrate that in 1955 the 332 residents included more males than females; the 0-5 cohort was relatively large with more males than females; the discrepancy in size between the 0-5 and 6-10 cohorts suggested the accuracy of Hughes' (1960) observations concerning high infant mortality; there was a relatively balanced ratio of males to females in adult reproductively-active cohorts; there were older cohorts available for insuring the transmission of key knowledge to younger generations; the economic base of the community was adequate for supporting cohorts which were not directly productive; and there were available males in the young to middle-aged cohorts essential to large marine mammal hunting by crews. Additionally, these data provide a detailed demographic reference for an earlier period of time against which 1970, 1975, and 1980 information can be compared.

In 1955 Hughes' census included only long-term resident households and excluded temporary residents such as teachers and missionaries. Of these 336 long-term residents, 322 (95.8 percent) were recorded as

Ages	Males	Females	Total Percentages
76-80	(2.3%) 4 **	* 2 (1.3%)	(1.8%)
	(1.2%) 2 *	** 4 (2.5%)	(1.8%)
66-70	(1.7%) 3 **	* 2 (1.3%)	(1.5%)
61-65	(2.3%) 4 **	**** 7 (4.4%)	(3.3%)
56-60	(4.7%) 8 ****	*** 5 (3.1%)	(3.9%)
51-55	(1.7%) 3 **	** 4 (2.5%)	(2.1%)
46-50	(1.7%) 3 **	***** 10 (6.1%)	(3.9%)
41-45	(6.4%) 11 ******	**** 7 (4.4%)	(5.4%)
36-40	(3.5%) 6 ***	** 4 (2.5%)	(3.0%)
31-35	(4.1%) 7 ****	**** 7 (4.4%)	(4.2%)
26-30	(7.7%) 13 *******	******* 14 (8.8%)	(8.1%)
21-25	(9.3%) 16 ********	******* 13 (8.1%)	(8.7%)
16-20	(8.1%) 14 *******	******* 13 (8.1%)	(8.1%)
11-15	(9.3%) 16 ********	******* 14 (8.8%)	(9.0%)
6-10	(12.8%) 22 **********	********** 23 (14.4%)	(13.6%)
0-5	(25.6%) 40 **********	********** 31 (19.4%)	(21.4%)

60 40 20 0 20 40 60

Number of People
(n = 332)

172 (51.8%) 160 (48.2%)

Figure 5: Age & sex composition by 5-year cohorts, Gambell -- 1955.[1] [2]

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[1] Statistics:

	Male	Female	Total
Mean	23.523	25.394	24.295
Std. Dev.	20.806	21.325	21.031

[2] Adapted from Hughes 1954-55. Three males and one female do not appear in the distribution because their birthdates were not recorded.

being of full-Eskimo ethnicity. There were 7 (4.0 percent) of the 176 males and 7 (4.4 percent) of the 160 females who were of mixed ancestry. The males were all between the ages of 1 and 21, 3 had been adopted into Gambell households, 2 were the offspring of Gambell women by non-Native men, and 2 were the children of an inmarried one-half Eskimo woman. All females who were not full Eskimo were between the ages of 3 and 25. Three were unmarried one-half Eskimo women born in Nome, three were offspring of these unmarried women, and one had been adopted from Nome. These data substantiate Hughes' (1960) conclusions regarding the relative isolation of the village until very recent times.

Figure 6 presents the age and sex composition of Gambell in 1970 based on U. S. Bureau of the Census data (U. S. Department of Commerce, Bureau of the Census 1970). Methodology in federal censuses includes everyone who is present in the community at the time the census is taken and excludes community residents who are absent for short-term periods of time (e.g. hospitalization, educational attendance, and seasonal employment). In comparing the 1970 to the 1955 data, several useful points emerge. If the 15 non-Native teachers and missionaries are subtracted from the population total, the community increased in size 7.5 percent from 1955 to 1970 or an average of .5 percent annually. The higher ratio of males to females for the Eskimo population had increased by 2.5 percent. The disproportionate ratio of the sexes in both years' data consistently occurred in cohorts younger than 15 years of age and possibly related to sexually selective adoptive practices which favored males over females. The 1970 data suggested a reduction in infant mortality, because the percentage of decrease between the youngest cohort and the next two

Ages	Males	Females	Total Percentages
86-90		* 1 (.6%)	(0.3%)
	(0.5%) 1 *	* 1 (.6%)	(0.5%)
76-80	(1.5%) 3 **	* 2 (1.2%)	(1.3%)
71-75	(2.5%) 5 ***	*** 5 (2.9%)	(2.7%)
66-70	(1.5%) 3 **	** 4 (2.4%)	(1.9%)
61-65	(2.0%) 4 **	**** 8 (4.7%)	(3.2%)
56-60	(4.0%) 8 ****	*** 6 (3.5%)	(3.8%)
51-55	(1.5%) 3 **	** 3 (1.8%)	(1.6%)
46-50	(2.5%) 5 ***	* 2 (1.2%)	(1.9%)
41-45	(4.0%) 8 ****	**** 8 (4.7%)	(4.3%)
36-40	(6.4%) 13 *******	**** 7 (4.1%)	(5.4%)
31-35	(6.4%) 13 *******	**** 7 (4.1%)	(5.4%)
26-30	(5.9%) 12 ******	****** 11 (6.5%)	(6.2%)
21-25	(7.4%) 15 ********	********** 20 (11.8%)	(9.4%)
16-20	(9.9%) 20 **********	****** 12 (7.1%)	(8.6%)
11-15	(10.9%) 22 **********	********** 22 (12.9%)	(11.8%)
6-10	(12.9%) 26 **********	********** 27 (15.9%)	(14.3%)
0-5	(20.3%) 41 **********	********** 24 (14.1%)	(17.5%)

60 40 20 0 20 40 60

Number of People
(n = 372)

202 (54.3%) 170 (45.7%)

Figure 6: Age & sex composition by 5-year cohorts, Gambell -- 1970.[1 2]

Figure 6: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	24.233	26.429	25.237
Median	17.833	20.500	19.167
Std. Dev.	20.815	21.903	21.318

[2] Institute of Social, Economic, and Government Research 1973: 21.

older cohorts was substantially less than in 1955. In 1970 the rate of percentage decrease between all cohorts starting at the base occurred in more or less regular increments, whereas in the 1955 data regularity of decreases from younger to older ages was evident only above the age of 10. In other respects, the sex and age structure of the adult population necessary for resource production (young to middle-aged adults) remained relatively stable and continued to provide support to less directly productive young and old segments of the population.

Figure 7 presents age and sex composition of Gambell in 1975 based on field data (Ellanna and Roche 1976). This population profile included non-Native teachers and missionaries (five individuals) who had been in the community for more than two years and an inmarried Tlingit woman but also included all Gambell residents temporarily absent from the village. The apparent population decline between the 1970 and 1975 data primarily resulted from methodological differences of the two censuses; therefore the actual rate of increase or decrease was not substantial but could not be precisely determined. The apparent decline may in part be explained by the August 1975 commercial airplane crash on the Island which took approximately seven Gambell

Ages	Males	Females	Total Percentages
86-90			(0.0%)
81-85	(0.4%) 1 *	* 2 (1.3%)	(1.8%)
76-80	(1.9%) 4 **	* 1 (0.6%)	(1.4%)
71-75	(0.4%) 1 *	** 3 (1.9%)	(1.1%)
66-70	(0.9%) 2 *	*** 6 (3.8%)	(2.2%)
61-65	(1.9%) 4 **	*** 5 (3.2%)	(2.5%)
56-60	(1.9%) 4 **	* 2 (1.3%)	(1.6%)
51-55	(3.3%) 7 ****		(1.9%)
46-50	(2.8%) 6 ***	**** 7 (4.5%)	(3.5%)
41-45	(6.1%) 13 *******	**** 7 (4.5%)	(5.4%)
36-40	(5.2%) 11 ******	*** 6 (3.8%)	(4.6%)
31-35	(5.2%) 11 ******	***** 10 (6.4%)	(5.7%)
26-30	(7.6%) 16 ********	******* 14 (9.0%)	(8.2%)
21-25	(12.3%) 26 **********	***** 9 (5.8%)	(9.5%)
16-20	(10.9%) 23 **********	********** 20 (12.8%)	(11.7%)
11-15	(12.8%) 27 **********	********** 23 (14.7%)	(13.6%)
6-10	(16.1%) 34 **********	******** 16 (10.2%)	(13.6%)
0-5	(10.0%) 21 **********	********** 25 (16.0%)	(12.5%)

60 40 20 0 20 40 60

Number of People
(n = 367)

211 (57.5%) 156 (42.5%)

Figure 7: Age & sex composition by 5-year cohorts, Gambell -- 1975.[1 2]

Figure 7: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	24.801	25.372	25.044
Median	22.519	18.200	18.372
Std. Dev.	18.441	20.592	19.359

[2] Adapted from Ellanna and Roche 1976: 15.

lives. The youngest cohort composed a substantially smaller segment of the 1975 population compared with previous years, possibly resulting from an increased use of birth control measures, an apparent decline in the overall number of reproductively-aged females associated with emigration, and externally-imposed state adoption regulations which may have discouraged traditional adoption practices and the frequency of adopting mainland children into the community. However, with small populations, the idiosyncratic activities of one or two large families may significantly alter the demographic structure of that population in a short-term analysis of change.

Figure 8 presents the age and sex composition of Gambell in 1980 based on field data and does not include any temporary residents of the Island such as teachers or missionaries. It does include non-Eskimos and non-Siberian Yuit who have become part of the population through inmarriage and adoption and individuals temporarily absent from the community. This population showed an increase of 15.7 percent from 1975 or 3.1 percent average annual increase. The ratio of males to females had continued to increase particularly in cohort 0-5, although that cohort remained a relatively smaller segment of the overall population than it was in 1955. The construction and

Ages	Males	Females	Total Percentages
86-90	(.4%) 1 *		(0.2%)
	(.4%) 1 *		(0.2%)
76-80	(.4%) 1 *	* 2 (1.1%)	(0.7%)
71-75	(.4%) 1 *	** 4 (2.3%)	(1.2%)
66-70	(1.6%) 4 **	** 4 (2.3%)	(1.9%)
61-65	(1.6%) 4 **	* 2 (1.1%)	(1.4%)
56-60	(2.0%) 5 ***	* 2 (1.1%)	(1.7%)
51-55	(3.3%) 8 ****	**** 8 (4.6%)	(3.8%)
46-50	(5.7%) 14 *******	*** 6 (3.4%)	(4.8%)
41-45	(4.5%) 11 ******	**** 7 (4.0%)	(4.3%)
36-40	(4.9%) 12 ******	***** 10 (5.7%)	(5.3%)
31-35	(6.6%) 16 ********	****** 11 (6.3%)	(6.4%)
26-30	(11.1%) 27 **********	****** 11 (6.3%)	(9.1%)
21-25	(9.4%) 23 **********	********** 21 (12.0%)	(10.5%)
16-20	(12.7%) 31 **********	********** 27 (15.4%)	(13.8%)
11-15	(14.8%) 36 **********	********* 18 (10.3%)	(12.9%)
6-10	(7.4%) 18 *********	********** 21 (12.0%)	(9.3%)
0-5	(12.7%) 31 **********	********** 21 (12.0%)	(12.4%)

60 40 20 0 20 40 60

Number of People
(n = 419)

244 (58.2%) 175 (41.8%)

Figure 8: Age & sex composition by 5-year cohorts, Gambell -- 1980.[1]

Figure 8: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	25.238	25.571	25.377
Median	21.900	20.625	21.313
Std. Dev.	17.952	19.016	18.382

operation of a high school in Gambell contributed to an increase in cohorts of high school-aged students, their parents, and siblings. The number of potential reproductively-active females increased by 67 percent, suggesting possible return migration, a decrease in outmarriage, and recruitment of wives from other populations. The discrepancy between the number of males and females in the population existed primarily in cohorts which were younger than those normally married, another indication of possible wife recruitment from other populations. Criteria involved in mate selection will be discussed below.

Table 6 demonstrates that the percentage of individuals of solely Eskimo ancestry remained relatively high (87.5 percent), although it had declined by 8.3 percent since 1955. There was only one non-Eskimo long-term resident of the community, an inmarried Tlingit woman.

In general Gambell's population structure demonstrated considerable continuity from 1955 to 1980. Interrelationships between this specific structure and Gambell's primary adaptive economic strategy, which focused on the hunting of large marine mammals, are addressed in Chapter V.

Unfortunately negligible information was documented about Savoonga's population structure during its earliest five decades as

TABLE 6: PERCENTAGE OF ESKIMO ETHNICITY BY AGE AND SEX, GAMBELL -- 1980[1]

Age Cohorts	100%		75%		50%		25%		0%	
	M	F	M	F	M	F	M	F	M	F
76-100	3	2	0	0	0	0	0	0	0	0
51-75	22	20	0	0	0	0	0	0	0	0
26-50	76	42	0	1	4	1	0	0	0	1
0-25	111	91	18	3	10	14	0	0	0	0
Total by sex	212	155	18	4	14	15	0	0	0	1
(Percent of population by sex)	(86.9)	(88.6)	(7.4)	(2.3)	(5.7)	(8.6)	(0.0)	(0.0)	(0.0)	(0.6)
Total individuals	367		22		29		0		1	
(Percent of total population)	(87.6)		(5.3)		(6.9)		(0.0)		(0.2)	

[1] Compiled from field data.

a community. Although it will be demonstrated that the extent of gene flow between the two St. Lawrence Island communities has been much less than may be expected for culturally related populations on a single island, harvested resources have been regularly distributed between the two communities through time. Therefore, the demographic compositions of both, as they potentially relate to hunting ecology, must be considered in reaching conclusions regarding the ecology of the Island's human populations.

Figure 9 presents the age and sex composition of Savoonga's population in 1970. These data were based on U. S. Bureau of the Census enumeration and are subject to all the qualifications of these data described above (U. S. Department of Commerce, Bureau of the Census 1970). The 1970 Savoonga population was a younger population than that of Gambell, in part reflecting its relatively short time-depth as a distinct community. Additionally, it was originally settled by reindeer herders and their families from Gambell, Siberia, and other locations on the Island. The interest in herding on the part of some individuals may have corresponded to demographic biases which are difficult to sort out in the more recent data. The relatively small size of the 0-5 cohort was most similar to that of Gambell in 1975 suggesting a declining birthrate in Savoonga, for whatever reason, in the latter part of the 1960s. Savoonga's 1970 population data illustrated a disproportionate number of males to females, particularly in the youngest two cohorts. There was a relatively small number of females in the 26-30 cohort suggestive of outmarriage. In 1970 there were 10 non-Eskimos in the population, only 1 of whom was an inmarried male. The ethnic composition of Savoonga in 1970 was therefore 97.3

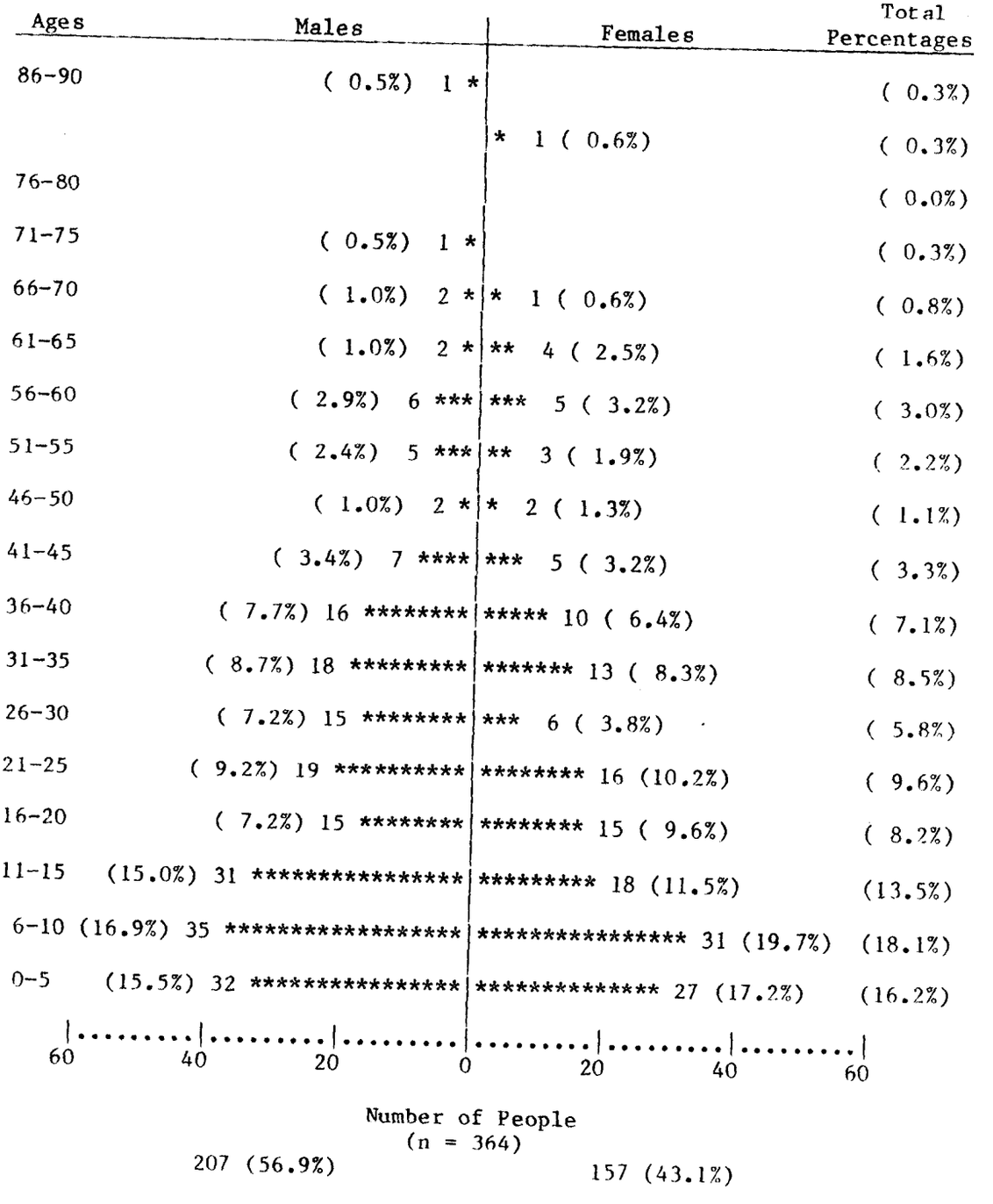


Figure 9: Age & sex composition by 5-year cohorts, Savoonga -- 1970.[1 2]

Figure 9: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	21.942	21.217	21.629
Median	17.875	16.125	16.900
Std. Dev.	17.285	17.417	17.322

[2] Institute of Social, Economic, and Government Research 1973: 51.

Eskimo, higher than that of Gambell in 1955.

Figure 10 illustrates the age and sex composition of Savoonga in 1975 based on field data (Ellanna and Roche 1976). Between 1970 and 1975 there was a 12.6 percent population increase or an average of 2.5 percent annually. Some of this increase can be explained by temporarily absent residents being counted in 1975 but not in 1970. The mean age of the Savoonga population increased for both sexes between 1970 and 1975. Interestingly, Savoonga crews first began whaling with their own boats and crews during this 5-year interval. Although the use of snowmachines influenced this significant development, it is important to note that in 1975 the age structure of Savoonga adult males more closely approximated that of Gambell males in all census data (see Chapter V).

Figure 11 presents the age and sex composition of Savoonga in 1980 based on field data, including all of the qualifications of these data discussed for Gambell. Adjusting for short-term non-Eskimos (teachers and missionaries) enumerated in 1975 and not included in 1980, the 1980 data illustrates an 18.4 percent population increase or 3.4 average annual increase. The increase was distributed across sex and age cohorts and, in part, was related to the construction and

Ages	Males	Females	Total Percentages
86-90			(0.0%)
81-85			(0.0%)
76-80	(1.8%) 4 **		(1.0%)
71-75	(0.9%) 2 *	* 1 (0.5%)	(0.7%)
66-70	(0.9%) 2 *	* 2 (1.1%)	(1.0%)
61-65	(2.2%) 5 ***	** 4 (2.2%)	(2.2%)
56-60	(0.4%) 1 *	** 4 (2.2%)	(1.2%)
51-55	(1.8%) 4 **	*** 5 (2.7%)	(2.2%)
46-50	(3.5%) 8 ****	** 4 (2.2%)	(2.9%)
41-45	(8.4%) 19 **********	**** 8 (4.4%)	(6.6%)
36-40	(7.9%) 18 *********	******** 15 (8.2%)	(8.0%)
31-35	(5.7%) 13 *******	**** 8 (4.4%)	(5.1%)
26-30	(6.2%) 14 *******	******* 14 (7.7%)	(6.8%)
21-25	(7.9%) 18 *********	******* 13 (7.1%)	(7.6%)
16-20	(13.2%) 30 **********	********** 20 (10.9%)	(12.2%)
11-15	(15.0%) 34 **********	********** 26 (14.2%)	(14.6%)
6-10	(10.6%) 24 **********	********** 23 (12.6%)	(11.5%)
0-5	(13.7%) 31 **********	********** 36 (19.7%)	(16.3%)

60 40 20 0 20 40 60

Number of People
(n = 410)

227 (55.4%) 183 (44.6%)

Figure 10: Age & sex composition by 5-year cohorts, Savoonga -- 1975.[1 2]

Figure 10: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	24.520	21.907	23.354
Median	18.317	17.825	18.120
Std. Dev.	18.058	17.389	17.789

[2] Adapted from Ellanna and Roche 1976: 20.

operation of a high school in Savoonga in 1976 which attracted high school-aged males and females, their parents, and siblings. The average age of the population of both sexes increased again in this 5-year interval.

There were 5 non-Eskimo inmarried spouses (2 males and 3 females) in Savoonga in 1980. The 1980 distribution of ethnicity in Savoonga is presented in Table 7. Including individuals of three-quarters and one-half Eskimo ancestry, Savoonga had a population which was 98.9 percent Eskimo in 1980.

Since there is only a decade of detailed demographic data available for Savoonga, there is inadequate information for assessing long-term trends. However, the Savoonga population was increasingly mirroring that of Gambell by 1980, and active recruitment of males and females from outside the community was ongoing. Interestingly, large marine mammal hunting patterns in Savoonga have increasingly mirrored those of Gambell as will be seen in Chapter V.

In this context the household or domestic family unit is the group of individuals, normally related, who reside in the same domicile. The importance of the number, size, and function of households in demographic analyses varies cross-culturally depending on the economic,

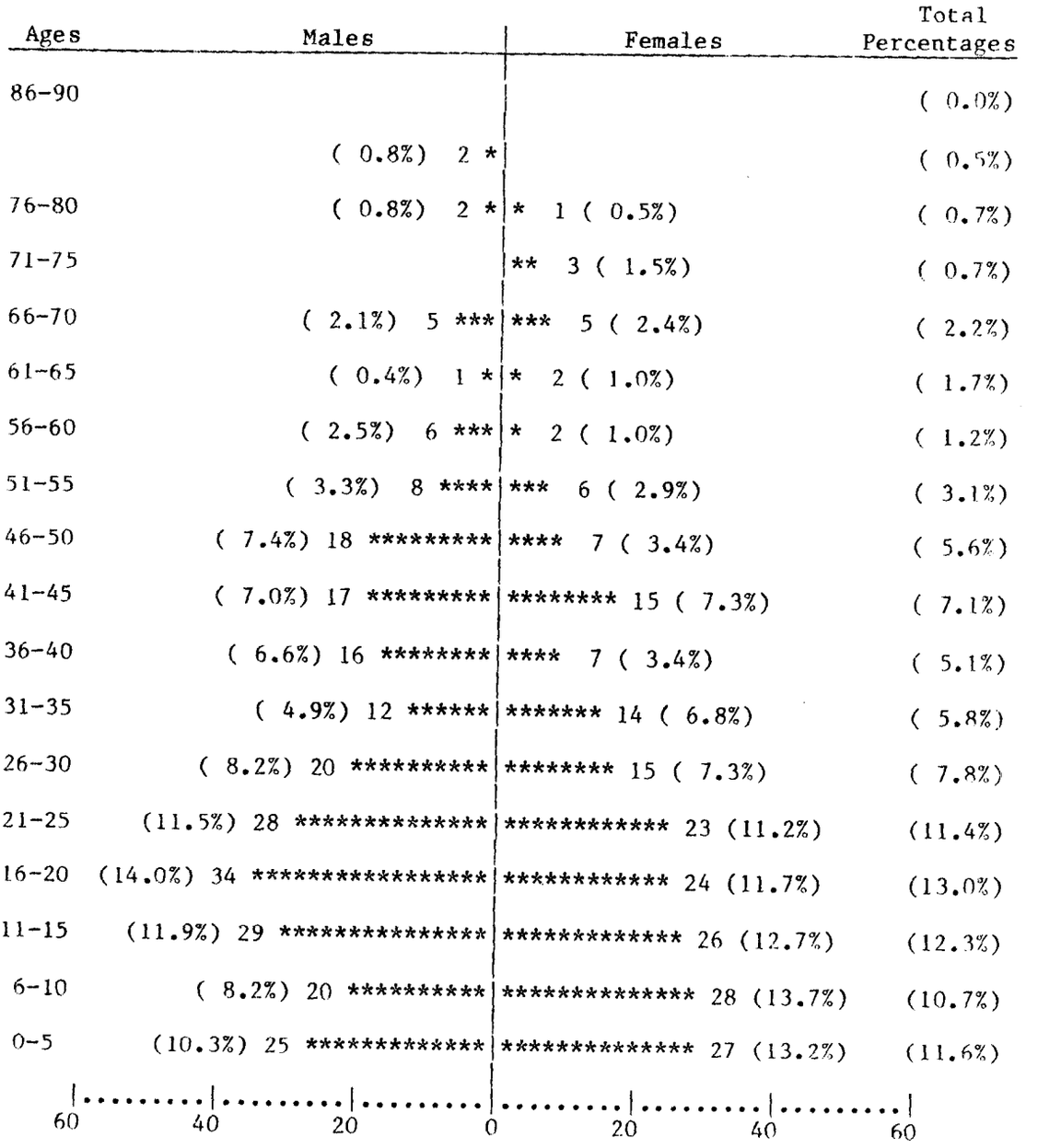


Figure 11: Age & sex composition by 5-year cohorts, Savoonga -- 1980.[1]

Figure 11: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	26.811	24.146	25.592
Median	22.909	19.667	21.625
Std. Dev.	17.826	17.937	17.906

social, and biological roles assigned to households in particular societies. As discussed in Chapter II, the traditional household in Alaskan Eskimo society had a key economic role as the minimal unit of production, distribution, and consumption, although households were not economically or socially autonomous in Bering Strait society. Additionally, they were the primary units of reproduction and child rearing, although these functions normally crossed household lines under certain conditions. Therefore data regarding the number, size, and composition of household units are important to the demographic analysis in this context.

Table 5 presented sporadic documented data on the number of households and the average number of individuals who composed households historically on St. Lawrence Island. Since some early visitors to the Island failed to go ashore or went ashore for very limited periods of time, and others did not recognize the significance of recording household information, there are considerable gaps and discrepancies in the data base regarding the number, size, and composition of inhabited domiciles. The earliest data for Gambell documented 20 "houses" in 1890 (Porter 1893); the earliest for Savoonga was 20 in 1932 (Anderson and Eells 1935: 25). Average household size was determined by dividing the total population by the total number of inhabited

TABLE 7: PERCENTAGE OF ESKIMO ETHNICITY BY AGE AND SEX, SAVOONGA -- 1980[1]

Age Cohorts	100%		75%		50%		25%		0%	
	M	F	M	F	M	F	M	F	M	F
76-100	4	1	0	0	0	0	0	0	0	0
51-75	19	18	0	0	1	0	0	0	0	0
26-50	80	55	1	0	0	1	0	0	2	2
0-25	124	116	6	3	6	8	0	0	0	1
Total by sex	227	190	7	3	7	9	0	0	2	3
(Percent of population by sex)	(93.4)	(92.7)	(2.9)	(1.5)	(2.9)	(4.4)	(0.0)	(0.0)	(0.8)	(1.5)
Total individuals	417		10		16		0		5	
(Percent of total population)	(93.1)		(2.2)		(3.6)		(0.0)		(1.1)	

[1] Compiled from field data.

domiciles. Archaeologists have developed techniques for assessing household size for prehistoric and undocumented historic periods, but these sources of data have not been explored in this context.

It is certain that the average household size during the historic period was greater in Gambell and Savoonga than was common in more recent years. Members of households were normally related males, their spouses and offspring, one or both parents, and less commonly other paternally-related males. Adoptive children were functional equivalents to biological offspring (Hughes 1960). Although the biological nuclear family model (i.e. father, mother, and offspring) was the core of the household unit, most households included kinsmen in addition to this basically biological model. The small, nuclear family unit, clearly the most frequently occurring and preferred household type in the United States today, was not necessarily viewed as the ideal household by St. Lawrence Islanders even as recently as 1955.

Table 8 presents the kinship composition of the 53 Gambell households in 1955 with an average household size of 6.34 individuals. All kinship connections were presented descriptively in relationship to household heads. There were no households composed of only husband and wife, probably related to economic demands on the household as a unit of production, the practice of bride-service (i.e. the prospective son-in-law customarily resided and worked in the bride's parents' household for approximately one year), the high value placed upon having children including those who were adopted, the high value placed upon accessibility to older people as critical reservoirs of information, the costs associated with obtaining and maintaining a house, and the cultural norms which valued a high level of day-to-day interaction

TABLE 8: HOUSEHOLD COMPOSITION BY TYPE, GAMBELL -- 1955[1] [2]
(n=53)

Key:

Hu = husband
Wi = wife
So = son
Da = daughter
ASo = adopted son
ADa = adopted daughter
SSo = stepson
SDa = stepdaughter
GSo = grandson
GDa = granddaughter
Br = brother
Si = sister
Mo = mother
Au = aunt
Ne = nephew
Ni = niece
Co = cousin
Fil = father-in-law
Mil = mother-in-law
Sil = son-in-law
Dil = daughter-in-law
Um = male, relationship unknown
Uf = female, relationship unknown

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)[3]
15	27.8%	male	WiSoDa
2	3.7%	male	WiDa
2	3.7%	male	So
1	1.9%	male	WiSoADa
1	1.9%	male	WiSoASoDa
1	1.9%	male	WiASoADa[4]
1	1.9%	male	WiSoSSo
1	1.9%	male	WiSoSDa
1	1.9%	male	WiSoDaNe
1	1.9%	male	WiNeNi
1	1.9%	male	WiSoDaUf
1	1.9%	male	WiSoASoDaBr
1	1.9%	male	WiASoADaBr
1	1.9%	male	WiSoDaBrSi
1	1.9%	male	WiASoADaGDa

TABLE 8: -- CONTINUED

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)
1	1.9%	male	WiSSoGDa
1	1.9%	male	WiSoDaCo
1	1.9%	male	WiSoDilGSoGDa
1	1.9%	male	WiASoDilGSoGDa
1	1.9%	male	WiSoDaSilDilGSoGDa
1	1.9%	male	WiMo
1	1.9%	male	WiASoADaMo
1	1.9%	male	WiSoMoBrCo
1	1.9%	male	WiSoMoBrSiAu[7]
1	1.9%	male	WiSoDaBrSilNi
1	1.9%	male	WiSoDaGSoMil
1	1.9%	male	Da
1	1.9%	male	WiASoADaMoUm
1	1.9%	male	WiSoDilGDaGSoUm
1	1.9%	male[5]	---
1	1.9%	female[6]	HuSoDaMil
1	1.9%	female	ASoDa
1	1.9%	female	SoDaDilGSoGDa
1	1.9%	female	Da
1	1.9%	female	SoMil
1	1.9%	female	SoDaFil
1	1.9%	female	Br[8]

TABLE 8: -- CONTINUED

[1] Based on Hughes 1954-55. The total population was 336, composed of 176 males and 160 females in 53 households.

[2] [illegible] information in Hughes' census, it was not always possible to differentiate between cousins, nephews, and nieces who were patrilineally or matrilineally related to head of household. However, as Hughes (1960) discussed, patrilineal descent was of primary importance in Gambell society in 1954-55, so it is likely that many collateral kin were related to the head through patrilineal linkages. Of 53 households, 28 (52.8 percent) were nuclear family models and 25 (47.2 percent) were extended family households. There were no single female households, one single male household, and no household composed only of a man and wife. There were 47 (88.7 percent) male heads and 7 (13.2 percent) female heads. There were 10 (18.7 percent) households with adopted children. Of the households, 45 (84.9 percent) included sons, adopted sons, and/or grandsons, whereas 42 (79.2 percent) included daughters, adopted daughters, and/or granddaughters.

[3] These are household types and in some cases they occurred with multiple members of the same kinship relation to head (such as more than one son or more than one brother).

[4] The adopted daughter was wife's sister's daughter.

[5] This was a widowed male. He was the only single individual household in Gambell during this year.

[6] Hughes did not explain why the female was named head of household. She was born in Nome and her husband in Gambell. This was the only case of a female head with a husband in the household.

[7] The only case of this type included an aunt who was the head's father's sister.

[8] There were three brothers in the household. One was 10 and the ages of the others were unknown.

[9] This niece is adopted by the brother and sister-in-law.

with kinsmen. For the same or similar reasons, there was only one single individual household, a relatively young unmarried male probably associated with kinsmen in another household. If the 10 households with adopted children were included, 28 (52.8 percent) were nuclear family units and 25 (47.2 percent) extended family units. Over 84 percent of the households had sons, son surrogates (adopted sons and grandsons), or both, whereas over 79 percent had daughters, daughter surrogates (adopted daughters and granddaughters) or both. Most

households (88.7 percent) were headed by males. The presence of daughters-in-law in households represented post-marital patrilocal residence and the presence of sons-in-laws represented bride-service (Hughes 1960). Since marriage was both clan endogamous and exogamous, households often represented more than one clan (Hughes 1960: 279).

Table 9 presents Gambell household composition in 1980. It should be noted that there has been externally-derived impetus for Gambell people to reorganize into nuclear family households. Impetus has come from federal and state-funded housing programs which design and construct housing units modeled on the average low-income, non-Native, United States home. Beyond the actual physical facility, however, are the ideals implicit in design and financing procedures which expect or demand that housing recipients conform to nuclear family models in domicile membership. The impact of housing projects has been most pronounced over the last decade (1970 to 1980). Gambell residents adapted to these conditions in a variety of ways. "Old houses" commonly became sleeping quarters for bachelor males who continued to perform all other economic and social activities with the larger primary household located in the "new house." In a few cases "old houses" have been rented primarily to non-Natives, since the concept of renting a dwelling is foreign to local families. In other cases, young married couples have taken up residence apart from the larger kin group earlier than was customary in the not too distant past and often had difficulties functioning without support from the larger kin group. Children commonly ate and/or slept in more than one household. Although the household as a unit of analysis in Eskimo society has never been satisfactory unless it could be integrated into a

TABLE 9: HOUSEHOLD COMPOSITION BY TYPE, GAMBELL -- 1980[1]
(n=90)

Key:

Wi = wife
So = son
Da = daughter
ASo = adopted son
ADa = adopted daughter
SDa = stepdaughter
GSo = grandson
GDa = granddaughter
Br = brother
Si = sister
Ne = nephew
Ni = niece
SCo = second cousin
Siil= sister-in-law

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)[2]
27	30.0%	male	WiSoDa
12	13.3%	male	WiSo[3]
5	5.6%	male[4]	---
5	5.6%	male	WiDa
4	4.4%	female	So
3	3.3%	male	So
2	2.2%	male	WiDaASo[5]
2	2.2%	male	WiSoDaGDa
2	2.2%	male	Ne[6]
1	1.1%	male	Wi
1	1.1%	male	WiSoDaASo
1	1.1%	male	WiSoSDa
1	1.1%	male	WiASo
1	1.1%	male	WiSDa
1	1.1%	male	WiSoDaGSo
1	1.1%	male	ADa

TABLE 9: -- CONTINUED

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)[2]
1	1.1%	male	WiGSoGDa[7]
1	1.1%	male	WiSoDaBr
1	1.1%	male	WiSoGDaBr
1	1.1%	male	WiSoMo
1	1.1%	male	WiSoSiil
1	1.1%	male	WiSoDaGSoNe[8]
1	1.1%	male	BrSi
1	1.1%	male	Si
1	1.1%	male	MoSiNeAu[9]
1	1.1%	male	Br
1	1.1%	male	BrSiilNeNi
1	1.1%	male	Co[10]
1	1.1%	male	SCo[11]
1	1.1%	female	SoDa
1	1.1%	female	Da
1	1.1%	female	SoDaGSo
1	1.1%	female	SoDaGSoGDa
1	1.1%	female	DaGSoGDa
1	1.1%	female	GSoGDa
1	1.1%	female	ASo
1	1.1%	female	---

TABLE 9: -- CONTINUED

[1] Based on field data. The total population was 419, composed of 244 males and 175 females in 90 households. There were no teachers or missionaries included in these data.

[2] These are household types and in some cases they occurred with multiple members of the same kinship relation to head (such as more than one son or daughter). Of 90 households, 62 (68.9 percent) were nuclear family households and 23 (25.6 percent) were extended family households. There were one (1.1 percent) single female household and 5 (5.6 percent) single male households. There was 1 (1.1 percent) household composed of only husband and wife. There were 6 (6.7 percent) households that reported having adopted children, but many of the grandchildren residing with grandparents were functionally adopted. Of the households in 1980, 70 (77.8 percent) included sons, adopted sons, grandsons, and/or nephews, whereas 52 (57.8 percent) included daughters, adopted daughters, granddaughters, and/or nieces. There were no stepsons in Gambell households. There were 10 (11.1 percent) households which included grandchildren. There were 79 (87.8 percent) male household heads and 12 (13.3 percent) female household heads.

[3] In one of these cases the household head was an inmarried Eskimo from Koyuk.

[4] Of these single males, 3 were bachelors and 2 had been widowed.

[5] In one of these cases, one adopted son was from Stebbins on the mainland. The wife in this household was also born on the mainland at Shaktoolik.

[6] In both cases, nephews were sons of the heads' brothers.

[7] The grandchildren in this case were the offspring of two adopted sons.

[8] This nephew was the son of the head's sister.

[9] The two nephews were the sons of the sister who resided in the household. The aunt was the father's sister.

[10] The cousins in this household were brothers to one another and they were the sons of the head's adopted father's brother.

[11] The second cousin was the head's father's brother's son's son.

complex of related households, the results of new housing programs have made the inhabited domicile an even more arbitrary unit of analysis. Nonetheless, major themes which aligned individuals in Gambell society in 1980 remained visible in types of kin relationships which characterized household composition.

Despite these changes described above, in 1980 23 (25.6 percent) remained extended family households and some of the nuclear family

households employed methods of adoption to arrive at that model. Only a single household was composed solely of husband and wife, although there were 6 (6.7 percent) single individual households. The primary role of patrilineally-determined kinship was still evident in the patterning of household membership. The relative proportion of female heads of household was less than that in 1955.

Table 10 presents household composition for Savoonga in 1980. Unfortunately there were no previously documented household composition data to use for purposes of comparison with 1980. However, themes of traditional household patterning and the influence of new housing projects were similar to those described for Gambell. The earliest household data for Savoonga indicated an average household size of 8.00 in 1935. In 1980 there were 92 households with an average size of 4.87 members. Including adopted offspring, 23 (25.0 percent) were extended family households. There were 7 (7.6 percent) single individual households, and 1 household composed solely of husband and wife. Of all households, 72 (78.3 percent) included sons, son surrogates (adopted or stepsons, grandsons, nephews) or more than one category of sons/son surrogates. Of all households, 63 (68.5 percent) included daughters, daughter surrogates (adopted or stepdaughters, granddaughters, nieces), or more than one of these categories. These data suggested the continued preference for males within St. Lawrence Island populations. Patrilineally-derived links between household members persisted into 1980.

Birthplaces of the living population and their parents provide useful information for analyzing the interrelationships between demographic and hunting-related variables, including the extent of

TABLE 10: HOUSEHOLD COMPOSITION BY TYPE, SAVOONGA -- 1980[1]
(n=92)

Key:

Wi = wife	SDa = stepdaughter	Si = sister
So = son	GSo = grandson	Mo = mother
Da = daughter	GDa = granddaughter	Ne = nephew
ASo = adopted son	SGSo= step grandson	Ni = niece
ADa = adopted daughter	SGDa= step granddaughter	Sil = son-in-law
SSo = stepson	Br = brother	Dil = daughter-in-law

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)[2]
25	27.2%	male[3]	WiSoDa
7	7.6%	male[4]	---
7	7.6%	male	WiSo
5	5.4%	male	WiDa
4	4.3%	female	SoDa
3	3.3%	male	So
3	3.3%	male	WiSoADa[5]
3	3.3%	male	WiSoDaGDa
2	2.2%	male	WiSoDaASo
2	2.2%	male	WiSoDaADa
2	2.2%	male	Br
2	2.2%	female	SoDaASo
1	1.1%	male	WiDaSSoSDa
1	1.1%	male	WiASoADa
1	1.1%	male	WiSSo
1	1.1%	male	WiSDa

TABLE 10: -- CONTINUED

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)
1	1.1%	male	WiASo
1	1.1%	male	WiADa
1	1.1%	male	Wi
1	1.1%	male	WiSoDaGSo
1	1.1%	male	WiSoGSoGDa
1	1.1%	male	WiSoDaASoADaGSoGDa
1	1.1%	male	WiSoDaADaGSoGDa
1	1.1%	male	WiDaADaGSo
1	1.1%	male	WiSSoSDaADa[6]SGSoSGDa
1	1.1%	male	WiDaMo
1	1.1%	male	WiSoDaSil
1	1.1%	male	WiSoDaBr
1	1.1%	male	WiASoUm
1	1.1%	male	ASo
1	1.1%	male	DaDilGSo
1	1.1%	male	SoASoGSoUm
1	1.1%	male	Si
1	1.1%	male	BrSiNeNi
1	1.1%	male	BrNe[7]
1	1.1%	male	Ne[7]
1	1.1%	female	Da
1	1.1%	female	ASoGDa
1	1.1%	female	GSo

TABLE 10: -- CONTINUED

[1] Based on field data. The total population was 448, composed of 243 males and 205 females in 92 households.

[2] ...household types and in some cases they occurred with multiple members of the same kinship relation to head (such as more than one son or daughter). Of 92 households, 62 (67.4 percent) were nuclear family households and 23 (25 percent) were extended family households. There were no single female household and 7 (7.6 percent) single male households. There was a single household composed only of husband and wife. There were 20 (21.7 percent) of the households which reported having adopted children and 13 (14.1 percent) households which included grandchildren. Of the households, 72 (78.3 percent) included sons, adopted sons, stepsons, grandsons, and/or nephews, whereas 63 (68.5 percent) included daughters, adopted daughters, stepdaughters, granddaughters, and/or nieces. There were 83 (90.2 percent) male household heads and 9 (9.8 percent) female household heads in Savoonga.

[3] In one case the head was an inmarried male non-Eskimo.

[4] Six of the single males were bachelors and one was separated from his wife.

[5] In one case the adopted daughter was the sister of household head.

[6] This female was adopted by the wife during a previous marriage.

[7] Nephew is brother's son.

recruitment from outside the community; criteria for recruitment; seasonal migrations associated with resource use; interpopulation and intra-island alliances; changes in birthing locations through time; and post-marital residency patterns. Information about birthplaces also provides insights into the degree of isolation of these populations related to insularity.

Table 11 presents place of birth by sex and 25-year cohorts for Gambell residents in 1955 based on Hughes' field data. The continued occupation of Southwest Cape (Powooiliak) as a community and seasonal camp into the first half of the 1900s was reflected in the fact that individuals in three of the four cohorts were born there. The small sample size in the 76-80 cohort probably accounted for the absence of Southwest Cape births for that age group. Recruitment

TABLE 11: PLACE OF BIRTH BY SEX AND 25-YEAR COHORTS, GAMBELL -- 1955[1]
(n=336)

	76-80		51-75		26-50		0-25	
	Males	Females	Males	Females	Males	Females	Males	Females
Gambell	4(100%)	2(100%)	17(85%)	20(90.9%)	36(92.3%)	30(71.4%)	104(92.9%)	82(88.2%)
Savoonga	--	--	--	--	--	4(9.5%)	2(1.8%)	7(7.5%)
SW Cape[2]	--	--	1(5%)	--	1(2.6%)	2(4.8%)	1(.9%)	--
Boxer Bay[2]	--	--	--	--	1(2.6%)	1(2.4%)	--	--
Siberia	--	--	2(10%)	2(9.1%)	1(2.6%)	3(7.1%)	--	--
Nome	--	--	--	--	--	--	4(3.6%)	3(3.2%)
Diomede	--	--	--	--	--	2(4.8%)	--	--
Unalakleet	--	--	--	--	--	--	--	1(1.1%)
Sitka	--	--	--	--	--	--	1(.9%)[3]	--

1 Data were derived from Hughes 1954-55. There were 10 males (5.7% of all males) and 23 females (14.4% of all females) born in places other than Gambell or camps used by Gambell residents.

2 Camps on St. Lawrence Island.

3 This individual was adopted by a couple who were unable to have children.

of both males and females from Siberia was indicated by birthplaces of the two cohorts between 50 and 75 years of age, but clearly no one in the living population had been recruited from Siberia since at least 1930. Considering the proximity of Gambell to Savoonga and their insular isolation from the Alaska mainland and political isolation from the Siberian mainland, a greater incidence of recruitment from Savoonga was expected. However, recruitment of wives from Savoonga included only 11 women (17 percent), over half of whom were in the youngest cohort. The recruitment of males and females born in Nome was a relatively recent phenomena occurring only in the 0-25 year cohort. This practice reflected the relatively recent and developing connection between St. Lawrence Island and the Alaska mainland in 1955. The Diomede inmarriage resulted from the Bureau of Indian Affairs relocation of a few King and Diomede island families to St. Lawrence Island between 1927 and 1932 (Braund 1981). In 1955 the vast majority (87.8 percent) of Gambell's population was born there. Hughes did not provide data on parental birthplace in 1955.

Table 12 presents place of birth by sex and 25-year cohorts for Gambell residents in 1980 based on field data. The diversity of places of birth for the youngest cohort contrasted to the greater homogeneity of birthplaces in the 1955 data. Nome, Kotzebue, and Anchorage births primarily reflected changing medical practices in the last two decades. Women were encouraged by medical professionals to have their babies in hospital facilities once transportation and medical services were more regularly available to St. Lawrence Islanders. The persistence of relatively minor recruitment of Savoonga females or males was reflected in these birth data. Two of the three Savoonga

TABLE 12: PLACE OF BIRTH BY 25-YEAR COHORTS AND SEX, GAMBELL -- 1980 (n=419)

Place Of Birth	Age Cohorts							
	76-100		51-75		26-50		0-25	
	Sex							
	M	F	M	F	M	F	M	F
Gambell	3	2	22	12	72	32	70	53
Savoonga	0	0	0	2	1	7	2	2
St. Lawrence Island Camps[1]	0	0	0	4	1	0	0	0
Siberia	0	0	0	2	0	0	0	0
King Island	0	0	0	0	0	1	0	0
Seward Peninsula and Norton Sound[2]	0	0	0	0	1	2	1	0
Nome	0	0	0	0	5	2	47	39
Kotzebue	0	0	0	0	0	0	12	6
Anchorage	0	0	0	0	0	0	4	5
Southcentral Ak.[3]	0	0	0	0	0	0	1	1
Southeastern Ak.[4]	0	0	0	0	0	1	1	1
Outside Alaska	0	0	0	0	0	0	1	1
Total	3	2	22	20	80	45	139	108

1 Camps in this category include Boxer Bay, Southeast Cape, and Northeast Cape.

2 Communities in this category include Golovin, Shaktoolik, Unalakleet, and Stebbins.

3 These individuals were born in Seward.

4 Communities in this category include Juneau, Sitka (Mt. Edgecumbe), and Yakutat.

males were involved in bride-service in 1980 and would eventually return to Savoonga with their Gambell wives. Other recruitment was minimal and occurred through mechanisms of adoption and marriage. In 1980 the majority (63.5 percent) of the population was born in Gambell despite the large number of hospital births in the youngest cohort. There was no incidence of camp birthing in the youngest cohort, which reflected primarily the encouraged practices of regular prenatal care and hospital births rather than the decreased seasonal use of camps. However, these more recent pregnancy-related practices have influenced the extent to which pregnant females can participate in long-term, camp-based resource harvest activities during summer months.

Table 13 presents parental birthplaces by 25-year cohorts for Gambell in 1980. Over half (56.8 percent) of the 1980 population had fathers and mothers who were born in Gambell, 76.6 percent had fathers who were born in Gambell, and 66.1 percent had mothers who were born in Gambell, indicating a greater percentage of female to male recruitment. If camps used by Gambell residents were included, the percentage of individuals with either one or two Gambell parents was even greater. Both males and females were recruited into Gambell's population through mechanisms of adoption and marriage. The level of recruitment and diversity of recruitment locations have increased in the younger cohorts, in large part reflecting the greater frequency and intensity of contacts with the Alaska mainland resulting from hospitalization and other medical care, formal education, military service, seasonal employment, mainland-based resource harvests, and other factors.

The 1980 parental birthplace data indicated that more children (15.0 percent) had mothers from Savoonga as opposed to those who had

TABLE 13: PARENTAL BIRTHPLACES BY 25-YEAR COHORTS, GAMBELL -- 1980[1]
(n=419)

Place of Birth		Number (Percentage of Cohort)			
Father	Mother	Cohort 0-25	Cohort 26-50	Cohort 51-89	Total Number and Percentage
Gambell	Gambell	121(49.0%)	85(68.0%)	32(68.1%)	238(56.8%)
Gambell	Savoonga	38(15.4%)	8(6.4%)	0(0.0%)	46(11.0%)
Gambell	camp[2]	11(4.5%)	3(2.4%)	0(0.0%)	14(3.3%)
Gambell	Nome	10(4.0%)	2(1.6%)	0(0.0%)	12(2.9%)
unknown	Gambell	12(4.9%)	0(0.0%)	0(0.0%)	12(2.9%)
unknown	unknown	1(.4%)	4(3.2%)[3]	5(10.6%)	10(2.4%)
outside	Gambell	8(3.2%)	1(.8%)	0(0.0%)	9(2.1%)
Nome	Savoonga	9(3.6%)	0(0.0%)	0(0.0%)	9(2.1%)
Siberia	Siberia	0(0.0%)	4(3.2%)	4(8.5%)	8(1.9%)
camp[2]	Gambell	5(2.0%)	1(.8%)	1(2.1%)	7(1.7%)
Gambell	other locations in Alaska	5(2.0%)	0(0.0%)	0(0.0%)	5(1.2%)
Siberia	Gambell	1(.4%)	1(.8%)	1(2.1%)	3(.7%)
outside	unknown	2(.8%)[4]	1(.8%)	0(0.0%)	3(.7%)

TABLE 13: -- CONTINUED

Place of Birth		Number (Percentage of Cohort)			
Father	Mother	Cohort 0-25	Cohort 26-50	Cohort 51-89	Total Number and Percentage
Savoonga	Savoonga	1(.4%)[5]	1(.8%)[6]	1(2.1%)[5]	3(.7%)
outside	Savoonga	3(1.2%)[7]	0(0.0%)	0(0.0%)	3(.7%)
camp[2]	Siberia	1(.4%)	2(1.6%)	0(0.0%)	3(.7%)
Gambell	King Island	2(.8%)	0(0.0%)	0(0.0%)	2(.5%)
camp[2]	camp[2]	0(0.0%)	0(0.0%)	2(2.1%)	2(.5%)
Koyuk	Gambell	2(.8%)	0(0.0%)	0(0.0%)	2(.5%)
unknown	Savoonga	1(.4%)	1(.8%)	0(0.0%)	2(.5%)
other locations in Alaska	Gambell	2(.8%)[8]	0(0.0%)	0(0.0%)	2(.5%)
Gambell	Unalakleet	2(.8%)	0(0.0%)	0(0.0%)	2(.5%)
outside	Nome	1(.4%)[9]	1(.8%)[5]	0(0.0%)	2(.5%)
Savoonga	Gambell	0(0.0%)	2(1.6%)	0(0.0%)	2(.5%)
Nome	Gambell	2(.8%)	0(0.0%)	0(0.0%)	2(.5%)
King Island	Wales	0(0.0%)	1(.8%)[5]	0(0.0%)	1(.2%)

TABLE 13: -- CONTINUED

Place of Birth		Number (Percentage of Cohort)			
Father	Mother	Cohort 0-25	Cohort 26-50	Cohort 51-89	Total Number and Percentage
Gambell	Diomede	0(0.0%)	1(.8%)	0(0.0%)	1(.2%)
unknown	Wales	0(0.0%)	1(.8%)[10]	0(0.0%)	1(.2%)
Shaktoolik	Shaktoolik	0(0.0%)	1(.8%)[5]	0(0.0%)	1(.2%)
Nome	Shaktoolik	1(.4%)	0(0.0%)	0(0.0%)	1(.2%)
unknown	Stebbins	1(.4%)[10]	0(0.0%)	0(0.0%)	1(.2%)
other locations in Alaska	other locations in Alaska	0(0.0%)	1(.8%)[10]	0(0.0%)	1(.2%)
Siberia	camp[2]	1(.4%)	0(0.0%)	0(0.0%)	1(.2%)
Koyuk	Koyuk	0(0.0%)	1(.8%)[11]	0(0.0%)	1(.2%)
outside	camp[2]	0(0.0%)	1(.8%)	0(0.0%)	1(.2%)
unknown	Nome	1(.4%)	0(0.0%)	0(0.0%)	1(.2%)
Shishmaref	Shishmaref	0(0.0%)	1(.8%)[10]	0(0.0%)	1(.2%)
Savoonga	Diomede	1(.4%)[10]	0(0.0%)	0(0.0%)	1(.2%)
camp[2]	Savoonga	1(.4%)	0(0.0%)	0(0.0%)	1(.2%)
Gambell	unknown	0(0.0%)	0(0.0%)	1(2.9%)	1(.2%)
outside	Teller	1(.4%)[10]	0(0.0%)	0(0.0%)	1(.2%)

TABLE 13: -- CONTINUED

1 Because of the small number of individuals over the age of 75, the cohorts 51-75 and 76-100 were combined.
2 [illegible]e Boxer Bay and Southwest Cape.
3 This category includes one adopted-in male and two adopted-in females.
4 One of these cases was an adopted-in male.
5 Inmarried female.
6 Adopted-in female.
7 One of these cases was an adopted-in female.
8 The father of these offspring was an adopted-in Tlingit.
9 Son of an inmarried female.
10 Adopted-in male.
11 Inmarried male.

fathers (1.4 percent). In two cases both parents were from Savoonga and had relocated in Gambell. Since paternal kinship bonds at St. Lawrence Island were still more important than those derived through mothers in 1980, it is not unexpeced to find that fewer males than females have immigrated. Some of the males who immigrated were from the mainland and were involved in temporary bride-service on the Island in 1980.

The phenomenon of fathers born outside of Alaska was recent occurring only in the younger cohorts and had potential implications for hunting since hunting groups were composed of related males. However, all of the "outside" fathers were individuals who never became part of the community and only contributed gene flow to its population. Offspring from these liaisons were usually retained in the household of the mother's parents and either formally or informally adopted by the mothers' fathers, thereby providing the necessary paternal link for participation in crew hunting activities. In three cases individuals with "outside" fathers and unknown mothers had been adopted

into the community from the mainland when they were children.

Table 14 presents place of birth by sex and 25-year cohorts for Savoonga in 1980. Unfortunately there are no earlier data to use for purposes of comparison, but it is likely that the incidence of births off the Island would have been similar to that of Gambell in 1955 due to the Island's isolation. The birthplaces of Savoonga's population were patterned differently than those of Gambell, primarily because Savoonga was a new settlement formed in 1916. Therefore no member of the oldest cohort could have been born in Savoonga. The oldest cohorts had originated in Gambell, other sites on the Island, and Siberia, although none of the people born in Siberia survived to 1980. In the other three cohorts, 272 (60.7 percent) were born in Savoonga. As in the Gambell case, the large number of Nome births and the few Kotzebue and Anchorage births resulted from newly established medical practices which encourage hospital births. Disregarding individuals from the oldest two cohorts because these were primarily original settlers of Savoonga, their spouses and some offspring, Savoonga residents recruited very few members from Gambell. Recruitment patterns from the mainland in the younger two cohorts paralleled those of Gambell -- that is, the community was basically endogamous over the last five decades. The oldest male born outside of Alaska was an Eskimo who had been adopted by a Savoonga household as a child. There were two non-Native males and three non-Eskimo females (one Samoan, one Tlingit, and one Caucasian) who had married into the community; of these spouses, one of the males and all of the females were residing in Savoonga on a regular basis in 1980.

Table 15 presents parental birthplaces by 25-year cohorts

TABLE 14: PLACE OF BIRTH BY 25-YEAR COHORTS AND SEX, SAVOONGA -- 1980 (n=448)

Place Of Birth	Age Cohorts							
	76-100		51-75		26-50		0-25	
	Sex							
	M	F	M	F	M	F	M	F
Savoonga	0	0	13	10	74	50	68	57
Gambell	4	1	1	3	1	1	0	3
St. Lawrence Island camps[1]	0	0	3	4	1	0	0	0
Diomede	0	0	0	0	0	1	0	0
Wales	0	0	0	0	0	0	0	1
Seward Peninsula and Norton Sound[2]	0	0	2	0	2	1	0	0
Bethel	0	0	0	0	0	1	0	0
Nome	0	0	0	0	2	2	54	58
Kotzebue	0	0	0	0	0	0	8	3
Anchorage	0	0	0	0	0	0	5	5
Southeastern Ak.[3]	0	0	0	1	0	0	0	0
Outside Alaska	0	0	1	0	2	2	1	0
Unknown	0	0	0	0	1	0	0	1
Total	4	1	20	18	83	58	136	128

1 Camps in this category include Boxer Bay, Camp Evwuk, Camp Collier, Southwest Cape, Ayevitak, and unknown camp.

2 Communities in this category include Teller, White Mountain, Koyuk, and the Nuluk River area.

3 This individual was born in Yakutat.

TABLE 15: PARENTAL BIRTHPLACES BY 25-YEAR COHORTS, SAVOONGA -- 1980[1]
(n=448)

Place of Birth		Number (Percentage of Cohort)			
Father	Mother	Cohort 0-25	Cohort 26-50	Cohort 51-82	Total Number and Percentage
Savoonga	Savoonga	156(59.1%)	15(10.6%)	1(2.3%)	172(38.4%)
Gambell	Gambell	6(2.3%)	27(19.1%)	20(46.5%)	53(11.8%)
unknown	Savoonga	25(9.5%)	9(6.4%)	0(0.0%)	34(7.6%)
Gambell	Savoonga	8(3.0%)	16(11.3%)	1(2.3%)	25(5.6%)
camp[2]	Savoonga	4(1.5%)	11(7.8%)	0(0.0%)	15(3.3%)
outside	Savoonga	14(5.3%)[3]	1(.7%)	0(0.0%)	15(3.3%)
Savoonga	camp[2]	8(3.0%)	6(4.3%)	0(0.0%)	14(3.1%)
Savoonga	Gambell	6(2.3%)	4(2.8%)	1(2.3%)	11(2.5%)
camp[2]	Gambell	0(0.0%)	7(5.0%)	3(7.0%)	10(2.2%)
camp[2]	camp[2]	2(.8%)	6(4.3%)	0(0.0%)	8(1.8%)
unknown	unknown	1(.4%)[4]	1(.7%)	6(14.0%)[4]	8(1.8%)
Gambell	camp[2]	1(.4%)	5(3.5%)	1(2.3%)	7(1.6%)
unknown	Gambell	1(.4%)	6(4.3%)	0(0.0%)	7(1.6%)
White Mountain	Savoonga	7(2.7%)	0(0.0%)	0(0.0%)	7(1.6%)

TABLE 15: -- CONTINUED

Place of Birth		Number (Percentage of Cohort)			
Father	Mother	Cohort 0-25	Cohort 26-50	Cohort 51-82	Total Number and Percentage
Gambell	unknown	0(0.0%)	3(2.1%)	2(4.7%)	5(1.1%)
Savoonga	Nome	5(1.9%)	0(0.0%)	0(0.0%)	5(1.1%)
outside	outside	1(.4%)	4(2.8%)[8] [9]	0(0.0%)	5(1.1%)
Siberia	Gambell	0(0.0%)	2(1.4%)	3(7.0%)	5(1.1%)
Siberia	camp[2]	0(0.0%)	5(3.5%)	0(0.0%)	5(1.1%)
Gambell	Siberia	0(0.0%)	3(2.1%)	2(4.7%)	5(1.1%)
Nome[7]	Gambell	3(1.1%)	0(0.0%)	0(0.0%)	3(.7%)
Savoonga	outside	3(1.1%)	0(0.0%)	0(0.0%)	3(.7%)
camp[2]	unknown	0(0.0%)	2(1.4%)	1(2.3%)	3(.7%)
Savoonga	other locations in Alaska[6]	3(1.1%)	0(0.0%)	0(0.0%)	3(.7%)
Siberia	Siberia	0(0.0%)	1(.7%)	1(2.3%)	2(.4%)
Brevig Mission	Nome	2(.8%)[5]	0(0.0%)	0(0.0%)	2(.4%)
Savoonga	Diomede	2(.8%)	0(0.0%)	0(0.0%)	2(.4%)

TABLE 15: -- CONTINUED

Place of Birth		Number (Percentage of Cohort)			
		Cohort	Cohort	Cohort	Total Number
Father	Mother	0-25	26-50	51-82	and Percentage
unknown	Nome	2(.8%)	0(0.0%)	0(0.0%)	2(.4%)
Siberia	Gambell	0(0.0%)	1(.7%)	0(0.0%)	1(.2%)
unknown	Wales	1(.4%)[9]	0(0.0%)	0(0.0%)	1(.2%)
Savoonga	unknown	0(0.0%)	0(0.0%)	1(2.3%)	1(.2%)
St. Michael	Gambell	1(.4%)	0(0.0%)	0(0.0%)	1(.2%)
outside	Wales	0(0.0%)	1(.7%)[9]	0(0.0%)	1(.2%)
Bluff	Safety	0(0.0%)	1(.7%)[9]	0(0.0%)	1(.2%)
Nome	Wales	0(0.0%)	1(.7%)[4]	0(0.0%)	1(.2%)
unknown	camp[2]	0(0.0%)	1(.7%)	0(0.0%)	1(.2%)
Savoonga	Teller	1(.4%)	0(0.0%)	0(0.0%)	1(.2%)
Diomede	Diomede	0(0.0%)	1(.7%)[9]	0(0.0%)	1(.2%)
outside	Nome	1(.4%)[9]	0(0.0%)	0(0.0%)	1(.2%)
White Mountain	White Mountain	0(0.0%)	1(.7%)[4]	0(0.0%)	1(.2%)

TABLE 15: -- CONTINUED

1 Because of the small number of individuals over the age of 75, the cohorts 51-75 and 76-100 were combined.

[illegible]ide Boxer Bay, Camp Collier, Evwuk, Southeast Cape, Southwest Cape, southside camp, and non-specific camps. For the parents of the oldest cohorts, some of these camps were actually settlements during their lifetimes.

3 In 5 cases the fathers were non-Natives who had never resided with the Savoonga population.

4 These were adopted-in males; in the case of the 51-82 cohort, only one of these individuals was adopted in.

5 These were the children of an inmarried female by a former marriage.

6 This was a St. Lawrence Island woman born in Bethel.

7 In one case, the male was a St. Lawrence Island person only born in the Nome hospital.

8 Both cases were inmarried males.

9 Inmarried females; in the case of females with both parents from outside, 2 of the 4 cases were inmarried females.

for Savoonga in 1980. The short history of the community and earlier isolation of the Island were demonstrated in the birthplaces of parents of the oldest cohort. These parents were solely from St. Lawrence Island or the Siberian mainland. In the youngest cohort, there was a larger percentage (59.1 percent) of people with both parents born in Savoonga than there were Gambell residents with both parents born in Gambell (49.0 percent). In addition, in the youngest Savoonga cohort, there were 184 (69.7 percent) of the residents in that cohort who had Savoonga fathers and 214 (81.1 percent) individuals who had Savoonga mothers, suggesting a higher incidence of male recruitment (or fathering by males from off the Island) than female recruitment (or adoption of children from non-St. Lawrence Island mothers). Although some of these males were doing bride-service for prospective or actual fathers-in-laws, the population was left with the problem of integrating males for purposes of group hunting who lacked direct

paternal links to the population. Some of the Nome cases were the offspring of relocated St. Lawrence Island families and, hence, had paternal kinship connections with uncles, nephews, cousins, or grandfathers who were still residing on the Island.

Mate Selection

Traditionally marriage on St. Lawrence Island was characterized by arrangement of the marriage between fathers, sometimes when prospective spouses were infants; bride-service (one year or more) and bride-price; patriclan exogamy and endogamy; infrequent polygyny when there were adequate available females in appropriate cohorts; the practice of the levirate; informal divorce; and patrilocal postmarital residence subsequent to bride-service (Hughes 1960; Moore 1923; and Geist and Rainey 1936). Prior to contact, there was an unknown number of patriclans named after locations of residence of clan heads. In more recent years the offspring of clan exogamous unions belonged to the clan of their fathers. It is possible that clan endogamy may have been the rule prior to the major population decimation in 1878 to 1880, but there are no data to substantiate speculation on patterns prior to that decline. In 1912 Moore recorded that marriage potentially occurred shortly after puberty and that there was only one unmarried female over the age of 30 in that year (Moore 1923: 367). He also noted two cases of polygyny and an apparent shortage of marriage-aged females at that time. He recorded that the institution of the levirate, bride-service, and arranged marriage were functioning in 1912.

By 1955 there were only three major clans and six minor clans

remaining in Gambell, and marriages occurred within and between clan members (Hughes 1960). There were a few women (6^{+}_{-} in 1955) who had married non-Natives and emigrated from the Island (Hughes 1960: 283). The remainder of marriages were mostly Island and community endogamous because of political barriers to Siberian recruitment and geographic and cultural barriers to Alaska mainland recruitment. Community endogamy may have been connected to clan membership. A few spouses and infants had been brought into the community from the mainland by this time. Bride-service was fully functional and usually involved participation of the prospective husband in the boat crew to which his father-in-law was associated (Hughes 1960: 279). Arranged marriages had become infrequent by 1955 and there were no documented cases of polygyny. Wife-exchange was one of several mechanisms (such as naming and adoption) employed to establish kinship bonds between members of different patriclans (Hughes 1960: 267). Being married, having children, and residing with patrilineally-related kinsmen were the norms in Gambell in 1955 as was demonstrated in Table 8.

It was not possible to determine age at marriage from the 1955 data (Hughes 1954-1955). However, Table 16 depicts the place of birth of spouses in Gambell in 1955. There were 51 marriages in which both spouses had survived and were residing in Gambell in 1955. Of these 51 marriages, the majority (34 or 66.7 percent) were village endogamous and 42 (82.4 percent) were Island endogamous (including spouses from Savoonga or other Island sites). Two husbands were from Siberia but one had relocated in Gambell with his Siberian wife. The other married a St. Lawrence Island woman who had been born at Southwest Cape but resided in Gambell. The only Eskimo spouses not from

TABLE 16: PLACE OF BIRTH OF SPOUSES, GAMBELL -- 1955
(n^1=51)

Place of Birth		Number of
Husband	Wife	Marriages (Percentage)
Gambell	Gambell	34 (66.7%)
Gambell	Savoonga	5 (9.8%)
Gambell	Nome	2 (3.9%)
Gambell	St. Lawrence Island camps[2]	2 (3.9%)
Gambell	Siberia	2 (3.9%)
Gambell	Diomede	2 (3.9%)
Siberia	Siberia	1 (2.0%)
Siberia	St. Lawrence Island camps[2]	1 (2.0%)
St. Lawrence Island camps[2]	Gambell	1 (2.0%)
St. Lawrence Island camps[2]	Siberia	1 (2.0%)

[1] Adapted from Hughes 1954-55. The total number of marriages in 1955 in which both spouses were still alive and residing together equals n; percentages are calculated on the basis of n.

[2] Camps included Boxer Bay and Southwest Cape, both of which were used by Gambell people after centralized residence in the village of Gambell had occurred.

St. Lawrence Island included two inmarried females from Nome and one from Diomede. The Diomede case resulted from the federally sponsored relocation experiment mentioned previously. Of all husbands, 49 (96.1 percent) were born in Gambell or camps used by Gambell residents. In 1955 marriage patterns were strongly community endogamous. Because of the primary emphasis placed on paternally-derived lines of kinship, particularly as they related to crew hunting and distribution, the recruitment of males from outside the community was negligible. There are no comparable data for Savoonga for an earlier period of time.

Field data for 1980 are useful in assessing the degree to which Gambell marriage patterns have changed or remained stable since 1955. Arranged marriage was no longer overtly practiced, although parental preferences or disapprovals were transmitted to young unmarried adults. Although data were not specific, it was suspected that many seemingly arbitrary parental preferences and disapprovals regarding mate selection were actually grounded in covert traditional norms and values, many of which focused on the perpetuation of viable hunting associations through paternally-linked kinsmen. Polygyny, wife-exchange, and the levirate were no longer practiced. Formal Christian and legal guidelines for marriage and divorce were encouraged mostly from authorities external to the community social network. Nonetheless, other characteristics of St. Lawrence Island marriage patterns had persisted through time, such as patrilocal residence and bride-service.

Table 17 presents the marital status of the population by 10-year cohorts and sex for Gambell in 1980. These data indicate that there was a larger percentage of unmarried males in 1980 than in 1955. In 1955 only 16.4 percent of Gambell males above the age of 25 were

TABLE 17: MARITAL STATUS OF THE POPULATION BY 10-YEAR COHORTS AND SEX, GAMBELL -- 1980[1]
(n=419)

Age Cohorts		Male				Female			
		Single	Married	Widowed	Separated or Divorced	Single	Married	Widowed	Separated or Divorced
81-90	No.	0	0	0	0	0	0	0	0
	%	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
71-80	No.	0	1	1	0	0	1	4	0
	%	0.0	50.0	50.0	0.0	0.0	20.0	80.0	0.0
61-70	No.	0	5	3	0	0	3	3	0
	%	0.0	62.5	37.5	0.0	0.0	50.0	50.0	0.0
51-60	No.	2	11	0	0	0	7	3	0
	%	15.4	84.6	0.0	0.0	0.0	70.0	30.0	0.0
41-50	No.	8	16	0	1	1	12	0	0
	%	32.0	64.0	0.0	4.0	7.7	92.3	0.0	0.0
31-40	No.	12	15	1	0	5	16	0	0
	%	42.9	53.6	3.6	0.0	23.8	76.2	0.0	0.0
21-30	No.	37	12	0	1	10	21	1	0
	%	74.0	24.0	0.0	2.0	31.3	65.6	3.1	0.0
11-20	No.	67	0	0	0	44	1	0	0
	%	100.0	0.0	0.0	0.0	97.8	2.2	0.0	0.0
0-10	No.	49	0	0	0	42	0	0	0
	%	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Column Total	No.	175	60	7	2	102	61	11	0
	%	71.7	24.6	2.9	0.8	58.6	35.1	6.3	0.0

[1] "Widowed" and "divorced" categories do not include remarried individuals. Totals do not equal the entire population, since cases with unknown marital status are not included.

unmarried. In contrast, in 1980 38.8 percent of the males above the age of 25 were unmarried. Although the higher ratio of males to females in Gambell in part accounted for the unmarried male population, there were approximately 11 unmarried females above the age of 21 in 1980. The average age of marriage for Gambell females in 1980 was 20.54 and the average of males was 25.27 (see Table 18). The large percentage of unmarried males has implications for the household as an economic unit and the division of labor in the overall community. Male hunters without wives had to depend on mothers and sisters for female support services normally provided by wives. For example, the majority of whaling and walrus captains were married in 1980. The percentage of widowed males and females in 1980 was similar to that of 1955. It is of interest to note that in 1980 there were only 9 more marriages than in 1955 despite a population increase of 83 persons.

Table 19 presents places of birth of spouses in Gambell in 1980. Of 60 marriages, 34 (56.7 percent) were community endogamous. If women born in camps and the one Gambell woman born in a Nome hospital are included in that total, the percentage of community endogamous marriages increases to 63.3 percent. If the Gambell man born in a Nome hospital and Gambell men born in camps are included, 57 or 95 percent of all male spouses were from Gambell in 1980. In contrast, 40 (66.7 percent) of the female spouses were Gambell women. Recruitment of females was highest from Savoonga (16.7 percent), although women were also recruited from Siberia, from mainland villages of Seward Peninsula and Norton Sound, and from elsewhere in Alaska. There were no female spouses from outside the State (i.e non-Native women) in Gambell in 1980. The high rate of Gambell male spouses in 1980

TABLE 18: AGE OF MARRIAGE OF 10-YEAR COHORTS BY SEX, GAMBELL -- 1980[1]

Age Cohorts	Male			Female		
	No. of Cases	Mean	Std. Dev.	No. of Cases	Mean	Std. Dev.
81-90	0	0.00	0.00	0	0.00	0.00
71-80	1	17.00	0.00	1	21.00	0.00
61-70	5	28.80	9.47	3	24.33	8.08
51-60	11	25.82	5.13	7	23.00	3.27
41-50	16	25.13	4.88	12	20.08	5.20
31-40	15	26.27	4.62	16	20.38	4.27
21-30	12	22.92	1.83	21	19.62	1.91
11-20	0	0.00	0.00	1	19.00	0.00
Total Population	60	25.27	5.10	61	20.54	3.97

[1] These data include all living members of the population for whom date of marriage was known. Dates of marriage for widowed, divorced, or separated individuals were incomplete.

TABLE 19: PLACE OF BIRTH OF SPOUSES, GAMBELL -- 1980
(n^1=60)

Place of Birth		Number of
Husband	Wife	Marriages (Percentage)
Gambell	Gambell	34 (56.7%)
Gambell	Savoonga	9 (15.0%)
Gambell	Nome[2]	4 (6.7%)
Gambell	St. Lawrence Island camps[3]	3 (5.0%)
Gambell	other locations in Alaska[4]	2 (3.3%)
Gambell	Siberia	1 (1.7%)
Gambell	King Island	1 (1.7%)
Gambell	Seward Peninsula/Norton Sound[5]	1 (1.7%)
St. Lawrence Island camps	Gambell	1 (1.7%)
Nome[6]	Gambell	1 (1.7%)
Nome	Savoonga	1 (1.7%)
Nome	Seward Peninsula/Norton Sound	1 (1.7%)
Seward Peninsula/Norton Sound	Gambell	1 (1.7%)

TABLE 19: -- CONTINUED

[1] The total number of marriages in 1980 in which both spouses were still alive and residing together equals n; percentages are calculated on the basis of n.
[2] One of the four Nome-born women was a Gambell resident who was born in the Nome hospital.
[3] Camps included Southwest Cape and Northeast Cape.
[4] Other locations in Alaska included Seward and Yakutat.
[5] This category included Golvin, Shaktoolik, and Unalakleet.
[6] This male was a Gambell resident born in the Nome hospital.

reflected the continued importance of patrilocal residence and the need for a core of related males to hunt together. Conversely, these data suggest that the mechanisms for integrating non-related adult males were basically absent in Gambell society in 1980. Interestingly, of the three non-Gambell spouses, two had been adopted into the community as children and were considered related to other Gambell males. The other inmarried male was doing bride-service in the community. Hence, 100 percent of the male spouses in 1980 were consistent with long-term St. Lawrence Island marriage practices and reflected the importance of intracommunity male alliances associated with crew hunting.

Unfortunately there are no earlier data specifically on Savoonga mate selection. The general patterns of marriage described for Gambell in 1912 and 1955 were applicable to Savoonga because of its origins as a community from Gambell, other St. Lawrence Island, and Siberian populations. The cultural similarities between these populations have been well documented. The problem at Savoonga was the integration of these marriage patterns within a basically segmented population. This may in part explain why it took over 50 years for Savoonga whaling crews to become operative (see Chapter V).

Table 20 presents the marital status of Savoonga's population by 10-year cohorts and sex in 1980. Population data indicate that 35.0 percent of Savoonga males 25 years and older were unmarried in 1980 excluding widowers. This percentage is comparable to but slightly lower than that of Gambell (38.8 percent). The average age of marriage of males in Savoonga in 1980 was 25.64 years of age (Table 21). By way of contrast, excluding women who were widowed, 57.2 percent of women 21 years or older were unmarried in 1980 suggesting that there were locally available spouses. The average age of marriage of Savoonga women in 1980 was 22.04 years of age (Table 21). It is possible that clan affiliations in part influenced mate selection within the village.

In the case of both Gambell and Savoonga, the mean age of males at marriage has generally decreased approximately two years from older to younger cohorts and the age of males at marriage has remained older than the age of females ranging from approximately three to five years through time. These data do not conform to Moore's 1912 observation that marriage transpired shortly after puberty (Moore 1923). In the case of females, the sample size from the oldest cohorts is too small to address mean ages at marriage with much assurance. In the case of males, it is unlikely that they married as young as Moore (1923) suggested since they were expected to be able hunters prior to the onset of a marital relationship.

The younger age of marriage contemporarily could be differentially interpreted. It is possible that more recently introduced values related to marriage and formal religious sanctions on cohabitation outside of marriage may be encouraging young people to marry regardless of the level of hunting skill achieved by the male at time

TABLE 20: MARITAL STATUS OF THE POPULATION BY 10-YEAR COHORTS AND SEX, SAVOONGA -- 1980[1]
(n=448)

Age Cohorts		Male				Female			
		Single	Married	Widowed	Separated or Divorced	Single	Married	Widowed	Separated or Divorced
81-90	No.	0	1	1	0	0	0	0	0
	%	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0
71-80	No.	0	1	1	0	0	3	1	0
	%	0.0	50.0	50.0	0.0	0.0	75.0	25.0	0.0
61-70	No.	0	5	1	0	0	4	3	0
	%	0.0	83.3	16.7	0.0	0.0	57.1	42.9	0.0
51-60	No.	5	8	0	1	0	7	1	0
	%	35.7	57.1	0.0	7.1	0.0	87.5	12.5	0.0
41-50	No.	9	23	1	2	1	19	2	0
	%	25.7	65.7	2.9	5.8	4.5	86.4	9.1	0.0
31-40	No.	11	17	0	0	3	17	1	0
	%	39.3	60.7	0.0	0.0	14.3	81.0	4.8	0.0
21-30	No.	34	12	0	2	20	16	0	2
	%	70.8	25.0	0.0	4.2	52.6	42.1	0.0	5.2
11-20	No.	63	0	0	0	48	2	0	0
	%	100.0	0.0	0.0	0.0	96.0	4.0	0.0	0.0
0-10	No.	45	0	0	0	55	0	0	0
	%	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Column Total	No.	167	67	4	5	127	68	8	2
	%	68.7	27.6	1.6	2.0	62.0	33.2	3.9	1.0

[1] "Widowed" and "divorced" categories do not include remarried individuals. Totals do not equal the entire population, since cases with unknown marital status are not included.

TABLE 21: AGE OF MARRIAGE OF 10-YEAR COHORTS BY SEX, SAVOONGA -- 1980[1]

Age Cohorts	Male			Female		
	No. of Cases	Mean	Std. Dev.	No. of Cases	Mean	Std. Dev.
81-90	1	32.00	0.00	0	0.00	0.00
71-80	1	24.00	0.00	3	23.00	5.00
61-70	5	24.80	6.14	4	23.75	7.27
51-60	8	25.50	4.07	7	21.86	4.60
41-50	23	25.52	6.69	19	22.89	7.64
31-40	17	27.06	4.42	17	21.59	4.50
21-30	12	23.92	2.64	16	21.69	2.87
11-20	0	0.00	0.00	2	16.50	0.71
Total Population	67	25.64	5.16	68	22.04	5.37

[1] These data include all living members of the population for whom date of marriage was known. Dates of marriage for widowed, divorced, or separated individuals were incomplete.

of marriage. It is also possible that males are learning about hunting earlier in more recent years because of modern technology that provides greater rapid mobility to the entire family, thereby allowing a higher level of participation in resource harvest activities at younger ages. Nelson found this to be true in Wainwright over the last two decades (Richard Nelson, personal communication, 1983). Additionally, young males may have access to the cash resources necessary for participation in hunting at an earlier age than was possible prior to the use of commercial items of hunting technology (this is discussed in greater detail in Chapter V). The trend towards a decreasing age of marriage may not be significant at all or may be related to a decline in the practice of bride-service. Lastly, the high incidence of unmarried males and lesser, although significant, incidence of unmarried females suggest a reluctance to marry that may relate to economic demands associated with supporting separate nuclear family households at a relatively young age. In previous decades a newly married couple would have initially resided with the bride's parents during the year or more of bride-service and then resided with the husband's parents or an older brother until the couple had the resources necessary for establishing a separate household. The externally-promoted bias towards nuclear family units associated with new housing projects, as discussed above, may be a factor, then, in discouraging marriage. The explanation for the relatively recent phenomena of unmarried young adults is undoubtedly very complex and only a few factors related to this explanation have been presented in this context.

Table 22 presents places of birth of spouses in Savoonga in 1980. Of 67 marriages, 38 (56.7 percent) were village endogamous.

TABLE 22: PLACE OF BIRTH OF SPOUSES, SAVOONGA -- 1980
(n^1=67)

Place of Birth		Number of
Husband	Wife	Marriages (Percentage)
Savoonga	Savoonga	38 (56.7%)
outside of Alaska[2]	Savoonga	3 (4.5%)
Savoonga	Gambell[3]	3 (4.5%)
Seward Peninsula/Norton Sound[4]	Savoonga	3 (4.5%)
Savoonga	Nome	2 (3.0%)
Savoonga	other locations in Alaska[5]	2 (3.0%)
Savoonga	outside of Alaska	2 (3.0%)
Gambell	Savoonga	2 (3.0%)
St. Lawrence Island camps[7]	St. Lawrence Island camps[7]	2 (3.0%)
Nome[8]	Savoonga	2 (3.0%)
Savoonga	St. Lawrence Island camps[7]	1 (1.5%)
Savoonga	Diomede	1 (1.5%)
Savoonga	Wales	1 (1.5%)
Savoonga	Seward Peninsula/Norton Sound	1 (1.5%)
Gambell[6]	Gambell[6]	1 (1.5%)
Gambell[6]	other locations in Alaska	1 (1.5%)
St. Lawrence Island camps[7]	Savoonga	1 (1.5%)
Nome[9]	Gambell	1 (1.5%)

TABLE 22: -- CONTINUED

[1] The total number of marriages in 1980 in which both spouses were still alive and residing together equals n; percentages are calculated of n.
[2] Of the three husbands, one was an Eskimo male born outside but adopted into a Savoonga household immediately following birth.
[3] One of the three wives had been adopted into a Savoonga household immediately following birth.
[4] The three husbands were adopted into Savoonga households from the Nuluk area (near Wales), Teller, and White Mountain immediately following birth.
[5] One of these wives was born in Bethel but adopted into a Savoonga household immediately subsequent to birth.
[6] All of these individuals were born before Savoonga was established as a community.
[7] St. Lawrence Island camps included Boxer Bay, Southwest Cape, Ayevitak, Camp Collier, and Camp Evwuk. The husbands and wives from camps who were married were born in different camps.
[8] One of these husbands was from Savoonga but born in the Nome hospital. The other was adopted into Savoonga as an infant.
[9] This individual was from Savoonga but was born in the Nome hospital.

If women and men born in the Nome hospital, in camps, or adopted into Savoonga households as children are included, 51 (76.1 percent) of the marriages were community endogamous. Of the 67 male spouses, 61 (91.0 percent) were born in Savoonga or camps used by Savoonga residents or had been adopted into Savoonga as children. Since Savoonga is a relatively new community composed of males from elsewhere on the Island and Siberia, it is useful to note that 65 (97.0 percent) of the male spouses were from St. Lawrence Island. Only 2 husbands were inmarried from off the Island and these were non-Native males. There were no cases of inmarried Eskimo males from off the Island. Two of the three Gambell-born males were original Savoonga settlers and the other was a paternal nephew of an original settler. Except for the two non-Native males, one of whom lives in Savoonga irregularly, there were no males residing in Savoonga who lacked close paternal kinship ties to other

Savoonga males. Therefore Savoonga mirrors Gambell in illustrating the importance of male kinship links. Interestingly, the non-Native male was a registered guide who employed his wife's kinsmen and took non-Natives hunting when walrus hunting by non-Natives was legal. As in the Gambell case, there were some female spouses recruited from Gambell, other Island locations, Seward Peninsula, other locations in Alaska, and outside Alaska. The integration of inmarried females was possible in Savoonga as it was in Gambell based on these data.

Reproduction, Mortality, and Migration

Data regarding reproduction, mortality, and migration on St. Lawrence Island prior to the 1950s are very incomplete. As previously discussed, archaeological, ethnohistoric, and early historic documentation indicate that the Island supported a substantial population prior to the 1878-1880 period and then declined drastically (see Table 5 and associated discussion). During the early historic period there was no documentation of St. Lawrence Islanders normally practicing infanticide and abortion, although information about such matters would not readily be available to an explorer or trader who spent a very short period of time visiting a community with whom he had difficulty communicating. Leighton and Hughes (1955) gathered informant data which indicated that suicide assisted by kinsmen (altruistic homicide) was an established practice on the Island and Siberian mainland adjacent to the Island. Such suicides were associated with old age (senilicide), physical and mental illness, or the sickness of a close kinsman, usually a male child. There was little or no documentation from the historic

period regarding other population dynamics, such as births, accidental or disease-related deaths, and morbidity apart from the previously discussed epidemics. Elliott (1886) and others noted the healthy appearance of the population in the 1800s prior to 1878. For reasons previously discussed in this chapter, the population reached a low of 261 in 1903 and has since been regenerating.

In 1940 Alexander Leighton conducted the first detailed anthropological research in Gambell including a census of Gambell's population. In 1954 to 1955 Charles Hughes (Hughes 1960) spent a year in Gambell assessing changes in the community and its population over the 15-year interval using Leighton's work as a baseline for purposes of comparison. Hughes' census was used for reconstructing the population status of the 1954 to 1955 period in this context.

Hughes (1960) made several observations of Gambell's populations dynamics and population status based on the 1940 to 1955 comparative data and on the results of monitoring the population from 1954 to 1955. Hughes (1960) noted that between 1940 and 1955 there had been a relative increase in the 4-15 year old cohorts which he attributed to an increased birthrate and decreased infant mortality (51). He estimated a crude birthrate of 40.4/1000 by treating 1940-1955 as a single unit and averaging the 1940 and 1954 populations (Hughes 1960: 52). Additionally, Hughes (1960) calculated the 1954-1955 age-specific fertility for women 20-29 as 357/1000, 30-39 as 428/1000, and 40-49 as 133/1000, which he noted was similar to the rates of other Alaska Natives and much higher than the rate of the United States in general (54). It should be emphasized that these calculations were based on a single year of observation. Hughes (1960) determined a crude

death rate of 31.3/1000 by treating 1940 to 1955 as a single unit and averaging the population totals of the two time periods (56). Infant mortality in the 15-year interval was assessed to be 169.4/1000 live births (Hughes 1960: 56). Table 23 presents Hughes' age-specific mortality rates for 1940-1955. Hughes' death data are important in this context, because their accuracy for this time period is unquestionably greater than that reconstructed for the same period from informant recall in 1980. Lastly, he noted that the adoption of orphans from the Siberian mainland had been a mechanism for increasing the population, whereas increasing contact with the Alaskan mainland (particularly that between young Gambell females and military males) may potentially decrease the Gambell population (Hughes 1960: 60-61).

TABLE 23: AGE-SPECIFIC MORTALITY RATES, GAMBELL -- 1940-1955[1]
(per 1,000)

Age Cohort	Rate	Age Cohort	Rate
1 or < 1	110.1	30-39	34.3
2-5	16.4	40-49	17.8
11-19	37.7	50-59	52.0
20-29	8.8	60-69	32.5
		70+	68.0

[1] Adapted from Hughes 1960: 58. Most of the deaths in the 11-19 cohort were related to tuberculosis.

Table 24 presents vital statistics for Gambell from 1940 to 1980. Birth and death data were based on informant recall and do not include statistics regarding relocated Gambell individuals who were not grandparents, parents, spouses, siblings, or offspring of the 1980 Gambell population. Field data indicate that there were very few individuals born in Gambell who were not represented in these data, although the offspring of relocated females born in Nome were absent from the birth data unless they had a sibling or one parent residing in Gambell.

In the case of all birth and death data presented in this chapter, totals are expected to be conservative based on the use of informant recall methodology. Although women were requested to provide data on all births, living and deceased, and all individuals were asked to provide data on living and deceased siblings, the confidence of the informant in the accuracy of such data for time periods which had occurred early in their lives appeared to be less than for time periods more recent in their memory. Additionally, birth data based on informant recall were probably more accurate than death data, since relating information about deaths was obviously difficult and painful for most informants regardless of the interval which had transpired since the death occurred. There may have been other social and cultural factors operative in the hesitancy and difficulty with which informants related information about deceased relatives. However, since information about deceased individuals was solicited from all relatives residing in the community, there were opportunities to cross-check incomplete data. In the case of older women, it is expected that information regarding miscarriages and stillbirths was also incomplete for some informants.

Based on these data the birthrate increased from 1940 to 1960,

TABLE 24: VITAL STATISTICS, GAMBELL -- 1940-1980[1]

	Total			Mean			Rate/1000	
	Births	Deaths	Population[2]	Births	Deaths	Population	Birth	Deaths
1980	5	1	419					
1979	9	4	(408.6)					
1978	12	3	(398.2)	9.6	2.6	398.2	24.1	6.5
1977	8	2	(387.8)					
1976	14	3	(377.4)					
1975	7	10	367					
1974	9	1	356					
1973	7	1	366	8.4	4.0	358.4	23.4	11.2
1972	9	3	354					
1971	10	5	349					
1970	5	3	365[3]					
1969	10	2	352[3]					
1968	12	2	(377.0)	9.8	1.6	378.3	25.9	4.2
1967	14	1	402					
1966	8	0	(395.7)					
1965	14	0	(389.4)					
1964	11	3	(383.1)					
1963	12	1	(376.8)	12.6	1.6	376.8	33.4	4.2
1962	13	0	(370.6)					
1961	13	1	(364.3)					
1960	17	0	358					
1959	11	2	(353.5)					
1958	14	1	349	13.4	1.4	349.1	38.4	4.0
1957	11	3	(344.6)					
1956	14	1	(340.3)					

TABLE 24: -- CONTINUED

	Total			Mean			Rate/1000	
	Births	Deaths	Population[2]	Births	Deaths	Population	Births	Deaths
1955	13	6	336					
1954	14	2	300					
1953	9	1	310	11.4	2.4	313.0	36.4	7.7
1952	9	1	(309.6)					
1951	12	2	(309.3)					
1950	12	0	309					
1949	12	3	(307.4)					
1948	14	5	(305.8)	10.8	2.4	305.8	35.3	7.8
1947	6	2	(304.2)					
1946	10	2	(302.6)					
1945	8	0	(301.0)					
1944	11	3	(299.4)					
1943	6	0	(297.8)	6.2	0.8	297.8	20.8	2.7
1942	4	0	(296.2)					
1941	2	1	(294.6)					
1940	6	1	293					

1 The 1968 to 1974 death data were supplemented by Public Health Service records (U. S. Department of the Interior, Bureau of Indian Affairs 1977a: 31).

2 Data in parentheses are estimated population totals based on previous and subsequent population documentation.

3 U. S. Department of the Interior, Bureau of Indian Affairs 1977a: 187-188.

declined gradually from 1961 to 1975, and has slightly increased from 1976 to 1980. Since this is a relatively small population, the relocation of a couple of large families or the death of a few highly reproductive males or females could alter this rate over the short-term. However, it is expected that exposure to medical professionals in the 1960s and the introduction of birth control to the population contributed to the declining rate after 1960. In addition, there were a few female informants who reported having surgery related to reproductive tract disorders while hospitalized for tuberculosis in the 1950s which rendered them sterile during the latter years of their reproductive period. During the 1970s there was a relative reduction in the number of reproductive females in the population. This phenomena in part was a result of outmarriage and migration subsequent to temporary educationally-related relocation, since residence off the Island for formal education was not widespread until the late 1960s and early 1970s. Females who had spent time away from the Island were more likely to relocate than males, particularly if they married non-St. Lawrence Island males. As previously discussed, Gambell society had remained structured around a core of related males who were the primary producers through the cooperative hunting of large marine mammals, thereby providing little incentive or means for females to marry and integrate non-St. Lawrence Island spouses into Gambell society.

The 1940 to 1955 crude birthrate from these data was substantially less than that calculated from Hughes' (1960) data (31.04 compared to 40.4 respectively). Although this discrepancy cannot be explained in full because Hughes' raw data are not available, it is expected that 1980 informant recall of births in the 1940s was

incomplete and that the birth data in Table 24 for the 1940s was therefore low.

Table 25 presents age-specific fertility, mean number of children, and average age at first birth for females alive and residing in Gambell in 1980. These data indicate that there had been a reduction in the average age at first birth between the cohort 60+ and the cohort 40-59. Cohort 40-59 demonstrated a greater rate of fertility and larger mean number of children. These differences may in part reflect incomplete birth data for the oldest cohort. Although the 20-39 and a portion of the 40-59 year old cohorts could have produced offspring subsequent to 1980, these data indicate that the younger cohorts were ceasing reproduction at earlier ages than the oldest cohort, since members of neither cohort had produced offspring from 1976 to 1980. The 60+ cohort included 3 barren females, a seemingly high proportion of the total population of females older than 60 in comparison to those of the other study populations. The most productive 5-year period declined between the 60+ and 20-30 year old cohorts, from 30-34 for the 60+ cohort, to 25-29 for the 40-59 cohort, to 20-24 for the 20-39 cohort. This decline correlates with the decreased mean age of marriage depicted in Table 18.

Table 26 presents the average number of children and age at first birth of Gambell males in 1980. As in the case of females, data for three cohorts (60+, 40-59, and 20-39) were presented to highlight changes in male reproductive patterns through time.

For all cohorts, the mean number of children was calculated separately for all males in the cohort (n) and for all reproductively active males in the cohort. The number of non-reproductive males in

TABLE 25: AGE-SPECIFIC FERTILITY OF FEMALES, GAMBELL -- 1980

Age Class		Ages of Females in 1980 60+ (n=13)	40-59 (n=23)	20-39 (n=62)	15-19 (n=26)	Totals (n=124)
	n[1]	65	64	--	--	129
45-49	births	4	0	--	--	4
	rate[2]	61.54	0.00	--	--	31.01
	n	65	98	--	--	163
40-44	births	11	7	--	--	18
	rate	169.23	71.43	--	--	110.43
	n	65	115	35	--	215
35-39	births	13	21	0	--	34
	rate	200.00	182.61	0.00	--	158.14
	n	65	115	106	--	286
30-34	births	14	36	9	--	59
	rate	215.38	313.04	84.91	--	206.29
	n	65	115	162	--	342
25-29	births	8	39	29	--	76
	rate	123.08	339.13	179.01	--	222.22
	n	65	115	256	--	436
20-24	births	6	28	62	--	96
	rate	92.31	243.48	242.19	--	220.18
	n	65	115	310	80	570
15-19	births	0	10	25	1	36
	rate	0.00	86.96	80.65	12.50	63.16
	Total n	455	737	869	80	2141
	Total births	56	141	125	1	323
	Average rate	123.08	191.32	143.84	12.50	150.86
Average age at first birth		27.1	22.5	20.2	19.0	
Mean number of children		4.31	6.13	2.02	.04	

1 The n is equal to mother-years, which are the number of reproductively-aged females x the number of years each of these females has lived in each age class.

2 Age-specific birthrate.

TABLE 26: AVERAGE NUMBER OF CHILDREN AND AGE AT FIRST BIRTH OF MALES, GAMBELL -- 1980[1]

	Ages of Males in 1980		
Variable	60+ (n=13)	40-59 (n=38)	20-39 (n=81)
Mean number of children	3.31(4.30)[2]	4.00(5.63)[3]	.80(2.41)[4]
Mean age at first birth[5]	30.5	27.6	24.8

1 No males younger than 20 were included since there was no evidence of paternity prior to that age.

2 The mean number in parenthesis was calculated for 10 males, since 3.31 represents the mean for all males including the 3 who had never been reproductively active.

3 The mean number in parenthesis was calculated for 27 males, since 4.00 represents the mean for all males including the 11 who had not yet been reproductively active.

4 The mean number in parenthesis was calculated for 27 males, since the .80 represents the mean for all males including the 54 who had not yet been reproductively active.

5 The mean number of children for males who have produced offspring.

each cohort was described in the footnotes to Table 26. Of all males of the ages 40-59, which were well beyond the average age of marriage presented in Table 18, 11 (28.9 percent) had not married or produced offspring if married. All of the married males in this cohort who had never produced children had adopted children. Of the youngest cohort, 54 (66.7 percent) of the total members had not married or produced offspring in marriage. Many of these males were younger than the average age of marriage for their cohort in 1980, so could be expected to produce offspring in the future. However, as previously discussed, there was a shortage of females relative to the number of unmarried males in 1980, which may result in higher levels of wife recruitment and/or a decreased birthrate over the next decade.

The mean number of offspring for reproductive males and all males was higher in the 40-59 year old cohort than in the 60+. As in the case of females, birth data for older males may not be as complete as those for younger males. Additionally, undoubtedly a proportion of the unknown fathers presented in Table 13 were Gambell men who were not identified by female informants and therefore did not show up as such in Table 26. As in the case of females, the average age at first birth has declined between the 60+ and 40-59 year old cohorts. Although males in the 40-59 year old cohort may produce their first offspring subsequent to 1980, it is unlikely that many will do so, since the average age at marriage for this cohort was in the 20s in 1980.

Figure 12 presents seasonality of birth by 25-year cohorts for Gambell in 1980. For the oldest cohort (51+), births peaked in July and, secondarily, in September representing a high level of conception in October and December, months characterized by minimal

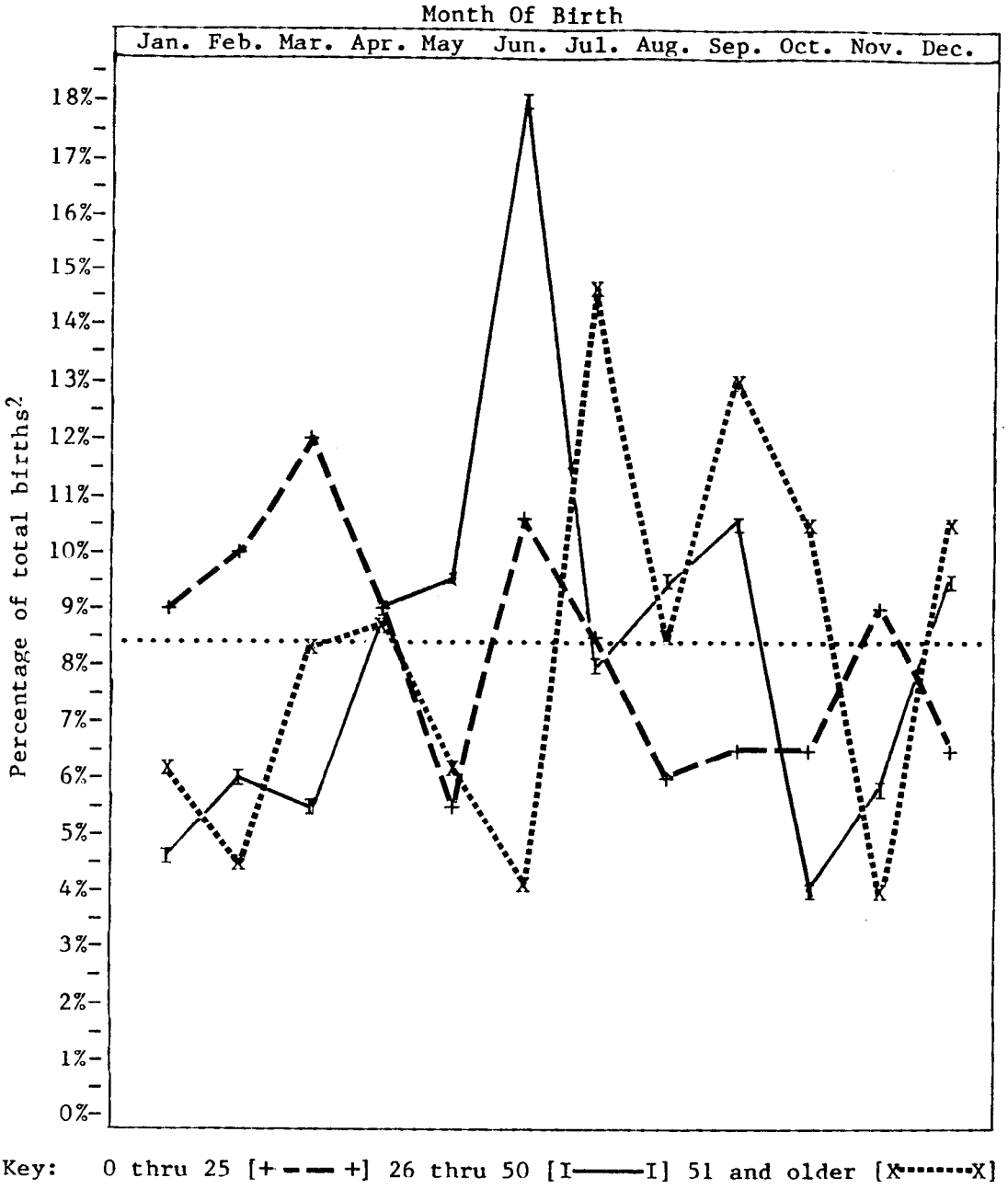


Figure 12: Seasonality of birth by 25-year cohorts, Gambell -- 1980.[1]

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1 Because of the small size of the population over 75 years of age, the oldest age category includes 11 individuals over 51.

2 The percentages are adjusted for differences in the number of days in each month. If births were equally distributed over the year, each month would contain 8.33 percent of the total births.

hunting activity. The low births for this cohort were primarily in February, June, and November, corresponding to low rates of conception in May, September, and February. As will be discussed in Chapter V, May and September were key spring and fall crew hunting months, whereas February was characterized by frequent individual hunting on ice by males.

The 26-50 year old cohort births were highest in June with a secondary peak in September, representing relatively high levels of conception in September and December respectively. These changes in birthing patterns from those of the oldest cohort could in part be explained by the decline in the importance of fall crew hunting in more recent years and the requisites of centralized village life and formal education, which mandated that families with their school-aged children return to the home village from summer camps in early September. The low births for this cohort included a three-month period from January to March, corresponding to a low incidence of conception during the months of April, May, and June -- key spring crew hunting months given the ice conditions over the last 70 years. October and November were also low birth months for this cohort, corresponding to low rates of conception in January and February. From the 1920s to the 1940s January and February were the months during which young to middle-aged males trapped foxes intensively.

The youngest cohort (0-25) differed most significantly from the previous two cohorts by demonstrating a more even distribution of births throughout the year. This pattern may reflect an even greater degree of centralization of the population during the last two decades and technological changes, such as high-powered outboard motors and

snowmachines, which permit producing males to conduct hunting activities from a central base. This more regular distribution of births throughout the year is more typical of patterns found, for example, among farming populations (Wright 1979: 72-80). For this cohort relatively higher birthing peaks occurred in March, reflecting a relatively greater incidence of conception in June. At Gambell contemporary spring crew hunting of walrus ends in June and many households prepare to depart for camps. Additionally, in recent years the mobility provided by modern technology permitted walrus hunting to take place from a central base, whereas whaling continued to require camp residence (see Chapter V). The relatively low incidence of births occurred between August and October, corresponding to fewer conceptions during the months of November, December, and January. As will be seen, this same phenomena appears in Savoonga data. There is no apparent ecologically-related explanation for low conception rates during these months.

Table 27 presents causes of death and number, range, and average age of death by sex and by decade for Gambell from 1871 to 1980. These data are exclusively based on informant recall and are subject to the qualifications mentioned previously in this chapter. In the 1971 to 1980 decade, there was only a single non-accidental death of an individual under the age of 20. This fact stands in stark contrast to Hughes' discussion of deaths from 1940 to 1955 (Table 23). During the entire decade there was only one known death from a hunting-related accident. A comparison of causes of death between the decades highlights the shift from epidemic diseases as the major cause of death during the 1800s to the mid-1900s to more contemporary diseases (e.g. cancer, heart disease), accidental deaths not related to hunting, and

TABLE 27: CAUSES OF DEATH AND NUMBER, RANGE,
AND AVERAGE AGE OF DEATH BY SEX, BY DECADE, GAMBELL -- 1871-1980[1]

	Number			Age Range[2]		Average Age[2]		Unknown Age	
Causes of Death	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
				1971-1980					
unknown[3]	4	9	0	46-76	61-92	66.5	74.8	0	2
airplane crash[4]	2	3	0	61-86	10-77	73.5	37.7	0	0
cancer	3	0	0	1-67	--	34.0	--	1	0
suicide	3	0	0	21-26	--	23.5	--	1	0
unknown illness	0	1	0	--	38	--	38.0	0	0
diabetes	1	0	0	77	--	77.0	--	0	0
heart disease	0	1	0	--	77	--	77.0	0	0
stroke	1	0	0	85	--	85.0	--	0	0
emphyzema	1	0	0	57	--	57.0	--	0	0
frozen/hypothermia	1	0	0	44	--	44.0	--	0	0
old age	0	1	0	--	89	--	89.0	0	0
Total 1971-1980	16	15	0	--	--	--	--	2	2

TABLE 27: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
1961-1970									
unknown	1	3	0	89	31-94	89.0	62.5	0	1
stroke	2	0	0	74-75	--	74.5	--	0	0
automobile accident	2	0	0	43-43	--	43.0	--	0	0
natural disaster	1	0	0	44	--	44.0	--	0	0
Total 1961-1970	6	3	0	--	--	--	--	0	1
1951-1960									
unknown	7	5	0	41-58	46-61	48.5	53.5	5	3
unknown illness	1	1	0	--	77	--	77.0	1	0
tuberculosis	1	1	0	--	6	--	6.0	1	0
measles	1	0	0	--	--	--	--	1	0
homicide	1	0	0	--	--	--	--	1	0
drowned	0	1	0	--	65	--	65.0	0	0
old age	0	1	0	--	--	--	--	0	1
Total 1951-1960	11	9	0	--	--	--	--	9	4

TABLE 27: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
				1871-1950[5]					
unknown	9	5	0	38-45	31	40.7	31.0	6	4
tuberculosis	2	5	0	10	5-31	10.0	17.8	1	0
influenza	1	0	0	40	--	40.0	--	0	0
stomach disorder	1	1	0	57	--	57.0	--	0	1
sudden infant death syndrome	0	1	0	--	1	--	1.0	0	0
paralysis	0	1	0	--	47	--	47.0	0	0
fall	1	0	0	40	--	40.0	--	0	0
unknown illness	0	1	0	--	--	--	--	0	1
Total 1871-1950	14	14	0	--	--	--	--	7	6

Total Reported Causes of Death, Dates of Death Known, Gambell, 1871-1980 = 88

Total Reported Deaths, Dates of Death Unknown, Gambell, 1871-1980 = 134

Total Reported Deaths, Gambell, 1871-1980 = 222

TABLE 27: -- CONTINUED

[1] Death data are based on informant recall, not on medical records or other documented sources. Similar causes have been grouped into categories. In most cases, data accuracy and completeness decline in relationship to the number of years which has transpired since their occurence. There are 138 individuals, closely related to the living Gambell population (either grandparents, parents, spouses, siblings, or offspring), who have died but dates of death are unknown. Causes of death for these individuals include, but are not limited to, tuberculosis, influenza, measles, stomach disorder, childbirth related, stroke, convulsions, arthritis, cancer, homicide, drowned, and miscarriage. There were 15 miscarriages, the largest category of death with unknown dates.

[2] Age range and average age are calculated only on cases of known sex.

[3] This category indicates that there is no information on cause of death.

[4] All but one case resulted from a 1975 crash of a relatively large commercial passenger aircraft on the Island.

[5] There were no informant reported deaths from 1891-1910. However, Jackson (1904) reported 1901, 1902, and 1903 deaths of 48, 9, and 25 respectively and 1899 and 1900 deaths of 13 and 44 respectively.

suicides. The deaths of females have increased relative to the deaths of males during the last decade in comparison to the previous three decades. Throughout the data period, females have been much less likely to die of accidental deaths related to the environment and have been less likely to commit suicide or to be victims of homicide. Given the amount of time males spend hunting in the open sea in boats or along ice leads, crossing the Island on land in inclement weather, or conducting other activities which require exposure to potentially life threatening environmental conditions, the relatively low number of accidental deaths is noteworthy.

To complete this discussion of Gambell's population dynamics, migration to and from the community must be considered. As previously noted, Hughes (1960) reported that the incidence of emigration from and immigration into the community was relatively minor in 1955.

Table 28 illustrates that only 31 individuals (9 percent) of Gambell's population had permanently emigrated in 1955, and minimally 9 of these were in Savoonga either as original settlers, their spouses, or as other inmarried spouses.

TABLE 28: EMIGRATION STATUS OF GAMBELL'S POPULATION -- 1955[1]

	Number	Percentage
Natives who reside in Gambell	282	81 %
Permanent emigrants	31	9 %
Emigrant but returned to Gambell	26	8 %
Temporarily absent from village (e.g. army, school)	8	2 %
Total	347	100 %

[1] Adapted from Hughes 1960: 71.

Burgess (1974) reported emigration data from 1958 to 1972, although he failed to balance it with immigration totals or with details regarding the destinaton of emigrants including the number who had gone to Savoonga. Additionally, Burgess' (1974) data reflected the period of time during which individuals and some households relocated to the Alaska mainland for formal educational and medical purposes, a trend which in part has ceased since a high school was constructed in Gambell in 1976. According to Burgess (1974), between the years 1958 and 1972, 157 individuals (25 families and 17 individuals) emigrated from the

community, although 42 (7 families and 11 individuals) returned (46). These data demonstrate the temporary nature of a large part of this emigration. However, since Burgess (1974) calculated an emigration rate of 8.3 individuals per year and an excess of 6 births over deaths per year, the population of Gambell would have declined by 2.3 individuals per year during this period (46). In fact, the population increased from 349 to 354 during this interval based on Burgess' data, so some component of his calculation must have been in error.

Table 29 presents the destinations and number of Gambell emigrants by sex and age in 1980. These data include all emigrated individuals who have a close relative (grandparent, parent, spouse, sibling, or offspring) residing in Gambell in 1980. Using Burgess' (1974: 46) net emigration of 115 in 1972, the 1980 data indicate that 23 additional individuals had left the community in that 8-year interval, for an annual emigration rate of 2.9 people per year -- a rate substantially less than that reported by Burgess for 1972.

As previously suggested, these data affirm that more females (61.6 percent) than males have emigrated from Gambell. Of the 138 emigrants, 14 (10.1 percent) remained on the Island. The largest number of males and second largest number of females relocated in Nome and tended to maintain close ties to the Island. They traveled frequently to Gambell for participation in resource harvests and resource distribution networks and shared a common subcommunity identity with other St. Lawrence Islanders within Nome's larger population. These individuals or families originally emigrated to Nome primarily for medical care and/or formal education. The relatively large number of Gambell females in Anchorage and some in Nome were mostly a reflection of

TABLE 29: DESTINATIONS AND NUMBER OF EMIGRANTS BY SEX AND AGE, GAMBELL -- 1980[1]
(n=138)

Destination	Males			Females		
	Total (Percentage)	Age Range	Mean Age	Total (Percentage)	Age Range	Mean Age
Savoonga	6(11.3%)	45-82	72.0	8(9.4%)	24-78	48.3
Diomede	0(0.0%)	--	--	3(3.5%)	33-50	41.0
Nome	24(45.3%)	8-89	37.0	17(20.0%)	18-80	47.9
Seward Peninsula/Norton Sound[2]	1(1.9%)	un	un	3(3.5%)	4-33	23.0
Anchorage	5(9.4%)	28-68	38.2	24(28.2%)	17-56	31.4
Fairbanks	0(0.0%)	--	--	2(2.4%)	25	25.0
elsewhere in Alaska[3]	2(3.8%)	30-33	31.5	2(2.4%)	27-59	43.0
outside of Alaska	3(5.7%)	29-43	37.3	5(5.9%)	20-40	30.0
unknown	12(22.6%)	5-84	31.3	21(24.7%)	23-79	34.0
Totals	53(38.4%)	--	--	85(61.6%)	--	--

TABLE 29: -- CONTINUED

un = unknown

[1] These data reflect only emigrants who are closely related (offspring, spouses, siblings, parents, or grandparents) to members of the study population who were alive and residing in Gambell in 1980. Based on field data, the majority of individuals born in Gambell who were residing in Nome in 1980 showed up in these emigration data because they had close relatives on the Island.
[2] Communities include Golovin, Shaktoolik, and Cape Nome.
[3] Communities include Kenai, Sitka, Wasilla, and Valdez.

outmarriage. Interestingly, the majority of Gambell males in Nome were single in 1980 unless they had emigrated as a family unit. Over the last decade, many unattached males moved back and forth between Nome and Gambell several times yearly.

There has been no previous detailed demographic analysis of Savoonga's population comparable to the research of Leighton (1940), Hughes (1954-55 and 1960), and Burgess (1974) at Gambell. The qualifications placed on the 1980 Gambell data related to informant recall methodology apply to the Savoonga data as well. Table 30 presents vital statistics for Savoonga from 1940 to 1980. As in the Gambell case, birth and death data were based on informant recall, although U. S. Public Health Service records of births and deaths were consulted to cross-check informant data for the 1968 to 1973 interval (U. S. Department of the Interior, Bureau of Indian Affairs 1977b: 187). As in the Gambell case, most Nome-based relocated Savoonga-born people had close relatives residing in Savoonga in 1980, so were therefore included in these data.

As was the case with the Gambell data, birth and particularly death information was probably conservative for the earlier years of

TABLE 30: VITAL STATISTICS, SAVOONGA -- 1940-1980

	Total			Mean			Rate/1000	
	Births[3]	Deaths[3]	Population[1]	Births	Deaths	Population	Births	Deaths
1980	8	3	448					
1979	5	1	(440.4)					
1978	9	0	(432.8)	9.2	2.8	432.8	21.3	6.5
1977	15	5	(425.2)					
1976	9	5	(417.6)					
1975	11	6	410					
1974	10	1	363					
1973	13	6	381	10.2	3.8	378.4	27.0	10.0
1972	7	2	369					
1971	10	4	369					
1970	13	3	364					
1969	6	3	328[2]					
1968	13	2	(362.5)	11.2	2.4	366.6	30.6	6.5
1967	14	2	397					
1966	10	2	(381.7)					
1965	18	1	(366.4)					
1964	10	0	(351.1)					
1963	13	1	(335.9)	13.2	1.2	335.9	39.3	3.6
1962	13	3	(320.6)					
1961	12	1	(305.3)					
1960	14	2	290					
1959	15	4	(283.3)					
1958	9	0	(276.7)	13.0	1.6	276.7	49.0	5.8
1957	19	0	(270.0)					
1956	8	2	(263.3)					

TABLE 30: -- CONTINUED

	Total			Mean			Rate/1000	
	Births[3]	Deaths[3]	Population[1]	Births	Deaths	Population	Births	Deaths
1955	13	3	(256.7)					
1954	5	1	250					
1953	13	1	240	9.8	1.2	247.1	39.7	4.9
1952	5	0	(243.0)					
1951	13	1	(246.0)					
1950	8	2	249					
1949	6	2	(245.0)					
1948	9	4	(241.0)	7.2	2.2	241.0	29.9	9.1
1947	6	3	(237.0)					
1946	7	0	(233.0)					
1945	8	0	(229.0)					
1944	11	3	(225.0)					
1943	5	0	(221.0)	6.4	0.6	221.0	29.0	2.7
1942	0	0	(217.0)					
1941	8	0	(213.0)					
1940	9	0	209					

1 Data in parentheses are estimated population totals based on previous and subsequent population documentation.

2 U. S. Department of the Interior, Bureau of Indian Affairs 1977b: 187.

3 The 1968 to 1973 birth and death data were supplemented by Public Health Service records (U. S. Department of the Interior, Bureau of Indian Affairs 1977b: 28).

the four decades, although some of the older informants were able to provide very thorough birth accounts. Based on these data the birthrate steadily increased from 1940 to 1960 and declined gradually until 1980. This pattern exhibited some parallels to that of Gambell. In both cases the 1940 to 1950 birthrate was relatively low, possibly reflecting both incomplete birth data and reproductive disruptions resulting from tuberculosis and hospitalization related to this disease. The decline after 1960 may have resulted from the introduction of medically-provided birth control and female outmarriage and emigration associated with mainland residence during formal education. In contrast to Gambell, the number of reproductively-aged females in Savoonga continued to increase throughout the 1970s.

The crude death rate did not exhibit trends during this 40-year period. It was highest during the period 1971 to 1975. As in the case of Gambell, it is expected that the death data were more incomplete than were the birth data.

Table 31 presents age-specific fertility, mean number of children, and average age at first birth for females residing in Savoonga in 1980. These data indicate that there has been a slight reduction in the average age at birth between the cohort 60+ and the cohort 40-59 years of age, although the reduction was not as great as that at Gambell. In fact, despite the lower age at first birth, the most productive age class for the 40-59 year old cohort was 5 years older than that of the 60+ cohort. In Savoonga the oldest cohort demonstrated births in all age classes and had the highest fertility rate of the Savoonga cohorts. Unlike Gambell, all but 1 of the 12 60+ year old females had produced offspring. Within the 40-59 year old cohort,

TABLE 31: AGE-SPECIFIC FERTILITY OF FEMALES, SAVOONGA -- 1980

Age Class		Ages of Females in 1980 60+ (n=12)	40-59 (n=32)	20-39 (n=62)	15-19 (n=25)	Totals (n=131)
	n[1]	60	66	--	--	126
45-49	births	2	0	--	--	2
	rate[2]	33.33	0.00	--	--	15.87
	n	60	135	--	--	195
40-44	births	5	4	--	--	9
	rate	83.33	29.63	--	--	46.15
	n	60	160	19	--	239
35-39	births	15	20	2	--	37
	rate	250.00	125.00	105.26	--	154.81
	n	60	160	79	--	299
30-34	births	11	38	7	--	56
	rate	183.33	237.50	88.61	--	187.29
	n	60	160	159	--	379
25-29	births	16	48	36	--	100
	rate	266.67	300.00	226.42	--	263.85
	n	60	160	271	--	491
20-24	births	18	44	46	--	108
	rate	300.00	275.00	169.74	--	219.96
	n	60	160	295	62	577
15-19	births	6	15	14	4	39
	rate	100.00	93.75	47.46	64.52	67.59
	Total n	420	1001	823	62	2306
	Total births	73	169	104	4	350
	Average rate	173.81	168.83	126.37	64.52	151.78
Average age at first birth		22.55	22.23	19.83	16.50	
Mean number of children		6.08	5.28	1.68	.08	

[1] The n is equal to mother-years, which are the number of reproductively-aged females x the number of years each of these females has lived in each age class.

[2] Age-specific birthrate.

no births were documented for the 45-49 age class and the 40-44 age class had the lowest rate of fertility. While the 20-39 year old cohort had a consistently lower fertility rate than the 40-59 year old cohort at all age classes, the distribution within the age classes was similar. This cohort was still reproductively active in 1980, so only trends have been observed to date.

Table 32 presents the average number of children and age at first birth of Gambell males in 1980. As in the case of females, data for three cohorts were presented to highlight changes in male reproductive patterns through time.

The mean number of children was calculated using both reproductively active and non-reproductive males, although all males in the 60+ cohort had been productive. The mean number of children for the 40-59 year old cohort was less than that for the 60+ cohort (mean 7.00) using calculations for all males (3.22 mean) and reproductive males only (5.21 mean), although males in the 40-59 year old cohort could have had children subsequent to 1980. Of all males in the 40-59 year old cohort, 38.2 percent had not married or produced children in marriage, although those who were married for more than a few years without producing offspring had adopted children. Of the youngest cohort, 56 (71.8 percent) of the males had not yet married or produced offspring in marriage (a greater percentage than at Gambell), although many of these males were still younger than the average age of marriage in 1980.

In contrast to Gambell the mean age at first birth for males was greatest in the youngest cohort and least in the oldest cohort. The scarcity of females in all cohorts may have influenced both the

TABLE 32: AVERAGE NUMBER OF CHILDREN AND AGE AT FIRST BIRTH OF MALES, SAVOONGA -- 1980

	Ages of Males in 1980[1]		
Variable	60+ (n=10)	40-59 (n=55)	20-39 (n=78)
Mean number of children	7.0	3.22(5.21)[2]	.68(2.41)[3]
Mean age at first birth[4]	22.70	25.41	26.50

1 Since there were only 4 males younger than 20 at time of paternity, a third cohort was not calculated. However the 3 19-year old and 1 18-year old male ages were calculated in the mean age at birth.

2 Mean number of children for the 34 men who had fathered offspring is noted in parentheses. The 3.22 is the mean number of children for all potential fathers including the 21 males who had no offspring.

3 Mean number of children for the 22 males who had fathered offspring is noted in parentheses. The .68 is the mean for all potential fathers including the 56 males who had no offspring.

4 This age was calculated for males who had reported offspring.

recent patterns of marrying females considerably younger than the males and marrying at an older age. Since the youngest cohort was most reproductively active in 1980, only trends could be noted. As in the Gambell case, some of the unknown fathers in Table 15 may have been Savoonga males who were not identified by female informants. Therefore birth data for these males were not recorded in Table 32.

Figure 13 presents seasonality of birth by 25-year cohorts for Savoonga in 1980. For the oldest cohort (51+), birth peaks occurred in June and November, corresponding to high conception rates in September and February. Since Savoonga males were herders and a school was established simultaneously with the settlement of the community, September would have been the month males would have returned with their school-aged sons to the community. The high conception in February is not readily explainable but may be associated with herding activities and was preceded by a month of an extremely low birthrate suggesting the absence of males from Savoonga. The other most significant low incidence of births for the oldest cohort occurred during the months of January through March, corresponding to infrequent conceptions in April through June. This can be explained by the absence of males from Savoonga for spring whaling with Gambell hunters and subsequent walrus hunting. The older cohort in general reflected the absence of males from the village for three-month intervals during reindeer herding activities.

The 26-50 year old cohort was not similar to the other two Savoonga cohorts or to any of the Gambell cohorts depicted in Figure 12. The highest birth peaks occurred in January and September, reflecting relatively greater incidence of conception in April and December.

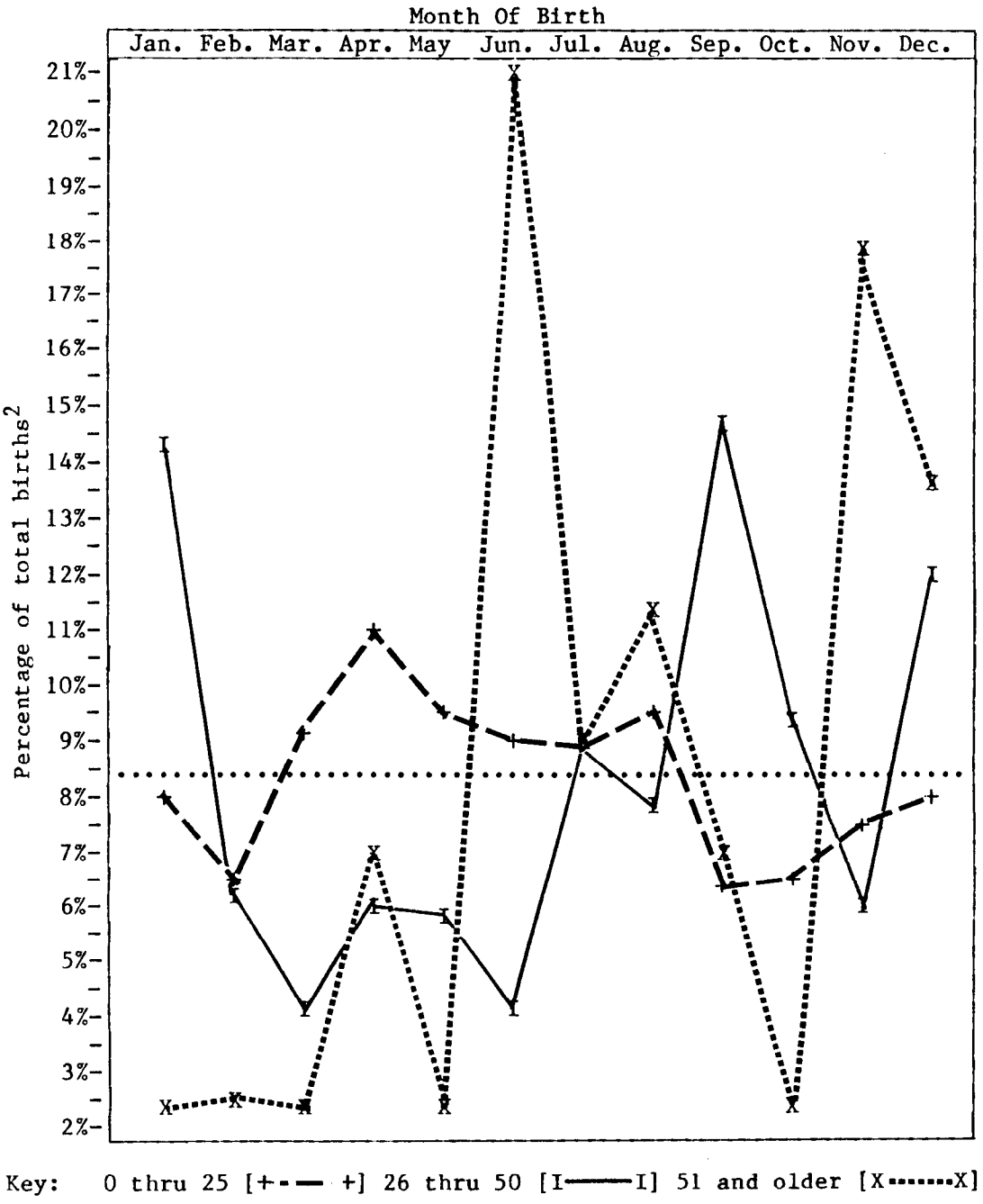


Figure 13: Seasonality of birth by 25-year cohorts, Savoonga -- 1980.[1]

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1 Because of the small size of the population over 75 years of age, oldest age category includes all individuals over 51.

2 The percentages are adjusted for differences in the number of days in each month. If births were equally distributed over the year, each month would contain 8.33 percent of the total births.

The April conceptions suggest that not all males participated in whaling with Gambell crews prior to the mid-1970s when they began whaling with their own crews. The December conceptions, as in the Gambell case, reflected the poor hunting conditions during this month.

The 0-25 year old cohort was very similar to that of Gambell, except that its peaks and lows fall uniformly one month later than those of Gambell. This pattern is consistent with the variation in hunting patterns between Gambell and Savoonga. As will be discussed in more detail in Chapter V, ice conditions create a set of environmental factors which influence an approximately one month later hunting period at Savoonga than at Gambell with the exception of whaling.

Table 33 presents causes of death and number, range, and average age of death by sex and by decade for Savoonga's population from 1901 to 1980. As in the Gambell case, these data are exclusively based on informant recall and are subject to the qualifications previously discussed. In the 1971 to 1980 interval, accidental deaths of males which were hunting-related (such as hypothermia, freezing, and gunshot accidents) were considerably higher than was the case in Gambell. Deaths from cancer and heart disease were higher in Savoonga than in Gambell and were noted as causes of deaths from as early as the 1950s. Over the past three decades, male deaths in Savoonga outnumbered female deaths by approximately three to one, primarily because of male accidental deaths associated with hunting-related activities. The incidence of epidemic diseases including tuberculosis was not great. However, Savoonga was established subsequent to the early epidemic diseases of the late 1800s and early 1900s. In both the cases of Gambell and Savoonga, there was a large number of individuals,

TABLE 33: CAUSES OF DEATH AND NUMBER, RANGE, AND AVERAGE AGE OF DEATH BY SEX, BY DECADE, SAVOONGA -- 1901-1980[1]

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
1971-1980									
unknown illness	3	2	0	71	--	71.0	--	2	2
cancer	4	0	0	33-81	--	57.0	--	2	0
frozen/hypothermia	4	0	0	17-65	--	36.3	--	0	0
suicide	2	2	0	23	16-25	23.0	20.5	1	0
airplane crash[3]	1	2	0	--	--	--	--	1	2
unknown[4]	1	1	0	<1	66	0.0	66.0	0	0
pneumonia	0	1	0	--	35	--	35.0	0	0
heart disease	1	0	0	46	--	46.0	--	0	0
childbirth related	1	0	0	<1	--	0.0	--	0	0
non-specific accident	1	0	0	21	--	21.0	--	0	0
gunshot accident	1	0	0	20	--	20.0	--	0	0
old age	1	0	0	78	--	78.0	--	0	0
Total 1971-1980	20	8	0	--	--	--	--	6	4

TABLE 33: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
				1961-1970					
unknown	4	0	0	19	--	19.0	--	3	0
drowned	4	0	0	35	--	35.0	--	3	0
heart disease	2	0	0	--	--	--	--	2	0
miscarriage	0	0	2	--	--	--	--	0	0
tuberculosis	1	0	0	41	--	41.0	--	0	0
influenza	1	0	0	<1	--	0.0	--	0	0
measles	0	1	0	--	<1	--	0.0	0	0
childbirth related	1	0	0	<1	--	0.0	--	0	0
old age	0	1	0	--	--	--	--	0	1
Total 1961-1970	13	2	2	--	--	--	--	8	1

TABLE 33: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
				1901-1960[5]					
unknown illness	6	0	0	3-46	--	14.8	--	2	0
pneumonia	2	0	0	<1	--	0.0	--	1	0
appendicitis	2	0	0	--	--	--	--	2	0
childbirth related	4	2	7	<1-<1	--	0.0	--	0	2
cancer	1	1	0	--	--	--	--	1	1
unknown	2	3	0	91	<1	91.0	0.0	1	2
heart disease	0	1	0	--	--	--	--	0	1
automobile accident	1	0	0	--	--	--	--	1	0
witchcraft	1	0	0	38	--	38.0	--	0	0
tuberculosis	1	2	0	46	--	46.0	--	0	2
whooping cough	1	0	0	<1	--	0.0	--	0	0
frozen/hypothermia	1	0	0	--	--	--	--	1	0
throat disorder	0	1	0	--	2	--	2.0	0	0
Total 1901-1960	22	10	7	--	--	--	--	9	8

Total Reported Causes of Death, Dates of Death Known, Savoonga, 1901-1980 = 84
Total Reported Deaths, Dates of Death Unknown, Savoonga, 1901-1980 = 134
Total Reported Deaths, Savoonga, 1901-1980 = 218

TABLE 33: -- CONTINUED

[1] Death data are based on informant recall, not on medical records or other documented sources. Similar causes have been grouped into categories. In most cases, data accuracy and completeness decline in relationship to the number of years which has transpired since their occurrence. There are 134 individuals, closely related to the living Savoonga population (either grandparents, parents, spouses, siblings, or offspring), who have died but dates of death are unknown. Causes of death for these individuals include, but are not limited to, tuberculosis, measles, whooping cough, colds, sudden infant death syndrome, childbirth related, cancer, drowned, fall, automobile accident, and miscarriage. There were 12 cases of miscarriage, the largest single category.

[2] Age range and average age are calculated only on cases of known sex.

[3] These deaths all occurred in 1975 as a result of a single crash of a relatively large commercial passenger airplane on the Island.

[4] This category indicates that there is no information on cause of death.

[5] Savoonga was not established until 1916, so deaths prior to this year were of relatives who lived elsewhere on the Island or in Siberia. There were no reported death data from 1921 to 1930.

described in the footnotes to Tables 27 and 33 respectively, who had died from a diversity of accidents and diseases but whose dates of death were unknown.

To complete this discussion of Savoonga's population dynamics, migration to and from the community must be considered. Unfortunately there are no previously documented migration data for Savoonga as was the case for Gambell, except for the recorded incidence of Savoonga females inmarried to Gambell males (Table 19).

Table 34 presents the destinations and number of Savoonga emigrants by sex and age in 1980. These data include all emigrated individuals with close relatives residing in Savoonga in 1980. In contrast to Gambell, there were fewer emigrants from Savoonga in 1980 (138 in Gambell compared with 79 in Savoonga). Of the total Savoonga emigrants, 17.7 percent had remained on the Island. The 11 females

TABLE 34: DESTINATIONS AND NUMBER OF EMIGRANTS BY SEX AND AGE, SAVOONGA -- 1980[1]
(n=79)

	Males			Females		
Destination	Total (Percentage)	Age Range	Mean Age	Total (Percentage)	Age Range	Mean Age
Gambell	3(15.0%)	17-47	29.3	11(18.6%)	20-54	40.3
King Island	0(0.0%)	--	--	1(1.7%)	29	29.0
Nome	7(35.0%)	35-76	46.4	21(35.6%)	2-66	32.8
Anchorage	0(0.0%)	--	--	6(10.2%)	40-47	42.3
Fairbanks	1(5.0%)	un	un	2(3.4%)	un-42	42.0
elsewhere in Alaska[2]	1(5.0%)	57.0	57.0	2(3.4%)	23-52	37.5
outside of Alaska	2(10.0%)	un-22	22.0	8(13.6%)	15-36	23.0
unknown	6(30.0%)	3-5	4.0	8(13.6%)	18-32	25.3
Totals	20(25.3%)	--	--	59(74.7%)	--	--

un = unknown

1 These data reflect only emigrants who are closely related (offspring, spouses, siblings, parents, or grandparents) to members of the study population who were residing in Savoonga in 1980. Based on field data, the majority of individuals born in Savoonga who were residing in Nome in 1980 showed up in these emigration data because they had close relatives on the Island.

2 Communities include Copper Center and Nenana.

married Gambell males. Of the three Savoonga males in Gambell, two were adopted into the community and one was doing bride-service. Of the remaining emigrants, 29 individuals (22 females and 7 males) resided in Nome in 1980. This pattern contrasts sharply with that of Gambell, since most Gambell emigrants to Nome were males. Of the Nome emigrants who were not part of families who relocated to have access to regular medical care, the majority of males and females had married spouses who were not from St. Lawrence Island. In general, Nome emigrants from Savoonga maintained close ties to their home community by visiting several times yearly, participating in resource harvest activities and resource distribution networks with Savoonga residents, and maintaining social relationships with other Savoonga emigrants residing in Nome. If emigrants to Gambell and Nome are considered together, 54.4 percent of Savoonga emigrants sustained interrelationships with the Island. The vast majority of remaining emigrants were females who had outmarried and were residing elsewhere in the State or outside of Alaska. In general, there were three times as many female as male emigrants from Savoonga, reflecting the emigration patterns and patrilocal residency preferences previously described for St. Lawrence Island in general and Gambell in specific.

Patterns of Adoption

The importance of adoption in St. Lawrence Island society, as a mechanism for expanding bonds based on kinship and as a means for assuring a functional proportion of males to females in appropriate age cohorts at the household and community levels, should not be

underestimated. Although direct evidence is not available, the practice of adoption undoubtedly preceded historic contact and it remained a well integrated component of St. Lawrence Island population dynamics in 1955 (Hughes 1960) and in 1980. Patterns of adoption at Gambell and Savoonga were similar in 1980 and will be discussed together.

Adoption on St. Lawrence Island has remained basically a means for establishing or reaffirming interrelationships between patrilineally-focused family groups, primarily within communities but also between the populations of different communities. These interrelationships have functioned to provide a network for distributing food and raw material resources and human resources across household, family, and less frequently, community boundaries. Adoptions were arranged by families but had implications for the larger population. For example, subsequent to the 1878-1880 population decline, orphans from mainland Siberia were recruited, in part to reestablish the Island's population (Burgess 1974). Traditional adoption practices, which persisted to 1980, did not require the validation of any political authority. In fact, the insistence on the part of State authorities that adoptions be "legalized" in recent years has generated some degree of anxiety and covertness regarding the practice.

The frequency of adoptions in 1980 was in part depicted in household composition data (Tables 8, 9, and 10). In 1955, 10 Gambell households (18.7 percent) included children who were designated by informants as being "adopted." In 1980, 6 Gambell households (6.7 percent) and 20 Savoonga households (21.7 percent) had children who were designated as "adopted." In addition to these, numerous households in both communities included grandchildren (particularly

grandsons), paternal nephews, and paternal nieces, many of whom also were functionally adopted offspring. In Gambell in 1980, 50 percent of the households with female or elderly heads included grandchildren, most or whom were grandsons. This pattern was also apparent in Gambell in 1955 and Savoonga in 1980. These grandchildren provided essential sex and age cohorts often unavailable in households with elderly male or female heads. In Gambell in 1955, extended family households were more common and adult children with their offspring were most commonly found in households containing elderly people or female heads. In all cases, if households lacked sons, brothers, nephews, or other adult males, grandsons were commonly incorporated into households.

The concept of an "illegitimate child" was foreign to St. Lawrence Island society in 1980. The offspring of an unmarried female was usually adopted and cared for by the female's parents whether or not the daughter bearing the child remained at home. In cases of females who had borne children prior to marriage and subsequently married the father of the child or a different male, the female's parents usually reared the child as their own. In several instances in both villages, married couples would adopt out a male or female child to the household of a barren sibling (usually the husband's brother) or to the parent(s) of the husband in cases in which the parents had aged and most adult children were no longer living in the parents' domicile. At least in the last decade, the offspring of a sexual liaison that was socially recognized belonged to the kinship group of its father, whereas offspring resulting from socially unrecognized paternity became a part of the mother's kinship group.

Although parental birthplace data (Tables 13 and 15)

documented the adoption into the community of both males and females in small number, some of whom were members of other Eskimo or Native groups, the reasons for and details surrounding these adoptions were not a part of this data base. Although complete data were not available, there was no reported case of St. Lawrence Islanders adopting children out of the study communities in recent years. Conversely, the children of St. Lawrence Islanders in Nome were occasionally adopted by appropriate relatives on the Island. This phenomena indicates the persistent high value placed on children among St. Lawrence Islanders, particularly on male offspring. The importance of males in the hunting context is detailed in Chapter V. It is also useful to note that adoption provides a mechanism for enculturating particularly a male child by a knowledgeable grandfather or father's elder brother, or any paternally-related adult male in the case of an orphaned child. The advantages of adoption to adoptive family, adopted child, and the overall well-being of the community are thus established.

Population History of King Island

Community Demographic Characteristics

Table 35 presents population size and distribution by sex, number of households, and average household size for King Island between 1791 to 1980. Since the King Island population relocated to Nome between the mid-1950s and mid-1960s, this table represents population totals for the Island, the mainland subcommunity, and both simultaneously. Footnotes have been employed to clarify the location of each

TABLE 35: POPULATION SIZE AND DISTRIBUTION BY SEX, NUMBER OF HOUSEHOLDS, AND AVERAGE HOUSEHOLD SIZE, KING ISLAND -- 1791-1980

Year	Population Size	Total Males	Total Females	Number of Households[1]	Average Household Size[2]
1980[3]	313	163	150	63	4.97
1975[4]	215	114	101	43	5.00
1973[4]	200	ND	ND	ND	ND
1968[5]	184	ND	ND	32	5.75
1966[6]	9	4	5	ND	ND
1962[7]	35	26	9	ND	ND
1960[8]	49	ND	ND	ND	ND
1959	120[9](62)[10]	ND	ND	14[9]	8.57
1958	97[5](194)[11](115)[10]	ND	ND	ND	ND
1957	90[9](101)[10]	ND	ND	ND	ND
1956[10]	76	ND	ND	ND	ND
1955[10]	99	ND	ND	ND	ND
1953	150[12](130)[10]	ND	ND	ND	6.00(est.)[12]
1952[13]	160	ND	ND	ND	ND
1950[5]	141	86	55	ND	ND
1948[14]	200	ND	ND	48	4.20

TABLE 35: -- CONTINUED

Year	Population Size	Total Males	Total Females	Number of Households	Average Household Size
1940[5]	210	119	91	ND	ND
1939[15]	208	ND	ND	ND	ND
1938[16]	196	111	85	48	4.08
1932[11]	175	ND	ND	ND	ND
1930[5]	165	92	73	ND	ND
1929	ND	(45)[17]	ND	ND	ND
1923[10]	200(est.)	ND	ND	ND	ND
1920[18]	137	ND	ND	ND	ND
1914[10]	167	ND	ND	ND	ND
1910[19]	119	ND	ND	ND	ND
1904[20]	137	80	57	ND	ND
1890[21]	200	100	100	38(56)	5.30
1880[22]	100	ND	ND	40(est.)[23]	2.50
1867[24]	250±	ND	ND	ND	ND
1850[25]	275	ND	ND	ND	ND
1791[26]	170	70	100	ND	ND

TABLE 35: -- CONTINUED

ND = no data

1 These are the number of inhabited domiciles. The number of domiciles located on the Island remained relatively constant throughout the historic period, since there was a very restricted area for building available at the village site. After relocation to Nome, the original village site was located along the beach coast of the city, although a few King Islanders resided in houses which were spatially separate from the east end complex. In November 1974 the King Island site was destroyed by high seas and unsecured barges. The Bureau of Indian Affairs financed and constructed disaster relief housing for the King Islanders in a discrete area several blocks north and west of their original site. Although most Islanders wanted to relocate on a beach front site, they had no option but to move into the new low income subdivision. Only one occupied house at the old site was not razed and the City of Nome reclaimed ownership of the majority of land that originally was the King Island village.

2 These data include single individual households.

3 Based on field data, 1980. All households in Nome which have King Island members were reported in these data including the non-Native spouses and parents of King Islanders and adoptive or affinally-related parents and/or siblings of King Island children in these households. King Islanders were defined as any individual who was born on King Island or who has a genealogical, affinal, or adopted grandparent, parent, sibling, or offspring who was born on King Island. The 1980 population included only those individuals as defined above who resided in Nome during that year. Individuals who had migrated out of Nome were not considered to be part of the 1980 resident population.

4 Ellanna and Roche 1976: 25 and 76. The 1973 estimate was based on ANCSA enumeration data.

5 Bogojavlensky 1969: 32-33. By 1968 the entire King Island population had relocated to Nome, so the population total was for the King Island subcommunity. The 1958 population data were for King Islanders located on the Island during winter months. The 1958 data reflected that the migration of several households to Nome had already occurred. The 1950 data also indicated a population decline which resulted from the migration of a few households to Nome in the late 1940s and deaths related to disease, particularly to tuberculosis and childhood diseases.

6 Burns 1967: 26; reconstructed from Native store and Alaska Department of Fish and Game data. The 1966 data were for the Island only.

7 Burns 1963: 20 and 22; this was the population on the Island, not including King Islanders in Nome.

8 Brunsman 1961: 3-10. This was the population enumerated on the Island. King Islanders residing in Nome were not distinguished from other Nome residents.

TABLE 35: -- CONTINUED

9 Harbo 1959; in 1957 and 1959 these data were for the Island. In 1959 Harbo noted that there were about an equal number of King Islanders in Nome. Of the 120 in 1959, 30 were hunters and the remainder were children, women, and older, non-hunting males.

10 Renner 1979: 73, 77, and 158; based on Lafortune's data. The discrepancy between Harbo's 1959 data and Lafortune's as reported in Renner cannot be explained except in regard to seasonal population flux or relocation that occurred in 1959; the same may be true for 1958 and 1957. The 1914 data included 45 children.

11 Ross 1958: 12 and 88. The 1957-58 estimate in parentheses was an enumeration of all King Islanders on the Island and in Nome.

12 Muñoz 1954: 129.

13 Brooks 1953: 505.

14 Trenchard 1939: 3.

15 Alaska Planning Council 1940: 22 and 25; based on U. S. Bureau of the Census 1940, data. The 208 population included 58 school-aged children and 2 non-Native teachers.

16 Cameron 1938. The kinship composition of these households is described in this chapter. There were no non-Natives in this census.

17 Renner 1979: 82. This was only the number of hunters in the community (young adult to middle-aged males).

18 Hunt 1921: 681.

19 U. S. Department of Commerce, Bureau of the Census 1913: 573. These were mid-winter enumeration.

20 Jackson 1904: 90; these were winter data.

21 Porter 1893: 8 and 165. All 200 were reportedly Iñupiat. The 38 households were domiciles housing 56 "families." Porter's data were gathered during the summer of 1890 and may therefore reflect seasonal movements. However, it is unlikely that King Islander's had begun their annual migration to the mainland because of the population size. It is also likely that the sex ratios were only estimates because all other population data for King Island demonstrated higher male population levels in relationship to those of women.

22 Petroff 1884: 5; reported data collected by the revenue cutter Corwin in the summer of 1880. This was probably a conservative estimate which failed to account for people traveling during the time the Corwin was visiting the Island. In addition, Petroff reported that the log of the Bear indicated that 100 people survived and 200 perished after the famine of 1890. Prior to 1890 there were 6 kazgi (as opposed to 3 in the 1900s) and elder King Islanders in the 1960s and 1970s stated that there were two other village sites on the Island in their grandfathers' time. According to these informants, the other villages were decimated by disease, possibly a smallpox epidemic between 1836 and 1839 (Petroff 1884: 59).

TABLE 35: -- CONTINUED

23 Hooper 1881: 5; the population estimate of 100 was low. The number of houses suggested a larger population, since household units included multiple family members. The low population estimate skewed the average household size for this year.

24 Ray 1975b: 166; based on accounts from Libby in June 1867. Walrus hide houses were still in use at this time.

25 Estimates from Burch 1975a: 12.

26 Kobelev as reported in Ray 1975b: 54. The 70 males included males and adolescents. The 100 females included women and infants. Kobelev's visit was in early June prior to migration to the mainland. However, at this time of year boat hunting and bird hunting may have resulted in the absence of young to middle-aged and adolescents from the village. Ten of the people in the village were from Kauwerak.

enumeration during the decade of primary relocation activity.

Since there have been no systematic archaeological investigations on King Island, the earliest population levels were reconstructed from early explorer accounts and oral history. Informants reported that there were two other village sites on the Island prior to contact with Euroamericans. Petroff (1884) reported that two village sites had been decimated by epidemics between 1836 and 1839 (105), although there were no first-hand observations of other villages during the early years of exploration. It is possible that these other villages were occupied prior to the habitation of the current site. However, the eldest King Island informants reported that these villages were occupied when their grandfathers were alive. If three sites were actually inhabited simultaneously, population estimates for the Island for the late prehistoric period may have been in excess of the 275 estimated by Burch for 1859 (1975a: 12). In fact, the revenue cutter Bear reported that 100 King Islanders survived and 200 perished after a "famine" in 1890 (Porter 1893). Clearly, the habitation of the two

other sites and total population prior to contact are questions which cannot be addressed satisfactorily given the data base currently available.

After the population decline of 1890, which reached a low of 100 if the revenue cutter data were accurate (Porter 1893), the population of the Island continued to grow until it reached a peak of 210 in 1940. Because of insular isolation, the majority of the community escaped some of the mainland epidemics including the influenza epidemic of 1918. Additional death data for King Island will be discussed below. During the late 1940s, 1950s, and early 1960s, an increasingly larger number of individuals and families relocated to Nome -- some for access to medical facilities, some for access to seasonal cash employment, and others for access to formal education. By 1968 the school had been closed and the relocation was complete. The King Island subcommunity population in Nome was 184. Therefore, between 1940 and 1968 the King Island community actually declined in size, in large part resulting from deaths related to tuberculosis and other diseases and from emigration. In the 12 years between 1960 and 1980, the community expanded at a relatively rapid rate of 70.1 percent or 5.8 percent annually.

The earliest documented population profile for King Island is presented in Figure 14 for 1930. These data, and those for 1940 and 1950 to follow, were derived from Bureau of Indian Affairs school records and were not presented in cohorts which are compatible with those of 1938, 1975, and 1980. Nonetheless, they are presented here for comparison to one another and to provide characteristics of the overall population. The 1930 population profile depicted a greater proportion of males relative to females. Of these males, 48.9 percent were too

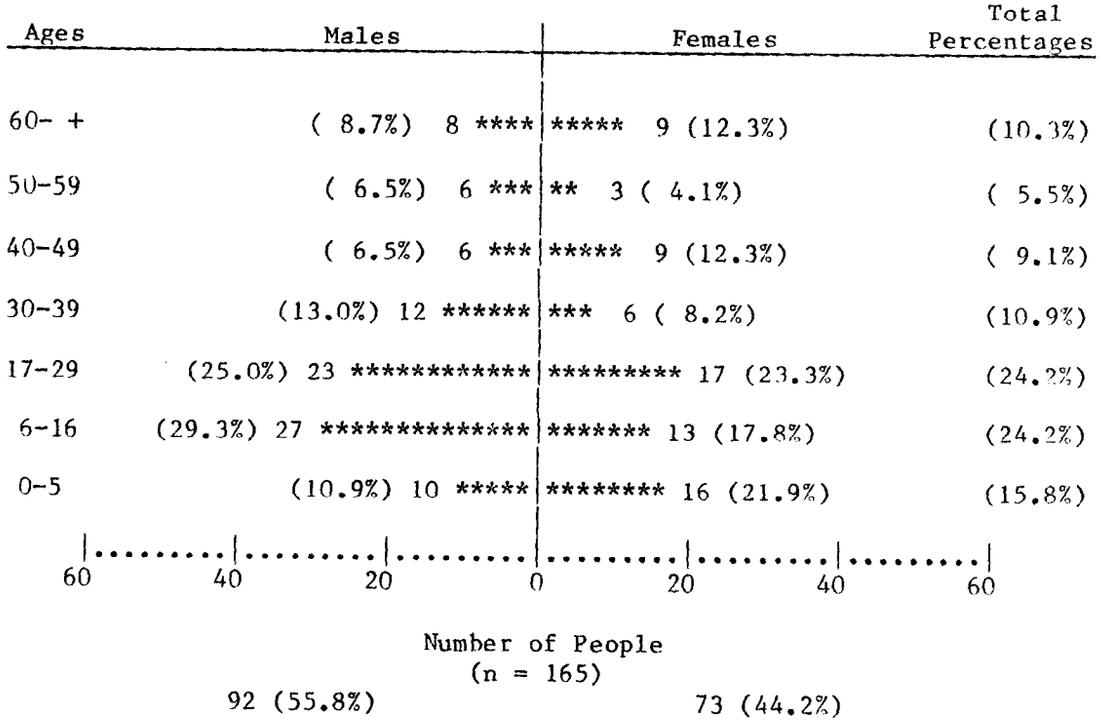


Figure 14: Age & sex composition, King Island -- 1930.[1]

[1] Adapted from Bogojavlensky 1969: 32. These data are based on school records.

young or too old to participate in skinboat crew hunting -- the primary productive activity of this population (see Chapter V). Although the relative proportion of males was greater than females, there were adequate women of child-bearing age to ensure replacement of the population.

Figure 15 depicts the population characteristics of King Island in 1938 based on a household census conducted by an agent of the Bureau of Indian Affairs (Cameron 1938). The raw census data were used in development of the profile. These data did not include teachers or missionaries.

Ages	Males	Females	Total Percentages
86-90			(0.0%)
81-85		* 1 (1.2%)	(0.5%)
76-80			(0.0%)
71-75	(1.8%) 2 *	* 1 (1.2%)	(1.5%)
66-70	(1.8%) 2 *	** 4 (4.7%)	(3.1%)
61-65	(1.8%) 2 *	* 2 (2.4%)	(2.0%)
56-60	(0.9%) 1 *	* 1 (1.2%)	(1.0%)
51-55	(1.8%) 2 *	* 2 (2.4%)	(2.0%)
46-50	(1.8%) 2 *	* 1 (1.2%)	(1.5%)
41-45	(6.3%) 7 ****	** 4 (4.7%)	(5.6%)
36-40	(5.4%) 5 ***	**** 7 (8.2%)	(6.1%)
31-35	(5.4%) 6 ***	** 3 (3.5%)	(4.6%)
26-30	(8.1%) 9 *****	**** 7 (8.2%)	(8.2%)
21-25	(9.0%) 10 *****	**** 7 (8.2%)	(8.7%)
16-20	(14.4%) 16 ********	*** 5 (5.9%)	(10.7%)
11-15	(15.3%) 17 *********	****** 12 (14.1%)	(14.8%)
6-10	(9.0%) 10 *****	******* 13 (15.3%)	(11.7%)
0-5	(18.0%) 20 **********	******** 15 (17.6%)	(17.9%)

60 40 20 0 20 40 60

Number of People
(n = 196)

111 (56.6%) 85 (43.4%)

Figure 15: Age & sex composition by 5-year cohorts, King Island -- 1938.[1 2]

Figure 15: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	22.324	23.800	22.964
Median	18.600	17.750	18.250
Std. Dev.	17.650	20.666	18.980

[2] Adapted from Cameron 1938.

In 1938, 47.7 percent of the males were either too old or too young to participate in crew hunting, similar to the percentage in 1930. The proportion of elderly men, who were essential to the transmission of hunting knowledge and responsible for constructing items of hunting technology, had declined from 1930. The relative number of old and reproductively active females had also declined during this interval. Causes of mortality during this period of time were well-documented and will be discussed in detail below.

The mean age of the 1938 population was relatively young (22.32 for males and 23.80 for females). This is approximately two years younger than the mean age of the Gambell population in 1955. The population had grown by 18.8 percent or 2.4 percent annually between ween 1930 and 1938.

Figure 16 depicts the age and sex composition of King Island in 1940 based on school records which grouped the Iñupiat population into irregular cohorts as was the case in 1930. In the interval 1938 to 1940 the population had grown 7.1 percent or 3.5 percent annually. The disproportionate ratio of males to females increased over that of 1938, which was similarly higher than that of 1930. In other respects the population resembled that of 1938, although detailed comparisons are difficult because of differentially structured cohorts.

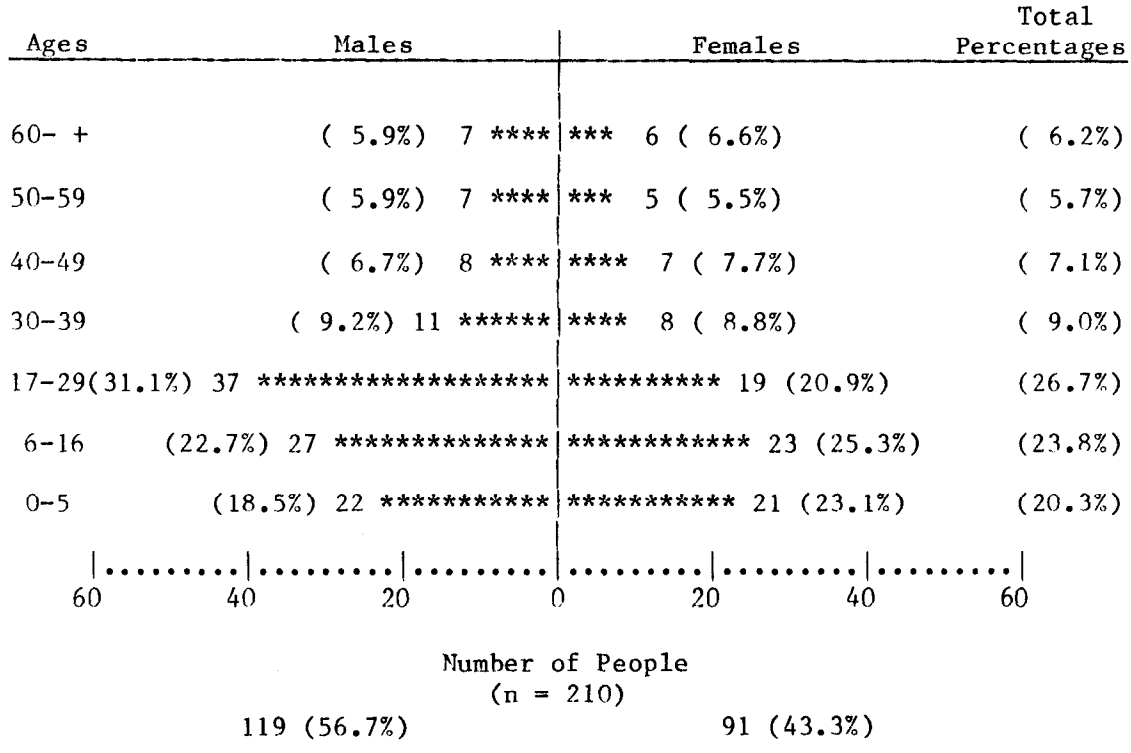


Figure 16: Age & sex composition, King Island -- 1940.[1]

[1] Adapted from Bogojavlensky 1969: 32. These data are based on school records.

Figure 17 depicts the age and sex composition of King Island's Iñupiat population in 1950 based on school records. The total population on the Island had declined by 32.9 percent or 3.3 percent annually. Although specific relocation data were not available for this period, field data verify that several families relocated to Nome between 1945 and 1950. Additionally, tuberculosis was active on the Island during this decade. Some individuals, particularly women, were hospitalized outside of the State and other families relocated in Nome to have greater accessibility to medical facilities. In 1950 the hospitalization of females probably was an important factor in the most

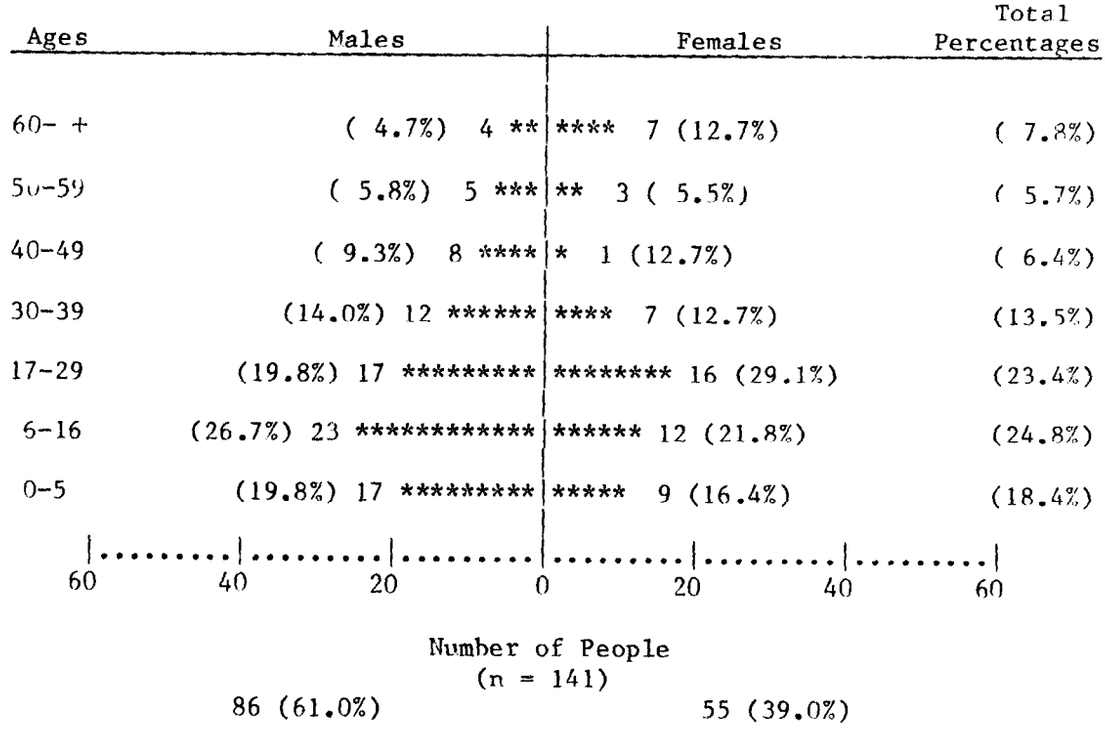


Figure 17: Age & sex composition, King Island -- 1950.[1] [2]

[1] Adapted from Bogojavlensky 1969: 32. These data are based on school records.

[2] This profile reflects the relocation of some King Islanders to Nome during the 1940s.

disproportionate ratio of males to females in the two decades from 1930 to 1950.

The composition of the community had undergone changes during the 1940 to 1950 decade. The ratio of non-hunting to hunting males had increased from 47.1 percent in 1940 to 51.2 percent in 1950. In particular, the 17-29 year old cohort had declined by 20 individuals or 11.3 percent during the decade. The percentage of women of reproductive age had increased slightly relative to the overall population.

Figure 18 presents the age and sex composition by 5-year cohorts

Ages	Males	Females	Total Percentages
86-90			(0.0%)
81-85		* 1 (1.0%)	(0.5%)
76-80			(0.0%)
71-75	(1.8%) 2 *		(0.9%)
66-70	(1.8%) 2 *	** 3 (3.0%)	(2.3%)
61-65	(3.5%) 4 **	*** 5 (5.0%)	(4.2%)
56-60	(2.6%) 3 **	* 2 (2.0%)	(2.3%)
51-55	(3.5%) 4 **	** 3 (3.0%)	(3.3%)
46-50	(2.6%) 3 **	* 1 (1.0%)	(1.9%)
41-45	(3.5%) 4 **	*** 5 (5.0%)	(4.2%)
36-40	(4.5%) 5 ***	** 3 (3.0%)	(3.7%)
31-35	(4.5%) 5 ***	*** 5 (5.0%)	(4.7%)
26-30	(14.0%) 16 ********	* 1 (1.0%)	(7.9%)
21-25	(14.0%) 16 ********	***** 10 (9.9%)	(12.1%)
16-20	(8.8%) 10 *****	****** 11 (10.9%)	(9.8%)
11-15	(10.5%) 12 ******	********* 18 (17.8%)	(14.0%)
6-10	(10.5%) 12 ******	********* 17 (16.8%)	(13.5%)
0-5	(14.0%) 16 ********	******** 16 (15.8%)	(14.9%)

60 40 20 0 20 40 60

Number of People
(n = 215)

114 (53.0%) 101 (47.0%)

Figure 18: Age & sex composition by 5-year cohorts, King Island -- 1975.[1 2]

Figure 18: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	25.325	22.100	23.818
Median	22.938	13.444	18.262
Std. Dev.	18.376	18.875	18.637

[2] Adapted from Ellanna and Roche 1976: 19.

of the King Island population in 1975 based on field data. This represents the subcommunity population in Nome, since by 1975 all King Islanders had relocated. The total population for the community was 215 including inmarried spouses. Since the population had been divided between the Island and the mainland in 1950, changes in population totals cannot be accurately assessed. However, in 1958 it was estimated that the combined Island and mainland King Island population total was 196 (Ross 1958: 12 and 88).

The most outstanding feature of the 1975 population was its similarity to that of 1938. In 1938, 6.6 percent of the population was 61 years or older, whereas in 1975 this segment of the population had increased modestly to 7.9 percent. In 1975 there was a decrease of 2.0 percent in the proportion of individuals 15 years of age and younger. The cohorts between ages 16 and 60 increased .7 percent. It is expected that birth control may not have significantly influenced birthrates of the King Island population in the 1960s because of the influence of Catholic missionaries on values associated with reproduction. However, several women reported surgeries during hospitalization for tuberculosis which rendered them infertile during their later reproductive years.

Figure 19 presents age and sex composition by 5-year cohorts for King Island in 1980. This profile was based on field data and included all individuals residing in Nome who had been born on King Island or who were the grandparent, parent, spouse, sibling, or offspring of a King Islander. Inmarried spouses and the adoptive family of two King Island children were included as part of the population total, although fertility, marriage, and place of birth data, discussed below, were presented only for inmarried individuals or siblings who were genetically related to the King Island population.

Between 1975 and 1980 the population increased by 45.6 percent or 9.1 percent annually. This increase was associated with a complex of factors. The adoptive non-Native family was not included in the 1975 census. Additionally, several females recruited non-Native spouses during the 5-year interval and several young to middle-aged males and at least one female who had relocated in Anchorage or outside the State returned to Nome with their families or alone if they were unmarried. The population increase was distributed between the cohorts in Figure 19. There was no increase in birthrate over this 5-year interval. The relative number of hunting-aged males and reproductively active females in the population increased between 1975 and 1980, although the increase in hunting-aged males was tempered by the fact that inmarried non-Native males who were not generally included in boat crew hunting. The percentage of women of reproductive age increased from 16.7 percent of the population in 1975 to 24.0 percent of the population in 1980.

Table 36 presents the percentage of Eskimo ethnicity by age and sex for King Island in 1980. Of all the populations included in

Ages	Males	Females	Total Percentages
86-90			(0.0%)
[illegible]		* 1 (0.7%)	(0.3%)
76-80	(1.8%) 3 **	* 1 (0.7%)	(1.3%)
71-75	(1.2%) 2 *	** 3 (2.0%)	(1.6%)
66-70	(1.8%) 3 **	*** 6 (4.0%)	(2.9%)
61-65	(1.2%) 2 *	* 2 (1.3%)	(1.3%)
56-60	(4.3%) 7 ****	* 1 (0.7%)	(2.6%)
51-55	(1.2%) 2 *	* 1 (0.7%)	(1.0%)
46-50	(3.7%) 6 ***	**** 7 (4.7%)	(4.2%)
41-45	(3.7%) 6 ***	** 4 (2.7%)	(3.2%)
36-40	(7.4%) 12 ******	****** 12 (8.0%)	(7.7%)
31-35	(10.4%) 17 *********	** 4 (2.7%)	(6.7%)
26-30	(12.9%) 21 **********	***** 10 (6.7%)	(9.9%)
21-25	(9.8%) 16 ********	********** 19 (12.7%)	(11.2%)
16-20	(10.4%) 17 *********	********** 19 (12.7%)	(11.5%)
11-15	(6.7%) 11 ******	********** 27 (18.0%)	(12.1%)
6-10	(11.7%) 19 **********	******** 15 (10.0%)	(10.9%)
0-5	(11.7%) 19 **********	********* 18 (12.0%)	(11.8%)

60 40 20 0 20 40 60

Number of People
(n = 313)

163 (52.1%) 150 (47.9%)

Figure 19: Age & sex composition by 5-year cohorts, King Island -- 1980.[1]

Figure 19: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	26.945	24.693	25.866
Median	25.250	19.000	22.250
Std. Dev.	18.661	19.041	18.848

this study, King Islanders exhibited the largest percentage of non-Eskimos within the population and the fewest number of individuals who reported that they were solely of Eskimo ancestry. The number of individuals who reported to be one-half Eskimo was also significantly greater than that of any other study population.

Given the exposure to a diverse population in Nome during the last 80 years, most intensively during the last 2 decades since relocation, the extent to which the population has remained of solely Eskimo ethnicity can be attributed in part to the strong social bonds which have persisted between King Islanders. To a large extent, the continued social, cultural, and genetic integrity of the subcommunity in Nome has been associated with the complex of behavior, values, and demands associated with crew hunting. The greatest number of affinally associated non-Natives were males. This fact contrasts starkly with the situation in Gambell and Savoonga, where inmarried spouses were virtually all females. Lastly, all members of the oldest two cohorts (51 to 75 and 76+ years) except one were solely Eskimo. This fact suggest that intermarriage with non-Eskimos was a phenomenon which occurred coincidental with relocation rather than throughout the entire span of contact with Nome's non-Eskimo population.

Table 35 presented sporadic documented data on the number of households and the number of individuals who composed households

TABLE 36: PERCENTAGE OF ESKIMO ETHNICITY BY AGE AND SEX, KING ISLAND -- 1980[1]

Age Cohorts	100%		75%		50%		25%		0%	
	M	F	M	F	M	F	M	F	M	F
76-100	2	1	0	0	0	0	0	0	0	0
51-75	15	13	0	0	0	0	0	0	1	0
26-50	50	29	0	0	4	2	0	0	6	6
0-25	51	67	7	2	19	27	0	1	5	1
Total by sex	118	110	7	2	23	29	0	1	12	7
(Percent of population by sex)	(73.8)	(73.8)	(4.4)	(1.3)	(14.4)	(19.5)	(0.0)	(0.7)	(7.5)	(4.7)
Total individuals	228		9		52		1		19	
(Percent of total population)	(73.8)		(2.9)		(16.8)		(0.3)		(6.1)	

[1] Compiled from field data.

historically on King Island. For reasons previously described, there were considerable gaps in the data base regarding the number, size, and composition of inhabited domiciles. The earliest data for King Island were documented in 1880 and 1890 (Petroff 1884; and Porter 1893; respectively). The 1880 data on number of households were estimates. The 1890 documentation of 38 households composed of 56 families and an average household size of 5.30 may be more accurate, although these data were allegedly gathered subsequent to the reported population decline of 200 individuals from an influenza epidemic in 1890 (Porter 1893). Based on documented data it is difficult to arrive at conclusions regarding household size until the 1930s, because estimates of the number of houses varied erratically. Based on ethnographic evidence and field data, it is certain that household size on the Island throughout the 1900s exceeded that of 1980. Muñoz (1954) reported an average household size of 6 in 1953 (130).

Table 37 presents household composition for King Island in 1938 based on Cameron's census data (1938). Although the census was probably thorough, its organization into household units was unclear. Table 37 was based on the apparent pattern of organization indicated by spaces on the census form between groups of people. If this interpretation is accurate, there were 48 households with an average household size of 4.08. As Table 37 indicates, the vast majority (70.8 percent) of household types were nuclear family models if adopted sons and adopted daughters were included. The incidence of five households with only husband and wife is very suspect based on field data, ethnographic data (Lafortune 1940), and contemporary (1980) household composition patterns. In general the village site on the Island was of

TABLE 37: HOUSEHOLD COMPOSITION BY TYPE, KING ISLAND -- 1938[1] [2]

Key:

Hu = husband
Wi = wife
So = son
Da = daughter
ASo = adopted son
ADa = adopted daughter
GSo = grandson
Br = brother

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)[3]
9	18.8%	male	WiSoDa
7	14.6%	male	WiSo
5	10.4%	male	Wi
4	8.3%	male	WiDaASo
3	6.3%	female[5]	ASo[4]
2	4.2%	male	WiDa
2	4.2%	male	WiSoDaASo
2	4.2%	female	SoDa
2	4.2%	male[6]	---
1	2.1%	male	WiSoADa
1	2.1%	male	WiASoADa
1	2.1%	male	WiSoDaASoADa
1	2.1%	male	SoDa
1	2.1%	female	WiGSo
1	2.1%	male	SoGSo
1	2.1%	male	So
1	2.1%	male	GSo
1	2.1%	female	WiASo
1	2.1%	male	SoDa
1	2.1%	male	WiSoASo
			WiSoDaBr

TABLE 37: -- CONTINUED

[1] Based on Cameron 1938. The total population was 196, composed of 111 males and 85 females in 48 households.

[2] There were 38 households (81 percent) that had members who were sons, adopted sons, or grandsons. There were 25 households (53 percent) with daughters or adopted daughters. There were no households with only female members. The adoption of males was much more common than the adoption of females (14 adopted sons compared to 3 adopted daughters). The distribution of the population by sex and age functioned to ensure that most households had the requisite division of labor based on these criteria. Only four households had only male members and informant data suggest that these may have been functionally aligned with female kinsmen in other households.

[3] These are household types and actually occurred in patterns which included multiple sons and daughters or adopted sons and daughters.

[4] One male was listed as a "son" of an 83 year-old female. However, since the male was only 19 years old, it is assumed that he was an adopted son.

[5] There were 6 female household heads in the population in 1938.

[6] One of these males was a 37 year-old bachelor. The other was a 48 year-old widow whose daughter had been residing at the Pilgrim Springs mission for one year.

limited size due to the topography of the surrounding area, and it seems unlikely that five young married couples would have had the luxury of unshared houses. Table 37 also indicates the prevalence of sons or son surrogates (grandsons and adopted sons) in King Island households, since 81 percent of the households included males linked to the household head in this manner. A much smaller proportion (53 percent) had daughters or daughter surrogates (adopted daughters); there were no cases of granddaughters residing in a household. Of 48 households, 14 (29.2 percent) included adopted offspring.

Table 38 presents household composition for the King Island subcommunity in Nome in 1980 based on field data. In the King Island case, the externally-derived impetus for forming nuclear family households was similar to that described for Gambell. Changes in household

TABLE 38: HOUSEHOLD COMPOSITION BY TYPE, KING ISLAND -- 1980[1]

Key:

Wi = wife
So = son
Da = daughter
ASo = adopted son
ADa = adopted daughter
SSo = stepson
SDa = stepdaughter
Gso = grandson
GDa = granddaughter
GGDa= great granddaughter
Br = brother
Si = sister
Ne = nephew
Ni = niece
Dil = daughter-in-law
Uf = female, relationship unknown
Urm = unrelated male

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)[2]
11	17.5%	male[3] [5]	WiSoDa
9	14.3%	male[6]	---
4	6.3%	male[7]	WiSo
3	4.8%	male[8]	Wi
3	4.8%	female	Da
3	4.8%	male[10]	WiSSoSDa[4]
2	3.2%	female	SoDaASo
2	3.2%	male	WiSoADa[9]
1	1.6%	male	WiSoDaADa
1	1.6%	male	WiSSoASoADa
1	1.6%	male	WiSoSSoSDa
1	1.6%	male	SoDa
1	1.6%	male	So
1	1.6%	male	WiDa
1	1.6%	male	WiSoDaGSo

TABLE 38: -- CONTINUED

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)
1	1.6%	male	WiSoDaGSoGDa
1	1.6%	male	WiSoDaGSoGDaGGDa
1	1.6%	male	WiASoGSo[11]GDa
1	1.6%	male	WiSoGSo
1	1.6%	male	WiSoBr
1	1.6%	male	WiSoDaBrSiNi[12]
1	1.6%	male	WiSoDaBrUf
1	1.6%	male	Br
1	1.6%	male	Ne[13]
1	1.6%	female	SoDa
1	1.6%	female	So
1	1.6%	female	ASo
1	1.6%	female	DaASoADa
1	1.6%	female	SoGDa
1	1.6%	female	SoASoGSo[14]
1	1.6%	female	SoDaADaGDaUrm
1	1.6%	female	SoDilGSoGDaUrm
1	1.6%	female	---

TABLE 38: -- CONTINUED

[1] Based on field data. Total population was 313 composed of 163 males and 150 females in 63 households. These data include households residing in Nome that are composed of mostly non-Natives who have adopted King Island children or have King Island children from a previous marriage. The King Island population resides in Nome.

[2] These are household types and in some cases they occurred with multiple members of the same kinship relation to head (such as more than one son or daughter). Of 63 households, 37 (58.7 percent) were nuclear family households and 17 (26.9 percent) were extended family households. There were 9 (14.3 percent) single male households and 1 (1.6 percent) single female household. Three households (4.8 percent) were composed only of husband and wife. There were 49 (77.8 percent) male heads of household and 14 (22.2 percent) female heads of household. There were 11 (17.5 percent) households with adopted offspring. Of the households, 44 (69.8 percent) included sons, adopted sons, stepsons, grandsons, and/or nephews, and 37 (58.7 percent) included daughters, adopted daughters, stepdaughters, and/or granddaughters. There were six inmarried non-Native heads of household.

[3] In three of these cases, head of household was an inmarried non-Native male.

[4] One of these cases includes a non-Native head, spouse, and children, but two of the children are offspring of a King Islander through a previous marriage.

[5] In three cases the male head of household had children by a previous wife and these children were living in the household.

[6] Of these single males, seven were bachelors and two were widowers.

[7] In two of these cases, the head of household was an inmarried non-Native male.

[8] In one case, head of household was an inmarried non-Native male.

[9] One case was a non-Native household with two adopted King Island female children.

[10] In one case, the household head was an inmarried Eskimo male from Unalakleet. In another case the household head was an inmarried Eskimo male from Diomede.

[11] One of the grandsons was the adopted son of the head's daughter, although the daughter did not live in the household or in Nome.

[12] The niece was the daughter of the sister who resides in the household.

[13] The nephew was the son of the head's sister who is not resident in the household.

[14] The grandson was the son of the adopted son of household head.

composition and size most notably occurred subsequent to the 1974 destruction of King Island village on the east end of Nome. At that time, the vast majority of families were relocated into government subsidized housing modeled in accordance with nuclear family concepts.

In 1980, 37 (58.7 percent) of the households were nuclear family types if adopted offspring were included in this model. Conversely, 17 (26.9 percent) were extended family household types. There were nine single-male households and one single-female household. Only three households were composed solely of married couples. The preference for male offspring was continuous with that described for 1938. In 1980, 69.8 percent of the households included sons or son surrogates, whereas 58.7 percent included daughters or daughter surrogates. As in both the Gambell and Savoonga cases, the incidence of male heads was considerably greater than that of female heads (77.8 percent as opposed to 22.2 percent respectively). The occurrence of children classified as "adopted" was less in 1980 compared with that of 1938 (17.5 percent compared with 29.2 percent respectively). However, field data indicate that there were additional cases of grandchildren present in King Island households who functioned as adopted offspring.

There was a noteworthy difference between the St. Lawrence Island and King Island cases. In Gambell all male household heads were born in Gambell, adopted into Gambell, or performing temporary bride-service. There appeared to be negligible means for females to bring non-Gambell spouses into the community. In the King Island case, the presence of inmarried household heads from Unalakleet, Diomede, and outside the State suggests that there was less importance

placed on a core of paternally-related males at the community level in King Island society in 1980. However, field data also suggest that the integration of outside males was by no means immediate or unqualified, and that their participation in resource harvest activities was most difficult at the level of crew hunting. In the case of inmarried non-Native males, there was no participation in skinboat crews. In general King Island households tended towards patrilocality, although it was not always clear if residency in Nome necessarily implied connections to the King Island community. In fact, some of the inmarried male spouses, particularly non-Natives, demonstrated overall tenuous connections to the community. In general, data suggest that King Islanders were more able than Gambell residents to establish kinship links through affinal affiliations, and this fact was represented in household composition in 1980. However, these affinal affiliations were not easily integrated into the hunting complex.

Birthplaces of living residents and their parents provide useful information for analyzing the interrelationships between demographic and hunting-related variables, including facts associated with recruitment, seasonal migrations, post-marital residency, and inter-community alliances. Table 39 presents place of birth by sex and 25-year cohorts of King Island residents in 1980 based on field data. The relocation of King Islanders to Nome from the mid-1950s to mid-1960s, the isolation of the Island during winter months, and the annual migration to the mainland during summer months prior to relocation were reflected in these data.

In the case of the oldest cohort (76+ years), all births occurred on the Island. Although the sample was small, these data

TABLE 39: PLACE OF BIRTH BY 25-YEAR COHORTS AND SEX, KING ISLAND -- 1980 (n=313)

Place Of Birth	Age Cohorts: 76-100 M	76-100 F	51-75 M	51-75 F	26-50 M	26-50 F	0-25 M	0-25 F
	Sex							
King Island	3	2	10	8	27	15	5	9
Diomede	0	0	2	0	0	1	0	0
Wales	0	0	0	0	0	1	0	0
Savoonga	0	0	0	0	0	1	0	0
Seward Peninsula and Norton Sound[1]	0	0	1	3	1	3	1	0
Nome	0	0	2	2	30	9	61	73
Kotzebue	0	0	0	0	0	0	0	3
Anchorage	0	0	0	0	0	0	4	5
Outside Alaska	0	0	1	0	4	6	8	5
Unknown	0	0	0	0	0	1	3	3
Total	3	2	16	13	62	37	82	98

[1] Communities in this category include Teller, Shishmaref, Mary's Igloo, Rocky Point, and Unalakleet.

suggest Island endogamy in earlier years. The 51-75 year old cohort was born after the Island had been impacted by disease and overall population totals had declined. It is likely that the number of available potential spouses had also declined and that Catholic clergy, initially settling on the Island in 1929, discouraged marriage between cross-cousins, a practice which is likely to have occurred at King Island given the size of the population, cousin terminology (Heinrich 1963), oral history, and ethnographic analogy based on data from Diomede. Therefore recruitment of spouses from off the Island provided an alternative to permanently or temporarily delaying marriage. In the case of the 51-75 year old cohort, 75 percent of the males and 76.9 percent of the females were King Islanders, indicating a relatively high degree of community endogamy. Two of the males born in Nome were King Islanders born during the annual summer migration to the mainland -- these were considered to be King Islanders in the above calculations.

The birthplaces of the 26-50 year old cohort demonstrated some changes. During the 1930 to 1954 period, Nome played a more significant role as a birthing center for King Islanders residing on the Island than it did for St. Lawrence Islanders. Other King Island families had begun to form the year-round King Island subcommunity within Nome, and their offspring were, of course, born there as well. In this cohort, 90.3 percent of the males were born at King Island or were King Islanders born in Nome. In contrast, 64.9 percent of the females were born on the Island or were Islanders born in Nome. In this cohort males greatly outnumbered females. They therefore had a strong impetus for recruiting female spouses from outside the community. As will be discussed in more detail below, many of the males from this

cohort never married. Interestingly, the majority of recruited male and female spouses were non-Natives as opposed to Eskimos from other villages.

In the 0-25 year old cohort, 89.0 percent of the males and 92.9 percent of the females were either born on King Island or were King Islanders born in Nome, Kotzebue, Anchorage, or outside the State. All known recruited males and females were non-Native in this cohort.

Parental birthplaces by 25-year cohorts for King Island in 1980 are presented in Table 40. Since King Island and Nome/King Island were representative of the same population, 157 individuals (50.2 percent) had parents who were both King Islanders. Considering the intensity and frequency of contact between King Islanders and other populations in Nome, this percentage was surprisingly similar to that of Gambell (56.8 percent) in light of Gambell's relatively greater isolation. Of all King Island residents in 1980, 67.7 percent had fathers who were born at King Island or were Islanders born in Nome. In comparison, 66.7 percent of the individuals had mothers who were King Islanders. These data suggest equivalent levels of recruitment of male and female spouses through time, although in the oldest cohort (51-80) all parents were King Islanders or their place of birth unknown, with the exception of the parents of inmarried spouses. In the case of Gambell, many of the parents from the oldest cohort had been recruited from Siberia or born in other settlements on the Island. In the youngest cohort (0-25) a relatively large number of individuals (17.2 percent of the cohort) were the offspring of King Island women and non-Eskimo males. This phenomenon was correlated with the residence of King Islanders in Nome. In addition, these individuals did

TABLE 40: PARENTAL BIRTHPLACES BY 25-YEAR COHORTS, KING ISLAND -- 1980[1]
(n=313)

Place of Birth		Number (Percentage of Cohort)			
Father	Mother	Cohort 0-25	Cohort 26-50	Cohort 51-80	Total Number and Percentage
King Island	King Island	61(33.9%)	51(51.5%)	22(64.7%)	134(42.8%)
outside	King Island	22(12.2)	2(2.0%)	0(0.0%)	24(7.7%)
outside	outside	7(3.9%)[2]	11(11.1%)[3]	1(2.9%)[4]	19(6.1%)
King Island	Nome/King Island	13(7.2%)	1(1.0%)	0(0.0%)	14(4.5%)
King Island	unknown	8(4.4%)	5(5.1%)	0(0.0%)	13(4.2%)
unknown	unknown	2(1.1%)	5(5.1%)[5]	5(14.7%)	12(3.8%)
King Island	outside	11(6.1%)	0(0.0%)	0(0.0%)	11(3.5%)
King Island	Mary's Igloo	1(.6%)	8(8.1%)	0(0.0%)	9(2.9%)
outside	Nome/King Island	9(5.0%)	0(0.0%)	0(0.0%)	9(2.9%)
King Island	Wales	3(1.7%)	4(4.0%)	0(0.0%)	7(2.2%)
unknown	King Island	5(2.8%)	1(1.0%)	1(2.9%)	7(2.2%)
King Island	Diomede	5(2.8%)	1(1.0%)	0(0.0%)	6(1.9%)
Nome	King Island	6(3.3%)	0(0.0%)	0(0.0%)	6(1.9%)
Nome/King Island	Nome/King Island	6(3.3%)	0(0.0%)	0(0.0%)	6(1.9%)
King Island	Shishmaref	5(2.8%)	0(0.0%)	0(0.0%)	5(1.6%)
King Island	Rocky Point	2(1.1%)	2(2.0%)	0(0.0%)	4(1.3%)

TABLE 40: -- CONTINUED

Place of Birth		Number (Percentage of Cohort)			
Father	Mother	Cohort 0-25	Cohort 26-50	Cohort 51-80	Total Number and Percentage
Nome	Nome/King Island	3(1.7%)	0(0.0%)	0(0.0%)	3(1.0%)
Diomede	Diomede	0(0.0%)	1(1.0%)[6]	2(5.9%)[6]	3(1.0%)
Wales	Wales	0(0.0%)	1(1.0%)[6]	1(2.9%)[6]	2(.6%)
Shishmaref	Nome/King Island	2(1.1%)	0(0.0%)	0(0.0%)	2(.6%)
Kiana	Nome/King Island	2(1.1%)	0(0.0%)	0(0.0%)	2(.6%)
Shishmaref	Shishmaref	0(0.0%)	1(1.0%)[6]	1(2.9%)[6]	2(.6%)
other locations in Alaska	other locations in Alaska	1(.6%)[7]	0(0.0%)	1(2.9%)[6]	2(.6%)
Nome/King Island	Kotzebue	2(1.1%)	0(0.0%)	0(0.0%)	2(.6%)
outside	Shishmaref	1(.6%)[7]	0(0.0%)	0(0.0%)	1(.3%)
Unalakleet	Unalakleet	0(0.0%)	1(1.0%)[6]	0(0.0%)	1(.3%)
outside	Nome	0(0.0%)	1(1.0%)[8]	0(0.0%)	1(.3%)
Wales	King Island	1(.6%)	0(0.0%)	0(0.0%)	1(.3%)
outside	unknown	0(0.0%)	1(1.0%)[8]	0(0.0%)	1(.3%)
outside	Savoonga	1(.6%)[8]	0(0.0%)	0(0.0%)	1(.3%)
Mary's Igloo	King Island	0(0.0%)	1(1.0%)[8]	0(0.0%)	1(.3%)
Savoonga	Savoonga	0(0.0%)	1(1.0%)[6]	0(0.0%)	1(.3%)
Nome/King Island	Savoonga	1(.6%)	0(0.0%)	0(0.0%)	1(.3%)

TABLE 40: -- CONTINUED

[1] Because of the small number of individuals over the age of 75, the cohorts 51-75 and 76-100 were combined. Since the combinations King Island-King Island, King Island-Nome/King Island, and Nome/King Island-Nome/King Island are functionally the same (i.e. all members are King Islanders despite the relocation of their village), the number of King Islander parents by cohort should be considered together; they are 83 (46.1%) for cohort 0-25, 52 (52.5%) for cohort 26-50, and 22 (64.7%) for cohort 51-80 or a total of 157 (50.2%) for the entire population.

[2] Two cases were inmarried males and five cases were adopted or half siblings of King Island children.

[3] Five cases were inmarried females, two cases were inmarried males, three cases were the adoptive or stepparents of King Island children, and one case was a female who had previously been married to a King Islander and resided with the children of this marriage.

[4] This was an inmarried male.

[5] One case was an inmarried female, two cases were inmarried males, and one case was an adopted-in female.

[6] These cases were all inmarried spouses.

[7] This was the child of an inmarried female by a former husband.

[8] These individuals were adopted into King Island society.

not have resident fathers in most cases and therefore the males potentially lacked the guidance provided by fathers and grandfathers in learning hunting-related skills and developing an associated base of knowledge. In some instances, these enculturative deficiencies were compensated by the formal or informal adoption of these offspring by their mothers' parents. Transmission of this knowledge is of mutual benefit to the individual and to the community given the contemporary adaptive strategies of King Islanders (see Chapter V).

Mate Selection

Traditionally marriage on King Island was primarily a mechanism by which alliances between males were formed and/or strengthened. Such alliances were essential to the formation of and participation in skinboat crews. The selection of mates was therefore guided by principles associated with maximizing a male's ability to participate in and reap the benefits of crew hunting and, secondarily, to establish networks of access to mainland resources. Other mechanisms, such as naming and adoption, achieved similar ends.

Prior to the proselytizing of King Islanders by Catholic clergy, marriages were characterized by arrangement, neolocality, community endogamy, infrequent polyandry (in part because of the scarcity of women), divorce, bride-price, and wife-exchange (comarriage) (Bogojavlensky 1969: 159). Males married after they had mastered the skills associated with hunting seals, walrus, and, less frequently, polar bear -- usually at an average age of 25 years. Females were normally approximately five years younger. The shortage of females as potential spouses has been stressed by older informants and observers of social institutions on the Island and was substantiated by King Island population data through time. From 1966 to 1967, Bogojavlensky (1969) noted that 90 percent of the marriages were endogamous (164). Marriage was prohibited between siblings, half-siblings, and linear ancestors or descendants (such as parents, offspring, or grandparents). All other categories of kinsmen were not excluded as potential spouses. Bogojavlensky (1969) noted that King Island males preferred arranging marriages of their offspring with the offspring of close factional allies, and

therefore first-cousin marriages were frequently the practice traditionally. However, the Catholic church discouraged first cousin marriages after 1930.

In 1936 there were 48 married couples. Of the 47 about which information was known, 30 were between individuals whose fathers were members of the same kazgi, 12 were between individuals whose fathers were members of different kazgi, 5 males married women from other villages, and 9 were cross-cousins (Bogojavlensky 1969: 169). Between 1936 and 1966 there were 51 marriages documented by Bogojavlensky (1969). Of these, 4 were between first cousins, 22 were within the same faction (i.e. skinboat crew), 17 crossed factional lines, 6 involved spouses from other villages, 1 was between a widower and his deceased wife's sister (sororate), and 1 widow remarried her deceased husband's brother (levirate) (169). All of these married couples resided on the Island. Divorce resulted from "laziness," persistent infidelity, incest, excessive abuse, drunkenness, and insanity (Bogojavlensky 1969: 170).

Comarriage or wife-exchange persisted on King Island until the 1920s (Bogojavlensky 1969: 131-133). This was a mechanism for establishing alliances between males and their families within the community and between communities. Trade, exchange, and mutual obligations transpired between the males, females, and children associated with comarriages. Comarriage was needless between close kin, as kin-based obligations were already established. Bogojavlensky (1969) referred to comarriage as "demographic insurance," because the sons of each family had obligations to the other family which could be relied upon in case one of the male household heads should die (137).

Field data indicate that the bonds established in a single case of comarriage, which was initiated and active 30 to 40 years previously, remained functional within the last decade.

Field data for 1980 are useful in assessing the degree to which King Island marriage patterns have changed or remained stable from earlier periods of time for which information was reported. Polyandry, comarriage or wife-exchange, and formally arranged marriage were no longer practiced in 1980. The Catholic church had been influential in discouraging cousin marriage, divorce, and, to a lesser degree, cohabitation outside of formal marriage. Nonetheless economic strategies and alliances or hostilities between particularly boat captains and crew within the community and between communities continued to be influential in mate selection in 1980, although to a more subtle degree.

Table 41 presents the marital status of the King Island population by 10-year cohorts and sex in 1980. These data indicate that there was a relatively large percentage (31.3 percent) of males 21 years or older who were unmarried in 1980. In contrast, in 1938 there were only 7 males (6.3 percent of all males) 21 years or older and unmarried. Only 2 of the 7 were above the average age of marriage (24.8 years) for King Island males in 1938 (Cameron 1938). The average age of marriage for females in 1938 was 19.9 years. In 1980 there were 20 females (20.4 percent of all females) who were 21 years or older and unmarried. In 1938 there were no unmarried females older than 18 years on King Island. This large percentage of unmarried males in 1980 may have implications for the division of labor by sex in the community, since large marine mammal hunting has requisites for both male and female labor by households. Additionally, there were no unmarried skinboat

TABLE 41: MARITAL STATUS OF POPULATION BY 10-YEAR COHORTS AND SEX, KING ISLAND -- 1980[1]
(n=311)

Age Cohorts		Male				Female			
		Single	Married	Widowed	Separated or Divorced	Single	Married	Widowed	Separated or Divorced
81-90	No.	0	0	0	0	0	1	0	0
	%	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
71-80	No.	0	4	0	0	0	2	2	0
	%	0.0	100.0	0.0	0.0	0.0	50.0	50.0	0.0
61-70	No.	1	2	2	0	0	4	4	0
	%	20.0	40.0	40.0	0.0	0.0	50.0	50.0	0.0
51-60	No.	2	5	0	1	0	1	1	0
	%	25.0	62.5	0.0	12.5	0.0	50.0	50.0	0.0
41-50	No.	3	9	0	0	1	7	3	0
	%	25.0	75.0	0.0	0.0	9.1	63.6	27.3	0.0
31-40	No.	16	11	0	2	2	12	1	1
	%	55.2	37.9	0.0	6.9	12.5	75.0	6.3	6.3
21-30	No.	29	8	0	0	17	12	0	0
	%	78.4	21.6	0.0	0.0	58.6	41.4	0.0	0.0
11-20	No.	28	0	0	0	45	1	0	0
	%	100.0	0.0	0.0	0.0	97.8	2.2	0.0	0.0
0-10	No.	38	0	0	0	33	0	0	0
	%	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Column Total	No.	117	39	2	3	98	40	11	1
	%	72.6	24.2	1.2	1.9	65.3	26.7	7.3	0.7

[1] "Widowed" and "divorced" categories do not include remarried individuals. Totals do not equal the entire population (313), since cases with unknown marital status are not included.

captains in 1938, 1967, or 1980, suggesting additional relationships between these two phenomena. It is possible that the guidelines related to traditional marriage patterns discussed above are still functionally operative but to a lesser and more covert degree than in the past. Hence it may be that although unmarried males and females were available in the population in 1980, some may not be considered suitable potential spouses by traditional criteria. The mean age of marriage for King Island males in 1980 was 27.74 years, although the mean age ranged from 32.00 for the oldest cohort to 22.50 for the youngest (21-30 year old) cohort (Table 42). The mean age of marriage of females in 1980 was 23.42 years, although the mean age ranged from 33.00 for the 61-70 year old cohort to 21.09 in the 21-30 year old. In both the cases of males and females in 1980, the youngest cohort was still open to marital recruitment, so mean ages may increase.

Table 43 presents places of birth of King Island spouses in 1980. Of 38 marriages, 13 (34.3 percent) were community endogamous. This is a substantial decline from the 90 percent community endogamy reported by Bogojavlensky (1969) for the 1966 to 1967 period. Of all marriages, 10 (26.3 percent) were marriages between King Islanders and non-Natives, both male and female. Marriages between King Islanders and Seward Peninsula residents made up 9 (23.7 percent) of the incidences of outmarriage. Two of the locations on Seward Peninsula were mainland areas previously used by King Islanders during summer resource harvest activities. Inmarried spouses from a diversity of locations accounted for the remainder of non-endogamous marriages. It is noteworthy that, as previously mentioned, a greater percentage of females than of males have been recruited into the population. Of 23

TABLE 42: AGE OF MARRIAGE OF 10-YEAR COHORTS BY SEX, KING ISLAND -- 1980[1]

Age Cohorts	Male			Female		
	No. of Cases	Mean	Std. Dev.	No. of Cases	Mean	Std. Dev.
81-90	0	0.00	0.00	0	0.00	0.00
71-80	2	32.00	9.90	1	21.00	0.00
61-70	2	28.50	6.36	4	33.00	8.29
51-60	2	32.40	5.13	0	0.00	0.00
41-50	8	27.75	5.47	7	24.43	6.63
31-40	10	28.60	4.90	12	22.58	5.14
21-30	8	22.50	2.27	11	21.09	3.48
11-20	0	0.00	0.00	1	16.00	0.00
Total Population	35	27.74	5.63	36	23.42	6.29

[1] These data include all living members of the population for whom date of marriage was known. Dates of marriage for widowed, divorced, or separated individuals were incomplete.

TABLE 43: PLACE OF BIRTH OF SPOUSES, KING ISLAND -- 1980
(n^1=38)

Place of Birth		Number of
Husband	Wife	Marriages (Percentage)
King Island[2]	King Island[2]	8 (21.1%)
King Island	King Island/Nome[3]	3 (7.9%)
King Island/Nome	King Island/Nome	2 (5.3%)
King Island	Seward Peninsula/Norton Sound[4]	3 (7.9%)
King Island	outside of Alaska	2 (5.3%)
King Island	Diomede Island	1 (2.6%)
King Island[2]	Seward Peninsula/Norton Sound[4]	1 (2.6%)
King Island[2]	outside of Alaska	1 (2.6%)
King Island/Nome	Savoonga	1 (2.6%)
King Island/Nome	Seward Peninsula/Norton Sound[4]	2 (5.3%)
King Island/Nome	outside of Alaska	1 (2.6%)
King island/Nome	other locations in Alaska[5]	1 (2.6%)
Diomede Island	King Island	1 (2.6%)
Seward Peninsula/Norton Sound[6]	King Island	2 (5.3%)
Nome	King Island	1 (2.6%)
Nome[7]	King Island/Nome	2 (5.3%)
outside of Alaska	King Island	3 (7.9%)
outside of Alaska	King Island/Nome	1 (2.6%)
outside of Alaska[7]	outside of Alaska	2 (5.3%)

TABLE 43: -- CONTINUED

[1] The total number of marriages in 1980 in which both spouses were still alive and residing together equals n; percentages are calculated of n.
[2] Three of the husbands and two of the wives were actually born in Nome during the summer months when the entire village population came to the mainland. They lived on the Island, however, so their birth in Nome was irrelevant to their population status.
[3] King Island/Nome refers to the King Island community post-relocation.
[4] These wives were born in Rocky Point, Mary's Igloo, Teller, Shishmaref, and Unalakleet.
[5] This wife was born in Kotzebue.
[6] These husbands were born in Mary's Igloo and Unalakleet. The Igloo man was an orphan who came to live at King Island prior to his marriage.
[7] All husbands were inmarried non-Natives.

community-exogamous marriages, 13 (56.5 percent) included King Island males and recruited females, whereas 10 (43.5 percent) included King Island females and recruited males. As previously mentioned, marriage patterns among King Islanders in recent years have tended towards greater flexibility in the recruitment and integration of outside membership than has been the case on St. Lawrence Island. It is not clear if this fact reflects more flexible social mechanisms than existed at St. Lawrence Island -- permitting a wide range of consanguineal, affinal, adoptive, and other interconnections between people -- which have been operative in King Island society for many generations, or if this apparent flexibility signals biological and social disruptions to the population which have implications for the continuity of successful crew hunting.

Reproduction, Mortality, and Migration

Data regarding reproduction, mortality, and migration on King Island were sporadically documented prior to the inception of formal education and missionary activity on the Island in 1929. The documented population fluctuations for the population were presented and discussed in reference to Table 35. In this section more specific details of reproduction and mortality will be presented. Table 44 presents birth and death data for King Island from 1930 to 1941 based on U. S. Bureau of Education records. Table 45 presents vital statistics for the Island from 1940 to 1980 based on informant recall. The latter compilation includes information on King Islanders who remained in Nome or who had a close relative (grandparent, parent, spouse, sibling, or offspring) remaining in Nome. Qualifications relating to informant recall methodology presented in the discussion of Gambell's population dynamics are relevant in this context as well.

The data presented in Table 35 illustrated fluctuations in the level of King Island's population from the early 1900s to 1930. Although the missionary Lafortune did not move to the Island until 1929, he was familiar with the Islanders as a result of their annual summer migration to Nome. He noted in his diaries that births and deaths were about equal on the Island until the 1930s (Lafortune 1940; and Renner 1979: 123).

Table 44 was compiled from documented birth and death records kept by the U. S. Bureau of Education from 1929 to 1941. Although there were gaps in the death data for a couple of the years and during the summer months in some instances when King Islanders were in Nome,

TABLE 44: BIRTHS AND DEATHS, KING ISLAND -- 1930-1941[1]

	Births			Deaths													
					Male[2]					Female[2]							
Year	Total	Male	Female	Total	C1	C2	C3	C4[8]	UC	C1	C2	C3	C4[8]	UC	Causes of Death[3]	Population Growth or Decline[4]
1930	13	5	8	11	0	0	1	5	0	0	0	0	5	0	a,b,c,d,e	+ 2
1931	7	5	2	13	0	0	2	3	0	0	0	0	8	0	b,d,f,g,h	- 6
1932	13	6	7	10	0	1	1	2	1	0	2	0	2	1	a,b,d,h,i	+ 3
1933	10	6	4	6[5]	1	0	0	1	0	1	1	0	2	0	b,d,h,j	ND[5]
1934	5	3	2	ND[6]	-	-	-	-	-	-	-	-	-	-	ND[6]	ND
1935	4	1	3	ND[6]	-	-	-	-	-	-	-	-	-	-	ND[6]	ND
1936	15	4	11	9	0	0	0	4	0	0	0	0	5	0	d,f,k,l	+ 6
1937	7	3	4	10	2	2	1	1	0	0	0	0	4	0	b,d,e,f,h,m,n,o,p	- 3
1938	18	6	12	4[7]	0	0	0	2	0	0	1	0	1	0	p,q,r,s	ND
1939	11	6	5	18	0	0	0	12	0	0	0	0	6	0	d,h,k,m,t,u	- 7
1940	17	8	9	2	0	0	0	1	0	0	1	0	0	0	d	+15
1941	5	3	2	6	0	2	0	3	0	0	0	0	1	0	b,d,m,u	- 1
Totals	125	56	69	89[7]	3	5	5	34	1	1	5	0	34	1	---	+ 9

TABLE 44: -- CONTINUED

1 Data derived from U. S. Bureau of Education.

2 Deaths are presented by age at death in 25 year cohorts. The C1 cohort is 76+, C2 is 51-75, C3 is 26-50, and C4 is 0-25. Individuals whose age at death was unknown are indicated in the UC (unknown cohort) columns by sex.

3 Causes of death are presented by code letters. Causes were reported by school teachers who were not medical professionals. Key to causes of death include:

a - convulsions
b - unknown
c - childbirth
d - tuberculosis
e - hunting accident
f - whooping cough
g - influenza
h - pneumonia
i - teething
j - unspecified accident
k - tubercular meningitis
l - unspecified infection
m - intestinal disorder
n - colic
o - old age
p - weakness
q - constipation
r - fall
s - abdominal trauma
t - measles
u - anemia

4 A (+) sign before number indicates the number of births exceeded the number of deaths for that year. A (-) sign indicates the number of deaths exceeded the number of births for that year.

5 Death data from mid-May through December, 1933, were missing or not recorded. Therefore population growth or decline information cannot be determined.

6 No death data were recorded for these years.

7 Incomplete death data. Based on these data, 26 or 55 percent of all male deaths and 28 or 66 percent of all female deaths occurred before age 6.

8 The deaths in these cohorts are not distributed evenly throughout the first 25 years of life. In the case of males, 26 or 76.5 percent of the cohort deaths occurred before the age of 5. In the case of females, 28 or 82.4 percent of the cohort deaths occurred before the age of 5.

these records reconstructed the population dynamics during a decade in which the level of births competed with deaths from introduced epidemics. In the 11 years from 1930 to 1940, U. S. Census data indicated a population growth from 165 to 210 -- an increase of 27.3 percent or 2.5 percent annually. The data in Table 44 exhibited a considerably smaller overall growth, although data on summer births and deaths,

TABLE 45: VITAL STATISTICS, KING ISLAND -- 1940-1980

	Total			Mean			Rate/1000	
	Births	Deaths	Population[1]	Births	Deaths	Population	Births	Deaths
1980	8	2	313					
1979	2	3	(293.4)					
1978	7	0	(273.8)	5.8	2.0	273.8	21.2	7.3
1977	4	2	(254.2)					
1976	8	3	(234.6)					
1975	8	5	215					
1974	6	2	(207.5)					
1973	4	3	200	7.4	2.6	202.6	36.5	12.8
1972	10	3	(196.8)					
1971	9	0	(193.6)					
1970	5	4	(190.4)					
1969	7	1	(187.2)					
1968	6	1	184	6.8	1.2	186.5	36.5	6.4
1967	8	0	(185.0)					
1966	8	0	(186.0)					
1965	9	0	(187.0)					
1964	10	1	(188.0)					
1963	6	0	(189.0)	9.2	0.2	189.0	48.7	1.1
1962	13	0	(190.0)					
1961	8	0	(191.0)					

TABLE 45: -- CONTINUED

	Total			Mean			Rate/1000	
	Births	Deaths	Population	Births	Deaths	Population	Births	Deaths
1960	5	0	(192.0)					
1959	7	0	(193.0)					
1958	8	0	194	6.6	0.0	188.1	35.1	0.0
1957	9	0	(185.2)					
1956	8	0	(176.4)					
1955	8	0	(167.6)					
1954	9	1	(158.8)					
1953	5	0	150	7.6	0.6	157.4	48.3	3.8
1952	12	0	160					
1951	9	2	(150.5)					
1950	7	1	141					
1949	7	0	(170.5)					
1948	4	2	200	6.4	0.8	189.6	33.8	4.2
1947	9	0	(218.8)					
1946	5	1	(217.5)					
1945	2	1	(216.3)					
1944	6	0	(215.0)					
1943	5	0	(213.8)	4.8	1.0	213.8	22.5	4.7
1942	6	2	(212.5)					
1941	5	2	(211.3)					
1940	14	0	210					

[1] Population totals in parentheses are estimates based on previous and subsequent population documentation.

deaths from 1933 to 1935, and emigration and immigration totals were not included. Based on the 1930 to 1940 year-by-year documented data, the birthrate was relatively high, approximating 58.1 births/1000.

Table 45 depicted birthrates from 1940 to 1980. All of the birthrates during these four decades were lower than that of the 1930 to 1940 interval. The highest birthrate during this period was between 1961 to 1965 (48.7 percent). This was the period of time that active relocation to Nome was in progress. The lowest birthrate occurred in the 1976 to 1980 interval. This low rate reflected the large number of unmarried child bearing-aged adults in the population during this period. It may also reflect the use of birth control techniques in recent years despite the strong influence of the Catholic church on the King Island population. The next lowest birthrate, which occurred from 1941 to 1945, may be explained in part by the participation of King Island males in military service during World War II.

Table 46 presents age-specific fertility, mean number of children, and average age at first birth for King Island females residing in Nome in 1980. These data indicate that there had been a relatively consistent average age at first birth between the oldest and middle two cohorts, although the 20-39 year old cohort was still very reproductively active in 1980 and their average age at first birth could increase. The 60+ and 40-59 year old cohorts had similar overall birthrates, although the 40-59 year old cohort's births were most concentrated in the 25-29 year age class. The phenomenon of younger cohorts not having as many children at older ages has been common in all the study populations. It may be in part the product of medically-induced sterilization or "planned parenthood" concepts. It may also reflect

TABLE 46: AGE-SPECIFIC FERTILITY OF FEMALES, KING ISLAND -- 1980

Age Class		Ages of Females in 1980 60+ (n=13)[3]	40-59 (n=19)	20-39 (n=41)	15-19 (n=23)	Totals (n=96)
45-49	n[1]	65	37	--	--	102
	births	0	0	--	--	0
	rate[2]	0.00	0.00	--	--	0.00
40-44	n	65	69	--	--	134
	births	7	1	--	--	8
	rate	107.69	14.49	--	--	59.70
35-39	n	65	95	17	--	177
	births	19	10	2	--	31
	rate	292.31	105.26	117.65	--	175.14
30-34	n	65	95	46	--	206
	births	11	22	5	--	38
	rate	169.23	231.58	108.70	--	184.47
25-29	n	65	95	94	--	254
	births	13	32	22	--	67
	rate	200.00	336.84	234.04	--	263.78
20-24	n	65	95	177	--	337
	births	17	30	26	--	73
	rate	261.54	315.79	146.89	--	216.62
15-19	n	65	95	205	65	430
	births	13	7	11	4	35
	rate	200.00	73.68	53.66	61.54	81.40
	Total n	455	581	539	65	1640
	Total births	80	102	66	4	252
	Average rate	175.82	175.56	122.45	61.54	153.66
Average age at first birth		21.40	20.90	21.00	17.00	
Mean number of children		6.15	5.37	1.61	.17	

[1] The n is equal to mother-years, which are the number of reproductively-aged females x the number of years each of these females has lived in each age class.

[2] Age-specific birthrate.

[3] Two of the 13 females were barren.

a decrease in the importance of children to older adults. There are no known ecologically-related explanations for this phenomenon. Of the 13 women in the 60+ cohort, 2 were barren. The overall fertility rate of King Island women was higher than that of both Gambell and Savoonga. The King Island population also exhibited a higher birthrate for the 15-19 year old cohort than Gambell but a similar rate to that of Savoonga. Lastly, both Gambell and Savoonga women had births between ages 45 to 49, but King Island females had none. It is suspected that this may relate to the relatively greater physical demands that were placed on King Island women while they were located on the Island and associated health conditions. Based on observations of the living population, it is expected that the onset and severity of osteoporosis in King Island females were earlier and greater respectively, although this index of health status has not yet been systematically investigated for King Islanders.

The average number of children and age at first birth of King Island males residing in Nome in 1980 is presented in Table 47. As in the case of females, data for three cohorts were presented to highlight changes in male reproductive patterns through time. For all cohorts, the mean number of children was calculated for all males in the cohort (n) and for all reproductively active males in the cohort.

Table 47 demonstrates that the incidence of non-reproductive males in the 40-59 year old cohort was slightly less than that of Gambell. In the case of the youngest cohort, which was still reproductively active in 1980, the incidence of non-reproductive King Island males was substantially greater than that at Gambell. This corresponds with the relatively larger percentage of unmarried King Island males

TABLE 47: AVERAGE NUMBER OF CHILDREN AND AGE AT FIRST BIRTH OF MALES, KING ISLAND -- 1980[1]

	Ages of Males in 1980		
Variable	60+ (n=13)	40-59 (n=25)	20-39 (n=59)
Mean number of children	3.69(4.36)[2]	3.84(5.05)[3]	.41(2.00)[4]
Mean age at first birth[5]	26.82	29.32	23.41

1 There was only one male in 1980 that had fathered offspring younger than age 20, so only three age cohorts were used. However, the single 18-year old paternity was calculated in mean age at first birth.

2 The mean number in parenthesis was calculated for the 11 reproductive males. The 3.69 mean was calculated for all males including 2 who had not been reproductively active.

3 The mean number in parenthesis was calculated for the 19 reproductive males. The 3.84 was calculated for all males including 6 who had not yet been reproductively active.

4 The mean number in parenthesis was calculated for the 12 reproductive males. The .41 was calculated for all males including the 47 who had not yet been reproductively active.

5 The mean age at first birth was only calculated for reproductively active males.

between the ages of 20 to 40. The mean number of children for all King Island males and reproductively active males was greater in the 40-59 year old cohort than in the 60+ year old cohort, whereas the mean age at first birth had increased from the oldest to middle cohort. At Gambell the mean number of children had also increased in the 40-59 year old cohort, but the age at first birth had declined. As previously mentioned, the paternity records for the oldest cohort may not be as complete as for the 40-59 year old cohort.

Figure 20 depicts seasonality of births by 25-year cohorts for King Islanders in 1980. For the oldest cohort (51+), the greatest percentage of births occurred in May, corresponding to a high level of August conceptions. For this population that had very high infant mortality, it is not known if more births actually occurred in May or if a greater number of offspring born in May survived. In the oldest cohort, there were no surviving births from the months of November and December. There were few births indicated for the months of August, September, and October, corresponding to conceptions in November, December, and January. Since births in August, September, and October would have been favorably timed for survival from an environmental perspective, unless their death rate from exposure to diseases in Nome was substantial, the participation of males in individual moving sea ice hunting during the early winter months may explain the relatively low rates of conception. No additional hypotheses can be offered at this time.

For the cohort 26-50 years, the highest percentage of births occurred in September, corresponding to a high rate of conception in December. These data reflect a definite change in birthing pattern

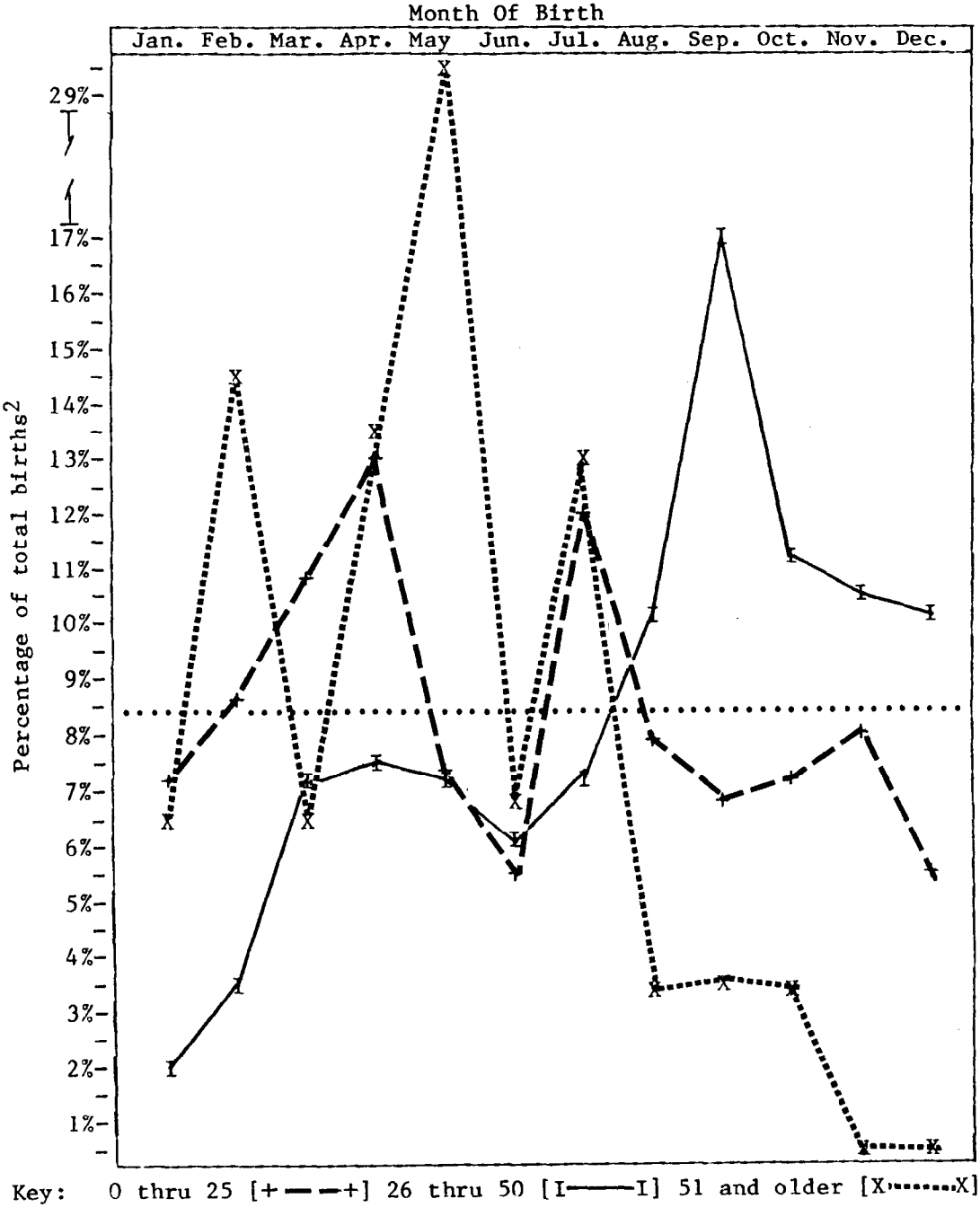


Figure 20: Seasonality of birth by 25-year cohorts, King Island -- 1980.[1]

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1 Because of the small size of the population over 75 years of age, oldest age category includes all individuals over 51.

2 The percentages are adjusted for differences in the number of days in each month. If births were equally distributed over the year, each month would contain 8.33 percent of the total births.

from that of the oldest cohort, but explanation related to changes in hunting patterns are not obvious and would be highly speculative. For births that occurred on the Island, the basic hunting patterns should have remained similar between the two cohorts. However, the church, school, and store had been established on the Island at this time, and these institutions may have influenced reproductive or hunting cycles. In particular, the Catholic church discouraged hunting during religiously important periods and may have suppressed hunting activities during the month of December.

For the youngest cohort (0-25), the births became more regularly distributed across the months of the year as they did in Gambell. Again, this observation probably reflects a lesser degree of hunting-related mobility after relocation to the mainland and more rapid mobility associated with the use of outboard motors and, more recently, snowmachines and wheeled vehicles on the Peninsula road system. The greater involvement of males in wage earning employment and carving unquestionably influenced more regularized conceptions throughout the year except during walrus-hunting months (May and June). Interestingly, conceptions began to rise in April and peaked in July for this youngest cohort, spanning the entirety of the walrus hunting period. Except for changes associated with technology and the mainland hunting base, no other explanations for this phenomenon can be suggested. These months remained high peak resource harvest and processing months for both males and females in 1980.

For all King Island cohorts, June was a low birth month, corresponding to low rates of conception in September. September has remained an active resource harvesting month on the mainland for both male and

female King Islanders prior and subsequent to relocation, although the patterns of harvest have become more central-based in recent years. Low conceptions in September do not conform to data from any other study community. In the King Island, Gambell, and Savoonga cases, seasonality of birth has remained more irregular than that of food-producing populations, despite trends towards greater regularity over the last 25 years.

Mortality on King Island was not well documented prior to 1930. The practices of infanticide and senilicide were not documented at King Island, although the latter was documented at Diomede, which was culturally very similar to King Island (Weyer 1932: 138).

> Female infanticide is a commonly reported practice among inupiaq Eskimos. I have never heard any mention of conscious female infanticide in Bering Strait. It is somewhat unlikely, in my opinion, that after the establishment of the church and school on the island that conscious infanticide, if it ever did exist, would persist. However, in 1930 [1950], the ratio after two decades of church and school was still 40 males to 28 females between 5 and 30. The explanation for this disproportion lies perhaps in the explicit and unmistakable preference in both word and deed for male children. (Bogojavlensky 1969: 33)

Suicide occurred among King Islanders (Bogojavlensky 1969; and Lafortune 1940), but was considered highly disgraceful and was indicative of a person, particularly an adult male, having no social support in the community. Suicide was the fate of social outcasts, and such status most frequently resulted from the absence of affiliation with a skin-boat crew.

It was reported that King Islanders escaped the impact of major epidemics until 1890, after which time the population experienced a substantial decline (Table 35) (Porter 1893). Although Bogojavlensky (1969) suggested that King Islanders had been impacted by the 1836-1839 smallpox epidemic based on informant recall (31), Ray (1975b) reported

that this epidemic failed to impact populations north of St. Michael. The impact of the 1900 measles and influenza epidemics on King Islanders has not been documented. The influenza epidemic of 1918 came to the Bering Strait area during the winter months when King Islanders were isolated from the mainland. Only one boat and crew with their families, who had overwintered at Sinuk, were affected by this epidemic. Unquestionably the annual contact with the transient population of Nome after 1900 provided the setting in which a greater number of contagious diseases was transmitted to King Islanders during summer months. Because of the Island's isolation during winter months, access to medical care was never readily available to its population except during summer months.

Table 44 presented birth and death data for King Island from 1930-1941 based on Bureau of Education records. The vast majority (76.4 percent) of deaths occurred in the cohort 0-25 years, and of these, the majority occurred before 2 years of age indicating high infant mortality. Lafortune (1940) referred to the high rate of infant mortality throughout his tenure on the Island. The ratio of male to female deaths for this period was 52.8 percent to 47.2 percent respectively. The highest incidence of deaths occurred from 1930 through 1932 and in 1937 and 1939. These were associated with epidemics of tuberculosis, whooping cough, influenza, and measles and associated disorders, including pneumonia and tubercular meningitis. It is of interest to note that there were only two hunting-related deaths during this 12-year interval. One man drifted away on the moving sea ice and one drowned while hunting from a kayak.

Table 45 presented total deaths, mean numbers of death for

5-year periods, and death rates for these 5-year intervals from 1940 to 1980. As discussed for Gambell, these data were based on informant recall and therefore were unquestionably conservative, particularly for the period prior to 1965. These data were in part incomplete because deaths which occurred in families which had relocated from Nome leaving no close relatives in the study population were not reported. Based on these limited data, the highest incidence of death occurred between 1971 and 1975.

Table 48 presents causes of death and number, range, and average age of death by sex and by decade for King Islanders residing in Nome in 1980 based on informant recall. In the 1971 to 1980 interval, 82.6 percent of the deaths were males including both accidental and disease-related deaths. Cancer as a cause of death was unreported by informants prior to 1971. In contrast to the data presented in Table 44, the majority of deaths from 1971-1980 were of middle-aged to older adults, and there was no indication of infant mortality except in one case of a congenital defect. All of the reported deaths in the 1961-1970 period were accidents or suicides -- a sharp contrast to causes of death from 1930-1941 even if the data for the later period were incomplete. Prior to 1960, all reported deaths were disease-related except for a case of freezing/hypothermia between 1931 and 1940 (the case already discussed in reference to Table 44). Clearly, contact with and relocation in Nome and exposure to western technology have resulted in an increase of accidental deaths and, in the early decades of the 1900s, diseases. Whereas in recent years western medicine has decreased the frequency of deaths related to disease, the incidence of accidents has increased for the King Island

TABLE 48: CAUSES OF DEATH AND NUMBER, RANGE, AND AVERAGE AGE OF DEATH BY SEX, BY DECADE, KING ISLAND -- 1901-1980[1]

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
1971-1980									
unknown[3]	4	2	0	19-72	74-77	52.7	75.5	1	0
cancer	3	1	0	60-68	67	61.3	67	0	0
homocides	3	0	0	23-25	--	24.0	--	0	0
automobile accidents	3	0	0	49-58	--	53.0	--	0	0
heart disease	2	0	0	35-63	--	49.0	--	0	0
hepatitis	1	0	0	15	--	15.0	--	0	0
brain disorder	1	0	0	60	--	60.0	--	0	0
congenital defect	0	1	0	--	<1	--	0.0	0	0
drowned	1	0	0	1	--	1.0	--	0	0
suicide	1	0	0	38	--	38.0	--	0	0
Total 1971-1980	19	4	0	--	--	--	--	1	0

TABLE 48: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
1961-1970									
frozen/hypothermia	1	1	0	46	38	46.0	38.0	0	0
unknown	1	0	0	40	--	40.0	--	0	0
non-specific accident	0	1	0	--	25	--	25.0	0	0
automobile accident	1	0	0	48	--	48.0	--	0	0
natural disaster	0	1	0	--	26	--	26.0	0	0
suicide	1	0	0	--	--	--	--	1	0
Total 1961-1970	4	3	0	--	--	--	--	1	0
1951-1960									
unknown	1	0	0	49	--	49.0	--	0	0
tuberculosis	0	1	0	--	18	--	18.0	0	0
childbirth related	0	1	0	--	<1	--	0.0	0	0
Total 1951-1960	1	2	0	--	--	--	--	0	0

TABLE 48: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
				1901-1950[4]					
unknown	12	9	0	<1-63	<1-32	31.8	6.6	1	0
tuberculosis	2	3	0	16-67	17-85	41.5	43.0	0	0
measles	4	2	0	1-5	<1-1	2.3	.5	0	0
non-specific weakness	1	1	0	2	<1	2.0	0.0	0	0
childbirth related	3	4	2	<1-<1	<1-48	0.0	12.0	0	0
whooping cough	2	4	0	<1-<1	<1-1	0.0	0.3	0	0
unknown illness	1	0	0	<1	--	0.0	--	0	0
pneumonia	4	1	0	<1-63	<1	32.5	0.0	0	0
stomach disorder	0	3	0	--	<1-3	--	1.3	0	0
meningitis	2	1	0	<1-1	1	0.5	1.0	0	0
convulsions	0	1	0	--	1	--	1.0	0	0
frozen/hypothermia	1	0	0	62	--	62.0	--	0	0
Total 1901-1950	32	29	2	--	--	--	--	1	0

Total Reported Causes of Death, Dates of Death Known, King Island, 1901-1980 = 96
Total Reported Deaths, Dates of Death Unknown, King Island, 1901-1980 = 59
Total Reported Deaths, King Island, 1901-1980 = 155

TABLE 48: -- CONTINUED

[1] Death data are based on informant recall, not on medical records or other documented sources. Similar causes have been grouped into categories. In most cases, data accuracy and completeness decline in relationship to the number of years which has transpired since their occurrence. There are 59 individuals, closely related to the living Gambell population (either grandparents, parents, spouses, siblings, or offspring), who have died but dates of death are unknown. Causes of death for these individuals are unknown.

[2] Age range and average age are calculated only on cases of known sex.

[3] This category indicates that there is no information on causes of death.

[4] U. S. Bureau of Education data reported 5 male (2 of whom were 51-75 and 3 of whom were 0-25) and 1 female (0-25) deaths in 1941 from unknown causes, tuberculosis, intestinal disorder, and anemia; 5 male and 8 female deaths in 1931 from unknown causes, tuberculosis, whooping cough, influenza, and pneumonia; 5 male and 5 female deaths in 1932 from convulsions, unknown causes, tuberculosis, pneumonia, and teething; 2 male and 4 female deaths in 1933 from unknown causes, tuberculosis, pneumonia, and unspecified accidents; 4 male and 5 female deaths in 1936 from tuberculosis, whooping cough, tubercular meningitis, and unspecified infection; 6 male and 4 female deaths in 1937 from unknown causes, tuberculosis, hunting accident, whooping cough, pneumonia, intestinal disorder, colic, old age and weakness; 2 male and 2 female deaths in 1938 from weakness, constipation, fall, and abdominal trauma; 12 male and 6 female deaths in 1939 from tuberculosis, pneumonia, tubercular meningitis, intestinal disorder, measles, and anemia; 1 male and 1 female deaths in 1940 from tuberculosis; and 6 male and 5 female deaths in 1930 from convulsions, unknown causes, childbirth, tuberculosis, and hunting accident. There were no reported death data from 1911-1920.

population. It is of interest to note, however, that the accidental deaths were not hunting-related during the last two decades.

To complete this discussion of King Island population dynamics, migration to and from the community must be considered. Emigration from King Island to Nome commenced much earlier than that of St. Lawrence Island, primarily because the pattern of annual summer migrations to the mainland was an established component of King Islanders' seasonal round, probably for as long as they have been on the Island (see Chapter V). In contrast, frequent contact between St. Lawrence

Islanders and Nome residents was not established until regular air transportation to the Island was established. Undoubtedly there would have been a substantial subcommunity of King Islanders in Nome if the course of events had not successfully discouraged continued winter habitation on the Island. In a sense, however, the entire population emigrated, but in doing so they were successfully reestablished as a discrete subpopulation in a new site. However, there has continued to be emigration out of the King Island population wherever located. This emigration is the subject of this discussion.

Table 49 presents destinations and numbers of King Island emigrants from the population by sex and age in 1980. As in the other cases, these data are only applicable to emigrants who had close relatives residing in Nome in 1980. The vast majority of King Island emigrants relocated in Alaska's urban centers, primarily for purposes of access to a market for carved ivory and, secondarily, access to wage employment. As in the St. Lawrence Island case, female emigrants outnumbered males, but the ratio between the two was less. The overall rate of emigration for King Islanders was substantially less than that of St. Lawrence Island, and in the last decade many emigrated King Islanders have returned to Nome. Access to walrus hunting and to King Island relatives were the main reasons provided by former emigrants for returning to Nome.

Patterns of Adoptions

Adoption in King Island society traditionally shared many common features with that described for St. Lawrence Island. Adoption at

TABLE 49: DESTINATIONS AND NUMBER OF EMIGRANTS BY SEX AND AGE, KING ISLAND -- 1980[1]
(n=65)

Destination	Males			Females		
	Total (Percentage)	Age Range	Mean Age	Total (Percentage)	Age Range	Mean Age
Gambell	0(0.0%)	--	--	1(2.9%)	26	26.0
Seward Peninsula/Norton Sound[2]	1(3.3%)	42	42.0	0(0.0%)	--	--
Anchorage	17(56.7%)	14-79	44.6	20(57.1%)	11-75	40.0
Fairbanks	5(16.7%)	11-25	18.4	9(25.7%)	13-53	36.9
elsewhere in Alaska[3]	1(3.3%)	24	24.0	1(2.9%)	39	39.0
outside	5(16.7%)	11-46	30.8	3(8.6%)	9-38	21.6
unknown	1(3.3%)	8	8.0	1(2.9%)	48	48.0
Totals	30(46.2%)	--	--	35(53.8%)	--	--

TABLE 49: -- CONTINUED

[1] These data reflect only emigrants who are closely related (offspring, spouses, siblings, parents, or grandparents) to members of the study population who were and residing in Nome in 1980. There were no year-round residents on King Island in 1980; all King Islanders who had not emigrated resided in Nome.
[2] This was Brevig Mission.
[3] Communities included Valdez and Palmer.

King Island differed, however, in providing a flexible pseudo kin-based mechanism for expanding and strengthening a male's faction (i.e. boat crew) (Bogojavlensky 1969). The emphasis placed on bonds between genealogically-related males on St. Lawrence Island was supplemented on King Island through other mechanisms, such as marriage, comarriage, naming, and adoption, although the latter two were also used to establish kin ties on St. Lawrence Island as well. The relatively small size of the population and more rigorous environmental demands at King Island encouraged the development of a more flexible system for aligning males for purposes of crew hunting. On St. Lawrence Island this same end was accomplished primarily, but not exclusively, through reproduction, although St. Lawrence Islanders employed mechanisms like adoption when reproductively-derived interconnections were inadequate.

In 1938 the importance of adoption as a mechanism for uniting males was highlighted in Cameron's (1938) census. Of 17 adoptions, 14 (82.4 percent) were males and 3 (17.6 percent) were females. Of all households in 1938, 22.9 percent had adopted offspring.

Table 38 indicated that in 1980, 11 households (17.5 percent of all households) included adopted offspring, although, as previously mentioned, there were other cases of grandchildren functioning as

adopted offspring. Although most adoptions were between King Island households in 1980, at least 3 girls and 1 boy had been adopted to households outside of the community. This contrasted to St. Lawrence Island where adoptions were primarily into the communities. Adoptions by maternal and, less frequently, paternal grandparents were most common in 1980. This was probably not the case in earlier years, since such an adoption would have been redundant in terms of establishing alliances between unrelated males. However, in earlier years it would have been less common for a female to have had a child outside of a socially recognized union with a male, thereby providing less need for grandparent adoption as a means for supporting such a child.

Population History of Diomede Island

Community Demographic Characteristics

Table 50 presents population size and distribution by sex, number of households, and average household size for Diomede Island between 1779 and 1980. These population totals are solely for the Island and do not include Diomeders who reside in Teller or Nome or Big Diomede Island unless specifically noted.

Earliest population levels for Diomede were reconstructed from early explorer accounts and oral history. The earliest documented population data were from Kobelev in 1779 and 1791 and reported populations of 164 and 100 respectively. Ray (1975b) suggests that Kobelev's data were relatively reliable in terms of overall population totals. However, males and adolescents were grouped together as were females

TABLE 50: POPULATION SIZE AND DISTRIBUTION BY SEX, NUMBER OF HOUSEHOLDS, AND AVERAGE HOUSEHOLD SIZE, DIOMEDE -- 1779-1980[1]

Year	Population Size	Total Males	Total Females	Number of Households[2]	Average Household Size[3]
1980[4]	146	85	61	27	5.41
1980[5]	139	ND	ND	33	4.21
1975[6]	141	80	61	19	7.42
1973[7]	83	ND	ND	ND	ND
1970	84[8]	ND	ND	26[9]	3.23
1969[10]	70	ND	ND	11	6.36
1968[16]	98	ND	ND	21	4.67
1967[23]	94	ND	ND	21	4.48
1966[23]	94	ND	ND	ND	ND
1960[8]	88[103[23]]	ND	ND	ND	ND
1958[11]	100	ND	ND	ND	ND
1952[12]	103	ND	ND	ND	ND
1950[22]	103[121[23]]	ND	ND	ND	ND
1940[23]	125	ND	ND	ND	ND
1939[13]	128	ND	ND	ND	ND
1926[14]	94	ND	ND	10	9.40

TABLE 50: -- CONTINUED

Year	Population Size	Total Males	Total Females	Number of Households[2]	Average Household Size[3]
1920[21]	101	ND	ND	ND	ND
1910[20]	90	ND	ND	ND	ND
1890[15]	85	45	40	17[20]	5.00
1880[16]	40	ND	ND	ND	ND
1865-1867[17]	150	ND	ND	ND	ND
1854[17]	150	ND	ND	ND	ND
1850[18]	300±	ND	ND	ND	ND
1791[19]	100(218)	45(103)	55(115)	ND	ND
1779[19]	164(398)	85(203)	79(195)	ND	ND

ND = no data

1 These data are all for Little Diomede unless otherwise noted. For some years Big Diomede population data are available and will be presented in parentheses. For some years the populations of the two islands were combined. Data which include the population totals for both islands will be referenced accordingly.

2 These are the number of inhabited domiciles.

3 The average includes single individual households.

4 Based on field data; the population total does not include teachers and missionaries and does include individuals temporarily away from home for educational, medical, or other short-term purposes.

TABLE 50: -- CONTINUED

5 U. S. Department of Commerce, Bureau of the Census 1980. These data include teachers, missionaries, and any other temporary visitors to the Island. They did not include people temporarily away from the village. The greater number of households in part can be explained by teacher and missionary buildings. It is expected that uninhabited dwellings may have been included in this enumeration.

6 Ellanna and Roche 1976: 7 and 9.

7 Totals included Native enumeration and two non-Native teachers. Diomede Alaska Native Claims Settlement Act enrollment by July 1973 was 99 indicating that a minimum of 16 enrolled individuals had emigrated from the Island (U.S. Department of the Interior, Bureau of Indian Affairs 1973).

8 U. S. Department of Commerce, Bureau of the Census 1970: 4.

9 Bering Straits Native Corporation 1980. This household estimate was high based on previous and subsequent years' data.

10 Burch 1975: 229.

11 Kenyon 1960.

12 Brooks 1953: 505.

13 Alaska Planning Council 1940: 22 and 25; based on U. S. Bureau of the Census, 1940, data. Of the population total, 44 were school-aged children and 1 a non-Native teacher. The population of Little Diomede was disrupted in 1933 when Soviet policies regarding national minorities provided impetus for individuals from East Cape, Siberia and Big Diomede to settle on Little Diomede Island (Bogojavlensky 1969: 32). Many Little Diomeders relocated in the Teller area where some families have remained to the present day. In 1968, Bogojavlensky (1969) claimed that two-thirds of Diomede's population had originated on Big Diomede or were the offspring of Big Diomeders.

14 Jenness 1929: 81. This was a December enumeration. Jenness stated that houses always contained two families.

15 Porter 1893: 8 and 165. All 85 were Iñupiat. The 17 referred to "houses," whereas the 20 was the number of "families." Criteria used for defining "family" membership were not specified by Porter.

16 Bogojavlensky 1969: 30. The 1880 data were summer population data. The 1968 data were based on winter populations.

17 Dall as reported in Ray 1975b: 109. These totals are for Big and Little Diomede islands combined.

18 Collinson 1889: 74. This total is for Big and Little Diomede islands combined.

19 Kobelev in Ray 1975b: 33-34 and 53. Male totals are for males and adolescents, female totals for females and infants. Big Diomede Island population totals are in parentheses.

20 U. S. Department of Commerce, Bureau of the Census 1913: 573. These were mid-winter enumerations. In 1900 the inhabitants of Diomede were moved to Teller and the village burned by the crew of the revenue cutter Bear because of disease. The 1910 population included those families who returned and some relocated Big Diomeders, although the number of each in the 1910 population is unknown.

TABLE 50: -- CONTINUED

21 Hunt 1921: 681.
22 Brunsman 1952: 51-5. This was a U. S. Census so teachers, missionaries, and visitors were counted; people temporarily away from home were not.
23 Burns 1967: 19 and 26. The discrepancy between the different population totals cannot be explained for 1950 and 1960. Burns' data may include relocated Diomeders who have returned to the Island for the spring walrus hunt.

and infants, so these data were not useful for generating accurate sex ratios. Additionally, most early explorer population enumerations were made during summer months when insular populations were highly mobile, so estimates may have been conservative. There were no early reports of other villages on the Island, although Big Diomede was reported to have three villages at time of contact.

As in the King Island case, the population history of the Island suggests a maximal carrying capacity of approximately 150 individuals since contact. Due to the size of Big Diomede's population (398 in 1779) and its proximity to Little Diomede Island, the habitat in that general area was supporting a population in excess of 500 individuals in the late 1700s (Ray 1975b). The population remained relatively stable until 1900, although the 1890 census reported only 85 persons (Porter 1893). However, Ray (1975b) questioned the accuracy of both the 1880 and 1890 census (110). In 1900 the inhabitants of Diomede were moved to Teller and the village was burned by the crew of the revenue cutter Bear because of a diptheria epidemic. The 1910 population included those families who returned and some relocated Big Diomeders. Since Diomede Island's population was also out of contact with the mainland during the winter months of 1918, they were not

victims of the influenza epidemic of that year. This conclusion is supported by a population increase between 1910 and 1920, although the mobility between Big and Little Diomede islands made population enumerations problematic prior to the 1930s.

In 1933 the Soviet Union's Policy for National Minorities resulted in disruptions to the populations of East Cape, Siberia, and Big Diomede Island. Subsequently, some Big Diomeders resettled on Little Diomede Island, and in the 1960s, according to Bogojavlensky (1969), in excess of two-thirds of Diomede's population were from the Soviet side of the Strait (32). Between 1939 and 1975 population estimates varied considerably, from 128 in 1939 to 70 in 1969. It is expected that these variations were more associated with census methodologies and Diomeder mobility than to actual population fluctuations. Nonetheless, by 1975 the population was solidly established to be 141 including two non-Native teachers and a missionary (Ellanna and Roche 1976). By 1980 the population was composed of 146 Iñupiat based on field data, including individuals temporarily away from the village and not including teachers and missionaries.

Unfortunately there were no published population profiles for Diomede prior to 1970. Figure 21 presents age and sex composition by 5-year cohorts for Diomede in 1970 based on U. S. Bureau of Census data (Institute of Social, Economic, and Government Research 1973: 15). These data indicated a high ratio of males to females and no females in the key child-bearing years from 26 to 35. Of all males, 53.1 percent were too old or too young to be actively involved in crew hunting (older than 60 and younger than 16). In light of data gathered in 1975, these 1970 data are highly suspect.

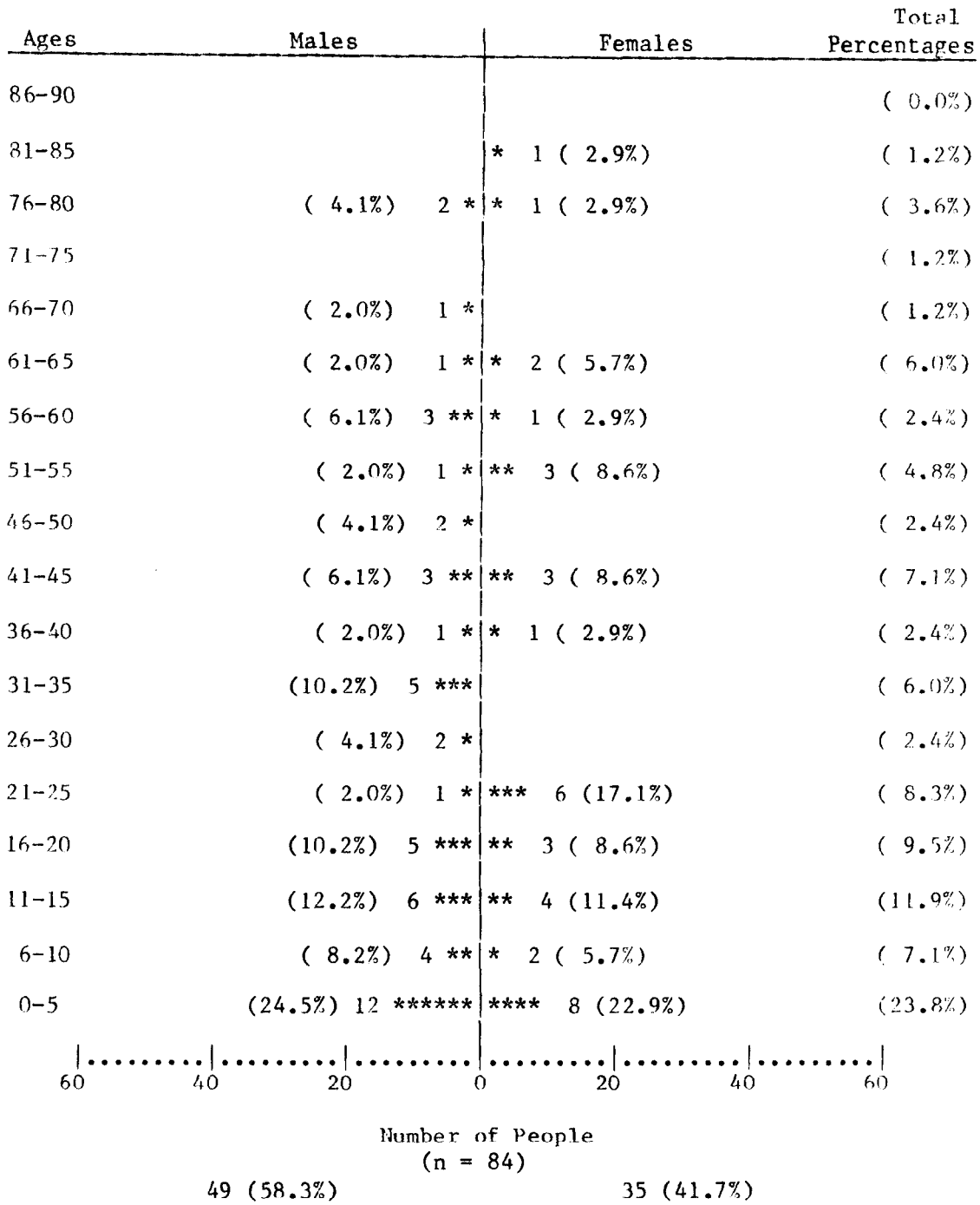


Figure 21: Age & sex composition by 5-year cohorts, Diomede -- 1970.[1] [2]

Figure 21: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	25.714	26.714	26.131
Median	18.000	21.000	18.500
Std. Dev.	21.897	23.508	22.448

[2] Institute of Social, Economic, and Government Research 1973: 15.

Figure 22 presents age and sex composition by 5-year cohorts for Diomede in 1975 based on field data (Ellanna and Roche 1976). Although there was still a high ratio of males to females, it was less than that recorded in 1970. A slightly lesser percentage of males (48.9 percent) was either too old or too young to participate in crew hunting under normal conditions, a 4.2 percent decline from 1970. Of the entire population, which was 57 individuals larger than the population in 1970, 21.3 percent of the females were potentially reproductively-aged females (16 to 50). This was a greater percentage than existed in the other study populations and 5.8 percent more than occurred in Diomede in 1970. Although there were 12 individuals above the age of 56 in 1970, only 5 of them were recorded in the 1975 census, a loss of 7 individuals leaving no one in the population older than 65. The mean age of the population was 3.5 years younger in 1975 than it was in 1970.

Figure 23 presents age and sex composition by 5-year cohorts for Diomede in 1980 based on field data. The ratio of males to females was similar to that of 1970, exhibiting a disproportionate ratio of the sexes which was greater than that in 1975. The overall population had increased by 8 individuals (5.8 percent or 1.2 percent annually), since 3 non-Natives were counted in the 1975 census and none were included

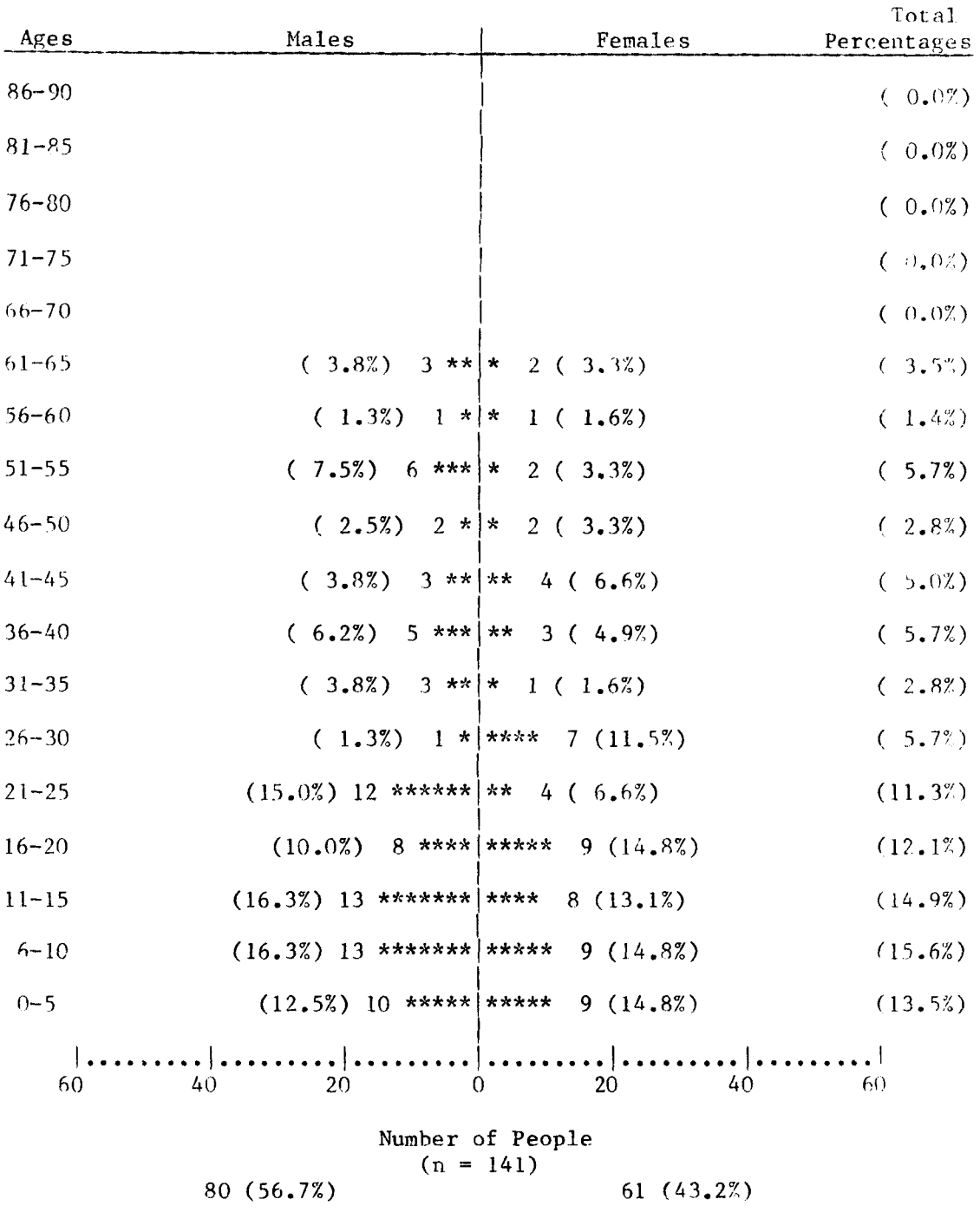


Figure 22: Age & sex composition by 5-year cohorts, Diomede -- 1975.[1] [2]

Figure 22: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	22.875	22.262	22.610
Median	18.000	18.000	18.000
Std. Dev.	17.338	16.654	16.988

[2] Adapted from Ellanna and Roche 1976: 13.

in 1980. Significantly, 29 individuals were born into the population between 1975 and 1980. Since the population had increased by only 8 individuals, 21 or 14.4 percent of the population had either died or migrated during the 5-year interval. Of all males, 37.6 percent was either too old or too young to participate in crew hunting under normal conditions. There was a slight decline in the percentage of potentially reproductive females relative to 1975. In general, the population was only slightly younger than that of 1975 and included five additional males. In other respects, the population had remained similar over the 5-year interval. The loss of 21 persons was in part accounted for by emigration for wage employment.

Table 51 presents the percentage of Eskimo ethnicity by age and sex for Diomede in 1980. Of all the study populations, Diomede exhibited the least percentage of partial Eskimo ethnicity within its population in 1980 and the largest percentage (95.1 percent) of individuals who reported solely Eskimo ancestry. There were no non-Eskimos in the resident population in 1980. Of the 7 individuals who were not solely of Eskimo ethnicity, 6 were in the youngest cohort (0-25) reflecting that Diomeder isolation from other populations had been least in more recent years. In 1980, although the population of the Island remained spatially removed from the mainland and isolated during the

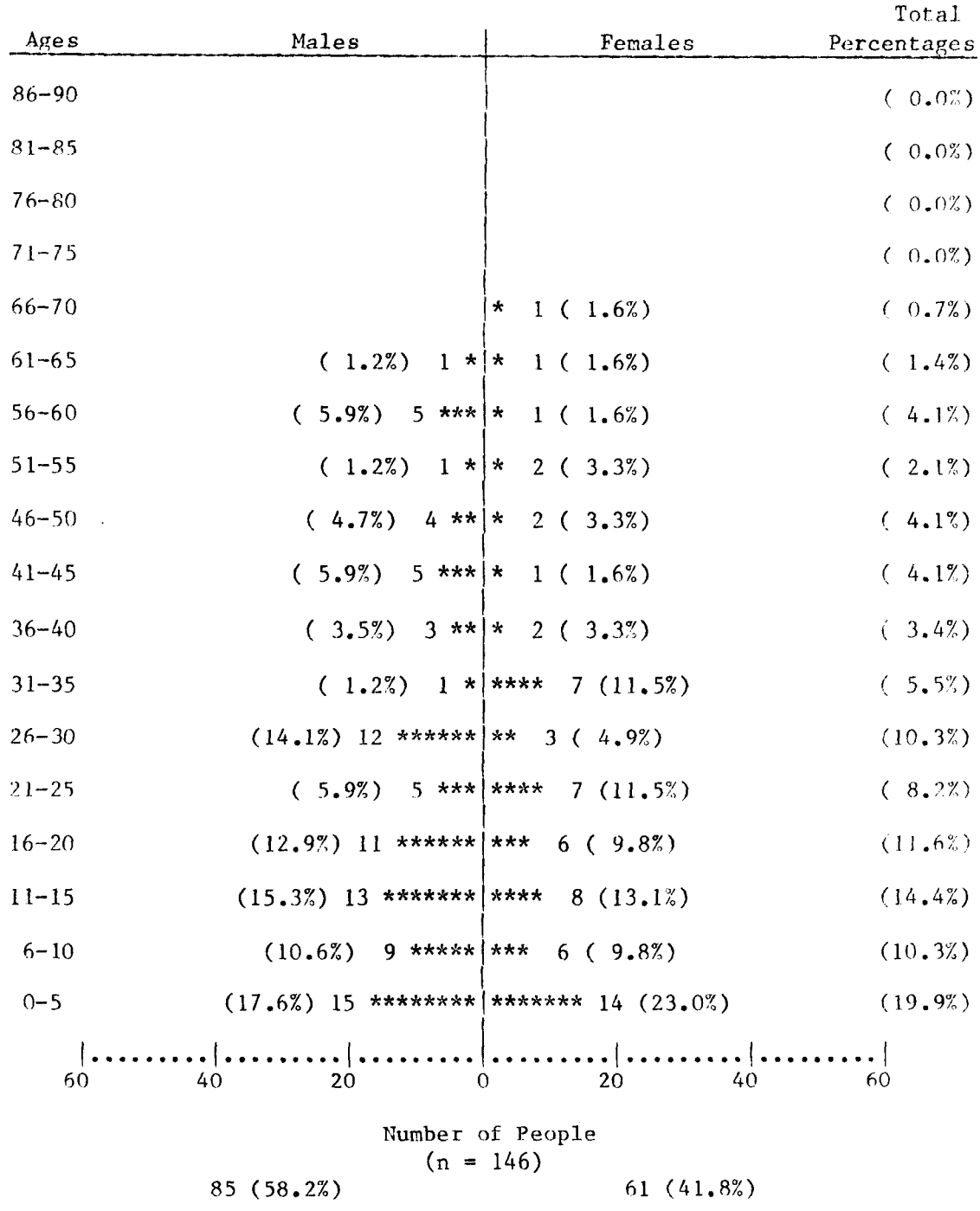


Figure 23: Age & sex composition by 5-year cohorts, Diomede -- 1980.[1]

Figure 23: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	22.294	20.770	21.658
Median	17.000	16.333	16.750
Std. Dev.	17.096	17.042	17.031

months when freeze-up begins but stable ice has not yet formed and during breakup, regular air transportation during the remainder of the winter months (usually mid-December to late April or early May) and umiak transportation during the summer months provided the means of mobility to Diomeders. Representatives of most families traveled frequently to Nome and less frequently to Anchorage or other areas of the State. Certainly access to potential spouses from other populations was available in recent years, but Diomeders who had not relocated have tended to marry within their own population.

Table 50 presented sporadic documented data on the number of households at Diomede Island and the number of individuals who composed households historically. The earliest documentation of the number of households in the community was in 1890, when it was reported that 20 families occupied 17 domiciles (Porter 1893), although the population estimate was probably low that year providing an average household size of 5.00 which was also low.

Eide's (1952) data from 1910 is much more accurate because he resided on the Island for nearly one year. He reported that some dwellings accommodated 10 to 20 people and that the relative size of domiciles related to the wealth of the family, although he did not report the number of dwellings in the community (Eide 1952: 50). In more recent years, estimates of the number of dwellings have ranged

TABLE 51: PERCENTAGE OF ESKIMO ETHNICITY BY AGE AND SEX, DIOMEDE -- 1980[1]
(n=143)

Age Cohorts	100%		75%		50%		25%		0%	
	M	F	M	F	M	F	M	F	M	F
76-100	0	0	0	0	0	0	0	0	0	0
51-75	7	5	0	0	0	0	0	0	0	0
26-50	23	15	1	0	0	0	1	0	0	0
0-25	49	37	0	0	4	1	0	0	0	0
Total by sex	79	57	1	0	4	1	1	0	0	0
(Percent of population by sex)	(92.9)	(98.3)	(1.2)	(0.0)	(4.7)	(1.7)	(1.2)	(0.0)	(0.0)	(0.0)
Total individuals	136		1		5		1		0	
(Percent of total population)	(95.1)		(0.7)		(3.5)		(0.7)		(0.0)	

[1] Compiled from field data. In three cases, ethnicity was not reported, although field data indicated they were probably 100 percent Eskimo.

from 21 in one year to 11 the following year, obviously indicating that one or both estimates were inaccurate. It is suspected that Bogojavlensky's (1969) estimate of 21 from 1967 to 1968 was most accurate.

In 1975, 19 domiciles were inhabited and some units of government-subsidized housing had been constructed. Between 1975 and 1980, additional units of new housing were constructed with the associated pressures towards the formation of nuclear family households described in the St. Lawrence and King Island's context. By 1980 there were 27 households based on field data.

Table 52 presents household composition by type at Diomede in 1980. The 27 households represented an average household size of 5.41 in 1980. Of all households, 19 (70.4 percent) were nuclear family models and 8 (29.6 percent) were extended family households. There were no single individual households and no cases of husbands and wives residing alone in a household. The percentage of extended family households was similar to that of King Island and Gambell but less than that of Savoonga. There was no preference for sons apparent in household composition in 1980, since an approximately equal number of households included sons or son surrogates and daughters or daughter surrogates. There were two instances of sons-in-law residing in households. This occurrence may reflect bilaterality of household composition or the practice of bride-service reported by Eide (1952) in 1910. There was no incidence of son-in-law residence in households at King Island in either 1938 or 1980. There were 4 (14.8 percent) households with adopted offspring, although grandchildren functioned as adopted children in other cases. All household heads (male and female) were Diomeders suggesting that patrilocal residence remained important in 1980.

TABLE 52: HOUSEHOLD COMPOSITION BY TYPE, DIOMEDE -- 1980[1]
(n=27)

Key:

Wi = wife
So = son
Da = daughter
ASo = adopted son
ADa = adopted daughter
SSo = stepson
SDa = stepdaughter
Gso = grandson
GDa = granddaughter
Br = brother
Ne = nephew
Ni = niece
GNi = grandniece
Co = cousin
Sil = son-in-law
Um = male, relationship unknown

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)[2]
5	18.5%	male	WiSoDa
2	7.4%	male	WiSo
2	7.4%	male	WiDa
2	7.4%	male	So
1	3.7%	male	WiSoDaSDa
1	3.7%	male	WiSSoDaSDa
1	3.7%	male	WiSoASoDaADa
1	3.7%	male	WiSo[3]Da[3]SoSSo
1	3.7%	male	WiADa
1	3.7%	male	WiDaASoGDa
1	3.7%	male	WiSoDaGSo
1	3.7%	male	WiSoSSoDaADaGSoGDa
1	3.7%	male	WiDa[3]BrSilNeNi
1	3.7%	male	BrSilNeNiGNi
1	3.7%	male	Ne[4]
1	3.7%	male	Co[5]Ne[6]Um
1	3.7%	female	So[7]
1	3.7%	female	Da
1	3.7%	female	SoDa
1	3.7%	female	SoDaNe[6]

TABLE 52: -- CONTINUED

[1] Based on field data. Total population was 146 (not including teachers and missionaries), composed of 85 males and 61 females in 29 households.

[2] These are household types and in some cases they occurred with multiple members of the same kinship relation to head (such as more than one son or daughter). Of 27 households, 19 (70.4 percent) were nuclear families and 8 (29.6 percent) were extended family households. There were no single individual households and no household composed only of a man and wife. There were 23 (85.2 percent) male heads of household and 4 (14.8 percent) female heads. There were 4 (14.8 percent) households with adopted children. Of the households, 19 (70.4 percent) included sons, adopted sons, stepsons, and/or grandsons, and 19 (70.4 percent) included daughters, adopted daughters, stepdaughters, and/or granddaughters.

[3] Offspring of male head and previous wife.

[4] The nephew is the head's sister's son.

[5] This cousin is the head's mother's brother's son.

[6] This nephew is the head's brother's son.

[7] This woman and her children normally reside in Wales with her husband. However, both she and her husband are Diomeders who have relocated to Wales. They were temporarily residing in Diomede to assist the female's mother.

Table 53 presents place of birth by 25-year cohorts and sex for Diomede in 1980 based on field data. These data reflect the isolation of the Diomede population and seasonal migration to the mainland. In the oldest two cohorts all individuals were Diomeders (or Big Diomeders) who were either born in Diomede or born at Nome or Teller during summer resource harvest activities on the mainland. In the 26-50 year old cohort most individuals were born at Diomede, except for 7 seasonal births at Nome, Teller, and Wales; 1 birth of a Diomeder at Unalakleet while his family was temporarily residing there; and 3 births at Gambell of the offspring of a Gambell male and a Diomede female. In the 0-25 year old cohort, many individuals were born at Diomede, except for the 44 hospital births of Diomeders in Nome, Kotzebue, or Anchorage, a practice encouraged by medical professionals;

TABLE 53: PLACE OF BIRTH BY 25-YEAR COHORTS AND SEX, DIOMEDE -- 1980

Place Of Birth	Age Cohorts: 76-100 M	76-100 F	51-75 M	51-75 F	26-50 M	26-50 F	0-25 M	0-25 F
	Sex							
Diomede	0	0	6	3	19	10	20	18
Big Diomede	0	0	0	1	0	0	0	0
Wales	0	0	0	0	1	0	0	0
Gambell	0	0	0	0	0	3	0	0
Seward Peninsula and Norton Sound[1]	0	0	1	0	2	1	8	3
Nome	0	0	0	1	3	1	21	16
Kotzebue	0	0	0	0	0	0	1	3
Anchorage	0	0	0	0	0	0	2	1
Outside Alaska	0	0	0	0	0	0	1	0
Total	0	0	7	5	25	15	53	41

[1] The communities in this category include Teller, Shishmaref, and Unalakleet.

a Diomeder born in Unalakleet while his family was temporarily residing there; a Diomeder born in Shishmaref of Diomede parents; and 9 Diomeders born in Teller of Diomede parents who lived on the Island or of relocated Diomeders who resided in Teller. Essentially, the entire population of the Island had Diomede connections through at least one parent.

Table 54 presents parental birthplaces by 25-year cohorts for Diomede in 1980. Birthplaces of parents suggest greater heterogeneity of origins. Of all individuals, 102 cases (69.9 percent) were of solely Diomede ancestry if Big and Little Diomede populations were viewed as one, despite location of birth. Of all fathers, 123 (84.2 percent) were Diomeders if Big Diomede and Diomeders in Shishmaref, Teller, and Wales are included. Of all mothers, 137 (93.8 percent) were Diomeders if Big Diomeders and Diomeders born in Nome, Gambell, and Teller are included. It is expected that the majority of the 11 "unknown" fathers were also Diomede males. If this were the case, only the "outside" fathers and Gambell father were from off the Island, and none of these were resident fathers. These data demonstrate the highest level of community endogamy found in the study populations spanning in excess of four generations. Since individuals with non-resident, non-Diomede fathers were brought into the households of their mothers' parents, grandfathers were available for ensuring the transmission of hunting-related knowledge and skills to the male offspring of such unions.

TABLE 54: PARENTAL BIRTHPLACES BY 25-YEAR COHORTS, DIOMEDE -- 1980[1]
(n=146)

Place of Birth		Number (Percentage of Cohort)			
Father	Mother	Cohort 0-25	Cohort 26-50	Cohort 51-69	Total Number and Percentage
Diomede	Diomede	56(59.6%)	16(40.0%)	2(16.7%)	74(50.7%)
unknown[2]	Diomede	10(10.6%)	1(2.5%)	0(0.0%)	11(7.5%)
Big Diomede	Diomede	0(0.0%)	5(12.5%)	3(25.0%)	8(5.8%)
Nome[3]	Diomede	6(6.4%)	1(2.5%)	0(0.0%)	7(4.8%)
Diomede	Nome[3]	4(4.3%)	2(5.0%)	0(0.0%)	6(4.1%)
Diomede	Gambell[4]	4(4.3%)	1(2.5%)	0(0.0%)	5(3.4%)
Big Diomede	Big Diomede	0(0.0%)	2(5.0%)	3(25.0%)	5(3.4%)
Diomede	unknown	1(1.1%)	3(7.5%)	0(0.0%)	4(2.7%)
outside[8]	Diomede	4(4.3%)	0(0.0%)	0(0.0%)	4(2.7%)
Shishmaref	Diomede	0(0.0%)	3(7.5%)	0(0.0%)	3(2.1%)
Wales	Diomede	0(0.0%)	1(2.5%)	2(16.7%)	3(2.1%)

TABLE 54: -- CONTINUED

Place of Birth		Number (Percentage of Cohort)			
Father	Mother	Cohort 0-25	Cohort 26-50	Cohort 51-69	Total Number and Percentage
Gambell	Big Diomede	0(0.0%)	2(5.0%)	0(0.0%)	2(1.4%)
unknown	Gambell[4]	2(2.1%)	0(0.0%)	0(0.0%)	2(1.4%)
Big Diomede	Shishmaref	0(0.0%)	1(2.5%)	1(8.3%)	2(1.4%)
unknown	Nome[5]	2(2.1%)	0(0.0%)	0(0.0%)	2(1.4%)
unknown	unknown	1(1.1%)	0(0.0%)	1(8.3%)	2(1.4%)
Diomede	Kotzebue[6]	1(1.1%)	0(0.0%)	0(0.0%)	1(.7%)
unknown	Kotzebue[6]	1(1.1%)	0(0.0%)	0(0.0%)	1(.7%)
Diomede	Teller	1(1.1%)	0(0.0%)	0(0.0%)	1(.7%)
unknown	Big Diomede	0(0.0%)	1(2.5%)	0(0.0%)	1(.7%)
Nome[7]	Gambell[4]	0(0.0%)	1(2.5%)	0(0.0%)	1(.7%)
Teller[9]	Diomede	1(1.1%)	0(0.0%)	0(0.0%)	1(.7%)

TABLE 54: -- CONTINUED

1 There were no individuals in cohort 76-100.
2 All of these fathers were Iñupiat.
3 In eight cases the Nome-born individuals were from the Diomede population but were only born in Nome. In the other cases the Nome-born individuals were from Diomede households who had relocated in Nome, except for the case of one female who was from a mainland Yupik-speaking populations.
4 These individuals were the offspring of women whose mother was a Diomeder who temporarily relocated to Gambell and a Gambell male.
5 This female was from a Diomede family who had relocated to Nome.
6 These individuals were Diomeders who were only delivered in Kotzebue hospitals.
7 In one case, the male was adopted into a Diomede household.
8 These were non-Native fathers.
9 This individual was a Diomede male from a family which had relocated to Teller.

Mate Selection

There has been no study of Diomede social institutions comparable to that of Bogojavlensky (1969) for King Island. However, Bogojavlensky (1969) implied that there were considerable parallels between the social institutions of both islands including that of marriage. Eide (1952) described some details of marriage in 1910 that were not documented for King Island, including a younger age of marriage (12 to 13) and polygyny, although informants have suggested the practice of polygyny by King Islanders in earlier times. In other respects, then, King Island and Diomede patterns of marriage were probably similar based on current levels of knowledge. Eide (1952) also reported that Big and Little Diomeders were of the same "tribe" and commonly intermarried (113). Marriage was closely associated with aligning males for skinboat crews in both King and Diomede island communities.

Field data gathered over the last decade are useful in assessing the degree to which Diomede marriage patterns have changed or remained stable from earlier periods of time for which information was reported. Christian clergy had influenced Diomede marriage patterns in a manner similar to that at King Island. Polygyny, comarriage, overtly arranged marriage, and bride-price were no longer functional features of Diomede marriage. Divorce and cousin marriages were discouraged.

Table 55 presents the marital status of the Diomede population by 10-year cohorts and by sex in 1980. These data indicate that there were 13 (35.1 percent) unmarried males between the ages of 21 and 50. Although there were no data from previous years at Diomede, this percentage was greater than that of King Island in 1980, which was considerably greater than that of King Island in 1938. Since the mean age of marriage at Diomede was 26.0 years in 1980 (Table 56), some of these males could be expected to marry in future years. Nonetheless, if the King Island analogy is valid, it is expected that the incidence of bachelorhood in 1980 was clearly a change from marriage patterns in the past at Diomede. There were 3 females (11. 1 percent) over the age 20, but no unmarried females over the age of 30 at Diomede in 1980. These facts indicate a scarcity of potential female spouses at Diomede in 1980 and suggests that there may have been some level of female emigration. The mean age of marriage for females in 1980 was 21.4 (Table 56), although this average is skewed by the 2 cases in the oldest cohort. If these cases were removed from the calculation, the overall mean age was 20.1 years. The incidence of unmarried females at Diomede Island was considerably less than that of King Islanders in

TABLE 55: MARITAL STATUS OF POPULATION BY 10-YEAR COHORTS AND SEX, DIOMEDE -- 1980[1]
(n=146)

Age Cohorts		Male				Female			
		Single	Married	Widowed	Separated or Divorced	Single	Married	Widowed	Separated or Divorced
81-90	No.	0	0	0	0	0	0	0	0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71-80	No.	0	0	0	0	0	0	0	0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-70	No.	0	1	0	0	0	2	0	0
	%	00.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0
51-60	No.	0	3	0	3	0	3	0	0
	%	0.0	50.0	0.0	50.0	0.0	100.0	0.0	0.0
41-50	No.	2	6	1	0	0	1	2	0
	%	22.2	66.7	11.1	0.0	0.0	33.3	66.7	0.0
31-40	No.	1	3	0	0	0	7	1	1
	%	25.0	75.0	0.0	0.0	0.0	77.8	11.1	11.1
21-30	No.	10	7	0	0	3	6	0	1
	%	58.8	41.2	0.0	0.0	30.0	60.0	0.0	10.0
11-20	No.	24	0	0	0	13	1	0	0
	%	100.0	0.0	0.0	0.0	92.9	7.1	0.0	0.0
0-10	No.	24	0	0	0	20	0	0	0
	%	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Column Total	No.	61	20	1	3	36	20	3	2
	%	71.8	23.5	1.2	3.5	59.0	32.8	4.9	3.2

[1] "Widowed" and "divorced" categories do not include remarried individuals. Totals do not equal the entire population, since cases with unknown marital status are not included.

TABLE 56: AGE OF MARRIAGE OF 10-YEAR COHORTS BY SEX, DIOMEDE -- 1980[1]

Age Cohorts	Male			Female		
	No. of Cases	Mean	Std. Dev.	No. of Cases	Mean	Std. Dev.
81-90	0	0.00	0.00	0	0.00	0.00
71-80	0	0.00	0.00	0	0.00	0.00
61-70	1	23.00	0.00	2	33.50	16.26
51-60	3	25.00	10.15	3	20.00	4.58
41-50	6	29.83	7.78	1	19.00	0.00
31-40	3	22.00	2.65	7	20.00	4.86
21-30	7	25.14	2.54	6	20.67	2.34
11-20	0	0.00	0.00	1	18.00	0.00
Total Population	20	25.95	6.13	20	21.40	6.52

[1] These data include all living members of the population for whom date of marriage was known. Dates of marriage for widowed, divorced, or separated individuals were incomplete.

1980. As discussed in previous cases, the high incidence of unmarried males and lack of availability of potential female spouses within the population have implications for division of labor, potential captaincy, and reproduction within the community.

Table 57 presents places of birth of spouses at Diomede in 1980. The Diomede case stands in stark contrast to all other study communities. Of the 20 marriages in which both spouses were residing together in Diomede in 1980, 100 percent were endogamous if Big Diomede is considered to be within the same population as that of Little Diomede. The females with birthplaces located off the Island were all Diomeders (i.e. at least one of their parents were from Diomede) who were born in other locations associated with contemporary hospital birthing practices, seasonal mainland activities, relocated Diomeders at Teller, or a Gambell marriage which resulted for the temporary relocation of a few Diomeders to Gambell as part of a Bureau of Indian Affairs experiment.

Based on contemporary data, Diomede marriage patterns do not reflect the flexibility of affinal arrangements found at King Island. In regards to population endogamy, Diomede appears to be more similar to Gambell than to King Island. In 1980 the Diomede community was clearly composed of a core of related males who hunted together in crews and a core of related females who provided necessary support labor to this adaptive strategy. Diachronic demographic data suggest the continuity of these patterns through time in the case of Diomede if Big Diomede and relocated Little Diomede island populations in Teller are considered as functional components of the overall Diomede population.

TABLE 57: PLACE OF BIRTH OF SPOUSES, DIOMEDE -- 1980
(n^1=20)

Place of Birth		Number of
Husband	Wife	Marriages (Percentage)
Diomede[2]	Diomede[2]	16 (80.0%)
Diomede	Big Diomede	1 (5.0%)
Diomede	Kotzebue[3]	1 (5.0%)
Diomede	Seward Peninsula/Norton Sound[4]	1 (5.0%)
Diomede	Gambell[5]	1 (5.0%)

1 The total number of marriages in 1980 in which both spouses were still alive and residing together equals n; percentages are calculated of n.

2 Three husbands and four wives were actually born on the mainland during summer resource harvest activities away from the Island. However, they lived on the Island and their birth on the mainland was irrelevant to their population status.

3 This wife was a Diomede resident born in the Kotzebue hospital.

4 This wife was a daughter from a Diomede household which had relocated to Teller.

5 This wife's mother was a Diomeder who temporarily relocated to Gambell, married a Gambell man, was subsequently widowed and returned to Diomede with her children.

Reproduction, Mortality, and Migration

Data regarding reproduction, mortality, and migration on Diomede Island were sporadically documented prior to the inception of formal education on the Island in the first decade of the 1900s. The documented population fluctuations for Diomede Island were presented and discussed in reference to Table 50. In this section more specific details of reproduction and mortality will be presented. Table 58 presents vital statistics for the Island from 1940 to 1980 based on informant recall. These data include information on Diomeders who were residing on the Island in 1980 or who had a close relative (grandparent, parent, spouse, sibling, or offspring) residing in the community in 1980. Oualifications relating to informant recall methodology presented in the discussion of Gambell's population dynamics are relevant in this context as well.

Table 58 presents birthrates from 1940 to 1980. Unfortunately, there were no earlier documented data which could be used for purposes of comparison. From 1940 to 1960 the birthrate at Diomede Island was slightly lower than that of King Island and comparable to that of Gambell and Savoonga. Fluctuations in the birthrate during the 1940 to 1960 interval are difficult to explain because the composition of the Diomede population during these years was not documented. Between 1960 and 1980 the Diomede birthrate was consistently higher than that of all other study communities, although the rate was highest between 1961 and 1965 and has since demonstrated a downward trend. However, between 1976 and 1980, the Diomede birthrate remained 9.37 births/1000 higher than that of Gambell, 12.17 births/1000 higher than that of

TABLE 58: VITAL STATISTICS, DIOMEDE -- 1940-1980

	Total			Mean			Rate/1000	
	Births	Deaths	Population[1]	Births	Deaths	Population	Births	Deaths
1980	5	4	146					
1979	5	2	(145.0)					
1978	5	2	(144.0)	4.8	2.6	143.4	33.47	18.13
1977	6	1	(143.0)					
1976	3	4	(142.0)					
1975	6	2	141					
1974	5	3	(112.0)					
1973	3	2	83	5.0	2.2	100.6	49.70	21.87
1972	4	1	(83.3)					
1971	7	3	(83.6)					
1970	3	2	84					
1969	5	1	70					
1968	4	0	98	4.6	1.2	88.0	52.27	13.64
1967	5	1	94					
1966	6	2	94					
1965	7	4	(95.5)					
1964	8	1	(97.0)					
1963	6	1	(98.5)	6.0	1.2	98.5	60.91	12.18
1962	3	0	(100.0)					
1961	6	0	(101.5)					

TABLE 58: -- CONTINUED

	Total			Mean			Rate/1000	
	Births	Deaths	Population	Births	Deaths	Population	Births	Deaths
1960	2	0	103					
1959	4	0	(101.5)					
1958	4	0	100	3.0	0.2	101.2	29.64	1.98
1957	3	0	(100.5)					
1956	2	1	(101.0)					
1955	2	1	(101.5)					
1954	7	0	(102.0)					
1953	1	3	(102.5)	4.2	0.8	104.2	40.31	7.68
1952	7	0	103					
1951	2	0	(112.0)					
1950	5	0	121					
1949	0	0	(121.4)					
1948	6	0	(121.8)	3.0	0.0	121.8	24.63	0.00
1947	1	0	(122.2)					
1946	3	0	(122.6)					
1945	7	0	(123.0)					
1944	4	0	(123.4)					
1943	3	0	(123.8)	4.0	0.0	123.8	32.31	0.00
1942	0	0	(124.2)					
1941	6	0	(124.6)					
1940	2	0	125					

[1] Population totals in parentheses are estimates based on previous and subsequent population documentation.

Savoonga, and 12.27 births/1000 higher than that of King Island. The overall downward trend since 1965 could, in part, be explained by the introduction and use of contraceptives and a reduction in the relative percentage of reproductively-aged females in the population.

For all study communities, the decline in birthrate over the past 15 years may be associated with the populations' response to reduced infant mortality since the 1950s. The use of abortion, abstinence, lengthy lactation, and other traditional means of population control has been documented (Eide 1952) and reported by informants for the historic period. It is expected that these populations were cognizant of the carrying capacity of the environment used by the population and the maximal population which could be sustained by the specifics of community structure and function. High infant mortality would have encouraged high birthrates to maintain maximally beneficial population size. Conversely, a rapid reduction in infant mortality may possibly have been responded to by control of birthrates, although a lag between the two trends would be expected. Such a lag did occur between the late 1950s and mid-1970s at Diomede. The extent of influence of the Catholic church on birth control at Diomede is unknown.

Table 59 presents age-specific fertility, mean number of children, and average age at first birth for Diomede females in 1980. These data indicate that the age at first birth had declined between the oldest and 40-59 year old cohorts, although the latter cohort could still reproduce and raise this average age. The fertility rate had increased from the oldest to the younger cohorts with the exception of the 15-19 year old cohort.

TABLE 59: AGE-SPECIFIC FERTILITY OF FEMALES, DIOMEDE -- 1980

Age Class		Ages of Females in 1980 60+ (n=2)	40-59 (n=6)	20-39 (n=19)	15-19 (n=7)	Totals (n=34)
45-49	n[1]	10	23	--	--	33
	births	0	0	--	--	0
	rate[2]	0.00	0.00	--	--	0.00
40-44	n	10	28	--	--	38
	births	1	1	--	--	2
	rate	100.00	35.71	--	--	52.63
35-39	n	10	30	10	--	50
	births	1	1	0	--	2
	rate	100.00	33.33	0.00	--	40.00
30-34	n	10	30	39	--	79
	births	2	13	4	--	19
	rate	200.00	433.33	102.56	--	240.51
25-29	n	10	30	55	--	95
	births	2	11	20	--	33
	rate	200.00	433.33	363.64	--	347.37
20-24	n	10	30	83	--	123
	births	1	12	33	--	46
	rate	100.00	400.00	397.59	--	373.98
15-19	n	10	30	95	17	152
	births	1	4	14	1	20
	rate	100.00	133.33	147.37	58.82	131.59
	Total n	70	201	282	17	570
	Total births	8	42	71	1	122
	Average rate	114.29	208.96	251.77	58.82	214.04
Average age at first birth		23.50	19.70	19.20	17.00	
Mean number of children		4.00	7.00	3.74	.14	

1 The n is equal to mother-years, which are the number of reproductively-aged females x the number of years each of these females has lived in each age class.

2 Age-specific birthrate.

The reproductive rates by age class had changed through time. In the oldest (60+) and 40-59 year old cohort, the most productive ages were 25-29 and 30-34. For the 20-39 year old cohort, the most productive ages were between 20-24, although this cohort was still reproductively active in 1980. As in the King Island case, there were no births between the ages of 45-49 as there had been at Gambell and Savoonga. Interestingly, there were no births between the ages of 35-39 in the cohort 20-39 year old. Although this cohort was still reproducing in 1980, the absence of births during these ages lends support to the hypothesis that birth control and/or family planning concepts were controlling population growth during the last two decades.

Table 60 presents the average number of children and age at first birth for Diomede males in 1980. Trends in the mean age at first birth for Diomede males were difficult to assess because the sample size was so small in the oldest cohort (n=2) and because the youngest cohort was still producing. However, based on these data the mean age at first birth had increased between the oldest and middle cohorts and was younger for the middle cohort than was that of King Island. Of all the study villages, Diomede's 20-39 year old male cohort was the most productive and Savoonga's was the least. The mean number of children was greatest for the 40-59 year old cohort and exceeded that of King Island for both all males and reproductively active males.

Figure 24 depicts seasonality of births by 25-year cohorts for Diomede in 1980. The sample size for the oldest cohort was relatively small (12) which may in part account for the seasonal irregularity of births in this cohort. The highest cluster of births occurred in August, September, and October, corresponding to a high rate of conception in

TABLE 60: AVERAGE NUMBER OF CHILDREN AND AGE AT FIRST BIRTH OF MALES, DIOMEDE -- 1980[1]

	Ages of Males in 1980		
Variable	60+ (n=2)	40-59 (n=15)	20-39 (n=20)
Mean number of children	2.00	4.27(5.82)[2]	2.25(3.38)[3]
Mean age at first birth[4]	25.00	27.00	25.38

1 There were no males in 1980 that had fathered offspring younger than age 20, so only three age cohorts are included.

2 The mean number in parenthesis was calculated for the 11 reproductively active males. The 4.27 mean was calculated for all males including 4 who had not been reproductively active.

3 The mean number in parenthesis was calculated for the 8 reproductively active males. The 2.25 mean was calculated for all males including 12 who had not yet been reproductively active.

4 The mean age at first birth was only calculated for reproductively active males.

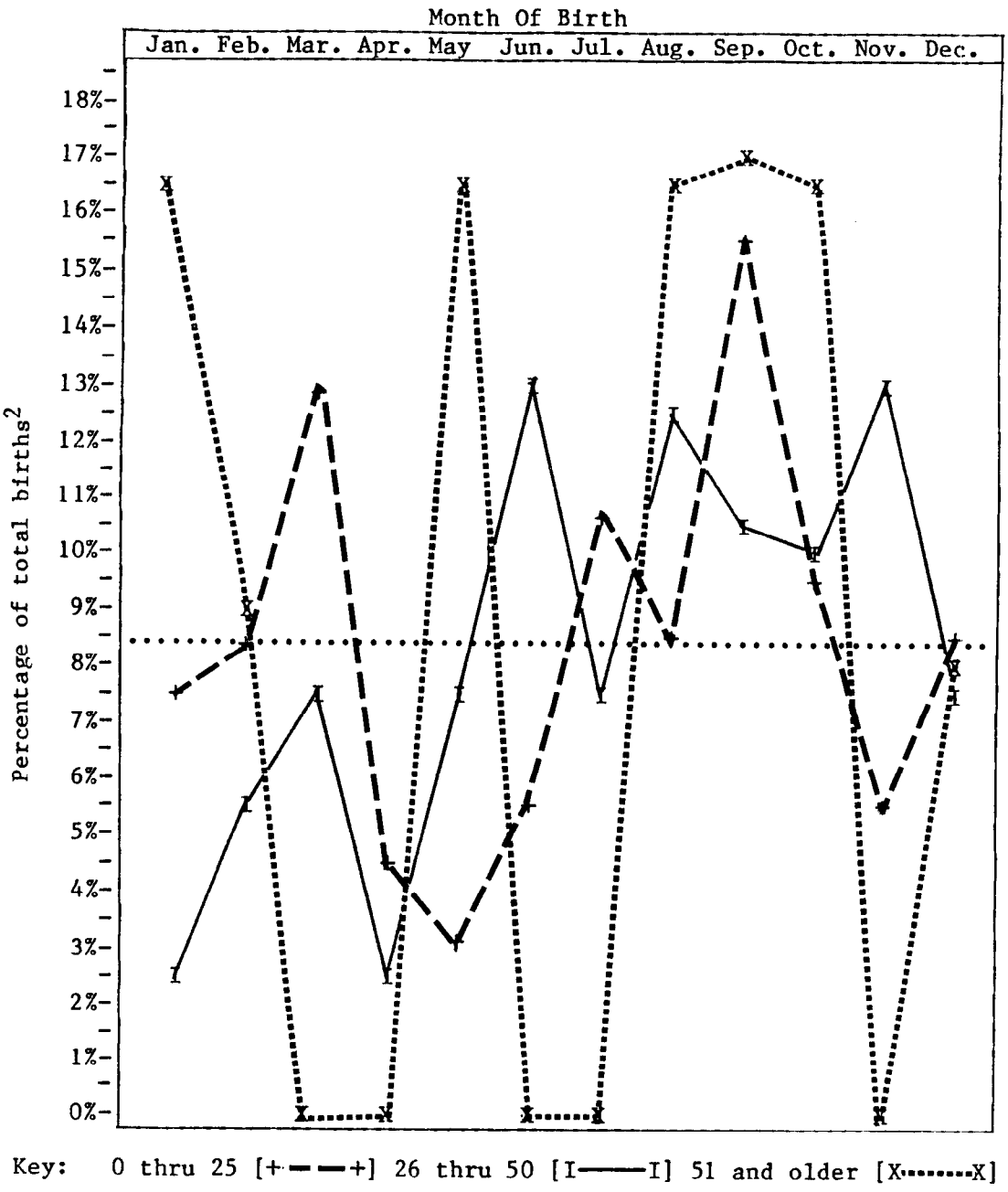


Figure 24: Seasonality of birth by 25-year cohorts, Diomede -- 1980.[1]

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1 Because of the small size of the population over 75 years of age, oldest age category includes all individuals over 51.

2 The percentages are adjusted for differences in the number of days in each month. If births were equally distributed over the year, each month would contain 8.33 percent of the total births.

November, December, and January. The months of November and December rendered the Diomede population more or less immobile in most years, since freezup was in process prohibiting boat travel for most of these months, yet ice conditions were not yet stable enough to permit individual hunting from moving ice until approximately mid-December. Traditionally kayak hunting for seals occurred during the first part of this period. Men went to the north side of the Island for sealing during these months, but absence from the village did not occur for extended periods of time.

For the 26-50 year old cohort, birth peaks occurred in June, August, and November, corresponding to conceptions in September, November, and February. September was the month Diomeders normally returned to the Island from mainland resource harvest and seasonal wage employment activities. February was an important month for individual hunting on moving ice. Birth lows occurred in January and April, reflecting infrequent conceptions in April and July. The July ebb was associated with Diomeders' intensive participation in walrus hunting into July because of their northerly geographic location vis-a-vis walrus migrations (see Chapter V). April is a period of isolation from the mainland and activity is focused on preparations for skinboat hunting.

For the cohort 0-25 years, as in the other study communities, birthing patterns were more regular throughout all months of the year. The highest frequency of births occurred in September, corresponding to relatively frequent conceptions in December. All Diomede cohorts demonstrated greater than average rates of conception during November and December, the months of least mobility for Diomede residents. Additionally, all cohorts displayed low rates of conception in July,

unquestionably associated with walrus hunting and the continued use of umiaks which permit longer periods of sustained hunting activity.

Mortality on Diomede Island during the early historic period has been generally discussed in connection with the population overview in Table 50. Little is known about causes of death prior to the introduction of epidemic diseases, although infant mortality was probably relatively common and senilicide (altruistic homicide or cooperative suicide), infanticide to prevent the death of a mother, and suicide have all been documented for Diomede (Weyer 1932; Eide 1952; and Bogojavlensky 1969). As in the case of King Island, Diomede's isolation from the mainland during winter months provided protection to its population from the measles/influenza epidemic of 1900 and the influenza epidemic of 1918 which decimated the neighboring village of Wales.

Death data for Diomede are very sketchy and provided in this context through informant recall. It should be noted that death data for Diomede are less complete than that for the other study populations except Wales, because they were not supplemented with documentation. Table 58 provided total and mean deaths and death rates by 5-year intervals from 1940 to 1980 based on informant recall. These data included information relating to the deaths of all close relatives of Diomeders residing on the Island in 1980.

During the 40-year period represented in Table 58, death data were so minimal from 1940 to 1960 that generalizations regarding death rates cannot be made. Between 1960 and 1980 the death rate was higher than that of all other study populations. Table 61 presents insights into the causes of death for the period 1911 to 1980. From 1960 to 1980, population with an incidence of childbirth-related and influenza

TABLE 61: CAUSES OF DEATH AND NUMBER, RANGE,
AND AVERAGE AGE OF DEATH BY SEX, BY DECADE, DIOMEDE -- 1901-1980[1]

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
1971-1980									
unknown[3]	5	5	0	<1-79[4]	1-87	16.0	44.8	0	0
suicide	3	0	0	18-46	--	29.7	--	0	0
cancer	3	0	0	51-64	--	55.3	--	0	0
childbirth related	1	1	0	<1	<1	0.0	0.0	0	0
homocide	2	0	0	9-12	--	10.5	--	0	0
drowned	2	0	0	40-55	--	47.5	--	0	0
unknown illness	0	1	0	--	64	--	64.0	0	0
influenza	0	1	0	--	75	--	75.0	0	0
Total 1971-1980	16	8	0	--	--	--	--	0	0
1961-1970									
unknown	6	2	1	1-70	22-54	40.2	38.0	0	0
childbirth related	2	0	0	<1-<1	--	0.0	--	0	0
non-specific respiratory	1	0	0	53	--	53.0	--	0	0
Total 1961-1970	9	2	1	--	--	--	--	0	0

TABLE 61: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
				1911-1960[5]					
unknown	1	3	0	77	31-44	77.0	37.5	0	1
influenza	3	3	0	73	68	73.0	68.0	2	2
Total 1911-1960	4	6	0	--	--	--	--	2	3

Total Reported Causes of Death, Dates of Death Known, Diomede, 1911-1980 = 46

Total Reported Deaths, Dates of Death Unknown, Diomede, 1911-1980 = 33

Total Reported Deaths, Diomede, 1911-1980 = 79

TABLE 61: -- CONTINUED

[1] Death data are based on informant recall, not on medical records or other documented sources. Similar causes have been grouped into categories. In most cases, data accuracy and completeness decline in relationship to the number of years which has transpired since their occurrence. There are 33 individuals, closely related to the living Diomede population (either grandparents, parents, spouses, siblings, or offspring), who have died but dates of death are unknown. Causes of death for these individuals were unknown; most of the cases died in the early 1900s.

[2] Age range and average age are calculated only on cases of known sex.

[3] This category indicates that there is no information on causes of death.

[4] Of the five males and five females, four males and two females were one year old or less. The average age is misleading in these cases.

[5] There were no reported death data between 1931 and 1950.

deaths within the last two decades, a reflection of the inaccessibility of contemporary professional medical care during much of the year. As in the King Island case, cancer deaths were first reported in the last decade and affected primarily males in their 60s. Deaths related to hunting equaled 12.5 percent of total male deaths from 1971 to 1980. The homicide and suicide incidence was greater than that of any study community and was equivalent to 21 percent of all deaths. The average age of deaths for both males and females was younger at Diomede than at other study sites.

To complete this discussion of Diomede population dynamics, migration to and from the community is considered. In general, contact between Nome and Diomede Islanders was of similar intensity to that of King Islanders until the latter commenced relocation to Nome on a more permanent basis. As previously discussed, in 1980 there were fall/early winter and spring months during which the Island was isolated from contact with the mainland for any purpose.

Table 62 presents destinations and numbers of Diomede emigrants by sex and age in 1980. As in the other cases, these data are only applicable to emigrants who had a close relative residing on the Island in 1980. The single largest site of relocated Diomeders was Nome with 44.9 percent of the total Diomede emigrants. This percentage included three Diomeders who married King Islanders. Diomeders in Wales and Teller retained close ties to their home community on the Island, including intermarriage, participation in resource harvest and distribution, and frequent visitations. The remaining emigrants were throughout the State and outside Alaska. As in all of the study population, more females than males had emigrated to locations which were further from the Island, primarily subsequent to marriages outside of the population.

Patterns of Adoption

As in the other study populations, adoption was commonly practiced in 1980. As previously mentioned, 14.8 percent of Diomede households had children classified as "adopted" and other cases included grandchildren who were functionally adopted. Since Diomede's resident population was essentially fully endogamous in 1980, it is hypothesized that adoptions provided a mechanism for balancing household composition by sex and age. Although Bogojavlensky (1969) maintained that Diomede adoption was similar to that of King Island in establishing and strengthening male alliances associated with boat crews, it is likely that this function was less important on Diomede than at King Island because of the cohesiveness of paternal kinship ties between males.

TABLE 62: DESTINATIONS AND NUMBER OF EMIGRANTS BY SEX AND AGE, DIOMEDE -- 1980[1]
(n=69)

Destination	Males			Females		
	Total (Percentage)	Age Range	Mean Age	Total (Percentage)	Age Range	Mean Age
Savoonga	0(0.0%)	--	--	1(2.6%)	28	28.0
King Island	2(6.7%)	57-66	61.5	1(2.6%)	43	43.0
Wales	3(10.0%)	23-65	40.3	2(6.6%)	22-65	43.5
Teller[2]	1(3.3%)	67	67.0	4(10.3%)	35-80	55.3
Nome	15(50.0%)	15-75	45.2	13(33.3%)	18-69	37.9
Anchorage	5(16.7%)	44-58	49.6	6(15.4%)	18-49	32.8
Fairbanks	1(3.3%)	47	47.0	5(12.8%)	32-43	38.2
elsewhere in Alaska[3]	3(10.0%)	23-41	33.3	1(2.6%)	41	41.0
outside	0(0.0%)	--	--	4(10.3%)	17-55	36.3
unknown	0(0.0%)	--	--	2(6.6%)	30-43	36.5
Totals	30(43.5%)	--	--	39(56.5%)	--	--

TABLE 62: -- CONTINUED

[1] These data reflect only emigrants who are closely related (offspring, spouses, siblings, parents, or grandparents) to members of the study population who were residing in Diomede in 1980. Based on field data, the majority of individuals born in Diomede who were residing in Nome in 1980 showed up in these emigration data because they had close relatives on the Island.

[2] Field data suggest that the emigration totals for Teller are distorted. There was a substantial subcommunity of relocated Diomeders in Teller who did not show up in emigration data because they no longer had close relatives residing in Diomede in 1980. In part, this can be explained by the fact that many Big Diomeders resettled at Diomede in the 1930s, and these were not close relatives of the Diomeders who had relocated at Teller.

[3] Communities include Bethel, Barrow, Mountain Village, and Tanana.

Given hypotheses already suggested regarding the unity of Big and Little Diomede island populations, it is expected that adoption between households on both islands was common prior to the 1930s. Unforunately there are no data to substantiate or disprove the expected high frequency of interisland adoptions. Eide (1952) observed in 1910 that adoption between households in the community occurred. He also noted that there was no concept of illegitimacy in relationship to children, and that offspring of an unmarried woman were easily integrated into her parent's household and community. The 1980 data on stepchildren suggested that Diomede children borne by a female prior to marriage or by a previous marrige were also integrated into their mother's parents' household after her marriage or remarriage to a male who was not their father. The retention of such children in a grandparents' household in 1980 related to the presence or absence of younger children in such households. There was no incidence of childless households in Diomede in 1980 regardless of the age or sex of head and his/her spouse.

Population History of Wales

Community Demographic Characteristics

Table 63 presents population size and distribution by sex, number of households, and average household size for Wales between 1791 to 1980. As previously mentioned, Wales was essentially composed of two contiguous villages -- Agianamiut to the south and Kiatanamiut to the north. Since they functioned as a single population and were treated as a single community in historic sources, they are considered together in this context. In 1980 the site of Agianamiut was no longer occupied and house sites near the beach were being eroded.

At time of contact, Wales was the largest Eskimo village in Alaska, although archaeological evidence indicates that there were more populous communities, such as Pt. Hope, prehistorically (Ray 1975b; Oswalt 1967; and Burch 1975a). Kobelev was unable to make a population estimate in 1791 because he found the village deserted, but he estimated that there were approximately 50 dwellings (Ray 1975b: 53). Since Wales was the central village for several small satellite communities, 19th century population estimates have included the populations of Wales with those of the satellite communities. The earliest on site population estimate for Wales proper was documented in 1854 by Captain Henry Trollope, who reported conflictingly a population for both villages of 400-500 in one citation and 300-400 in another (Ray 1975b: 148-150). Thornton (1931), a resident missionary-teacher, recorded substantial ethnographic detail about the community from 1890 to 1891, including a population enumeration of 539. Although a

TABLE 63: POPULATION SIZE AND DISTRIBUTION BY SEX, NUMBER OF HOUSEHOLDS, AND AVERAGE HOUSEHOLD SIZE, WALES -- 1791-1980[1]

Year	Population Size	Total Males	Total Females	Number of Households	Average Household Size[2]
1980[4]	122	73	49	30	4.07
1980[5]	132	ND	ND	54	2.44
1975[3]	117	72	45	29	4.03
1974[6]	104	ND	ND	ND	ND
1973[7]	115	ND	ND	ND	ND
1970[8]	131	78	53	36	3.64
1967[29]	115	ND	ND	27	4.26
1960[8]	128(153[29])	ND	ND	ND	ND
1958[26]	127	ND	ND	ND	ND
1952[9]	160	ND	ND	ND	ND
1950[10]	141	ND	ND	35	4.03
1939[11]	193	ND	ND	ND	ND
1931[12]	172	ND	ND	ND	ND
1930[25]	170	ND	ND	ND	ND
1928[13]	165(156[32])	ND	ND	30	5.67
1922[30]	150	ND	ND	ND	ND
1920[24]	136	ND	ND	ND	ND

TABLE 4-59: -- CONTINUED

Year	Population Size	Total Males	Total Females	Number of Households	Average Household Size
1910[23]	337	ND	ND	ND	ND
1904[28]	500(est.)	ND	ND	ND	ND
1900[22]	396	ND	ND	64	6.19
1894[27]	600(est.)	ND	ND	ND	ND
1893[27]	600(est.)	ND	ND	ND	ND
1891[31]	539	284	255	69	7.80
1890[14]	488	260	228	76(138)	6.42
1880[15]	400	ND	ND	ND	ND
1874[16]	400+	ND	ND	ND	ND
1866[29]	650	ND	ND	ND	ND
1854[21]	300-500(est.)	ND	ND	40-60	8.0(est.)[33]
1827[17]	400	ND	ND	ND	ND
19th century[18]	750(est.)	ND	ND	ND	ND
early 19th century[19]	500-600(est.)	ND	ND	ND	ND
1791[20]	ND	ND	ND	50±("yurts")	ND

TABLE 63: -- CONTINUED

ND = no data

1 Wales was essentially the two villages of Agianamiut on the south and Kiatanamiut on the north. The number of households was the number of occupied domiciles.
2 This calculation includes single individual households.
3 Ellanna and Roche 1976: 7 and 9.
4 Based on field data; population total does not include teachers, missionaries, or Naval Station personnel but does include residents temporarily out of the community for education, health care, etc.
5 U. S. Department of Commerce, Bureau of the Census 1980. Population totals include teachers, missionaries, and other visitors to the village. These enumerations do not include individuals temporarily absent from the community.
6 Peterson 1978: 19.
7 Ellanna and Roche 1976: 76; includes 10 non-Natives. By July 1973 164 individuals had enrolled to Wales under the Alaska Native Claims Settlement Act, indicating a minimum of 59 emigrants from Wales.
8 U. S. Department of Commerce, Bureau of the Census 1970: 4. This total includes teachers and missionaries. The discrepancy with Burns' (1967) data cannot be explained.
9 Brooks 1953: 505.
10 Burg 1952: 73. The household data were the number of residences excluding the school and other government buildings.
11 Alaska Planning Council 1940: 22 and 25; based on U. S. Bureau of the Census, 1940, data; included 57 school-aged children and 2 non-Native teachers.
12 Anderson and Eells 1935: 142. Two residents died of an influenza epidemic during the spring, but a total of 164 individuals contracted the disease.
13 Curtis 1930: 135.
14 Porter 1893: 8 and 165. All 488 were reportedly Iñupiat. The household data indicated that there were 76 domiciles containing 138 families, although criteria for defining membership in a family were not specified.
15 Petroff 1884: 4; these were summer population data.
16 Elliott 1886: 431. They did not go ashore when they traded with boats from Wales during the summer of 1874.
17 Crawford et al. 1981: 169.
18 This is the population estimate for the Wales area including satellite communities -- Burch 1975a: 12.
19 Ray 1975b: 110-111. The populations of Agianamiut and Kiatanamiut were approximately equal. Ray notes that the larger Strait populations were always walrus hunters, sometimes whalers.
20 Kobelev in Ray 1975b: 53; during this June visit the village was deserted, possibly because people feared attack. However, 150 men and 20 umiaks had congregated along the coast northeast of Wales.

TABLE 63: -- CONTINUED

21 Ray 1975b: 148-150; based on data from Captain Henry Trollope as he attempted to cross the Bering Strait in the winter of 1854 in search of information about Beechey. Trollope reported the populations of the two Wales' villages as 200 or 250 each in one reference and 150 or 200 each in another citation. He also stated that there were 6 to 10 people in each house.

22 Hunt 1902: 426.

23 U. S. Department of Commerce, Bureau of the Census 1913: 573. These were mid-winter enumerations.

24 Hunt 1921: 681. These are U. S. Bureau of the Census data, so they included non-Native teachers and missionaries.

25 Grogan 1932: 8. These are U. S. Bureau of the Census statistics. They therefore include non-Native teachers and missionaries.

26 Wilson 1958: 7.

27 Jackson 1894: 44 and 128. In the spring of 1894, only 139 people were in the community.

28 Jackson 1904: 51.

29 Burns 1967: 26.

30 Bailey 1948: 109.

31 Thornton 1931: 20. Of the total population, 231 were in the northern village and 308 in the southern. Of the total population, 232 were children.

32 Weyer 1932: 205. These data were based on Weyer's field notes.

33 This estimate was derived by using the mid-point between the low and high population estimates (400) and the mid-point between the high and low number of household estimates (50).

respiratory epidemic brought about the deaths of 26 Wales people in 1890, the populations remained relatively large until the influenza epidemic of 1918, which is estimated to have killed 200 of a population of 400 (Bogojavlensky 1969: 30). Additionally, the influenza epidemic totally decimated most of the small satellite communities in the Wales area (Koutsky 1981). The population reached a low of 136 in 1920, increased gradually until 1939, declined during the 1940s to 141 in 1950, and has fluctuated between approximately 115 and 130 until 1980.

There were no published population profiles for Wales prior to 1970 data. Figure 25 presents the age and sex composition of Wales in

Ages	Males	Females	Total Percentages
86-90			(0.0%)
81-85			(0.0%)
76-80	(1.3%) 1 *		(0.8%)
71-75			(0.0%)
66-70			(0.0%)
61-65		** 3 (5.7%	(2.3%)
56-60	(7.7%) 6 ***	** 3 (5.7%)	(6.9%)
51-55	(6.4%) 5 ***	* 1 (1.9%)	(4.6%)
46-50	(6.4%) 5 ***	** 3 (5.7%)	(6.1%)
41-45	(2.6%) 2 *	*** 6 (11.3%)	(6.1%)
36-40	(6.4%) 5 ***	* 1 (1.9%)	(4.6%)
31-35		* 1 (1.9%)	(0.8%)
26-30	(1.3%) 1 *	* 1 (1.9%)	(1.5%)
21-25	(11.5%) 9 *****	*** 5 (9.4%)	(10.7%)
16-20	(12.8%) 10 *****	**** 7 (13.2%)	(13.0%)
11-15	(17.9%) 14 *******	****** 12 (22.6%)	(19.8%)
6-10	(17.9%) 14 *******	*** 6 (11.3%)	(15.3%)
0-5	(7.7%) 6 ***	** 4 (7.5%)	(7.6%)

60 40 20 0 20 40 60

Number of People
(n = 131)

78 (59.5%) 53 (40.5%)

Figure 25: Age & sex composition by 5-year cohorts, Wales -- 1970.[1 2]

Figure 25: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	24.936	25.755	25.267
Median	17.500	16.875	17.188
Std. Dev.	18.624	18.854	18.649

[2] Institute of Social, Economic, and Government Research 1973: 61.

1970 based on U. S. Bureau of Census data (Institute of Social, Economic, and Government Research 1973: 61). These data reflected everyone in the community, including teachers and missionaries and did not include residents temporarily absent from the village.

This profile demonstrates the greatest disproportionate ratio of males to females for the study populations throughout the study period, except for King Island in 1950, during which time the population was beginning relocation to Nome and women were hospitalized for tuberculosis, and for Wales in 1975 and 1980. The percentage of Nome males who were non-productive for purposes of crew hunting was 44.9 percent, which was relatively high but lower than that reported for Diomede during the same period. Reproductively-aged females composed 18.3 percent of the population, comparable to that of the other study populations during the same time interval. The number of 0-5 and 6-10 year old children was minimal, demonstrating a declining birthrate over the last decade. There were no males in the 31 to 35 year old cohort, the singularly most important cohort for a combination of reproductive potential and marine mammal harvest potential. The scarcity of males and females over the age 60 may have had implications for the transmission of knowledge between generations. There were 10 non-Natives included in these data.

Figure 26 presents age and sex composition by 5-year cohorts for Wales in 1975 based on field data (Ellanna and Roche 1976). These data also included both Natives and non-Natives in the population. The disproportionate ratio of males to females was the highest of any study population during all time periods considered. The overall population had declined by 14 individuals (10.7 percent), although the number of non-Natives in the population had declined by 4 individuals. In comparison to 1970, the percentage of non-productive males had declined to 30.6 percent. The percentage of reproductively-aged females had increased to 19.7 percent, although the birthrate had continued to decline during this 5-year interval. There were no males and females in the 36-40 year old cohort. The mean age was 28.9, the highest for all study populations during all times except for Wales in 1980.

Figure 27 presents age and sex composition by 5-year cohorts for Wales in 1980 based on field data. No non-Natives were included in these data. Calculating for the absence of non-Natives, the population had expanded by 11 people (9.0 percent). The disproportionate number of males to females had only slightly decreased. There was a decrease in the relative percentages of non-productive males (i.e. males who could participate in crew hunting) and reproductively-aged females. The number of individuals in the 0-5 cohort indicated continuity in the trend of declining births which commenced in 1960. There were no individuals (male or female) in the 41-45 year old cohort, a cohort which normally would include boat captains (see Chapter V). The mean age had increased to 30.2, the maximal mean age encountered in this study.

Table 64 presents the percentage of Eskimo ethnicity by age

Ages	Males	Females	Total Percentages
86-90			(0.0%)
81-85			(0.0%)
76-80			(0.0%)
71-75		* 2 (4.4%)	(1.7%)
66-70	(1.4%) 1 *	* 1 (2.2%)	(1.7%)
61-65	(5.6%) 4 **		(3.4%)
56-60	(6.9%) 5 ***	** 3 (6.7%)	(6.8%)
51-55	(5.6%) 4 **	** 3 (6.7%)	(6.0%)
46-50	(4.2%) 3 **	** 4 (8.9%)	(6.0%)
41-45	(4.2%) 3 **	* 1 (2.2%)	(3.4%)
36-40			(0.0%)
31-35	(4.2%) 3 **	* 2 (4.4%)	(4.3%)
26-30	(15.3%) 11 ******	*** 5 (11.1%)	(13.7%)
21-25	(11.1%) 8 ****	* 2 (4.4%)	(8.5%)
16-20	(18.1%) 13 *******	***** 9 (20.0%)	(18.8%)
11-15	(13.9%) 10 *****	** 4 (8.9%)	(12.0%)
6-10	(4.2%) 3 **	*** 5 (11.1%)	(6.8%)
0-5	(5.6%) 4 **	** 4 (8.9%)	(6.8%)

60 40 20 0 20 40 60

Number of People
(n = 117)

72 (61.5%) 45 (38.5%)

Figure 26: Age & sex composition by 5-year cohorts, Wales -- 1975.[1 2]

Figure 26: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	28.972	28.889	28.940
Median	23.250	22.750	23.150
Std. Dev.	17.933	20.458	18.857

[2] Adapted from Ellanna and Roche 1976: 27.

and sex for Wales in 1980 based on field data which did not include transient members of the population (e.g. teachers, Naval Station personnel, etc.). This table indicates that reproductive contact with non-Natives occurred only within the last 25 years. However, emigration data will demonstrate that this generalization holds true only for individuals who remained in the population, whereas other females who had married non-Natives had emigrated from Wales. The two non-Natives in the population came to Wales between 1975 and 1980. Wales females had married these non-Native males, resided outside the State, and returned to Wales with their husbands and children within the last 5-year interval. Additionally, another outmarried female had returned to Wales from outside the State with her children after her marriage had terminated. Field data indicate that there were several other outmarried females who were establishing and maintaining regular contacts through visitations to the village. In some cases, females had been out of the village for in excess of a decade. The percentage of full Eskimo ethnicity in Wales was greater than that of King Island but less than that of Gambell, Savoonga, and Diomede.

Table 65 presented sporadic documented data on the number of households in Wales and average household size historically. Estimates of the number of households varied from 50^{+} in 1791 to 76

Ages	Males	Females	Total Percentages
86-90			(0.0%)
81-85			(0.0%)
76-80		* 2 (1.4%)	(1.6%)
71-75	(1.4%) 1 *		(0.8%)
66-70	(4.1%) 3 **	* 1 (2.0%)	(3.3%)
61-65	(6.8%) 5 ***	* 1 (2.0%)	(4.9%)
56-60	(4.1%) 3 **	** 4 (8.2%)	(5.7%)
51-55	(5.5%) 4 **	** 4 (8.2%)	(6.6%)
46-50	(4.1%) 3 **	* 1 (2.0%)	(3.3%)
41-45			(0.0%)
36-40	(2.7%) 2 *	** 3 (6.1%)	(4.1%)
31-35	(9.6%) 7 ****	** 3 (6.1%)	(8.2%)
26-30	(9.6%) 7 ****	* 2 (4.1%)	(7.4%)
21-25	(19.2%) 14 *******	**** 8 (16.3%)	(18.0%)
16-20	(12.3%) 9 *****	** 4 (8.2%)	(10.7%)
11-15	(6.8%) 5 ***	**** 8 (16.3%)	(10.7%)
6-10	(6.8%) 5 ***	** 4 (8.2%)	(7.4%)
0-5	(6.8%) 5 ***	** 4 (8.2%)	(7.4%)

60 40 20 0 20 40 60

Number of People
(n = 122)

73 (59.8%) 49 (40.1%)

Figure 27: Age & sex composition by 5-year cohorts, Wales -- 1980.[1]

Figure 27: -- Continued.

[1] Statistics:

	Male	Female	Total
Mean	30.521	29.755	30.213
Median	25.200	23.125	24.667
Std. Dev.	19.272	20.902	19.861

in 1890 to 27 in 1967. Thornton (1931) reported 69 households in 1891 after Wales had suffered a slight population decline. Similarly, average household size varied dependent upon the accuracy of population estimates and enumerations of domiciles. In regard to the number of individuals occupying a single domicile, ethnographic accounts are more accurate and useful in this context. As previously mentioned, Thornton's (1931) accounts of Wales in 1890-1891 included detailed ethnographic notes. Thornton reported that the 69 households were composed, on the average, of 7.8 individuals (Thornton 1931: 140). Both the total populations and average household size declined in the 1900s. In recent years, new housing projects encouraged the formation of nuclear family households. However, in 1975 and 1980, bachelor males were commonly sleeping in "old houses" but eating and participating in resource harvest, processing, and consumption in the household of a parent or sibling. Similarly, married offspring and their families frequently prepared and consumed at least one meal daily with a parent or other kinsmen. In Wales the household, as it existed in 1980, was not the functional unit in regards to resource harvest and use in most instances.

Despite the qualifications placed on using the Wales household as a unit of analysis, the composition of these households in 1980 reveals some useful information. Table 65 presents household composition

TABLE 64: PERCENTAGE OF ESKIMO ETHNICITY BY AGE AND SEX, WALES -- 1980[1]
(n=122)

Age Cohorts	100%		75%		50%		25%		0%	
	M	F	M	F	M	F	M	F	M	F
76-100	0	2	0	0	0	0	0	0	0	0
51-75	16	10	0	0	0	0	0	0	0	0
26-50	18	9	0	0	0	0	0	0	1	0
0-25	30	18	0	0	7	10	0	0	1	0
Total by sex	64	39	0	0	7	10	0	0	2	0
(Percent of population by sex)	(87.7)	(79.6)	(0.0)	(0.0)	(9.6)	(20.4)	(0.0)	(0.0)	(2.7)	(0.0)
Total individuals	103		0		17		0		2	
(Percent of total population)	(84.4)		(0.0)		(13.9)		(0.0)		(1.6)	

[1] Compiled from field data.

TABLE 65: HOUSEHOLD COMPOSITION BY TYPE, WALES -- 1980[1]
(n=30)

Key:

Wi = wife
So = son
Da = daughter
ASo = adopted son
ADa = adopted daughter
Gso = grandson
GDa = granddaughter
Br = brother
ANe = adopted nephew

Number of Households	Percentage of Households	Sex of Head	Composition (Relationship to Head)[2]
6	20.0%	male[3]	---
4	13.3%	male[4]	WiSoDa
4	13.3%	male	WiSo[5]
3	10.0%	male	WiDa[4]
1	3.3%	male	WiSoADa
1	3.3%	male	WiSoDaASo
1	3.3%	male	WiASo
1	3.3%	male	WiADa
1	3.3%	male	WiSoDaGSo
1	3.3%	male	WiSoDaGDa
1	3.3%	male	WiSoDaASoGSo
1	3.3%	male	WiSoDaANe[6]
1	3.3%	male	Wi
1	3.3%	male	Br
1	3.3%	female	So
1	3.3%	female	SoDa[7]
1	3.3%	female	SoGSo

TABLE 65: -- CONTINUED

[1] Based on field data. Total population was 122 (not including teachers, missionaries, or Naval Station personnel), composed of 73 males and 49 females in 30 households.

[2] These are household types and in some cases they occurred with multiple members of the same kinship relation to head (such as more than one son or daughter). Of 30 households, 18 (60 percent) were nuclear families and 6 (20 percent) were extended family households. Six (20 percent) were single male households. There was 1 (3.3 percent) husband and wife in a separate household. There were 27 (90 percent) male and 3 (10 percent) female heads of household. There were 6 (20 percent) households with adopted children. Of the households, 18 (60 percent) included sons, adopted sons, and/or grandsons, whereas 15 (50 percent) included daughters, adopted daughters, and/or granddaughters. There were no stepchildren or stepparents in this population.

[3] Field data indicate that these males are primarily unmarried adults living in the older homes of households which have obtained new housing. They are functionally attached to the households of parents or married siblings for purposes of resource consumption and the division of labor in resource production.

[4] One of these households is headed by an inmarried non-Native male.

[5] In one of these cases a daughter-in-law, grandson, and granddaughter normally reside in the household. They were in Diomede for part of the year providing assistance to the daughter-in-law's mother.

[6] The nephews are wife's sister's adopted sons from another community.

[7] This female head is divorced from a non-Native husband who lives outside. She returned to Wales with her children after the marriage had been terminated.

by type in Wales in 1980. In 1980, 18 (60.0 percent) were nuclear family households, a percentage which was greater than that at Gambell and King Island, but less than that at Savoonga and Diomede. Extended family and single male households composed 20.0 percent of the total households. There were 10 percent more households with male offspring or son surrogates than female offspring or daughter surrogates. Of all households, 20 percent had children classified as "adopted," a percentage greater than that at King Island, Diomede, and Gambell but less than that at Savoonga in 1980. Additionally, some cases of grandchildren may be functionally adopted. Although the data were not clear

in 1980 because of the artificial division of people into new nuclear-family focused houses, other field data and Trollope's notation of brothers residing in the same household with their families (Ray 1975b: 150) affirmed the importance of male-focused kinship links at the functional household level. In Wales most male heads of household were Wales-born males, except in the cases of the two inmarried non-Natives spouses and the relocated Diomede family. The residence of non-Native males in Wales was a recent phenomenon in 1980. It is unknown if their integration into the community will be successful. Lastly, this was the only community with no incidence of stepchildren within a household.

Birthplaces of living residents and their parents provide useful information regarding recruitment, seasonal migrations, post-marital residency, and intercommunity alliances. Table 66 presents place of birth by 25-year cohorts and by sex in Wales in 1980. In the case of the oldest cohort, the sample was extremely small (n=2) and both were Wales people, although a female was born in Nome during annual summer population movements.

In the 51-75 year old cohort, the Diomede births represented the relocated Diomede family which resided in Wales. Of all births in this cohort, Nome, one of the Teller, Nuluk, and Wales area births were people of the Wales population. One male was inmarried from Teller and one female from Shishmaref.

In the 26-50 year old cohort, the Diomede birth was associated with the relocated family. One female was inmarried from White Mountain and one non-Native male inmarried from outside the State. The remainder of births outside of Wales were of Wales people seasonally located at

TABLE 66: PLACE OF BIRTH BY 25-YEAR COHORTS AND SEX, WALES -- 1980

Place Of Birth	Age Cohorts							
	76-100		51-75		26-50		0-25	
	Sex							
	M	F	M	F	M	F	M	F
Wales	0	1	11	6	15	8	17	10
Wales Area	0	0	0	2	0	0	1	0
Diomede	0	0	1	1	1	0	1	1
Seward Peninsula and Norton Sound[1]	0	0	3	1	1	1	4	1
Nome	0	1	1	0	1	0	7	6
Kotzebue	0	0	0	0	0	0	1	0
Anchorage	0	0	0	0	0	0	1	2
Outside Alaska	0	0	0	0	1	0	6	7
Unknown	0	0	0	0	0	0	0	1
Total	0	2	16	10	19	9	38	28

[1] The communities in this category include Teller, Brevig Mission, Shishmaref, Nuluk area, Golovin, and White Mountain.

Nome and Brevig Mission.

In the 0-25 year old cohort, the recent practice of giving birth in hospitals was reflected in the 17 births in Nome, Kotzebue, and Anchorage. The 13 births which occurred "outside" resulted from the marriage of 3 females to non-Native males and their temporary relocation outside of the State. One Diomede birth was that of an inmarried female and the other that of a relocated Diomeder. All of the Seward Peninsula births were associated with the inmarried White Mountain female.

Overall, only 11 births (9 percent) did not involve at least one Wales parent, and 4 of these were associated with the relocated Diomede family. If an adjustment is made for the relocated family, 94.1 percent of the births were associated with Wales' population. The occurrence of inmarried males was less than that at King Island but higher than that at Savoonga. Gambell and Diomede had no incidence of inmarried males.

Table 67 presents parental birthplaces by 25-year cohorts at Wales in 1980. Including Wales area births and births of Wales people in other locations, 67 (54.9 percent) had parents who were both from the Wales population. This percentage was greater than that of King Island and Savoonga but less than that of Gambell and Diomede. This fact reflects the apparent recruitment through inmarriage of both male and female members, but contrasts with Gambell and Savoonga by including inmarried males and by exhibiting no cases of males or females recruited from outside the community via adoption.

Of all fathers, 84 (68.9 percent) were from the Wales population, whereas of all mothers, 90 (73.8 percent) were from the Wales population.

TABLE 67: PARENTAL BIRTHPLACES BY 25-YEAR COHORTS, WALES -- 1980[1]
(n=122)

Place of Birth		Number (Percentage of Cohort)			
Father	Mother	Cohort 0-25	Cohort 26-50	Cohort 51-76	Total Number and Percentage
Wales	Wales	27(40.9%)	20(71.4%)	12(42.9%)	59(48.4%)
outside of Alaska[4]	Wales	17(25.8%)	0(0.0%)	0(0.0%)	17(13.9%)
Wales	White Mountain	7(10.6%)[3]	0(0.0%)	0(0.0%)	7(5.7%)
Wales	Wales area	5(7.6%)	1(3.6%)	1(3.6%)	7(5.7%)
unknown	unknown	2(3.0%)[3]	0(0.0%)	4(14.3%)	6(4.9%)
Diomede	Diomede	2(3.0%)	1(3.6%)	2(7.1%)	5(4.1%)[5]
Wales area	Shishmaref	0(0.0%)	1(3.6%)	3(10.7%)	4(3.3%)
Wales	Cape Espenberg	0(0.0%)	1(3.6%)	3(10.7%)	4(3.3%)
unknown	Wales	1(1.5%)	1(3.6%)	0(0.0%)	2(1.6%)
outside of Alaska[6]	outside of Alaska[6]	1(1.5%)	1(3.6%)	0(0.0%)	2(1.6%)
Nome[2]	Wales	1(1.5%)	0(0.0%)	0(0.0%)	1(.8%)
Wales	unknown	0(0.0%)	0(0.0%)	1(3.6%)	1(.8%)
other locations in Alaska	Wales	1(1.5%)	0(0.0%)	0(0.0%)	1(.8%)
Teller	Wales	1(1.5%)	0(0.0%)	0(0.0%)	1(.8%)
Lost River	Diomede	1(1.5%)	0(0.0%)	0(0.0%)	1(.8%)
unknown	Wales area	0(0.0%)	1(3.6%)	0(0.0%)	1(.8%)
Siberia	Wales	0(0.0%)	0(0.0%)	1(3.6%)	1(.8%)
Fish River[3]	Elim[3]	0(0.0%)	1(3.6%)	0(0.0%)	1(.8%)

TABLE 67: -- CONTINUED

[1] Because of the small number of individuals over the age of 75, the last two cohorts were combined.
[2] This was a Wales man who was only born in the Nome hospital.
[3] These were all associated with an inmarried female.
[4] These were Caucasian males.
[5] All of these were from a single relocated Diomede household.
[6] These were the parents of inmarried Caucasian males.

Those data suggest a higher level of male than female recruitment, although the outside fathers of 10 offspring did not reside in the village, the Diomede parents were associated with a relocated family in 4 cases, the outside parents were associated with inmarried males, and the Fish River/Elim parents were associated with an inmarried female. Children without resident fathers resided with grandparents who were active in teaching them skills associated with appropriate age and sex roles in Wales today. It is not clear how well the offspring of resident non-Native males will be integrated into productive roles, particularly males into boat crew participation.

Mate Selection

Historic documentation of marriage patterns at Wales was more detailed than that of the other study communities. Although features of marriage discussed for Diomede were characteristic of Wales as well, the incidence of polygyny was emphasized by Thornton (1931). It is not clear if the incidence of polygyny was greater at Wales or merely its documentation gave it undue emphasis. Nonetheless, in the period 1890-1891, Thornton (1931) reported that polygyny was commonly

practiced by "rich men" or umealit (skinboat captains). According to Thornton (1931), one umealiq had four wives, one had three wives, and several others had two in 1890 (63). Females who produced more male children were preferred to those who produced a greater percentage of females. If polygyny were restricted to males who held the position of umealiq, there was unquestionably differential fertility between males who were successful boat captains and those who were not. The average age of marriage for males ranged between 23-27, whereas that of females ranged between 17-25 (Thornton 1931: 100). Thornton did not comment upon the degree of population endogamy in 1890, but it is suspected that the incidence of exogamy increased subsequent to the population decline of 1918.

Field data for 1980 are useful in assessing changes in Wales' marriage patterns through time. As in the other cases, missionaries, (Presbyterian in the Wales case) encouraged the abolition of many traditional social institutions after 1890, including polygyny and comarriage, although the missionary history at Wales was more disrupted and involved greater overt resistance on the part of the local populace than was the case in all the other study communities.

Table 68 presents the marital status of the Wales population by 10-year cohorts and by sex in 1980. These data indicate that in 1980, 28 (57.1 percent) of males 21 years or older were unmarried -- the highest incidence of bachelor males in all study populations. Conversely, there were 4 females (13. 8 percent) over the age of 21 who were not married in 1980 -- a lesser percentage than that of King Island and Savoonga but greater percentage than that of Gambell and Diomede. In 1980 the average overall age of marriage of Wales males was 26.3 years

TABLE 68: MARITAL STATUS OF POPULATION BY 10-YEAR COHORTS AND SEX, WALES -- 1980[1] (n=122)

Age Cohorts		Male				Female			
		Single	Married	Widowed	Separated or Divorced	Single	Married	Widowed	Separated or Divorced
81-90	No.	0	0	0	0	0	0	0	0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71-80	No.	0	1	0	0	0	0	2	0
	%	0.0	100.0	0.0	0.0	0.0	0.0	100.0	0.0
61-70	No.	3	5	0	0	0	2	0	0
	%	37.5	62.5	0.0	0.0	0.0	100.0	0.0	0.0
51-60	No.	2	5	0	0	0	8	0	0
	%	28.6	71.4	0.0	0.0	0.0	100.0	0.0	0.0
41-50	No.	1	3	0	0	0	1	0	0
	%	33.3	66.7	0.0	0.0	0.0	100.0	0.0	0.0
31-40	No.	5	3	0	1	0	4	1	1
	%	55.6	33.3	0.0	11.1	0.0	66.7	16.7	16.7
21-30	No.	17	4	0	0	4	5	0	1
	%	81.0	19.0	0.0	0.0	40.0	50.0	0.0	10.0
11-20	No.	14	0	0	0	12	0	0	0
	%	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
0-10	No.	10	0	0	0	8	0	0	0
	%	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Column	No.	52	20	0	1	24	20	3	2
Total	%	71.2	27.4	0.0	1.4	49.0	40.8	6.1	4.0

[1] "Widowed" and "divorced" categories do not include remarried individuals. Totals do not equal the entire population, since cases with unknown marital status are not included.

and Wales females 21.6 years (Table 69). Since all unmarried females were in the 21-30 year old cohort, the average age was actually less -- 18.8 years. There are no readily available explanations for the incidence of unmarried females given the number of available, unmarried males in the appropriate cohorts. The largest number of unmarried males was between 21 and 30 years of age, and the average age of marriage for this cohort was 21.25 years. Unfortunately there were no marital data from previous years for comparison. The implications of the large number of bachelor males for the division of labor in regards to large marine mammal hunting have already been discussed. The mean age of marriage between cohorts had exhibited considerable variation and no clear trends through time.

Table 70 presents place of birth of Wales spouses in 1980. Of 20 marriages, 15 (75.0 percent) were community endogamous for the Wales population. The Diomede/Diomede case was a relocated family, whose son interestingly recruited a spouse from Diomede who was temporarily living in Diomede in 1980. It is useful to compare community endogamy between the study communities. King Island had the least percentage (34.3 percent) of endogamous marriages, Gambell 63.3 percent, Savoonga 71.6 percent, Wales 75.0, and Diomede 100 percent.

If the relocated family from Diomede is not considered, 16 (84.2 percent) of the male and female spouses were from the Wales population, suggesting equivalent and relatively low levels of male and female recruitment to the population. The presence of inmarried males indicates that paternal linkages to the community and the environment were less significant than was the case at Gambell, Savoonga, and Diomede, but more significant than was the case for King Islanders in

TABLE 69: AGE OF MARRIAGE OF 10-YEAR COHORTS BY SEX, WALES -- 1980[1]

Age Cohorts	Male			Female		
	No. of Cases	Mean	Std. Dev.	No. of Cases	Mean	Std. Dev.
81-90	0	00.00	0.00	0	0.00	0.00
71-80	1	23.00	0.00	0	0.00	0.00
61-70	5	34.40	14.12	2	36.50	28.99
51-60	5	22.00	6.36	8	20.63	4.17
41-50	2	35.50	7.78	1	18.00	0.00
31-40	3	23.67	3.06	4	20.50	2.38
21-30	4	21.25	2.22	5	18.80	1.79
11-20	0	0.00	0.00	0	0.00	0.00
Total Population	20	26.30	9.42	20	21.60	8.89

[1] These data include all living members of the population for whom date of marriage was known. Dates of marriage for widowed, divorced, or separated individuals were incomplete.

TABLE 70: PLACE OF BIRTH OF SPOUSES, WALES -- 1980
(n^1=20)

Place of Birth		Number of
Husband	Wife	Marriages (Percentage)
Wales[2]	Wales	9 (45.0%)
Nome[3]	Wales	1 (5.0%)
Wales	Wales area[4]	2 (10.0%)
Wales	Seward Peninsula/Norton Sound[5]	2 (10.0%)
Wales area[4]	Wales	1 (5.0%)
Wales area[4]	Diomede	1 (5.0%)
Seward Peninsula/Norton Sound[5]	Wales	1 (5.0%)
outside of Alaska[6]	Wales	2 (10.0%)
Diomede[7]	Diomede[7]	1 (5.0%)

1 The total number of marriages in 1980 in which both spouses were still residing together equals n; percentages are calculated of n.

2 One of the husbands was born in Nome during seasonal trading activities. He lived in Wales all of his life and his birth there was irrelevant to his population status.

3 This husband was part of the Wales population, but he was born in the Nome hospital.

4 Wales area included camp sites and, in one case, the Nuluk River area in specifically.

5 The husband was from Teller and the wives from Shishmaref and White Mountain.

6 These husbands were inmarried non-Natives.

7 This Diomede couple was born and raised in Diomede and moved to Wales in 1956 after they had been married for over a decade.

1980. The data from Wales in 1980 do not adequately explain patterns of marriage in Wales over the last four decades. As emigration data will demonstrate and as previously discussed, a minimum of 55 females had outmigrated primarily as a result of outmarriage to primarily non-Native males encountered at the military installation at Tin City. Additionally, there are a few entire families who emigrated to Nome and who may or, in most cases, may not have married other members of the relocated Wales population. Significant in this context are the facts that these outmarrying females departed the population and their offspring have been lost to the population. Additionally, a large number of Wales endogamous marriages were also lost from the population and from these data because they relocated leaving behind no close relative residing in Wales in 1980. The offspring of this relocated group apparenly have not chosen to marry within the Wales population in most cases based on non-systematically gathered data and observations. Lastly, for whatever reasons, females have not brought non-Wales husbands back to the community for long-term residence. The two cases which do not conform to this generalization were recent in 1980 and may not have been successfully integrated. The ultimate outcome of this outmarriage for large marine mammal hunting has been the loss of a core of related males and their offspring necessary for effective crew formation and function and females to reproduce and perform parallel tasks associated with economic production, distribution, processing, and consumption.

Reproduction, Mortality, and Migration

Data regarding reproduction, mortality, and migration at Wales were sporadically documented prior to Thornton's (1931) residence in Wales from 1890-1893. Subsequent to his residence at Wales, documented data were also sketchy. This analysis relies primarily on data derived from informant recall for the 1900s. The documented population fluctuations were presented and discussed in association with Table 63. In this section more specific details of reproduction and mortality will be presented. Table 71 presents vital statistics for Wales from 1940 to 1980 based on informant recall. These data include information on people who were residing in Wales in 1980 or who had a close relative residing in Wales in that year. Oualifications relating to informant recall methodology presented in the discussion of Gambell's population dynamics are relevant in this context.

As previously discussed, the 1891 Wales population had not been significantly impacted by epidemic diseases. Thornton (1931) noted that most families in Wales had one to three children in 1890, and that only a single family had six offspring (100). These data suggest either a relatively low birthrate or high infant mortality. Thornton (1931) recorded the number of births between 1890 and 1891 and calculated a single year's birthrate of 55.7/1000 (25). This birthrate is relatively high in comparison with more contemporary birthrates for Wales and the other study populations, and suggests that the observed number of children per family was influenced by high infant mortality.

Table 71 indicates that in more recent years Wales birthrates were highest between 1956 and 1960. This 5-year interval was preceded

TABLE 71: VITAL STATISTICS, WALES -- 1940-1980

	Total			Mean			Rate/1000	
	Births	Deaths	Population[1]	Births	Deaths	Population	Births	Deaths
1980	1	1	122					
1979	1	1	(121.0)					
1978	2	3	(120.0)	1.6	1.4	120.0	13.33	11.67
1977	3	1	(119.0)					
1976	1	1	(118.0)					
1975	3	1	117					
1974	1	4	104					
1973	1	0	115	2.4	1.4	116.4	20.62	12.03
1972	2	1	(120.3)					
1971	5	1	(125.7)					
1970	3	0	131					
1969	5	0	(125.7)					
1968	2	2	(120.3)	2.8	0.4	121.8	22.99	3.28
1967	3	0	115					
1966	1	0	(116.9)					
1965	3	1	(118.7)					
1964	2	1	(120.6)					
1963	5	0	(122.4)	3.4	1.2	122.4	27.78	9.80
1962	5	1	(124.3)					
1961	2	3	(126.2)					

TABLE 71: -- CONTINUED

	Total			Mean			Rate/1000	
	Births	Deaths	Population	Births	Deaths	Population	Births	Deaths
1960	6	1	128					
1959	6	1	(127.5)					
1958	10	3	127	6.4	1.4	130.6	49.00	10.72
1957	8	1	(132.5)					
1956	2	1	(138.0)					
1955	7	1	(143.5)					
1954	4	1	(149.0)					
1953	6	1	(154.5)	5.0	1.6	151.5	33.00	10.56
1952	4	2	160					
1951	4	3	(150.5)					
1950	5	4	141					
1949	5	2	(146.2)					
1948	4	4	(151.4)	4.8	2.4	151.4	31.70	15.85
1947	6	2	(156.6)					
1946	4	0	(161.8)					
1945	7	2	(167.0)					
1944	4	4	(172.2)					
1943	4	2	(177.4)	4.4	5.0	177.4	24.80	28.18
1942	4	4	(182.6)					
1941	3	3	(187.8)					
1940	3	3	(193.0)					

[1] Population totals in parentheses are estimates based on previous and subsequent population documentation.

by 15 years during which the birthrate gradually increased between 1940 and 1956. However, the low reported birthrates in the 1940s and early 1950s may be biased by incomplete informant recall. Since 1966, the birthrate in Wales has gradually declined to a low of 13.33/1000 between 1976 and 1980. This and the 1971 to 1975 birthrate of 20.62/1000 were the lowest birthrates recorded for any of the study populations at any point in time between 1940 and 1980.

Table 72 presents age-specific fertility, mean number of children, and average age at first birth for Wales females in 1980. These data indicate that there had been a relatively consistent age at first birth between the oldest and 20-39 year old cohorts, although the latter cohort was still reproductively active in 1980 and its average age could increase. The mean number of children was 10.83 for the 60+ year old cohort and had declined to 6.88 for the 40-59 year old cohort, although that cohort could have still reproduced subsequent to 1980. In contrast to the low birthrate, age-specific fertility for all cohorts was higher than that of all other study populations. As in the cases of Diomede and King Island, there were no births between 45 and 49 years of age for any cohort. Additionally, the 40-59 year cohort produced no births between the ages of 40 to 44. This cessation of reproduction in the 30s has been common for all Iñupiat populations, but was not the case on St. Lawrence Island.

Interestingly, Wales exhibited the lowest birthrate of all the study communities in 1980 and the highest age-specific fertility. This phenomenon is in part related to the relatively low percentage of females to males in the community. In addition, apparently a large percentage of the offspring of the 60+ and 40-59 year old cohorts either

TABLE 72: AGE-SPECIFIC FERTILITY OF FEMALES, WALES -- 1980

Age Class		Ages of Females in 1980 60+ (n=6)	40-59 (n=8)	20-39 (n=15)	15-19 (n=5)	Totals (n=39)
	n[1]	30	32	--	--	62
45-49	births	0	0	--	--	0
	rate[2]	0.00	0.00	--	--	0.00
	n	30	36	--	--	66
40-44	births	7	0	--	--	7
	rate	233.33	0.00	--	--	106.06
	n	30	40	5	--	75
35-39	births	16	6	0	--	22
	rate	533.33	150.00	0.00	--	293.33
	n	30	40	22	--	92
30-34	births	14	11	1	--	26
	rate	466.67	275.00	45.45	--	282.61
	n	30	40	37	--	107
25-29	births	13	18	9	--	40
	rate	433.33	450.00	243.24	--	373.83
	n	30	40	66	--	136
20-24	births	9	15	12	--	36
	rate	300.00	375.00	181.82	--	264.71
	n	30	40	75	17	162
15-19	births	6	5	7	0	18
	rate	200.00	125.00	93.33	0.00	111.11
	Total n	210	268	205	17	700
	Total births	65	55	29	0	149
	Average rate	309.52	205.22	141.46	0.00	212.86
Average age at first birth		20.83	19.67	20.85	--	
Mean number of children		10.83	6.88	1.93	0.00	

[1] The n is equal to mother-years, which are the number of reproductively-aged females x the number of years each of these females has lived in each age class.

[2] Age-specific birthrate.

died or emigrated from the community. Young women between the ages 16 to 20 seemed to disappear from the population between 1970 and 1975. The women remaining in Wales have produced, on the average, a large number of children, but there are simply too few women. Finally, the majority of the offspring of the cohorts with high age-specific fertility were born prior to the last two decades. The 20-39 year old cohort produced similarly to the same cohort in other study populations but less than the older Wales cohorts. The youngest cohort had not produced at all in 1980 and many may emigrate before they do produce if patterns established between 1970 and 1975 persist, although they seemingly had been mitigated between 1976 and 1980. The availability of a high school in the community in future years may discourage at least part of this emigration, although by 1982 no high school had yet been established.

Table 73 presents the average number of children and age at first birth of males in Wales in 1980. The mean number of children for the oldest cohort, including both reproductive and non-reproductive males, was greater than that of all other Wales cohorts and of all cohorts in the other study populations. In the cohort 40-59 years, the discrepancy between the mean number of children of reproductively active males and the mean for all males in 1980 was considerable and is attributable to the large percentage of unmarried males. Additionally, 80 percent of the youngest cohort had not yet produced offspring. The mean age at first birth increased between the 60+ and 40-59 year old cohorts.

Figure 28 depicts seasonality of births by 25-year cohorts at Wales in 1980. For the oldest cohort (51+), birth peaks occurred in

TABLE 73: AVERAGE NUMBER OF CHILDREN AND AGE AT FIRST BIRTH OF MALES, WALES -- 1980[1]

	Ages of Males in 1980		
Variable	60+ (n=9)	40-59 (n=10)	20-39 (n=31)
Mean number of children	8.33(12.50)[2]	3.80(7.60)[3]	.19(1.33)[4]
Mean age at first birth[5]	26.33	28.60	25.33

1 No males younger than 20 were included as a 1980 cohort, since there was no evidence of paternity prior to that age.

2 The age in parenthesis was calculated for the 6 males who had produced offspring. The 8.33 mean number included 3 non-reproductively active males.

3 The age in parenthesis was calculated for the 5 males who had produced offspring. The 3.80 mean number included 5 non-reproductively active males.

4 The age in parenthesis was calculated for the 6 males who had produced offspring. The .19 mean number included 25 males who had not yet been reproductively active.

5 Mean age was only calculated for males who had produced offspring by 1980.

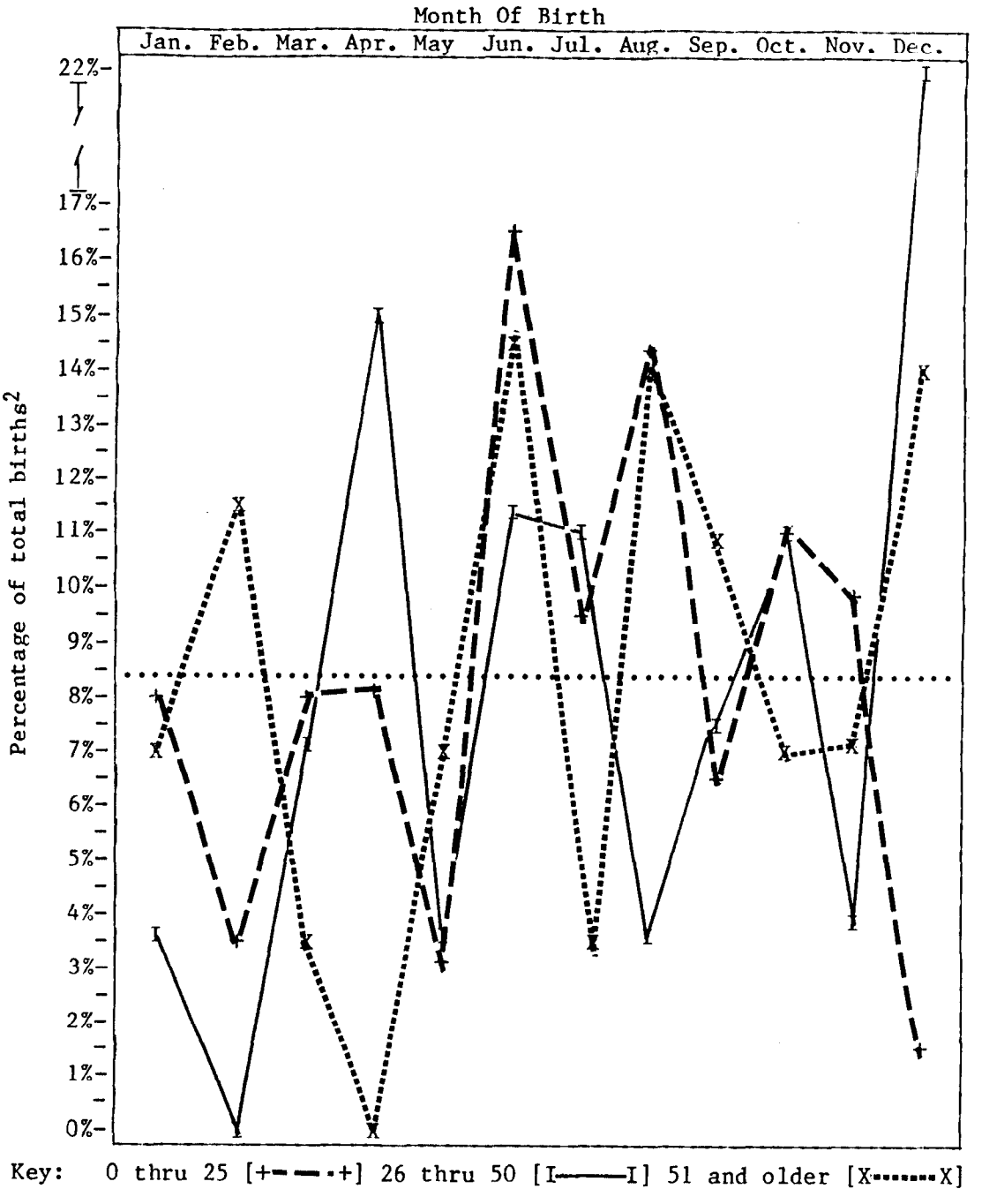


Figure 28: Seasonality of birth by 25-year cohorts, Wales -- 1980.[1]

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1 Because of the small size of the population over 75 years of age, oldest age category includes all individuals over 51.

2 The percentages are adjusted for differences in the number of days in each month. If births were equally distributed over the year, each month would contain 8.33 percent of the total births.

February, June, August, and December, corresponding to relatively high conception rates in May, September, November, and March. May was an important month for boat preparation in the village prior to the onset of marine mammal hunting. September corresponded to return to the central village from camps, a phenomenon observed in other study populations. November was the month of freezeup with corresponding poor ice conditions for individual hunting. March was a high conception month for both the oldest and middle (26-50 year) cohorts, but there is no ecologically related explanation for this occurrence. The lowest births occurred in April, corresponding to conception in July. As in the Diomede case, intensive crew hunting occurred during July and males were absent from the village for a substantial part of this month.

In the cohort 26-50 years, birth peaks occurred in April, June, and December, corresponding to relatively high conceptions in July, September, and March. The latter two months have already been discussed for the oldest cohort. The high incidence of conception in July is truly puzzling and suggests a decline in participation in crew hunting between 1930 and 1954. It is possible that this phenomenon may in part be explained by participation of males in reindeer herding and tin mining, an observation made by Jenness in 1926 (Jenness 1928: 72). There were no births in February, corresponding to a low incidence of conception in May. Again, this pattern does not lend itself to explanation and may have been associated with a non-hunting economic activity as described above.

For the cohort 26-50 years, the highest percentage of births occurred in June, reflecting a relatively high number of conceptions

in September, a phenomenon discussed for other cohorts in Wales and in other study populations. The lowest birth period was December, reflecting relatively few conceptions in March. This occurrence is not consistent with previous trends and cannot be explained ecologically. The most significant characteristics of the youngest cohort's birth pattern is the vascillation of birth frequencies between months of the year. Whereas vascillations were common in the oldest two cohorts of all study populations, the youngest cohorts exhibited greater regularity between months of the year. However, in the case of Wales, this trend was not apparent in the pattern of the youngest cohort.

Mortality at Wales has not been well documented prior to 1890. Thornton (1932) provided insight into causes of death and mortality rates between 1890 and 1891. Thornton (1931) reported that 26 persons died of a respiratory epidemic in the fall of 1890, but that there were only 4 additional deaths for the remainder of the year (25). He calculated a mortality rate of 48.6/1000 for the 1890-1891 interval. Thornton (1931) repored no suicides at Wales during his tenure there. Ray (1975b) reported that there were 16 deaths of men on moving sea ice associated with hunting between 1881 and 1891 (244). Although records were not available for King and Diomede islands during a similar period of time, more recent data suggest that King Islanders and Diomeders were more successful at hunting on moving ice, a view shared by Bogojavlensky (1969). As Table 63 indicated, the largest number of deaths in Wales was associated with the influenza epidemic of 1918-1919. In excess of 176 people died in this year according to informants and historical records (Koutsky 1981; and Bogojavlensky 1969).

Table 71 presented total deaths, mean number of deaths for 5-year intervals, and death rates for these intervals from 1940 to 1980. As discussed in regards to the other study populations, these data were based on informant recall and were therefore unquestionably conservative. Additionally, there are no death data for the large number of emigrants who had no close relatives residing in Wales in 1980. Despite these qualifications, the death rate of this population was much higher than that of other study populations for the entire 1940 to 1980 period with the exception of Diomede, where death rates exceeded those of all study populations. The death rate from 1976 to 1980 does not indicate a significant decline from previous 5-year intervals.

Table 74 presents causes of death and number, range, and average age of death by sex and by decade for Wales in 1980. As in all other cases, the largest percentages of deaths involved males between 1971 and 1980. The females who died in this decade were reported to be all infants. Only one of the two accidents was hunting-related. There was no incidence of epidemic diseases in this decade. From 1961 to 1970 there were deaths associated with measles. Average ages of death were notably younger for this decade than for the 1971 to 1980 period. There were no reported hunting-related deaths in this decade. Throughout the earlier decades, common causes of death were primarily contagious diseases, more males than females died overall, more males than females died of accidents, and average ages at death were relatively low.

To complete this discussion of Wales population dynamics, migration to and from the community is considered. Table 75 presents

TABLE 74: CAUSES OF DEATH AND NUMBER, RANGE,
AND AVERAGE AGE OF DEATH BY SEX, BY DECADE, WALES -- 1901-1980[1]

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
1971-1980									
unknown[3]	4	3	0	19-85	<1	57.5	0.0	0	2
unknown illness	1	0	0	63	--	63.0	--	0	0
kidney disorder	0	1	0	--	<1	--	0.0	0	0
congenital defect	1	0	0	<1	--	0.0	--	0	0
cancer	1	0	0	63	--	63.0	--	0	0
non-specific accident	1	0	0	26	--	26.0	--	0	0
snowmachine accident	1	0	0	22	--	22.0	--	0	0
suicide	1	0	0	28	--	28.0	--	0	0
Total 1971-1980	10	4	0	--	--	--	--	0	2

TABLE 74: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
				1961-1970					
measles	1	1	0	1	14	1.0	14.0	0	0
unknown illness	1	0	0	15	--	15.0	--	0	0
non-specific respiratory	1	0	0	<1	--	0.0	--	0	0
septicemia	1	0	0	1	--	1.0	--	0	0
abortion	0	0	1	--	--	--	--	0	0
homicide	0	1	0	--	30	--	30.0	0	0
non-specific accident	0	1	0	--	29	--	29.0	0	0
Total 1961-1970	4	3	1	--	--	--	--	0	0

TABLE 74: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
1951-1960									
unknown	2	2	0	<1	<1-54	0.0	27.0	1	0
tuberculosis	1	2	0	16	<1-1	16.0	0.5	0	0
heart disease	2	0	0	53-72	--	62.5	--	0	0
childbirth related	2	0	0	<1-<1	--	0.0	--	0	0
pneumonia	1	0	0	1	--	1.0	--	0	0
measles	0	1	0	--	2	--	2.0	0	0
drowned	1	0	0	4	--	4.0	--	0	0
gunshot accident	1	0	0	1	--	1.0	--	0	0
Total 1951-1960	10	5	0	--	--	--	--	1	0

TABLE 74: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
				1901-1950					
tuberculosis	1	3	0	17	22-61	17.0	39.3	0	0
influenza	11	10	0	1-53	1-43	26.7	22.3	7	7
whooping cough	2	2	0	2-2	<1-5	2.0	2.5	0	0
unknown	9	4	0	<1-59	<1-1	22.0	.5	1	2
non-specific accident	2	0	0	8-12	--	10.0	--	0	0
unknown illness	1	3	0	5	<1-<1	5.0	0.0	0	1
pneumonia	2	0	0	<1-13	--	6.5	--	0	0
old age	1	0	0	--	--	--	--	1	0
measles	1	1	0	1	<1	1.0	0.0	0	0
frozen/hypothermia	1	0	0	<1	--	0.0	--	0	0
stomach disorder	1	1	0	48	11	48.0	11.0	0	0
non-specific respiratory	2	1	0	1-1	<1	1.0	0.0	0	0
chicken pox	1	1	0	<1	1	0.0	0.5	0	0
cancer	1	3	0	32	51-52	32.0	51.5	0	1

TABLE 74: -- CONTINUED

Causes of Death	Number			Age Range[2]		Average Age[2]		Unknown Age	
	Male	Female	Unknown	Male	Female	Male	Female	Male	Female
1901-1950 (continued)									
natural disaster	1	0	0	48	--	48.0	--	0	0
suicide	0	1	0	--	26	--	26.0	0	0
childbirth related	0	1	0	--	<1	--	0.0	0	0
diptheria	1	0	0	9	--	9.0	--	0	0
Total 1901-1950	38	31	0	--	--	--	--	9	11

Total Reported Causes of Death, Dates of Death Known, Wales, 1901-1980 = 106
Total Reported Deaths, Dates of Death Unknown, Wales, 1901-1980 = 81
Total Reported Deaths, Wales, 1901-1980 = 187

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1 Death data are based on informant recall, not on medical records or other documented sources. Similar causes have been grouped into categories. In most cases, data accuracy and completeness decline in relationship to the number of years which has transpired since their occurrence. There are 81 individuals, closely related to the living Wales population (either grandparents, parents, spouses, siblings, or offspring), who have died but dates of death are unknown. Causes of death for these individuals include, but are not limited to, tuberculosis, influenza, diptheria, paralysis, homicide, non-specific accidents, frozen/hypothermia, drowned, and miscarriages. Miscarriages totalled 14, the largest single specified category.

2 Age range and average age are calculated only on cases of known sex.

3 This category indicates that there is no information on cause of death.

TABLE 75: DESTINATIONS AND NUMBER OF EMIGRANTS BY SEX AND AGE, WALES -- 1980[1]
(n=80)

Destination	Males			Females		
	Total (Percentage)	Age Range	Mean Age	Total (Percentage)	Age Range	Mean Age
Savoonga	0(0.0%)	--	--	1(1.8%)	22	22.0
King Island	0(0.0%)	--	--	2[4](3.6%)	47-66	56.5
Diomede	1(4.0%)	34	34.0	0(0.0%)	--	--
Nome[2]	7(28.0%)	17-78	53.0	11(20.0%)	20-78	56.4
Seward Peninsula[3]	3(12.0%)	un	un	3(5.5%)	22-53	32.3
Anchorage	2(8.0%)	35-47	41.0	11(20.0%)	27-67	39.1
elsewhere in Alaska[5]	2(8.0%)	32-41	36.5	2(3.6%)	36-38	37.0
outside of Alaska[6]	1(4.0%)	35	35.0	11(20.0%)	9-47	34.8
unknown	9(36.0%)	9-36	21.0	14(25.5%)	15-49	29.7
Totals	25(31.2%)	--	--	55(68.8%)	--	--

TABLE 75: -- CONTINUED

un = unknown

1 These data reflect only emigrants who are closely related (offspring, spouses, siblings, parents, or grandparents) to members of the study population who were residing in Wales in 1980. Based on field data, there were a substantial number of emigrants born in Wales who did not have close relatives in Wales in 1980. This resulted from entire families relocating from Wales to Nome with no close surviving kinsmen remaining resident in the community. Where field data are available, these will be footnoted for comparison with emigration data based on close interconnections with Wales residents in 1980.

2 Field data indicate that in 1980 there were minimally 64 individuals in Nome who had been born in Wales and subsequently relocated. These data do not include offspring of relocated Wales population born in Nome or elsewhere.

3 These communities included Teller and Shishmaref.

4 One female was actually born in Teller but was part of the Wales population. Her birth in Teller was associated with seasonal travel during summer months. She is the mother of the other Wales woman who had married a King Islander.

5 These communities include Chugiak, Fort Yukon, Ambler, and Tetlin. Field data indicated an additional 14 individuals located in Fairbanks, Seward, Palmer, and Scammon Bay.

6 Field data indicate a minimum of 14 people located outside of Alaska in 1980 who had been born in Wales.

destinations and number of emigrants by sex and age for Wales in 1980. As previously discussed in association with patterns of mate selection, based on field data there were in excess of 64 additional emigrants in Nome who did not show up in these data because they were not the grandparents, parents, spouses, siblings, or offspring of any Wales residents in 1980.

Table 75 indicates that the number of female emigrants was significantly greater than that of males (68.2 percent as compared with 31.2 percent respectively). As previously noted, the majority of females emigrated as a function of outmarriage, and 69.9 percent of the female emigrants left the Bering Strait area. In contrast,

56.0 percent of the males left the Bering Strait area and located throughout and outside of the State. For emigrants whose destinations were known, the largest single percentage (50.0 percent) relocated in Nome. Male relocation was more frequently initially associated with employment, education, and access to medical facilities than with outmarriage, although outmarriage was frequently an ultimate outcome. As indicated above, immigration to Wales has been limited to three male and three female inmarried spouses, a relocated Diomede family, and two children who were adoptive relatives of an inmarried female. Recruitment of members of the population from outside Wales was minimal, particularly in relationship to the relatively high level of emigration.

Patterns of Adoption

Information regarding adoption at Wales has not been previously documented based on data gathered directly from the community. Thornton (1931) noted that adoption was common in 1890 to 1891, but provided no other details about the nature of adoption during this time period. Bogojavlensky (1969) made the assumption that adoption functioned similarly at King Island, Diomede, and Wales, but his data were derived primarily from King Islanders. As discussed in the King Island context, adoption, as described by Bogojavlensky (1969), was primarily a means for consolidating male alliances focused on skinboat crews, primarily within the community but, secondarily, between communities.

Based on contemporary Wales data, if intercommunity adoption existed in the past, it did not persist to 1980. In this regard,

adoption at Wales was more similar to that at Diomede in 1980, since in both cases adoption did not go outside of the community -- that is, at least one natural parent of the adoptive child was a member of Wales' population. Table 65 described household composition in Wales in 1980. Although 6 (20.0 percent) of the households reported children classified as "adopted," there were additional functionally adopted children -- namely grandchildren of household head. Based on these data, adoption appeared to me more a means of balancing the sex and age composition of households. In 1980 there was only one childless household in Wales.

Contemporarily adoption provides a means of enculturating the offspring of a non-resident, non-Wales male. Based on ethnicity and place of birth tables, this phenomenon occurred relatively recently. Since the continuation of crew hunting depends upon the success of male enculturation and integration (see Chapter V), the functional importance of adoption for this purpose will parallel trends of reproduction by non-resident males.

CHAPTER V

BERING STRAIT INSULAR ECOLOGICAL ADAPTATIONS: 1650-1980

Introduction

This chapter describes historically and contemporarily patterns of ecological adaptation of the populations of Gambell, Savoonga, King Island, Little Diomede, and Wales. For each study community, the following information is presented to provide an early contact baseline and demonstrate changes occurring through time:

(1) central themes in the social organization of production and distribution;
(2) seasonal harvests of resources;
(3) habitats used as defined by the population cohort of the harvester;
(4) details of harvest patterns keyed to specific resources, with the focus of attention on marine mammal hunting.

Early contact baseline data are reconstructed from historical documentation. Social, economic, and technological events that have induced significant shifts in these adaptive strategies (such as commercial whaling, the introduction of outboard motors, etc.) are discussed and chronologically referenced. As previously mentioned, documentation for the historic period is not uniform in quantity or quality for the study populations. Contemporary data are derived primarily from field research in the communities during the past decade (1970-1980). In

this chapter Gambell and Savoonga are discussed as a unit as are King and Little Diomede islands because of similarities in adaptive strategies. However, differences are highlighted and some data, such as harvest levels and boat crew number and composition, are presented separately.

It is useful to explore central themes in the social organization of production and distribution before considering specific hunting patterns. Since the emphasis of this study is large marine mammal hunting, and this type of hunting is conducted by organized groups rather than by individuals, an understanding of the social dynamics of production and distribution is essential to an analysis of the actual hunting patterns. In addition, the social patterns of large marine mammal hunting influence individual hunting and distribution as well as non-marine group hunting and fishing activities. Lastly, the social organization of large marine mammal hunting is an important link between population structure and hunting ecology.

Central Themes in the Social Organization of Production and Distribution

In Bering Strait insular societies, the individual could play one of several roles in the production of food and raw materials, depending on age, sex, and physical condition. The opportunities for individuals or households[1] to act as isolated economic units were

[1] For purposes of this study, "household" refers to the social group that normally resides in the same domicile in the permanent winter village. Although some household membership in these communities was fluid during different seasons or in response to social factors, there was usually a stable core membership that persisted through time and in response to seasonal variation.

limited in the past and remain so today. The nature of the environments, accessible resources, and harvest technologies required cooperative action and a well-defined division of labor to maximize the full potential of these environments in the context of fluctuations in resource availability and population structure. Details of division of labor are described for each village in subsequent sections of this chapter. As will be detailed below, individually-focused harvests, or harvests involving small groups of individuals carrying out singular activities in concert (e.g. berry picking), were mostly performed by the very young, very old, infirm or temporarily incapacitated. The important exceptions to this were the hunting of marine mammals on foot on moving or stationary ice (mauqsatuat[1] in King Island Iñupiaq) or the hunting of marine mammals by kayak, both of which were undertaken by young and middle-aged males. Although these were individual efforts, resulting products were channeled into larger consumptive units.

The composition of all cooperative units of production relied, to a greater or lesser degree, on kinship-based alliances as the focal theme of organization (Burch, Jr. 1975a; Bogojavlensky 1969; and Hughes 1960). Households were the smallest cooperative economic unit and included a core of individuals related by consanguineal and affinal kinship ties. As Burch, Jr. (1975a) describes:

> Direct observational data on family composition from the traditional period do not exist. However, there is some information on household composition. Since individuals apparently never lived alone in traditional times, and since unrelated families reportedly never shared a single dwelling, it maybe assumed that household membership and domestic family membership coincided. (239)

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[1] Bogojavlensky 1969: 78.

The continuity of patterns of household composition through time has been demonstrated in Chapter IV.

It is important to note that typical household units included representatives of the full range of population cohorts, thereby providing the division of labor by age and sex critical to functional economic units in these societies. Although cooperation in production and distribution of food and raw materials extended beyond the household for most economic activities, including the hunting of large marine mammals, in a limited sense the household was the smallest functional unit of productions (Ellanna 1980). However, households in the Bering Strait area did not normally exist in economic and social isolation from other households except for short periods of time (Bogojavlensky 1969; and Hughes 1960).

In many harvest activities, two or more households related by consanguineal or affinal ties joined together in productive activities. Examples of these include the paired hunting by males of marine mammals on foot or in kayak (Bogojavlensky 1969; and Hughes 1960 and 1974), participation in mainland fishing activities, and hunting of molting migratory waterfowl. As discussed in Chapter IV, there were mechanisms within Bering Strait society which promoted the formation of interpersonal and interfamilial alliances and these functioned to facilitate family-focused production. Examples of these mechanisms included adoption, mate selection, wife-exchange (comarriage), and naming (Bogojavlensky 1969; Burch, Jr. 1975a; Heinrich 1960 and 1963; and Hughes 1960 and 1974). As in the case of household production, some activities like the harvest of large marine mammals included alliances beyond the family, although, according to Hughes, family member alliances played

an important role in St. Lawrence Island crew hunting in the 1950s (Hughes 1960).

In Bering Strait insular society the hunting of large marine mammals was traditionally and remains the most complex form of cooperative hunting. As previously discussed, prehistoric and historic data from northwestern and arctic Alaska suggest that the hunting of large marine mammals such as whales required a large population base and a well-defined social network to permit the structure and functioning of intracrew and intercrew cooperation (Bockstoce 1976; and Freeman 1979). Bogojavlensky (1969) explored, for King and Diomede islands, the social organization of skinboat hunting and the mechanisms by which a man became a skinboat "captain" or umealiq and recruited and maintained the necessary crew. According to Bogojavlensky (1969), boat hunting (aŋunñiaqtuat in Iñupiaq) was conceptually and socially entirely different from mauqsatuat ("hunting on foot") (72). The cooperation in boat hunting extended throughout the year manifesting itself through common membership in men's houses (kagrit in Iñupiaq), the sharing of information about hunting strategies and technology, distribution of harvested resources, joint men's and women's (i.e. wives of crew of the same boat) work groups related to boat hunting, boat crew sponsored ceremonies, and many other common activities. Bogojavlensky (1969) described a crew as ". . . a social constellation of men focused on a captain and obligated to him" (117); that most successful captains had, as a nucleus of their crew, a cohort of men with whom relationships stemmed from elementary kinship ties (genealogically and socially determined) (118).

On St. Lawrence Island, Hughes (1960) contended that boat crews were more clearly based on the kin relationships between men, their fathers, and/or their paternal uncles:

> Boat crews are almost always made up only of clansmen, although sometimes a nonclansman is a regular member of the crew. When this happens, however, it is for idiosyncratic reasons, and there is no cultural pattern which makes it expectable as the structure of the crew. Occasionally, too, an outsider will hunt in a boat on a particular day if the crew is shorthanded. But the cadre of the crew consists of men of one clan. (255)

In this context it is informative to explore the operative social structure of the skinboat crew. The primary figure was the skinboat "captain" (umealiq in Iñupiaq, angyaelik[1] in Siberian Yupik). This individual was usually the boat owner, although an old and/or otherwise incapacitated owner may be replaced in his functional captaincy role by a brother; a paternal, parallel, male cousin; an eldest son; or son of a brother. The boat owner/captain was usually the eldest male of an extended family group, who has appropriately developed hunting skills. Other crew positions normally required close culturally-defined kinship ties to the captain, and for pragmatic reasons these were largely, though not exclusively, determined by birth. Important criteria included being male (females did not usually participate in crew hunting); birth order (the eldest male usually had the greatest authority or rank in the kin group); and genealogical or appropriate socially-defined relationship to captain (brother; paternal, parallel cousin, socially considered to be like a brother; son; and son of a paternal, parallel, male cousin). Although these paternally-defined kinship patterns appeared to be most well developed among

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[1] Siberian Yupik terms come from Hughes 1960 and display an orthography somewhat different from that of the Iñupiaq used in the author's fieldwork.

St. Lawrence Islanders (Hughes 1960), similar patterning has also been observed for contemporary insular Iñupiat.

The captain usually occupied a position at the stern of the skinboat and was responsible for steering the boat in addition to making all critical decisions regarding the hunt. These decisions included when to go out; where to hunt; evaluating conditions of the ice, wind, and current; hunting strategy or how to approach prey; the number of animals to harvest; whether or not to cooperate with another boat in the area; how to cope with emergency situations; who was to receive female walrus hides if he did not retain them all; and other important determinations.

The other most important position was the second in command, who was usually a brother of the captain or some other important older male relative previously described. This individual usually was a striker (harpooner) or the first to shoot the prey (sivooyachta in Siberian Yupik). Other positions in the 10-12 person crew decreased in authority in order from the bow to the stern with the exception of the captain who manned the rudder in the very stern of the boat and, after outboard motors were introduced, the "mechanic" (evinruchta in Siberian Yupik) who was responsible for the successful operation of the engine. Other positions were variably responsible for the inflation and timely dispatch of line floats for whales and walrus. After the introduction of rifles, other crew positions provided backup shooting power during the harvest of a mammal and manpower for other more mundane chores related to the hunt. Apprentices learned to hunt by participating in crews with very limited and secondary functions, always in out-of-the-way seats on the boat.

The social structure of the boat crew has persisted more or less unchanged through time.

> The boat crew is probably one of the most ancient of Sivokak institutions and in its general outlines has resisted all sorts of pressures to change. Modifications have been made in the equipment used for hunting, but they have been absorbed into the preexisting social pattern. This pattern was based on the bonds of loyalty which existed among several close relatives and over which was imposed a scheme of technical-role relationships and a chain of authority and command. (Hughes 1960: 255-256)

Currently both skinboats and aluminum boats are used for hunting large marine mammals on St. Lawrence Island. The structure of the larger skinboat crew has remained essentially unchanged. Aluminum boats require a smaller crew because of their size. Therefore skinboat crews divide into smaller units along the existing lines of authority and in accordance with patterned functional roles. Thus the hunting unit has remained intact despite technological change. This will be considered further in Chapter VI.

The distribution of fish, game, and plant resources in Bering Strait society was highly structured in the past. These patterns of distribution have persisted to the present for the allocation of local resources, although their applicability to the dissemination of cash is not well understood and a subject outside the purview of this study. The social organization of distribution is discussed at the community level. Although the distribution system assured the maintenance of these communities by normally providing for the basic needs of members, it also allowed certain individuals and families (i.e. boat captains and their kinsmen) to acquire a disproportionate amount of the available harvest of game, fish, plants, and trade items.

The organization of distribution on King Island was documented and analyzed by Bogojavlensky (1969) for the late 1960s. Informant

recall and field observations during the 1970s corroborated this analysis and its continuity through time. Bogojavlensky (1969) pointed out that for males there were only two basic production groups: the skinboat crew and the solitary hunter on moving ice. Individual hunting from kayaks was considered to be in the same category as solitary hunting on moving ice. Distribution rules coincided with the basic dichotomy of production.

> When a seal is successfully killed and retrieved the hunter will begin to drag it home. Usually, for ringed seals . . . the whole carcass is dragged home. Bearded seals are butchered on the spot. The hide is removed with the blubber. Then a hundred pounds of choice cuts are wrapped in the hide; the whole is roughly stitched up with rawhide and dragged home.
>
> However, if another hunter sees a kill and is able to reach the successful hunter before he drags his seal to the shore ice, he is entitled to a considerable share, amounting to roughly a third of the meat (skin and blubber excepted). If other hunters reach the scene, they are also all -- to the seventh one -- entitled to predetermined shares. The sizes of the shares diminish according to order of arrival. The successful hunter is not required to share anything once he has reached the shore ice.
>
> This sharing, associated exclusively with hunting on foot, is called ningiq. (Bogojavlensky 1969: 74)

The degree to which this rule was invoked depended on how plentiful game was at any given time. Ningiq was the rule for the initial division of game acquired by solitary hunters and depicted the random nature of this kind of production.

In contrast, game harvested by skinboat crews was divided into shares to be distributed between crew participants. Bogojavlensky (1969) describes the sharing of skinboat harvests:

> The sharing of the harvests is handled in an established way under the direction of the captains for each boat. The procedure is somewhat different at King Island and at Diomede. At Diomede, after each of the early trips, the meat is sorted out so that tongues are in one pile, flippers in another, and so forth. The captain then gets first choice and carries off as much as he cares to. The rest is divided equally among the crew. Later,

> when meat is no longer hauled in any quantities, each crew member helps himself to whatever he wants. . . . All the tusks, however, are collected by the captain, and are later divided up. The captain alone, or the captain and the owner of the outboard motors (where these are not one and the same), keep one half of all the ivory. The rest supposedly is divided equally among the crew. However, since all of the captain's sons over the age of twelve . . . are inevitably in the crew, he gets to keep their shares and makes them some present. . . . Most members of the crews are never allowed to take hides. (85)

King Island hunters usually butchered on the ice away from the village. Meat was carried to shore when boats returned and the sorting and sharing was done by wives and mothers of crew members with no participation of the hunters.

> All crewmen received equal share [of the meat] after the captain's wife takes at least one extra share "for the boat," one for the captain, and often two for his sons. (Bogojavlensky 1969: 86)

King Island captains also retained half of the ivory with his sons receiving only partial shares. Cow walrus hides were exclusively the property of captains, although they would occasionally give one to a crew member for use in covering kayaks.

Once King and Diomede island hunters turned over harvested game to their wives (or mothers if the hunter still resided in the same household as his mother), a secondary distribution network emerged. Women redistributed game throughout a network of female-focused alliances which included her kinsmen. These networks frequently crossed the lines of kinship and alliance established by her husband.

The first harvest of each species to occur in an annual cycle was shared throughout the community. Also, the first harvest of each species by a novice hunter would also be shared primarily with older people in his community. Lastly, the ceremonial division of game such as polar bear occurred in men's houses and crossed the boundaries of kinship groups and skinboat alliances.

The distribution system provided multiple opportunities for ensuring all households would participate in successful harvest. Sharing by males occurred both randomly (ningiq) or cooperatively (through skinboat crews). Females subsequently redivided their portion of the harvest to households which may not have gotten shares through male linkages. On some occasions the entire community could participate in a harvest. Lastly, captains increased their status, power, and the extent of their alliance network by providing for unfortunate households which lacked productive males. All of these networks remained functional in the 1970s.

The organization of distribution on St. Lawrence Island and at Wales shared many features of the patterns described for King and Diomede islands. St. Lawrence Island populations and, to a much lesser extent those of Wales and Diomede, actively hunted bowhead whales. The distribution of the harvests were formal in regard to which crew position was to receive what portions of a harvested bowhead, but the basic characteristics of skinboat crew participation in the allocation of harvests prevailed. However, because a single bowhead whale provided such a large mass of food and raw materials, the distribution network included the entire community.

On St. Lawrence Island a boat captain retained a larger overall share of the ivory to a maximum which compensated for his costs in providing and maintaining the boat. The remaining harvest was divided equally among households which participated in the hunt regardless of the number of representatives they had on the crew. Since St. Lawrence Island crews were composed of very close kinsmen, strong obligations of mutual support existed. Therefore, although initial shares may

have been smaller for a household with several sons on the same crew, additional portions were received through a secondary distribution network operative between kinsmen from different households (Hughes 1960).

Prehistoric (Bockstoce 1976; and Freeman 1979) and historic data and ethnographic analogy suggest that intercrew cooperation is necessary for successful and efficient large marine mammal hunting, particularly for whaling. Intercrew cooperation has been documented for St. Lawrence Island:

> If there are more than one boat and crew from one patriclan, the several boats tend to hunt together and help each other on the ice. A group of boats composed of clansmen is called by a special term, aelrae kothreit. These boats "hunt with each other and help each other; they stay close." The hunting union among boats of a clan was more pronounced in the past than it is now, however. (Hughes 1960: 255)

Intercrew cooperation is not well documented for King and Diomede islands and Wales. Bogojavlensky (1969) explores the institution of the kazgi or men's house. As previously mentioned, in King and Diomede island communities a man normally would become a member of his father's men's house unless he was adopted; in the case of an adoption he would enter the men's house of his adoptive father (Bogojavlensky 1969: 178). Therefore since there were possibly only three or four kazgi at any point in time, it can be inferred that brothers and other related males (e.g. paternal, parallel cousins) might end up in the same kazgi. If more than one had a boat, the cooperation born out of allegiance between kinsmen was operative within the membership of the kazgi. Nevertheless, data also strongly suggest that factionalism focused on strong skinboat captains unquestionably crossed kazgi lines (Bogojavlensky 1969; and Ross 1958), thereby suggesting that bonds of

intercrew cooperation also spanned multiple kazgi.

On King Island the institution of the kazgi continued to function until the mid-1960s as a means for ensuring intercrew cooperation and allegiance. When the King Islanders relocated to Nome, the institution of the kazgi was basically abandoned, although in the late 1960s and early 1970s the social composition of activities performed in the King Island community hall and carving cooperative workshop in Nome in part reflected kazgi membership patterns. At Diomede the institution of the kazgi was disrupted by missionary activity and population relocations of Diomeders to the mainland (Teller area) and Big Diomeders to Little Diomede Island in the 1930s (Bogojavlensky 1969: 172-173).

> Norwegian missionaries entered the community in approximately 1910 and purchased a men's house [kazgi] for the mission. The captain who dominated that men's house at the time received payment as de facto owner. This established a precedent, and the men's houses at Diomede came to be considered the property of their respective dominant members. This was abetted by teachers and Protestant missionaries. . . . To underscore their rights, the owners moved their families into the men's houses and used them as household dwellings. (Bogojavlensky 1969: 173)

Population declines related to disease and the influence of missionaries and other outsiders contributed to the decline of the four Wales men's houses as well. Prior to World War I a teacher at Wales was effective in stopping the functioning of the men's houses because he felt they caused friction between the two parts of the village (Anderson and Eells 1935: 119).

In the last decade intercrew cooperation has continued. However, it is primarily based on kinship alliances in the absence of other social institutions. In the case of King Island, field data suggest that contemporary intercrew cooperation in large part reflects the patterns of alliance which were established and strengthened or

weakened by the dynamics of kazgi membership in the recent past.

Although evidence of cooperation in production and distribution between individuals, households, or families residing in different communities is not well documented, there are numerous citations in historical literature about prolonged stays of individuals or families from one community in another. Further, the extensive trade and exchange network that existed in the Bering Strait area is well documented (Ray 1964, 1975a, and 1975b).

Although the populations of the Iñupiaq study communities occupied the relatively large winter villages which are the focus of this study, they were relatively mobile during summer months. It was during these months that intercommunity contact peaked. Such contact involved alliances between both individuals and family groups from different winter villages and between communities (i.e. "tribes" in the context of Bering Strait society):

> Besides informal tribal understandings on an individual basis, there also existed tribal alliances. These alliances probably did not differ much from an informal granting of permission to hunt or fish in other territories, but those that we know existed were pointedly in force for widening the range of subsistence pursuits, and for protection in the event of raids by and wars with Indians or Siberians. . . .
>
> In principle, any two contiguous tribes could be allies, but the most necessary alliances were between island and mainland tribes, which would have celebrated the messenger feast in December had ice conditions made it possible. . . . The alliances between Little Diomede and Wales and between King Island and Kawerak had dated back before memory, and entire families would spend a season or almost a year in the other tribe's homeland. On King Island in 1791, Ivan Kobelev met inhabitants of the Kheuveren (Kuzitrin) River, who had come the preceding summer for trade; in 1892, eleven Diomede Islanders wintered at Wales. (Ray 1975b: 108-109)

Hughes (1960 and 1974) documents the temporary movement of families or households from one winter community to another as a way of dealing with resource shortages. An older informant relates such an

incident which occurred during his childhood:

> In the evening . . . some men arrived from Gambell with their sleds loaded with food, kerosene, and dog food . . . I was afraid of the strange men. I hadn't seen them before, and some of them were staying in our house. . . . They had heard about our hard time, and they organized and bought things at the store and brought them to us.
>
> That winter of my fifth year was not a very good one. We were short of food and out of fuel oil and seal oil. We got some help from the village, but that was not enough, and we had to go to Gambell. I was going to see the village for the first time. (Hughes 1974: 30)

As previously demonstrated, St. Lawrence Island supported a greater number of communities than did the smaller islands, and the economic need for mainland resources was less. Nonetheless, genealogical data suggest that intermarriage between St. Lawrence Island and the Siberian mainland did occur at least since the latter half of the 1800s, and trade between the Island and mainland has been documented from earliest contact. Mainland resource harvests may have occurred in the context of these other activities.

Among the Iñupiat study populations, mechanisms for establishing intercommunity alliances were basically means for extending kinship networks. Although community outmarriage was not unknown, the populations of all study villages were most commonly endogamous. However, marriages between allied contiguous groups (e.g. King Island and Kauwerak) were occasionally used as a means for establishing and/or strengthening intercommunity or interfamilial ties and resultant mutual obligations. As previously discussed, spouse recruitment, comarriage, adoption, trading partnerships, and naming were mechanisms which resulted in intercommunity alliance and allegiance between family groups. It is likely that these patterns of alliances included intercommunity/intercrew hunting cooperation at least periodically or under particular

ecological or economic circumstances such as the harvest of a very large marine mammal, the harvest of a large number of migratory herd animals, or the harvest of any resource in times of extreme scarcity. Historic documentation provides evidence that these same interfamilial networks which crossed community lines were also important in the distribution of resources, particularly fish, game, and plants available to one community but not to another.

In regards to intercommunity cooperation, study populations were less sedentary and less centralized in the earlier historic period than they are today or in recent years. Ray (1964) reconstructs initial contact settlement patterns for Bering Strait Iñupiat from early documentation. Although the Bering Strait mainland settlement pattern involved central villages with smaller, satellite communities, the insular pattern was somewhat different. At time of contact, only one community each was occupied on King and Little Diomede islands, although oral histories substantiated by archaeological evidence indicate that other village sites on both islands may have been occupied at an earlier time (field data and Robert Mack, personal communication, 1980). Therefore King and Diomede island intercommunity contact was primarily with the mainland communities of Kauwerak and Wales respectively. In the case of Diomede, contact with the mainland occurred on both the Siberian and Alaskan sides of the Strait. King and Diomede populations, and to a much lesser extent the Wales population, inhabited their relatively isolated permanent villages in winter, but in late spring, summer, and early fall activities traveled considerable distances to mainland camps and territories normally occupied and utilized by other populations.

Hrdlička (1930: 209) presented data which indicated that there were a dozen settlements of greater or lesser size on St. Lawrence Island in 1849 and six settlements in 1878 prior to the major population decline which occurred during the winter of 1878-79. The centralization of the population into first one and then two villages did not occur until approximately 1900. The extent to which these multiple insular settlements maintained contact is unknown. All study communities maintained some level of contact with Siberian Yupik populations inhabiting coastal Asia. Based on historic and genealogical evidence as discussed in Chapter IV, the contacts between St. Lawrence Island and Indian Point (Chaplino) on the Siberian coast and between the Diomede islands and East Cape, Siberia were the most frequent.

Contemporary field data demonstrate that intercommunity cooperation in production and distribution has persisted through time although in somewhat different form. Individuals or entire families who originated in study communities but who have relocated to larger communities such as Nome commonly return to their home village during key resource harvest seasons. For example, during the whaling season representatives of most St. Lawrence Island families residing in Nome return to the Island to join the crews of appropriate kinsmen to participate in this activity and share in the harvest. Since contact with the Siberian mainland and its resources is no longer politically possible for St. Lawrence Islanders, reciprocal resource harvest production and distribution occurs on Seward Peninsula with Savoonga and Gambell family representatives participating in moose hunting, salmon fishing, and other harvest activities with kinsmen who reside in Nome. Food products and raw materials flow between the Island and

Nome throughout the year.

In addition, Savoonga and Gambell skinboat crews occasionally cooperate in harvesting a bowhead whale if hunting in the same area. In all cases, a bowhead harvested by one St. Lawrence community will be distributed to residents of the other community. This distribution pattern between villages has been codified and in part is a response to the limited bowhead harvest quotas imposed upon the populations in recent years by the International Whaling Commission.

King Islanders residing in the Nome subcommunity are annually joined in walrus hunting activities by male kinsmen who normally reside part of the year in other Alaskan cities and less frequently outside the State. These individuals usually assume positions on crews in accordance with traditional guidelines for crew membership and functioning outlined above. Although King Islanders do not frequently hunt with crew members who are basically "outsiders," some inmarried spouses or other non-King Islander affinal kinsmen are occasionally asked to participate in walrus hunting, particularly if a boat captain lacks a full crew. The latter circumstance occurs less frequently since the use of aluminum boats has begun to replace the use of the more traditional skinboat with its larger crew requisites. King Islanders rarely hunt in the same vicinity as do hunters from Diomede and Wales and the exchange of products between allied families from these communities is common. Since captains control the distribution of female walrus hides suitable for use as umiak covers and female hides are available infrequently to King Island hunters based in Nome, it has not been uncommon in the last decade for King Island captains to secure needed hides in exchange for resources or cash from families in Diomede or

Wales with whom they have an alliance. This occurs even if excess hides may be held by other King Island captains.

The logistics of travel to Diomede from the mainland during the walrus migration usually do not allow for nonresident Diomeders to participate in hunting from the Island unless they go to the Island before breakup or towards the end of the walrus migration. However, in recent years a crew of relocated Diomeders who lives in Teller has followed walrus herds northward with the receding ice pack, eventually stopping to hunt from Little Diomede.

Intercommunity contact between the populations of Diomede and Wales has continued to the present. In part this contact is related to the geographic proximity of these two communities, and Wales is the first landing site for skinboats crossing the Strait from Diomede to the mainland. During walrus migrations hunters from these two communities generally do not hunt in the same areas early in the season primarily because of ice and current conditions. Diomeders frequently remain in Wales for short periods of time when traveling either to or from the community. As demonstrated in Chapter IV, there has not been frequent intermarriage between the two communities, but field data suggest that secondary kinship ties and alliances remain operative. These interrelationships involve mutual support and trade. Since many contemporary residents of Diomede are relocated Big Diomeders and their offspring, previous residents of Diomede who now live on the mainland (primarily in Teller and Nome) and the large number of Wales residents who have relocated to Nome participate in a mutual resource distribution system. However, collecting data regarding this distribution network was not within the boundaries of this study.

In summary, kinship has been and continues to be a central theme in the social organization of production and distribution at the levels of individual, household, skinboat crew, community, and inter-community. The remainder of this chapter explores quantitatively and qualitatively the specifics of historical and contemporary hunting adaptations for the populations of the study communities.

The Hunting Ecology of St. Lawrence Island

An Overview of the Seasonal Use of Key Ecosystems

A general overview of St. Lawrence Island topography, climate, sea ice environment, faunal and floral resources, and sociocultural features was presented in Chapter II. In this chapter the details of St. Lawrence Islanders' hunting ecology as they relate to demography are examined through time with a focus on marine adaptations in general and large marine mammal hunting in specific.

The large marine mammal hunting emphasis is based on several factors. It is hypothesized that the availability of large marine mammals and the development of an effective means for harvesting them through cooperative hunting were major factors in the growth and maintenance of relatively large and sedentary populations on St. Lawrence Island for a period of time spanning minimally two thousand years. Burgess (1974) points out that in 1972 walrus and bowhead provided 53 percent of all locally-derived protein (195). If seals are included, many of which are also harvested by crews hunting in boats, marine mammals provided 94 percent of locally-derived protein (Burgess 1974: 195). Secondly, the efficient hunting of large marine mammals required

a population base which could provide multiple crews of able-bodied males and a social structure adequate for coordinating intracrew and intercrew cooperation in production and distribution (Bockstoce 1976; and Freeman 1979).

Figures 29 and 30 present the study communities and areas in the vicinity of each community. At time of contact St. Lawrence Island had 34 settlements (including Gambell), several of which had populations in excess of 100 residents (Foote 1965: 214-288). In part, centralization in Gambell occurred in response to the population decline of 1878-1880 and to outside commercial and missionary influences. Savoonga was established as a reindeer camp in 1916. Today Gambell and Savoonga are the only permanent established settlements on the Island, although numerous camps are used for specific resource harvest activities.

Figure 31 illustrates the seasonal round of resource harvest activities for all populations on the Island. Resources harvested on the mainland are footnoted to distinguish them from insular resources. The presence or absence of sea ice, the biotic resources indigenous to the Island, the seasonal timing of the movements of migratory animals, and insularity vis-a-vis access to adjacent mainland areas establish boundaries for the seasonal round which are relatively stable through time. Fluctuations in the seasonal round of St. Lawrence Islanders' harvest activities since contact have been mostly the result of the changes in socioeconomic patterns and technology which will be discussed in this chapter. Figure 31 illustrates seasonal round patterns reconstructed for the historical period -- early exploration to Hughes' work in 1955 (Hughes 1960) -- and for the contemporary period -- 1972

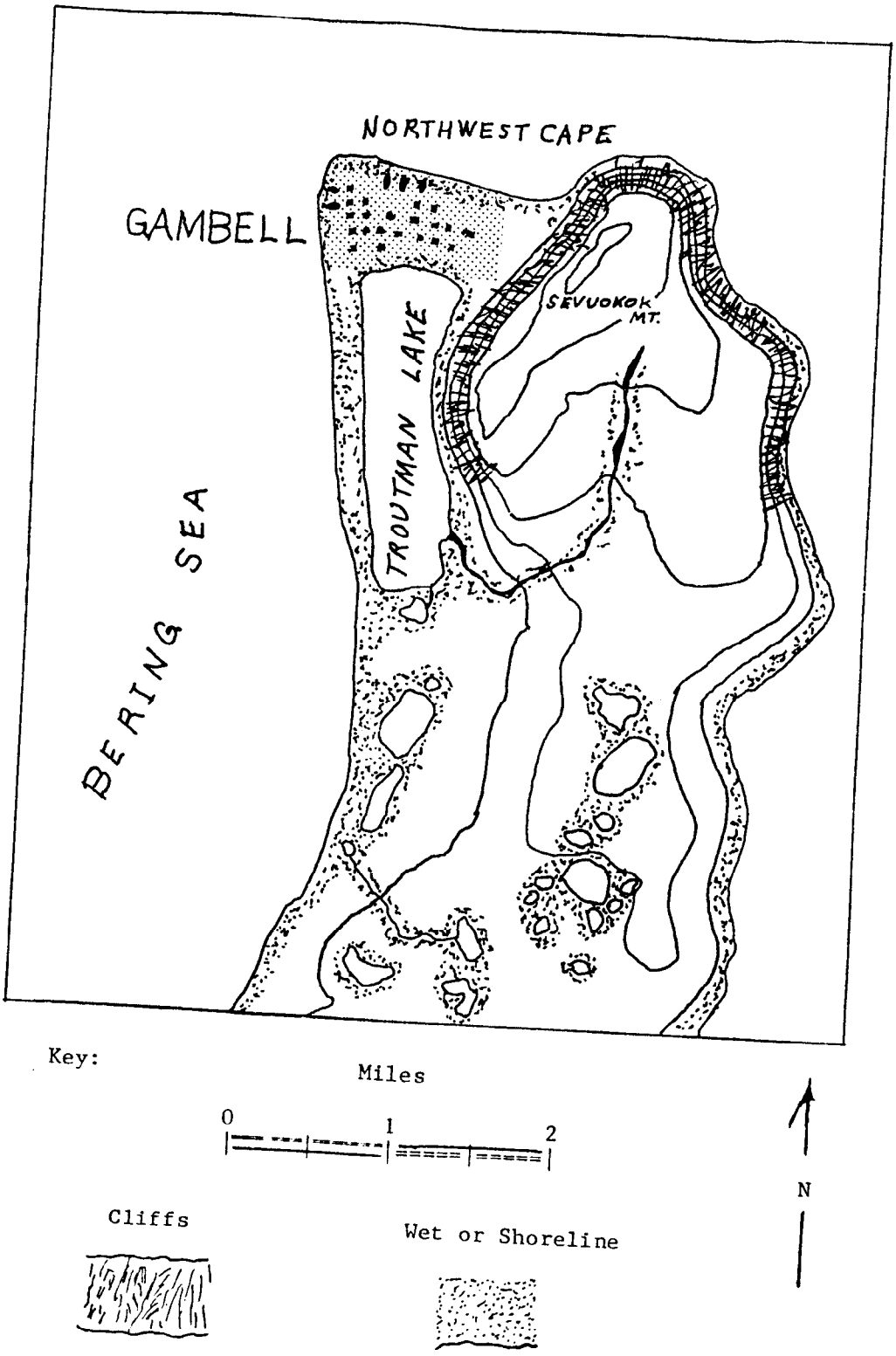


Figure 29: Gambell, St. Lawrence Island and vicinity.

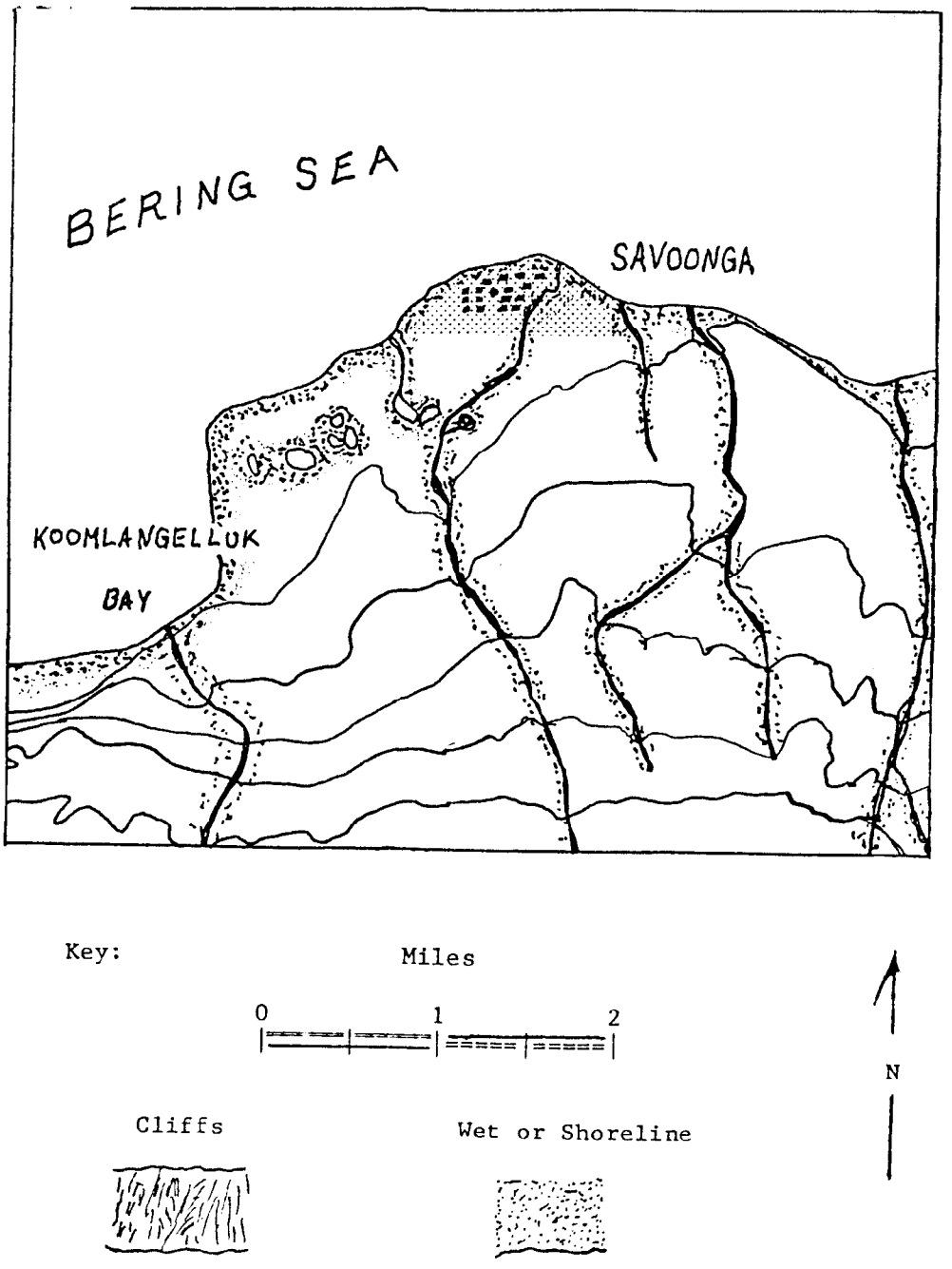


Figure 30: Savoonga, St. Lawrence Island and vicinity.

Key: + = historic (1650-1955) x = contemporary (1972-1980)

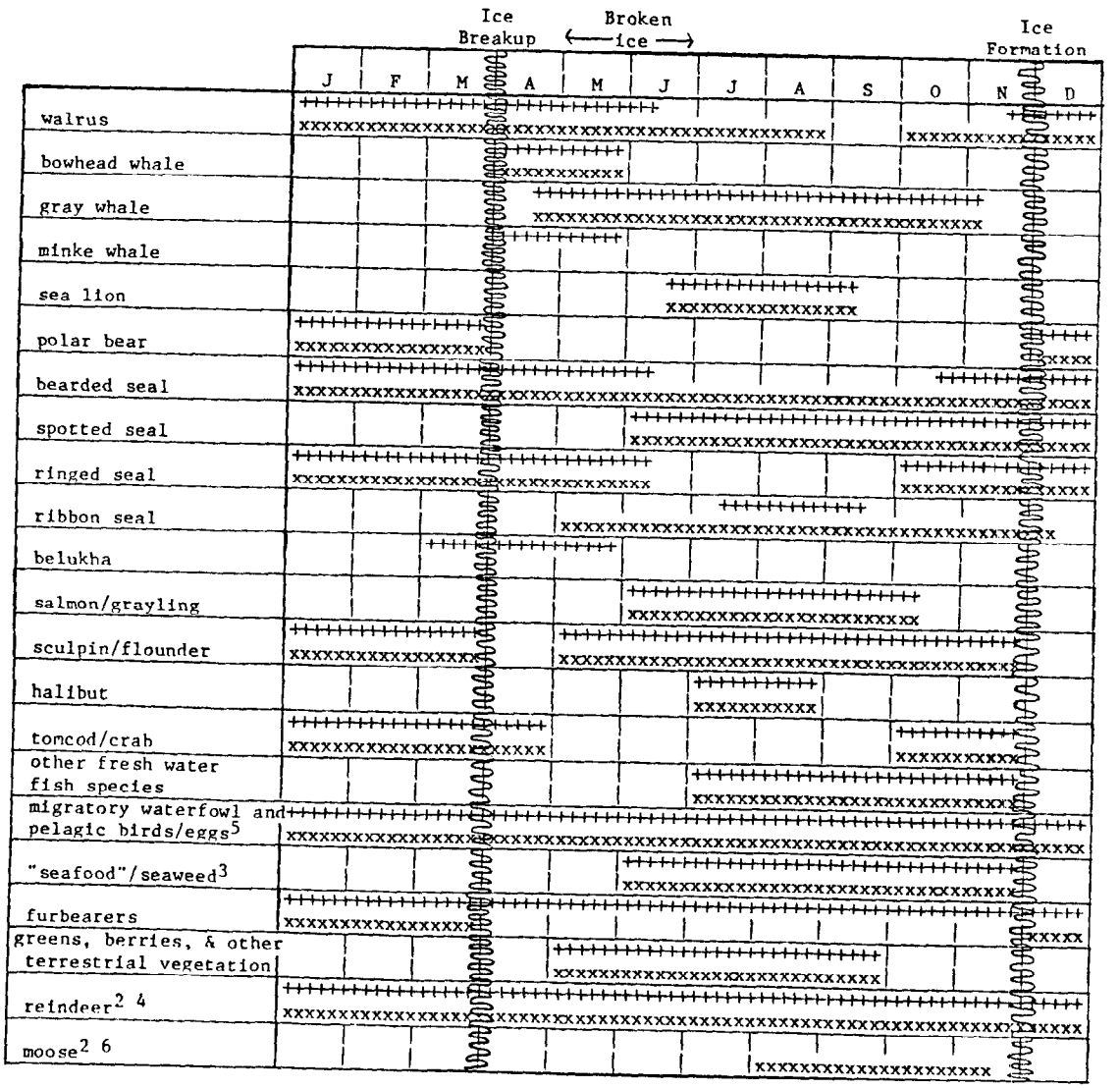


Figure 31: Seasonal harvests of major resources -- St. Lawrence Island.[1]

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1 Sources include: Burgess 1974; Ellanna 1980; Geist and Rainey 1936; Hughes 1960 and 1974; and Sherrod 1982.

2 Reindeer and moose are mainland resources and do not naturally occur on St. Lawrence Island.

3 Sometimes referred to in literature as "beach throw."

4 Since reindeer transplant in 1900 -- prior to that time they traded for reindeer with populations in Siberia.

5 Includes: immature gulls, auklets, cormorants, puffins, ducks, loons, geese, and murres. Only old squawduck remain throughout the winter. All species begin returning late May or early June.

6 In recent years some residents of the Island travel to Nome and hunt moose with relatives who reside there.

to 1980 (Burgess 1974; Ellanna 1980; Sherrod 1982; and field data).

Figure 32 presents habitats used by St. Lawrence Island populations through time keyed to specific cohorts. Ecological zones include both insular and mainland habitats used by the population of each village. Although St. Lawrence Island has a greater diversity of biotic resources than do the other islands in the study area and Wales, historical records suggest that access to the Siberian mainland for resource exchange was essential in the past (Ray 1975b; Hughes 1960; and Collins 1937). Today the mainland link is with Alaska, primarily in the vicinity of Nome.

Figure 32 demonstrates some points which should be highlighted. The sea actually provides four notably different environments for harvest activities. These include nearshore waters, open sea, shore ice, and moving sea ice. Although more than one cohort may use some of these sea environments, the most productive in terms of total biomass harvested are open sea and moving ice, including broken ice. These environments are used almost exclusively by young to middle-aged males in cooperative harvest endeavors. Nonetheless, the range of potential resource harvest activities permits all population cohorts to engage in some level of food production during all seasons and in relatively close proximity to the village. The ability to obtain alternate resources by diverse population cohorts ensures the maintenance of the population during periods in which the harvest of maxifauna is insufficient (Laughlin 1972).

Inland	Lakes and streams	Village or camp	Beach	Cliffs	Nearshore Waters	Shore Ice	Open Sea	Moving Ice
-	+	Old and/or infirm males	+	-	(+)	+	(+)	-
+	+	Old and/or infirm females	+	-	(+)	+	-	-
(+)	(+)	Pregnant females	+	-	(+)	(+)	-	-
+	+	Children (<12+)	+	(+)	(+)	+	-	-
+	+	Young to middle-aged females	+	-	+	+	-	-
+	+	Young to middle-aged males	+	+	+	+	+	+

Figure 32: Habitats keyed to population cohorts -- St. Lawrence Island.[1] [2] [3]

---

[1] People are ordered in terms of harvesting productivity with the least directly productive at the top; old and/or infirm males, for example, may be very indirectly productive by contributing knowledge and/or technology to hunting. Beginning with types of cohorts, their use of habitat is indicated by a plus sign. Parentheses indicate qualified use or special limitations (e.g. limitations related to strength or stamina). This chart provides no indication of the different methods of using the same area nor the different resources procured (e.g. women may jig for tomcod on shore ice and young men may hunt seals at leads; or men may hunt reindeer or caribou inland while women and children gather berries).

[2] Adapted from Laughlin 1968a: 41.

[3] Sources include: Burgess 1974; Ellanna 1980; Geist and Rainey 1936; Hughes 1960 and 1974; and Sherrod 1982.

Marine Mammal Hunting

Marine resources provided the vast majority of food and raw materials to resident populations for the 2000+ years people have lived on the Island (Geist and Rainey 1936). Hughes (1960) observed in 1954:

> . . . it is the sea mammals, rather than those of the land, which are of fundamental importance to the St. Lawrence Eskimos. . . . The Pacific walrus (Odobenus divergens) is the most important animal in the diet in terms of bulk as well as taste. Also hunted, however, are the various types of seals -- ribbon seal (Phoca fasciata), ringed seal (Phoca hispida), leopard or spotted seal (Phoca vitulina), and the bearded seal (Erignathus barbatus) -- and the whales, bowhead (Balaena mysticetus), finback (Balaenoptera physalus), and the gray or summer whale (Rhachianectes glaucus). Only a few of the St. Lawrence Islanders regularly hunt the sea lion (Eumetopias jubata). (6)

Reliance on marine mammals has continued to the present time. Figures 33 and 34 illustrate the contemporary participation of Gambell and Savoonga households in marine mammal harvest and use based on a sample of households from each community (Sherrod 1982). These figures indicate that the vast majority of households harvested and/or used marine mammals with the exception of belukha and ribbon seal in Gambell. Belukha were harvested in the past. Although a few households reported "hunting" belukha in 1980 incidental to bowhead whaling, none was harvested nor was belukha the focus of the hunt. Ribbon seals were hunted more frequently by Savoonga than by Gambell residents, although few were harvested in either location.

The harvest of these major marine resources occurred either through the cooperative efforts of men in boats or by individuals on foot on moving or stationary ice or in small boats. The data in the remainder of this chapter are presented within the framework of this important harvesting dichotomy. Hunting by crews in boats is

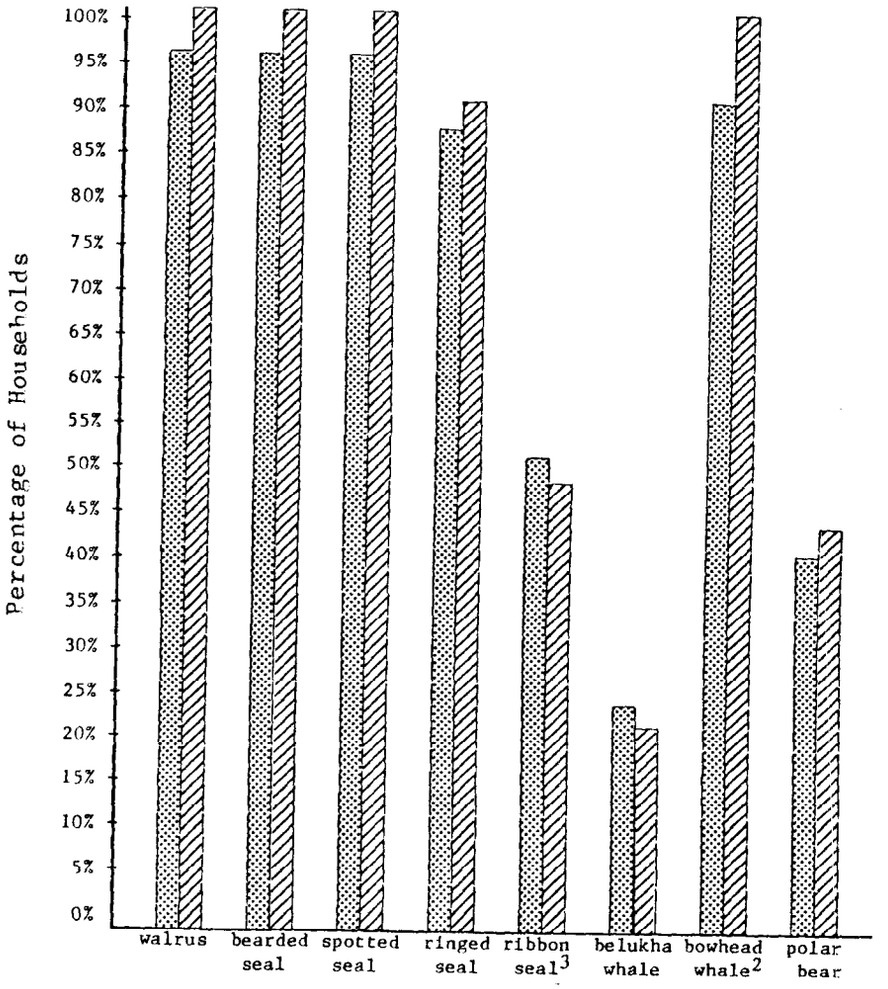


Figure 33: Household marine mammal harvest activities and use, 1980 -- Gambell.[1]
(n=29)
Key: = harvest activities = use

[1] Based on Eskimo Walrus Commission research, 1980-81 (Sherrod 1982).
[2] Bowhead whale harvest is currently restricted to two per village per year by the International Whaling Commission.
[3] Ribbon seals are not abundant in this area.

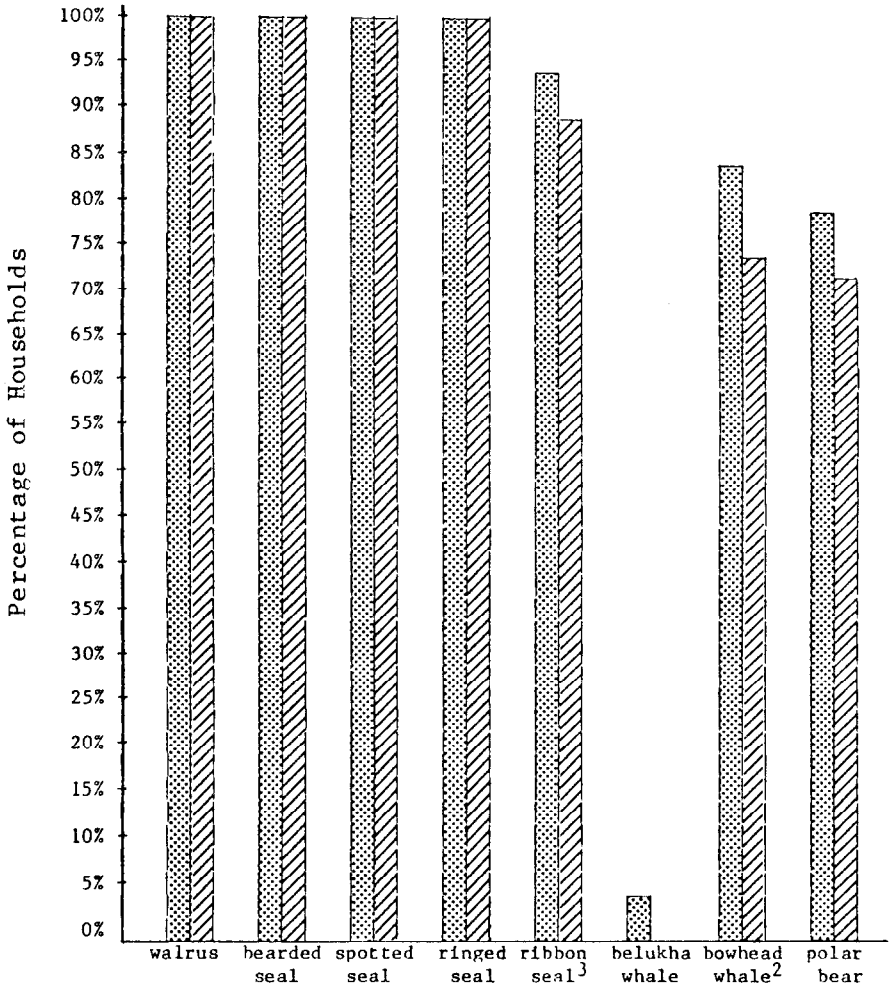


Figure 34: Household marine mammal harvest activities and use, 1980 -- Savoonga.[1]

Key: = harvest activities = use

[1] Based on Eskimo Walrus Commission research, 1980-81 (Sherrod 1982).
[2] Bowhead whale harvest is currently restricted to two per village per year by the International Whaling Commission.
[3] Ribbon seals are not abundant in this area.

ecologically, demographically, socially, nutritionally, technologically, and evaluatively distinct from other harvest activities.

> The island people of Bering Strait recognize two general kinds of hunting: mauqsatuat "hunting on foot" and aqunñiaqtuat "boat hunting". They are conceptually and sociologically entirely different. The fact that hunting by kayak is included under the first category underscores the fact that it is their respective social implications that are conceptually primary. (Bogojavlensky 1969: 72)

Crew hunting is the most relevant adaptive set for purposes of this study because of its productivity and interconnections with demographic features of the population.

Crew Hunting

Alignment with and participation in a skinboat (umiaq in Iñupiaq, angyak in Siberian Yupik) crew were essential for any productive adult male in Bering Strait insular society. As Bogojavlensky observed:

> The people of Bering Strait are forever concerned with acquiring the benefits and special goods that stem from skinboat operations, not to speak of the simple fact that to get to participate in boat hunting is considered a supreme pleasure. Material benefits flow from belonging to a crew and it is true that the people of Bering Strait are highly interested in the gaining of wealth. However, the sense of belonging to a solidary group is at least equal in importance to the economic gains that come with being a member of a lasting crew. Men from crews that have disintegrated and who are not absorbed in others become not only poorer, but also wretchedly alienated. Suicides can be traced to such disintegrated crews, and they are common in Bering Strait. (1969: 105-106).

Although this passage specifically referred to King and Diomede islands, its relevancy to St. Lawrence Island can be inferred from Hughes' work in Gambell in the 1950s (Hughes 1960) and Doty's observations at the turn of the century (Doty 1900). Although documentation

of the operation of skinboats in hunting and trading contexts has been amply recorded, the more subtle but critical role of individual (family) membership and participation in crews and the ecological importance of crew hunting have not been well understood or documented by observers of St. Lawrence Island society.

Walrus Hunting

The singularly most important harvest activity undertaken by boat crews was walrus hunting.

> On the basis of food tastes, the St. Lawrence Islanders could well pre-empt the name "walrus eaters," since they live astride one of the richest walrus-hunting areas in the world and for centuries that animal has been the mainstay of their diet. (Hughes 1960: 101)

From the earliest Russian records of the seventeenth and eighteenth centuries, walrus, variously referred to as "sea-horses" or "morse," were mentioned repeatedly as important sources of both food and raw material (Collins 1937; Golder 1914; Hooper 1881; and von Kotzebue 1821). Walrus hides were used as the covering for both boat and house frames and still are used for constructing skinboats.

As discussed in Chapter II, Pacific walrus are available to St. Lawrence hunters in large numbers for a limited time during migrations, although individual animals and small groups are available year-round (Fay 1982). For example, in 1969, 70 percent of the walrus harvest was in spring, 12 percent in summer, 15 percent in fall, and 3 percent in winter (Burns 1970b: 9). The focus of walrus hunting activity always occurs in conjunction with the spring breakup of sea ice. The timing of the breakup not only varies from year to year, but occurs

approximately one month sooner in Gambell than Savoonga because of Gambell's location and access to both western and northern beaches. In the spring Savoonga walrus hunters are limited early in the season by a persistent ice pack and distance from the migratory herds. By early June walrus hunting is usually more productive in the vicinity of Savoonga. Gambell hunters must travel some distance to the vicinity of Savoonga to obtain walrus.

The productivity of hunters from either village is very dependent upon a combination of favorable wind, ice, current, and other weather conditions such as the absence of fog. A combination of strong winds, particularly from the south or southwest, can move the ice pack and walrus out of the reach of hunters in a very short period of time. At best, hunting is possible during only approximately half of the migratory period, and in some years hunters have only a couple of days to conduct this extremely important productive activity (U. S. Department of the Interior, Fish and Wildlife Service 1980 and 1981; Burns 1963, 1964, 1965a, 1966, 1967, 1968, and 1969; and Fay 1982).

Table 76 illustrates the fluctuations in the number of walrus harvested through time in the last 50 years. Oral history and early historic documentation indicate that there were years in which an adequate number of walrus could not be harvested (Hughes 1960 and 1974; Jackson 1894; and Nelson 1899). Variations in walrus harvest totals through time result from multiple factors in addition to ice and weather conditions, including fluctuations in walrus and human population size and changing technology. The quality of harvest data is extremely variable from year to year, and systematic attempts to gather and record numbers of walrus taken did not begin until the 1950s. Therefore

TABLE 76: RETRIEVED WALRUS HARVEST TRENDS, 1648-1980 -- ST. LAWRENCE ISLAND[1] [2]

	Harvest Total				# crews[7]	# Hunters
Year	Island	Gambell	Savoonga	NE Cape	G/S/NEC	G/S/NEC
1980	1012	556[3]	456[3]	ND	39/42[3]/ND	ND/109/ND
1979	901	476[4]	425[4]	ND	ND	ND
1978	1038	471[5]	567[5]	ND	ND	ND
1977	1699	1059[5]	640[5]	ND	ND	ND
1976[6]	1398	742[5]	656[5]	ND	ND	ND
1975	1107	641[5]	466[5]	ND	ND	ND
1974	465	261[5]	204[5]	ND	18/14/ND[28]	91/74/ND[28]
1973	770	255[5]	515[5]	ND	ND	ND
1972	486	250[5]	236[5]	ND	16[8]/12-15[9]	72/62/ND[28]
1971	718	175[5]	543[5]	ND	ND	ND
1970	423	243[5]	180[5]	0	ND	ND
1969	408	226[5]	179[5]	3[5]	22/16[10]/ND	110/77/ND[28]
1968	597	466[5]	117[5]	14[5]	19/18[11]/ND	95/86/ND[28]
1967	408	84[5]	299[5]	25[5]	18/21[12]/ND	85/86[12]/ND
1966	1026	488[5]	511[5]	27[5]	21/19[13]/ND	85/86[13]/ND
1965	970	447[5]	389[5]	71[5]	16/16/2[14]	75/78/15[14]
1964	381	118[5]	238[5]	25[5]	13/16[15]/ND	75/78/ND[15]
1963	766	314[5]	452[5]	0[5]	17/16[16]/ND	75/78/ND[28]
1962	673	380[5]	293[5]	0[5]	18/16[17]/ND	84/78/ND[17]
1961	525	275[5]	250[5]	ND	16/ND/ND[28]	86/ND/ND
1960	818	386[5]	432[5]	ND	16/ND/ND[28]	77/ND/ND[28]
1959	ND	ND	ND	ND	ND	ND
1958	450+	150[18]	300+[18]	ND	14/ND/ND[18]	77/ND/ND[28]
1957	470(est)	200[18]	270[18]	ND	13/ND/ND[18]	72/ND/ND[28]

TABLE 76: -- CONTINUED

	Harvest Total			# crews	# Hunters
Year	Island	Gambell	Savoonga	G/S	G/S
1956	480(est)	150[18]	330[18]	13/ND[18]	72/ND[28]
1955	150	125[18]	30[18]	13/ND[18]	72/ND[28]
1954	190	70[20]	120[21]	13/ND[18]	72/ND[28]
1953	375	200[20]	175[21]	13/ND[18]	72/ND[28]
1952	475(est)	275[20]	200(est)[19]	13/ND[18]	72/ND[28]
1951	--	ND	200(est)[19]	ND	ND
1950	500(est)	300[20]	200(est)[19]	ND	ND
1949	--	250[20]	ND	ND	ND
1948	25±	70(est)[20]	185±[22]	ND	ND
1947	--	178[20]	ND	ND	ND
1946	--	172[20]	ND	ND	ND
1941-45	ND	ND	ND	ND	ND
1940	--	313[20]	ND	ND	ND
1939	--	313[21]	ND	ND	ND
1938	300(est)	200(est)[21]	100(est)[21]	ND	ND
1937	300(est)	200(est)[21]	100(est)[21]	ND	ND
1936	300(est)	200(est)[21]	100(est)[21]	ND	ND
1935	300(est)	200(est)[21]	100(est)[21]	ND	ND
1931-34	ND	ND	ND	13[9]/ND	ND
1930	--	ND	260[23]	ND	ND
1900	200[24]	--	--	ND	ND
1881	walrus	important resource -- no harvest data[25]			
1821	walrus	important resource -- no harvest data[26]			
1648	walrus	important resource -- no harvest data[27]			

TABLE 76: -- CONTINUED

ND = no data

1 From 1648-1899 walrus harvest totals for the entire Island are presented; from 1900-1980 Gambell, Savoonga, and, when applicable, Northeast Cape are presented separately. The accuracy of harvest totals is extremely variable depending upon data source.

2 Spring harvest data for 1981 and 1982 were 961 and 942 respectively for Gambell and 581 and 169 respectively for Savoonga. The number of hunters was 107-167 in 39 crews at Gambell in 1982 and 125-149 hunters in 35 crews at Savoonga in 1982. (Lourie 1982: 45c, 52, 58c, and 85)

3 U. S. Department of Interior, Fish and Wildlife Service 1980. In 1980, 37 of the 39 crews were using aluminum boats. The other two were wooden and skin.

4 Hinman 1980: 38.

5 Nelson 1980.

6 In April 1976 the State resumed control of walrus management. Quotas were established for all walrus hunting communities. Management was returned to the Federal government prior to the 1980 season.

7 These are walrus hunting crews. In the mid-1970s the use of aluminum boats for walrus encouraged a fissioning of the larger whaling crews into smaller walrus hunting crews. Captains of walrus hunting crews were frequently younger members of the whaling crews and lacked the experience or backing necessary to head a whaling crew. According to Braund (1981) there were no aluminum boats in Gambell in 1973.

8 Burgess 1974: 177.

9 Braund 1981: 110 and 113. The crew data in the 1931-34 column is for 1932 according to Geist's field data.

10 Burns 1970b: 10-11.

11 Burns 1969: 8.

12 Burns 1968: 8.

13 Burns 1967: 18.

14 Burns 1966: 29-30.

15 Burns 1965a: 15.

16 Burns 1964: 6.

17 Burns 1963: 15.

18 Fay 1958: 6.

19 Buckley 1958: 17. Average estimate is for the period 1950-58. Range for Gambell was 70-275; variation is great as conditions may vary from year to year.

20 Hughes 1960: 137-38; see Hughes for more detail about data sources.

21 Fay 1955: 160.

22 Brooks 1953: 505.

23 Anderson and Eells 1935: 196.

24 Jackson 1901: 108.

25 Hooper 1881.

26 von Kotzebue 1821.

27 Golder 1914.

28 Lourie 1982: 54c and 86b.

trends, not absolute numbers, are important in this context.

Before discussing harvest levels in greater detail, it is necessary to put them in the context of the actual hunt. As offshore ice begins to break up, small groups of males and cows with calves are the first to migrate followed by the majority of bulls and barren cows. Since St. Lawrence Island is located at the northern edge of walrus winter distribution with some resident winter populations south and west of the Island, access to both sexes and all age groups is more likely than is sometimes the case for King and Little Diomede island populations. In the latter cases, inclement weather and/or poor ice conditions may prevent hunter access to the herds during the "window" a particular age and/or sex segment of the walrus population is passing by the islands heading north. Walrus herds pass north on both sides of St. Lawrence Island, but the vast majority of the early migration passes to the west with late spring distribution of remaining animals along all of the northern shore (Fay 1955 and 1982). A few remain on the north side of the Island all summer. When population levels are relatively high, there are resident summer herds on the Punuk Islands near the southeast shore of the Island (Fay 1957: 434).

In the past if adequate numbers were available, St. Lawrence hunters used the following selection criteria in descending order of preference: (1) large adult females with newborn young; (2) any adult female with newborn young; (3) large adult females with no young; (4) adult females with no young; (5) large adult males; (6) any adult males; and (7) juveniles of either sex (Buckley 1958: 23). More recent studies indicate that this order of preference generally has continued into the present (Lourie 1981 and 1982; and U. S. Department of the Interior,

Fish and Wildlife Service 1980 and 1981). In years with restricted hunting access, hunters would harvest whatever age and sex cohorts were available.

Prior to the 1860s the angyak (skinboat), flat-bottomed, covered with split female walrus hides, and 22-26[1] feet in length, was used for both walrus hunting and whaling. The following quotation, based on informant recall in 1954-55, describes spring walrus hunting prior to the introduction of the outboard:

> . . . a boat full of hunters would silently paddle to an ice floe on which a group of walruses were sleeping. Then the striker of the boat . . . would quietly jump onto the ice and try to kill several of the sleeping animals with lances and knife before the rest slid, alarmed, off into the water. At other times walruses swimming in the open sea were harpooned and lanced if they could be approached closely enough. When the animals were harpooned from the boat, inflated sealskins, called "pokes", were attached to the harpoon line in order both to impede the swimming of the animal and to help keep the carcass afloat after it died. It was finally killed with the lance. (Hughes 1960: 104)

A boat crew engaged in such activities numbered 7-8 usually young to middle-aged males. Crew size was influenced by minimal labor needs necessary for hauling the boat over ice, hauling walrus out of the water, and butchering in a timely fashion and by the fact that large boats with large crews were prestigious for a particular captain and his kinship groups.

As a result of contact with commercial whalers, both firearms and wooden whaling boats became readily available after 1869 (Braund 1981: 123; and Foote 1964). Wooden boats were exchanged for service

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[1] Estimates of boat size are complicated by the presence of both large and small skinboats with different functions, the lack of precise early contact measurements, and the absence of complete boat remains in archaeological sites. Larger boats may have developed as a result of contact with a few King Island families relocated on St. Lawrence Island in the 1930s.

on commercial whaling crews or could be purchased, with associated gear, with 6 to 30 pieces of baleen (Braund 1981: 136). In 1921 there were 21 good wooden boats on St. Lawrence Island, and by 1932 virtually everyone was using wooden boats for whaling and walrus hunting (Braund 1981: 123 and 164). Geist and Rainey (1936) point out that small skinboats were still maintained by St. Lawrence Islanders to use for other species such as seal or to use if ice conditions did not permit near access to broken ice and leads. The wooden whaling boats were too heavy to haul long distances across the ice (Geist and Rainey 1936).

Since the wooden boats were large and heavy, manpower requirements reinforced the continuation of patterns of crew size, composition, and recruitment. The continued use of small skinboats for other kinds of hunting was significant in maintaining the roles of women and men in angyak construction and skinning and in retaining the base of knowledge associated with skinboats. After World War II wooden whaling boats became increasingly difficult to obtain via the market economy (Bogojavlensky 1969: 66). The use of skinboats increased accordingly. Only one wooden boat was used for walrus hunting and whaling in 1980.

Commercial whaling crews significantly decimated the Pacific walrus during the last half of the 1800s, as indicated in commercial whaling records of walrus harvest and the shrinking distribution of herds by 1880 (Foote 1964; and Fay 1957). Bockstoce and Botkin (1982) estimated that approximately 140,000 walrus were retrieved by commercial whaling crews betweeen 1849-1914 and 200,000 to 235,000 may have been killed, since no more than 60 to 70 percent of walruses shot were retrieved and processed (184-185). The greatly diminished number of

walrus, the declining number of hunters, the increased loss rate connected with the use of rifles in dispatching an animal prior to harpooning, the environmental constraints placed on spring hunting with any technology, and the expense involved in obtaining firearms and ammunition in the early days all suggest that harvest efficiency (i.e. a higher rate of successful retrieval) and total number of animals harvested probably did not increase in the latter part of the 1800s and early 1900s. Additionally, it has been suggested that the significant decline in walrus numbers combined with poor ice and weather conditions may have played an important part in the St. Lawrence Island famine and resulting 1000+ deaths the winter of 1878-79 (Burgess 1974; Geist and Rainey 1936; and Hughes 1960). Firearms permitted virtually all crew members to be engaged in the dispatch of walrus when a herd was encountered, rather than just the striker. This suggests that the skill involved in shooting a rifle was more common than that of a striker, although the striker still maintained his role in harpooning and/or lancing animals that had been first shot. Spring walrus hunting continued to require a complex knowledge base, including data regarding animal behavior, ice conditions, wind and current conditions, traditional technology (i.e. the harpoon, angyak, floats, etc.), efficient butchering, and, most importantly, the means for recruiting, organizing, and managing a skinboat crew.

Outboard motors were introduced to St. Lawrence Island hunters as early as 1916 (Hughes 1960: 104) and by the 1930s were used by most boat captains (Geist and Rainey 1936). Outboard motors extended the potential range of St. Lawrence hunters and the speed with which a crew could get to a herd and return to the village with a full load,

discharge their load and return to the hunting site. Although St. Lawrence Islanders did not normally travel more than 10-20 miles directly offshore, their range adjacent to the coastline expanded with the use of outboard motors. In addition, crews went out in less than ideal weather and ice conditions with the expectation that they could beat a more hasty retreat to shore in case weather or ice condition deteriorated.

The use of outboard motors created a new specialist in the crew the evinruchta -- mechanic and person reponsible for the successful operation of the outboard. Sails and oars were retained for backup power and for moving the boat when conditions of silence were desirable. Outboard motors were placed in wells towards the stern half of the boat but were never actually positioned on the stern proper until bent-ribbed skinboats were introduced to St. Lawrence Island by King Islanders in the 1930s (Braund 1981). Even after the introduction of bent-ribbed boats, St. Lawrence Island captains normally used outboard motors in wells and retained rudders, important for sailing, on the stern. The use of outboard motors required the captain to invest a sizeable amount of cash to purchase, operate, and maintain a motor. The sale of carved and raw ivory provided the means to that cash in the early decades of the 1900s. After the sale of raw ivory was banned in 1941, carved ivory sales and the trade of raw ivory to village cooperative stores provided necessary cash.

Despite the technological changes described above, the underlying social, economic, evaluative, and strategic characteristics of walrus hunting by crews remained fundamentally unchanged throughout this period. Walrus harvest trends, illustrated in Table 76, reflect

this continuity through time given the normal range of yearly variations discussed above and the fluctuations in human and walrus population levels. In addition, the State of Alaska began to regulate the harvest of cow walrus in 1960, which influenced total harvest takes (Burns 1965a). Sometime after 1925 the Gambell Village Council passed an ordinance limiting the number of walrus taken per boat per day to four adults and one subadult or pup. Other stipulations were placed on the harvesting of pups only and taking walrus under dangerous ice conditions unless the hunter was short of food (Fay 1958: 4). Hughes noted that this ordinance was operative when he did his fieldwork in 1954-55 (Hughes 1960).

In the mid-1970s St. Lawrence Island hunters began to purchase and use 15'-18' aluminum boats for walrus hunting. As noted in Table 76, there were no aluminum boats in Gambell in 1973 (Braund 1981). The first aluminum boat in Gambell was purchased in 1974. In 1980 and 1981, 39 boats participated in the Gambell spring walrus hunt (U. S. Department of the Interior, Fish and Wildlife Service 1980 and 1981). Of these, 37 boats were aluminum, 1 was a 23' skinboat, and one was an 18' wooden boat. In 1980 at Savoonga there were 42 walrus hunting crews. Since 1979 only aluminum boats have been used for hunting walrus at Savoonga (Lourie 1982: 85). Field data indicate that the majority of the aluminum boats in both communities was purchased in 1979.

Unlike previous technological changes, the use of aluminum boats for walrus hunting has affected the size of crews and has greatly increased the number of crews hunting from each village (see Table 76). Skinboat crews, which currently function as bowhead whale hunting

units, have averaged 6 to 7 members since the introduction of outboard motors in the early 1920s and 7 to 8 members prior to that time (Hughes 1960: 256). These same crews were the unit of production in walrus hunting until aluminum boats were integrated into hunting patterns. The aluminum boat, as used on St. Lawrence Island, was crewed by 3 to 4 men in 1980 and 1981.

As previously mentioned, in 1980 and 1981 aluminum boat walrus hunting crews were mostly subdivisions of the larger skinboat crews. However, field data indicate that not all experienced whaling crew members became walrus captains and not all whaling captains participated directly in walrus hunting. One older whaling captain received walrus products from sons or other younger members of his whaling crew (and household) who had become walrus hunting captains. Although many of the older and more experienced members of whaling crews (often "strikers") became walrus hunting captains, younger, less experienced hunters with the economic means of purchasing an aluminum boat and outboard motor (approximately $2500 for a 16' and $4500 for an 18' boat and motor in 1979) had the opportunity to become walrus captains without inheriting boats, positions, and status from their fathers. Additionally, women, primarily daughters of captains, were observed on rare occasions accompanying males on walrus hunting crews. All data indicate that women were always prohibited from serving on skinboat crews in the past.

The shift to the use of aluminum craft for walrus hunting is too recent to assess the long-term implications for the social and demographic characteristics of boat crews on St. Lawrence Island. Aluminum boats travel greater distances at higher rates of speed than

do skinboats, are more fuel efficient, and can be launched with less preparation.[1] Thus walrus hunting crews using aluminum boats are able to disperse more rapidly, scan a greater territory in pursuit of walrus, and do so in greater number because of reduced manpower requirements for each crew. However, aluminum boats have a lesser carrying capacity for hauling the products of the hunt than do skinboats.

The use of aluminum craft increases hunting risks to walrus hunters. The aluminum boat is less seaworthy, and its potential speed encourages hunting in marginal conditions. As previously mentioned, in 1978 several Savoonga aluminum boat crews hunting walrus in poor ice and weather conditions had to be rescued as boats were crushed by moving ice and sank. Undoubtedly, risk is also increased when less experienced hunters provide direction to the hunt implicit in the role of skinboat captain.

The age of a captain is one measure of hunting experience. Table 77 presents the age of St. Lawrence Island walrus captains by crew and village in 1980. In Gambell the 39 walrus captains ranged in age from 26 to 63 with 23 percent in their 30s, 46 percent in their 40s, and 15 percent in their 50s. The average age of Gambell walrus captains was 42.9 years. In Savoonga the 42 walrus captains ranged in age from 23 to 70, with 23 percent in their 30s, 48 percent in their 40s, and 19 percent in their 50s. The average age of Savoonga walrus captains was 43.8 years. Review of these data suggests that some of the social criteria associated with becoming a boat captain were still

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[1] Lourie (1982: 51-52) states that at Gambell in 1982, hunting crews traveled an average of 23 miles from the village per 7 hour hunting trip. In 1958 the average trip using larger skin and wooden boats was 12 miles in 7.2 hours.

TABLE 77: AGE OF WALRUS CAPTAINS, 1980 -- ST. LAWRENCE ISLAND

Crew #	Gambell	Savoonga	Crew #	Gambell	Savoonga
1	43	52	22	49	45
2	41	48	23	26	48
3	43	27	24	43[1]	43
4	48	40	25	55	42
5	54	34	26	32	36
6	45	55	27	30	46
7	36	46	28	27	40
8	48	46	29	34	47
9	30	44	30	37	36
10	56	39	31	40	47
11	31	23	32	27	45
12	27	35	33	47	52
13	54	70	34	57	36
14	45	39	35	31	48
15	57	34	36	63	36
16	61	47	37	46	49
17	41	54	38	30	55
18	49	23	39	46	59
19	49	39	40	--	51
20	47	45	41	--	47
21	48	42	42	--	50

[1] This captain's father is a whaling captain who does not walrus hunt probably because of his age. Some of the whaling crew remain with the son for walrus hunting.

operative in 1980. Although men in their 20s may have had the financial resources necessary for acquiring contemporary walrus hunting technology (i.e. aluminum boats and large outboard motors), the data indicate that they lacked the ability to recruit and maintain crews. There exists a direct relationship in Eskimo society between age, level of knowledge about features of the natural environment, hunting skills and achievements, prestige, and respect. The age structure of walrus captains as depicted in Table 77 reflects these values.

Lastly, although walrus harvest data presented in Table 76 indicate consistently larger numbers of animals harvested in recent years, the relative productivity of aluminum boats over skinboats in the harvest of walrus has not been established. In addition to boat type, factors which have influenced harvest totals include annual variations in harvest success related to climatic conditions; increased walrus populations (Fay and Stoker 1981; and U. S. Department of the Interior, Fish and Wildlife Service 1980 and 1981); increased human populations; the use of CBs (citizen's band radios) for strategic reasons during a hunt; and more accurate on-site monitoring of harvest success. Although in 1980 and 1981 the ratio of man-hours to walrus harvested varied greatly from community to community depending upon hunting conditions, the hunting efficiency of skinboats and aluminum boats at Diomede was almost identical (U. S. Department of the Interior, Fish and Wildlife Service 1980 and 1981). This indicator of differential efficiency was not calculated for St. Lawrence Island, because the vast majority of walrus hunting was conducted by aluminum boats.

Whaling

Bowhead whales, and occasionally other species of whales, have been harvested by St. Lawrence Island boat crews since earliest known habitation on the Island. There are antecedents for a whaling orientation in the Old Bering Sea (or Okvik) culture of the Siberian coast and St. Lawrence Island as early as the beginning of the first millenium AD (Bandi 1959: 67; Collins 1937; and Dumond 1977). Bockstoce (1976) argues that whaling developed in the Bering Strait area approximately 1000 years before it was practiced intensively in northwestern Alaska. Archaeological evidence suggests that whaling increased in importance during the Punuk cultural tradition subsequent to Old Bering Sea. In 1000-1200 AD (late Punuk) settlements on St. Lawrence Island were larger and more numerous than those in previous periods (Dumond 1977: 128).

The interconnections between a successful whaling adaptation and population growth have been established (Bockstoce 1976; and Freeman 1979). Foote (1965) came to the conclusion that the population on St. Lawrence Island peaked at approximately 4,000 between the years 1000-1650 AD (Burgess 1974). As discussed in Chapter IV, diseases such as smallpox and influenza in the first half of the 1800s decreased the St. Lawrence Island population to 1,500-2,500 in the period 1830-1850. Disease and other factors resulted in the 1878-80 population decline, with survivors numbering 400-500 in 1880. At the same time, commercial whaling during the second half of the 1800s severely depleted the number of bowhead whales and walrus available to Bering Strait hunters (Foote 1964; and Bockstoce and Botkin 1982). Shortly

after the human population decline of 1878-1880, the majority of surviving St. Lawrence Islanders and some mainland Siberian Eskimos began the process of resettlement and centralization, particularly at Sivoukak (Gambell). The relocation into more concentrated settlements may have been influenced by the need for a relatively large population base to support bowhead whaling. In the spring of 1880 two observers reported the taking of a whale by a crew of mostly women and boys at Gambell (Burgess 1974: 31). This very abnormal incident may have reflected a shortage of able-bodied young men for participation in skinboat hunting.

Bowheads have been the most economically and socially important whale to St. Lawrence Islanders through time. Further, because of bowhead size and the manpower needed to harvest and butcher them, the taking of bowhead requires a more complex level of intracrew and intercrew organization than does the harvest of any other marine mammal. Bowhead whaling normally occurs during the month of April, although ice conditions and migration patterns may vary this harvest period on either end. Bowhead whale, like walrus, migrate north in the spring in association with the breakup of the ice pack. The bowhead migration precedes that of walrus and is the first skinboat crew harvest activity of the year. As previously described, spring ice and lead conditions at Gambell have permitted earlier and more strategically located marine mammal harvest activities in comparison with other insular sites.

Bowhead whale harvest totals and numbers of crews for St. Lawrence Island are presented in Table 78. Prior to the last decade, information regarding harvest levels and the number of participant crews is either sparse or unavailable. No harvest data for the village

TABLE 78: BOWHEAD WHALE HARVEST TRENDS, 1940-1980 -- ST. LAWRENCE ISLAND[1]

	Total Island		Gambell		Savoonga	
Year	# Whales	# Crews	# Whales	# Crews	# Whales	# Crews
1980	3	30	1	22	2	8
1979	0	--	0	22	0	8[8]
1978[4]	2	29[8]	1	21[8]	1	8[8]
1977	2(8)[9]	27[9] [10]	2	21	0	6[9]
1976	8(5)[2]	22[2]	1[2]	19[2]	7[2] [6]	3[2]
1975	1(3)[2]	23[2]	1[2]	19[2]	0[2]	4[2]
1974	2(2)[2]	--	2[2]	18	0[2]	ND
1973	6(1)[9]	20[9]	2[2]	14	4[2]	6[8]
1972	2(3)[9]	13	2[2]	12[3]	1	1[8]
1971	1	--	1[2]	ND	--	--
1970	0	--	0[5]	ND	--	--
1969	2	--	2[9]	ND	--	--
1968	1(4)[9]	20	1[2]	20[9]	--	--
1967	3	--	3[9]	ND	--	--
1966	2	--	2[9]	ND	--	--
1965	1	--	1[9]	ND	--	--
1964	0	--	0[5]	ND	--	--
1963	0	--	0[5]	ND	--	--
1962	0(4)[9]	--	0[5]	ND	--	--
1961	1(1)[9]	--	1[2]	ND	--	--
1960	0(1)[9]	--	0[9]	ND	--	--
1959	--	--	ND	ND	--	--
1958	0	--	0[2]	ND	--	--
1957	0	--	0[2]	ND	--	--
1956	1	--	1[2]	ND	--	--
1955	2	10-12	2[2]	10-12[7]	--	--
1954	0	10-12	0[9]	10-12[7]	--	--
1953	2(1)[9]	--	2[2]	ND	--	--
1952	1	--	1[9]	ND	--	--
1951-1941	--	--	ND	ND	--	--
1940	5	--	5[9]	ND	--	--
1939-1938	--	--	ND	ND	--	--
1937	1	--	1[9]	ND	--	--
1936	1	--	1[9]	ND	--	--
1935-1933	--	--	ND	ND	--	--
1932	--	13	ND	13[11]	--	--
1931-1930	--	--	ND	ND	--	--
1929	1	--	1[9]	ND	--	--
1928	ND(2)[9]	3	ND	3[9]	--	--
1927-1922	--	--	ND	ND	--	--
1921	--	20	ND	20[9]	--	--
1920-1912	--	--	ND	ND	--	--

TABLE 78: -- CONTINUED

	Total Island		Gambell		Savoonga	
Year	# Whales	# Crews	# Whales	# Crews	# Whales	# Crews
1911	3	--	3[9]	ND	--	--
1910	--	--	ND	ND	--	--
1909	0	--	0[9]	ND	--	--
1908-1904	--	--	ND	ND	--	--
1903	0	1	0[9]	1[9]	--	--
1902-1900	--	--	ND	ND	--	--
1899	1	--	1[9]	ND	--	--
1898-1895	--	--	ND	ND	--	--
1894	2	--	2[9]	ND	--	--
1893-1892	--	--	ND	ND	--	--
1891	4	--	4[9]	ND	--	--
1890-1887	--	--	ND	ND	--	--
1886	2	--	2[9]	ND	--	--
1885-1882	--	--	ND	ND	--	--
1881	1	--	1[9]	ND	--	--
1880	1	1	1[9]	1[9]	--	--
1879-1871	--	--	ND	ND	--	--
1870	5	--	5[9]	ND	--	--

ND = no data

1 Numbers in parentheses are whales struck and lost. Bowhead harvest in 1982 were 2 for Gambell and 1 for Savoonga (Lourie 1982: 227).
2 Marquette 1977: 4, 5, 11, and 33.
3 Burgess 1974.
4 Quota of four whales for the Island was imposed by the International Whaling Commission.
5 Steven Braund, personal communication, 1982.
6 One of the seven whales was a "stinker" (a floating dead whale).
7 Hughes 1960: 257.
8 Willman Marquette, personal communication, 1982. According to Marquette, 1972 was the first year Savoonga whaled as a village. Prior to that time Savoonga men hunted with Gambell crews. The first captain to initiate whaling from a Savoonga-based boat was a 62 year-old Savoonga skinboat captain.
9 Marquette and Bockstoce 1980.
10 This was the first year that there were high schools in Gambell and Savoonga. The availability of young men who were still in school may have influenced the increase in crews.
11 Braund 1981: 113.

of Savoonga are presented for years prior to 1972. Before that year, Savoonga hunters participated in whaling as members of Gambell crews (Steven Braund, personal communication, 1982). Since 1972 Savoonga hunters have continued to whale as a community.

Table 78 also suggests that in the last decade successful harvests of bowhead whales on St. Lawrence Island have been more consistent than in the preceding 20 years. However, since there are limited harvest data prior to 1940, it is not possible to ascertain the characteristics of harvest patterns preceding that time. Archaeological evidence does not indicate the relative quantity of bowhead to other whale or marine mammal species harvested since bowhead whales are normally butchered in the water or on the ice edge. Numbers of crews and harvest totals are most meaningfully considered in the context of the hunt.

Hughes (1960) reconstructed an early contact bowhead whale hunt based on field data gathered in 1954-55:

> The open skinboat, the angyak, was traditionally propelled both with paddles and with a sail made from a number of walrus stomachs sewn together. Following the voyage of whaling ships to this region, canvas sails replaced those made from the walrus. Aside from the introduction of somewhat different types of weapons, the general pattern of killing a whale remains the same today as it was in ancient times. The boat quietly approached the swimming, surfacing whale from the left rear side, the harpooner (or "striker") with his equipment ready. The ancient Eskimo harpoon was an ivory head tipped with a stone blade. The harpoon head is fastened to a long rawhide line of baby walrus hide, to which in turn were tied as many as three inflated sealskins ("pokes"), used for the same purpose as those in walrus hunting. The boat approached as closely as possible to the whale, and the striker threw his weapon. Others in the crew had the special job of throwing the inflated sealskins overboard and watching to see that no one got a foot tangled in the coiled rawhide line. The whale would sound in its attempt to get away from the harpoon head in its flesh, but swimming was impeded by the buoyant capacity of the large sealskin pokes, and the animal would tire quickly and have to return to the surface for air. The pokes marked the place of surfacing, where the boats (several boats hunted

> whales together) waited for it. In the old days stone-headed lances were used to kill the animal, and it was sometimes difficult for men equipped with only small boats and lances to kill the sixty to seventy foot long bowhead, whose tail could smash a boat and a dozen men in a moment of anger. (Hughes 1960: 112)

Bowhead were usually towed to shore by several boats attached to a common line. Since paddling provided the energy necessary to move the boats, men, and whales, it could take several days to get the carcass to shore.

Hughes (1960) reported that in 1940 and 1955, canvas sails were used in place of walrus stomach sails or paddles. Outboard motors were not used in searching for or pursuing whales because of their high noise level. Whaling guns and attached bombs were used with the harpoons. Outboard motors were used only for towing the dispatched whale back to shore (Hughes 1960: 113-115). The traditional pattern of bowhead distribution was very structured and provided proportionally larger shores of mangtak, baleen, and other valued portions of the animal to the striking boat and three or four other boats depending upon the order in which the boats had assisted in restriking a whale which had been already struck but not killed. Since approximately the 1940s the system of distribution had changed, with the household (as opposed to the boat crew) becoming the basic recipient unit and with each household receiving an equal share of the more prized portions of the whale (Hughes 1960: 115-116). However, the elder who directed the distribution (a captain or retired captain who headed a family group or lineage) provided flexibility to established patterns and could revert to earlier boat-based allocation practices if he so desired (Hughes 1960: 116-117).

In the last decade (1970-1980) bowhead whale hunting patterns on St. Lawrence Island have remained similar to those described by Hughes (1960) in 1954-55. Skinboats with sails were the only craft used for bowhead whaling, with the possible exception of one or two large wooden whaling boats. Aluminum boats (or plywood "speed boats") were never used for whaling. Since skinboats were not usually a commodity which could be purchased and which were normally passed on from father to son, the continued use of them for whaling set limits on who could become a whaling captain.

Technological changes included the use of CBs (citizen's band radios), larger outboard motors, and snowmachines for hauling skinboats and gear. CBs provided an important means of communication between boat crews of the same and of different communities. This means of communication allowed crews to disperse in searching for bowheads but more rapidly regroup to assist a successful striking crew or pursue a whale that had only been sighted but not struck. Larger outboard motors provided the means for towing a bowhead to shore from greater distances in a shorter time period.

The use of snowmachines facilitated the movement of skinboats, gear, supplies, and hunters from the villages to hunting sites. In addition to demographic factors, it is likely that access to the use of snowmachines in the early 1970s played a part in the commencement of bowhead whaling by the community of Savoonga in 1972. As previously described, Savoonga's geographic location does not provide access to leads in the ice pack early in the spring hunting season, the period most critical to contemporary successful bowhead whaling. Savoonga hunters were forced to haul their skinboats, gear, and crew overland

to Southeast Cape, a distance of 30-40 miles, in order to harvest bowhead from Savoonga-based boats.

As indicated in Table 78, there were 22 whaling crews in Gambell and 8 in Savoonga in 1980. The average number of whaling crew members was 7 to 8. The positions on the whaling crews were essentially the same as that reported by Hughes (1960) in 1954-55. As previously discussed, some positions on whaling crews were highly specialized. The position of captain required knowledge and skills which could be acquired only through extensive experience in whaling and other marine mammal hunting and the tutelage and supervision of older, retired captains -- usually their fathers or occasionally paternal uncles or older brothers. Thus, the captains were usually among the oldest of the community's active hunters. As indicated in Table 79, in 1980 the 22 whaling captains at Gambell were all between the ages of 41 to 63 with the exception of one 27-year old captain whose father had moved to Nome leaving his sons to crew the boat and his elderly father to provide supervision. Of 22 Gambell captains, approximately 55 percent were in their 40s (over half of which were older than 45), 32 percent were in their 50s, and 14 percent in their 60s. The average age of Gambell whaling captains ws 50.1 years. The 8 Savoonga captains ranged in age from 36 to 70; 63 percent were in their 40s, 13 percent in their 50s, and 13 percent in their 70s. The average age of Savoonga whaling captains was 47.5 years.

The strikers were second in command and most frequently assumed control of the skinboat when a captain retired or ceased hunting for some other reason. In 1980 the 22 Gambell strikers ranged in age from 19 to 49; 5 percent were in their teens, 30 percent in their 20s,

TABLE 79: AGE OF WHALING CAPTAINS AND STRIKERS, 1980 -- ST. LAWRENCE ISLAND

	Gambell		Savoonga	
Crew #	Age of Captain	Age of Striker	Age of Captain	Age of Striker
1	43	ND	52	27
2	41	19	40	34
3	54[1]	23	46	36
4	54	29	70	39
5	48	36	36	35
6	56	30	47	36
7	27[2]	31	42	45
8	54	20	47[3]	42
9	57	33	--	--
10	61	49	--	--
11	41	34	--	--
12	49	25	--	--
13	49	41	--	--
14	49	ND	--	--
15	63	28	--	--
16	43	32	--	--
17	55	40	--	--
18	57	27	--	--
19	63	31	--	--
20	46	30	--	--
21	45	43	--	--
22	47	27	--	--

ND = no data

1 This captain is frequently unavailable due to employment. In his absence his 48-year old brother is captain.

2 This captain's father resides in Nome.

3 An older brother started this crew but left Gambell for employment.

40 percent in their 30s, and 15 percent in their 40s. In Savoonga the 8 strikers ranged in aged from 27 to 45; approximately 13 percent were in their 20s, 63 percent in their 30s, and 25 percent in their 40s.

The kin relationships between captains and strikers were similar to those described by Hughes (1960) in 1954-1955. Of 22 strikers in Gambell in 1980, 35 percent were sons of the captains, 35 percent were the captains' younger brothers, 25 percent were sons of captains' brothers, and 5 percent unrelated to the captains. In Savoonga, of 8 strikers 25 percent were sons of the captain and 75 percent were brothers of the captain.

The other crew positions were less specialized but included both experienced and inexperienced members. Each crew had a trainee for the striker position. The evinruchta (person who operated the outboard motor) was usually one or another of the younger adult men with mechanical knowledge derived from experience and training. Young men in their teens were usually treated as apprentices but provided essential manpower while acquiring skills and knowledge necessary to becoming successful producers.

Table 80 presents kinship relations between captain and whaling crew members in Gambell and Savoonga in 1980. It is clear that brothers, sons, or brother's sons or any combination of these three category of kin formed the core of St. Lawrence Island whaling crews in 1980. Other crew members were usually individuals who could trace affinal or consanguineal relationships to the captain through links of males, females, or both. These relationships sometimes spanned two or three generations. Although informants classified a few instances of crew members as being "unrelated," it is suspected that additional

TABLE 80: KINSHIP RELATIONS OF WHALING CREWS, 1980 -- ST. LAWRENCE ISLAND[1]

Key:

Br = brother
C = captain
Da = daughter
Fa = father
Hu = husband
Mo = mother
Ru = relationship unknown
Si = sister
So = son
Ur = unrelated

Crew Type	Crew Composition	Gambell	Savoonga	Total
1	C: Br, So	1	0	1
2	C: Br, So, BrSo	2	1	3
3	C: Br, So, BrSo, FaSiSo	1	0	1
4	C: Br, So, FaBrSo	1	0	1
5	C: Br, So, MoSiDaSo	1	0	1
6	C: Br, So, DaHu	1	0	1
7	C: Br, So, SiHu	0	1	1
8	C: Br, So, Ru	1	0	1
9	C: Br, BrSo	0	2	2
10	C: Br, BrSo, SiHuBrSo	1	0	1
11	C: Br, BrSo, MoSiDaHu	1	0	1
12	C: Br, BrSo, Ur	1	0	1
13	C: Br, FaBrSo, Ru	1	0	1
14	C: Br, MoSiHu, SiSo	0	2	2
15	C: Br, FaBr, FaBrSo, Ru	0	1	1

TABLE 80: -- CONTINUED

Crew Type	Crew Composition	Gambell	Savoonga	Total
16	C: So, BrSo	2	0	2
17	C: So, SiSo	3	0	3
18	C: So, SoSo, Ur	1	0	1
19	C: So, SiSoSo, Ru	1	0	1
20	C: BrSo, BrSoSo	1	0	1
21	C: BrSo, FaBrSoSo	0	1	1
22	C: BrSo, Ru	1	0	1
23	C: Ur	1	0	1

[1] One or more numbers of a crew may be of the relationship expressed in the equation. These crew equations express only the nature of relationships, not the frequency with which they reappear on the same crew.

genealogical data would provide connecting links for at least some of these cases. It is also expected that the single unrelated crew is not an inexplicable anomaly. Such a configuration could be expected to arise in a situation in which a capable, ambitious, charismatic individual lacks sufficient male kin to form a crew through normal channels. If there is a surplus of unattached or nebulously attached hunting-aged males, such an emerging leader may successfully recruit a whaling crew. The example of such a crew in Gambell was relatively new (formed in 1978) and had parallels in other study communities.

Within the last decade there has been an increase in the number of whaling crews on St. Lawrence Island. However, it is not known how many crews existed during the precontact or early contact period when St. Lawrence populations were larger. The dynamics of the growth of the number of whaling crews are complex. One variable is the increased number of hunting-aged males in the population between 1970 and 1980. In the 1970 to 1975 period, some families with boats had an inadequate number of crew members because sons in their older teens were away from the village attending high schools. Although high schools were available locally after 1976, partially relieving the crew shortage problem, school attendance restricted hunting participation during week days. School officials frequently complained that students chose to hunt over regularly attending school in the spring, and school scheduling has begun to accommodate this conflict.

It is likely that the commencement of whaling by Savoonga-based crews temporarily disrupted Gambell crew member availability and crew structure. However, the extent of this impact is unknown because the data concerning the level and nature of participation by Savoonga

hunters in Gambell crews have not been documented. Since Gambell and Savoonga crews participated in mutual assistance, the commencement of whaling by Savoonga-based crews can be viewed as a positive adaptation for the Island's population as a whole.

Evidence derived from archaeology and oral history indicate that in the past, as in recent years, other whale species were harvested. Midden deposits yield the remains of minke and finback whales (Geist and Rainey 1936: 346). Geist and Rainey (1936) observed, however, that in the 1920s and 1930s minke and finback were not hunted frequently and bowhead played a central role in St. Lawrence Islander whaling. Oral tradition, faunal remains, and documented data indicate that gray whales were occasionally harvested in the past as they are in the present. They were taken opportunistically after walrus hunting and were considered to be vastly inferior to bowhead as a food and raw material source and more difficult and dangerous to hunt successfully (Marquette and Braham 1982: 389-390). Table 81 presents gray or "summer whale" harvest data from 1952-1980. Belukha were occasionally harvested until the 1960s, but in more recent years negligible effort has been expended on their harvest. There is a significant body of oral history surrounding the special relationship which was thought to exist between killer whales and humans, and there is no evidence that killer whales were ever hunted by St. Lawrence Islanders. In 1980 killer whales were still considered to have many similarities to humans.

TABLE 81: GRAY WHALE HARVEST TRENDS, 1952-1980 -- ST. LAWRENCE ISLAND[1]

Year	Gambell	Savoonga
1952	0	--
1953	1	--
1954	1	--
1955	ND	--
1956	1	--
1957	0	--
1958	1	--
1959	0	--
1960	0	--
1961	0	--
1962	0	--
1963	0	--
1964	1	--
1965	0	--
1966	0	--
1967	0	--
1968	0	--
1969	0	--
1970	0	2
1971	ND	ND
1972	1	ND
1973	ND	ND
1974	3	ND
1975	ND	ND
1976	ND	ND
1977	1	ND
1978	1	ND
1979	2	1
1980	0	1

ND = no data

[1] Adapted from Marquette and Braham 1982: 388.

Other Marine Mammals

In past and present times, other marine mammals have been harvested by St. Lawrence Island hunters in crews. These harvests are normally opportunistic and occur while crews are trying to locate walrus or bowhead whales in the spring or, less frequently, walrus in the fall. In the spring bearded seals haul out on ice floes in large numbers and can be harvested both on the ice or in the water. Ringed seals are the most abundant of the smaller seals during spring months. Table 82 presents marine mammal harvest for a single spring hunting season as an example of the spring hunting complex. However, whales and walrus are always the focus species during this hunting period and seals will be ignored if their harvest may jeopardize the successful take of the larger species. In addition, weather, ice, and current conditions greatly influence the spring seal harvest levels from year to year, so harvest data from a single year may not be representative. Seals harvested by members of a crew belong to the entire crew (not to the individual who dispatched the animal) and are shared accordingly. The relative number of seals harvested by crew members during a spring hunt usually is inversely related to the number of the larger species harvested. This preference for larger species applies to the harvest of bearded seals as compared with smaller seal species.

Individual Hunting

Figures 31 and 32 illustrate that individually-focused marine mammal harvest activities on St. Lawrence Island occurred during

TABLE 82: SPRING MARINE MAMMAL HARVEST, 1967 -- ST. LAWRENCE ISLAND[1]

Category	Total	Gambell	Savoonga
# Crews	39	18	21
# Hunters	172	85	87
# Hunting days[2]	59(109)	30(50)[4]	29 (59)[4]
# Walrus	212	30	182
# Bowhead whales	3	3	0
# Bearded seals[3]	127	54	73
# Other seals[3]	1,313	752	561

1 Adapted from Burns 1968: 8.
2 Hunting days for walrus season only; these figures do not include whale hunting days.
3 Data do not include seals harvested during the whaling period. Those data are not available.
4 Total number of days of the migration are in parentheses. Because of weather, ice conditions, etc., not all days are actual hunting days.

seasons and in environmental settings not exploited by hunters in boat crews. These seasons and environmental settings included fall hunting from shore; late fall and winter hunting from shore ice at leads or, in the past, at breathing holes; fall hunting in nearshore waters; and hunting from moving sea ice. These types of marine mammal hunting were normally the activity of an individual hunter, although father and son pairs occasionally participated in these activities together. Individual marine mammal hunting was conducted mostly by young to middle-aged males -- mid-teens to mid-50s or 60s depending upon the health and agility of the hunter. All species of seal and relatively small numbers of walrus compared to the spring harvest were taken depending upon resource availability and the quality of hunting conditions. The 300+ miles of complex coastline at St. Lawrence Island characterized by bays, lagoons, streams, cliffs, and wetlands provides excellent habitat for individual hunting of marine mammals and other species.

Prior to the introduction of the rifle, St. Lawrence Island hunters practiced breathing hole hunting of seals and walrus during winter months when ice conditions permitted (Hughes 1960: 108). If leads in the ice pack were available, seals and walrus would not normally make breathing holes. Hughes (1960) reported that more walrus than seals were killed at breathing holes prior to the use of rifles, according to older informants in 1954-55 (108). After rifles were introduced, hunting at leads was more productive, and seals and walrus were retrieved with seal hooks (Hughes 1960 and 1974). Early historic documentation suggests that St. Lawrence Island hunters did not normally hunt from kayaks and were more reluctant to hunt from moving ice

than were hunters from King and the Diomede islands, although Elliott (1886) depicted the use of a kayak in walrus hunting possibly at St. Lawrence Island during the summer of 1874 (459). These facts probably reflect the very different ice and resource conditions at St. Lawrence Island. Walrus were available year-round, there was stable shore-fast ice on the northern side of the Island, there were ice free areas during most winters on the southern side of the Island, bays and lagoons were available for breathing hole hunting, and the southern shores of the Island provided the most northerly winter habitat for some species of hair seals.

Hunting from leads and shore with rifles and seal hooks persisted into the 1970s. In 1971-72 Burgess (1974) reported:

> The individual character of seal hunting very much contrasts with the cooperative walrus and whale hunts. The man out earliest gets the best spots, and it is the nature of these wary animals that requires the hunt be solitary. Hunting techniques are simple: wait at the blind along the shore or at an ice lead (sometimes for hours), fire an accurate shot at the head briefly exposed above the surface of the water, hook and retrieve the seal before it sinks, or before wind and currents move it out of reach of the seal hook. (Burgess 1974: 159)

Burgess (1974) documented winter marine mammal harvest activity for individual hunters during the fall and winter months (October through March) of 1971-72. These data indicate that ringed seals, spotted seals, walrus, and bearded seal (in decreasing order of absolute harvest totals) were taken by individual hunters during this period (Burgess 1974: 180-193). These harvest totals are not particularly useful in this context, however, because harvests of producers are not linked with a specific number of dependents in households, families or in the village as a whole. In addition, Burgess (1974) estimates that the harvest totals of seals are low. Nonetheless, his data are useful

in demonstrating that individual hunter marine mammal production remained an important source of food and raw materials in 1971-72.

In 1980 the basic patterns of individual marine mammal hunting activity had remained intact, although breathing hole hunting had been virtually eliminated. Whereas hunters in their 50s recalled practicing modified forms of breathing hole hunting using rifles, it was not actively practiced in 1980. Braund (1981) reported that small skinboats, in the 16' to 17' range, were present on the Island in earlier years, although only one small 8' skin-covered vessel remained in 1973 (Braund 1981: 168). These smaller boats were used for non-crew hunting under minimal open water conditions, such as in small leads close to the village or for summer fishing trips (Braund 1981: 113). The 1980 data indicate that the functions of these smaller skin craft were transferred to small plywood and aluminum craft commonly referred to as "speedboats." These were used by single or paired hunters in the fall and winter to hunt and retrieve marine mammals in nearshore waters, lagoons, or leads. Although this could technically be referred as "boat hunting," it was not crew hunting and was most similar to and conceptualized as individual hunting.

Tables 83 and 84 provide household marine mammal hunting data from a 10 percent sample of households in Gambell and Savoonga in 1980. Although the absolute levels of harvest may not be representative of the other 90 percent of village households because the sample was not random, and may not represent other years because harvest totals vary greatly from year to year, these data are useful for demonstrating the continuation of individualized fall and winter harvest activity. These data also demonstrate that fall and winter marine mammal harvests

TABLE 83: SAMPLE HOUSEHOLD MARINE MAMMAL PRODUCTIVITY
DURING FALL/WINTER MONTHS, 1980 -- GAMBELL[1] [2]

Key: BS = bearded seal
Hhld.= household
RS = ringed seal
SS = spotted seal
W = walrus

Hhld. #	Hhld. Size	Ratio Hunters/Dependents	Oct. - Dec.				Jan. - March				Total			
			RS	SS	BS	W	RS	SS	BS	W	RS	SS	BS	W
1	1	1:0	12	1	21	16	13	0	10	4	25	1	31	20
2	5	1:4	30	10	0	9	0	0	0	0	30	10	0	9
3	3	1:2	0	2	0	3	0	0	0	0	0	2	0	3
4	7	2:5	4	11	3	0	8	0	0	0	12	11	3	0
5	5	1:4	0	0	0	0	0	0	0	0	0	0	0	0
6	8	5:3	4	0	0	0	0	0	0	0	4	0	0	0
7	9	7:2	0	2	5	0	10	0	8	5	10	2	13	5
8	7	4:3	0	0	0	0	0	0	0	0	0	0	0	0
9	5	4:1	16	9	12	15	9	4	4	15	25	13	16	30
10	9	5:4	7	2	0	0	3	0	0	1	10	2	0	1
11	5	4:1	0	1	0	0	3	0	0	0	3	1	0	0
12	6	5:1	6	15	3	14	4	0	5	8	10	15	8	22
13	2	2:0	2	0	0	1	3	0	0	0	5	0	0	1
14	8	4:4	9	8	0	2	4	0	0	0	13	8	0	2
15	4	1:3	17	7	7	2	3	0	5	1	20	7	12	3
16	3	1:2	2	3	3	2	0	0	0	0	2	3	3	2
Total Hhld. =16	Total Individuals = 87 $\bar{x}$ = 5.4	48:39	109	71	54	64	60	4	32	34	169	75	86	98

[1] Field data and Sherrod 1982; these data are a 10 percent sample of total Gambell households in 1980.
[2] The months October through March are usually individual or paired (or small family group) hunting periods. They were selected to illustrate non-crew marine mammal productivity.

TABLE 84: SAMPLE HOUSEHOLD MARINE MAMMAL PRODUCTIVITY DURING FALL/WINTER MONTHS, 1980 -- SAVOONGA[1] [2]

Key: BS = bearded seal
Hhld.= household
RS = ringed seal
SS = spotted seal
W = walrus

Hhld. #	Hhld. Size	Ratio Hunters/Dependents	Oct. - Dec.				Jan. - March				Total			
			RS	SS	BS	W	RS	SS	BS	W	RS	SS	BS	W
1	8	3:5	10	0	0	0	0	0	0	0	10	0	0	0
2	2	1:1	1	3	0	0	0	0	0	0	1	3	0	0
3	6	0:6	0	0	0	0	0	0	0	0	0	0	0	0
4	3	1:2	0	0	0	0	0	0	0	0	0	0	0	0
5	6	3:3	9	4	0	0	21	0	0	0	30	4	0	0
6	7	4:3	0	0	0	0	0	0	0	0	0	0	0	0
7	4	1:3	6	0	4	3	2	0	0	0	8	0	4	3
8	10	5:5	15	7	1	0	3	0	0	0	18	7	1	0
9	7	2:5	5	7	0	0	7	0	0	0	12	7	0	0
10	3	2:1	2	0	0	0	8	0	0	0	10	0	0	0
11	4	1:3	8	2	0	0	8	0	0	0	16	2	0	0
12	2	1:1	6	7	0	0	6	8	0	0	12	15	0	0
13	7	4:3	7	1	0	0	7	0	0	0	14	1	0	0
14	9	3:6	6	1	0	0	0	0	0	0	6	1	0	0
15	10	3:7	0	0	0	0	0	0	0	4	0	0	0	4
16	5	2:3	3	12	1	15	3	0	0	0	6	12	1	15
Total Hhld. =16	Total Individuals = 93 $\bar{x}$ = 5.8	36:57	78	44	6	18	65	8	0	4	143	52	6	22

[1] Field data and Sherrod 1982; these data are a 10 percent sample of total Savoonga households in 1980.
[2] The months October through March are usually individual or paired (or small family group) hunting periods. They were selected to illustrate non-crew marine mammal productivity.

vary between households as does the ratio of hunters to dependents. Lastly, these data also suggest that fall and winter harvests may be higher at Gambell than at Savoonga, although data for a sequence of years is necessary before this conclusion could be validated.

Finally, the practical range of fall and winter marine mammal hunting activities has been extended in recent years by the use of snowmachines and ATVs (all terrain vehicles) for overland or coastal travel. Although mobility on land was provided by dog teams in the past, these mechanized forms of transportation allow the hunters to remain at a centralized home rather than at camp for more days each year. This factor may have demographic implications (Binford and Chasko 1976).

Other Resource Harvest Activities

All historical and contemporary data indicate that the harvest of non-marine mammal resources by St. Lawrence Island populations has continued to be secondary to marine mammal hunting based on demographic, social, economic, nutritional, and evaluative criteria. Harvest totals of specific resource categories by pounds for the periods 1971-72 in Gambell and 1974 in Gambell and Savoonga, presented in Table 85, illustrate examples of the economic and nutritional dimensions of this marine mammal dependency.

However, the availability of multiple ecological niches which can be exploited by different age and sex segments of the population provides greater adaptability for the population as a whole (Laughlin 1972). The range of resources available to St. Lawrence Island

TABLE 85: POUNDS OF SUBSISTENCE RESOURCES HARVESTED -- ST. LAWRENCE ISLAND

Gambell, 1971 - 72[1]		
Resource	Number	Pounds
walrus	240	120,120
ringed seal	443	35,440
bearded seal	73	24,820
bowhead	1	24,200
birds	ND	7,612
reindeer	ND	1,100

	Gambell, 1974[2]	Savoonga[2]
Resource	Pounds	Pounds
mammals	453,845	549,700
fish	24,200	2,500
fowl	10,000	4,000
berries and greens	1,500	2,200

1 Burgess 1974.
2 Adapted from U. S. Department of Interior, Bureau of Indian Affairs 1977b: 159.

populations was presented keyed to specific seasons in Figure 31. In comparison to King and Diomede islands, St. Lawrence Island hosts a greater diversity of resources and is probably the only one of the three islands which had adequate resource diversity to support human populations for limited periods of time in geographic isolation from mainland habitats and/or trade in the precontact period, although such isolation apparently never existed for lengthy intervals.

Figure 32 presented St. Lawrence Island habitats keyed to specific population cohorts. A discussion of the relationships between these cohorts, habitats, and non-marine mammal resources through time completes the consideration of St. Lawrence Island human ecology in this context. The level of participation by St. Lawrence Islanders in harvests of non-marine mammal resources in 1980 is presented in Figure 35.

Old and/or infirm males have been most productive indirectly by transmitting their knowledge of hunting skills, the social organization of hunting, the environment, animal behavior, technology, and other important categories of information to younger, less experienced male producers. Although this role has been somewhat eroded by the tenets of modern, western education and other sociocultural changes, older men still transmit hunting-related information which remains important to the successful exploitation of particularly the marine environment. Older men no longer capable of hunting contributed to the hunting effort by fabricating items of technology essential to the harvest. Many carved ivory to provide cash which permitted the purchase of more modern items of hunting technology (such as aluminum boats, outboard motors, rifles, CBs, ammunition, etc.). In 1980 older

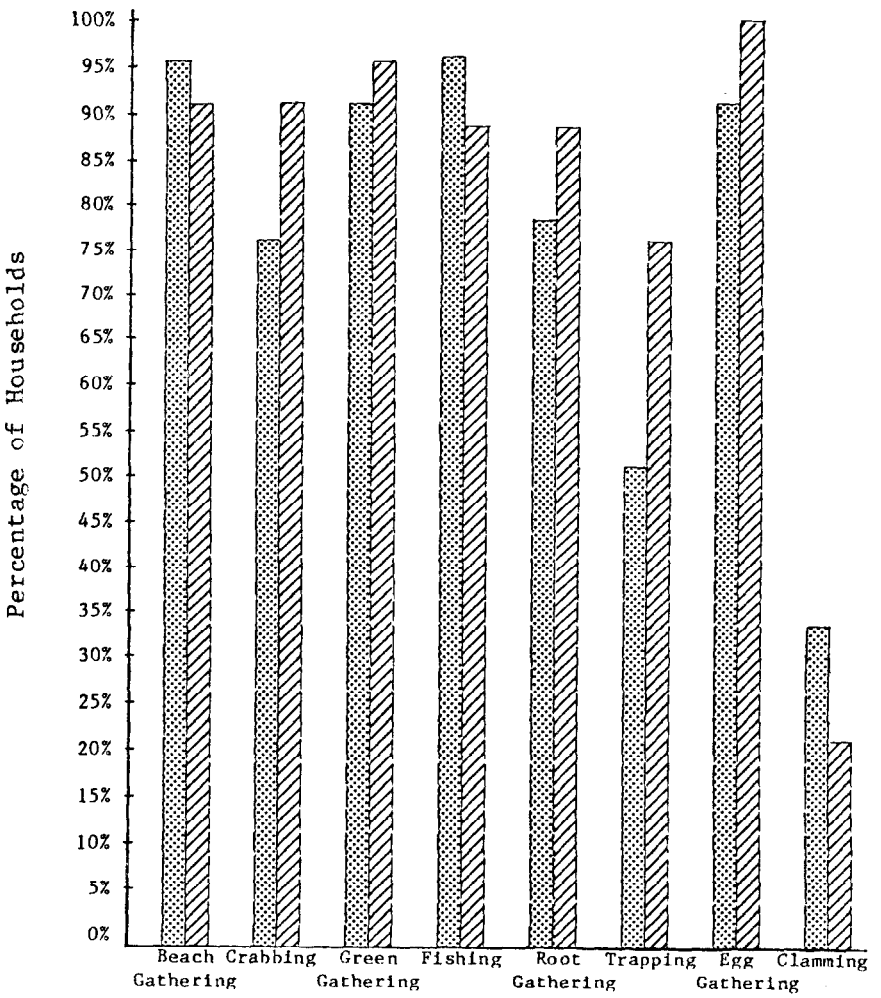


Figure 35: Household non-marine mammal harvest activities, 1980 -- St. Lawrence Island.[1]
(n=28 for Gambell)
(n=19 for Savoonga)

Key: = Gambell = Savoonga

[1] Based on Eskimo Walrus Commission research, 1980-81 (Sherrod 1982).

men with a functional level of mobility participated in summer fishing, winter tomcod fishing and crabbing through the shore ice, and beach gathering. As revealed by the ages of whaling and walrus captains, there has continued to be considerable variation in the age of retirement from captaincy. It is likely that in both earlier times and the present, older men have been reluctant to retire from captaincy if they lack an appropriate successor for their role or if their retirement may bring about the instability or collapse of their crew. In 1980 old men who had been successful captains were less likely to engage in gathering activities or other roles normally held by females.

The nature of the productive roles of old and/or infirm females differs to a lesser degree from that performed by younger women than is the case for males. St. Lawrence Island women have functioned through time in key roles associated with the butchering, distribution, processing, storage, preparation, and fabrication of useful products from raw materials of marine mammals. Females have been essential in preparing and sewing the skins which cover the skinboat. Older women have continued in these roles through time. However, older and/or infirm women have provided supervision to younger females and have performed fewer tasks which are physically demanding. As in the case of males, there has continued to be some degree of stratification between women based on their affiliation with successful boat captains, and this stratification has been reflected in the quality and quantity of their work loads in older age. Differential work loads in this context are also clearly associated with the availability of human resources within the household or family.

In 1980 old and/or infirm females exploited non-marine mammal resources in much the same way as they had in the past. During summer fishing periods, older women who were physically able accompanied family members to fish camps, mostly on the south side of the Island. There they assisted younger women in preparing fish and birds harvested during this period. In 1954-55 Hughes (1960) noted that there was less fishing done then than was remembered to have occurred in the youth of people who were then middle-aged (119).

In 1980 during summer and fall months, usually, but not exclusively, associated with residence in summer camps, older women, younger women, children, and occasionally older males gathered greens, willow leaves, "potatoes" and other tubers, salmonberries, crowberries, whortleberries, and other terrestrial vegetation (see Table 1). The magnitude of this harvest has not been recorded but was highly valued as a source of fresh food and dietary variety.

In 1980 older women joined with younger women and children in gathering food thrown onto the beach by high seas. This activity occurred year-round but was most productive subsequent to fall storms. Foods gathered in this manner included crab, clams, sea squirts (several varieties of tunicates), seaweed, fish, and other varieties of animal and plant life. These are referred to as "beach throw" in the literature and were locally called "seafood" or specific names such as "sea peaches," "sea cucumbers," "sea potatoes," etc. The magnitude of this harvest has not been documented, but in 1980 these food products were consumed at least once a day in observed households. Some varieties were stored for long periods of time. Because of the absence of beaches and more northerly latitude, beach throw were not available in

large quantities at King and Diomede islands.

In 1980 older women, younger women, children, and older males harvested tomcod, crab, and sculpin through the shore ice during winter and early spring months. Young to middle-aged males also participated in crabbing while hunting at leads or during periods of time in which they were not conducting hunting activities. Tomcod, crab, and sculpin were often the only fresh foods available during lulls in marine mammal harvests. Prior to the availability of commercial foods, or even contemporarily when cash was relatively unavailable, these species provided food during times of actual shortage (Thomas 1981). These species were particularly important in the past when the previous year's spring and fall marine mammal harvests were low or failed.

Young to middle-aged females have continued to model their productive activities after those of their mothers, grandmothers, and other older relatives as described above. Their work load has continued to be heavier than that of older women and girls. In 1980 child care was shared between all females within households and between closely related households.

The gathering, fishing, and ice fishing activities of children have already been discussed. At approximately the age of 12 the productive activities of children begin to diverge by sex. Males assume apprentice positions on boat crews. They also accompany their fathers or other appropriate older male relatives on individualized seal and walrus harvest activities. Younger males individually or in small groups harvest waterfowl and eggs from cliffs. Some younger males trap on their own or assist older male relatives in this pursuit. The productive role of younger males has been reduced by their

participation in formal education. Nonetheless, in 1980 adult men took their responsibilities for enculturating younger males in male-specific productive roles very seriously. A boy's first harvest of each species was given considerable attention and was distributed to others in accordance with traditional patterns.

As previously described in some detail, young to middle-aged males have continued to be the most productive members of St. Lawrence Island society, primarily through marine mammal hunting. However, they remain producers in other ecological niches during lulls in marine mammal hunting activities and opportunistically in the context of marine mammal hunting. Waterfowl hunting is an example of secondary production during crew hunting endeavors. Young to middle-aged males also gather eggs from cliffs, fish for species other than tomcod and sculpin (e.g. cod, halibut, salmon, pike, char, and grayling), and trap.

It is useful to note that young to middle-aged males are the only St. Lawrence Island population segment in which most members have the physical abilities, skills, and cultural acceptance to exploit all ecological niches used by the Island populations. This greater level and varied spectrum of production available to males may in part explain the expressed preference for male offspring demonstrated in Chapter IV. In 1980 some younger women were expressing an interest and occasionally participating in male roles of production.

The Hunting Ecology of King and Little Diomede Islands

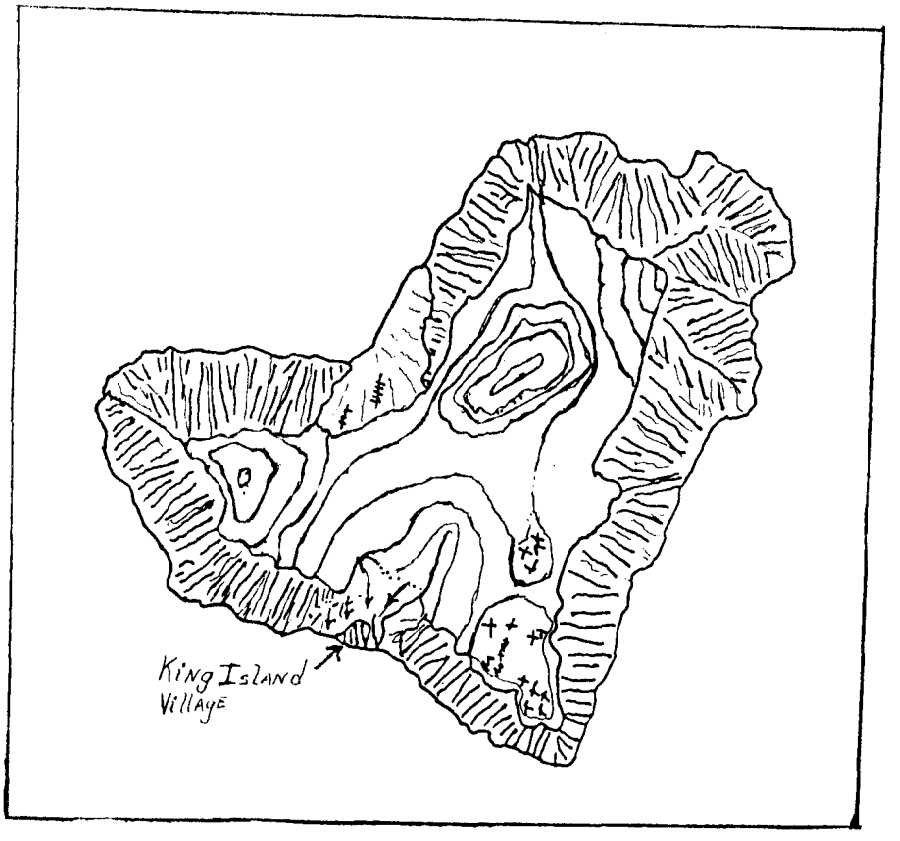
An Overview of the Seasonal Use of Key Ecosystems

In Chapter II overviews of King and Diomede island topographies, climates, sea ice environments, faunal and floral resources, and socio-cultural features were presented. The details of the hunting ecologies of King and Diomede islands as they relate to demography are examined in historical perspective in this chapter. The focus of this discussion is marine adaptations in general and large marine mammal hunting in specific.

Since all of the insular study communities share some basic features of ecological adaptation, similar themes will be referenced and only variation will be discussed in some detail. King and Diomede island populations share a cultural history distinct from that of St. Lawrence Island (Iñupiat as opposed to Siberian Yuit), and King Island populations have relocated to the mainland in Nome within the last two decades.

Figures 36 and 37 present more detailed maps of the islands on which the study communities are located. Figure 4 depicted the islands in relationship to adjacent mainland areas and to one another. As previously mentioned, only one village site on each island has been occupied since earliest documented contact, although evidence indicates there may have been other village locations in earlier periods.

Figures 38, 39, ad 40 illustrate the seasonal harvest activities for each community. Two seasonal rounds are presented for King Island (one pre- and one post-relocation), because the environmental



Key:

Feet

0 500 1,000

N

Cliffs

Wet or Shoreline

Figure 36: King Island.

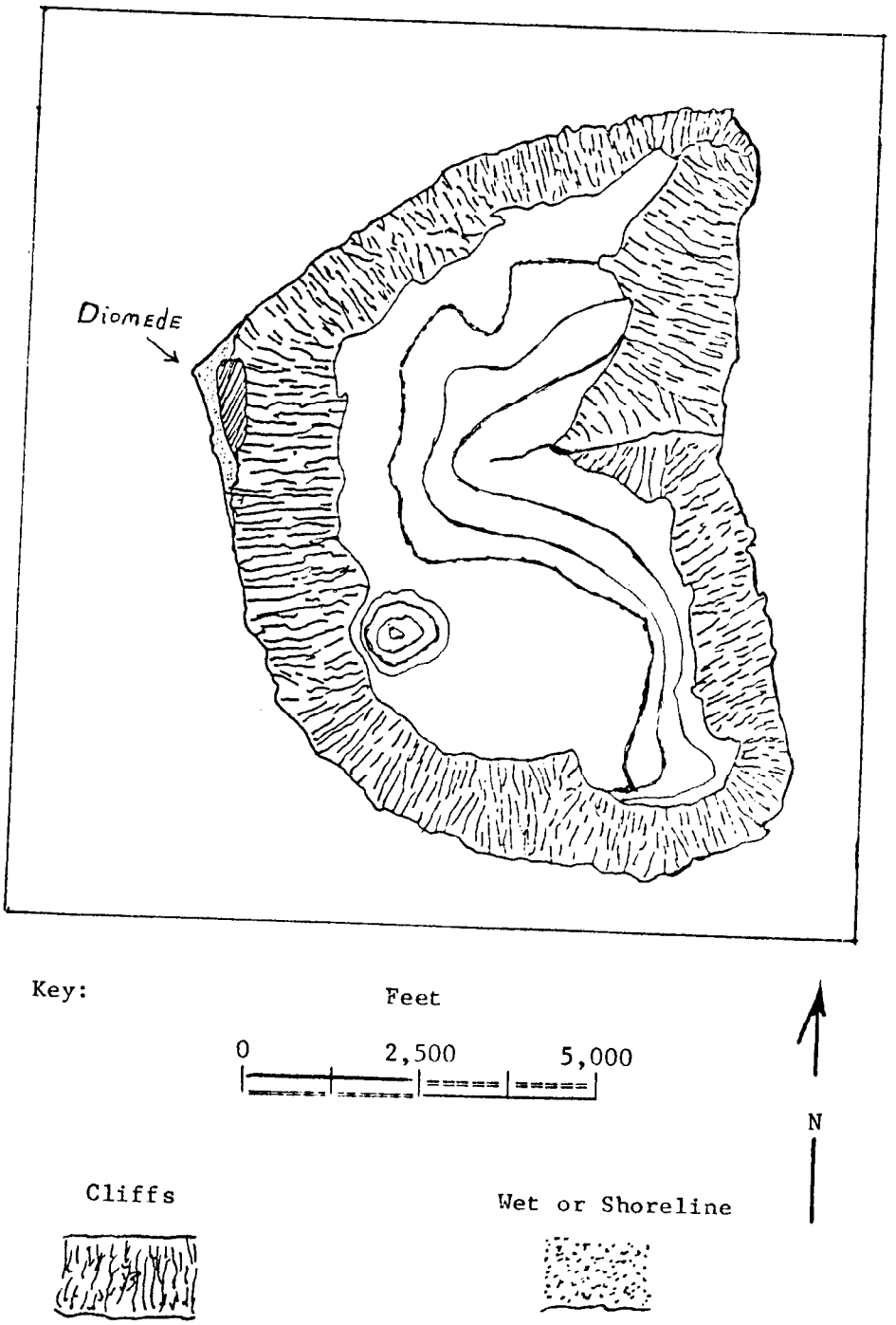


Figure 37: Little Diomede Island.

Key: + = historic (1650-1959)

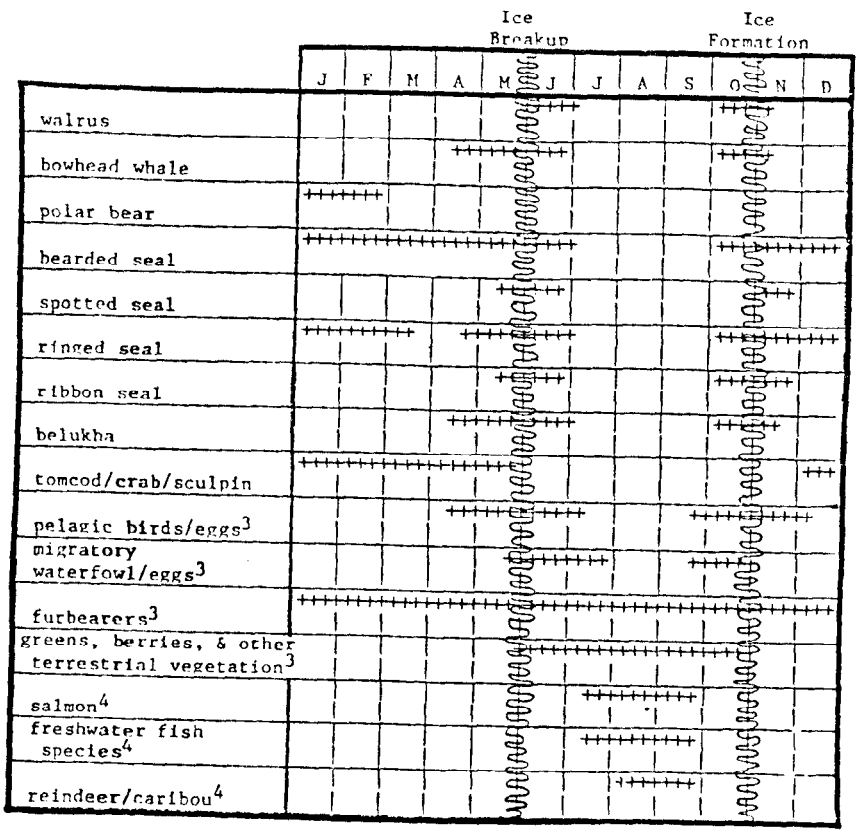


Figure 38: Seasonal harvests of major resources prior to relocation -- King Island.[1] [2]

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1 Sources include: Bogojavlensky 1969; Brooks 1953; Marquette and Bockstoce 1980; Renner 1979; and Ross 1958.

2 This figure reflects the seasonal round when King islanders were living on the Island. The post-relocation seasonal harvest is presented in Figure 39.

3 These resources are available at the Island but were more abundant on the mainland with the exception of pelagic birds and eggs. Only arctic fox are available on the Island.

4 Salmon and freshwater fish do not occur on the Island because there are no streams, lakes, or other freshwater sources. Caribou and, in more recent years, reindeer are available only on the mainland.

Key: x = contemporary (1960-1980)

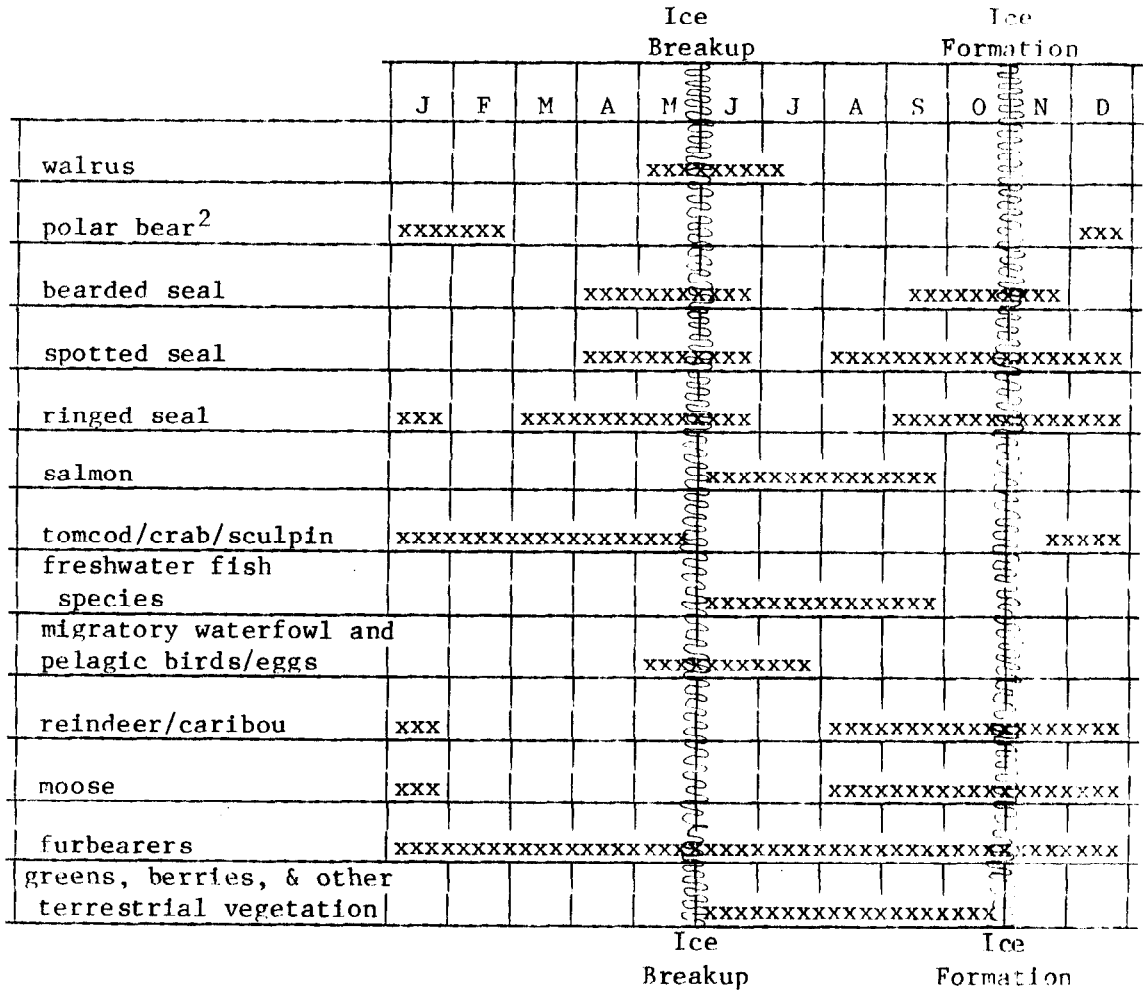


Figure 39: Seasonal harvests of major resources, post-relocation -- King Island.[1]

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1 Sources include field data and Sherrod 1982.

2 Rarely available in the Nome area. One was taken by a small group of related King Island men on the shore ice in front of Nome in early spring, 1976.

Key: + = historic (1650-1959) x = contemporary (1960-1980)

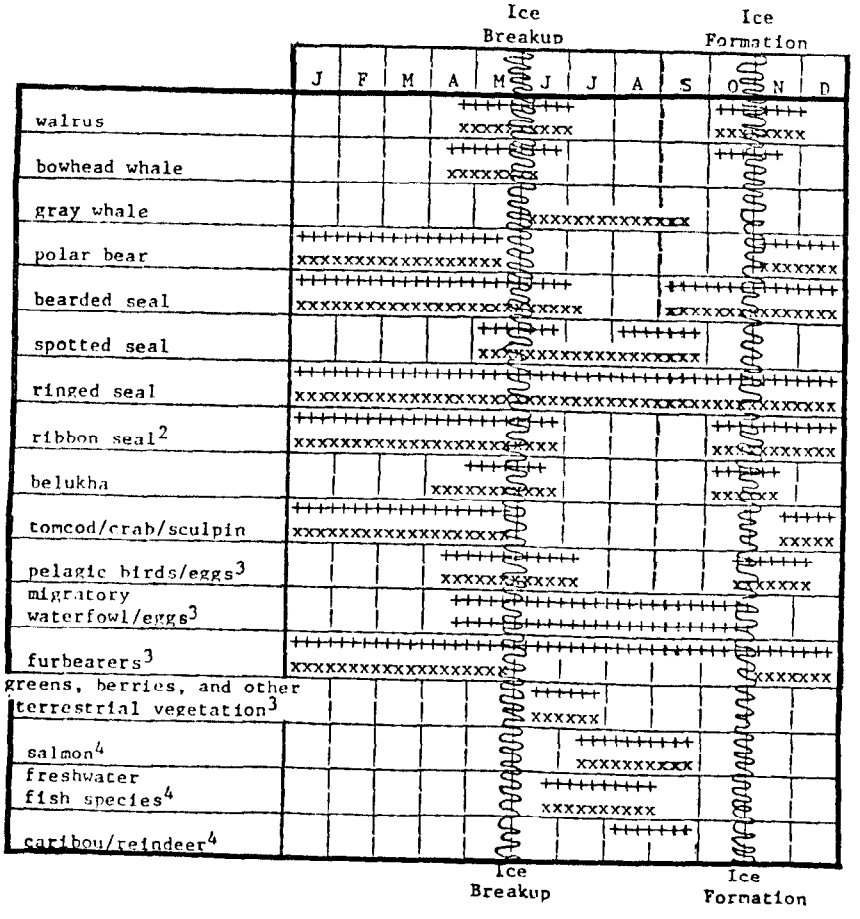


Figure 40: Seasonal harvest of major resources -- Little Diomede Island.[1]

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1 Sources include: Bogojavlensky 1969; Buckley 1958; Burns 1965 and 1969; Collins 1937; Eide 1952; Jenness 1929; Kenyon 1960; Ross 1958; Sherrod 1982; and Thomas 1981.

2 Ribbon seals are rare at Little Diomede Island but are harvested if seen.

3 These resources are available at the mainland and on the Island. The only furbearer on the Island was the arctic fox. Pelagic birds and eggs are very abundant on the Island.

4 These resources are not available on the Island.

conditions in the Nome area are very dissimilar to those of the Island and because ice conditions in the Nome area limit access to the Island early in the spring hunting season. Fluctuations in the seasonality of harvests through time are depicted for Diomede Island in a single figure. As in the case of St. Lawrence Island, harvest seasonality was predominantly influenced by species availability and conditions of access. However, unlike St. Lawrence Island populations, King and Diomede islanders continued to be more reliant on resources obtained from the mainland. The timing of mainland harvests depended upon open water conditions which allowed boat passage, since the ice of the Strait was never stable enough to permit winter island to mainland travel. Broken pack ice in spring and slush ice, new ice, and high seas during fall storms restricted boat mobility to a two to three month summer "window." The contemporary period for King and Diomede islands was defined in Figures 39 and 40 as 1960 to 1980. In the case of King Island, this period approximates the relocation of the majority of the population to Nome.

Figures 41 and 42 present habitats used by King and Diomede populations through time keyed to specific cohorts. Ecological zones include both insular and mainland habitats used by the populations of each community. The relocation of King Islanders to Nome has eliminated the close proximity of some of these habitats, such as cliffs and moving ice. Although King Islanders will travel considerable distances to have access to the Island or similar habitats, the lack of proximity has reduced the level of participation in harvesting activities. Conversely, the use of mainland habitats has correspondingly increased. In addition, the use of large outboard motors and access to air travel

Inland	Lakes and streams	Village or camp	Beach	Cliffs	Nearshore Waters	Shore Ice	Open Sea	Moving Ice
-		Old and/or infirm males	+	-	(+)	+	-	-
+	+	Old and/or infirm females	+	-	(+)	+	-	-
(+)	(+)	Pregnant females	+	-	(+)	+	-	-
+	+	Children (<12+)	+	(+)[6]	(+)	+	-	-
+	+	Young to middle-aged females	+	+[5]	+	+	(+)[4]	-
+	+	Young to middle-aged males	+	+	+	+	+	+

Figure 41: Habitats keyed to population cohorts -- King Island.[1] [2] [3]

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1 People are ordered in terms of harvesting productivity with the least directly productive at the top. However, old and/or infirm males are very indirectly productive by contributing knowledge and/or technology to the hunt. Beginning with types of cohorts, their use of habitat is indicated by a plus sign. Parentheses indicate qualified use or special limitations (e.g. limited strength, skill, or stamina). This chart provides no indication of the different methods of using the same area nor the different resources procured (e.g. women may jig for tomcod on shore ice while younger males hunt seals at leads; or men may hunt caribou or moose inland while women and children gather berries).

2 Adapted from Laughlin 1968a: 41.

3 Sources include: Bogojavlensky 1969; Renner 1979; and Ross 1958.

4 In recent years there has been very limited participation of a few females in open sea hunting that has probably resulted from the relocation of King Islanders to Nome and their need to go great distances to hunt walrus. In addition, the participation of females in recent years may also reflect a sporadic shortage of male crew and the need for butchering labor at hunting sites far from the home village.

5 Kleinschmidt 1910.

6 Young boys over the age of 13 or 14 were primary harvesters of birds and eggs on the Island.

Inland	Lakes and streams	Village or camp	Beach	Cliffs	Nearshore Waters	Shore Ice	Open Sea	Moving Ice
-	+	Old and/or infirm males	+	-	(+)	+	-	-
+	+	Old and/or infirm females	+	-	(+)	+	-	-
(+)	(+)	Pregnant females	+	-	(+)	+	-	-
+	+	Children (<12+)	+	(+)[5]	(+)	+	-	-
+	+	Young to middle-aged females	+	+[4]	+	+	-	-
+	+	Young to middle-aged males	+	+	+	+	+	+

Figure 42: Habitats keyed to population cohorts -- Little Diomede Island.[1] [2] [3]

---

1 People are ordered in terms of harvesting productivity with the least directly productive at the top. However, old and/or infirm males are very indirectly productive by contributing knowledge and/or technology to the hunt. Beginning with types of cohorts, their use of habitat is indicated by a plus sign. Parentheses indicate qualified use or special limitations (e.g. limited strength, skill or stamina). This chart provides no indication of the different methods of using the same area nor the different resources procured (e.g. women may jig for tomcod on shore ice while younger males hunt seals at leads; or men may hunt caribou inland while women and children gather berries).

2 Adapted from Laughlin 1968a: 41.

3 Sources include: Bogojavlensky 1969; Collins 1937; Fide 1952; Ross 1958; and Thomas 1981.

4 Kleinschmidt 1910.

5 Young boys over the age of 13 or 14 were the primary harvesters of birds and eggs on the Island.

in the case of Diomede have increased mobility between the islands and mainland.

The importance of King Island's habitat to resource use by its population is reflected in the persistent travel of large segments of the community from the Island to the mainland and, in the last two decades, from the mainland to the Island. As demonstrated in Chapter IV, although some King Island families had gradually moved into Nome during the 1940s and 1950s in response to employment opportunities, medical care primarily for tuberculosis victims, active involvement in the Alaska Territorial Guard during World War II, and other factors, the total abandonment of the village was forced upon the remaining population by the closure of the Bureau of Indian Affairs school and cessation of associated services in 1959 (Hopkins and Chapman 1966). In the early 1900s, normally 8 to 12 large skinboats carrying the Island's population would leave King Island for the mainland in early July after walrus hunting and remain approximately 80+ days on the mainland fishing, hunting and trapping terrestrial game, trading up and down the coast, gathering berries, and working at seasonal jobs (Ross 1958). In late September to early October they would return to the Island for the winter. In the 1950s this pattern continued -- for example, in 1953 6 large skinboats with 150 people arrived in Nome from King Island shortly after July 4 (Muñoz 1954). After the school was closed in 1959, only 4 hunters and their dependents remained on the Island the winter of 1960-61 (Burns 1963: 12). Despite resistance to resettlement on the part of several families, only 4 hunters and a total of 9 people remained on the Island during the winter of 1965-66. It was their intent to restock the meat supply in preparation for resettlement the

following winter. For a variety of reasons, most important of which was failure of attempts to get the school reopened, this resettlement did not occur. The winter of 1966 was the first time no one remained at the Island during the October to July period (Burns 1968: 4; and David Hopkins, personal communication, 1975). From 1966 to 1980 seasonal migration was in the opposite direction. Each spring one or more boats attempted to reach the Island either from Nome or from Cape Woolley, which is the mainland adjacent to King Island. The spring migration was usually difficult because of shore and pack ice conditions. For example, in 1966 and 1967, 3 skinboats went to the Island and 2 went in 1968 and 1969 (Burns 1968: 4-5; 1969: 8; and 1970b: 9). In more recent years, 4 skinboats and 1 aluminum boat with 42 people went in 1974, and 6 boats (5 aluminum and 1 skin) with 32 people went in 1981 (Thomas Ellanna, personal communication, 1982). In all of these cases, the purpose of these seasonal migrations was to undertake harvest activities either not feasible or as productive on the mainland.

Figures 41 and 42 indicate multiple marine environments (i.e. nearshore waters, open sea, shore ice, and moving sea ice) in the vicinity of King and Diomede islands as was the case at St. Lawrence Island. However, moving sea ice has played a much more important role in the overall ecological adaptations of King and Diomede islands as contrasted with those of St. Lawrence Island. This habitat was particularly relevant since both King and Diomede islands had no beaches and their abbreviated coastlines (5+ miles) were faced with rocky cliffs and included no bays, lagoons, or river mouths. For these island populations, the sea ice provided the greatest portion of food and raw materials. This very specialized adaptation to moving sea ice was

unique among marine mammal hunting ecologies (Bogojavlensky 1969: 13). Since moving sea ice was exploited exclusively by young to middle-aged males, this segment of the population was essential to the well-being of both populations.

Marine Mammal Hunting

Marine-derived resources provided the majority of food and raw materials to the residents of King and Diomede islands from the time of earliest documented contact. Although the archaeologically-derived history of these islands is not as well established as that of St. Lawrence Island, it is obvious that only marine mammal hunters could have occupied these islands because of the scarcity of other resources. Bockstoce (1976) noted that the cooperative hunting of large marine mammals was essential to maintaining relatively large, sedentary populations in these insular habitats.

Reliance on marine mammals has continued to the present time. Figures 43 and 44 illustrate the contemporary (1980 and 1982 for King Island) participation of King and Diomede island households in marine mammal harvest and use based on a sample of households from each community (Sherrod 1982; and Ellanna 1982). These figures indicate that there is a high level of participation by the study households in the harvest and use of marine mammals. The focus of marine mammal harvest activity for these communities was walrus and bearded seal. However, walrus were considered by the islanders to be the most important of the two species. Although bowhead (or other whale) harvest persisted at Diomede Island, it was not undertaken by King Islanders in the

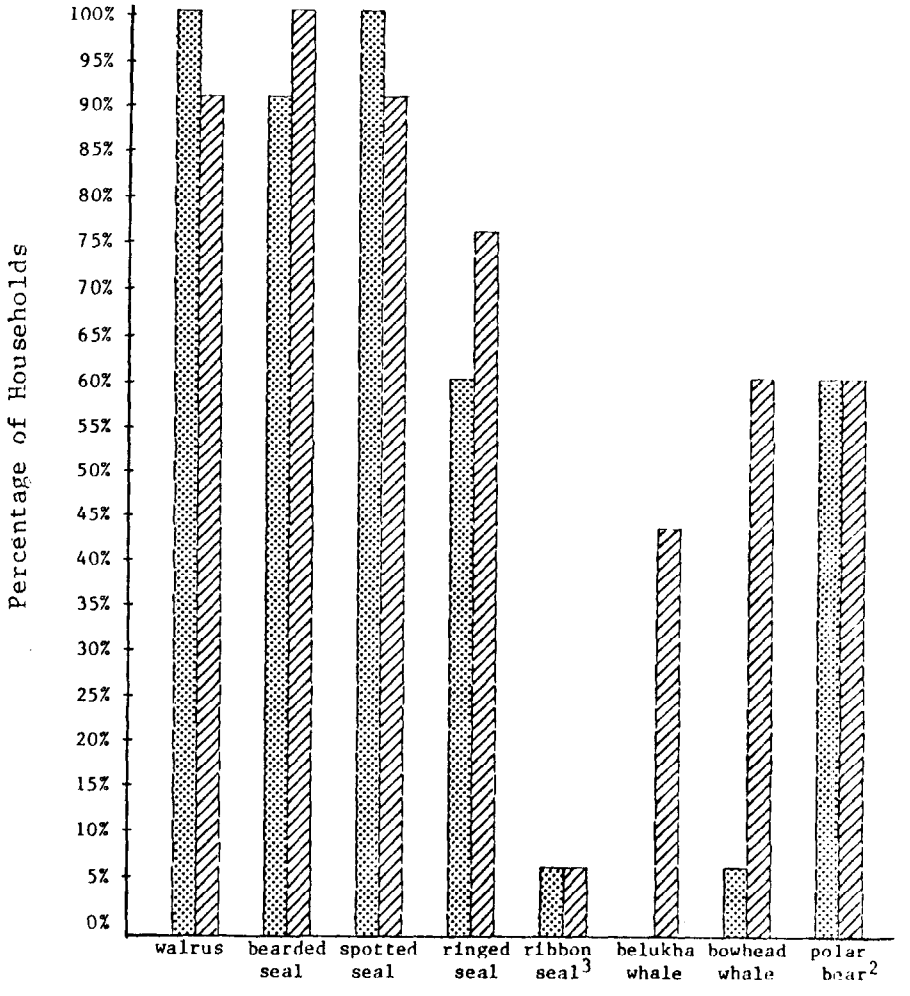


Figure 43: Household marine mammal harvest activities and use, 1980 -- King Island.[1]
(n=12)

Key: = harvest activities = use

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[1] Based on Eskimo Walrus Commission research, 1980-81 (Sherrod 1982).
[2] Polar bears are rare in the Nome area where King Islanders currently reside.

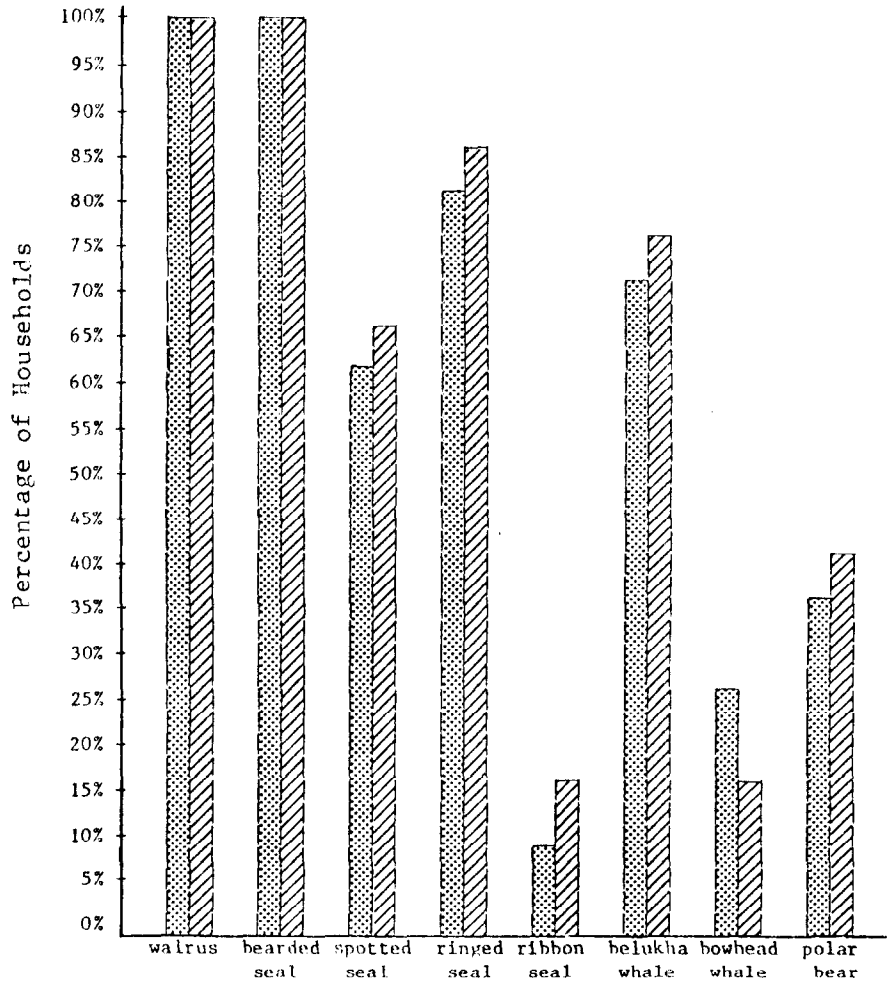


Figure 44: Household marine mammal harvest activities and use, 1980 -- Diomede.[1]
(n=17)
Key: = harvest activities = use

[1] Based on Eskimo Walrus Commission research, 1980-81 (Sherrod 1982).

1980s. Since relocation in Nome, King Islanders normally have not had access to polar bears except on a single occasion in 1976.

The harvest of marine mammals occurred either through the cooperative efforts of boat crew members or by individuals on foot on moving or stationary ice or, in the past, in kayaks. As in the case of St. Lawrence Island, boat hunting (aŋunñiaqtuat) and hunting on foot (mauqsatuat) were conceptually distinct (Bogojavlensky 1969) and remained so in 1980. In 1980 crew hunting was still the singularly most important harvest activity to King and Diomede islanders. As in the St. Lawrence Island case, crew hunting productivity and its interconnections with demographic and social characteristics of the populations make boat hunting the most germane activity in this context.

Crew Hunting

The importance of boat crew membership for King, Diomede, and St. Lawrence Islanders has previously been discussed in this chapter. For King and Diomede Islanders, membership in and alliance with a boat crew was essential to the social and economic well-being of males and their kin groups and, in the long term, to the well-being of the community in its entirety. Boat hunting was characterized by close cooperation which extended over the entire year and by sharing within a more or less exclusive group (Bogojavlensky 1969: 79). As previously discussed, the institution of kazgi (men's house), which was linked to boat crew membership, was most complexly developed in these two insular study communities and Wales.

Since King and Diomede island populations moved virtually intact by skinboats from the islands to the mainlands each spring, alliance with a skinboat captain and crew had implications beyond participation in the spring hunt. A captain thus had greater influence on King and Diomede islands, since he controlled the means of access to the mainland-based segments of the seasonal resource round and to trade goods. This sphere of influence extended into wage employment after contact, since outsiders negotiated for the labor of crews through captains. On King and Diomede islands, successful captains sometimes had more than one boat and crew (Bogojavlensky 1969).

Walrus Hunting

Of all Bering Strait communities, the focus of crew hunting on the Pacific walrus was the most intense on King and Diomede islands. Their geographic location in areas where the Strait narrows provided the best possible access to migrating walrus if ice conditions were favorable. However, there was negligible year-round access to walrus such as was possible on St. Lawrence Island. Therefore, King and Diomede hunters had approximately one month annually to conduct a successful walrus hunt, and of this month, hunting days were usually restricted by ice and climatic conditions. Therefore, very stringent demands were put upon King and Diomede island crews to be highly organized and efficient during the intense but short duration of the walrus migration. In addition, King and Diomede hunter access to particular sex or age segments of the walrus population could be lost or significantly reduced if ice and weather conditions were unfavorable for

several contiguous days, since the herds are segregated by age and sex during the migration. This did affect access particularly to female hides which were necessary for covering the large skinboats.

Table 86 depicts the number of walrus harvested by King and Diomede island hunters over the last 70 years, although there are substantial data gaps prior to 1950. Fluctuations in walrus harvest totals through time resulted from a complex of factors including, but not limited to, ice and weather conditions, fluctuations in the size of human and walrus populations, and technological and social changes. The relocation of King Island's population to Nome unquestionably influenced harvest totals and total number and composition of crews during the 1960s. According to oral tradition, there were years that the walrus harvest was inadequate causing considerable hardship for residents of the islands, although a poor hunting year for the hunters of one of these islands may not have necessarily been poor for the other. Since King and Diomede island populations had a greater alliance with mainland populations (Kauwerak and Wales respectively) than they did with one another, mutual assistance between these two islands was the exception rather than the rule (Bogojavlensky 1969; and Ray 1975b). The quality of harvest data from year to year was extremely variable depending upon data source. Therefore harvest trends rather than absolute totals are most meaningful in this context.

Harvest trends and number of boat crews are most usefully evaluated within the context of the hunt. Bogojavlensky (1969) portrayed the spirit of the hunt in the late 1960s:

> The main walrus hunt is therefore in the spring. The lunar month associated with this hunting is termed ikpingiilaq "numb time" suggesting the feverish, round-the-clock activity for both the

TABLE 86: RETRIEVED WALRUS HARVEST TRENDS, 1910-1980 -- KING AND DIOMEDE ISLANDS[1]

	Harvest Totals			# Crews	# Hunters
Year	Totals	King Island	Diomede	KI/LD	KI/LD
1980	1,109+	400+	709[2]	8[3]/8[2]	41/54[4]
1979	--	ND[21]	362[5]	8/5[23]	ND
1978	--	ND	328[5]	8/ND	ND
1977	--	ND	265[5]	7/ND	ND
1976	--	ND	739[5]	7/ND	ND
1975	817	24[5]	793[5]	7/ND	ND
1974	439	5[5]	434[5]	5[22]/4[23]	ND/36[23]
1973	571	153[5]	418[5]	5/3[23]	32(est)[5]/29[23]
1972	425	21[5]	404[5]	3/3[23]	ND/29[23]
1971	676	141[5]	535[5]	3/ND	ND
1970	717	127[5]	590[5]	2/ND	ND
1969	230	1[5]	229[5]	2[8]/5[9]	ND/23[9]
1968	802	37[5]	565[5]	2[8]/4[10]	14[10]/28[10]
1967	722	129[5]	593[5]	3[8]/3[11]	28/28[11]
1966	1,352	596[5]	756[5]	4/3[12]	41[12]/30[12]
1965	492	208[5]	284[5]	3/2[14]	23/18[14]
1964	264	195[5]	69[5]	3[15]/25[23]	20[23]/25[23]
1963	619	240[5]	379[5]	4/3[16]	20/25[16]
1962	480	225[5]	255[5] [6]	3[23]/2[7]	26/21[7]
1961	600	90[5]	510[5]	3/3[7]	24/22[7]
1960	1,180	230[5]	950[5]	2[13]/4[7]	25[17]/28[7]
1959	--	274[7]	ND	3/2[7]	26/21[7]
1958	367(est)	250(est)[18]	117[7]	4[24]/4[7]	ND/29[7]
1957	500(est)	250(est)[18]	250(est)[18]	ND	ND
1956	500(est)	250(est)[18]	250(est)[18]	ND	ND
1955	500(est)	250(est)[18]	250(est)[18]	ND	ND
1954	500(est)	250(est)[18]	250(est)[18]	ND	ND
1953	500(est)	250(est)[18]	250(est)[18]	ND	ND
1952	250+(est	100+[19]	150(est)[19]	ND	ND
1951	500(est)	250(est)[18]	250(est)[18]	ND	ND
1950	500(est)	250(est)[18]	250(est)[18]	ND	ND
1949-1911	--	ND	ND	ND	ND
1910	--	ND	125[20]	ND/11[20]	ND

ND = no data

1 The accuracy of harvest totals is extremely variable depending upon the data source. There has been no single systematic method of data gathering throughout the time period represented here. In 1981 a total of 6 boats with 32 total crew hunted walrus on King Island in the first half of June and again on July 3. The total harvest of walrus on the Island was 269 (U. S. Department of the Interior, Fish and Wildlife Service 1981).

TABLE 86: -- CONTINUED

[2] Field data and U. S. Department of the Interior, Fish and Wildlife Service 1980.

[3] Two skin and six aluminum boats. U. S. Department of the Interior, Fish and Wildlife Service 1980.

[4] Estimated from the number of crews and size of crews as reported by U. S. Fish and Wildlife Service in 1981.

[5] Nelson 1980.

[6] According to Burns (1963: 15), the limit imposed by the Alaska Department of Fish and Game was a major factor in limiting the size of the harvest.

[7] Burns 1963: 2, 10, 12, 14, 16, 18, and 20. In 1962, 1 Diomede boat was dropped from the total used the previous year because of the 21 crew members, 4 were elderly men and 2 were boys. Several young men had left the Island since 1961. Although the older men provided knowledge and fire power, they could not provide the strenuous labor needed to man the third boat. On King Island 35 people (26 hunters and 9 women) remained on the Island in an attempt to put enough meat away to permit resettlement in the winter of 1962-63. Kenyon (1960) claimed that boats were from 20'-30' in length with 6 to 13 crew members (6 to 8 being the most usual).

[8] Data are only on King Island boats and crews which went to the Island in the spring. They do not include data on boats and crews which hunted from the mainland only.

[9] Burns 1970b: 8-9 and 11.

[10] Burns 1969: 8.

[11] Burns 1968: 5 and 8. All three were large skinboats.

[12] Burns 1967: 18-19.

[13] Only large skinboats are counted in this column. There were 7 small (12'-16') skinboats (with crews of 3 each) and 5 large skinboats (one of which was uncovered) in 1959. Only 2 large boats were operative simultaneously during this season (Harbo 1959: 24).

[14] Burns 1966: 30 and 32.

[15] Burns 1965: 15.

[16] Burns 1964: 6.

[17] Harbo 1959: 5 and 24.

[18] Buckley 1958: 18 and 23. Buckley estimated the average number of walrus killed and retrieved annually for the 1950-1958 period at King and Diomede islands, although he noted that fluctuations occurred from year to year primarily because of availability. He claimed the harvest range at Diomede was 130-507. Buckley states that average boat crew size at Diomede was 10.

[19] Brooks 1953: 505.

[20] Eide 1952: 170. The crews all used large (30') skinboats with sails. During the 1910 spring hunt the 11 crews also harvest 3 bowhead, 500 seals, belukha, and polar bear. The number of belukha and polar bear harvested were not recorded.

TABLE 86: -- CONTINUED

21 Between 1976 and 1981, King Island hunter harvests were counted with all Nome walrus harvests and therefore are not documented individually.
22 Includes 4 skin and 1 aluminum boat.
23 Lourie 1982: 110b and 159b.
24 Kenyon 1960: 335.

> hunters and the women who process the kill. . . . The boats are in keen competition, and if one crew ventures out, then all will follow, even when it is clearly fruitless, and all hands are numb with fatigue. For the men of Bering Strait, spring boat hunting is the highest state of existence, brightening even the most lackluster and inspiring the dullest. It is a value in itself. (81)

Oral tradition and earlier documentation suggest continuity through time of walrus hunting patterns and the emotions and values associated with this very productive activity.

Prior to the acquisition of rifles in the 1860s, King and Diomede island walrus hunting was conducted from relatively large (36' average) skinboats powered by paddles and sails. Walrus were approached quietly while hauled out on spring ice floes and dispatched by the crew of one or more boats with harpoons and lances. They were also harpooned in water and dispatched after they tired from the chase while attached to a harpoon line and float used to create drag. Shore and pack ice conditions made it necessary to haul the large skin-covered crafts over ice to open leads or open water. Skinboat captains and other experienced crew members used high vantage points on ice ridges or on the islands to scan moving ice for walrus. Hauled out animals can be heard for many miles if wind conditions permit, so keen attention was paid to both visual and auditory information. Walrus were preferably butchered on ice and meat, hides, and ivory were hauled

back to the village for distribution.

Boat crews on King and Diomede islands were somewhat larger than those of St. Lawrence Island. The ideal crew was composed of 9-10 allied hunters including the captain, although actual crew size reflected the number of functional captains and the availability of young to middle-aged males in the community at any point of time. The only males not participating in crew hunting were the very old, the very young (under the age of 12 to 14), the infirm, or the socially ostracized (termed "lazy men" by informants). There was no acceptable social position for an able but non-hunting young to middle-aged male in King and Diomede island societies with the possible exception of the shaman (angekok). Bogojavlensky (1960) suggests that suicide was the probable outcome for an able-bodied male without crew affiliation.

Prior to the 1970s there were three major technological changes which influenced crew hunting on King and Diomede islands. These included rifles, outboard motors, and bent-ribbed skinboats. Wooden whaling boats, which were integrated into St. Lawrence Island technology, were never used by King and Diomede Islanders, although they had exposure to them by working for commercial whalers. The absence of suitable beaches and distance of portages over ice made the use of wooden whaling craft unfeasible on these islands.

Rifles were readily available by the mid-1860s (Foote 1964). The use of rifles allowed more members of the crew to provide shooting power in dispatching hauled out walrus. Correspondingly, techniques of stalking hauled-out animals were somewhat modified; hunting loss probably increased as did the total number of animals successfully retrieved; the skill of harpooner (usually the captain) had less

relative value; and younger, less experienced males could take a more active role in actually harvesting animals as opposed to doing more menial support tasks.

In the 1920s, outboard motors were introduced to King Island (Braund 1981: 184). This resulted in a modification to the shape of the skinboat, from the traditional flat-bottomed, slatted-side form to a bent-ribbed craft more suitable for propulsion by outboard motors (Bogojavlensky 1969; and Braund 1981). This new hull design was influenced by the form of commercial whaling boats and other introduced craft. In the initial modified version, the outboard motor was positioned in a well in the stern half of the skinboat. More recent modifications included the placement of one outboard motor directly on the stern with another in the well, placement solely on the stern of the boat, or, on Diomede, the construction of an additional transom near the stern of the boat on which a second outboard motor was mounted to the side to provide increased speed (Braund 1981: 106). The placement of the outboard motor directly on the stern required the lowering of the stern and reduction of freeboard. This was not advantageous in heavy seas, since it allowed water to enter the otherwise extremely seaworthy craft under high sea conditions. The use of outboard motors also required a substantial cash investment on the part of the captain or close kin, and in recent years the motor has received a "share" of the boat's harvest. This share went to the captain unless a relative or other crew member financed or provided the outboard motor.

In the 1970s some King Island hunters began to use 16' to 18' aluminum boats for walrus hunting. The use of aluminum craft had just begun on Diomede in 1980 (see Table 86). As in the St. Lawrence Island

case, the use of aluminum boats influenced the number, size, and composition of crews. At Diomede Island the crews listed in Table 86 were skinboat crews until 1980, when there were 6 skinboats and 2 aluminum boats operating during the spring walrus hunting season. The use of aluminum boats at Diomede is too recent to comment on outcomes. In 1970 there were 2 King Island skinboat crews hunting for walrus approximately 20-50 miles off the mainland coast. By the spring of 1974 there were 4 King Island skinboats and 1 aluminum boat that hunted off the mainland from Cape Woolley and from the Island. The following winter one captain was killed and none of his male relatives assumed captaincy of the crew. That boat was never reskinned, and the deceased captain's male relatives joined other crews. One of the other skinboats used in 1974 was not reskinned. The crew disbanded and the captain became a crew member on other boats. One of the 1974 skinboat captains operated a second skinboat until he sold it in 1978. In 1977 he purchased an aluminum boat and alternately used both the remaining skinboat and aluminum boat through 1981. By 1980, only two King Island skinboats were operational, and the captain of one was 76 years old. The remainder of captains and crew was deployed in six aluminum boats, two of which had been modified to enhance speed.

The crew size of the King Island skinboats remained relatively large (8-10), although the formation of aluminum boat crews resulted in some reshifting of membership on the skinboat crews. In 1980 none of the newly emerged aluminum boat captains had been skinboat captains previously. Aluminum boat crew size in both King and Diomede island cases remained large (ranged 4 to 7 members) in comparison to the St. Lawrence Island example (3 to 4 members). In the King and Diomede

island cases, there was no whaling captain/walrus captain dichotomy. King Islanders were not whaling and Diomede Islanders used the same crews for both purposes.

The use of aluminum boats by the King Islanders had several implications for walrus hunting. Hunters could travel greater distances at higher speeds (increasing accessibility to King Island only under good weather conditions), they were able to disperse more rapidly increasing the opportunity for harvest but with lesser capacity for hauling back harvest products in a single trip, and younger men were provided nontraditional means of access to captaincy through the accumulation of cash necessary for acquiring modern technology. In the past King and Diomede islanders traveled great distances in open seas (50-80 miles) in search of walrus. They were noted by other populations in the Bering Strait areas as being the most skilled navigators of open water for hunting and trading purposes. The skinboat provided the means to safely carry large numbers of people and gear in heavy seas. Skinboat travel was much slower than aluminum boat travel even with the use of large outboard motors, but aluminum boats were much less seaworthy increasing potential risks to hunters and requiring considerable expertise in evaluating weather, ice, and current conditions on the part of the captain. Data suggest that there were several factors that encouraged the use of the aluminum boats by King Island hunters. These factors include the long distances they are required to travel in a relatively short time to reach Cape Woolley, King Island, and walrus from their site of relocation; the continuation of the long-standing high level of intense competition between King Island captains during the brief walrus hunting period (i.e. the skinboats could not

compete in speed with the aluminum boats in getting to migrating animals from Nome); the greater difficulty in obtaining female walrus hides for skinboat covers after relocation; and the decreased demands for large boats to transport the entire population during summer months, thereby redefining the function of the boat as strictly a means of hunting.

Given this complex of factors described above associated with the technological change related to the use of aluminum boats, it was important to examine details of crew composition, crew size, and, most importantly, characteristics of boat captains in these changing contexts. Table 87 presents the ages of King and Diomede island captains in 1980 keyed to the type of craft they commanded and the size of their crews. In 1980 the 8 King Island captains ranged in age from 40 to 76, with 63 percent in their 40s, 25 percent in their 70s, and the remaining 12 percent in their 50s. The average age of King Island captains in 1980 was 52. Despite the use of aluminum boats, these data suggest that age and experience have remained important in recruiting and maintaining boat crews. In 1974 the 5 King Island captains ranged in age from 38 and 70, with 40 percent in their late 30s, 20 percent in their late 40s, 20 percent in their late 50s, and 20 percent in their 70s. Three of the five 1974 captains remained active in 1980, one had died, and one had joined another crew. The average age of a captain in 1974 was 51.

In 1980 the 8 Diomede captains ranged in age from 39 to 63, with 38 percent in their 40s, 38 percent in their 50s, 12 percent in their 60s, and 12 percent in their late 30s. The average age for Diomede Island captains in 1980 was 51. There are no comparable

TABLE 87: AGE OF WALRUS CAPTAINS, CREW SIZE, AND BOAT TYPE, KING ISLAND, 1974 and 1980; LITTLE DIOMEDE ISLAND, 1980

1980							
Crew #[5]	King Island	Crew Size	Type of Boat	Crew #	Diomede Island	Crew Size	Type of Boat
5	76	7-10	skinboat	1	44	6-9[4]	skinboat
6	44	2-7[4]	skinboat & aluminum	2	40	4[4]	aluminum
7	70	4-5[4]	aluminum	3	39	4-6[4]	aluminum
8	52	5[4]	aluminum	4	63	ND	skinboat
9	44	5-6[4]	aluminum	5	49	6-10[4]	skinboat
10	42(30)[2]	4	aluminum	6	56	6-12[4]	skinboat
11	47	3[4]	aluminum	7	56	6-12	skinboat
12	40[3]	5[4]	aluminum	8	57	5-9[4]	aluminum

1974		
crew #[5]	King Island	Type of Boat
5	70	skinboat
6	38	skinboat
13	49[1]	skinboat
14	59	skinboat
9	38	aluminum

1 This captain's wife's 49 year-old brother was in command of the boat during the trip to King Island in 1974.

2 The younger man owns the boat and is the older man's sister's son, but the older man normally takes it out as captain when he is not working and able to hunt.

3 This captain participated as a member of crew #5 when it was active. At other times he took out his own boat with the crew members from #5.

4 U. S. Department of the Interior, Fish and Wildlife Service, 1980.

5 Numbers have been assigned to all known King Island crews from 1930 to 1980. The same crew number is used for a specific crew in Tables 87, 88, 89, and in the discussion.

documented data for a previous time period to use for comparison with 1980 information.

Bogojavlensky (1969) established King Island captain and crew information for the 1930s and 1940s. These data provide time depth to an understanding of King Island skinboat crew dynamics and are presented in Table 88. The average age of captains in 1930 was 52 and 47 in 1940. This latter age was influenced by the very unusual case of captain #5 who commanded two skinboats at the age of 29 after the death of his father. Based upon crew size for these two time periods, there were 29 and 32 skinboat crew hunters in the community in 1930 and 1940 respectively. Bogojavlensky (1969) states that there were also a few young to middle-aged men who did not hunt with skinboat crews in 1930. According to these data, the rise and fall of skinboat captains were closely related to kinship networks developed through consanguineal, affinal, nominal, adoptive, and wife-exchange mechanisms.

Examples of these kin-based mechanisms which have continued to function in crew formation are presented in Table 89 for King Island in 1930, 1940, and 1980. Although there are no comparable documented data for Diomede, informants and the literature suggest that crew formation at King and Diomede islands were patterned along similar lines, although demographic analyses in Chapter IV suggest that such an assumption may be speculative.

Unlike the St. Lawrence Island case, the dominant pattern of captain and crew interrelationships in King Island society was based on kinship links established through marriage. Table 80 revealed that there were no wife-based kinship ties in St. Lawrence Island crew structure. In 1980 these primarily affinal kinship ties were more

TABLE 88: AGE OF WALRUS CAPTAINS AND CREW SIZE, KING ISLAND, 1930 AND 1940[1]

	1930		1940	
Crew #[5]	Captain's Age	Crew Size	Captain's Age	Crew Size
1	50	9	60	10
2	60	11	Deceased	--
3	45[2]	9	No crew[3]	--
4	--	--	45	11
5	--	--	35[4]	11

1 Bogojavlensky 1969: 209-210 and 221-222.

2 This captain lacked extensive kinship ties at the Island, because he was brought to the Island as a mainland orphan. He never had any sons. He gained captaincy through economic endeavors. He was the first man to use an outboard motor and designed the bent-ribbed boat. He controlled the store on the Island and used the store's warehouse as his kazgi. He referred to his crew, who were all unrelated to him, as a "company" (Bogojavlensky 1969: 214-220).

3 His crew was dissolved because of disputes with two other men. The kin of the men in the dispute eventually abandoned captain #3. He died shortly thereafter.

4 In 1930 this young captain's father was not aligned with any skin-boat faction. His father was involved in the downfall of captain #3. Captain #5 still commanded a boat in 1980.

5 Numbers have been assigned to all known King Island crews from 1930 to 1980. The same crew number is used for a specific crew in Tables 87, 88, 89, and in discussion.

TABLE 89: KINSHIP RELATIONS OF WALRUS CREWS, 1930, 1940, AND 1980 -- KING ISLAND[1]

Key:

Br	= brother	Ru	= relationship unknown
C	= captain	Si	= sister
Da	= daughter	So	= son
Fa	= father	Ur	= unrelated
Hu	= husband	Wi	= wife
Mo	= mother	Wix	= co-husband related through wife exchange

1930

Crew #[5]	Crew Composition
1	C: Br, BrSo, BrDaSo, SiHu, SiSo, DaHu, Ur
2	C: So, Br, DaHu, DaHuBr, DaHuFa, DaHuSiSo, DaDaHu, DaDaHuFa, Ur
3	C: Ur[2]

1940

Crew #	Crew Composition
1	C: BrSo, SiSo, DaHu, DaHuBr, Ur
4	C: Br, BrSo, SiSo[3], BrDaHu(or SiSo), SiSoBr[3], SiSoSiHu[3], SiSoSiHuFa[3]
5	C: Br, FaWiSo[4], FaWiDaHu[4], FaWiDaHuBr, WiSiHu, WiSiHuBr, and Wix

TABLE 89: -- CONTINUED

1980	
Crew #	Crew Composition
5	C: So, BrSo, FaBrSo (or BrWiMoHu), BrWiBr, FaFaBrDaSo, FaFaBrSo, Ru[6]
6	C: So, WiBr, WiRu[7]
7	C: So, SiSo, DaDaHu
8	C: So, Ur
9	C: Br, FaBrSo, Ru[10], Ur
10	C: (co-captain SiSo), Br, Ur
11[8]	C: Br, FaBrSoSo, Ru
12	C: Ru[9]

1 The data from 1930 and 1940 are adapted from Bogojavlensky 1969: 209-210 and 221-222. See Table 88 for corresponding crew numbers.

2 See Table 88, footnote 2.

3 The sister adopted two unrelated males, both of whom were on the crew and one of whom married the captain's brother's daughter. SiSoBr is a sibling of one of her adopted sons whom she did not adopt. One of the adopted sons had a sister who also was not adopted by the captain's sister. This woman's husband and husband's father were also members of the crew.

4 This individual was a step-sibling to the captain (the captain's father married a woman who already had children prior to marrying him).

5 Numbers have been assigned to all known King Island crews from 1930 to 1980. The same crew number is used for a specific crew in Tables 87, 88, 89, and in discussion.

6 This crew member is a Diomeder whose relationship to captain is recognized but details are unknown. He is also the captain's neighbor.

7 There were four crew members who were related to the captain through his wife, but details of these relationships were not known. One of these related crew members was a maternal uncle of another.

TABLE 89: -- CONTINUED

[8] This crew normally hunts with the captain of crew #9 and are also included in the kinship composition of that crew. The captain of crew #11 did not hunt frequently in 1980 because of full-time employment.

[9] This crew and captain normally hunted with the captain of crew #9 and are listed with that crew. Captain #12 usually took out his own boat only when the captain of crew #9 was not hunting.

[10] Two of the crew members, whose relationship to captain is unknown, are paternal cousins (FaBrSons).

complexly extended through mechanisms which included adoption, naming, step-kinsmen, half-kinsmen, and crossing multiple generations to identify a common link. King Islanders stated that these kinship ties associated with boat crew membership were primarily through lines of related males. However, clearly female connections between living and deceased men were often integral to the process of establishing some basis for kinship bonds. In addition, King Island males were keenly cognizant of the means by which their own marriages or the marriages of sisters and daughters could be used to consolidate crews (Bogojavlensky 1969). Lastly, the role of sons, brothers, and brother's sons was significant in skinboat crew formation in King Island society as it was at St. Lawrence Island. However, sons, brothers, and brother's sons did not participate in crew composition at the same level as that observed for St. Lawrence Island. For King Island this seemed to be the case in 1930 and 1940 as well as in 1980.

Whaling

While the harvest of bowhead and other whale species has been clearly documented for Diomede Island, there are only a couple of accounts of whaling by King Island hunters (Bockstoce 1977b; Braund 1981; and Marquette and Bockstoce 1980). Marquette and Bockstoce (1980) noted that there was documentation of bowhead whaling by Diomede Island hunters only in 1905, 1910, 1916, and 1976, with retrieved harvest totals of 1, 1, 1, and 0 respectively (13). Peterson (1978) did not even acknowledge Diomede Island as an active whaling community, although Diomede residents considered themselves to be whalers, obtained a bowhead quota from the International Whaling Commission, and had appropriate modern technology in the 1970s. The only documented account of King Island taking a bowhead occurred in 1897 when hunters from the Island were reported to have harvested a single whale (Marquette and Bockstoce 1980: 13). In 1980 King Islanders did not consider themselves to be whalers and lacked appropriate modern technology (e.g. whaling guns).

Although archaeological evidence and oral history suggest that the hunting of large whales did occur at both islands prior to contact, whaling has not played an important role in the ecological adaptations of King and Diomede islanders during the last century or more. Since the necessary crew structure, traditional technology (e.g. umiaks, harpoons, float apparatus), and expertise (commercial whalers employed crews from King and Diomede islands) existed, it can only be surmised that other factors influenced the low level of participation in whaling. These factors may have included climatological and related ecological

changes which influenced the migration route of bowheads (in the last century bowhead have migrated for some distance along the Siberian coastline north of St. Lawrence Island); the decimation of the bowhead population in the latter half of the 1800s; relatively recent political developments which prohibited King and Diomede hunters from entering Soviet waters and separated Diomede from Big Diomede hunters; a hunting pattern which did not emphasize intercrew cooperation; and a possible walrus hunting focus at King and Diomede islands which was a long-standing cultural tradition for reasons which have not been revealed. Demographic data discussed in Chapter IV indicated that population declines may have resulted in an insufficient number of crews to carry out efficient bowhead whaling by these communities.

There are limited data regarding the harvest of other whales by King and Diomede island hunters. Although in 1980 belukha were still harvested by Diomede Island crews, they were usually taken at leads incidental to walrus hunting. Belukha have not been harvested by King Islanders in approximately the last decade, although they were harvested in the vicinity of Nome during summer months as late as the 1950s and possibly into the early 1960s. Both communities salvaged dead whales which were still edible (Renner 1979: 117 and 120). One gray whale ("summer whale") was landed in 1978 at Diomede and in 1980 three Diomede Island hunters reported hunting gray whales unsuccessfully (Marquette and Braham 1982).[1] There are no documented accounts of gray whale harvests by King Island hunters.

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[1] In 1982 Diomede harvested 1 gray whale (Lourie 1982: 227).

Other Marine Mammals

In recent years, as in the past, other marine mammals have been harvested by King and Diomede island hunters functioning in crews. These harvests were normally opportunistic and usually occurred while crews were trying to locate walrus in the spring. Table 90 presents marine mammal harvest for a single spring hunting season (1967) as an example of the spring hunting complex. Field observations in the last decade indicated that King Islanders were very active in harvesting bearded and ringed seals during the spring hunt, although seals were not taken as frequently after walrus were spotted and the actual harvest of walrus was occurring. In addition, weather, ice, and current conditions greatly influenced the spring seal harvest levels from year to year. Seals harvested by members of a crew belonged to the entire crew rather than to the individual who dispatched the animal, and they were distributed accordingly. The relative number of seals harvested by crew members during the spring hunt were inversely related to the number of walrus harvested. This preference for larger species applied to the harvest of bearded seals as compared with the harvest of smaller seal species.

Individual Hunting

Figures 38, 39, 40, 41, and 42 illustrate that in the past and present, marine mammal hunting from King and Diomede islands was conducted by individual males, less frequently pairs (usually father and son), or, more rarely, small groups of related men during seasons

TABLE 90: SPRING MARINE MAMMAL HARVEST, 1967 -- KING AND LITTLE DIOMEDE ISLANDS[1]

Category	Total	King Island	Little Diomede
# crews	8	3[4]	5[5]
# hunters	58	28	30
# hunting days[2]	38(71)	5(12)[3]	33(59)[3]
walrus	701	129	572
bearded seals	48	7	41
other seals	195	19	176

1 Adapted from Burns 1968: 8-9.
2 Walrus season hunting days only.
3 Total number of days of walrus availability are in parentheses. Because of weather, ice conditions, etc., not all days are actual hunting days.
4 These were all large skinboat crews.
5 There were three large skinboats and two small skinboats.

and in environmental settings not exploited by hunters in boat crews.

> During the winter, except for an occasional father-and-son team, the King Islanders always hunted alone on foot, although some hunters took a dog along to help drag game home or to help with tracking in case a bear was spotted. By April, the hunters no longer hunted on foot since leads began to open up in the ice fields, which during the winter had been more or less solid, and seals could be harpooned from kayaks (Father Lafortune as described by Renner 1979: 113).

On King Island hunting on foot would begin when sea ice was adequate to support the hunter (usually November). Hunters would climb over the Island to the north shore where they would harvest bearded, spotted, ribbon and ringed seals and walrus on their southerly migration (Bogojavlensky 1969: 73). Only ringed and bearded seals remained in meaningful numbers in the vicinity of the islands during the winter months. Seals were harvested at leads or at breathing holes depending on ice conditions and technology. As in the case of St. Lawrence Island, the use of rifles undoubtedly increased the effectiveness of hunting at open leads.

Hunting on moving ice required a well-developed expertise related to ice, wind, and current conditions. The result of miscalculation was often the death of the hunter. Since hunters on moving ice were young to middle-aged, failure to perform successfully on moving ice influenced their economic and reproductive contributions to the community.

> The sea ice environment provides the greatest part of subsistence. For eight months of the year the panorama of land, landfast ice, and moving ice dominates the lives of these villages. . . .
>
> The greatest danger to the hunter is being drifted away by a sudden reversal of the wind. The ice . . . demands constant vigilance, for it is often neither solid underfoot nor stationary.

> Every day that wind permits, the hunters venture out on the moving ice sometimes going as far as ten miles. With the exception of an occasional father and son team, they always hunt alone (Bogojavlensky 1969: 73).

Polar bears were also hunted on foot by individual hunters. The successful take of a polar bear resulted in the highest prestige for a man. Bears were most frequently available in January or February when northerly winds prevailed. The harvest of a polar bear inspired a community-wide celebration hosted by kin of the successful hunter and which cut across factional and kazgi lines of affiliation (see Bogojavlensky 1969 for a thorough discussion of this event). It was the only occasion on which the hunting success of an individual was socially recognized through a community-wide event.

Kayak hunting occurred in spring and fall. As previously mentioned Bogojavlensky (1969) pointed out that kayak hunting was conceptually regarded as an individual hunting activity as opposed to boat hunting. King and Diomede islanders used one person kayaks built to the size specifications of their owners. On occasion, two men hunting by kayaks in rough seas lashed their boats together to make their way back to the village or to haul back a harvested seal. Kayaks were no longer used by King Islanders after relocation to Nome (the mid-1960s) and Diomede Islanders stopped using kayaks in the late 1930s (Bogojavlensky 1969: 86).

Although crew hunting provided the focal point for many features of King and Diomede island societies and provided large quantities of food and raw materials, first-hand observers commented on the importance of individual hunting on moving sea ice to overall community productivity (Bogojavlensky 1969; Lafortune 1940: and Ross 1958). Although systematically gathered data concerning individual hunter

harvests of seals and occasionally walrus during late fall and winter months are not available for King and Diomede islands, the observers' accounts provide scattered references to harvests for these communities at particular points of time. Ross (1958) reported that during her residence on King Island (1931-32), 30 to 40 seals were brought into the village daily during winter months (48). Eide (1952) noted that 500 seals were harvested in a 6-month period in 1910 at Diomede Island (170). On December 9, 1940 at King Island, Lafortune reported in his diary:

> The whole village feels good. About one ton of food was the result of the first real hunting of the season. Five oogruks were killed and quite a few seals. Every bit of the meat was taken to the village. I was given a good share of the spoils (Lafortune 1940: 131).

Lafortune's diary indicated throughout that the large quantities of marine mammal products were taken by King Island hunters during late fall and winter months.

> In November 1932, ice and weather conditions were favorable; consequently "lots of seals and oogruks and one walrus and two belugas, besides all kinds of birds [were taken]." On 12 December 1933, he recorded, "This is one of the biggest hunting days. Every hunter had two or three seals. A few of them had 4. (Lafortune as quoted by Renner 1979: 118)

Although data are not available, the literature suggests that the harvest of seals on moving ice (mauqsatuat or "foot hunting") was relatively productive from time of contact to as recently as the 1950s and early 1960s. Access to commercial sources of fuel for heating and suitable materials for clothing, kayak covering, footgear, and other items of daily life was limited until the last two decades and remains costly today. Nonetheless, these technological changes have undoubtedly decreased the level of need for some marine mammal products. These factors may in part explain the apparent reduced level of effort and/or

productivity connected to individual hunting activities in the last decade.

Tables 91 and 92 provide household marine mammal harvest data from a 23 percent sample of King Island households in Nome in 1980 and 1982 and a 45 percent sample of Diomede households in 1980. Table 91 suggests that the King Island hunter fall and early winter harvests were low for all species and the spring harvest was virtually non-existent. Although the sample was not random, all households included at least 1 hunter, and 5 of the 12 households had more than 1 hunter. Low harvest totals from King Islanders in the Nome setting may in part be associated with well-developed shore ice conditions in the Nome area and the absence of open leads within an approximately 2 to 10 mile radius of the community of Nome. This area was not a winter hunting site for Iñupiat prior to the founding of Nome. There is a need for longitudinal data on individual fall and winter seal harvests, since the complex of environmental, social, economic, and technological factors that influence hunting patterns during one year may not be reflective of long-term or short-term trends.

Although the 1980 Diomede household harvest data also indicate marginal absolute productivity as compared with that of St. Lawrence Island, the smaller overall population size of the community, the fewer number of young to middle-aged hunters, and the different ecological setting are variables which must be considered in a meaningful analysis of differential fall/winter productivity. In addition, King and Diomede hunters' yields during the spring walrus season have been relatively large (vis-a-vis number of crews) in comparison with that of St. Lawrence Island. However, field observations suggest that Diomede's role

TABLE 91: SAMPLE HOUSEHOLD MARINE MAMMAL PRODUCTIVITY DURING FALL/WINTER MONTHS, 1980 AND 1982 -- KING ISLAND[1] [2]

Key: BS = bearded seal
Hhld. = household
PB = polar bear
RS = ringed seal
SS = spotted seal
W = walrus

Hhld. #	Hhld. Size	Ratio Hunters/ Dependents	Oct. - Dec.					Jan. - March					Total				
			RS	SS	BS	W	PB	RS	SS	BS	W	PB	RS	SS	BS	W	PB
1	5	4:1	0	0	0	0	0	3	0	0	0	0	3	0	0	0	0
2	2	1:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	6	1:5	1	2	1	0	1	0	0	0	0	0	1	2	1	0	1
4	6	1:5	2	2	6	0	0	0	0	0	0	0	2	2	6	0	0
5	6	1:5	2	3	6	0	0	0	0	0	0	0	2	3	6	0	0
6	5	1:4	3	1	0	0	0	0	0	0	0	0	3	1	0	0	0
7[3]	4	3:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8[3]	4	3:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9[3]	9	4:5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10[3]	7	1:6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11[3]	1	1:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12[3]	10	3:7	4	5	0	0	0	0	0	0	0	0	4	5	0	0	0
Total Hhld. =12	Total Individuals = 65 $\bar{x}$ = 5.4	24:41	12	13	13	0	1	3	0	0	0	0	15	13	13	0	1

[1] Field data; Ellanna 1982; and Sherrod 1982. These data are a 23 percent sample of Nome households which identify themselves as King Island households or which contain King Island members.

[2] The months October through March are usually individual, paired, or small family group hunting periods. They were selected to illustrate non-crew marine mammal productivity.

[3] These data are from 1982. The use of 1982 data was intended to supplement the small sample from 1980. No households were repeated in the 1980 and 1982 data.

TABLE 92: SAMPLE HOUSEHOLD MARINE MAMMAL PRODUCTIVITY DURING FALL/WINTER MONTHS, 1980 -- LITTLE DIOMEDE[1] [2]

Key: BS = bearded seal
Hhld.= household
PB = polar bear
RS = ringed seal
SS = spotted seal
W = walrus

Hhld. #	Hhld. Size	Ratio Hunters/ Dependents	Oct. - Dec.					Jan. - March					Total				
			RS	SS	BS	W	PB	RS	SS	BS	W	PB	RS	SS	BS	W	PB
1	4	1:3	0	0	5	2	0	2	0	0	0	0	2	0	5	2	0
2	7	3:4	4	0	3	1	0	6	0	0	0	0	10	0	3	1	0
3	2	2:0	1	1	0	0	0	3	2	0	0	0	4	3	0	0	0
4	10	1:9	20	0	3	0	0	30	0	0	0	0	50	0	3	0	0
5	7	3:4	0	0	0	0	0	8	0	0	0	0	8	0	0	0	0
6	8	2:6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1	1:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	2	1:1	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0
9	5	1:4	3	1	1	0	0	12	0	0	0	0	15	1	1	0	0
10	2	1:1	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0
11	6	4:2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	9	1:8	0	1	0	0	0	0	0	0	0	1	0	1	0	0	1
13	2	2:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	2	2:0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
15	2	1:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hhld. =15	Total Individuals = 69 $\bar{x}$ = 3.9	26:43	31	3	12	4	0	61	4	0	0	1	92	7	12	4	1

[1] Sherrod 1982; these data are a 45 percent sample of total Diomede households in 1980.
[2] The months of October through March are usually individual, paired, or small family group hunting periods. They were selected to illustrate non-crew marine mammal productivity.

In this productivity normally has been much greater than that of King Island since relocation. The direction of individual hunting in these two communities cannot be adequately assessed in the absence of additional fall and winter harvest data for sequential years and information on the extent of contemporary transmission of skills and knowledge related to moving sea ice hunting from older to younger males in King and Diomede island societies.

Other Resource Harvest Activities

All historical and contemporary data indicate that the harvest of non-marine mammal resources by King and Diomede islanders has continued to be secondary to marine mammal hunting based on demographic, social, economic, nutritional, and evaluative criteria. Although data have not been systematically documented regarding the magnitude of other resource harvest for these islands, observers have noted that such resources were considered to be very important not only as a source of dietary and nutritional variety, but also as a buffer in the event of an inadequate harvest of marine mammals (see Figures 38, 39, and 40). As previously described, residents of King and Diomede islands were reliant on moving ice as the habitat of production during late fall and winter months. However, during some years, wind, ice, and current conditions made this habitat inaccessible for days or even weeks. During these periods of time, the more stationary shore ice and stored reserves provided crab (king and blue varieties), bullhead, bluecod, and sculpin and other species for residents' consumption.

Although these smaller islands provided abundant habitat for pelagic birds and eggs and numerous non-mammal marine species (such as crab and tomcod) accessible from the apron of shore ice which formed in the vicinity of the village sites, mainland habitats and trade with mainland populations provided a large portion of non-marine mammal resources. King Islanders fished for salmon and freshwater fish at the mouth of the Sinuk River and other southwestern Seward Peninsula salmon-spawning streams and rivers. They traded with the inland Kauwerak-speaking Iñupiat for caribou meat and hides. Contemporary King Islanders have extensive and detailed knowledge of mainland habitats and resources, suggesting their long-term association with southwestern Seward Peninsula ecosystems. There are fewer historical accounts of Diomede Islander mainland resource activities in Alaska, although in the 1900s there has been significant Diomede Islander contact with the Imuruk Basin area in general and Teller in specific.

Figures 41 and 42 presented King and Diomede island habitat use keyed to specific population cohorts. A discussion of the relationship between these cohorts, habitats, and non-marine mammal resources through time completes the discussion of King and Diomede islander ecological adaptations in this context.

Tables 40 and 41 indicated that King and Diomede island boat captains were older than those of St. Lawrence Island in 1980. The age of King Island captains in 1980 was not significantly different from that of captains in the 1930s and 1940s. Field data and documented observations suggest that the age at which males commenced active hunting in crews and on foot at King and Diomede islands was greater than that at St. Lawrence Island. The rigors and demands for agility

of hunting on moving ice limited participation by older men. The greater average age of young men commencing skinboat and individual hunting on foot and the need for knowledge, skill, agility, and strength for hunting on moving ice restricted the number of male producers in this habitat, thus affecting the ratio of marine mammal hunters to dependents. Although the rigors of skinboat hunting were also great, the large crew structure provided the manpower for dealing with tasks requiring strenuous labor. Thus, older captains continued to hunt and their crews profited from their cumulative knowledge founded in experience.

As in the St. Lawrence Island case, older and/or infirm males no longer capable of hunting were productive indirectly through the transmission of knowledge and skills to younger men and through the fabrication of technology. On King Island the culturally-defined patterns of labor division specified that only older men manufactured hunting technology. Bogojavlensky (1969) stated that since older men were effectively the repository of knowledge for building skinboats, they exercised control over new boats entering the community's fleet. Older men also conducted fishing from the shore ice and at summer camps and actively carved ivory. There is little evidence that they participated in gathering activities.

As in the St. Lawrence Island case, King and Diomede island women were most productive in roles associated with the butchering, distribution (only on King Island), preparation, storage, and fabrication (with the exception of carving ivory) of products derived from harvested marine mammals. They were the primary producers of greens, berries, tubers, and other gathered food and raw materials available

in insular and mainland habitats. As in the St. Lawrence Island example, the roles of older women paralleled those of younger women and older girls based upon the physical capabilities and stamina of the specific older woman.

Since relocation a few King Island women have actively participated in marine mammal hunting excursions, although their role in this context excluded the dispatching of animals and focused on providing the labor necessary in preparing walrus to be hauled back to the village. Although the participation of women in crew hunting prior to relocation was probably infrequent, it undoubtedly occurred when harvest was associated with seasonal population movements or when there was a shortage of manpower. The prominent role of King Island women in walrus distribution may be related to the participation of a captain's wife's relatives in his skinboat crew. At Diomede Island, captain's wives did not participate in the primary distribution network. Younger children participated with women in gathering and meat and fish processing activities in accordance with their age and skills. Young girls gradually moved into the roles of women with no marked transition.

Older boys and young men were active in hunting migratory waterfowl, gathering eggs from the cliffs and rocky surfaces of the islands, fishing, and other activities associated with the development of skills and abilities necessary to the performance of their roles as hunters. Older boys and young men associated with older men, particularly in the context of the men's house (kazgi), and were instructed through the mediums of oral tradition and observation.

The primary role of adult King and Diomede island males has been discussed in some detail. Apart from marine mammal hunting, they also engaged in hunting terrestrial mammals such as caribou, hunting birds, gathering eggs, and fishing. In earlier years, young to middle-aged males, particularly boat captains, conducted the vast majority of trade for resources and products not available at the islands such as caribou, furbearers, berries, etc. In more recent years they have been the primary producers of cash by carving ivory and, to a lesser extent, by wage employment.

Prior to King Island population relocation, patterns of resource harvest were very similar on King and Diomede islands. In the last two decades these patterns have begun to diverge. Figure 45 illustrates a sample of household participation in non-marine mammal harvest activities in 1980. In 1980 King Islanders in the sample demonstrated a higher level of involvement in those harvest activities best conducted on the mainland. Conversely, Diomede Islanders participated to a greater degree in harvest activities that were more productive in insular habitats.

Moose have moved into Seward Peninsula habitat during the last three decades. In the last decade they have become firmly integrated into the King Island annual resource harvest cycle. In 1980 moose were most frequently harvested by vehicle along the road system of southwestern Seward Peninsula. Due to road conditions, pickup trucks were the most frequently used for this purpose. King Islanders participated in the hunting of moose in groups composed of numbers of several related households (often including women and children) accompanying a pickup truck owner on day-long excursions along one of the three

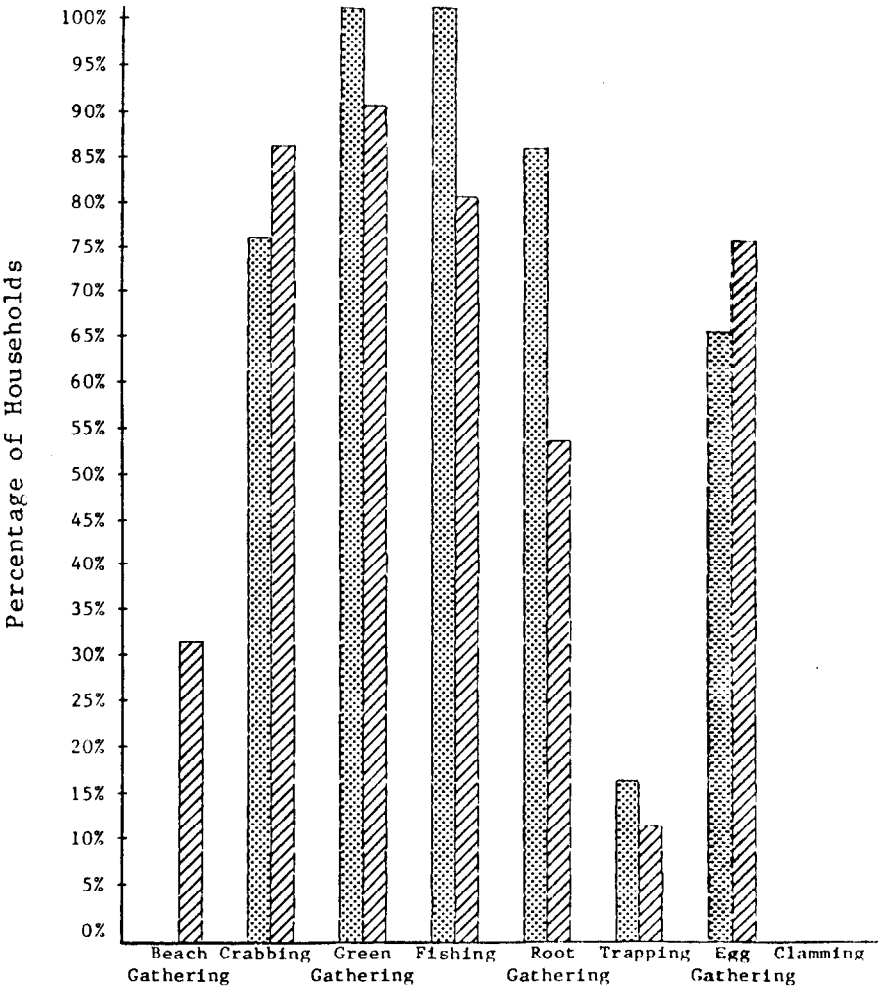


Figure 45: Household non-marine mammal harvest activities, 1980 -- King and Diomede Islands.[1]
(n=12 for King Island)
(n=17 for Diomede Island)

Key: = King Island = Diomede Island

[1] Based on Eskimo Walrus Commission research, 1980-81 (Sherrod 1982).

70+ mile road systems leading out of Nome. Although moose were the focus of the trip, gathering, squirrel trapping, and fishing were often conducted along the way. A harvested moose was shared between households which participated in the hunt, although the truck owner usually received the largest share. Secondary distribution to non-participant relatives through the wives of hunters usually occurred. It is of interest to note that all of the King Island skinboat captains in 1980 were also owners of pickup trucks used in moose harvest in the manner described above. Additionally, trucks have become an important means of access to the Cape Woolley hunting site, recently road-connected to Nome during the summer months. Hunters who wanted to participate in the crew hunting from Cape Woolley were dependent on truck owners (captains) or boat owners (also captains) to take them to the camp by boat or truck. In 1980 several of the boats used for walrus hunting were hauled to Cape Woolley by pickup truck and trailer.

Data suggest that differences in non-marine mammal resource harvests between King and Diomede islanders in 1980 are more closely associated with King Islanders' adaptation to a non-insular environment than with the social, economic, and technological options that have been introduced as a result of contact with non-Iñupiat populations. However, changes which have been noted in King Island productive patterns in 1980 have, to a large extent, paralleled themes in the organization and functioning of production documented from earlier contact periods.

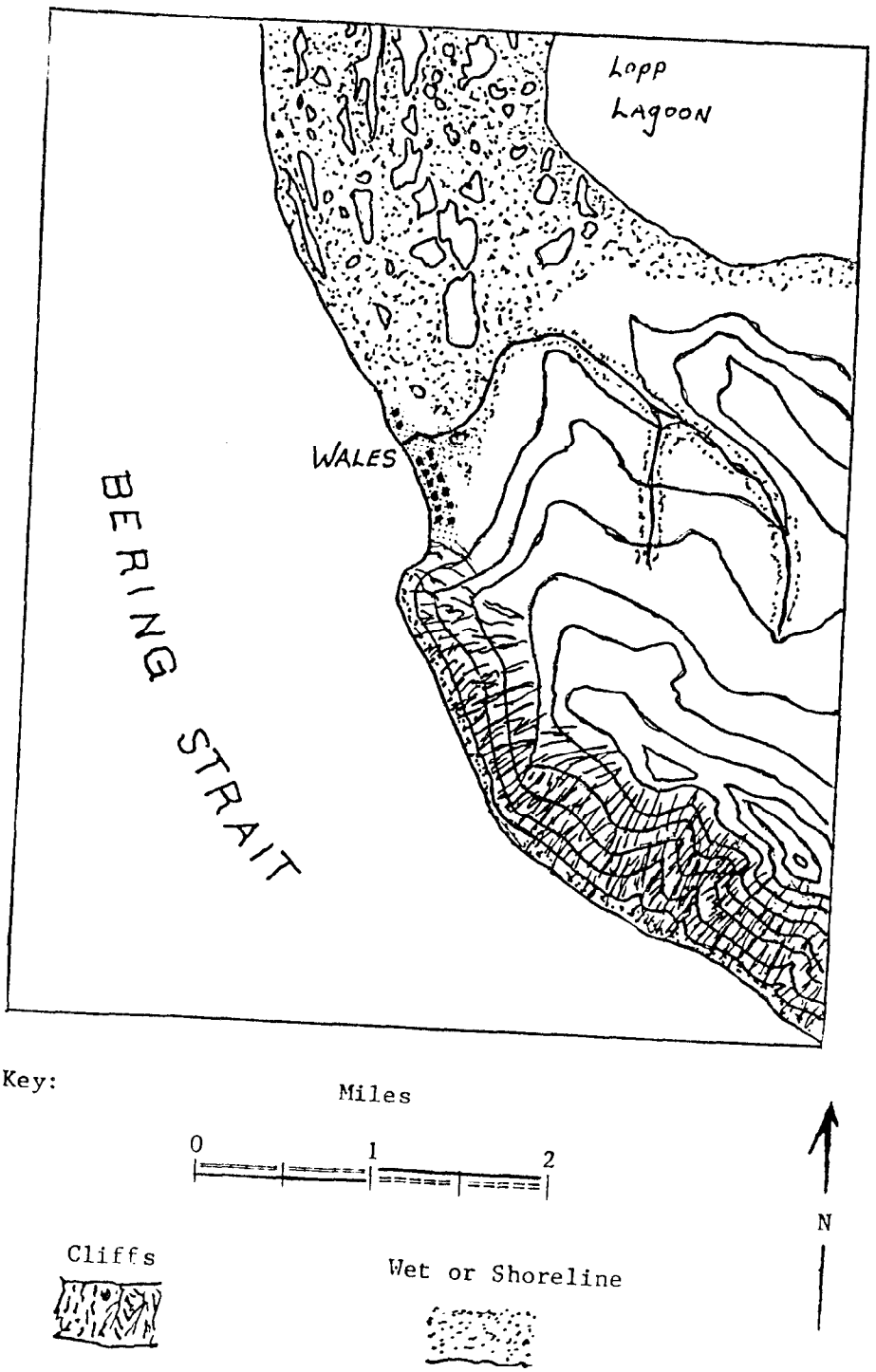
The Hunting Ecology of Wales

An Overview of the Seasonal Use of Key Ecosystems

A general overview of Wales climate, topography, sea ice environment, faunal and floral resources, and sociocultural features was presented in Chapter II. In this chapter the details of Wales population's hunting ecology as they relate to demography are examined through time with a focus on marine adaptations in general and large marine mammal hunting in specific. Wales was included in the study to provide a mainland Iñupiat comparison to the insular populations of Bering Strait, since Wales has traditionally used the same large marine mammal resource base as have King, Diomede, and St. Lawrence islands and shares other insular-like features described above.

Since all Bering Strait study communities share some basic features of ecological adaptation, similar themes will be referenced and only variations will be discussed in some detail. Wales' population shares more cultural and linguistic characteristics with Diomede and King island populations than with those of St. Lawrence Island.

Figure 46 presents a more detailed map of the contemporary community of Wales. As previously mentioned, since earliest contact until the early 1900s, Wales was composed of two adjacent communities. Additionally, Wales was the population center for several smaller satellite communities. As discussed in the previous chapter, the influenza epidemic of 1918 wiped out most of the smaller communities in the vicinity of Wales as well as much of Wales' population.



Figre 46: Wales and vicinity.

Figure 47 illustrates the seasonal round of harvest activities for Wales. Fluctuations in the seasonality of harvests through time are depicted in the figure. Although the harvest of resources by Wales residents was largely restricted by the seasonality of resource availability as was the case for the insular populations, Wales was a mainland community and therefore its residents had access to some species of terrestrial animals and freshwater fish year-round. Conversely, insular populations were isolated except during the approximately three months of open water which occurred during summer and early fall. The designation of the "historic period" as 1650-1969 and the "contemporary period" as 1970-1980 for Wales is arbitrary, but this dichotomy distinguishes documented resource harvest and use data from those which were gathered in the field.

Figure 48 presents habitats used by Wales population cohorts. Contemporary ecological zones include both marine and terrestrial habitats from Ikpek Lagoon in the northeast, to the headwaters of the Nukluk and Pinguk rivers in the east, and to the Imuruk Basin area (the vicinity of Teller) in the southwest. Historical accounts indicated that the Kingikmiut (the people of the Kingigan or Wales area) traveled as far north as Cape Krusenstern and as far south as Cape Darby for trade and resource harvest activities on mainland Alaska (Bockstoce 1977a: 109). Campbell, the missionary teacher at Gambell, recounted that Wales and Diomede Island people came to St. Lawrence Island for trading purposes at the turn of the century (Jackson 1902). Since it is highly unlikely that this lengthy voyage would have been undertaken across open water, it is surmised that they must have traveled south along the Siberian coast. It is unknown to what degree Siberian

Key: + = historic (1650-1969)
x = contemporary (1970-1980)

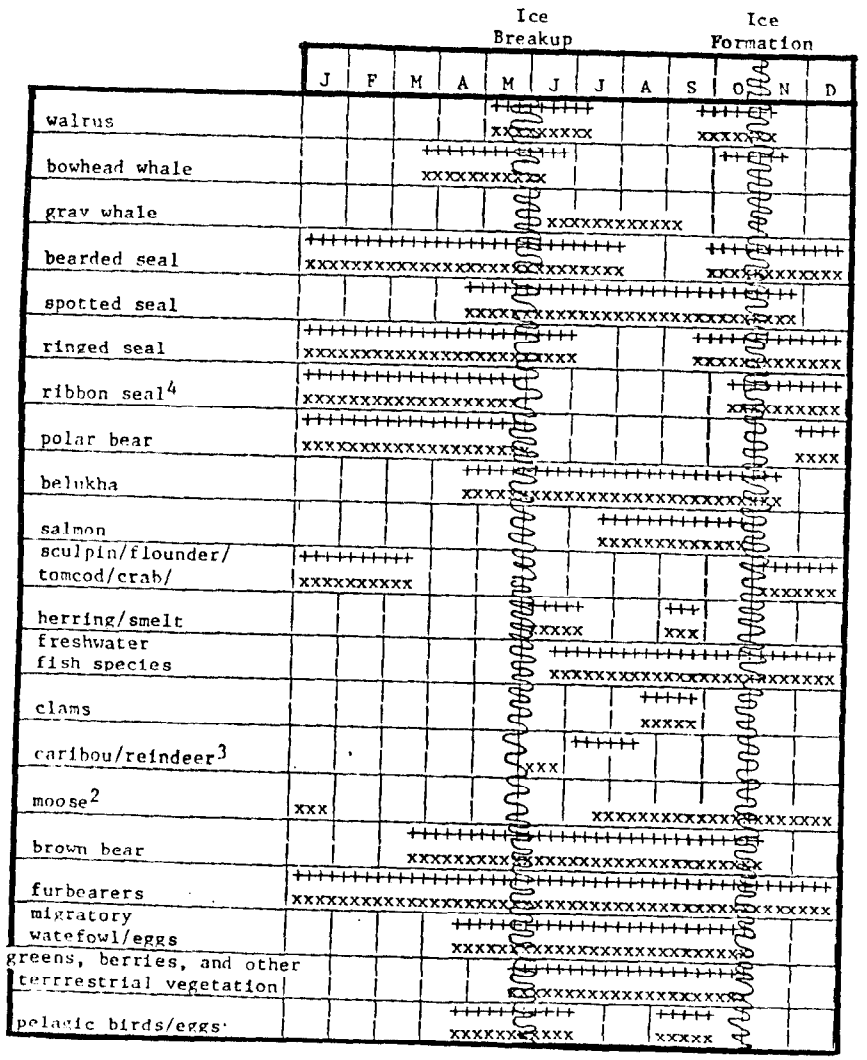


Figure 47: Seasonal harvests of some resources -- Wales.[1]

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1 Sources include: Bailey 1948; Bogojavlensky 1969; Eisler 1978; Koutsky 1981; Senungetuk 1971; and Thornton 1931.

2 Moose were not available to Wales' hunters until the 1970s.

3 Caribou were no longer available after the 1860s. Reindeer were introduced to Wales in 1894 and are privately owned today. They may be eaten at times not indicated here when butchered by owner.

4 Ribbon seals are rare in the Wales area but are harvested if encountered.

Inland	Lakes and streams	Village or camp	Beach	Cliffs	Nearshore Waters	Shore Ice	Open Sea	Moving Ice
-	+	Old and/or infirm males	+	-	(+)	+	+[4]	-
+	+	Old and/or infirm females	+	-	(+)	+	-	-
(+)	(+)	Pregnant females	+	-	(+)	+	-	-
+	+	Children (<12±)	+	(+)	(+)	+	-	-
+	+	Young to middle-aged females	+	-	+	+	-	-
+	+	Young to middle-aged males	+	+	+	+	+	+

Figure 48: Habitats keyed to population cohorts -- Wales.[1] [2] [3]

[1] People are ordered in terms of harvesting productivity with the least directly productive at the top. Old and/or infirm males, for example, may be very indirectly productive by contributing knowledge and/or technology to hunting. Beginning with types of cohorts, their use of habitat is indicated by a plus sign. Parentheses indicate qualified use or special limitations (e.g. limitations related to strength or stamina). This chart provides no indication of the different methods of using the same area nor the different resources procured (e.g. women may jig for tomcod on shore ice and young men may hunt seals at leads; or men may hunt reindeer or caribou inland while women and children gather berries).

[2] Adapted from Laughlin 1968a: 41.

[3] Sources include: Bailey 1948; Bogojavlensky 1969; Eisler 1978; Koutsky 1981; Senungetuk 1971; and Thornton 1931.

[4] In 1980 whaling captains were 64 and 67.

habitats may have been exploited during these trips or if such journeys were solely for purposes of trade.

As in the insular cases, Figure 48 illustrates the use of four maritime environments (open sea, nearshore waters, shore ice, and moving ice) by the population of Wales. Historical and contemporary information indicate that Wales hunters used winter hunting strategies more similar to those of St. Lawrence Island than to those of King and Diomede islands. This similarity of pattern relates to access to marine resources via an extensive and complex coastline and areas of relatively stable shore ice which could be traversed by men, sleds, and dogs. The availability of coastline with lagoons and river entrances reduced the requisite for specialization in hunting on moving ice — the adaptive strategy most well-developed among Diomede and King islanders. The ability to conduct winter marine mammal hunting under conditions which are less physically strenuous may have allowed both older and younger men to participate, thereby increasing the time span in which males were direct producers.

Marine Mammal Hunting

As in the insular cases, marine-derived resources provided the majority of food and raw materials to the residents of Wales and smaller satellite villages in the area. In fact, access to large marine mammals, and a population base which enabled hunters in boat crews to exploit this base, bore a direct relationship to the presence of one of the largest known Eskimo population in historic times at Wales. Jenness (1928) commented that faunal remains in Wales and

Diomede were similar except for the greater percentage of caribou bones in Wales sites, reflecting the greater terrestrial options of Wales producers.

The majority of Wales households participated in marine mammal harvest and use in 1980 as illustrated in Figure 49. These data were based on a 30 percent sample of households from the community (Sherrod 1982). Comparison with Figures 33, 34, 35, and 44 suggests that in 1980 residents of Wales were less involved in the harvest of marine mammals than were those of the other study communities and that use level exceeded that of production in all categories. Two of the households in the sample did not have active hunters, which in part accounts for use level exceeding that of production. However, since new housing projects have divided functional extended family households into smaller units in recent years, the producers for a household may actually reside in another dwelling. Lastly, year-round access to terrestrial resources may, in part, account for the differences in marine mammal use patterns between Wales residents and the insular study communities.

As in the insular study cases, marine mammal harvests occurred by crews in boats and by men on foot. These were conceptually, economically, and socially distinctive productive activities in Wales society as they were in the insular cases. Since the population of Wales hunted both bowhead whales and walrus, crew hunting organization was an essential feature of the adaptive strategies of this community. The large, sedentary population of Wales during the historic period was supported by, and provided support to, the successful exploitation of large marine mammals.

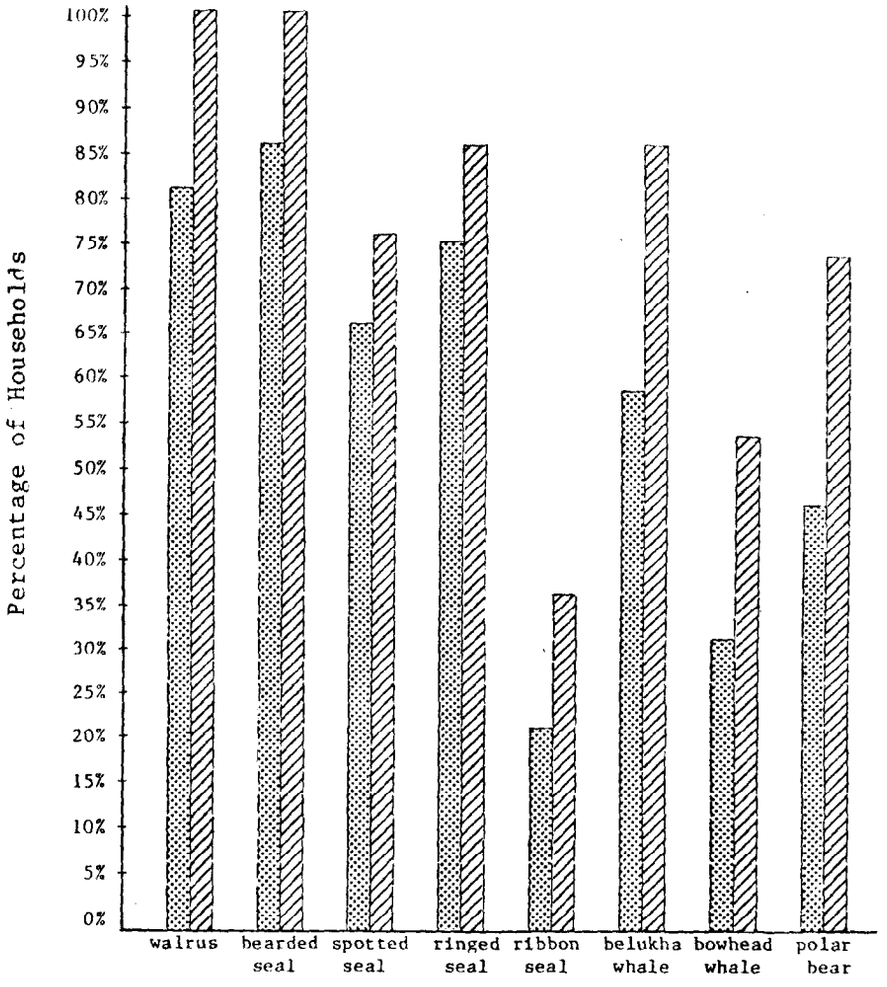


Figure 49: Household marine mammal harvest activities and use, 1980 -- Wales.[1]
(n=16)
Key: = harvest activities = use

[1] Based on Eskimo Walrus Commission research, 1980-81 (Sherrod 1982).

Crew Hunting

Although there has been no systematic study of skinboat crews or hunting in the Wales context comparable to that of Bogojavlensky (1969), observations and field data derived from survey research suggest that membership and participation in crews was of importance equivalent to that of the insular cases. Accounts from the late 1800s and early 1900s stated the umiak in Wales averaged 35'-40' long, 8' wide, and could carry 15-20 people and 5 tons of freight (Thornton 1931: 125). They normally functioned with a hunting crew of from 6-10 men. Before major population declines in the early 1900s, Thornton (1931) reported 51 umiaks (umiat) in Wales, although population levels and observations indicate that no more than 10 to 12 crews operated at any point in time. Although Wales' population did not relocate as a group seasonally as was the case at King and Diomede islands, residents of Wales were renowned traders who traveled to Port Clarence, Kotzebue Sound, East Cape and Indian Point (Chaplino), Siberia for this purpose during summer months. The umiak and connections with an umealiq or captain through membership in a crew were essential to conducting these activities. The umiak was also important for transport to summer camps to participate in inland or riverine habitat harvest activities.

Walrus Hunting and Whaling

Although the relative importance of walrus to whales for the community of Wales is not clearly established in the historical record, the harvest of walrus was more reliable at least over the last two

decades. Table 93 depicts the harvest of walrus and bowhead whales from 1880-1980, although there are walrus harvest data for only the 1960-1980 period and for 4 earlier years.

Although walrus harvest totals in Wales unquestionably varied from year to year in the past for the same reasons described for other study communities (ice, weather, etc.), there are limited historical data to verify the suspected central importance of walrus to the Wales community and to smaller satellite communities in the area. In 1891 Thornton (1931) wrote, ". . . without walrus meat and walrus-hide canoes, these Innuit would surely perish" (178). Wales harvested walrus meat and hides for the local populations and also for trade with the communities of Shishmaref, Brevig Mission, Teller, and Mary's Igloo at least in more recent times (Eisler 1978).

As in the insular cases, the introduction of rifles in 1860 influenced stalking strategies and some features of the functions of crew members during a hunt, but they did not diminish the role of walrus in the economy and society of Wales. By 1920 outboard motors were introduced but were used in conjunction with the large skinboats, sails, and small dories carried inside the skinboat (Bailey 1948). Bailey (1948) provided the first relatively comprehensive description of walrus hunting in Wales in 1922. Bailey (1948) reported hunting walrus in the vicinity of the Diomedes and Siberian coast and harvesting bearded seal and other seal species while trying to locate walrus (112). Most of the propulsion of the craft during these hunting trips was by sail. Other hunting strategies described by Bailey (1948: 113-125), including scanning, stalking, dispatching, retrieval, and in the 1970s based on field data.

TABLE 93: BOWHEAD WHALE AND WALRUS HARVEST TRENDS, 1880-1980 -- WALES

Year	#Whales	#Walrus	# Crews Whaling/Walrus
1980	1	100[6]	3/8[6]
1979	0	257[7]	2/9[13]
1978	0	174[7]	3/ND
1977	0[5]	39[7]	2[5]/ND
1976	0[1]	109[7]	2[1]/ND
1975	0[5]	116[7]	2[1]/ND
1974	0[5]	16[7]	ND
1973	0[5]	35[7]	ND
1972	0[5]	15[7]	ND
1971	1[4]	146[7]	ND
1970	1[5]	77[7]	2[5]/ND
1969	1[5]	6[7]	ND
1968	ND	66[7]	ND
1967	ND	4[7]	ND
1966	0[5]	140[7]	ND
1965	0[5]	9[7]	ND
1964	0[5]	7[4]	ND
1963	0[5]	8[7]	ND
1962	0[5]	25[13]	ND
1961	0[5]	ND	ND
1960	0[5]	65[7]	ND
1959	0[5]	ND	ND
1958	0[5]	ND	ND
1957	0[5]	ND	ND
1956	0[5]	ND	ND
1955	0[5]	ND	ND
1954	0[5]	ND	ND
1953	0[5]	ND	ND
1952	0[5]	42[9]	ND
1951	0[5]	ND	ND
1950	ND	ND	7[5 12]
1949	0[5]	ND	ND
1948	0[5]	ND	ND
1947	0[5]	ND	ND
1946	0[5]	ND	ND
1945	0[5]	ND	ND
1944	0[5]	ND	ND
1943	0[5]	ND	ND
1942	0[5]	ND	ND
1941	0[5]	ND	ND
1940	0[5]	ND	ND
1939	0[5]	ND	ND
1938	1[5]	ND	1[5 12]
1937-1931	ND	ND	ND
1930	15[2]	10[2]	ND
1929-1923	ND	ND	ND
1922	1[11]	ND	6[5 12]
1921-1919	ND	ND	ND
1918	1[5]	ND	ND
1917	ND	ND	ND
1916	1[5]	ND	6[5 12]
1915	0[5]	ND	5[5 12]
1914	0[5]	ND	ND
1913	0[5]	ND	ND
1912	0[5]	ND	ND
1911	0[5]	ND	ND
1910	0[5]	ND	ND
1909	0[5]	ND	ND
1908	0[5]	ND	ND
1907	0[5]	ND	ND
1906	0[5]	ND	ND
1905-1903	ND	ND	ND
1902	11[5]	ND	ND
1901	8[5]	ND	ND
1900	0[5]	ND	6-8[10 12]
1899-1898	ND	ND	ND
1897	0[5]	ND	ND
1896	ND	ND	ND
1895	0[5]	ND	ND
1894	ND	ND	ND
1893	2[3]	ND	ND
1892	ND	ND	ND
1891	1[5]	109[8]	10-12[5 12]
1890	0[5]	322[8]	10-12[5 12]
1889	3[5]	ND	10-12[5 12]
1888	1[14]	ND	ND
1880	1[5]	ND	10-12[5 12]

TABLE 93: — CONTINUED

ND = no data

et al 1977: 5 and 11.
2 Anderson and Eells 1935: 196. Species of whales were not provided.
3 Jackson 1894: 101.
4 Personal communication, David Flanagan, National Marine Fisheries Service, NOAA, 1982.
5 Marquette 1980: 11.
6 U. S. Department of the Interior, Fish and Wildlife Service 1980. At least two of the boats were plywood and one was a skinboat.
7 Nelson 1980.
8 Thornton 1931: 172 and 178. Thornton recorded there were 51 umiaks this year.
9 Brooks 1953: 503.
10 Six to eight crews reported approximately 1900 (Koutsky 1981: 13).
11 Reported by Bailey in 1922 (Bailey 1948: 125).
12 Walrus and whaling crews are the same prior to 1951.
13 Lourie 1982: 115c and 130b.
14 Ray 1975b: 111; based on data from teachers Harrison Thornton and William Lopp.

Senungetuk (1971) described some characteristics of walrus hunting during approximately the late 1940s or early 1950s:

> The umiak is approximately 30 to 35 feet long, about 8 feet wide at the widest point, and 5 feet high at the bow. Each of the 4 or 5 member crew usually brought along the eldest son as a fledgling crewman, thus increasing the total crew to 10 or 12, as the case might be. (50)
>
> Plywood scows were carried in the skinboat and are used to retrieve seal shot from the ice when the skinboat has been pulled upon a cake. (60)

According to Senungetuk (1971), at this time most of the community's efforts in March and April were directed towards preparing the skinboats and other technology for large marine mammal hunting.

In 1975 Eisler (1978) recorded that there were four or five skinboats at Wales. However, at this time they were in need of skins because of the low number of female hides taken the previous year (110). He recorded no details of walrus hunting in 1975.

In 1980, 8 crews participated in walrus hunting. Of these crews, 1 (a relocated Diomeder) operated out of a skinboat, 2 out of plywood boats, 3 out of aluminum boats, and 2 out of crafts of unknown construction. However, there were more umiak frames at the village which could have been used if skins were available and prepared for covering them. The ages of walrus and whaling captains keyed to type of craft and crew size is presented in Table 94. In 1980 the 8 Wales walrus captains ranged in age from 33 to 67, with 25 percent in their 30s and 40s, 25 percent in their 50s, and 50 percent in their 60s. The average age of Wales walrus hunting captains in 1980 was 57, which is higher than that of all of the other study communities.

There is no longitudinal data on the composition of walrus hunting crews for Wales such as Bogojavlensky (1969) provided for King Island. Although the complete details of Wales walrus hunting crew membership for 1980 are also unknown, the data that are available suggest some patterns. Captains' sons, brothers, and brothers' and sisters' sons formed the nucleus of Wales crews in 1980, although there was some participation by males related through the wives of captains. For example, crew #8 (see Table 94) was composed of the 66 year-old captain, 2 sons in their 30s, one son-in-law in his 30s, 3 sons in their 20s, and his wife's brother's son who also resides in the captain's household. The presence of captains' wives' relatives in crews suggests crew composition patterning more similar to those of King and Diomede islands than that of St. Lawrence Island. However, the decline of the Wales population from 400-500 to 122 in approximately the last 75 years may have drastically impacted patterns of crew formation based upon the number of available young to middle-aged productive

TABLE 94: AGE OF WALRUS CAPTAINS, CREW SIZE, AND BOAT TYPE, 1980 -- WALES[1]

Crew #	Age of Captain	Crew Size	Boat Type	Hunting Activity
1	67	6	plywood aluminum	walrus/whaling[4]
2	64(30)[2]	6	plywood	walrus/whaling[4]
3	33(67)[3]	5	skinboat	walrus/whaling[4]
4	62	ND	ND	walrus
5	47	ND	aluminum	walrus
6	57	4	ND	walrus
7	59	5	aluminum	walrus
8	66	7	plywood	walrus

ND = no data

1 U. S. Department of the Interior, Fish and Wildlife Service 1980.

2 This captain's 30 year-old son acted as captain when his father was ill and out of the community.

3 The older man is captain when the crew is whaling and his 33 year-old son is striker. When the crew is walrus hunting the younger man is captain. This household is originally from Diomede.

4 According to U. S. Fish and Wildlife Service 1980 data, only 3 crews whaled. It would be unusual for aluminum boat crews to attempt to hunt bowhead whales.

males. The degree of competition between captains for crews at Wales is also unclear, but in recent years there has been considerable change involving walrus captaincy and at least two older males have been able to form crews because their sons have matured and one older male has remained an active captain for over a decade in part because of his large number of sons. Bogojavlensky (1969) made a point about the importance of hunting to the continued social well-being of Bering Strait villages that may provide some insight in this context:

> . . . when the hunters of a given village begin to falter and their equipment is not renewed and the harvests decline, such as at Wales, it is considered a direct indication of general decadence. The procedure for sharing game in crews in a given village are regarded as a gauge of the quality of social life. Thus, the procedures at Wales are drastically different, involving a system of credit for the crew at the local cooperative village store, and are generally condemned as profoundly un-Eskimo in spirit. (88)

The disruption of crew formation and function along culturally-accepted patterns may have been related to the "decline" that Bogojavlensky (1969) was describing in 1967.

The location of Wales was often not as advantageous to intercepting the forward segments of the walrus migration as that of King and Diomede islands. In some years, shore ice and pack ice between Wales and Little Diomede Island and/or high winds restrict the participation of Wales hunters early in the spring season. These conditions and demographic changes may have acted together to bring about the decline in the use of skinboats (e.g. no access to female hides), although other factors may also have been significant in the shift from skinboats to plywood and aluminum craft. Intact but unskinned skinboat frames could still be observed in the village in 1982. It is too early to assess the impact of aluminum boats on Wales crew hunting.

Until aluminum boats were introduced to large marine mammal hunting in Wales, walrus hunting crews and whaling crews were essentially the same. Although there is less narrative documentation about the details of bowhead whaling at Wales than there is for Gambell and Savoonga in recent years, the importance of Wales as a center for aboriginal whaling is well-documented archaeologically, in oral tradition and in photographs from the early 1900s. In the spring, populations from small satellite villages in the Wales area would gather at the main village at Cape Prince of Wales to participate in whaling (Koutsky 1981: 11). Intercrew cooperation was essential to this hunt. Bowhead whale harvest data for Wales and other whaling villages were compiled by Marquette and Bockstoce (1980) (Table 93). These data indicate that bowhead whales were not consistently harvested by Wales crews through time. However, since these data are based on the documentation of bowhead harvests, and there has been negligible documentation of Wales resource procurement in general, Marquette and Bockstoce's (1980) bowhead harvest data may be conservative.

In 1980 at least three crews hunted and harvested a single bowhead whale. The ages of these captains, sizes of crews, and type of craft were presented in Table 94. Whaling captains were 64 and 67 with an average age of 66. Two used plywood boats and the other, who is a relocated Diomeder, used a skinboat which was captained by his son for purposes of walrus hunting.

Gray or summer whales were occasionally taken in the past, although the harvest of one each year in 1969 and 1970 are the only takes which have been documented to 1980 (Marquette and Braham 1982: 388). Since 1980 at least one crew has actively attempted to harvest

gray whale (Steven Braund, personal communication, 1982).[1] It is not known at this time if this interest will be long-term or shared by other crews.

Other Marine Mammals

Other marine mammals are harvested by Wales crews during whaling and walrus hunting. These harvests are opportunistic. Table 95 presents examples of marine mammal harvests in 1890 and 1930. Although many of the smaller seals were taken by individual hunters on foot, the majority of whales, walrus, and bearded seals were harvested by crews in the spring. In 1980, 100 percent of all walrus harvested by 16 households were taken in association with crew hunting. Additionally, 91 percent of the bearded seals, 68 percent of the spotted seals, 50 percent of the ringed seals, 100 percent of the belukha, and 100 percent of the polar bear were taken during crew hunting periods. Polar bears are not hunted by crews and the details of the April and May polar bear takes are unknown.

Individual Hunting

As in the insular cases, marine mammals were taken by individual men on foot during winter months at breathing holes or leads with nets, harpoons, and, more recently, rifles. Whereas spring crew hunting resulted in the concentration of hunters from satellite communities

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[1] In 1982 Wales harvested one gray whale (Lourie 1982: 227).

TABLE 95: QUANTITY OF MARINE MAMMAL RESOURCES HARVESTED, 1890 and 1930 -- WALES

1890[1]		
Resource	Number	Pounds
Hair Seal	4500	652,500
Walrus	322	322,000
Bearded Seal	81	42,525
Belukha	32	17,600
Polar Bear	19	8,550
Bowhead Whale	0	0

1930[2]		
Resource	Number	Pounds
Hair Seal	501	ND
Walrus	10	ND
Bearded Seal	ND	ND
Whale	15	ND
Polar Bear	4	ND

1 Thornton 1931; data for a six-month period including spring and summer.

2 Anderson and Eells 1935: 196. Species of whales and seasons of harvest were not designated by the authors.

at Wales, individual seal hunting was most expeditiously accomplished by the dispersement of hunters along the coast in satellite communities. Koutsky (1981) reported 11 fall and winter settlements in addition to Kingigin (Wales) in an area stretching from Lopp Lagoon northeast of Wales to an area southeast of present-day Tin City (18-22). It is not known how many of these were inhabited simultaneously, however.

Thornton (1931) provided some of the earliest data related to individual hunter productivity in Wales during late fall and winter months. He reported the harvest of 4,000 to 5,000 seals from September to June of 1890-1891, only a portion of which were taken by crews in spring (181). Additionally 19 polar bears were taken between December and April during 1891 (158). In the winter of 1890-1891 there were 14 kayaks in Wales used for individual marine mammal hunting and caribou drives (Thornton 1931: 127). Although hunting on moving ice was not as frequent nor as well-developed in Wales as it was in King and Diomede islands, other features of individual hunting and changes in these patterns through time described for the other study communities were applicable to Wales. Because of the extensive and complex coastline and winter access to larger areas of stationary shore ice, the habitat exploited by individual Wales hunters on foot was more similar to that of St. Lawrence Island than it was to King or Diomede islands.

Table 96 presents household marine harvest data from a 30 percent sample of all Wales households in 1980. This table suggests that there was minimal individual marine mammal harvest during the October to December period and none during the January to March period of 1980. The sample included two households without hunters. Although harvest records from a single year's sample cannot be extrapolated to

TABLE 96: SAMPLE HOUSEHOLD MARINE MAMMAL PRODUCTIVITY DURING FALL/WINTER MONTHS, 1980 -- WALES[1] [2]

Key: BS = bearded seal
Hhld. = household
PB = polar bear
RS = ringed seal
SS = spotted seal
W = walrus

Hhld. #	Hhld. Size	Ratio Hunters/ Dependents	Oct. - Dec.					Jan. - March					Total				
			RS	SS	BS	W	PB	RS	SS	BS	W	PB	RS	SS	BS	W	PB
1	1	1:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	8	6:2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	2	0:2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	6	5:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	4	0:4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	1	1:0	8	1	1	0	0	0	0	0	0	0	8	1	1	0	0
7	8	2:6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	4	2:2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	3	1:2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	1	1:0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
11	1	1:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	3	2:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	11	3:8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	3	1:2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	4	3:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	5	5:0	0	8	2	0	0	0	0	0	0	0	0	8	2	0	0
Total Hhld. =16	Total Individuals = 65 $\bar{x}$ = 4.06	34:31	9	9	3	0	0	0	0	0	0	0	9	9	3	0	0

[1] Sherrod 1982; these data are a 30 percent sample of total Wales households in 1980.
[2] The months October through March are usually individual, paired, or small family group hunting periods. They were selected to illustrate non-crew marine mammal productivity.

the past or present, there are several factors which may explain the apparent decline of individual hunting. These include successful spring hunts combined with more convenient means of storage; a fewer number of dogs; demographic changes and mandatory formal education which have limited the availability of young to middle-aged males who exploit the winter marine habitat; centralization into a single settlement; the availability of semi-domestic reindeer and commercial foods during winter months; absence of kayaks as a means of hunting; a decrease in the quality and quantity of transmitted knowledge regarding individual hunting because of demographic changes; and the absence of the institutional means for transmitting hunting knowledge between males (i.e. the kazgi).

Other Resoures Harvested

Historical and contemporary data indicate that the harvest of non-marine mammal resources by residents of Wales has continued to be secondary to marine mammal hunting. Although systematically gathered data are not documented regarding the level of reliance on non-marine mammal resources by Wales residents in the past, the mainland location of the community and year-round access to terrestrially-based resources provided harvest opportunities not available to insular populations, particularly to those of King and Diomede islands. These resources provided a source of nutritional and dietary diversity, seasonally fresh food, and an alternative to shortage if marine mammal harvests failed or were inadequate.

Figures 47 and 48 presented resources used by Wales residents and the habitats in which they occurred keyed to population cohorts. The relationships between resources, habitats, and cohorts are explored below to finalize this discussion of Wales hunting ecology.

Table 47 indicated that in 1980 the average age of walrus and whaling captains at Wales was older than that of the other study communities. Whereas the average age of a Wales walrus captain (i.e. 57) could still be considered "middle-aged," the whaling captains were all in their 60s with an average age of 66. Thus in the case of Wales in 1980 there was a greater percentage of older men exploiting the open sea environment during the migrations of large marine mammals than in the other study communities. "Old" men at Wales, as in the other study communities, crabbed, fished for tomcod and flounder through the ice, fished for salmon during summer, etc. Since marine mammals were available on more stationary ice at sites dispersed along the coast in the vicinity of Wales, older men were able to persist in small marine mammal harvests to an age exceeding that of King and Diomede islands. As in the other communities, the roles of old men as the repositories of hunting knowledge has persisted through time. The degree to which older men were involved in reindeer herding is undocumented.

The roles of women in Wales society were parallel to those of King and Diomede islands, although their involvement in marine mammal hunting has not been suggested in the literature or field data. Additionally, caribou drives were conducted inland during summer months prior to the 1860s (Koutsky 1981). Women and children probably played some role in the caribou drive, although men in kayaks conducted the dispatching of caribou after they were driven into water. Women also

gathered migratory waterfowl eggs which were deposited in grass near lagoons during summer months.

Thornton (1931) provided some relevant information about the productive roles of Wales children in 1890. Children began to model activities after adults of the same sex after the age of 10+. Boys began to fish for salmon with nets, take ducks without rifles (using bolas, nets, bows and arrows, traps, etc.), and fish for crab and tomcod through the ice. After the introduction of rifles, boys were given instruction in their productive use by the age of 13 or 14, but a young man was 18+ before he began seal hunting (Thornton 1931: 109). Field data suggest that the patterning of a young male's activities by age remained very similar in 1980, although boys younger than 18 were occasionally taken in boat crews as apprentices.

Caribou drives were conducted by young to middle-aged males during summer months until approximately the 1860s. Unfortunately there was no documentation regarding the role of boat crews in caribou drives. Drives required a high level of organization, however, and it is likely that boat crews functioned in this capacity as they did in the case of the Nunamiut. This concept is further suggested by the fact that skinboats were used to provide transportation to the lagoon nearest a caribou drive site. Other young to middle-aged male productive functions associated with hunting birds, gathering eggs, trapping furbearers, and summer and winter fishing were similar to those described for King and Diomede islands. Jenness (1928) stated that in 1926 "all the men of Wales were involved with reindeer herding or tin mining on June 20" (72). The involvement of young to middle-aged males in herding may have disrupted spring marine mammal crew hunting,

fishing, and other productive activities, although time spent in herding may have been allocated to caribou harvest prior to the 1860s. The impact of herding on male roles was not documented.

Figure 50 illustrates a sample (30 percent) of household participation in non-marine mammal harvest activities in 1980. Despite the location of Wales on the mainland, residents demonstrated a level of particiption most similar to that of Diomeders with the exception of moose hunting. Moose hunting in the Wales area was not conducted from a road system and thereby participation was restricted primarily to young and middle-aged males who could travel by snowmachine to the hills east of the village in winter or who encounter the moose on the beach in summer and fall months while engaged in other productive activities.

As was the case in the other study communities, young to middle-aged males were the only segment of the Wales population historically and contemporarily which exploited all available habitats. Nonetheless, non-marine mammal resources, exploited primarily by women, children, and elder males, were an important source of dietary and nutritional diversity and sustained the population during periods when marine mammal harvests were low. The proportionately small number of individuals in these sex and age cohorts in 1980, as demonstrated in Chapter IV, may have decreased the quantity of these resources harvested in recent years, although participation levels, depicted in Figure 50, have remained relatively high for most resource categories.

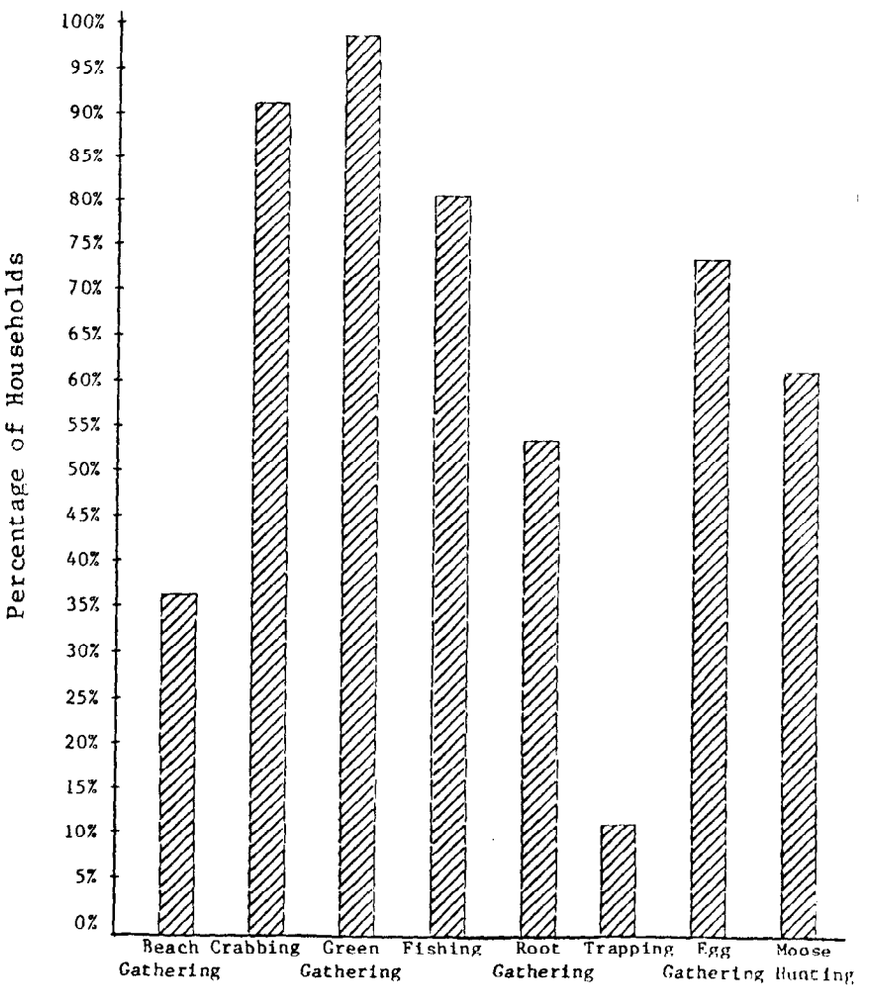


Figure 50: Household non-marine mammal harvest activities, 1980 -- Wales.[1]
(n=17)

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1 Based on Eskimo Walrus Commission research, 1980-81 (Sherrod 1982).

CHAPTER VI

POPULATION CORRELATES OF BERING STRAIT HUNTING ECOLOGY: ANALYSIS AND CONCLUSIONS

Introduction

Detailed analyses of specific demographic and hunting data and comparisons of these data between the study populations have been integrated into the findings presented in Chapters IV and V. The analysis in this chapter addresses the more synthetic questions posed in Chapter I. The underlying issue to be addressed was the nature of the relationship between human ecology and population structure in hunting societies. More precisely, it was the nature of the relationships between population structure and human ecology in Eskimo communities of the Bering Strait area, who inhabited similar environments but represented two distinct cultures and insular, relocated insular, and insular-like mainland populations. The general hypothesis, that in some cases population size and structure may be the independent variables in understanding different hunting adaptations in similar environmental settings, was to be examined. This relationship was proposed by Bockstoce (1976) and Freeman (1979) in regards to large marine mammal hunting. In light of this hypothesis, an explanation for the apparent absence of whaling at King Island and more recently sporadic whaling at Diomede and Wales was sought. Secondarily, it was hypothesized that if the ecological focuses of these communities were similar diachronically and synchronically in relationship to one another, the

populations would also share demographic features and processes. Lastly, it was hypothesized that these populations would include sex and age cohorts that were marginal producers or non-producers given the potential productivity of cooperative large marine mammal hunting relative to other northerly Eskimo adaptations.

Analysis

Population Characteristics and Hunting Patterns

Figure 51 presents population characteristics of the study communities in 1980 in a comparative matrix. This matrix is useful in comparing and contrasting contemporary demographic characteristics of the study populations, which have been shown to be ecologically similar if factors involving relocation are taken into account. It was demonstrated in Chapter V that there has been one major difference between the study populations in ecological adaptation throughout the historic period -- namely, that participation in bowhead whaling has been intensive and consistent at Gambell, relatively recent and intensive at Savoonga, sporadic at Diomede and Wales during the 1900s, and absent at King Island. Since the intent of this study was to explore interrelationships between hunting ecology and population structure, it is useful to explore this seemingly important ecological variation in light of the demographic data available for the study populations through time.

It has been suggested by Bockstoce (1976), Freeman (1979), and contemporary whaling data from northwestern and arctic Alaska

Population Characteristics	Gambell	Savoonga	King Island	Diomede	Wales
population size	419.00	448.00	313.00	146.00	122.00
ratio of males to females	139:100	119:100	109:100	139:100	149:100
ratio of adoptive to non-adoptive households	7:100	22:100	17:100	14:100	20:100
ratio of extended to nuclear households	37:100	37:100	46:100	42:100	33:100
average household size	4.66	4.87	4.97	5.41	4.07
ratio of productive males to total population[1]	54:100	55:100	50:100	47:100	67:100
ratio of reproductive females to total population[2]	29:100	31:100	32:100	24:100	21:100
mean age of males	25.20	26.80	26.90	22.30	30.50
mean age of females	25.60	24.10	24.70	20.80	29.80
mean age at marriage -- males	25.30	25.60	27.70	26.00	26.30
mean age at marriage -- females	20.50	22.00	23.40	21.40	21.60
ratio of married to unmarried -- males[3]	117:100	129:100	86:100	185:100	75:100
ratio of married to unmarried -- females[4]	444:100	317:100	205:100	800:100	625:100

Figure 51: Population characteristics of the study communities, 1980.

Population Characteristics	Gambell	Savoonga	King Island	Diomede	Wales
age-specific fertility females, 60+	123.08	173.81	175.82	114.29	309.52
age-specific fertility females, 40-59	191.32	168.83	175.56	208.96	205.22
average age at first birth -- males 60+	30.05	22.70	26.82	25.00	26.33
average age at first birth - females 60+	27.10	22.60	21.40	23.50	20.83
mean number of children -- males 60	3.31	7.00	3.69	2.00	8.33
mean number of children -- females 60+	4.31	6.08	6.15	4.00	10.83
birthrate 1976-1980	24.10	21.30	21.20	33.50	13.30
deathrate 1976-1980	6.50	6.50	7.30	18.10	11.70
ratio of 65+ individuals to total population	6:100	5:100	8:100	2:100	12:100
ratio of inmarried to local male spouses	0:100	10:100	77:100	0:100	36:100
# whaling crews	22.00	8.00	--	8.00	3.00
# walrus hunting crews	39.00	42.00	8.00	8.00	8.00
ratio of whaling captains to productive males	18:100	5:100	--	21:100	7:100
ratio of walrus captains to productive males	36:100	36:100	8:100	21:100	20:100

Figure 51: -- Continued.

Figure 51: -- Continued.

1 "Productive males" refers to the category of men between the ages of 16 to 60. It is this age group which would normally participate in skinboat crew hunting. The ratio is between these males and the total population.
2 This includes females aged 16-50.
3 Ratio is calculated on males 21 years and older. "Unmarried" means having never been married.
4 Ratio is calculated on females 21 years and older. "Unmarried" means having never been married.

(Marquette 1976; and Hughes 1960) that multiple crews (5-8) were a prerequisite for maximal successful harvest and retrieval of large whales in northerly habitats. Given a minimal crew size of 7 to 8 men established in the data from St. Lawrence Island presented in Chapter V, there was a need for no less than 35 to 64 young to middle-aged males available in a population who actively whaled. In the case of the Iñupiat populations who used larger skinboats, the crew size requisites were higher (10-12 men or a total of 50-96 crew members). Based on population profiles presented in Chapter IV, no more than 30 percent of the entire population of these communities could have been participant in skinboat crews at any given time.

In light of these considerations, the population totals of all study communities were examined. St. Lawrence Island had more than an adequate population (1500+) for effective whaling prior to the 1878-1880 decline, but subsequently the 200+ remnant survivors from several Island sites resettled at Northwest Cape (Gambell) and recruited some Siberian Eskimos to the population. With the reestablished 260+ population, whaling continued, although at least one unusual incident of a crew of females and boys was noted. In 1912 the St. Lawrence Island population was 219, only 200 of which were in Gambell. There were no reported harvests of whales between 1912 and 1927, suggesting that the population

may have been marginal for this activity. Similarly, although Savoonga was established in 1916, its hunting males did not begin to whale with their own crews until 1972 when its population reached 369. In 1972 only a single boat whaled. Since Savoonga was a relocated settlement, initially it did not have a core of patrilineally-related males, as was found in Gambell and in Savoonga in 1980, for at least one or two generations after settlement. It is expected that population size, population composition, and access to an easy means (i.e. snowmachines) for hauling boats to the whaling camps on the southwest shore of the Island were the key factors in the commencement of whaling at Savoonga in 1972. The period of intensive participation in whaling at Savoonga corresponded to the return of high school-aged males to the village after a school was constructed in 1976.

During 1910 Diomede's population was estimated to be 90 persons total. However, Eide (1952) documented that 11 crews in 30-foot skinboats harvested 3 bowheads during that year. Throughout the 1910 to 1980 period, Diomede has never exceeded its 1980 population of 146. In 1910 the 11 crews probably would have required in excess of 100 young to middle-aged males. Given Diomede's population size, clearly, not all of these males or crews were solely from Little Diomede Island, and it is expected that crews from Big Diomede Island (with a population in excess of 300) and those of Diomede hunted together. Most likely, men joined the crews of captains who were kinsmen on either island, as Eide (1952) documented a high level of intermarriage and adoption between the islands. Between 1916 and 1976 at Diomede, there were no reported harvests of bowheads. As discussed in Chapter IV, a Soviet minority policy disrupted Big Diomede Island's population

in 1933 bringing about some relocation to Little Diomede Island. Remaining Big Diomeders were forcibly relocated to the Soviet mainland and political boundaries prohibited contact between the two related populations. Although there have been sporadic attempts at whaling in more recent years, the success rate has been minimal. These data indicate that Diomeders were whalers at the turn of the century, but it is highly unlikely that there was ever adequate population solely on Little Diomede Island to whale effectively. Since Diomeders were documented as participating with a large number of crews in 1910 and they have the skill, technology, and base of knowledge necessary to whale, it is concluded in this context that they functioned as a unit with the residents of Big Diomede in large marine mammal hunting and, most likely, as a single population of 450+ for purposes of mate selection, adoption, and other population dynamics. Interestingly, Eide (1952) referred to them as being the same "tribe" in 1910.

In the case of Wales, the large population base (539 in 1891) was maintained until 1918 and Wales hunters were successful whalers prior to the turn of the century based on informant data, although documentation of harvests were incomplete. Thornton (1932) reported 10-12 crews (and 51 umiaks in the village) in 1890-1891. In 1922 Wales hunters were successful in harvesting a single whale when the population was 150, but whaling has generally been sporadic during the 1900s. In 1980 the population was 122 and there were 8 small crews primarily using aluminum boats.

There has been only a couple of accounts of whaling by King Islanders in all historical records. In 1980 King Islanders lacked specialized whaling technology and exhibited no interest in pursuing

or harvesting bowhead whales. Archaeological evidence, the limited accounts mentioned above, and the fact that King Islanders were hired by commercial whalers to hunt bowhead suggest that at one time there was greater participation in this activity, although the migratory paths of bowhead may have precluded as intensive an effort as was suggested for Diomede and Wales. It is most likely that King Islanders whaled when species were available prior to the decimation of the two other villages on the Island and prior to the decline of the bowhead population during the latter part of the 1800s. Bogojavlensky (1969) suggested that decimation of the other villages occurred in the 1830s. Since the current King Island village site maintained a population of approximately 100-250 individuals throughout the last century according to documentation, two other related communities could have brought the effective population to in excess of 300 or 400 people. The relatively low but stable population at the single site for the past 150 years may explain the disappearance of whaling from King Island hunting strategies over the last century or more.

If the data-based extrapolations presented above are accurate, essentially all of the study populations were relatively large prior to contact. In fact, maximal exploitation of the large marine mammal habitat is likely to have required a functional population base of 300 or more, and indirect and direct evidence suggests this may have been the case for all populations of concern in this context. It could also be argued conversely that whereas the exploitation of walrus was possible with a population of 100^{+}_{-}, the maximal exploitation of walrus and bowhead whales required 300 or more. When large marine mammals were efficiently exploited by hunters in crews, they supported

the non-productive age and sex cohorts of a 300+ population. In all cases, then, the study populations may have shared the walrus/whaling crew-based hunting focus as well as overall size.

Since variations in population size discussed above were explained as most likely resulting from post-contact human and marine mammal population reductions and the political disruptions of Big Diomede's population, population centers on St. Lawrence Island prior to 1878 were estimated by Foote (1965) and others to have had populations of approximately 200-400 each, and contemporary technology has permitted the use of a widespread resource base from centralized communities, it can be expected that the populations of Gambell and Savoonga may continue to grow. In 1980 residents were using resources over an area that supported several large settlements prior to 1878. It is not expected that Diomede's population will grow substantially in the single site, since the large population base of which they were probably a part included several sites and access to the coasts of Big Diomede and the adjacent Siberian mainland. Wales' population declined most drastically 52 years prior to 1980, so regeneration has not had long to occur, although outmarriage has somewhat crippled both Wales' productive and reproductive capabilities. Additionally, its size prior to 1900 in part reflected the ability of Wales' population to expand the carrying capacity of the environment through trade. Wales lost this role after the establishment of Nome at the turn of the century.

In the case of characteristics other than population size, Figure 51 demonstrates a higher degree of diversity than was anticipated when study hypotheses were initially generated. As will be

discussed below, in part this diversity reflects the sequence of historical events presented in Chapters IV and V which have influenced the population structures of the study groups. There are no clear-cut distinctions between the two cultural groups (Siberian Yuit and Iñupiat), although death rates and the relatively large number of individuals over 65 years in Gambell and Savoonga can be usefully contrasted with Diomede data to suggest the ameliorating influences of the more moderate environment and more diverse and abundant resource base at St. Lawrence Island in encouraging longer and probably healthier lives. In this regard, Diomede in 1980 is more representative of King Island prior to relocation. King Island and Wales have been greatly affected by readily available western medical care, which has unquestionably influenced death rates, causes of death and longevity. Hence, King Island and Wales are contemporarily less useful comparatively in analyzing factors related to mortality.

There are several population characteristics shared by all study populations which were closely connected to the crew hunting of large marine mammal species. The ratio of males to females was consistently higher in all groups. Gambell and Diomede were identical and may reflect the fact that they were older, more stable, and less disrupted populations. Although Savoonga appeared to be approaching the Gambell model demographically, its relatively brief history as a community provides partial explanation for deviations from the Gambell configuration and similarities to the relocated community of King Island. The preference for males and male-focused kinship linkages has been discussed for all populations.

Comparisons between other population characteristics provide additional insights. Although average household size and ratio of extended to nuclear family households were similar in all communities, they are probably not significant in this context. As previously explained, household size has been significantly influenced by governmentally subsidized housing projects which encouraged nuclear family models. The mean ages of males and females were similar across study populations with the exception of Wales, which demonstrated a peculiar set of demographic features related to relatively recent major population decline and female outmarriage. Although the mean ages of males and females were similar, mean ages at marriage were approximately five years older for males. This is a pattern which was well established through time in all communities for which data were available and which probably reflects the continuity in time and space of the belief that males must demonstrate the ability to produce through hunting prior to marriage. The ratio of productive males and reproductive females to the total population was similar across the study populations, although Wales demonstrated the greatest deviation as it did in most demographic characteristics. These similarities imply that large marine mammal hunters share beneficial ratios of productive males and potentially reproductive females to overall population members which assure an adequate supply of resources and an adequate supply of new members essential to the perpetuation of the population.

In general, population dynamics were less similar between study communities than were the outcome of these processes -- the population structure. That is, these data indicate that the structural ends were achieved through various processual means, and that the older less

disrupted, more established populations (Gambell and Diomede) exhibited more stability through time and similarity to one another than they did to the newly established, relocated, or recently disrupted populations.

Recruitment through reproduction, adoption, and inmarriage are examples of mechanisms which function to establish and maintain maximally beneficial population sizes and compositions in light of the requirements for sustaining the population. Gambell and Diomede exhibited the lowest rates of adoption from other communities and inmarriage of males of all study populations. This suggests that recruitment through reproduction and intracommunity redistribution of children were adequate to sustain the population structure necessary for large marine mammal hunting and other productive activities associated with overall ecological adaptations. In fact, the negligible incidence of recruited male spouses at Gambell and Diomede underscores the importance of crew hunting in the overall adaptive framework, since crew membership was determined by kinship ties derived primarily through related males. Although Savoonga practiced a high incidence of adoption, there was negligible recruitment via inmarried males, again related to the emphasis placed on patrilineally-related males in that community. Gambell and Diomede exhibited the highest birthrates, the highest ratio of married to unmarried females, and the highest age-specific fertility for the 40-59 year old age class, correlating with the emphasis placed on reproduction as a means of recruitment in these populations. Wales again was problematic in this comparison because of its extraordinarily high ratio of unmarried to married males and married to unmarried females. In general Wales' population demonstrated

participation in recruitment by multiple means to offset its high rate of loss via emigration of primarily young females through outmarriage.

The ratio of whaling and walrus hunting captains to all productive males varied between the study populations, reflecting the degree to which the communities participated in these productive activities. Given the size of Savoonga's population, the low ratio of whaling captains can be explained by the recency of whaling as an activity conducted by Savoonga-based crews. Savoonga's ratio of walrus captains to productive males was identical to that of Gambell. Since Diomeders essentially used the same boats and crews for whaling and walrus hunting until 1980, they demonstrated a high ratio of whaling captains to productive males, even in comparison to Gambell. This ratio reflects continuity in the use of large skinboats for whaling and walrus hunting, as opposed to the dichotomy of boat type and crew number used for the different species at Gambell and Savoonga. While it appears that Diomede and Wales males participated in whaling at the same level as occurred at Gambell and Savoonga based on the ratio of crews (captains) to productive males, they have not demonstrated comparable levels of productivity in recent years. This phenomenon may provide indirect evidence for the view that multiple crews are necessary for maximizing the success of whaling efforts in this environment.

Population Dynamics, Technological Change, and the Maintenance of Crew Stability

In Chapter V it was established that boat crews in all study populations were, for the most part, composed of males related in a very patterned manner to the boat captain. On St. Lawrence Island,

relationships between crew members and captain appeared to be the most structured and were exclusively based on patrilineally-derived kinship with the exceptions of son-in-laws doing bride-service and an occasional "unrelated" male when labor demands exceeded the availability of appropriate male kinsmen. In some cases, the "unrelated" status of such a crew member may have been only superficially concluded. Comprehensive data were available for King Island, which indicated more flexible means by which kinship affiliations between captain and crew could be established, including the participation of male affines. Conversely, in Gambell and Savoonga, there were no incidences of crew members being related through the captains' wives in 1980. Although the mechanisms for deriving the kin-based association between captains and crew members appeared to be more flexible at King Island because the wife's relatives could be incorporated into crews, the integration of inmarried spouses (particularly non-Natives) into hunting crews has not occurred, suggesting limitations to affinal crew recruitment in King Island society. It was assumed in Chapter V, based on Bogojavlensky's data, that Diomede crew formation patterns paralleled those of King Island, although the details of crew/captain interrelationships were unknown. Demographic data from Diomede in 1980 suggest that this conclusion in part may be unfounded. Since Diomede, like Gambell, had no incidence of inmarried males in the population in 1980, it is possible that Diomede's crew structure more closely paralleled that of Gambell (St. Lawrence Island in general) than that of King Island. In fact, informant data in the last decade and recent ethnographic information on this topic (Bogojavlensky 1969) stressed the importance of patrilineally-derived kinship connections between

captains and crews at King Island. The discrepancy between ideal and real patterns of recruitment suggest that the flexibility exhibited in King Island crew formation in 1930, 1940, 1974, and 1980 may have [illegible] response to population disruptions in the 1800s and subsequent small population size.

If inmarriage was not a viable means for recruiting crew members for Bering Strait study populations, reproduction and adoption were the sole remaining mechanisms for increasing the number of crew members or primary producers. The data presented in Chapter IV demonstrated a general preference for male children in all study populations. Savoonga and King Island practiced the highest frequency of adopting males into the community, in part reflecting the newness of Savoonga as a community and its need for male producers. As demonstrated in Figure 51, King Island recruited actively through reproduction as well in 1980.

The conservative nature of boat crew composition has been demonstrated by its persistence through time despite notable technological changes. Chapter V described the introduction of aluminum boats for walrus hunting in the Bering Strait area over the last decade. In terms of the study populations, King Island was the first to integrate the use of aluminum boats and Diomede had only begun to use them on a limited basis in 1980. As discussed in Chapter V, walrus crews using aluminum boats were generally smaller than those of skinboats, although the smaller crews continued to be organized along the same types of kin-based patterns as those of the larger skinboats. Aluminum boats were not found suitable for whaling at St. Lawrence Island, and walrus crews were restructured annually from existing skinboat whaling crews.

Since aluminum boats were purchases from commercial sources, the acquisition of the technology required to establish captaincy became more accessible and was no longer controlled by existing captains. However, the skills, experience, and kinship network necessary for the recruitment and maintenance of a boat crew continued to place restrictions on the number of functioning captains and crews. Additionally, the demographic structures of the communities placed limits on the number of crews per community, particularly in light of the constraints put on male recruitment discussed above. It will be of interest in this regard to observe to what degree and in what manner Diomeders integrate the use of aluminum boats in marine mammal hunting in light of their continued location on the Island and participation in large marine mammal hunting.

Skinboat Captains in the Bering Strait Context

Laughlin (1968b) noted that differential fertility between headman, chiefs, or successful hunters is common among hunting populations. In Bering Strait, boat captains were successful hunters and the closest approximation to headman found in this area. Figure 52 presents fertility of boat captains compared with fertility of all males by 20-year cohorts. This figure demonstrates that boat captains produced more offspring than non-captains in all study populations. With one exception this generalization applied to calculations of mean numbers of children for all males and all captains and to means of reproductively active males and reproductively active captains. In most cases, boat captains had produced offspring. The differential fertility between

	60+		40-59		20-39	
	All Males	Boat Captains	All Males	Boat Captains	All Males	Boat Captains
Gambell[2]	3.31 (4.30)	3.33 (5.00)	4.00 (5.63)	4.29 (5.15)	.80 (2.41)	1.53 (2.56)
Savoonga[3]	7.00 (7.00)	13.00 (13.00)	3.22 (5.21)	3.76 (5.45)	.68 (2.41)	1.85 (2.67)
King Island[4]	3.69 (4.36)	8.00 (8.00)	3.84 (5.05)	4.70 (5.50)	-- --	-- --
Diomede[5]	2.00 (2.00)	3.00 (3.00)	4.27 (5.82)	7.29 (7.29)	2.25 (3.38)	5.67 (5.67)
Wales[6]	8.33 (12.50)	11.60[7] (11.60)	3.80 (7.60)	5.33 (8.00)	.19 (1.33)	2.00[7] (2.00)

Figure 52: Fertility of boat captains compared with fertility of all males by 20-year cohorts, 1980.[1]

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1 Mean number of children determined for all males. Means for reproductively active males are presented in parentheses.

2 In Gambell 23.8 percent of captains had adopted children, in addition to natural children portrayed above. In Gambell's overall, only 6.7 percent of household heads reported having adopted children.

3 In Savoonga 23.2 percent of captains had adopted children, whereas 21.7 percent of all households reported having adopted children.

4 For King Islanders, 37.5 percent of captains had adopted children, whereas 17.5 percent of all households reported having adopted children.

5 At Diomede 9.1 percent of captains had adopted children, whereas 14.4 percent of all households reported having adopted children.

6 In Wales 33.3 percent of captains had adopted children, whereas 20.0 percent of all households reported having adopted children.

7 This includes one relocated Diomede captain.

captains and non-captains on St. Lawrence Island was less than that of all Iñupiat study populations. It should be noted that unmarried captains were a phenomenon found only in the populations of St. Lawrence Island. In all cases, the unmarried captains at Gambell and Savoonga were members of extended families with fathers who had been captains before retirement. In at least two cases, more than one adult unmarried son of a retired captain became captains -- one of a whaling skinboat crew and another of an aluminum boat walrus hunting crew. In cohorts 40-59 and 20-39 in all populations, the mean number of children could increase for all males and for boat captains subsequent to 1980.

Most communities except Diomede had cases of married captains who had not been able to produce offspring. In all of these cases, offspring had been adopted. Additionally, in all cases except Diomede, boat captains adopted in more offspring to their households than did non-captain households in the overall population (see footnotes to Figure 52). This was a means of recruiting male offspring to assume and support captaincy when the father/captain retires, thereby retaining a functional boat crew within the family.

In interpretation of the evolutionary history of the human species, it is now generally accepted that ". . . hunting has placed a premium upon inventiveness, upon problem solving, and has imposed a real penalty for failure to solve the problem. Therefore it has contributed as much to advancing the human species as to holding it together within the confines of a single variable species" (Laughlin 1968b: 304). It can be expected that more contemporary hunters inhabiting the rather unforgiving environments of the study area are subject

to these same selective processes. Hence, since captains achieved and maintained their roles in large part because of their exceptional skills, abilities to problem-solve, and inventiveness, it is likely that those aspects of these characteristics transmitted genetically would be beneficial at the population level if captains produced a greater number of offspring. Since captaincy was transmitted in most instances from fathers to eldest sons, the social system supported the development of successful individual characteristics.

It was noted historically and contemporarily that boat captains and their families were usually better off economically and nutritionally than were the families of non-captains. As Thornton (1931) noted in 1890-1891, polygyny at Wales was exclusively the practice of captains, the "wealthy," thereby ensuring differential fertility in this context. Since captains tended to be the sons of captains with kinship obligations to siblings, it is likely that in most cases the families of captain's male siblings and unmarried female siblings fared better than other families both economically and nutritionally. It has been noted that captains' younger brothers played an important role in St. Lawrence and King island boat crews and, most likely, in those at Diomede and Wales as well, although direct data to support this assumption are not available in this context.

Finally, the role of captains in supporting less productive age and sex cohorts cannot be assessed by examining solely the households which captains head. In reality captains participated in an extensive distribution network that cross-cut multiple households and community boundaries. Although it is not the intent to map this distribution network for purposes of this study, an understanding of the

overall value of captains to the well-being of a population must look beyond the household for a more meaningful unit of analysis.

Conclusion

Based on relationships between the data presented in Chapters IV and V, several general conclusions have been derived. The functional population size of communities in the Bering Strait area that relied primarily, although not exclusively, on the hunting of large and associated smaller marine mammals by crews was probably substantial (400+) prior to contact. In all cases, the population size was achieved by the cooperative productive and reproductive activities of individuals located in more than one closely-related and proximal settlement. Although this has been well established for St. Lawrence Island and Wales, the suggestion that the Diomedes (Big and Little) were essentially a single functional population and that King Island's population functioned from three separate sites has not been promoted previously in the literature. In terms of what is known about these hunting populations in 1980, this view is appealing in that it addresses many unanswered questions about their population structures and ecological adaptations contemporarily. In specific, the larger functional populations at an earlier period of time would have permitted a whaling/walrus focus by all study populations. Disruptions to these populations resulted in the more sporadic and less efficient participation in whaling of Diomede and Wales hunters and the disappearance of King Islander whaling.

The study communities tended towards endogamy in 1980, particularly in the cases of Diomede and Gambell. Data from the oldest cohorts suggest that this tendency was greater in the past than in [illegible] population disruptions resulting from disease, relocation, the formation of new settlements, and exposure to non-local potential spouses have influenced the level of endogamy in populations such as King Island. Nonetheless, the selection of spouses within populations still exceeds outmarriage in all study cases. For the study populations excepting King Island, the inmarriage of males has been minimal corresponding to the patterning of crews around a core of mostly patrilineally related males. In more recent years, King Island females have married a substantial number of non-King Island males. In some cases, they have not resided in Nome. In other cases, these inmarried males have resided with or near the King Island subcommunity in Nome but have not been integrated into the functioning of boat crews. Although emigration of Wales females has been proportionately greater than that of other populations, inmarried spouses did not usually return to Wales to establish residency. The outcome of two cases of inmarried males settling in Wales is too recent to evaluate its outcome in regards to integration into the population. In general, all study communities except Diomede were more amenable to the recruitment of females. Diomede was endogamous in the case of both spouses. It is expected that the continuity and productivity of crew hunting in all study communities will be associated with access to an adequate number of related males in the appropriate age cohorts. The incidence of endogamy is also associated with the population isolation of study communities. This fact suggests that King Island may have been more

similar to Diomede prior to relocation.

The birth and death rates of the study population corresponded to the generalization that high birthrates and high death rates are characteristic of hunter/gatherer populations. In recent years these rates have been ameliorated by western medicine. It is noteworthy that both death and birthrates increased from St. Lawrence Island north, possibly in association with the decreasing diversity and productivity of ecological niches from south to north which provide a means of production for the very young, the very old, and the infirm. Interestingly, causes of death data based on informant recall from the last 40 years indicated a relatively low incidence of accidental deaths related to exploitation of the environment but an ever increasing incidence of deaths from non-hunting accidents (such as automobile and aircraft accidents) and "modern" diseases such as cancer and heart disease. The relative frequency of old people (60+) on St. Lawrence Island was greater than that of the Iñupiat populations, but all study populations have supported relatively old members and valued them as repositories of knowledge.

There is scant evidence of population "bottlenecks" (Laughlin 1968b) for the study communities unless the major population decline on St. Lawrence Island in 1878 to 1880 is attributed to famine as some have suggested. It is more likely that diseases, which debilitated productive segments of the population, acted in concert with climatic variations and decreased resource availability, thereby limiting productivity during critical harvest periods. Informants recall "hard winters" in all of the study communities, but note that distribution of resources between households prevented starvation. From

another perspective, it is possible that epidemic-related population decimations in the 1800s and early 1900s prevented such "bottlenecks" in the historic period, but that they may have occurred prehistorically.

The data from Chapters IV and V suggested correlations between resource harvest activities and the frequency of conception rates during particular months. In the case of the oldest cohort in each population, variations of birth frequency by month were more interconnected with resource harvests than was the case in the two younger cohorts. All cohorts in all populations exhibited a high rate of conception in September, reflecting centralization associated primarily with formal education and the seasonal abandonment of family camps in early fall. With one exception, birthing patterns of all cohorts from all populations reflected the intensity of spring marine mammal harvests by young to middle-aged males in crews, although ecologically-related variations between the timing of harvest periods paralleled variations in month of birth. Except for Wales, seasonality of birth of the youngest cohort became more regular across the months of the year, corresponding to the hunting mobility of males using rapid, modern technology and the relative immobility of females in connection with the non-Eskimo institutions which have been introduced to these communities in recent years. Nonetheless, the variation in seasonal patterns of birth for all populations remains more irregular than those, for example, of food producers.

Chapter V demonstrated that individual marine mammal hunting seemed to be less intensively pursued contemporarily than historic accounts and informant recall indicated was the case in the past. Although conclusions regarding the decline of individual marine

mammal hunting based on data from a single year and a sample of households should be considered tentative and highly speculative, such conclusions are consistent with the empirically-derived knowledge of ecological configurations obtained from a decade of observations in the study communities. Hence, it is suggested that crew hunting of marine mammals is culturally, economically, nutritionally, and socially more central to the adaptive strategies of these populations and therefore has remained more stable through time. The institutional (boat crew) characteristics of crew hunting, firmly integrated in the demographic structures and processes of these populations, perpetuate such stability through time in the face of acculturative changes, such as the introduction of western technology and the cash economy. Conversely, individual marine mammal hunting lacked such an institutional context. In addition, individual marine mammal hunting provided an economic supplement to the more productive and primary crew hunting activities and a source of fresh meat during all seasons. Contemporarily, there are other alternatives to individual production and sources of fresh foods during non-crew hunting months or in cases in which crew hunting has been inadequately productive.

Of all the study populations, contemporarily Wales appears to be the product of the greatest demographic and related ecological disruptions. Whereas Wales provides an excellent example of the potential ecological consequences of a drastic population decline, frequent outmarriage, family relocations, and associated demographic imbalances, it may be that Wales is contemporarily (1980) in the process of regenerating both its population and the viability of its marine mammal hunting base. Although there is minimal documentation, oral

histories, activities of males in 1980, and observations such as those of Jenness (1929) suggest that Wales males became actively involved in reindeer herding, mining activities, and seasonal employment in Nome [illegible] the first half of the 1900s. These activities may have acted in concert with the 1918 population reduction to bring about the decline in both crew and individual marine mammal hunting. In 1980 males who had remained in Wales were no longer heavily involved in herding, mining, or other sources of cash employment. Although Bogojavlensky (1969) concluded that Wales had fallen into social and economic decline as a result of not hunting, the sequence of historic events which impacted the population base of the community unquestionably disrupted marine mammal hunting potential which, in turn, may have temporarily encouraged males to participate in non-hunting economic alternatives.

A final note on the relationship between boat crew membership and population size may be an appropriate synthesis of key points developed in this context. Chapter V demonstrated the relative productivity of boat crews for providing resources in comparison with other types of resource harvest activities. Chapter IV and V demonstrated the relative rigidity of boat crew structure, composition, and recruitment through time and the conservative nature of these facets of boat crews in the Bering Strait area. The ability of a population to regenerate and maintain itself is usually viewed as relating directly to the ratio of reproductively-aged females in the population. It is suggested here that for Bering Strait populations, the constraints on the reproductive capacity of the population were similarly tied to the ratio of productive males who could function as boat crew members. As previously mentioned, reproductively-aged females could be recruited

into the study populations more easily than productive males. conversely, patterns of crew hunting prohibited the recruitment of males who could serve both productive and reproductive functions in the population. Hence, no matter how many reproductive females there were in the population at any given point of time, the real key to the potential for demographic expansion depended on the ratio of crew hunting males to non-productive or minimally productive age and sex cohorts in the population. Since it has been demonstrated that expansion of male cohorts could only occur through birth or pseudo consanguineal connections such as adoption, very real limits to growth were placed upon the population by the implicit rules governing crew recruitment and membership. In actuality, then, the institution of boat crew directly guided population dynamics while, conversely, remaining functional only if adequate recruitment of crew members were possible. This was a double-bind -- a complex balance between multiple demographic and ecological features -- which had to be resolved to ensure sustained population bases were achieved. The populations of the study area worked towards this end but not always using the same means.

APPENDIX I

PRIMARY MARINE MAMMAL RESOURCE AVERAGE LIVE WEIGHT

Common Name	Scientific Name	Average Live Weight†
Pacific walrus	(Odobenus rosmarus divergens)	800 kg[1]
Bearded seal	(Erignathus barbatus)	150 kg[1]
Spotted seal	(Phoca vitulina largha)	81 to 109 kg[2]
Ringed seal	(Phoca hispida)	60 kg[1]
Ribbon seal	(Phoca fasciata)	93 kg[2]
Belukha	(Delphinapterus leucas)	Male 1.5 m ton[2] Female 1.36 m ton[2]
Bowhead whale	(Balaena mysticetus)	30 m ton[1]
Gray whale	(Eschrichtius gibbosus)	14 m ton[1]
Sea lion	(Eumetopias jubata)	Male 1 m ton[2] Female 272 kg[2]
Polar bear	(Ursus maritimus)	Male 362 to 635 kg[2] Female 180 to 272 kg[2]

† Depending on the species of the animal, the actual usable dressed weight is estimated at between 75% and 30% of the live weight. (Wolfe 1979).

1 Burgess 1974: 99.
2 Haley 1978: 200, 203, 220.

AMERICAN FAMILY HISTORY STUDY

LABORATORY OF BIOLOGICAL ANTHROPOLOGY — DEPARTMENT OF BIOBEHAVIORAL SCIENCES — UNIVERSITY OF CONNECTICUT

HANDEDNESS: R L A R-L L-R

A_1 A_2 B O (H); M N S s; Rh: D C c E

CODE NO. _____ NAME _____ SEX M F AGE _____ LIVING AT _____ SINCE _____

BIRTHDATE _____ BIRTHPLACE _____ SINGLE( ) MARRIED( ) WIDOWED( ) SEPARATED( ) DIVORCED( )

FATHER'S NAME _____ BIRTHDATE _____ BIRTHPLACE _____ ( )AGE ( )AGE AT DEATH DATE _____

MOTHER'S MAIDEN NAME _____ BIRTHDATE _____ BIRTHPLACE _____ ( )AGE ( )AGE AT DEATH DATE _____

( ) ADOPTED DATE _____ PLACE _____ BY _____

_____

NAME OF HUSBAND(S) OR MAIDEN NAME OF WIFE(S):

(1)WIDOWED (2)SEPARAT (3)DIVORCE

1. _____ BIRTHDATE _____ BIRTHPLACE _____ DATE MARRIED _____ DATE _____
2. _____ BIRTHDATE _____ BIRTHPLACE _____ DATE MARRIED _____ DATE _____
3. _____ BIRTHDATE _____ BIRTHPLACE _____ DATE MARRIED _____ DATE _____

MOTHER'S FATHER _____ BIRTHDATE _____ BIRTHPLACE _____ DATE OF DEATH _____
MOTHER'S MOTHER _____ BIRTHDATE _____ BIRTHPLACE _____ DATE OF DEATH _____
FATHER'S FATHER _____ BIRTHDATE _____ BIRTHPLACE _____ DATE OF DEATH _____
FATHER'S MOTHER _____ BIRTHDATE _____ BIRTHPLACE _____ DATE OF DEATH _____

LIVING BROTHERS	AGE	BIRTH DATE	LIVING AT	LIVING SISTERS	AGE	BIRTH DATE	LIVING AT	DEAD BROTHERS/SISTERS	BIRTH DATE	AGE AT DEATH	DATE OF DEATH
1.				1.				1.			
2.				2.				2.			
3.				3.				3.			
4.				4.				4.			

APPENDIX II (back)

MOTHER'S AGE AT BIRTH	SEX	BIRTHDATE	STILLBIRTH OR MISCARRIAGE	CHILD'S NAME	MOTHER OR FATHER	DATE OF/AGE AT DEATH (CAUSE)	ADOPTED BY	MARRIED TO
	M F							
	M F							
	M F							
	M F							
	M F							
	M F							
	M F							
	M F							

ORDER_____ PLACE_____ DATE_____

BERING STRAITS CENSUS

PREPARED BY: _____ VILLAGE _____

DATE: _____

#	Last Name First Name	Relation to Head-of-House	Sex	DATE & PLACE OF BIRTH	Social Security No.	Race	% Blood	Highest Grade Completed	Working Skills	1975 Employment: Months Unemp.	Months Employd.	Total Income
		Head										

1) Would you or members of your family leave your home for permanent employment? ___YES ___NO
2) Would you or members of your family leave your home to train for a particular job? ___YES ___NO
If yes, what kind of training? _____
3) If you answered yes to question 1, please enter the number found to the left of your name ___ ___ ___ ___ ___ ___.
4) If you answered yes to question 2, please enter the number found to the left of your name ___ ___ ___ ___ ___ ___.

notes: 1. For all married women, include maiden name.
2. Head of household is the primary wage earner.
3. Include all members of the household who are away for school, temporary work, etc.

Eskimo Walrus Commission

Kawerak, Inc.
P.O. Box 948
Nome, Alaska 99762

MARINE MAMMAL RESEARCH DATA

Interviewer:

Community:

Date:

Household Identification No.:

Introduction and Purpose

The Eskimo Walrus Commission (EWC) was formed in August 1978 to participate in the study and management of the Pacific Walrus as well as other marine mammals. This was done in order for you, the subsistence hunter, to have the long neglected expert knowledge which you have,documented and used as input for dicisions that affect your reliance on the marine mammals of your area. The Eskimo Walrus Commission is composed of eleven (11) members from the coastal communities in the western and northern areas of Alaska.

The more information that you can share from your expert knowledge of your subsistence economy, the better the Eskimo Walrus Commission will be able to speak on your behalf. The information that you share with the EWC will be kept strictly confidential-- that is , your name will never be used in any report. Feel free to express your opinion of specific questions or of our research in general in spaces provided for your comments.

The Eskimo Walrus Commission would like to thank you for sharing your expert knowledge with them in this very important study.

Mr. Carl M. Ahwinona, Sr.
Marine Mammal Research Specialist
Research Department
Eskimo Walrus Commission
P.O. Box 948
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1. _____

Household Member	Relation to Head of House-hold	Sex	Age	Role in Boat Hunting?*	Handicraft Age I began to: Carve	Handicraft Age I began to: Sew	I took Training as:	I work in village as:	I travel away from home to work as:
Head									
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									

*Role in boat hunting, such as captain, co-captain, engineer (motor operator), cook, apprentice (learner), crew member, occasional crew member, person who supports a boat crew, retired captain, retired crew

Comments on above (if any)_____

_____

2. Members of the household support the household in the following ways (please check)

green picking_____ fishing (subsistence_____
root picking_____ fishing (commercial)_____
beach gathering_____ eggs gathering_____
trapping_____ moose hunting_____
caribou hunting_____ carving_____
wood craft_____ basket weaving_____
knitting_____ skin sewing_____
other_____ crabbing(subsistence_____
clamming(subsistence_____

comment on above:_____

3. Does this household have a boat(s)? yes_____ no_____

a. If yes, what type(s)?

skinboat_____ aluminum_____ wood_____ fiber glass_____ canoe_____

kayak_____ cabin cruiser_____ raft_____

b. How many people in the crew?_____

c. How are crew members related?_____

4. Do you hunt walrus? yes_____ no_____

a. If yes, please check which months:

January_____ April_____ July_____ October_____
February_____ May_____ August_____ November_____
March_____ June_____ September_____ December_____

b. comment on above hunting:_____

c. I caught_____walrus this past year.

bulls_____ cows_____ calves_____ unknown_____

I found_____dead walrus.

d. They were: fat_____ medium_____ skinny_____ Stomachs had_____

e.By month, please estimate the walrus taken and amount used.

Month	No. of Walrus Taken	Shares with Other Crews	Coke/ Mugoona w/meat	Flippers	Meat	Intestines, Heart, Liver, etc.	Hide
Jan.							
Feb.							
March							
April							
May							
June							
July							
Aug.							
Sept.							
Oct.							
Nov.							
Dec.							

f.comment:_____

4.g. How does your family prepare walrus? (please check)

dried_____ dried & cooked stored in oil ____ dried & store in oil____

coke/mungoona with blubber & meat stored in meat hole____ flippers in meat hole__

cooked & stored in oil____ aged flippers in container____ fry blubber/meat____

rendered blubber_____ fresh frozen blubber_____ fermented liver_____ freezer____

pickled coke/mungoona____ young walrus whole in meat hole;_____How many?_____

hide for for boat____ hide for rug____ hide for blanket toss____ hide for rope_

intestine for raincoat____ intestine for storage____ intestine for food____

stomach for drum____ stomach for storage____ tusk for carving____ Oosik____

Tusk for harpoon parts____ teeth for carving____ teeth for fish hooks____

bones for carving____ bones for net sinkers____ tusk /boat keel runners____

bone/boat keel runners_____ bone for harpoon parts____ aged/dried___ ocean aged_

meat and other parts for dog food____ bait for trapping____ pressure cook/flippe

fresh blubber chopped up____ Oosik for tools____ Oosik for handicraft____

h. comment on other uses:_____

_____

5. Do you hunt oogruk/mukluk? Yes_____ No_____

a. If yes, please check which months.

January_____	April_____	July_____	October_____
February____	May_____	August_____	November_____
March_____	June_____	September____	December_____

b. I caught_____ oogruk/mukluk this past year.

males_____ females_____ young_____ unknown_____

I found_____ dead oogruk/mukluk.

c. They were: fat_____ medium_____ skinny_____ their stomach had_____

d. comment on above hunting:_____

_____

_____

e. By month, please estimate the oogruk/mukluk taken and amounts used.

Month	No. of Oogruk/ Mukluk Taken	Shares With Other Crews	Meat	Blubber	Flippers	Intestines Heart, Liver, etc.	Hides
Jan.							
Feb.							
Mar.							
Apr.							
May							
June							
July							
Aug.							
Sept.							
Oct.							
Nov.							
Dec.							

f. comment on above:_____

_____

5.g. How does your family prepare oogruk/mukluk?

dried____ dried & cooked____ dried & cooked/stored in oil____ cooked fresh____
dried & stored in oil____ fresh frozen____ aged meat/ frozen____ aged/dried____
ocean aged____ fermented flippers____ fermented liver____ rendered oil____
fresh blubber frozen____ aged whole____ aged flippers in container____ dog food____
intestines for food____ intestines for raincoat____ intestines for storage____
intestines for handicraft____ hide for rope____ hide for mukluk soles____
hide for boat skin____ bones for handicraft____ claws for handicraft____
teeth for handicraft____ skin for back pack____ skin for gun case____

h. comment on other use:_____

_____

_____

6. Do you hunt spotted seals? Yes____ No____

a. If yes, please check which months:

January_____	April_____	July_____	October_____
February_____	May_____	August_____	November_____
March_____	June_____	September____	December_____

b. I caught_____ spotted seals this past year. males_____ females_____ unknown____

c. They were: fat____ medium____ skinny____ their stomachs had_____

d. I found_____ dead spotted seals.

e. comment on above:_____

_____

_____

f. By month, please estimate the spotted seals taken and amounts used.

Month	No of Spotted Seals Taken	Shares with Other Crews	Meat	Blubber	Flippers	Intestines, Heart Liver, etc.	Hides
Jan							
Feb							
Mar							
Apr							
May							
June							
July							
Aug							
Sept							
Oct							
Nov							
Dec							

g. comment on above:_____

_____

_____

_____

_____

6.h. How does your family prepare spotted seal?

dried____ dried & cooked____ dried & cooked/stored in oil____ cooked fresh____
dried & stored in oil____ fresh frozen____ aged meat/frozen ___ aged/dried____
ocean aged____ fermented flippers____ fermented liver____ rendered oil____
fresh blubber frozen____ aged whole____ aged flippers in container___ dog food__
intestines for food____ intestines for raincoat____ intestines for storage____
intestines for handicraft____ hide for rope____ hide for mukluks____
hide for slippers____ mitts____ caps____ hunting pants____ waterproof boots____
coat____ parka____ vest____ purse____ hunting bag____ gun case____ emblems____
cushion cover____ yo-yo's____ dolls____ storage bag____ harpoon float____
seal poke for oil____ seal poke for meat/greens/oil storage____ bleached hide____
bleached hide for art work____ bleached hide for mukluk straps____
bleached hide for bead work base____ bleached hide for cerimonial mask____
bleached hide for mukluk trimmings & borders____ bait for trapping____
fresh chopped up bluhber____ aged/dried intestines____ dried intestine____

i. comment on other uses:_____

_____

7. Do you hunt ringed seals? Yes____ No____

a. If yes, please check which months:

January_____	April_____	July_____	October _____
February____	May_____	August_____	November_____
March_____	June_____	September____	December_____

b. I caught_____ringed seals this past year. male____ female____
young____ unknown____

c. They were: fat____ medium____ skinny____ their stomachs had_____

d. I found_____ dead ringed seals.

e. comment on above:_____

_____

_____

f. By month, please estimate the ringed seals taken and amount used.

Month	No of Ringed Seals Taken	Shares with Other Crews	Meat	Blubber	Flippers	Intestines Heart Liver,etc.	Hides
Jan							
Feb							
Mar							
Apr							
May							
June							
July							
Aug							
Sept							
Oct							
Nov							
Dec							

comment:_____

7.h. How does your family prepare and utilize the ringed seal? (please check)

dried____ dried & cooked____ dried & cooked/stored in oil____ cooked fresh____
dried & stored in oil____ fresh frozen____ aged meat/frozen____ aged/dried____
ocean aged____ fermented flippers____ fermented liver____ rendered oil____
fresh blubber frozen____ aged whole____ aged flippers in container____ dog food____
intestines for food____ intestines for raincgear____ intestines for storage____
intestines for handicraft____ hide for rope____ hide for mukluks____
hide for slippers____ mitts____ caps____ hunting pants____ waterproof boots____
coat____ parka____ vest____ purse____ hunting bag____ gun case____ emblems____
cushion cover____ yo-yo's____ dolls____ storage bag____ harpoon float____
seal poke for oil____ seal poke for meat/greens/oil storage____ bleached hide____
bleached hide for art work____ bleached hide for mukluk straps____ bone toys____
bleached hide for mukluk trimmings & borders____ bleached hide for cerimonial mask
bleached hide for bead work base____ bait for trapping____ claws for craft____
chopped frozen blubber____ fried blubber/meat____ dried intestine____ kick ball____

i. comment on other uses:_____

8. Do you hunt ribbon seals? Yes____ No____.

a. If yes, please check which months:

January_____	April_____	July_____	October_____
February_____	May_____	August_____	November_____
March_____	June_____	September_____	December_____

b. I caught_____ ribbon seals this past year.

males_____ females_____ young_____ unknown_____

their stomach had_____

I found_____ dead ribbon seals.

c. By month, please estimate the ribbon seals taken and amounts used.

Month	No of Ribbon Seals Taken	Shares with Other Crews	Meat	Blubber	Flippers	Intestines Heart Liver,etc.	Hides
Jan							
Feb							
Mar							
Apr							
May							
June							
July							
Aug							
Sept							
Oct							
Nov							
Dec							

comment on above:_____

8.d. How does your family prepare and utilize ribbon seals? (please check)

dried____ dried & cooked____ dried & cooked/stored in oil____ cooked fresh____
dried & stored in oil____ fresh frozen____ aged meat/frozen____ aged/dried____
ocean age____ fermented flippers____ fermented liver____ rendered oil____
fresh blubber frozen____ aged whole____ aged flippers in container____ dog food
intestines for food____ intestines for raingear____ intestines for storage____
intestines for handicraft____ hide for rope____ hide for mukluk____
hide for slippers____ mitts____ caps____ hunting pants____ waterproof boots____
coat____ parka____ vest____ purse____ hunting bag____ gun case____ emblems____
cushion cover____ yo-yo's____ dolls____ storage bag____ harpoon float____
seal poke for oil____ seal poke for meat/greens/oil storage____ bleached hide____
bleached hide for art work____ bleached hide for mukluk straps____ bone toys____
bleached hide for bead work base____ bait for trapping____ claws for craft____
bleached hide for mukluk trimmings & borders____ bleached hide for cerimonial mas

e. comment on other uses:_____

_____

9. Do you hunt Belukha? Yes____ No____

a. If yes, please check which months:

January_____	April_____	July_____	October_____
February_____	May_____	August_____	November_____
March_____	June_____	September____	December_____

b. I caught_____ Belukha this past year.

adult (sex if known)____ Young____ Unknown____ Length/Size_____

their stomachs had_____

I found_____ dead belukha.

c. By month, please estimate the belukha taken and amount used.

Month	No. of Belukha taken	Share with Other Crews	Meat	Muktuk	Flukes and Flippers	Stomach	Intestines	Sinew	Head
Jan									
Feb									
Mar									
Apr									
May									
June									
July									
Aug									
Sept									
Oct									
Nov									
Dec									

comment on above:_____

_____

_____

_____

9.d. How does your family prepare and utilize Belukha? (please check)

MEATS: dry____ dried/cooked____ dried/frozen____ dried/stored in oil____
canned____ dried/smoked____ fresh frozen____ fresh cooked____ fried___
aged/frozen____ aged/cooked____ aged/dried____ dog food____ bait____
other ways:_____

MUKTUK: dried____ age/cooked____ age/frozen____ cooked/stored in oil____
uncooked/pickled____ cooked/pickled____ cooked/stored in oil____
oncooked/stored in oil____ dried/smoked____ bait____
other ways:_____

FLUKES/
FLIPPERS: fresh/uncooked____ fresh/fried____ aged____ aged/stored in oil____
fresh/pickled____ cooked/pickled____ aged/frozen____
other ways:_____

SINEW: dried____ other ways:_____

HEAD: age/dried____ broiled____ aged/cooked____ fresh/cooked____ uncooked__
cooked/stored in oil____ cooked/pickled____ uncooked/pickled____

BONES: handicraft____ hunting implements____ net sinkers____ dog food____
other ways:_____

e. comment on above:_____

10. Do you hunt Black Whales? (Bowhear,Right) Yes____ No____

a. If yes, please check which months:

January_____	April_____	July_____	October_____
February_____	May_____	August_____	November_____
March_____	June_____	September____	December_____

b. I caught____ Bowhead/Right whale this past year. I found___dead black whale.
adult (sex if known)____ length/size_____ young____ lengrh/size_____

c. There were_____ other crew members with boats that help haul/cut the whale.

d. We share our catch with____ communities as well as those that did not come.
We share with relatives____ that come to visit. We share at Potluck____
We share with neighbors____ We exchage with our neighbors____
Other times:_____

e. How does your family prepare and utilize the Bowhead,Right Whale?(please check
MEAT: dried____ dried/cooked____ smoke/dried____ dried/stored in oil____
fresh/cooked____ fresh frozen____ fermented w/muktuk____ bait____
aged/frozen____ aged/dried____ aged/dried/frozen____ dog food____
other ways:_____
MUKTUK: fresh/uncooked____ aged/uncooked____ uncooked/pickled____ cooked__
cooked/pickled____ other ways:_____
FLUKES?
FLIPPERS: fresh/uncooked____ fresh/fried____ fresh/frozen____ cooked____
aged/frozen____ fresh/pickled____ aged/pickled____
other ways:_____
EARDRUMS: handicraft____ other ways:_____
BALEEN: handicraft____ sled____ basket____ hunting implement____
other uses:_____
GUM BASE: food____ other_____
BONES: handicraft____ hunting implements____ other_____

f. comment:_____

10.g. By month, please estimate the bowhead/right whale taken and amount used.

Month	No of Bowhead/ Right Taken	Shares with Other Crews	Meat	Muktuk	Flukes and Flippers	Tongue	Sinew	Baleen	Head and Other Parts
Jan									
Feb									
Mar									
Apr									
May									
June									
July									
Aug									
Sept									
Oct									
Nov									
Dec									

comment on above:_____

_____

_____

_____

_____

11. Do you hunt any other marine mammals such as: minke, gray, or summer whale, porpoise, sea lion, etc?

a. If so, please describe when, where, and how you hunt them and prepare them:

_____

_____

_____

_____

b. If not, do you ever observe any of these other marine mammals?

yes_____ no_____

If so, please describe where, when, and in what numbers you have observed them:_____

_____

_____

12. Do you take polar bear if you encounter them while out hunting?

yes_____ no_____

a. If yes, please check during which months:

January_____ April_____ July_____ October_____

February_____ May_____ August_____ November_____

March_____ June_____ September_____ December_____

b. I caught ____ polar bear this past year.

male____ female____ young____ unknown____

length/size_____

12.c. How many ways did your household use polar bear? (please check)

meat cooked____ meat frozen/later use____ share with others____

skin for mukluks____ skin for rug____ skin for matress____ teeth/handicraft____

skin for sno-go seat____ skin for parka ruff____ skin for coat____

skin for parka____ skin for hunting pants____ skin for mittens____

claws for ornaments____ claws for fish hooks____ other handicraft____

d.comment on other uses:_____

_____

_____

e. I found____ dead polar bear.

f. They were: fat____ medium____ skinny____

13.Please mark walrus haul out places on the map provided.

a. Are there more walrus seen in haul out places? (both old and new places)

yes____ no____ don't know____

comment:_____

_____

_____

b. Are there more walrus seen on top of ice floes? yes____ no____

comment:_____

_____

c. Does the walrus diet seem to be the same, based on stomach contents?

yes____ no____

Please explain:_____

_____

_____

14.This one Question is for Gambell residents only:

a. Do you use the community freezer? yes____ no____

15.Have you noticed an increase or decrease of any of the following animals:

Walrus:	increase____	decrease____	same____	don't know____
oogruk/mukluk:	increase____	decrease____	same____	don't know____
spotted seal:	increase____	decrease____	same____	don't know____
ringed seal:	increase____	decrease____	same____	don't know____
ribbon seal:	increase____	decrease____	same____	don't know____
belukha:	increase____	decrease____	same____	don't know____
black whales:	increase____	decrease____	same____	don't know____
sea lions:	increase____	decrease____	same____	don't know____
polar bear:	increase____	decrease____	same____	don't know____
gray whales:	increase____	decrease____	same____	don't know____
minke whales:	increase____	decrease____	same____	don't know____

16.Do you know the traditional hunting laws or traditional hunting rules of your subsistence hunting area? If so, could you explain something about them in your own words?

_____

_____

_____

_____

17.Do you have any additional comments you want to make on this research or topics of this research project?_____

_____

The Eskimo Walrus Commission is looking to you, the subsistence hunter, to help them in helping you to continue to meet your subsistence needs. We appreciate the inform--ation you share with the Commission on this Marine Mammal Reaearch Project.

DIVISION OF SUBSISTENCE NOME RESOURCE SURVEY

DATE: _____ HOUSEHOLD I.D. #: _____

(1) Household Member (Relation to head of household)	Age	Sex	I work in Nome as: (within the last year)	I travel away from home to work as: (within the last year)

(2) How long have you lived in Nome? _____

(3) If you are from another village, where did you live before moving to Nome?

_____ (village) _____ (date)

(4) Within the last year, did members of your household go after the following foods? (please check) Where? (Nome or village-locale):

Foods	Locale
____ Salmon (subsistence)	_____
____ Salmon (commercial)	_____
____ Herring	_____
____ Tomcod	_____
____ Whitefish	_____
____ Capelin (cigar fish)	_____

____	Ling cod or Burbot	_____
____	Char	_____
____	Trout or Grayling	_____
____	Halibut or Flounder	_____
____	Pike	_____
____	Ducks/Geese/Cranes	_____
____	Ptarmigan	_____
____	Arctic Hare or Rabbits	_____
____	Brown/Black Bears	_____
____	Caribou	_____
____	Moose	_____
____	Egg gathering	_____
____	Greens/Roots	_____
____	Berries	_____
____	Crabs	_____
____	Clams	_____
____	Other	_____

(5) Members of the household support the household in the following ways (please check). Where? (locale):

	Activity	Locale
____	Trapping	_____
____	Wood craft	_____
____	Knitting	_____
____	Carving	_____
____	Basket Weaving	_____
____	Sewing	_____
____	Other	_____

(6) Does this household have a boat(s)? yes _____ no _____

a. If yes, what type(s)?

skinboat _____ aluminum _____ wood _____ fiberglass _____

canoe _____ kayak _____ cabin cruiser _____ raft _____

(7) Do you hunt walrus? _____ yes _____ no

(7a) If yes, for the last year (Sept. 1981 to Sept. 1982) please estimate the number of walrus taken for each month that you hunted walrus.

	1981				1982								
(month)	S	O	N	D	J	F	M	A	M	J	J	A	S
(number)													

(7b) How do you use walrus? (please check):

Food _____ Other _____

Raw Material _____

Comment on other uses: _____

(8) Do you hunt oogruk/mukluk? _____ yes _____ no

(8a) If yes, for the last year (Sept. 1981 to Sept. 1982) please estimate the number of oogruk taken for each month that you hunted oogruk/mukluk.

	1981				1982								
(month)	S	O	N	D	J	F	M	A	M	J	J	A	S
(number)													

(8b) How do you use oogruk/mukluk? (please check):

Food _____ Other _____

Raw Material _____

Comment on other uses: _____

(9) Do you hunt spotted seal? _____ yes _____ no

(9a) If yes, for the last year (Sept. 1981 to Sept. 1982) please estimate the number of spotted seal taken for each month that you hunted spotted seal.

	1981				1982								
(month)	S	O	N	D	J	F	M	A	M	J	J	A	S
(number)													

(9b) How do you use spotted seal? (please check):

Food _____ Other _____

Raw Material _____

Comment on other uses: _____ _____

(10) Do you hunt ringed seals? _____ yes _____ no

(10a) If yes, for the last year (Sept. 1981 to Sept. 1982) please estimate the number of ringed seal taken for each month that you hunted ringed seal.

	1981				1982								
(month)	S	O	N	D	J	F	M	A	M	J	J	A	S
(number)													

(10b) How do you use ringed seal? (please check):

Food _____ Other _____

Raw Material _____

Comment on other uses: _____

(11) Do you hunt ribbon seals? _____ yes _____ no

(11a) If yes, for the last year (Sept. 1981 to Sept. 1982) please estimate the number of ribbon seal taken for each month that you hunted ribbon seal.

	1981				1982								
(month)	S	O	N	D	J	F	M	A	M	J	J	A	S
(number)													

(11b) How do you use ribbon seal? (please check):

Food _____ Other _____

Raw Material _____

Comment on other uses: _____

(12) Do you hunt belukha? _____ yes _____ no

(12a) If yes, for the last year (Sept. 1981 to Sept. 1982) please estimate the number of belukha taken for each month that you hunted belukha.

	1981				1982								
(month)	S	O	N	D	J	F	M	A	M	J	J	A	S
(number)													

(12b) How do you use belukha? (please check):

Food _____

Raw Material _____

Other _____

Comment on other uses: _____

(13) Do you hunt black whales (bowhead/right)? _____ yes _____ no

(13a) If yes, for the last year (Sept. 1981 to Sept. 1982) please estimate the number of black whales taken for each month that you hunted black whales.

	1981				1982								
(month)	S	O	N	D	J	F	M	A	M	J	J	A	S
(number)													

(13b) How do you use black whales (please check):

Food _____

Raw Material _____

Other _____

Comment on other uses: _____

(14) Do you hunt polar bear? _____ yes _____ no

(14a) If yes, for the last year (Sept. 1981 to Sept. 1982) please estimate the number of polar bear taken for each month that you hunted polar bear.

	1981				1982								
(month)	S	O	N	D	J	F	M	A	M	J	J	A	S
(number)													

(14b) How do you use polar bear (please check):

Food _____

Raw Material _____

Other _____

Comment on other uses _____

(15) Do you have any additional comments you want to make on this research or topics of this research project.

_____

_____

_____

_____

_____

_____
Interviewer Signature

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