

NOATAK:
SEASONALITY OF BIRTH IN AN IÑUPIAQ VILLAGE
IN NORTHWEST ALASKA

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INTRODUCTION

There is a long history of interest in the phenomenon of seasonal variation in human births. Hill (1888) studied birth cycles and their relation to weather and holiday festivals in India. Heape (1909) systematically investigated human birth seasonality. Westermarck (1922) devoted a chapter in *The History of Marriage* to evidence of such seasonality and argued that it is especially strong among "primitive peoples." In fact, many subsequent anthropological studies report seasonality of birth in a variety of cultural, economic, and environmental settings and for different historical periods.

Seasonality of birth is of interest to anthropologists because such seasonality can be interpreted as a human response to environmental fluctuations (Leslie and Fry 1989: 103). The most commonly reported explanations for birth seasonality are summarized in Lam and Miron (1991): (1) weather (which can affect the probability of conception or the frequency of coitus); (2) agriculture (because labor demand can affect the desired timing of births or the absence of spouses from home); (3) other economic variables (such as labor migration or seasonal absence for resource exploitation); (4) holidays (because festivities can affect the frequency of sexual activity; and (5) marriage (in communities in which marriages are seasonal and sexual activity tends to take place between married couples) (as listed in Madrigal 1993: 256).

Borgerhoff Mulder (1992) recently studied the Datoga, a semi-nomadic pastoral population in northern Tanzania, and found a marked

seasonal distribution of birth only partly associated with rainfall. Clark and Thompson (1987) looked at data for 1980-1984 from rural Greene County, Alabama and discerned a seasonal trend in births, with a peak between August and November (like the United States as a whole). Leslie and Fry (1989) examined the nomadic Turkana of northwest Kenya and concluded that rainfall drives a highly seasonal distribution of births. Malina and Himes (1977) compiled data from 1945 to 1970 for a rural Zapotec farming community in Oaxaca and found birth seasonality associated with the rainy season. Mosher (1979) examined data from 1926 to 1976 for a rural Taiwan fishing community and concluded that for peasant cultivators the annual cycle of production exerts a more decisive influence on birth seasonality than time of marriage, temperature, rainfall, or workload. Nonaka et al. (1990), looking at French Canadian population birth records for 1621-1765, found a bimodal pattern of birth seasonality influenced by both month of marriage and mother's month of birth. Roenneberg and Aschoff (1990a, b) compiled worldwide data for 1669-1981, and noted a seasonal component in human births based on biological factors rather than social factors. They found that the biological rhythm of conceptions was primarily influenced by environmental factors of photoperiod and temperature, and that seasonality of birth is declining with industrialization. These studies all emphasized an environmental component of human birth seasonality.

Yet some studies find a strong cultural component to seasonality of birth. Of particular interest are works by Condon (1982, 1983, 1991) and Condon and Scaglione (1982), which examine birth seasonality in the Central Canadian Arctic. These studies in the far north find evidence that fertility may be affected by seasonal variations in light intensity and

duration, and that cultural factors mediate between the environmental rhythms and human fertility and birth patterns (Condon 1991: 287).

Condon identifies the following social and economic changes as critical in accounting for the sudden disappearance of birth seasonality in the 1980s: (1) increasing reliance on wage employment and social assistance; (2) decreased dependence on subsistence hunting and trapping; (3) changing attitudes on the part of young people entering prime reproductive years; and (4) the introduction of television, radio, and southern-style recreation activities (Condon 1991: 287). While Condon's conclusions are not without some controversy, another study in the same area appears to support his findings.

Van de Velde et al. (1993) studied data from 1863-1978 for the Arviligjuarmiut Inuit of the Central Canadian Arctic, and noted statistically significant seasonality of births only in the period prior to 1938. They concluded that seasonality of births is related to mobility rather than environmental factors -- few conceptions occur when mobility is high; more conceptions occur when mobility is low. They note that:

this relation between mobility and seasonality confirms Condon's (1991) conclusion that, despite direct biological effects of environmental factors (photoperiodicity and possibly temperature), birth seasonality is to a large extent culture-mediated and is thus influenced by socioeconomic as well as by ideological factors ... this explains the differences in circannual birth patterning between different arctic regions (Van de Velde et al. 1993: 33).

Indeed, seasonality of births has been considered an almost universal human phenomenon (Lam and Miron 1991; Madrigal 1993: 256). Only a few studies report a lack of seasonality of birth. For instance, Madrigal (1993) looked at baptism records from 1851 to 1901 for Escazu, Costa Rica (a peasant community at that time) and found no indication

that temperature or rainfall influences seasonality of births. Indeed, Madrigal suggests that seasonal patterns of human birth distribution may not be as universal as most literature would indicate (Madrigal 1993: 270).

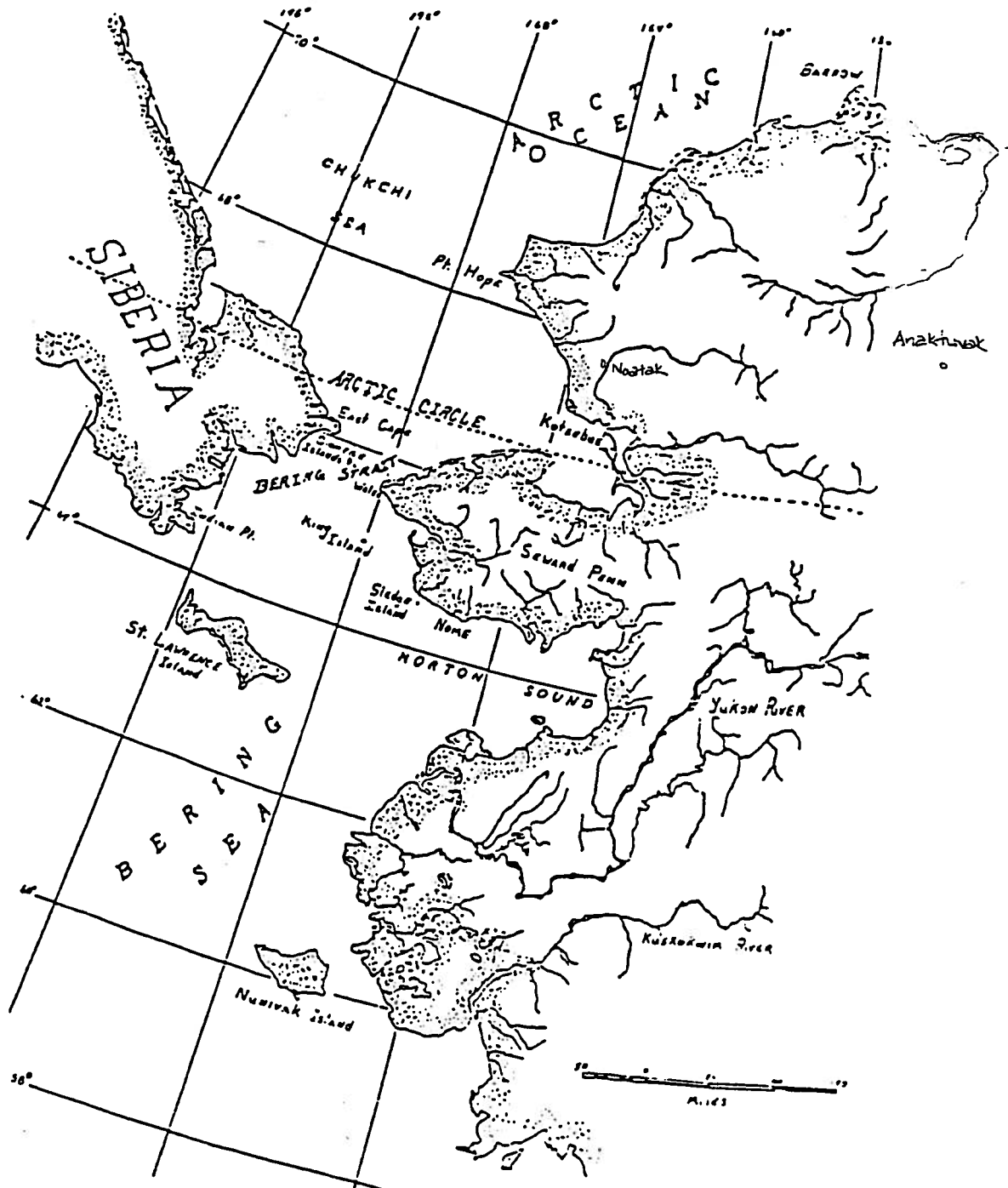
Seasonality of birth rarely has been a focus of study in Iñupiat (Eskimo) hunter-gatherer populations in Alaska. Of particular interest to this paper are two studies which gathered and analyzed data pertaining to seasonality of birth -- Binford and Chasko's (1976) study of the Nunamiut (inland arctic Iñupiat) and Ellanna's (1983b) study of Bering Strait insular Iñupiat and Siberian Yup'ik.

The Nunamiut people have depended on hunting caribou in the mountains of the central Brooks Range for almost 200 years (Hall 1984: 339). In the early 1950s, the Nunamiut settled more or less permanently in the village of Anaktuvak Pass (Hall 1984: 344) (see Figure 1). Binford and Chasko (1976: 134) found marked seasonality of birth for the Nunamiut of Anaktuvak, with an overall decline in seasonal patterns of birth concurrent with centralization.

Before centralization, the Nunamiut relied on caribou for 90 percent of their diet when they were inland, as well as for skins for clothing, sinew for sewing, and bone and antler to make tools and such (Hall 1984: 341). When the caribou migrated through Nunamiut territory in great numbers in the spring and fall, the Nunamiut conducted large-scale drives; at other times of the year, small bands were hunted or snared by the men (Hall 1984: 341). The spring drive was not sufficient to last the summer,

Figure 1

Location of Communities in Alaska
with Data on Seasonality of Birth



Based on: Ellanna 1983a: 12

since caribou tend to be thin and in poor condition in the spring (Binford and Chasko 1976: 101). Thus, summer settlements were generally near a good fishing lake, where women fished and trapped ground squirrels, while the men ranged far afield in search of caribou and sheep (Binford and Chasko 1976: 101). The Nunamiut seasonal round also included regularized seasonal movement to the north arctic coast. Families travelled north along the Colville river to its mouth on the coast to trade caribou skins and sinew for marine mammal products at the summer Nigliq trade fair (Hall 1984: 342). This movement was structured by marriages and kin ties, and was variable -- some families made the journey some years but not other years; other families didn't follow this move to the coast at all but remained inland. The Nunamiut were thus highly mobile, and tended to move even more frequently as resources became scarce. Male absenteeism corresponded to the differential seasonal frequencies of birth (Binford and Chasko 1976: 94).

With centralization and the concurrent change in diet (as store bought goods became more available and utilized), the patterns of birth seasonality changed. Binford and Chasko cited increased carbohydrate consumption and increased stability in yearly caloric intake as determinants in the shift in patterns of seasonality (Binford and Chasko 1976: 131). However, the population still maintained a strong dependence on caribou and exhibited marked seasonal variations in births (Binford and Chasko 1976: 134).

Ellanna (1983b) studied the villages of Gambell and Savoonga on St. Lawrence Island, King and Little Diomed Islands, and the mainland community of Wales (see Figure 1). These Bering Strait insular or insular-like communities, traditional hunters of large marine mammals,

also exhibited distinct seasonality of birth (Ellanna 1983a: 497), though seasonality had been declining in more recent years.

The Iñupiat and Yup'ik peoples in Ellanna's study depended heavily on males organized into skinboat crews hunting whales (primarily bowhead, much less commonly gray, and some belukha) and/or Pacific walrus, as well as a variety of seals (ugruk, spotted, ribbon) (Ellanna 1983a: 4). The walrus and whales are migratory species that travel mainly in groups, while seals that migrate tend to be more dispersed (Ellanna 1983a: 33-36). Women exploited terrestrial and marine fauna, and people of both sexes and a broadly defined cohort also took migratory waterfowl, sea birds, fish, and terrestrial and marine fauna as available (Ellanna 1983a: 18-28). Still, marine mammals were (and are) reliable focal resources. The Natives of Bering Strait were able to live in seasonally centralized villages, which were occupied for very long periods of time. While the Nunamiut and the Bering Strait Iñupiat had distinctly different adaptations -- inland versus coastal, highly mobile versus centralized -- they both depended heavily on resources which were migratory and nucleated.

Noatak, on the other hand, is a riverine community originally comprised mainly of two different Iñupiaq groups. The Napaaqtugmiut of the lower Noatak River depended upon caribou, seals, fish, and a variety of resources. The Nuataagmiut of the upper Noatak River depended more heavily on caribou, but they also took some belukha, many fish, and a variety of other resources. While the Nuataagmiut seem more similar to the Nunamiut in their reliance upon caribou they hunted a different herd of caribou in a different fashion. They also seem to have closer ties to the coast and access to a wider variety of resources, for few remained inland

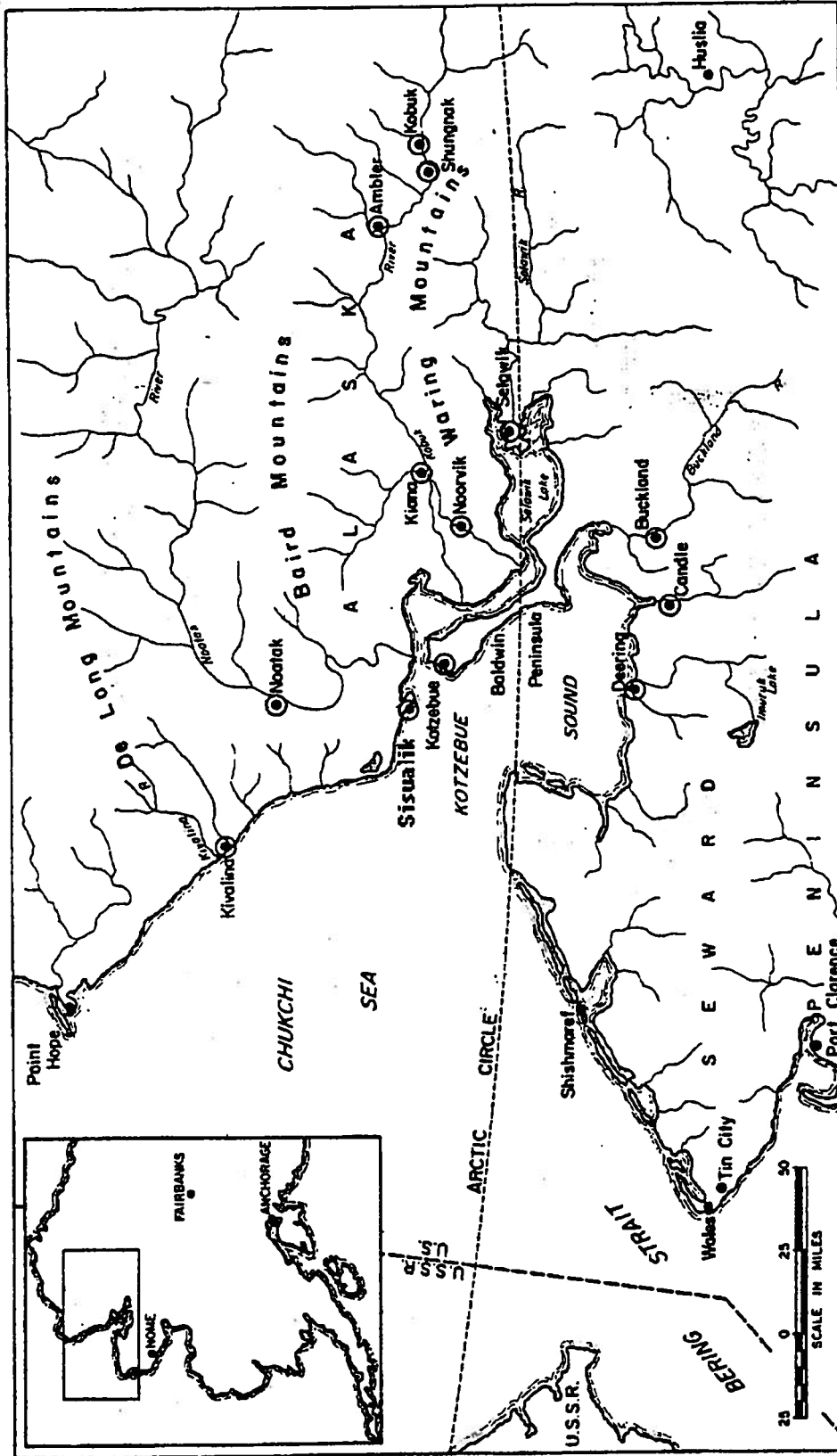
year round. In other words, these Iñupiat peoples did not depend mainly on nucleated migratory resources but, instead, on a myriad of resources, some of which were neither migratory nor nucleated.

The similar dependence on nucleated, migratory resources and exhibition of seasonality patterns for the Nunamiut and the Bering Strait Iñupiat and Yup'ik, and the distinct difference in resource utilization patterns between these two groups and the people of Noatak, raises an interesting question. Can we expect to find distinct patterns of seasonality of birth in a riverine adapted Iñupiat community, as well as in inland and coastal adapted Iñupiat communities which depend heavily on nucleated migratory resources? In other words, is seasonality of birth an inherent feature of Iñupiaq demography in general -- a widespread Iñupiaq trait? Is seasonality a product of environmental factors? Or is it inherent in Iñupiaq culture? This question is pursued by examining seasonality of birth for the people of Noatak.

PHYSICAL ENVIRONMENT

The study area is roughly synonymous with the Kotzebue Sound region, or Northwest Alaska Native Association (NANA) region (see Figure 2). This northwest area encompasses some 36,000 square miles bordering Kotzebue Sound between Cape Thompson and Cape Espenberg, and reaching inland up those rivers (Noatak, Kobuk, and Selawik) that drain into the sound in the area (Burch 1984: 303). Entirely above the arctic circle, the area is subject to extremes of light and dark. In summer, the

Figure 2
The Northwest Alaska Study Area



Source: Kevin Waring Associates 1988: 3

sun never sets for days; in winter, the sun never climbs above the horizon for days. The area is also varied in climate, topography, vegetation, and resources.

The northwest region has an arctic climate, with local variations. The coastal areas have long cold winters and short cool summers, little annual precipitation (8-9 inches), and frequent winds. Temperatures range from -52°F to 85°F (Burch 1984: 303). The flats near the village of Noatak are relatively warmer in summer and colder (though less windy) in winter (Burch 1994: 91). Temperatures range from below -60°F to a maximum of above 100°F (Burch 1994: 91). Inland regions have an arctic continental climate, with long cold winters, short variable (30°F to 90°F) summers and little precipitation. Temperatures are extreme, commonly ranging between -60°F and 90°F (Burch 1994: 117, 118).

The topography of the region is also varied. Most coastal areas are low-lying, with some rolling hills, and much standing water. The Brooks Range is the northwestern extension of the Rocky Mountains, and the peaks between the upper Noatak and upper Kobuk rivers are high and rugged. The Noatak River, the focus of the larger study area, is some 450 miles long from its headwaters in the Brooks Range to its mouth at Kotzebue Sound. The river runs through varied terrain -- from the high, rocky headwaters, through tundra, scrubby deciduous trees, and through spruce forest. Much of the region is underlain by permafrost, where the ground remains frozen year round at some depth.

Tundra vegetation (lichens, mosses, grasses, and sedges) prevails throughout the region, with willows and alders nestling next to streams. Spruce trees grow along the banks and valley floors of the Noatak, Kobuk, Selawik and some smaller rivers in the region (Burch 1984: 303). Berries

-- blueberries, cranberries, salmonberries, crowberries -- abound. Other harvestable flora include greens, roots, shrubs (with edible or otherwise useful bark), mosses, and trees, especially including driftwood (Burch 1984: 306).

Animal resources important to indigenous peoples in the study area are many and diverse. Several species of marine mammals (belukha, bearded seals, ringed seals, spotted seals, a few Pacific walrus, and bowhead whales near Point Hope) are taken, as are large terrestrial mammals (caribou, recently moose, black, brown, and polar bears). Small game (ground squirrels, hare) and furbearers (fox, hoary marmot, wolverine, lynx, wolf, otter, mink, muskrat, ermine) provide food and skins. Abundant freshwater fish (Dolly Varden and arctic char, grayling, ling cod, lake trout, pike, suckers, several species of whitefish, sheefish, burbot, arctic cod) and some species of anadromous salmon (pink and chum) are important food sources. And birds -- abundant migratory waterfowl (many species of ducks and geese), sandhill cranes, whistling swans, pelagic birds, ptarmigan, and snowy owls -- round out the diverse resource base (Burch 1984: 306; 1994: 92). These resources, in all their diversity, provide a broader range of possibilities than those available to either the Nunamiut or the Bering Strait insular and insular-like Natives.

CULTURAL SETTING:

THE NATIVES OF NORTHWEST ALASKA

The northwest region of Alaska has been inhabited by hunter-gatherers for many thousands of years (Anderson 1984: 80). As the region

is varied ecologically, so are the peoples of the region diverse. While the population is mainly Iñupiat, bordering Athabaskan Indians (Koyukon) along the upper Kobuk River and, at times in the past, the upper Noatak River, the assumption of one homogeneous Iñupiat culture is naive. Burch identified 10 different “societies,” or socioterritorial units, living in the region in the early 19th century (see Figure 3):

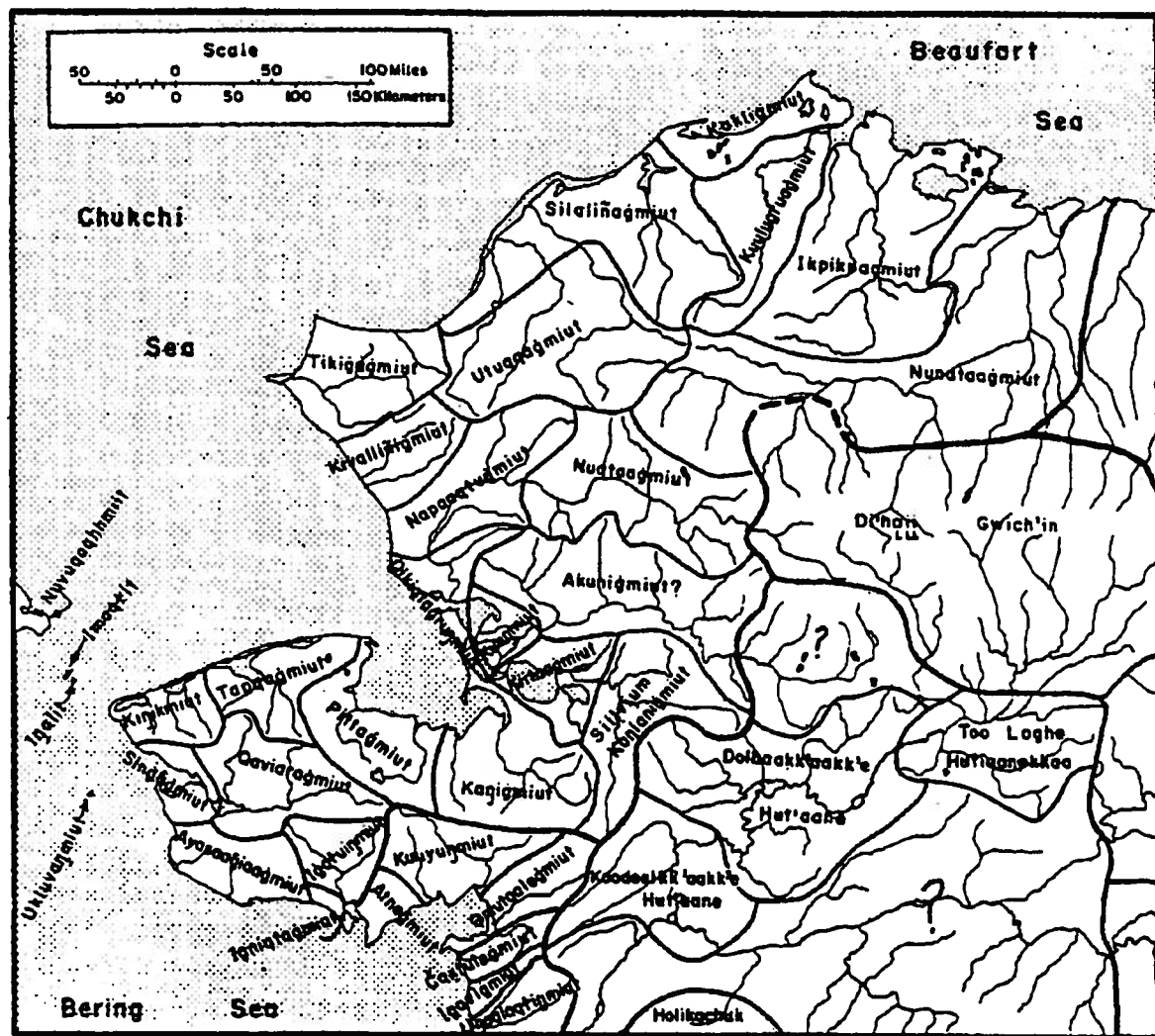
- (1) Kivalinigiut, of the Kivalina and Wulik river drainages and adjacent coastline;
- (2) Napaaqtugmiut, of the lower Noatak River basin, and the Chukchi Sea directly to the west;
- (3) Nuataagmiut, of the upper Noatak River basin;
- (4) Qikiqtagrunmiut, of the extreme lower Noatak River, Baldwin Peninsula, and the northern shore of the inner reaches of Kotzebue sound;
- (5) Kuungmiut, of the Kobuk river basin;
- (6) Akunigiut, of the middle Kobuk River basin;
- (7) Kuuvaum Kangianigiut, of the upper Kobuk River drainage;
- (8) Siilvingmiut, of the Selawik River basin;
- (9) Kangigiut, of the Buckland river drainage and adjacent coastline; and
- (10) Pitagiut, of the Goodhope river and the coastline adjacent to its mouth (Burch 1984: 303).

The focus in this study is primarily on the Napaaqtugmiut and the Nuataagmiut.

Burch has recently revised his analysis, dividing the Siilvingmiut into two groups -- the Siilviim Kangianigiut of the Upper Selawik and the Kiitaagmiut of the Lower Selawik (Burch 1994: 5). He also changed the

Figure 3

Political Map of Northwestern Alaska in the Early 19th Century



Source: (Burch 1994: 4)

terminology “societies” to “nations,” to reflect the words and meanings of his Iñupiaq elder sources. Burch’s sources referred to the groups as nunatqatigiit in Iñupiaq, and as “nations” in English (Burch 1994: 1).

Burch defines and defends the use of “nations” as follows:

“Nation” is an appropriate word to use, because nunatqatigiit were, in fact, analogous to countries, or nations, in the modern world. Like modern nations, those of early nineteenth century northern Alaska had dominion over separate territories, their citizens thought of themselves as being separate peoples, and they engaged one another in war and in trade. However, they were tiny in comparison to modern nations, never involving more than a few hundred people. They were comprised entirely of closely interrelated families, and they lacked governments and most of the other organizational trappings of nations as most of us have come to understand them. In addition, their members followed distinctive annual cycles of movement, wore distinctive styles of clothing, and spoke distinctive subdialects of the Iñupiaq language (Burch 1994: 1).

In addition, for a generation or two (or possibly longer), the extreme upper Noatak valley was occupied by the Dihai Kutchin (Di’haii Gwich’in) (Burch 1984: 303; 1994: 5) and after about 1870, by the Nunamiut Iñupiat (Burch 1984: 303).

As these different Iñupiaq groups inhabited different local environments, so were their ecological adaptations to the interior, riverine, and coastal environments different. There was some overlap in use of resources, as people traveled extensively along the rivers, inland, and to the coast. While each group maintained identifiable and distinct social systems, each was not an entirely separate economic system. Travel to the coast and trade brought much contact between groups.

Variations of the Malimiut dialect of the Iñupiaq language were spoken by all these groups (with the possible exception of the

Kivalinigmiut, who may have spoken the northern dialect), though there were local variants (i.e., between the Noatak River and the Kobuk River). Distinct dialectical variations characterize societal differences. Yet despite differences in local dialects, people from throughout the region were able to understand each other's language. Indeed, they had extensive contact with each other -- as they pursued their seasonal rounds, and particularly at the large trade fairs on the coast at Sisualik (Sheshalik) in the summer. An overview of Euro-American exploration, trade, and ensuing impacts will aid in an understanding of the changes in the ways of life for the Iñupiat of the Noatak region.

EURO-AMERICAN EXPLORATION AND TRADE IN THE NORTHWEST REGION

Euro-American exploration and trade have had many impacts in the northwest region, some of which may have influenced the inhabitants demographically. For instance, the following factors can be of demographic significance: changing settlement locations or patterns; changing socioteritorial or political boundaries; changing marriage patterns; and changing resource pursuit or utilization. These factors can be seen as impacts of Euro-American exploration and trade in northwest Alaska.

The northwest region of Alaska was explored less thoroughly and, in many places, later than the southern regions. Indeed, the interior of the northwest region remained unexplored until the late 19th century. The coastal areas were an initial primary focus, as Europeans sought to understand the geography of Alaska. The fur trade, to the south, and then

the whaling industry, along the coast, brought further impacts. Yet even before direct contact with Europeans, residents of coastal and interior northern Alaska did have access to European trade goods, through their own extensive trade networks.

Indeed, Iñupiat in northwest Alaska had access to trade goods much earlier than those in southwest Alaska. When the Russians established trade in northeastern Siberia in the mid-17th century, European trade goods began to move from the Chukchi and Siberian Yup'ik through the Natives (both Iñupiat and Yup'ik) of the Diomed Islands, the Seward Peninsula, and Kotzebue and Norton Sounds into northwestern Alaska and the Bering Strait islands (VanStone 1984: 154). By the early 18th century, the people of Sledge Island, the Diomedes, Cape Prince of Wales, and East Cape, Siberia were the middlemen for this extensive trade (Ray 1964: 86, VanStone 1984: 154). Traditional trading centers such as Sisualik on Kotzebue Sound (see Figure 2) became distribution centers for the European trade goods (and focal points for Euro-American traders and influence), while continuing to be important for the trade between Native groups. Such goods were distributed through indigenous trade networks throughout northwest Alaska, as well as in the Yukon and Kuskokwim regions (Ray 1964: 86, 1975: 97-102).

While the Russians (and Russian-American Company) dominated exploration and exploitation of the southwest Alaska throughout the last half of the 18th and the first half of the 19th centuries, northwest Alaska remained little explored by Europeans in the 18th century. Between 1776 and 1780, Captain James Cook explored much of the coast between Bristol Bay and Icy Cape. In late August and September of 1778, hampered by fog and ice, Cook sighted the general areas of the Mulgrave Hills, Cape

Lisburne, and Icy Cape (Foote 1961: 15). The following year, after Cook's death, Captain Clerke led the same expedition to the area, but again apparently did not go ashore (Foote 1961: 15). This thorough exploration of the coastline allowed the map of Alaska to begin to take its true shape (VanStone 1984: 152).

Cook and Clerke's expeditions also contributed to the Russian push to emphasize their claim to all Alaska. Thus, Otto von Kotzebue sailed in the *Rurick* in 1815 to explore what is now Kotzebue Sound. From August 1 to 14, 1816, Kotzebue's party explored the shores of the sound. They were perhaps the first Europeans to meet some or most of the Iñupiat there, and they saw many people, baidaras (open skin boats), and dwellings (Kotzebue 1821: 206-240). Kotzebue's "Chart of Beering's Straits" noted the locations many Native dwellings around Kotzebue Sound and Hotham Inlet, including six "habitations" between Cape Krusenstern and the tip of the spit at Sisualik (Kotzebue 1821: 237, 360).

In 1824, Capt. John Franklin and Capt. Parry of England's Royal Navy, attempted to sail west around from the Mackenzie River. In 1825 Capt. Frederick William Beechey sailed the *HMS Blossom* from England for the Bering Strait, to meet Franklin and Parry (Beechey 1831a: vi). During the summers of 1826 and 1827, Beechey searched for Franklin along the coast between Kotzebue Sound and Point Barrow, making detailed observations of the arctic coast and its inhabitants (Beechey 1831a: 342-460, Foote 1961: 16). Beechey's notes described several villages and encounters with Natives. Beechey also noted evidence of trade -- at Cape Thompson, Iñupiat had broad-headed iron spears (Beechey 1831a: 360); near what is now Wainwright, Natives had iron knives and iron kettles (Beechey 1831a: 373); at Point Barrow, Iñupiat had copper kettles (Beechey 1831b: 306);

and at Kotzebue Sound, Natives had an Empress Catherine Russian coin, the head of an Asian halberd and tobacco (Beechey 1831a: 409, 411). Beechey listed natural resources used at Kotzebue Sound -- wolverine, polar bear, beaver, caribou, ermine, arctic fox, white hare, marten, muskrat, otter, seal, walrus, wolf, herring, salmon, trout, cranberries, and whortleberries (Beechey 1831a: 343). Beechey also noted summer activity along Kotzebue Sound -- during July and August, extensive fishing and fish drying; in early September, people began to move along the coast or inland.

It was not until 1837 and 1838 that the Europeans sailed along the north coast again. Thomas Simpson and Peter Warren Dease, of the Hudson's Bay Company, sailed west in 1837 from the Mackenzie River to Point Barrow and back. Simpson noted several facts which led him to believe that an Eskimo trade route existed, possibly down the Colville River. There were Eskimos with Russian knives on Barter Island; knives and buttons of Russian manufacture on the Mackenzie River; the people west of Tangent Point requested tobacco, while those east appeared not to know of it; and iron kettles at Camden Bay (as opposed to the copper kettles at Point Barrow) (Simpson 1843: 103).

By the 1840s, Natives in northwest Alaska had at least rudimentary knowledge of Europeans, if not much actual contact. Trade goods were available on a small scale, through both indigenous trade routes and direct contact with European traders. Traditional trading centers such as Sisualik on Kotzebue Sound (which were visited yearly by people of the Noatak River) remained distribution centers for the European and Native trade goods. From there, trade goods were distributed throughout northwest Alaska, as well as in the Yukon and Kuskokwim regions, and on such a scale that the Russians became concerned that they were missing

out on valuable trade (Van Stone 1984: 155).

In 1842-1844, the Russian-American Company sent Lt. Lavrentii Zagoskin to explore the Buckland, Koyukuk, Yukon, and Kuskokwim rivers (Zagoskin 1967: 82). Aware of the existing widespread Native trade, the company wanted to usurp the trade for the middle Yukon, rather than have the furs go to the Seward Peninsula, through Iñupiat middlemen, and across Bering Strait to the Chukchi (Zagoskin 1967: 82). Zagoskin penetrated the Yukon almost to the mouth of the Tanana, as well as the Kuskokwim and Koyukuk rivers, and produced a detailed report of the fur trade and of the many Iñupiat and Indians whom he contacted (Zagoskin 1967: 79-283). Still, the Russian-American company did not disrupt the Native trade through Sisualik. And it wasn't until the whaling industry inundated the northwest and western coast of Alaska in the 1850s (Bockstoe 1986: 9) that the northern interior received some spurious interest.

The expeditions prior to the middle of 19th century had relatively limited influence on the coastal peoples of northwest Alaska. However, around 1848, two different groups began to have a major impact on the people along the coast of northwest Alaska -- the searchers for the Sir John Franklin's lost ships and crew, and the American commercial whalers who had discovered an arctic whale fishery north of Bering Strait.

In 1845, Franklin sailed west from the eastern Canadian Arctic, looking for the fabled northwest passage. After three years with no word, the search for Franklin began. Capt. Henry Kellett with the *HMS Herald*, Comm. Thomas Moore and the *Plover*, and Robert Sheddon with the yacht *Nancy Dawson* sailed north past Point Hope in July of 1849. They made frequent contact with Iñupiat along the coast, and a small party even made it all the way to the Mackenzie River. The *Herald* and the *Nancy Dawson*

sailed south at the end of the summer, while the *Plover* wintered over at the Choris Peninsula. During that winter, crew members had frequent contact with the Iñupiat of Kotzebue Sound. It is possible that some Noatak River natives were among those contacted, though more likely that most were upriver during that winter and therefore heard secondhand about the *Plover* and her crew. The ships continued to search for Franklin during the summers of 1850, 1851, and 1852, spending the two intervening winters at Port Clarence. The British searched the coast between Kotzebue and Point Barrow, and Dr. John Simpson took the extensive notes that provide a detailed account of northwest Iñupiat at that time (Simpson 1875).

The American whaling interest began with the Capt. Roys and the *Superior*, which sailed through Bering Strait in 1848. After catching her full of bowhead whales in less than two months (Bockstoce 1986: 93), the *Superior* returned to Sag Harbor, New York. The following year, over 150 whalers repeated Roys's voyage, as did 130 in 1850 (Bockstoce 1986: 93, 95). In 1852, the number of whaling ships in the Arctic Ocean and the Bering Sea reached a peak of 220, with only erratic success at catching whales (Bockstoce 1986: 97). The British ships searching for Franklin reported frequent sightings of American vessels.

The need for fresh water and food, and the desire to trade, soon brought the American whalers and the Alaskan Natives into direct contact with Euro-Americans. By the summer of 1851, six small trading vessels were operating in the Bering Strait (Bockstoce 1986: 182). Around this time, Natives first requests for payment included rum (though little was available), tobacco, and knives (Bockstoce 1986: 183). The Iñupiat now began to receive trade goods in larger quantities. The whalers were

interested in baleen, and traded with the Natives for it, while also taking large amounts with their own ships (Bockstoce 1986: 184). By 1859, guns and powder were among the favored trade items, at least for Bering Strait if not for further north and east (Bockstoce 1986: 185). Some Natives worked on the whaling vessels and at whaling stations on shore, clearly changing settlement patterns and seasonal rounds. By 1887, common trade and payment goods included tobacco, knives, some firearms and ammunition, flour, bread, matches, hatchets, thimbles, thread, needles, and beads (Bockstoce 1986: 193). Trade became more important to the whalers as the demand for baleen decreased near the end of the 19th century. Some vessels began to rely more on trading than whaling as bowhead grew increasingly scarce (Bockstoce 1986: 202). Such ships established the first regular trade contacts with settlements in northwest Alaska (VanStone 1984: 155).

The whalers had tremendous influence through their trade goods, as well as deleterious health impacts (Wolfe 1982; Fortune 1989), and their ships served to draw people in the summer. Ships that overwintered also acted as magnets, drawing Natives to trade and observe. Settlement patterns changed as Natives began to include whaling stations in their seasonal rounds. Yet by 1920 the whaling period had ended, and other activities became foci for change for the Iñupiat of northwest Alaska.

The United States Navy and the Department of the Treasury Revenue Marine explored the rivers flowing into Kotzebue Sound in the 1880s, and several reports were published (Healy 1887, 1889; Hooper 1881; Stoney 1965). The U.S. Geological Survey thoroughly explored the northern interior after 1900 (Schrader 1904; Smith 1913; Smith and Mertie 1930). These were the first American expeditions to fully reach into Nuataagmiut

territory.

Mining was a major economic activity throughout much of Alaska, beginning in the late 1800s. Northwest Alaska saw some mining impacts, though not on the scale of the Yukon River and its tributaries. Some individuals went north on whaling ships, hoping to reach gold fields in Nome and farther north. While some miners left the ships in Iñupiat villages, and stayed for a year or more, they contributed little in the way of ideas and goods. The Kobuk and Noatak Rivers were explored by miners, yet there were no great finds reported like those at Nome. The whaling ships and missionaries brought more of the Euro-American social and material culture to the Iñupiat of northwest Alaska (VanStone 1984: 156).

As Natives of the Noatak were exposed to this Euro-American culture, many aspects of their lives were altered. Changes in settlement patterns (centralization), subsistence patterns, and in religious practices are readily discernable. In addition, such changes can bring about shifts in a population's demography. As previously noted, seasonality of birth can be responsive to such changes.

SEASONAL ROUND: AN ANNUAL CYCLE

A RECONSTRUCTION OF THE NAPAAQTUGMIUT AND NUATAAGMIUT SEASONAL ROUND PRIOR TO 1850

Don Charles Foote undertook extensive studies of the northwest region in the early 1960s as part of the Human Geographical Studies Program for the United States Atomic Energy Commission associated with Project Chariot. The politically controversial project proposed to make a deep sea harbor by means of nuclear blasting near Cape Thompson, but was

never completed (see *The Firecracker Boys* (O'Neill 1994) for more background on Project Chariot). Ernest S. Burch, Jr. has also undertaken extensive studies of the northwest region, beginning in the 1960s and continuing to the present. His work extends and builds upon Foote's, in light of more recent understandings. Taken together, the work of Burch and Foote provides valuable reconstructions of the seasonal rounds for the Napaaqtugmiut and the Nuataagmiut in the early to mid-19th century.

The Napaaqtugmiut

The Napaaqtugmiut, or People of the Spruce, probably numbered in the several hundreds around 1850 (Foote 1961: 32), though estimates are hard to reckon. Burch estimates the Napaaqtugmiut population at 264-336 for the early 19th century (Burch 1994: 94). Napaaqtugmiut territory included the lower Noatak River basin, mainly between the Kugrak River and the Igichuk Hills, extending all the way to the coast (see Figure 4).

In June, the Napaaqtugmiut were settled along the Chukchi Sea coast (see Figure 5), between the Kivalinigmiut spring settlement to the north and the Qikiqtagrungmiut spring settlement to the south. The spring and summer dwelling was the galuugvik -- a dome-shaped home consisting of portable willow poles with a caribou skin cover (Burch 1994: 102; Foote 1961: 32). As breakup began, bearded seal hunting was the most important subsistence pursuit (Burch 1994: 95). Ringed seals and the occasional belukha were also taken, as were ducks and geese. Char were caught as they ran out of the rivers and along the shore (Burch 1994: 95). Willow leaves were picked in early June and eaten raw or preserved in seal oil (Foote 1961: 35).

In late June or early July, when the ice and the seals left the coast,

the Napaaqtugmiut prepared to head to Sisualik (see Figure 4). They covered their boats (umiaks) with new bearded seal skin covers, and headed south along the coast in one big flotilla (Burch 1994: 97). At Sisualik, the Napaaqtugmiut camped near the Nuataagmiut, the Qikiqtagrunmiut, and those Kuungmiut who were participating in the belukha hunts. If the belukha hunts were still in progress, the Napaaqtugmiut joined in. Afterwards, the trade fair (katngut) became the primary focus. The trade fair drew hundreds of people from northwest Alaska and beyond, and as such involved extensive trading. It also was a time for feasting, dancing, and games (Burch 1994: 97).

After a short time at Sisualik (perhaps only a week or two), in late July or early August, the Napaaqtugmiut traveled back up the Noatak River in their skin boats. They went to their fall/winter camps, which were chosen in part for proximity to good salmon fishing areas (Burch 1994: 98). Most men headed upriver to hunt caribou, for the hides were prime for clothing (Burch 1994: 98). Some even hunted mountain sheep, when they were looking for caribou in the mountains (Burch 1994: 99). The women, children, and some men fished (for salmon, trout, and whitefish), picked berries (blueberries, cloudberry, cranberries, crowberries, and strawberries), and collected sourdock and masu (Eskimo potato) (Burch 1994: 98; Foote 1961: 33-34). Foote (1961: 33) also reports that the Napaaqtugmiut sometimes hunted caribou on foot between early August and the middle of September, with some Kivalinigmiut and Nuataagmiut. This alternate hunt was mainly for caribou skins.

By freeze up, usually in October, the men returned to the fall/winter settlements. The settlements (see Figure 5) were not only chosen with

salmon fishing in mind, but also for proximity to good areas to fish for char, grayling, and ling cod after freeze up (Burch 1994: 99). The settlements also had an abundance of willows -- to provide shelter from the wind, for fuel, and as habitat for hare and ptarmigan (Burch 1994: 99). The women began to make clothing, and continued to fish, now assisted by the men. Women and children also set snares for hares and ptarmigan. The men continued to hunt caribou, in the Mulgrave Hills or on the flats, and they also hunted wolverines, wolves, foxes, and lynx (Burch 1994: 101).

During fall and winter, the Napaaqtugmiut commonly lived in small, spruce pole houses covered with layers of sod or moss, with a short entrance closed with a bearskin or caribou skin and also a skylight over a fireplace (Foote 1961: 32; Burch 1994: 99). This type of house, called an ivrulik, was heated with a fire built on rocks -- when the rocks were hot, the fire was extinguished, and the rocks alone put out considerable heat. Willows and dried spruce were abundant for fuel. Seal oil lamps, of baked mud or stone, were used for heat and light. Some lamps were made locally; others were obtained in trade from other groups (Foote 1961: 32). Seal oil for the lamps was obtained by hunting and trading at Sisualik.

During the short days of winter, the Napaaqtugmiut subsisted on their stores of caribou, fish, seal, and belukha meat, as well as some plants and berries. They also fished through the river ice, snared ptarmigan and rabbits, trapped fur bearing animals (ermine, fox, mink, otter, wolf, wolverine), and killed the occasional caribou and hibernating bear (Foote 1961: 34). In years of abundance, the Napaaqtugmiut held Messenger Feasts with other Iñupiat in the region during the winter. In other years, people visited Napaaqtugmiut friends and relatives in other camps. The short days of early winter were thus usually a time for

feasts, dances, games, and athletic contests (Burch 1994: 101). Between January and early March, the Napaaqtugmiut commonly ran short of stored food, and had to move in search of sustenance. In most years, they searched for fish, though in desperate years, they went to the coast for seals (Burch 1994: 101).

In late March, the Napaaqtugmiut made their annual trip to the coast. They used a few dogs to help pull spruce sleds carrying their belongings, including umiak and kayak frames and covers, and hunting equipment. The people moved through the Noatak River lowlands and west across the low-lying Alutunitok Hills to the coast. Foote reports that they traveled downstream on the Ohkaleeksout and Kilikmak Creek drainages (Foote 1961: 35). At the coast, the Napaaqtugmiut spread out into several settlements, covering the length of their coastal territory (see Figure 4). Some families moved onto the sea ice for a time. Bearded seal hunting was the primary activity until breakup, although ringed seals were taken too. In April and May, fishing in streams and the ocean was also an important activity. Birds were hunted as well, with snares and arrows. Eggs became important, too, and duck eggs, gull eggs, and other shore bird eggs were gathered along the beaches and grassy shores of coastal lagoons (Foote 1961: 35). With breakup came the move south to Sisualik.

Burch (1994: 102) notes that the Napaaqtugmiut had a nearly circular seasonal cycle of movement:

The people themselves used to remark on this fact with reference to the mountain called Ingitqalik, the high mountain just behind Krusenstern Lagoon that is clearly visible from Kotzebue. The elders used to say they spent their entire lives just going round and round that mountain (Burch 1994: 102).

The Nuataagmiut

The Nuataagmiut, or "People of the Noatak," lived on the upper Noatak River, between the Grand Canyon of the Noatak River and Aniuk River (see Figure 6). It is not known just how big the population was around 1850, but Foote (1961: 35) suggests that it was fairly large, numbering in the several hundreds. Burch (1994: 121) estimates an average population size of 536. The population apparently fluctuated, and Burch notes four specific times during the 19th century that the population changed: (1) around 1802, several families (perhaps 20 to 30 people) of Kulugruagmiut (from the Meade River on the Arctic Coastal Plain) arrived as refugees from famine in their own territory; (2) in the early 1850s, an estimated 10 women and 20 children in a Nuataagmiut settlement were massacred by raiders from the Kobuk; (3) around 1877, a measles epidemic killed perhaps 50 Nuataagmiut (and was not reported anywhere else); and (4) refugees from other Kotzebue Sound groups moved to the upper Noatak in search of caribou just before and during the Great Famine (during the winters of 1881-1882 and 1882-1883) (Burch 1994: 123).

Most Nuataagmiut spent summer hunting belukha and trading at Sisualik. Other Iñupiat groups converged on Sisualik as well -- from places such as Kotzebue Sound, the Kobuk River, Cape Prince of Wales, the Diomed islands, and Point Hope. The people from Kotzebue Sound and the Kobuk River hunted the belukha (under the direction of the Nuataagmiut (Burch 1994: 125)) when they arrived during the hunts, while others, including the Napaaqtugmiut, usually reached Sisualik after the main migrations of belukha had passed (Foote 1961: 37).

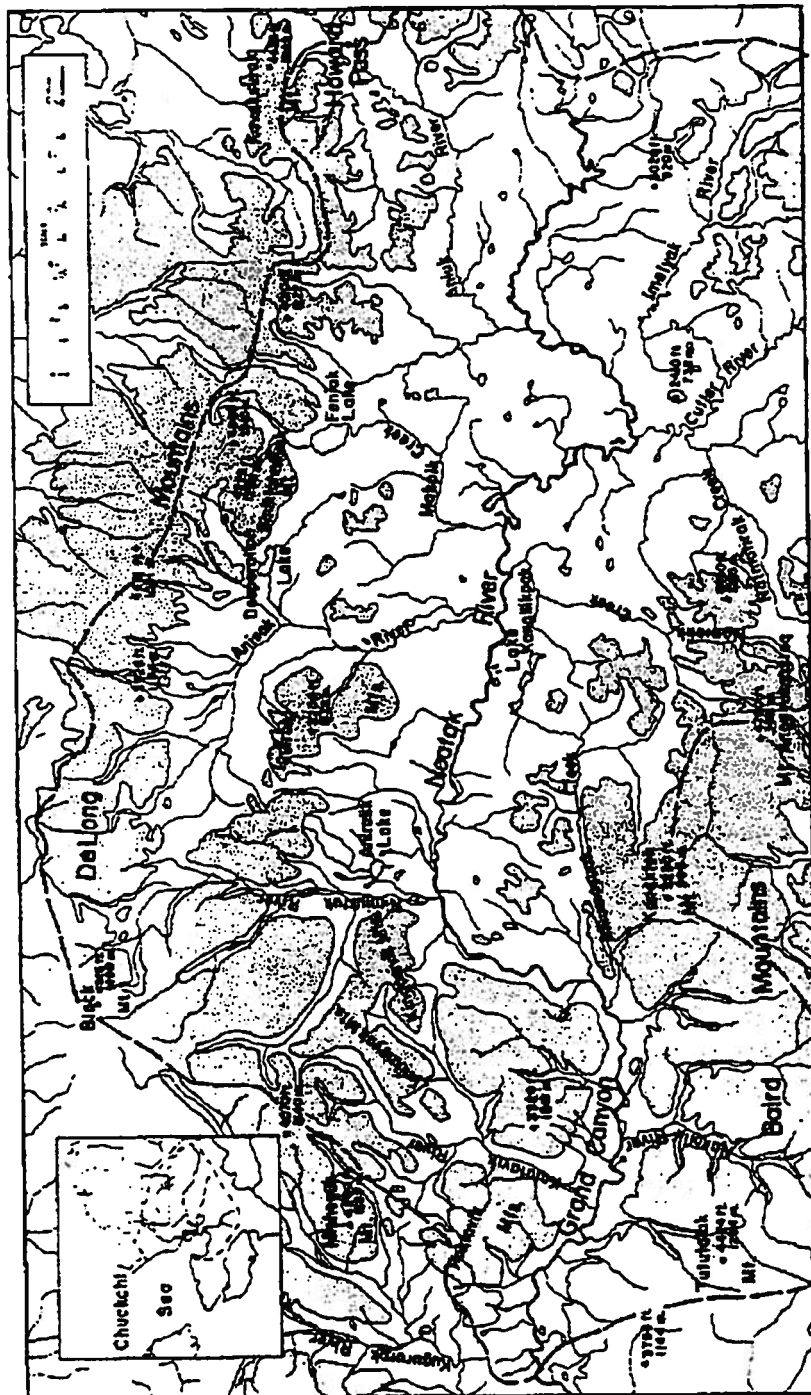
By mid-July, the migrations of belukha were usually past, and the

Nuataagmiut worked on their boats. Apparently, the Nuataagmiut had larger boats than other groups in northwest Alaska -- boats especially suited to travel on the upper noatak River (Burch 1994: 125). They made or repaired boat frames, and stretched on new bearded seal skins covers. Most, though not all, bearded seal skins were obtained in trade from the Qikiqtagrungmiut, Napaaqtugmiut, or Tapqagmiut (Shishmaref people) (Burch 1994: 125). After the boats were finished, the men hunted ducks and geese behind Sisualik, while the women picked sourdock (quaaggaq) in the Noatak Delta (Burch 1994: 125). By then, people had arrived for the trade fair.

Trade was extensive at Sisualik. People came from all over northwest Alaska, Point Hope, the Seward Peninsula, Bering Strait, and Siberia (Burch 1994: 125). Each year, several boats came from East Cape, Siberia, passing by the Diomed Islands and Kotzebue Sound (Foote 1961: 38). These boats brought a variety of items from Siberia -- tobacco, iron lances, reindeer skins, walrus rope, skins, ivory, and perhaps iron kettles (Foote 1961: 38). The Siberians took home a host of goods -- whale meat, blubber, muktuk, seal line, jade, soapstone lamps from the Canadian Arctic, and furs (Foote 1961: 38). The Napaaqtugmiut had usually left Sisualik to travel up the Noatak River when the Siberians arrived, so when the Nuataagmiut followed upriver in August, further trading occurred.

Not all Nuataagmiut spent the summer on the coast. Apparently a few (Burch estimates 75 or fewer people) stayed inland because they had no boat to travel down river, or because they wanted to pursue large quantities of caribou skins before the rest of the Nuataagmiut returned upriver (Burch 1994: 126). In early summer, the Nuataagmiut who remained inland subsisted on fish, ground squirrels, migratory waterfowl

Figure 6
Nuataagmiut Territory: Upper Noatak District



Source: Burch 1994: 116

and their eggs, and dried meat from the spring caribou migration. In July, most moved to large lakes (especially Desperation and Feniak Lakes) to drive caribou and spear them from kayaks (Burch 1994: 126). Others went to areas with caribou drive fences. Other inland resources important to these people were brown bear, mountain sheep, and salmon.

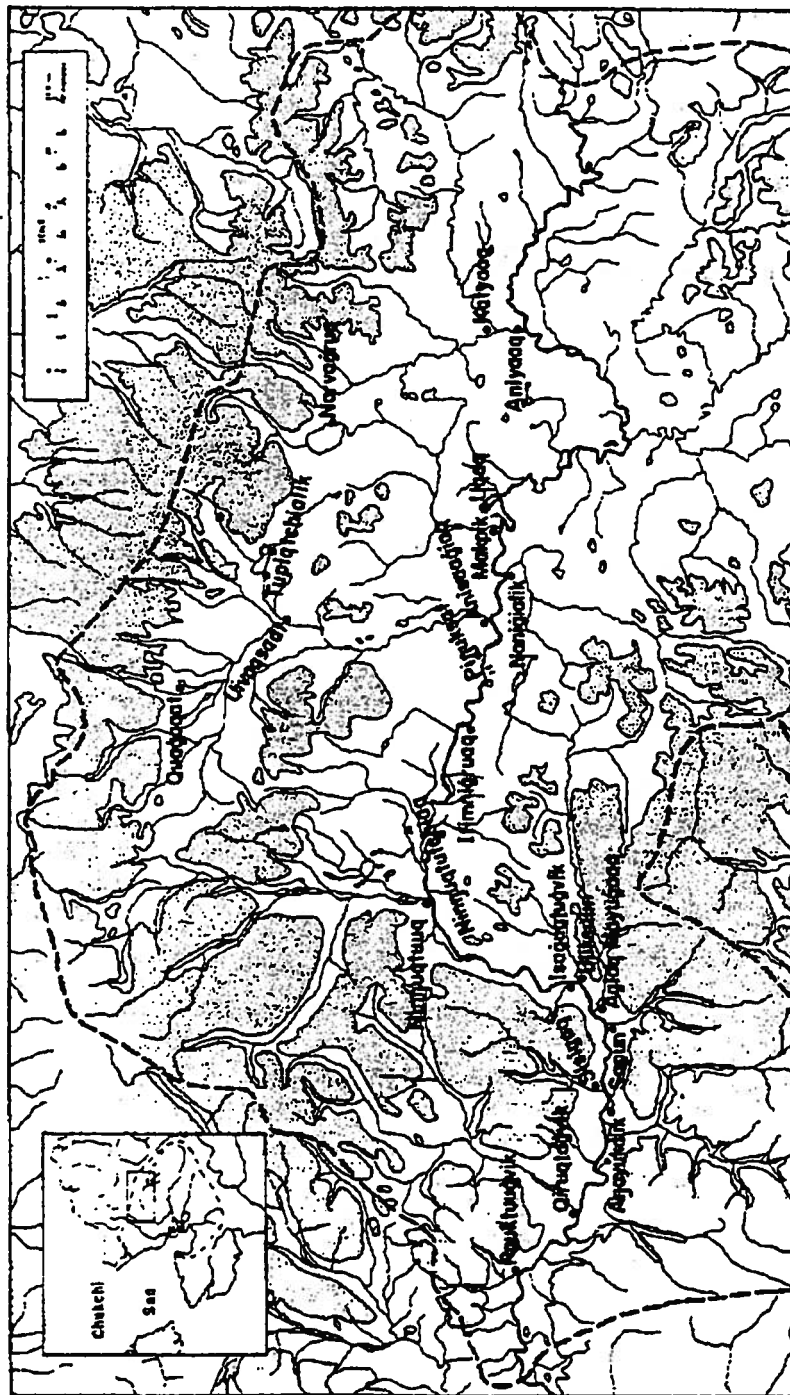
Another small group of Nuataagmiut did not travel to Sisualik, but instead went north to the coast. About 24 people, and a couple of boats, portaged over Hōward Pass in April or May and went down the Colville River, presumably with partners among the Kangianigmiut of the upper Colville (Burch 1994: 127). These Nuataagmiut attended the major trade fair at Nigliq, on the Colville River delta. There, they traded European goods obtained the previous year at Sisualik (Burch 1994: 127). They also hunted seals, and fished. To return home with their boats, they had to wait until snow conditions were such that they could portage back over the divide.

For those Nuataagmiut who spent the summer at Sisualik, mid-August was the time to travel back up the Noatak River. These people traveled as far inland as possible by boat, attempting to reach a choice area for their fall/winter houses before freeze up. Otherwise, they might have to travel by foot without all their supplies, or wait for snow to travel with sleds. Some caribou may have been pursued on the trip upriver (perhaps some in cooperation with the Napaaqtugmiut caribou corrals (Foote 1961: 38)), but the tough ascent of the river was of primary importance (Burch 1994: 128). Once the people reached their destination, they built their houses -- an ivrulik for those near the river, with a cottonwood and/or willow frame, a moss covering, and a single skylight (Burch 1994: 129) -- and turned their attention to hunting. The caribou

hunt was of supreme importance after boat travel had ceased, since the caribou hides were ideal for winter clothing in late August and September. However, the Nuataagmiut also fished, and trapped small animals and birds, until well after freeze up (Foote 1961: 38). If hunting and fishing were successful, many related families could remain together during the fall and winter. If not, people were forced to separate into smaller family groups to find needed resources (Foote 1961: 38).

The Nuataagmiut did not have a permanent winter village, but chose spots close to caribou, fish, and ptarmigan. Figure 7 shows the locations of major fall/winter settlements. Their winter houses were commonly willow domes covered with two layers of sod and an outer layer of mud, with a skylight (Foote 1961: 36). Burch calls these houses, sometimes made with cottonwood, galuugvik. The wood frame could be removed and reused, once the outer mud was frozen. The Nuataagmiut also built houses (one called ivrulik) with upright posts of cottonwood and/or willow, and a covering of moss (Burch 1994: 129). They sometimes built snow houses as temporary shelters. The more permanent dwelling could be elaborate -- sometimes related families joined short entries to a main entrance and common door (Foote 1961: 36). The houses were heated with willow burned in central fireplaces. Stone lamps were used to burn seal oil and caribou fat. Pottery was obtained through trade with coastal groups or sometimes made locally. Winter activities included caribou hunting, trapping of furbearing animals (fox, wolf, wolverine), and fishing (for crayfish, grayling, whitefish, lake trout, pike, and the occasional ling cod) (Burch 1994: 135; Foote 1961: 39). Early winter was the holiday season, with messenger feasts and occasionally a gathering (katirut) of all the Nuataagmiut. These gatherings depleted stored resources, and by the end

Figure 7
Nuataagmiut Fall/Winter Settlements



Source: Burch 1994: 130

of January, families often had to move in search of food. Foote reports that people occasionally made winter trading trips by dog team north to the Utukok and Colville rivers (Foote 1961: 39). March was the leanest time of year, and in bad years people fled to the lower Noatak, the Colville, and the Kobuk rivers. But by the end of March, the caribou usually had returned to the upper Noatak, along with the ptarmigan. These two resources were mainstays for the Nuataagmiut. The caribou, part of the Western Arctic Herd, made their way through Nuataagmiut territory on their way to calving grounds on the North Slope. April was thus known as the time to dry caribou meat. As spring approached, families returned to their boats to make ready for the trip down river.

Spring begins in late April and early May, and most Nuataagmiut began to move to their cached boats along the Noatak River, to prepare for the trip downstream (Foote 1961: 39). However, some Nuataagmiut families remained inland, and some traveled with their boats and dogs to the Colville River (Foote 1961: 36). After the ice went out and the river conditions seemed right, the boats headed downriver in one big flotilla, loaded with people, belongings, and dogs. Fish caught while floating downstream provided food for people and dogs. During this spring trip, the Nuataagmiut seldom met any Napaaqtugmiut, because the latter had already left to travel overland to the coast (Foote 1961: 37). The Nuataagmiut stopped at the Noatak Delta for their spring sewing festival -- only when they were at Tuulaagiaq could women make clothes (Burch 1994: 137). The men hunted ducks and seals, collected eggs, and fished. By late May or early June, the Nuataagmiut reached Sisualik, where they fished for trout and whitefish while waiting for belukha to return (Foote 1961: 37). Occasionally, they hunted seals to make pokes for storage. The

Nuataagmiut used pyramidal tents covered with caribou skins from April until October (Foote 1961: 36).

The seasonal rounds of the Napaaqtugmiut and the Nuataagmiut are different in critical ways. The Napaaqtugmiut depended less heavily on caribou, and more on belukha. They were less mobile in the winter. Since the Nuataagmiut tended to move more in the winter, and since the men were absent more often in search of resources, their patterns of seasonality prior to 1850 should be different (perhaps more pronounced) than those of the Napaaqtugmiut.

CHANGES IN THE SEASONAL ROUND AFTER 1850

The seasonal round of 1850 was distinctly different from the seasonal round of 1960 or 1990. Changes began with increasing Euro-American contact. Stoney (1965 [1900]) noted some changes from the 1850s -- widespread use of tobacco; flint and steel for fires; cards were introduced around 1881; most men owned rifles (probably obtained in trade at Sisualik); and steel traps replaced deadfall traps. After 1887, the Napaaqtugmiut and Nuataagmiut developed a new travel pattern (Foote 1961: 47). In late winter or early spring, some families traveled overland to the whaling stations at Jabbertown, south of Point Hope. The men joined commercial whaling crews and were paid with whale meat and trade items (Foote 1961: 47). In early July, after spring commercial whaling, the families with boats traveled down the coast to Sisualik; those with only sleds waited for snow to travel back to the Noatak River.

By the end of the 19th century, the Nuataagmiut faced serious disruptions to their population and to their seasonal round. The first

disruption was an epidemic known locally as "red sickness" because of the associated red pimples. The sickness also brought a high fever, and presumably was measles (Burch 1994: 138). The epidemic struck at a katngut feast with members of the Nuataagmiut, the Utuqqagmiut, and the Kangianigmiut attending. Burch estimates the year of the epidemic as 1878, and the number of deaths as perhaps 40 Nuataagmiut, and 60 Utuqqagmiut and Kangianigmiut combined (Burch 1994: 138). This happened around the time that Selawik and Kobuk people were starting to migrate to the upper Noatak for caribou, and while they may have brought the disease, they also increased the overall population of Nuataagmiut territory for the next several years (Burch 1994: 138).

The second disruption for the Nuataagmiut was the decline of the caribou. In the 1880s, the caribou herds declined drastically in number, and the Nuataagmiut were forced to relocate. About half, or even two thirds (Burch 1994: 138), of the families left the upper Noatak, moving north to the Colville River and even as far as Barter Island and Herschel Island. Others moved to Point Barrow. Some went east, others went south with the Napaaqtugmiut and Kivalinigmiut. After this migration, in 1887 or 1888, relatively few Nuataagmiut lived in their home territory (Burch 1994: 138). Indeed, a permanent population was never reestablished in this upper Noatak area (Burch 1994: 139). In 1908, only about ten Nuataagmiut boats made the autumn trip upriver (Foote 1961: 48). In the 1920s and 1930s, some families wintered on the upper Noatak. Since then, caribou hunting and trapping expeditions from Noatak and the Kobuk river occasionally have gone into the region (Burch 1994: 139).

The Napaaqtugmiut were also impacted by the scarcity of the caribou. The Great Famine struck in the winter of 1882-83, and possibly

also 1881-82 (Burch 1994: 102). Apparently, food was in short supply -- including caribou, salmon, char, ptarmigan, and seals -- and people relied on supplies gathered early in the summer (Burch 1994: 103). Starvation was common when supplies of fish and small animals did not last the winter (Foote 1961: 48). When these supplies ran out, people ate ptarmigan droppings and the inner bark of willows, and many died of starvation, exhaustion, and cold (Burch 1994: 103). Those who survived fled north to the Arctic coast and throughout the northwest area, especially the Kobuk River. Some returned, along with immigrants from the upper Noatak, Kotzebue, and Kivalina areas, over the next fifteen years (Burch 1994: 103). Burch estimates that less than 50 individuals remained in Napaaqtugmiut territory in 1885 (Burch 1994: 103)

THE VILLAGE OF NOATAK AND THE 20TH CENTURY

The village of Noatak was founded in fall 1908, with the opening of a federally supported Friends mission school. Elmer and Emily Harnden came from Washington state as missionary-teachers. Elmer Harnden had selected a site along the western bank of the Noatak River (see Figure 1). By the middle of October, a log schoolhouse and dwelling were ready for the beginning of school (Roberts 1978: 221). Roughly 80 to 100 people gathered in the village for at least part of that first winter (Burch 1994: 104). Nearly all of the Napaaqtugmiut came to Noatak village in the fall of 1908, while many Nuataagmiut remained upriver for another year or two (Williamson 1961a: 78).

By 1910, nearly all the Napaaqtugmiut and Nuataagmiut had moved to Noatak village (Williamson 1961a: 79). The population of Noatak and the

surrounding area was 153, including 12 whites (Burch 1994: 104). Though the missionary teachers apparently did not compel Natives to stay in the village, the people may have been open to the idea since: (1) the disappearance of the caribou had caused much hunger among the Iñupiat of the area; and (2) the Iñupiat of the Noatak River apparently desired to educate their children, to learn more about Christianity, and to be in a better position to trade (Williamson 1961a: 79). In 1910, 135 people attended Thanksgiving dinner at the mission school; in 1914, 138 attended -- these numbers represent most of the people in the Noatak River valley at that time (Williamson 1961a: 79). Many people converted to the Friends Church -- in 1990, the Church was still a presence.

Settling in Noatak village brought change to the seasonal round. The village was located in the middle of traditional Napaaqtugmiut wintering grounds, but the Nuataagmiut were more than 150 miles from their traditional wintering grounds (and they had ranged some 200 miles from those grounds for hunting, trapping, trade, and festivals). In 1909, the Nuataagmiut joined the Napaaqtugmiut in their spring journey overland to the coast, then down the coast to Sisualik in the summer, then back upriver in August to the village (Williamson 1961a: 82). Some men journeyed alone to Point Hope, not so much for whaling work but to obtain muktuk and to visit, leaving their families in Noatak (Williamson 1961a: 82).

Caribou numbers remained low during the first decades of the 20th century. Food was in short supply, in part due to commercial whaling. Reindeer were introduced from Siberia as an experiment in social engineering as well as a food source to replace species that had been depleted by commercial whalers (Ellanna and Sherrod 1995: 76, 303).

Between 1910 and 1940, the people of Noatak harvested reindeer for food and hides. Some surplus was sold in the 1930s on the commercial market. However, by the mid-1940s, caribou had returned to the Noatak River area, and the reindeer industry had disintegrated.

While the reindeer industry was important in Noatak, with most families owning shares, few men were actually involved in the day to day managing and herding of the animals. Men still spent most of their time hunting, fishing, and trapping. Trap lines extended long distances from the village, and for many years, most men were away from the village for extended periods between November and March (Williamson 1961a: 85). The fur market collapsed at roughly the same time that the reindeer industry declined. Yet, young men took their families to muskrat trapping grounds south of Noatak, while older men returned to the sealing coast in April (Williamson 1961a: 86).

Aspects of the market economy became crucial to Noatak villagers in the 1920s. Patterns of living had changed enough that people felt they depended on store bought goods. A cooperative Native store was established in the late 1920s. When Noatak incorporated in 1939, the council ruled that outside interests would not be allowed to trade in the village (Williamson 1961a: 86). Depressed economic conditions in the late 1930s and early 1940s brought Civilian Conservation Corps work to the region, to help provide cash to those in greatest need (Williamson 1961a: 86). Summer employment for wages (at canneries, construction sites, jobs in Kotzebue, etc) grew during the 1940s, with men often leaving the village for work. Only those working nearby in the region (i.e. at Kotzebue) brought their families along.

By 1960, the seasonal round reflected the changes of the previous

decades of Euro-American contact. During spring, there was some muskrat and migratory waterfowl hunting (Williamson 1961b: 102). People also prepared for the trip to Sisualik, or for outside employment. Summer activities included hunting for belukha, ugruk, and seals at Sisualik, as well as travelling for wage employment. Autumn was the time for caribou hunting, fish seining, and berry picking. Fish, particularly chum salmon (dog salmon) were very important at this time, to feed the dog teams that provided winter transportation. Winter activities included caribou hunting by dog team, trapping, ice fishing, some sealing, and firewood gathering. Dog travel was the key to extending the distance people could range to find resources.

By 1990, the situation had changed further. No longer were dog teams the crucial mode of winter travel. Snow machines and all terrain vehicles (ATVs) had all but replaced the dogs for travel. Subsistence resources were still of primary importance, and villagers ranged great distances to obtain what they needed. The opening of the Red Dog Mine near Kivalina brought much wage employment to the entire NANA region, and many Noatak villagers worked at the mine. The schedule of work (for instance, two weeks on and two weeks off) was not conducive to accessing resources that don't sit and wait to be exploited, so there was dissatisfaction among some workers. As is the case all over Alaska, Noatak Iñupiat were caught between needing cash to obtain their subsistence resources (for guns, ammunition, gas, motors and boats, ATVs, etc.) and needing time in the sequence necessary to pursue local resources.

Changes in seasonal round are apparent during the last 140 years. Such changes might impact seasonal patterns of birth. Indeed, distinct

seasonal rounds might be reflected in distinct seasonality of birth. However, if individuals are doing many different subsistence pursuits at the same time -- that is, not everyone is focusing on the same resource -- then perhaps seasonal patterns will not be well defined for the population as a whole.

METHODOLOGY

DATA COLLECTION

This study used both literary research and analyses of field data to examine certain demographic variables (total population and age-sex profiles) and the question of seasonality of birth for the village of Noatak. Historical and current sources were used to obtain a broad context in which to view the demographic variables and the seasonality of birth question. Published (ranging from Beechey to Bockstoe) and archival (Foote) sources can provide invaluable information, but are subject to the biases of authors and eras. The literature thus provides the background from which the data analyses can come forth and the context in which the analyses can be understood.

The demography of the village of Noatak was examined using population data from several different sources. Of primary importance were the 1920 U.S. Census, the 1940 Bureau of Indian Affairs (BIA) census, and field data gathered as part of the northwest area anthropological study between 1989 and 1992. U.S. Census data for the years between 1910 and 1990 were used as well. Other total population estimates (for years prior to census collection) were also included in the

narrative, particularly those extrapolated by Foote (1964) and those researched by Burch (1994). Each set of data has its own problems and limitations.

This study relies heavily upon field data gathered during the summers of 1989 and 1990 as part of the Northwest Area (NWA) Study funded in large part by the U.S. National Park Service, as well as on follow up interviews in 1992. While of limited time depth, the data contain useful information. The data were gathered using anthropological methods, including extensive family histories and related interviews. Family history forms (see Appendix A) were filled out in an attempt at gathering data for the entire population of the village. Several anthropologists with differing degrees of expertise visited Noatak at different times in the summers of 1989 and 1990 to collect data. In addition, one villager collected some data (data which had to be regathered since it was neither complete nor unbiased). The data collection process included checking the data with villagers for accuracy, and often revisiting individuals to fill in gaps. This portion of the study was both important and time consuming.

Family history data can potentially include all known individuals in a family through multiple generations -- including parents, grandparents, siblings, all offspring (deceased and living), and even those who have moved away, who are at camp, who are deceased, and more, as well as a distinction between biological and adoptive parents. A census typically enumerates only those individuals in the census location at the time of the census. Household members who are away at camp, work, school, hunting, or whatever, may not be included in the population, even if they are residents of the location. Thus, anthropological data can give a

broader perspective than the federal or other governmental census data. The census data, in turn, can help fill in gaps left by incomplete memories, incomplete records, and death.

Unfortunately, few population studies beyond the U.S. censuses are available for the study area. The lack of BIA censuses, as well as the lack of other population studies, makes it difficult to reconstruct the population of Noatak prior to the 1920, 1940, and 1990 data. As a whole, the data collected were used to reconstruct family histories from individual life history data and household composition, and also used in comparison with other demographic data.

DATA ANALYSIS

Getting the data ready for analysis was a huge component of this study. All of the available data were entered into a computer, and organized according to each individual, or "ego." The information for each ego included: (1) last name; (2) first name; (3) eskimo name(s); (4) sex; (5) year of birth; (6) month of birth; (7) place of birth; (8) year of death; (9) cause of death; (10) father's last name; (11) father's first name; (12) father's eskimo name(s); (13) father's year of birth; (14) mother's last name; (15) mother's first name; (16) mother's eskimo name(s); (17) mother's year of birth; (18) residence in 1990; (19) page number for ego form; and (20) notes. The NWA study was used as the starting point (with a few birth dates in the latter half of the nineteenth century), and the 1920 U.S. census and 1940 BIA census data were added to the existing files. The data were then checked exhaustively to try to eliminate duplications and ensure accuracy. This lengthy process resulted in a large data set with useful seasonality data, but limited fertility and mortality

data. While the data contains more variables than necessary for this particular paper, the extra variables have been useful in checking for accuracy, and will presumably be valuable for other studies.

While the overall sample contained over 1200 cases, and 766 cases have month of birth data, very few cases showed death data. Without accurate death data, fertility and mortality cannot be extrapolated. Thus, the data limit the analyses which can be performed. However, the data are clean enough to allow certain analyses. Appropriate demographic variables were identified and extracted -- total population; age-sex profiles; and seasonality of birth. An effort was made to examine the same variables as Binford and Chasko (1976) and Ellanna (1983b), in order to better compare populations and seasonality of birth between each population in northwest Alaska. A discussion of each demographic variable and its implications delineates the results of this study.

Total Population

Total population is useful in determining whether a population is growing, declining, or remaining steady. Fluctuations in total population may be tied to various factors which may affect fertility and/or mortality. The total population for the village of Noatak for the years 1880 to 1990, as enumerated by the U.S. Census Bureau, provides an idea of how the population grows and declines over time.

Age-Sex Profiles

Age-sex profiles give a detailed picture of the age-sex structure of populations. Often represented visually as population pyramids, the profiles are graphed on vertical and horizontal axes, and usually based on

five year age groups (cohorts). The pyramid consists of bars depicting age groups in ascending order from lowest to highest. The bars for males are to the left of the central axis; those for females are to the right of the axis. The length of the bars from the central axis delineates the number of individuals in each age group. The age scale is shown vertically, often to the left of the pyramid; sometimes straddling the central axis. In some cases, the age scale is shown on both sides of the pyramid, perhaps combining both age and year of birth (Shryock and Siegel 1980: 236).

A healthy population generally has a pyramid with a large base, a gradual narrowing to the top, and a balance of males and females. A growing population will have a triangular pyramid, wide at the base with a narrow peak. A more stable population will have a more rounded pyramid, with more individuals in the older age groups. A population with babies dying suddenly or a sudden control of fertility will have a pyramid with a narrowed base, a bulge in the middle cohorts, and a narrowing to the peak. A look at the population pyramids for Noatak at several different times - 1920, 1940, 1990, and some intervening U.S. census years -- allows comparison of the age-sex structure of the population for those times.

Seasonality of Birth

Seasonality of birth is studied through month of birth and year of birth data. As previously stated, Binford and Chasko (1976: 134) and Ellanna (1983: 497) found marked seasonality of birth in Iñupiat populations. These data sets provide a basis for comparison with the Noatak data.

Binford and Chasko (1976: 120) tabulate Nunamiut male absenteeism and conception frequencies for three time periods (1935-1950; 1950-

1956; 1957-1970). Binford's data are rather vague (for instance, seasons are not defined by month) and not as comprehensive as Ellanna's data. Ellanna (1983: 149, 167, 227, 272, 314) graphed seasonality by 25 year cohorts. Ellanna's population data provide a good comparison, because the data have no missing cohorts, skewed sex ratios, inflated age groups, or other anomalies, as can be seen in the population pyramids (Ellanna 1983: 86; 94; 189; 249; 291).

This paper looks at seasonality for the entire 766 case Noatak data set (all those with month of birth data) and for subsets of that data set (divided into different time periods or generations). The groups were chosen so that the number of births was large enough not to be influenced by chance, and also to reflect some rough historic correlation. Statistical Program for the Social Sciences (SPSS) for PCs (personal computers) was the statistical package used to manipulate the data.

ANALYSIS

TOTAL POPULATION

The total population for Noatak has changed dramatically over time (see Table 1). United States Bureau of Census data indicate that the population dropped from 400 in 1880 to only 121 in 1910. As previously discussed, starvation and epidemics in the late 19th century decimated the Napaaqtugmiut and Nuataagmiut populations. Between 1910 and 1940, however, the population of Noatak showed a dramatic increase. Between 1940 and 1990, the population declined, increased, decreased, and finally climbed again to roughly the same level.

Table 1: Total Population for 1880 to 1990 at Noatak

1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
400	N/A	N/A	121	164	212	336	326	275	293	273	333

Source: U.S. Bureau of the Census Publications

These population figures represent total populations, including both Natives and Whites (of which there are and were few) living in Noatak. The 1880 population must be taken with caution due to problems in accuracy of numbers and settlement boundaries. The other population figures are subject to the cautions previously described for the U.S. census.

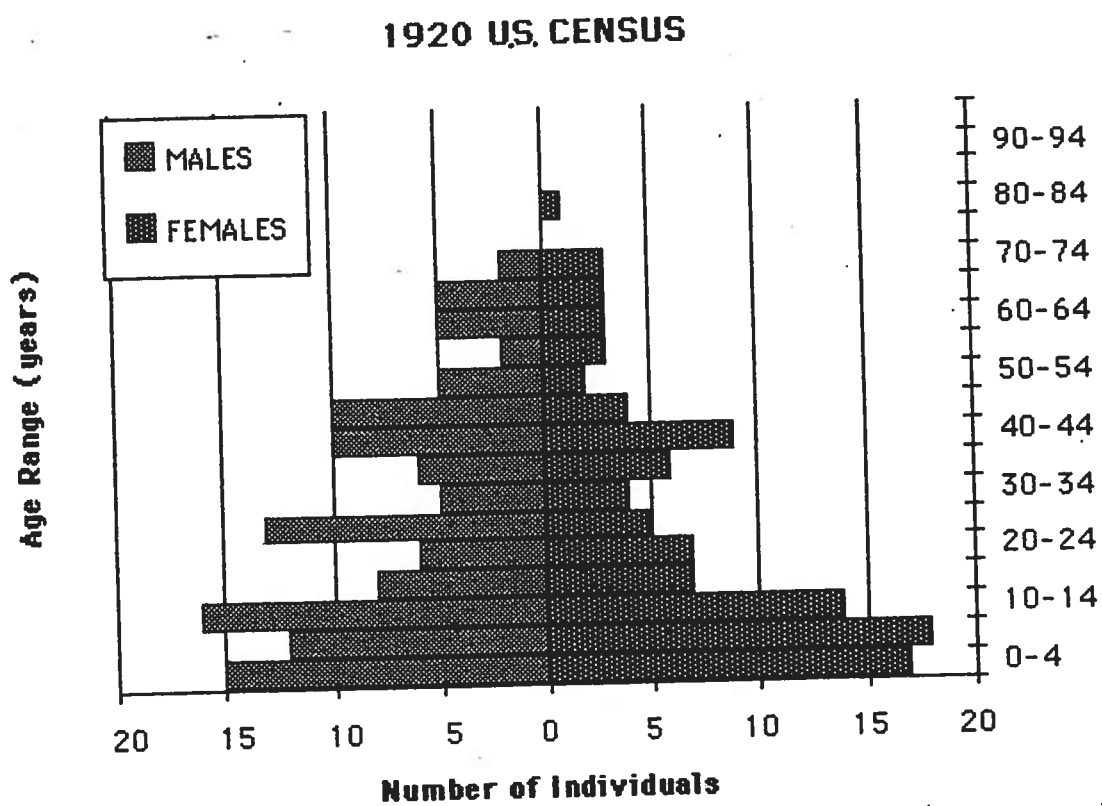
AGE-SEX PROFILES

A look at the population pyramids for Noatak at three different times -- 1920, 1940, and 1990 -- shows some similarities and some differences in the age-sex structure of the population at those times.

Figure 8 shows the population pyramid for 1920, based on data from the 1920 U.S. census. It shows a total population for the Noatak area of 226. The males outnumber the females in 10 of 17 age classes. Females outnumber males in the 0-4, 5-9, 20-24, 55-59, 70-74, and 80-84 age classes. Numbers are equal for the 35-39 age class. There are a total of 120 males and 106 females, with a ratio of 53 percent males to 47 percent females.

The shape of the 1920 population pyramid is not symmetrical, though females and males show very similar longevity. The male side has a more rounded shape, more like that of a stable population, while the female side is more triangular, like that of a growing population.

Figure 8
Age/Sex Profile for Noatak 1920

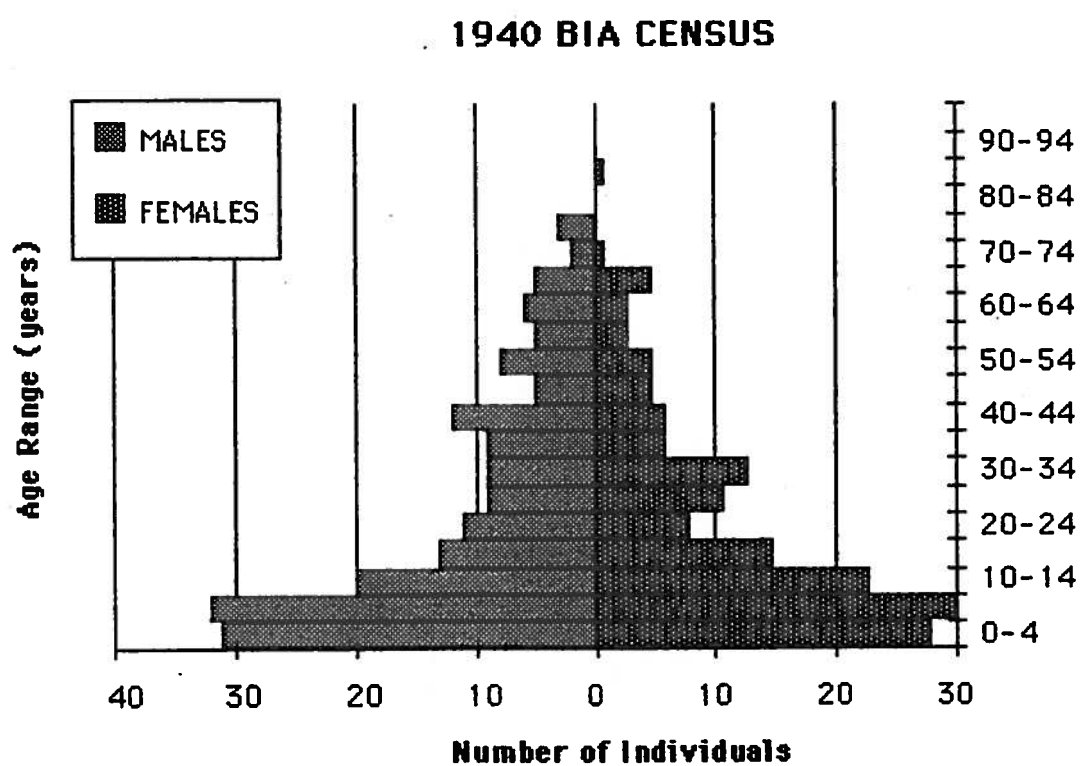


There are several potential causes for a pyramid of this shape. Epidemics can cause certain groups of a population to die, while others may not be exposed, and others may survive the disease. Perhaps males were hit harder by disease at certain ages. The only recorded epidemics in the Noatak region were a flu and fever epidemic around 1890 that wiped out more than a hundred Nunamiut during a trading feast on the upper Noatak River (Fortuine 1989: 211; Gubser 1965: 53), and an influenza epidemic in 1900 that covered all of western Alaska, including the Noatak region (Fortuine 1989: 216). The Great Famine of 1882-1883 (and possibly 1881-1882 as well) struck the Napaaqtugmiut, causing many survivors to flee their homeland (Burch 1994: 102, 103). The Nuataagmiut survived the Great Famine, but were struck by a "red sickness" in the 1870s (Burch 1994: 138). At about this time, Selawik and Kobuk people were moving into the upper Noatak in search of caribou (Burch 1994: 138). Noatak river populations were obviously not static, but were in fact highly mobile.

The age classes born prior to 1905 show an overall lack of females, yet certain male classes are smaller too. Perhaps, as today in many villages in Alaska, more females moved out of the community. Marrying out did occur, as did some males marrying in. Adoption is also a factor in the Noatak region, and perhaps linking the Noatak data with data from Kivalina, Kotzebue, and Kobuk River villages (i.e. Ambler, Kiana, Kobuk) would help trace movements of individuals. However, it is difficult to move beyond speculation with a small population, since aberrations can look like trends.

Figure 9 is the age-sex profile for Noatak based on the 1940 BIA census. It shows a total population of 343, larger than that recorded for

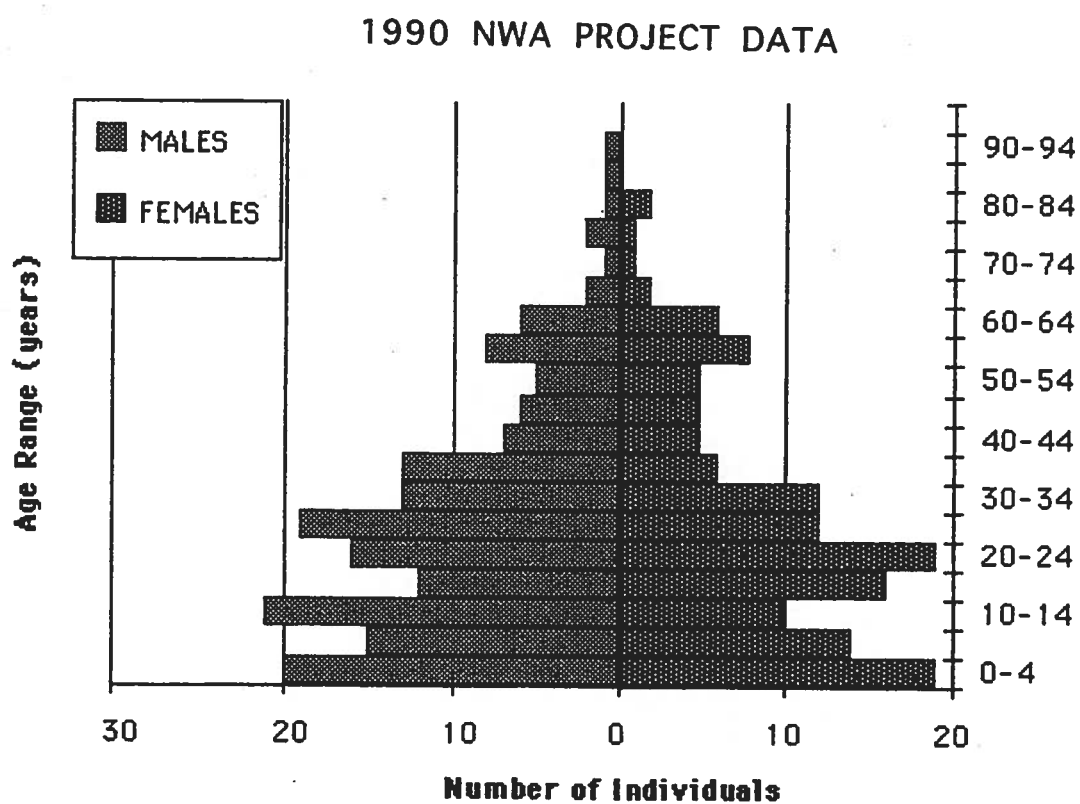
Figure 9
Age/Sex Profile for Noatak in 1940



1920. There were 180 males and 163 females, for a ratio of 52 percent males to 48 percent females. This is not too different from the 1920 ratio. However, the shape of the populations pyramid for 1940 is very different from that for 1920. It is much more triangular, like that of a growing population. There are quite a few individuals under 20 years of age. There are 26 individuals over the age of 60 in 1940 (7.6 percent), as opposed to 22 in 1920 (9.7 percent).

Figure 10 shows the population pyramid for Noatak based on the 1990 Northwest Area Study. The NWA study recorded a total population of 312 individuals in Noatak. This is smaller than that found in 1940. Some migration to Kotzebue, Sisualik, and farther points such as Anchorage and Fairbanks has occurred. There were 169 males and 143 females, for a ratio of 54 percent males to 46 percent females. Again, this is similar to the previous ratios. The numbers in the younger age groups are fairly even, except for the age 10-14 cohort, with roughly twice as many males as females. The pyramid narrows sharply at the 40-44 cohort. There is no lack of females in the cohorts between ages 20 and 34, as has been observed for some Alaska Native villages. Apparently, females are not moving out to the cities, leaving for education permanently, or looking for jobs elsewhere. Or perhaps they move out temporarily. Or perhaps enough wage employment exists in the region for females to maintain residence in Noatak (i.e. Noatak school, village store, post office, Red Dog Mine, etc.). The employment situation is obviously much different than that of previous years.

Figure 10
Age/Sex Profile for Noatak in 1990



It is apparent that the population pyramids are very different for the three different years (1920, 1940, and 1990). What happened in the intervening years to change the population structure in these ways? Possible factors include education, birth control, health facilities, job opportunities in Noatak and elsewhere, the opening of Red Dog Mine, and more.

SEASONALITY OF BIRTH

Seasonality of birth is not apparent in the Noatak data when it is lumped as one set. Table 2 shows the distinct lack of variation in monthly births. Indeed, the range of error is greater than the range of births between months. This would seem to suggest that Noatak does not follow most reported populations in exhibiting seasonal birth variation. However, further analysis reveals the naivete of this suggestion.

When the Noatak data are broken down into smaller time periods, seasonality of birth does in fact become apparent. Yet, each time period exhibits a different pattern of seasonality. Figure 11 shows many zigzags of lines with different peaks and valleys corresponding to seasonal variation in births. Appendix B contains the data in table form, along with supporting statistics. The reasons behind such distinct yet shifting seasonality are difficult to ascertain.

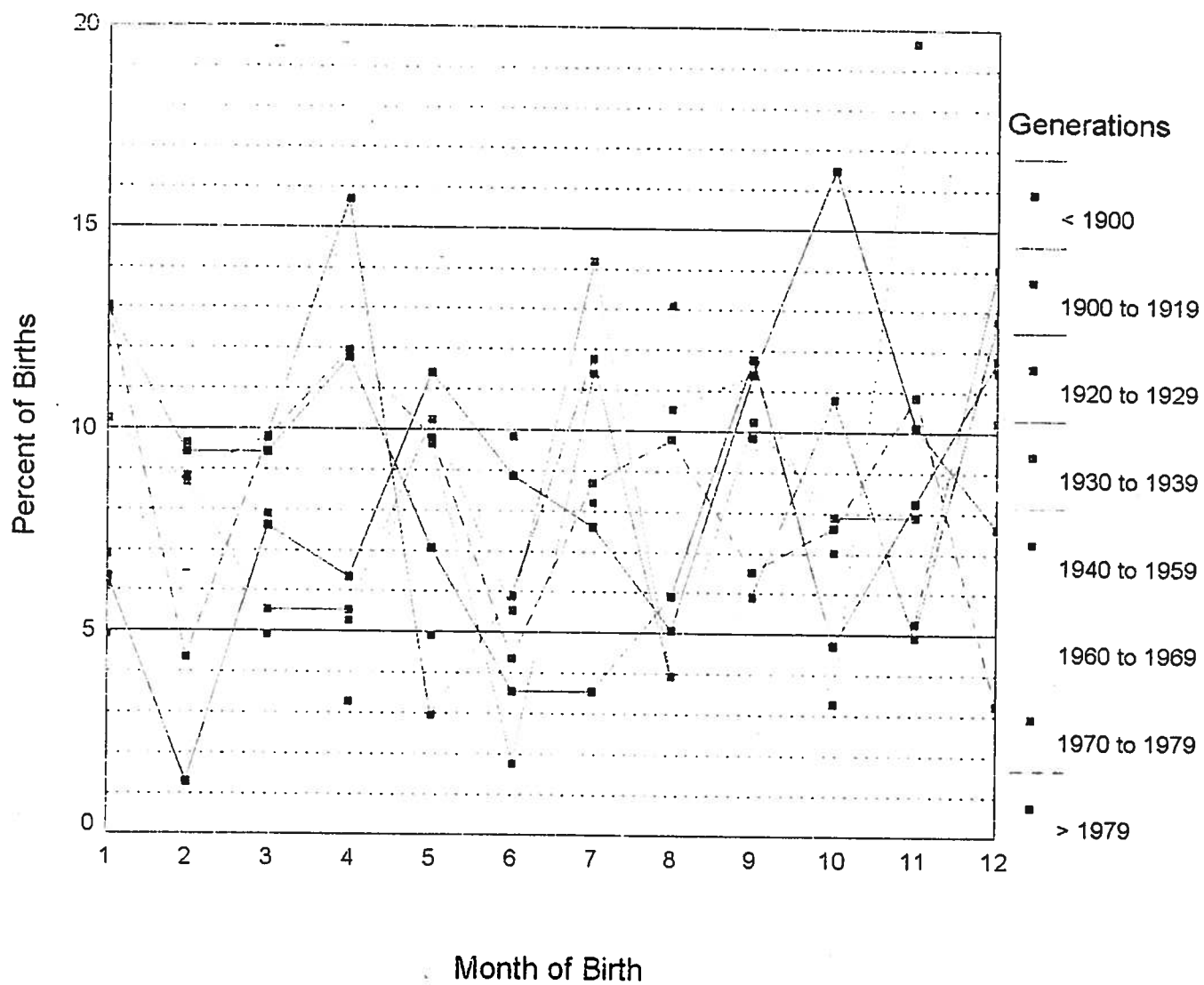
The most dramatic case of seasonality of birth is for the 1970 to 1979 group. The peak of births in November is higher than any other peak. Such a peak is hard to understand in its sudden appearance and magnitude.

TABLE 2: Seasonality of Birth for Noatak (Whole Data Set)

		Value	Frequency	Percent	Valid Percent	Cum Percent
		1	67	8.7	8.7	8.7
		2	55	7.2	7.2	15.9
		3	62	8.1	8.1	24.0
		4	65	8.5	8.5	32.4
		5	63	8.2	8.2	40.6
		6	46	6.0	6.0	46.6
		7	74	9.6	9.6	56.3
		8	55	7.2	7.2	63.4
		9	71	9.2	9.2	72.7
		10	66	8.6	8.6	81.3
		11	66	8.6	8.6	89.8
		12	78	10.2	10.2	100.0
		Total	768	100.0	100.0	
Std err	.127	Std dev	3.524	Variance	12.417	
Kurtosis	-1.247	S E Kurt	.176	Skewness	-.065	
S E Skew	.088	Range	11.000	Minimum	1.000	
Maximum	12.000					
Valid cases	768	Missing cases	0			

Figure 11

Seasonality of Birth for Noatak by Time Periods



In contrast, the years between 1960 and 1969 show very little seasonality. And the shift in seasonality between the pre-1900 data and the 1900 to 1919 data is quite sharp -- an October peak before 1900 is replaced by an April peak between 1900 and 1919.

Many studies argue that seasonality of birth is tied to ecological and perhaps also cultural factors (Arcury et al. 1990; Borgerhoff Mulder 1992; Condon 1991; Condon and Scaglione 1982; Cowgill 1966a, b; Holland 1989; Lam and Miron; Leslie and Fry; Malina and Himes 1977; Nonaka et al. 1990; Roenneberg and Aschoff 1990a, b; Van de Velde et al. 1993). Yet isolating those factors which are at the heart of the shifts in Figure 11 is difficult.

One possible reason for a change in seasonality of birth is centralization, because this changes subsistence patterns. Noatak village was formed in 1908, and this corresponds with a shift in the calculated seasonality pattern for the time period 1900 to 1919. Other possible causes for a shift in seasonality include increased reliance on wage employment, though wage employment has not fluctuated as widely as seasonality. Subsistence hunting and trapping are still important, and certainly have been so throughout the 20th century. Changing attitudes of the young is quite possibly a factor, and especially with the introduction of television and radio. The introduction of snow machines and ATVs may also be important, since this impacted subsistence pursuits. At this point, it is hard to draw firm conclusions.

CONCLUSIONS

A preliminary demographic analysis of Noatak, with an emphasis on seasonality of birth, presents an interesting picture. Noatak has a healthy population, as seen in the age/sex profiles and the total population counts. The Noatak data also appears to support the theory that seasonality is indeed a part of Iñupiaq society. When the Noatak data are broken down into smaller groups by time period, seasonal variation in births is apparent. Yet this seasonal variation itself varies -- seasonal patterns do not persist in any one form. In fact, when the data are taken as a whole, the seasonal patterns disappear. This is not the case for the Bering Strait data, where seasonality is apparent both within cohorts and when cohorts are combined. And it does not seem possible to key seasonality to specific cultural or ecological factors. While Bering Strait seasonality is linked to marine mammal hunting adaptations (absence of male, taboos associated with hunting), Noatak seasonality does not appear to be linked to any one obvious factor. Yet, this in itself may actually be an obscure link.

Additionally, Noatak seasonality does not appear to be declining over time, as was found in studies by Binford and Chasko (1976), Condon (1991), Ellanna (1983b), and Van de Velde et al. (1993). Noatak seasonality changes, but persists.

The population of Noatak, as a riverine adapted community, is not constrained by any single ecological factor or any cultural factors around a single ecological factor. The resource base is diverse, and at any one time, people in an extended family can engage in different subsistence activities. Caribou hunting, trapping, and fishing can occur

simultaneously. In other words, the heterogeneity of patterns stands out.

This heterogeneity is not reflected in historic accounts or in the anthropological literature. Traditionally, scholars have assumed that coastal and riverine peoples had similar seasonal rounds and kinship. Factors which greatly influenced the coast (such as whaling) were presumed to strongly impact inland peoples as well. However, it now appears that riverine adaptations are more distinct in their diversity than reported. And this distinct diversity may be a key to the diversity of seasonality patterns.

In order to better understand the seasonality of birth for Noatak, further research is needed. More fieldwork might eliminate some of the restrictions in the Noatak data base (i.e. lack of death data), and allow the extraction of other demographic variables. Yet the lack of good historic census data is still a problem, making it more difficult to accurately describe populations prior to, and during, the 20th century. In addition, it would be interesting to examine another riverine community in order to provide a comparison to the Noatak case. Noatak does indeed exhibit seasonal variations in birth patterns, but are these variations found in other riverine Iñupiaq communities?

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APPENDIX A

HOUSEHOLD COMPOSITION AND FAMILY HISTORY FORMS

HOUSEHOLD COMPOSITION FORM

Collected By: _____
Date Collected: _____
Source: _____

Sheet _____
of _____

Village: _____ Household #: _____ Location: _____

Head of Household: _____ YOB: _____ Code #: _____
Last First

.....

HOUSEHOLD MEMBERS:

Name: _____ YOB: _____ Permanent _____
 Last _____ First _____ Code #: _____ Temporary _____ How Long _____
 Relation to Head: _____ >4X/Wk: Eats _____ Sleeps _____
 Kin Term: _____ 2-4X/Wk: Eats _____ Sleeps _____
 <2X/Wk: Eats _____ Sleeps _____

Name: _____ YOB: _____ Permanent _____
 Last First Code #: _____ Temporary _____ How Long _____
 Relation to Head: _____ >4X/Wk: Eats _____ Sleeps _____
 Kin Term: _____ 2-4X/Wk: Eats _____ Sleeps _____
 <2X/Wk: Eats _____ Sleeps _____

Name: _____ YOB: _____ Permanent _____
 Last First Code #: _____ Temporary _____ How Long _____
 Relation to Head: _____ >4X/Wk: Eats _____ Sleeps _____
 Kin Terms: _____ 2-4X/Wk: Eats _____ Sleeps _____
 <2X/Wk: Eats _____ Sleeps _____

Name: _____ YOB: _____ Permanent _____
 Last First Code #: _____ Temporary _____ How Long _____
 Relation to Head: _____ >4X/Wk: Eats _____ Sleeps _____
 Kin term: _____ 2-4X/Wk: Eats _____ Sleeps _____
 <2X/Wk: Eats _____ Sleeps _____

Name: _____ YOB: _____ Permanent _____
 Last First Code #: _____ Temporary _____ How Long _____
 Relation to Head: _____ >4X/Wk: Eats _____ Sleeps _____
 Kin Term: _____ 2-4X/Wk: Eats _____ Sleeps _____
 _____ <2X/Wk: Eats _____ Sleeps _____

Name: _____ YOB: _____ Permanent _____
 Last First Code #: _____ Temporary _____ How Long _____
 Relation to Head: _____ >4X/Wk: Eats _____ Sleeps _____
 Kin Term: _____ 2-4X/Wk: Eats _____ Sleeps _____
 <2X/Wk: Eats _____ Sleeps _____

Name: _____ YOB: _____ Permanent ☐
 Last First Code #: _____ Temporary ☐ How Long _____
 Relation to Head: _____ >4X/Wk: Eats _____ Sleeps _____
 Kin Term: _____ 2-4X/Wk: Eats _____ Sleeps _____
 <2X/Wk: Eats _____ Sleeps _____

Sheet 1
of

NORTHWEST ALASKA STUDY
FAMILY HISTORY FORM
Dept. of Anthropology
University of Alaska Fairbanks

Collected By: _____ Revised By: _____
Date Collected: _____ Date Revised: _____
Source: _____ Source Revised: _____
Place: _____ Place Revised: _____
Coded By: _____

Code # _____ Village #: _____ Household #: _____

Name: _____
Last First

Eskimo Name: _____

Sex: M F Birth Date: ____/____/____ Birthplace: _____
Mo/Dy/Year

Living At: _____ Since: _____ (Year)

Death Date: ____/____/____ Death Cause & Place: _____
Mo/Dy/Year

Marital Status: Single _____ Married _____ Separated _____ Divorced _____ Widowed _____ Other _____

Ethnicity: Inupiaq ____/8 Yup'ik ____/8 Athabaskan ____/8 Caucasian ____/8 Other ____/8: _____

Language you speak at home: _____

Anyone in household speaks other than English: Yes _____ No _____ Language: _____

If so, do you understand this language: Very Little _____ Some _____ Most _____ All _____

PARENTS

Father's Name: _____
Last First

Eskimo Name: _____

Birth Date: ____/____/____ Birthplace: _____

Death Date: ____/____/____ Death Cause & Place: _____

Ethnicity: Inupiaq ____/8 Yup'ik ____/8 Athabaskan ____/8 Caucasian ____/8 Other ____/8: _____

Mother's

Maiden Name: _____
Last First

Eskimo Name: _____

Birth Date: ____/____/____ Birthplace: _____

Death Date: ____/____/____ Death Cause & Place: _____

Ethnicity: Inupiaq ____/8 Yup'ik ____/8 Athabaskan ____/8 Caucasian ____/8 Other ____/8: _____

Adoptive

Father's Name: _____
Last First

Eskimo Name: _____

Birth Date: ____/____/____ Birthplace: _____

Death Date: ____/____/____ Death Cause & Place: _____

Ethnicity: Inupiaq ____/8 Yup'ik ____/8 Athabaskan ____/8 Caucasian ____/8 Other ____/8: _____

Relation to Ego: _____ Date Adopted: ____/____/____

Kin Term: _____

Sheet 2

of ____

PARENTS, CONTINUED

Code #

Adp. Mother's

Maiden Name: _____

Last

First

Eskimo Name: _____

Birth Date: ____/____/____

Birthplace: _____

Death Date: ____/____/____

Death Cause & Place: _____

Ethnicity: Inupiaq ____/8 Yup'ik ____/8 Athabaskan ____/8 Caucasian ____/8 Other ____/8: _____

Relation to Ego: _____

Date Adopted: ____/____/____

Kin Term: _____

PARENTS PARENTS

Father's

Father's Name: _____

Last

First

Eskimo Name: _____

Birth Date: ____/____/____

Birthplace: _____

Death Date: ____/____/____

Death Cause & Place: _____

Ethnicity: Inupiaq ____/8 Yup'ik ____/8 Athabaskan ____/8 Caucasian ____/8 Other ____/8: _____

Fath. Mother

Maiden Name: _____

Last

First

Eskimo Name: _____

Birth Date: ____/____/____

Birthplace: _____

Death Date: ____/____/____

Death Cause & Place: _____

Ethnicity: Inupiaq ____/8 Yup'ik ____/8 Athabaskan ____/8 Caucasian ____/8 Other ____/8: _____

Mother's

Father's Name: _____

Last

First

Eskimo Name: _____

Birth Date: ____/____/____

Birthplace: _____

Death Date: ____/____/____

Death Cause & Place: _____

Ethnicity: Inupiaq ____/8 Yup'ik ____/8 Athabaskan ____/8 Caucasian ____/8 Other ____/8: _____

Moth. Mother

Maiden Name: _____

Last

First

Eskimo Name: _____

Birth Date: ____/____/____

Birthplace: _____

Death Date: ____/____/____

Death Cause & Place: _____

Ethnicity: Inupiaq ____/8 Yup'ik ____/8 Athabaskan ____/8 Caucasian ____/8 Other ____/8: _____

SPOUSE

Sheet 3
of ____Ego Code #: _____
Village #: _____
Household #: _____

Code

Husband/Wife
Maiden Name: _____
Last First
Eskimo Name: _____
Birth Date: ____/____/____ Birthplace: _____
Death Date: ____/____/____ Death Cause & Place: _____
Date Married: ____/____/____ Status: Widowed __ Separated __ Divorced __ Date: ____/____/____
Ethnicity: Inupiaq __/8 Yup'ik __/8 Athabaskan __/8 Caucasian __/8 Other __/8: _____

Husband/Wife
Maiden Name: _____
Last First
Eskimo Name: _____
Birth Date: ____/____/____ Birthplace: _____
Death Date: ____/____/____ Death Cause & Place: _____
Date Married: ____/____/____ Status: Widowed __ Separated __ Divorced __ Date: ____/____/____
Ethnicity: Inupiaq __/8 Yup'ik __/8 Athabaskan __/8 Caucasian __/8 Other __/8: _____

Husband/Wife
Maiden Name: _____
Last First
Eskimo Name: _____
Birth Date: ____/____/____ Birthplace: _____
Death Date: ____/____/____ Death Cause & Place: _____
Date Married: ____/____/____ Status: Widowed __ Separated __ Divorced __ Date: ____/____/____
Ethnicity: Inupiaq __/8 Yup'ik __/8 Athabaskan __/8 Caucasian __/8 Other __/8: _____

ECONOMIC INFORMATION *****

Employment for the Last Year, Including Subsistence:

Part-time:	Hr/Wk _____	Beg./End _____	Type: _____	At: _____
	Hr/Wk _____	Beg./End _____	Type: _____	At: _____
Full-time:	Hr/Wk _____	Beg./End _____	Type: _____	At: _____
	Hr/Wk _____	Beg./End _____	Type: _____	At: _____
Subsistence:	Hr/Wk _____	Beg./End _____	Type: _____	At: _____
	Hr/Wk _____	Beg./End _____	Type: _____	At: _____
	Hr/Wk _____	Beg./End _____	Type: _____	At: _____

Household Public Assistance (Ask head of household only):

___ Aid Families Dependent Children: Beg./End _____
___ Food Stamps: Beg./End _____
___ Adult Public Assist.: Beg./End _____
___ General Relief Assist.: Beg./End _____
___ Medicaid: Beg./End: _____
___ Unemployment Benefits: Beg./End _____

OFFSPRING

Sheet ____
of ____Ego Code #: ____
Village #: ____
Household #: ____

Code #

.....

Name: _____ M F Eskimo
Sex: U Name: _____
Last/Maiden First
Relationship: Offspring ____ Step Child ____ Adopted Child ____ Other: _____
Birth Date: ____/____/____ Birthplace: _____
Death Date: ____/____/____ Death Cause & Place: _____
Living At: _____
Father's Name: _____ YOB: _____ Code #: _____
Mother Maiden: _____ YOB: _____ Code #: _____
Spouse's Name: _____ YOB: _____ Code #: _____
Last First

Name: _____ M F Eskimo
Sex: U Name: _____
Last/Maiden First
Relationship: Offspring ____ Step Child ____ Adopted Child ____ Other: _____
Birth Date: ____/____/____ Birthplace: _____
Death Date: ____/____/____ Death Cause & Place: _____
Living At: _____
Father's Name: _____ YOB: _____ Code #: _____
Mother Maiden: _____ YOB: _____ Code #: _____
Spouse's Name: _____ YOB: _____ Code #: _____
Last First

Name: _____ M F Eskimo
Sex: U Name: _____
Last/Maiden First
Relationship: Offspring ____ Step Child ____ Adopted Child ____ Other: _____
Birth Date: ____/____/____ Birthplace: _____
Death Date: ____/____/____ Death Cause & Place: _____
Living At: _____
Father's Name: _____ YOB: _____ Code #: _____
Mother Maiden: _____ YOB: _____ Code #: _____
Spouse's Name: _____ YOB: _____ Code #: _____
Last First

Name: _____ M F Eskimo
Sex: U Name: _____
Last/Maiden First
Relationship: Offspring ____ Step Child ____ Adopted Child ____ Other: _____
Birth Date: ____/____/____ Birthplace: _____
Death Date: ____/____/____ Death Cause & Place: _____
Living At: _____
Father's Name: _____ YOB: _____ Code #: _____
Mother Maiden: _____ YOB: _____ Code #: _____
Spouse's Name: _____ YOB: _____ Code #: _____
Last First

SIBLINGS

Sheet ____
of ____Ego Code #: ____
Village #: ____
Household #: ____

Code #

_____ Name: _____ Sex: M F Eskimo
 Last/Maiden First
 Relationship: Sibling ____ Half-Sibling ____ Adopted sibling ____ Other: _____

Birth Date: ____/____/____ Birthplace: _____
 Death Date: ____/____/____ Death Cause & Place: _____
 Living At: _____

Father's Name: _____ YOB: _____ Code #: _____
 Mother Maiden: _____ YOB: _____ Code #: _____
 Spouse's Name: _____ YOB: _____ Code #: _____
 Last First

_____ Name: _____ Sex: M F Eskimo
 Last/Maiden First
 Relationship: Sibling ____ Half-Sibling ____ Adopted sibling ____ Other: _____

Birth Date: ____/____/____ Birthplace: _____
 Death Date: ____/____/____ Death Cause & Place: _____
 Living At: _____

Father's Name: _____ YOB: _____ Code #: _____
 Mother Maiden: _____ YOB: _____ Code #: _____
 Spouse's Name: _____ YOB: _____ Code #: _____
 Last First

_____ Name: _____ Sex: M F Eskimo
 Last/Maiden First
 Relationship: Sibling ____ Half-Sibling ____ Adopted sibling ____ Other: _____

Birth Date: ____/____/____ Birthplace: _____
 Death Date: ____/____/____ Death Cause & Place: _____
 Living At: _____

Father's Name: _____ YOB: _____ Code #: _____
 Mother Maiden: _____ YOB: _____ Code #: _____
 Spouse's Name: _____ YOB: _____ Code #: _____
 Last First

_____ Name: _____ Sex: M F Eskimo
 Last/Maiden First
 Relationship: Sibling ____ Half-Sibling ____ Adopted sibling ____ Other: _____

Birth Date: ____/____/____ Birthplace: _____
 Death Date: ____/____/____ Death Cause & Place: _____
 Living At: _____

Father's Name: _____ YOB: _____ Code #: _____
 Mother Maiden: _____ YOB: _____ Code #: _____
 Spouse's Name: _____ YOB: _____ Code #: _____
 Last First

APPENDIX B

SEASONALITY OF BIRTH FOR DISCREET GROUPS:
TABLE AND STATISTICS

MOB	Count Exp Val Row Pct Col Pct Tot Pct	GEN								Row Total
		< 1900	1900 to	1920 to	1930 to	1940 to	1960 to	1970 to	> 1979	
		1919	1929	1939	1959	1969	1979			
		0	1	2	3	4	5	6	7	
1	5	7	11	13	7	9	3	12	67	
	6.9	8.9	7.4	11.1	10.0	9.3	5.3	8.0	8.7%	
	7.5%	10.4%	16.4%	19.4%	10.4%	13.4%	4.5%	17.9%		
	6.3%	6.9%	12.9%	10.2%	6.1%	8.5%	4.9%	13.0%		
2	1	9	8	11	11	7	4	4	55	
	5.7	7.3	6.1	9.1	8.2	7.6	4.4	6.6	7.2%	
	1.8%	16.4%	14.5%	20.0%	20.0%	12.7%	7.3%	7.3%		
	1.3%	8.8%	9.4%	8.7%	9.6%	6.6%	6.6%	4.3%		
3	6	10	8	7	9	9	3	9	61	
	6.3	8.1	6.8	10.1	9.1	8.4	4.9	7.3	8.0%	
	9.8%	16.4%	13.1%	11.5%	14.8%	14.8%	4.9%	14.8%		
	7.6%	9.8%	9.4%	5.5%	7.9%	8.5%	4.9%	9.8%		
4	5	16	10	7	6	8	2	11	65	
	6.7	8.7	7.2	10.8	9.7	9.0	5.2	7.8	8.5%	
	7.7%	24.6%	15.4%	10.8%	9.2%	12.3%	3.1%	16.9%		
	6.3%	15.7%	11.8%	5.5%	5.3%	7.5%	3.3%	12.0%		
5	9	3	6	13	11	9	3	9	63	
	6.5	8.4	7.0	10.4	9.4	8.7	5.0	7.6	8.2%	
	14.3%	4.8%	9.5%	20.6%	17.5%	14.3%	4.8%	14.3%		
	11.4%	2.9%	7.1%	10.2%	9.6%	8.5%	4.9%	9.8%		
6	7	6	3	7	2	11	6	4	46	
	4.7	6.1	5.1	7.6	6.8	6.4	3.7	5.5	6.0%	
	15.2%	13.0%	6.5%	15.2%	4.3%	23.9%	13.0%	8.7%		
	8.9%	5.9%	3.5%	5.5%	1.8%	10.4%	9.8%	4.3%		
7	6	12	3	18	13	9	5	8	74	
	7.6	9.9	8.2	12.3	11.0	10.2	5.9	8.9	9.7%	
	8.1%	16.2%	4.1%	24.3%	17.6%	12.2%	6.8%	10.8%		
	7.6%	11.8%	3.5%	14.2%	11.4%	8.5%	8.2%	8.7%		
8	4	4	5	5	12	8	8	9	55	
	5.7	7.3	6.1	9.1	8.2	7.6	4.4	6.6	7.2%	
	7.3%	7.3%	9.1%	9.1%	21.8%	14.5%	14.5%	16.4%		
	5.1%	3.9%	5.9%	3.9%	10.5%	7.5%	13.1%	9.8%		
9	9	6	10	13	13	8	6	6	71	
	7.3	9.5	7.9	11.8	10.6	9.8	5.7	8.5	9.3%	
	12.7%	8.5%	14.1%	18.3%	18.3%	11.3%	8.5%	8.5%		
	11.4%	5.9%	11.8%	10.2%	11.4%	7.5%	9.8%	6.5%		
10	13	11	4	10	8	11	2	7	66	
	6.8	8.8	7.3	10.9	9.8	9.1	5.3	7.9	8.6%	
	19.7%	16.7%	6.1%	15.2%	12.1%	16.7%	3.0%	10.6%		
	16.5%	10.8%	4.7%	7.9%	7.0%	10.4%	3.3%	7.6%		
11	8	5	7	10	6	8	12	10	66	
	6.8	8.8	7.3	10.9	9.8	9.1	5.3	7.9	8.6%	
	12.1%	7.6%	10.6%	15.2%	9.1%	12.1%	18.2%	15.2%		
	10.1%	4.9%	8.2%	7.9%	5.3%	7.5%	19.7%	10.9%		
12	6	13	10	13	16	9	7	3	77	
	7.9	10.3	8.5	12.8	11.5	10.7	6.1	9.2	10.1%	
	7.8%	16.9%	13.0%	16.9%	20.8%	11.7%	9.1%	3.9%		
	7.6%	12.7%	11.8%	10.2%	14.0%	8.5%	11.5%	3.3%		
Column Total		79	102	85	127	114	106	61	92	766
Total		10.3%	13.3%	11.1%	16.6%	14.9%	13.8%	8.0%	12.0%	100.0%

Chi-Square	Value	DF	Significance
Pearson	100.49835	77	.03739
Likelihood Ratio	103.65524	77	.02313
Mantel-Haenszel test for linear association	.24314	1	.62194

Minimum Expected Frequency - 3.663
Cells with Expected Frequency < 5 - 5 OF 96 (5.2%)

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Phi	.36221			.03739 *1
Cramer's V	.13690			.03739 *1
Contingency Coefficient	.34056			.03739 *1
Lambda :				
symmetric	.04744	.01536	3.04587	
with MOB dependent	.04644	.01759	2.58990	
with GEN dependent	.04851	.01863	2.55038	
Goodman & Kruskal Tau :				
with MOB dependent	.01184	.00233		.04247 *2
with GEN dependent	.01802	.00352		.06586 *2
Uncertainty Coefficient :				
symmetric	.02985	.00554	5.38076	.02313 *3
with MOB dependent	.02732	.00508	5.38076	.02313 *3
with GEN dependent	.03288	.00610	5.38076	.02313 *3
Kendall's Tau-b	-.01106	.02596	-.42621	
Kendall's Tau-c	-.01128	.02647	-.42621	
Gamma	-.01238	.02905	-.42621	
Somers' D :				
symmetric	-.01106	.02595	-.42621	
with MOB dependent	-.01135	.02663	-.42621	
with GEN dependent	-.01079	.02531	-.42621	
Pearson's R	-.01783	.03542	-.49285	.62226 *4
Spearman Correlation	-.01447	.03554	-.40012	.68918 *4
Eta :				
with MOB dependent	.12001			
with GEN dependent	.13496			

>Warning # 10390
>Kappa cannot be computed for this table because row values do not equal
>column values.

*1 Pearson chi-square probability
*2 Based on chi-square approximation
*3 Likelihood ratio chi-square probability
*4 VAL/ASE0 is a t-value based on a normal approximation, as is the significance

>Warning # 10313
>Relative Risk Estimate cannot be computed.

Number of Missing Observations: 0