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Food Security in Arctic Alaska: A Preliminary Assessment

Richard A. Caulfield

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Le présent document a été publié initialement dans la collection **Recherche** du Groupe d'études inuit et circumpolaires (GÉTIC) de l'Université Laval.

Adresse postale:

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ISBN : 2-921438-37-2

Dépôt légal: Bibliothèque nationale du Québec, 1^{er} trimestre 2000
Bibliothèque nationale du Canada, 1^{er} trimestre 2000

**FOOD SECURITY IN ARCTIC ALASKA:
A PRELIMINARY ASSESSMENT**

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INTRODUCTION

Alaska's Arctic communities have a dynamic mixed economy that is central to understanding food security and sustainable development (Wolfe, et al. 1984; Wolfe and Walker 1987). In this economy, cash and country food production are mutually supportive. Income from wage employment and government transfers enable households to obtain valued country foods like whales, seals, caribou, and fish. Both country foods and imported foodstuffs contribute flexibly toward meeting nutritional, social, economic, and cultural needs. Cash enables household members to purchase boats, outboard motors, rifles, and fishnets. With these, the region's Iñupiat people are able to procure and consume large amounts of country foods; far more on average than residents of urban Alaska are. They use a wide array of wild resources, working together flexibly to procure, process, and share country foods. These practices are based on traditional systems of land use and occupancy, and they invoke a complex and dynamic system of indigenous knowledge, beliefs, and values.

In a rapidly changing world, Iñupiat people of Arctic Alaska continue to value country foods as central to their culture and identity. In the words of an Iñupiat elder from Kotzebue, "The land means everything to us, it brings us food, it provides for our clothing, it provides for our lodging, it brings us water; it means everything to us" (Berger 1985). At the same time, imported foods—ranging from basics like rice, eggs, and sugar to soda pop and candy—offer a wide array of choices in contemporary Iñupiat diets. However, imported foods in the region are expensive, their availability is often uncertain, and their quality can vary greatly. While desired for the dietary variety they bring, imported foods can also have detrimental effects on the health of Arctic residents.

This mixed subsistence-cash economy is of central importance to understanding food security and sustainable development in Alaska. In this paper, I offer a preliminary assessment of food security in Alaska's Arctic communities over time, including both formal and non-formal sectors. In doing so, I draw heavily upon my own research, that of the Division of Subsistence, Alaska Department of Fish and Game, and state and federal sources. I also highlight some issues affecting food security in the region, pointing to additional research needs as a contribution to broader comparative study.

The data presented here underscore the fact that the Arctic region's mixed economy is dynamic and subject to rapid change. Our understanding of this economy must be historically- and culturally informed. Current transportation and supply systems are based on economic assumptions and subsidies that may well change over time. Where one community may have extraordinary access to a particular resource for a time—wage jobs in the oil industry, for example—other nearby communities may have very limited access to this same resource. Moreover, availability of caribou, salmon, or other resources can change dramatically due to ecological or other factors.

Issues of food security in the Arctic must also be placed in a global context (Nuttall 1998). Decisions about food security issues in Alaska—including subsistence rights, oil and gas development, animal rights activism, Arctic pollutants, and responses to global change—are typically made not in Barrow or Kotzebue but in distant centers like London, New York, and Moscow. While Arctic residents are increasingly successful in securing political self-determination, we know that food security is increasingly affected by a global economy that is itself dynamic and filled with contradictions.

Finally, understanding these local and global dynamics requires documentation of indigenous knowledge about food systems, and how Alaska Native peoples themselves perceive socioeconomic, cultural, and ecological change relating to food security (see Brooke, 1993). For Arctic residents, these issues are not merely of academic interest; they are central to their economic and cultural survival.

1. ALASKA'S ARCTIC REGION

Alaska is America's largest state—comprising some 150 million hectares—and is home to about 621,000 people (Map 1). Indigenous Alaskans—Iñupiat, Yup'ik, Alutiiq, Aleut, Athabaskan, Tlingit, Haida, and Tsimshian—make up only about 16 percent of the total population. Surprisingly, Alaska is a rather urbanized state. Over half of the state's population (some 308,000 people) lives in Anchorage and the nearby Matanuska-Susitna Valley. Only about 20 percent of Alaska's population—or some 125,000 people—live in rural areas (Figure 1). These people live in about 225 communities, most of which have fewer than 500 people and are not connected by road. About half of this rural population is made up of indigenous Alaskans.

Alaska's Iñupiat homeland can be divided broadly into three major areas: the North Slope Borough (NSB), the Northwest Arctic Borough (NWAB), and the Seward Peninsula/Bering Straits region referred to here as the "Nome Census Area" (NCA). This paper focuses on food security issues and data from these three areas. The combined population in this region is about 24,000 people, about 80 percent of who are Iñupiat. They share a common language and a rich cultural history. The climate of the region includes both maritime and arctic conditions and is influenced profoundly by the Bering, Chukchi, and Beaufort seas. Temperatures range from 10-15°C in summer to -20°C or more in winter. The physical landscape is dominated largely by treeless tundra but includes mountains reaching over 2700 meters.

Table 1 provides an overview of socioeconomic characteristics of Alaska's Arctic region. In general, it is a vast, remote, and sparsely populated region where year-round access is primarily by air. There are no roads connecting rural communities with the rest of the state. The region's population is young (median age in the 20s), with a large school-aged population. Not surprisingly, households tend to be large (3.75 in the Northwest Arctic Borough) compared to the rest of Alaska (at 2.7).

Wage employment opportunities vary greatly within the region, but in general they are limited and seasonal. With the exception of the North Slope Borough, unemployment is high compared with Alaska as a whole. Per capita income (1997) in much of the region falls below the average for Alaska (\$24,969). The notable exception is on the North Slope, where wages and tax revenues from the oil industry at Prudhoe Bay contribute to greater job opportunities and wealth.

Government transfers are also important in household incomes in Arctic Alaska. In one region of western Alaska, these transfers are estimated to be nearly 50% of total per capita income (*Alaska Economic Trends* 1999). Eleven percent of this came from one transfer received by all Alaskans: the Alaska Permanent Fund Dividend (PFD), paid from the state's oil royalties and other income. In 1998 the PFD amounted to \$1,540.88 for each Alaskan. PFD income is particularly important for larger rural households that have limited access to wage employment.

Hub communities of Nome (population 3,706), Kotzebue (population 2,964), and Barrow (population 4,397) in Arctic Alaska are the locus of many wage jobs and are regional service centers for health services, retail stores, government agencies, and transportation. They all have regular service from scheduled jet aircraft and receive shipments of goods and equipment by barge during summer months.

1.1 Nome Census Area

Iñupiat people have inhabited the Nome/Bering Straits for at least four thousand years. For food they relied heavily on marine mammals like seals, walrus, and whales. The discovery of gold near present-day Nome in 1898-99 brought a huge influx of Euro-Americans to the region. With them came diseases and social disruption on a massive scale. While the population of stampedeers quickly waned, the newly founded town of Nome continued to serve as a hub for mining, commerce, and trade.

Nome continues to be a hub community today, serving the seventeen inhabited communities of the Norton Sound/Bering Straits region as a focal point for employment, goods, and services. It has over 1,400 wage and salary jobs, nearly 40 percent of all in the region (Kawerak, Inc. 1999). A large proportion is with the Norton Sound Health Corporation, which provides health care to the region (with 400 employees). Other major employers are the Bering Straits School District, Kawerak, Inc. (the regional Native non-profit organization), and Nome Public School District. Nome also has a bustling visitor industry, centered on the world-famous Iditarod Trail Sled Dog Race. Visitors also come in summer to enjoy the region's colorful history, to watch birds and other wildlife, and to learn about Iñupiat culture.

Under the Alaska Native Claims Settlement Act (ANCSA) of 1971, Iñupiat people became shareholders in Bering Straits Native Corporation (BSNC). As a vehicle for the land claims settlement, BSNC has invested in real estate, a car rental agency, a construction firm, and other businesses. In 1997 it had 6,190 shareholders and earned revenues of \$6.7 million

(Anonymous 1998). Kawerak, Inc., the regional non-profit Native organization, provides educational, cultural, and social services to indigenous residents.

Table 2 shows employment patterns in the Nome Census Area from 1990-1997 (Alaska Department of Labor 1999a). Government sector jobs dominate the employment picture, making up nearly 40 percent of the total (Figure 2). The service sector provides 28% of all private sector jobs, 12% came from trade, and only 2.1% from mining. Overall, job opportunities in the region outside of Nome are extremely limited. As a result, many families rely on subsistence hunting and fishing for food, and dependent on government transfers such as unemployment and welfare benefits, the Alaska Permanent Fund dividend, and other public assistance programs. The region has a high poverty rate. In 1993, approximately 25% of all families lived below the poverty line; a figure approximately 14% higher than the Alaska average (Kawerak, Inc., 1999).

Commercial fishing for herring, salmon, halibut, and crab in Norton Sound provide employment for some 200 people in summer months. In addition, creation of the Community Development Quota (CDQ) program in 1992 opened up opportunities for Nome area communities to receive allocations of bottomfish from the Bering Sea. These communities created the Norton Sound Economic Development Corporation (NSEDC), which is using capital generated by the CDQ program to modernize and diversify regional fisheries, build additional infrastructure, promote education, and participate directly in Bering Sea fisheries (Norton Sound Economic Development Association 1999).

Future economic hopes for the Nome Census Area region are focused largely on expanding tourism and fisheries. The price of gold currently is low, making it unlikely that mining activity will increase in the near future.

1.2 Northwest Arctic Borough

The Northwest Arctic Borough (NWAB) has a population of 6,844 people living in 11 remote communities. Nearly 87% of the population is Iñupiat. Iñupiat people have inhabited the area for at least several thousand years, depending largely upon marine mammals, fish, and caribou. Today, the largest community is Kotzebue, the regional hub, located on a peninsula on the Chukchi Sea. It has a population of 2,964, a majority of whom are Iñupiat. Kotzebue is home to a number of regional institutions, including the NANA Regional Corporation, Maniilaq (the regional non-profit organization), the Northwest Arctic Borough School District, and the Northwest Arctic Borough offices.

Outside of Kotzebue, the other communities in the region range in size from nearly 600 (Noorvik) to as few as 100 (Kobuk). There are no roads connecting communities to each other or to other regions of the state. Year-round travel between communities is largely by air or by snowmachine in winter. Boats travel the Noatak, Kobuk, Selawik, and Buckland rivers in summer months, carrying freight, fuel, and people.

Like the Nome Census Area, the NWAB has a very young population with large household sizes (Alaska Department of Labor, 1998a). The median age of the population is 23 years, nearly 10 years less than the average statewide median of 32.2 years. The average household size is 3.75 compared with the statewide average of 2.7. Over 32 percent of the population are school-aged, compared with 23 percent statewide.

Table 3 shows the types of wage employment available in the NWAB area (Alaska Department of Labor 1999c). Public sector jobs make up nearly one-third of all employment (Figure 3). The largest employers are the Northwest Arctic Borough School District, the City of Kotzebue, and the federal and state governments. Recent research shows that personal income in the region is dominated by public sector funds, up to nearly 70 percent of income came from federal, state, local, and tribal government payrolls and transfer payments (Alaska Department of Labor 1999b). Unemployment remains high, normally at twice the state average. Moreover, employment figures indicate that there is a very large number of “discouraged” workers in the NWAB, particularly in the smaller communities.

The NANA Corporation, created under ANCSA in 1971, is a major economic force in the region. It has 10,000 shareholders, and earned total revenues of \$60 million in 1997 (Anonymous 1998). Through its investments, it seeks to overcome these economic difficulties by creating new jobs for shareholders. Foremost among its investments is the Red Dog Mine, which is located 90 miles north of Kotzebue. NANA operates this world-class zinc mine in a joint venture arrangement with Cominco Alaska, a subsidiary of the Canadian multinational corporation. It is the world’s largest producer of zinc concentrate. In 1997 and 1998, NANA and Cominco invested an additional \$85 million to expand operations, increasing capacity of the operation by 40%. The ore is extracted year-round and shipped by truck to a port near the community of Kivalina on the Chukchi Sea. There it is stockpiled for shipment by barge during the brief summer season of open water.

Red Dog is the largest single employer in the NWAB, with a payroll totaling to nearly \$26.4 million (1997) (Alaska Department of Labor 1999b). Over 50 percent of mine employees and contractors are Iñupiat. In 1997, average wages for employees were over \$70,000 per year as compared to about \$33,000 for the rest of the borough. In addition to the mine’s economic benefits, NANA views the operation as a means of providing shareholders with stable, year-round jobs with high salaries. The two-week-on, one-week-off schedule for most mine employees enables village residents to participate both in wage employment and also in subsistence activities during time off. Overall, NANA estimates that its activities provide up to one job in five and 10% of all personal income in the NWAB through mining, hotel, and other businesses.

Subsistence hunting and fishing remain important elements in the way of life of NWAB residents. This is especially true in the Borough’s smaller communities, where the taking of caribou, seals, salmon, moose, and other species is an important element in local diets. Reindeer herding, which for

many years was part of the region’s economy, has declined in significance. Today only one herder still has reindeer in the region. Meat from this herd can be purchased locally in Nome, Kotzebue, and Barrow. However, increasing numbers of animals have been lost to the Western Arctic Caribou Herd, which has increased dramatically in numbers in recent years. Moreover, markets for reindeer antler, previously marketed to Asia, have declined due to poor economic conditions.

Commercial fishing has never been a major element in the NWAB economy, and recent declines in fish stocks and prices have only made conditions worse. The 1998 catch of chum salmon was the lowest on record in both volume and value.

1.3 North Slope Borough

Alaska’s North Slope Borough is the largest of the three areas in Alaska’s Arctic—encompassing some 223,000 square kilometers. It is also one of Alaska’s more wealthy boroughs. The North Slope is home to some 7,400 people, about 56% of who are Iñupiat. Iñupiat people have inhabited the NSB region for thousands of years, relying on marine mammals, caribou, fish, and other subsistence resources (Huntington, 1991). Of particular importance is the bowhead whale, which Iñupiat people have hunted in spring and fall as it migrates in coastal waters. Bowhead whaling has long been central to the Iñupiat economy and diet (Kruse, 1986). Even in a rapidly changing world, participation in whaling is a vital part of North Slope Iñupiat identity and social organization (Freeman et al., 1998).

The largest community in the region is Barrow, which has a population of 4,397 (1998 data). Barrow is the economic hub for the North Slope Borough, and is headquarters for the Arctic Slope Regional Corporation (ASRC), the North Slope Borough School District, the Iñupiat Community of the Arctic Slope (the regional tribal consortium), and state and federal agencies. The six other communities in the region—Anaktuvuk Pass, Atkasuk, Nuiqsut, Point Hope, Point Lay, and Wainwright—range in size from about 200 (Point Lay) up to some 750 (Point Hope) (Alaska Department of Labor, 1997).

Like the other areas of Alaska’s Arctic, the NSB has a low median age ($n=27.0$) compared to the rest of Alaska ($n=32.2$) and a large population under the age of 18 (40%). However, it is also more diverse ethnically than the other areas—particularly in Barrow, where 36% of the population is non-indigenous. Demographic changes and economic factors have led to an overall decline of 258% in the proportion of indigenous people in the NSB between 1990 and 1997 (Alaska Department of Labor 1997: 94).

The major income producing activity on the North Slope is oil and gas exploration and development. British Petroleum/ARCO operations at Prudhoe Bay and surrounding fields produce some 25% of the United States’ oil. Tax revenues from oil fields fund an extensive array of borough jobs and services. The Arctic Slope Regional Corporation (ASRC) is involved extensively in oilfield support services, contracting and construction, petroleum refining, consulting services, fuel and product distribution, hotel and tourism services, and other enterprises. In 1997, it had total revenues

of nearly \$663 million, providing jobs to many of its 7,800 shareholders (Anonymous 1998).

As in the other areas, employment in the NSB is heavily based on government services (24%), particularly with the North Slope Borough government (Table 4—Alaska Department of Labor 1999d). However, oil and gas-related employment (listed as “mining” in census data) provides fully 44% of all jobs in the NSB, reflecting the extraordinary contribution of this sector to employment in the region (Figure 4). These economic opportunities help explain the NSB’s low unemployment rate which, at 5.1, is below that for Alaska as a whole.

2 COUNTRY FOOD AND FOOD SECURITY IN ALASKA’S ARCTIC

Country foods (commonly called “subsistence” or “Native” foods in Alaska) are a major part of the diets of people living in Alaska’s Arctic (Wolfe, 1996). Families consume bowhead whales, walrus, seals, fish, berries, waterfowl, caribou, moose, Arctic hares, and many other species. As noted above, these foods are important not only for their nutritional qualities but also for their connection to Iñupiat identity and a treasured way of life. Participation in the taking of wild foods in Arctic Alaska and rural Alaska generally is quite high (Figure 5). Sixty-three percent of all Arctic households take game resources (e.g. whales, caribou) and 78 percent take fish. Fully 92 percent consume game and 96 percent consume fish (*ibid.*).

Consumption of country foods is greater in rural Alaska than anywhere else in the United States. About 43.7 million pounds or nearly 20 million kilograms of country foods are taken each year (Wolfe 1996: 1). This amounts to a per capita consumption of 375 pounds or 169 kilograms annually or just over one pound a day. In comparison, the average American uses about 222 pounds (about 100 kilos) of store-bought meat, fish, and poultry annually (out of a total of some 1,370 pounds of food). Thus, the average rural Alaskan uses more wild meat and fish than the average American uses store-bought meats and fish.

The use of country foods in Arctic Alaska and rural Alaska generally is far greater than that in Alaska’s urban areas, like Anchorage. People in Arctic Alaska take 516 pounds (232 kilos) per person per year compared with only 19 pounds (8.5 kilos) in Anchorage (*ibid.*). Table 5 shows that the nutritional contribution of these country foods to Arctic residents’ overall protein requirement is extraordinary; they provide 335% of daily requirements. Moreover, they provide 48% of the population’s daily requirement for calories.

Equally interesting is the economic value of country foods to the economies of rural Alaska. Table 5 also shows that the estimated replacement cost of country foods in Arctic Alaska at US\$3 per pound is over \$31 million. The total value of such production for all of rural Alaska exceeds \$131 million. Clearly, country foods are an enormous contribution to any notion of sustainable development.

Table 6 shows the diversity of foods used by Iñupiat people in Alaska’s Arctic. The overall take in Arctic communities on average is over 10 million pounds (4.5 million kilos). The largest proportion of these foods (42%) is marine mammals, particularly bowhead whale. The second largest (30%) is fish, while the third, which includes caribou and moose, is 24%.

The important thing about this intriguing figure is the high levels of harvest (shown in elevation) in Arctic Alaska, particularly as compared with Anchorage and other non-rural places.

Iñupiat people continually speak of the importance of country foods to kinship and social organization: “We, the Iñupiat people, have always shared and divided our food and that is our way of life. I do not want to lose our cultural lifestyle, because it is so precious. Our Iñupiat lifestyle from time immemorial has been utilized and is still prevalent today. We have practiced our whaling traditions and we are still using them today . . . The whaling tradition is the most precious in my life” (Lori Kingik of Point Hope; Berger 1985: 51).

Figure 7 shows how these relationships are expressed in the social organization of production. The figure is a schematic diagram of country food production in Wales, a community in Alaska’s Arctic (Magdanz and Utermohle 1998: 52). Different shapes depict distinct household types, but the important data is the interrelationships between household units. This diagram reveals the domestic mode of production and distribution so common in rural Alaska. Kinship is the primary basis for such economic groups. Recent research shows that in over 75% of cases where household members worked with others, they did so with extended family members related by kinship (*ibid.*).

Subsistence research in Alaska also shows a surprising degree of specialization in procuring country foods (Wolfe, 1987). While consumption of these foods is typically widespread within communities, often there are certain particularly productive households in the community that procure far more foods than they themselves can consume. Research shows that these so-called “super-households” typically make up about 30 percent of a community’s households, and yet they not uncommonly produce about 70 percent or more of the community’s country foods. The reasons for this may well have to do with their developmental cycle—they often have more mature adults—and they typically have more hunting and fishing equipment. The existence of these super-households suggests that specialization in country food production may not be new, and that such differences may underlie differences in leadership, trade, or ceremonial status among hunter-gatherers (*ibid.*: 17).

While country foods clearly play an important economic, social, nutritional, and cultural role in Alaska’s Arctic, their continued use is under threat from various quarters. Contaminants in wild foods, habitat destruction, and animal rights activism outside of the Arctic pose threats to continuation of subsistence practices. I return to these important issues in the final section of the paper, looking at issues affecting food security in Alaska.

3 THE FORMAL SECTOR AND FOOD SECURITY

Imported foods are a major complement to country foods in the mixed economy of Arctic Alaska. Because few crops are grown in Alaska's Arctic (other than small household gardens), nearly all food products other than country foods have to be imported from elsewhere. Thus, Arctic communities are highly dependent upon efficient and cost-effective procurement, transportation, and distribution systems for obtaining foods necessary for contemporary livelihoods.

Alaska's Inupiat communities are at the far end of a supply line that stretches thousands of kilometers from food producing areas elsewhere in North America and beyond. This supply line can involve food producers, wholesalers, retailers, postal workers, truckers, railroads, major airlines, small air taxis, ocean-going container ships, coastal barges, and local distributors. Unfortunately, it is difficult to gather comprehensive data about these stakeholders in the formal sector. In some cases, the data do not exist, while in others it is viewed as proprietary information by private businesses. Thus, the preliminary data that follow are limited. However, they help identify needs and gaps for further research.

Most foods imported to Arctic Alaska reach their destination by air or by sea. Coastal barges serve Nome, Kotzebue, and Barrow during the brief summer open-water season. Much of their freight is petroleum products (especially fuel oil), heavy equipment, and durable goods. However, some foodstuffs are shipped by barge. Of the three hub communities above, only Nome has an official port listed in the federal *Waterborne Commerce Statistics* database (United States Army Corps of Engineers 1999). Port authority officials there report that the community's port receives about 8,700 tons of freight each year, but that it is difficult to distinguish how much is foodstuffs (the amount is small compared to the total) (City of Nome 1999). Three major barge companies serve Alaska's Arctic communities: Northland Services, Alaska Marine Lines, and Bowhead Transportation. Crowley Maritime Services provided general cargo service until recently, but reportedly now only carries fuel.

Significant quantities of food are shipped to communities in the region by air. Air freight service is provided to the region by Alaska Airlines (jet service), Northern Air Cargo (jet and turboprop), and others. Local air taxis such as Cape Smythe Air, Bering Air, and others carry goods to smaller communities from hub communities. Typically, perishable food items are shipped by air via large certificated air carriers like Alaska Airlines. Local air taxi companies then transship them to smaller communities.

A large amount of foodstuffs is shipped via the U.S. Postal Service (USPS). These goods are carried by airlines under contract with the USPS, usually at a subsidized rate. These subsidies are part of a nationwide program to delivery mail at uniform rates. Costs of shipping in Alaska typically are higher than elsewhere in the US, requiring a subsidy to attain this goal. The USPS also has a requirement that mailed goods be delivered at a set frequency, which means that deliveries are often made more frequently than normal air taxi market conditions would dictate.

Foodstuffs are shipped both by regular parcel post and through a "bypass" mail delivery system. In the former, parcels are routed through the normal mail delivery system. Bypass mail means that goods do not have to be handled through postal facilities. Instead, they can be delivered directly from air carrier to shipper at the parcel post rate. It is commonly used to ship wholesale groceries and consumer goods.

Deliveries to rural Alaska typically originate in Anchorage or Fairbanks. Bypass mail is weighed by USPS officials, shrink-wrapped on pallets or placed in "igloo" containers, and flown to hub communities by one of the major air carriers. Alaska Airlines, for example, uses Boeing 737 aircraft with moveable bulkheads to accommodate igloo containers, while Northern Air Cargo can accommodate cargo on pallets. From hub airports, bypass mail is sorted and transferred to smaller air taxis for delivery to outlying communities.

Hub communities like Nome, Kotzebue, and Barrow usually have several larger grocery stores and a number of smaller convenience or specialty food stores. The Alaska Commercial Company owns full-service grocery stores in Kotzebue, Nome, and many other rural Alaskan communities. Most small communities have privately owned or cooperative stores with more limited goods.

4 ISSUES AFFECTING FOOD SECURITY IN ARCTIC ALASKA

4.1 Subsistence conflicts

Of all the issues affecting food security in Alaska, one of the most important and politically volatile is the conflict over a subsistence priority for rural Alaskans, and particularly Alaska Natives (Caulfield 1993; *Cultural Survival Quarterly* 1998). Alaska's Inupiat and other indigenous peoples have used country foods for their livelihoods for generations. But colonization by Russia and later the United States brought a flood of new immigrants who increasingly compete for these same resources. As late as World War II, indigenous peoples were a majority in Alaska, but today they make up only 16% of the total population.

Alaska's indigenous people view the taking of country foods as a vital part of their economies and, importantly, as a basic human right (*ibid.*). But as the state's immigrant population expands, conflicts are emerging between those who use fish and wildlife resources for "sport" and those whose cultures and livelihoods are built on ancient customs and traditions in the Arctic landscape.

ANCSA, enacted in 1971, extinguished aboriginal rights to hunting and fishing as part of a larger land claims agreement (Case, 1984; Alaska Natives Commission, 1994). However, the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 provided a priority for subsistence hunting and fishing by "rural residents" of the state, and enabled the State of Alaska to manage these activities uniformly

throughout the state consistent with this priority. However, in 1989 the Alaska Supreme Court found this priority to be unconstitutional in state law, and efforts to bring state law into compliance with ANILCA have failed because of political opposition from some quarters. As a result, the US federal government is now stepping in to insure that a rural priority for subsistence is maintained on federal public lands; about 60% of the state.

Today there are increasingly bitter conflicts between those who support a rural subsistence priority and those who believe that such a priority violates ideals of “equality under the law” in American jurisprudence. One commentator, arguing against a rural or Native Alaskan preference, asserts that

“almost everyone in [Alaska] is becoming aware that the ‘subsistence preference’ is a farce. That is, nearly no one in the state could be considered a subsistence hunter if what is meant by that is a sole or primary reliance for one’s livelihood on the proceeds of the chase.”

Not surprisingly, Alaska’s indigenous people disagree sharply with this.

“We the Native people,” states one elder, “. . . are proud of one thing, that is our culture and our Native way of life, to live off the land, because we know culture and our tradition and our way of life cannot be bought, cannot be taken away from us, no matter what happens” (in Berger, 1985: 51).

A growing number of Alaska’s indigenous peoples feel that the State’s political leadership is turning its back on their rights and that new strategies must be employed to protect subsistence. On May 5, 1999, three thousand Native and non-Native people marched through the streets of Anchorage in support of subsistence. A recent newspaper article by Tlingit leader Robert Loescher, raises the possibility of using non-violent civil disobedience as a tool in protecting food security in rural Alaska:

We don’t know how long our subsistence will continue under this cloud of uncertainty, and our people are getting more impatient, so we as leaders need to be prepared for civil disobedience. The best course of action is for us to continue to represent ourselves before every governmental body that we can. But we also need to be prepared to support Native people when they end up in the hands of law enforcement officials (Loescher, 1999: 21-22).

This type of rhetoric is not unknown in Alaskan politics. What is perhaps new is that the speaker is not a marginalized member of the body politic but the president and chief executive officer of Sealaska Corporation, one of the wealthiest and most powerful of the ANCSA regional corporations.

4.2 Arctic contaminants

The traditional diet of Alaskan Iñupiat people is rich in protein, vitamins, and essential elements. They are particularly well suited to life in an Arctic climate. Scientists believe that high consumption of fish and marine mammals by

indigenous peoples may lower incidences of heart disease. They also have less fat and carbohydrates than do imported foods. Rich, fatty imported foods can contribute to poor health, including greater risk of diabetes and cardiovascular disease (Arctic Monitoring and Assessment Programme, 1997).

Scientists today are increasingly concerned about industrial contaminants entering into Arctic food chains. Of greatest concern are persistent organic pollutants (POPs), heavy metals, and radionuclides. Indications are that long-range transport and biomagnification of some of these in the Arctic contribute to contaminant levels 10 to 20 times higher in Arctic residents than in those living in temperate regions. Indigenous peoples dependent upon large quantities of country foods are especially vulnerable.

Indications thus far are that contaminant levels in country foods in Arctic Alaska may be lower than in other more polluted areas. Nevertheless, Iñupiat people and other Alaskan indigenous peoples are quite concerned about growing rates of cancer, diabetes, and heart disease. The newly formed Alaska Native Science Commission has undertaken preliminary work as a means of understanding issues of contaminants in country foods. As noted in the recent AMAP report on Arctic contaminants,

The current levels of exposure to persistent organic contaminants in the Arctic are clearly of concern, but it is still not clear what public health measures should be taken. The dilemma is especially difficult in communities where traditional foods are vital to spiritual, cultural, and physical well-being. (*Ibid.*: 177)

4.3 Global climate change

Global climate change and increased ultraviolet radiation caused by ozone depletion may also be a serious threat to food security in the Arctic. Many scientists are convinced that these changes are linked to greenhouse gas emissions and production of CFCs, particularly in industrialized countries. The seriousness of this problem is difficult to gauge. The Intergovernmental Panel on Climate Change (IPCC) suggests that continued increases in global temperatures at current rates could raise the average global air temperature between 1 and 3.5° C by 2100. Significantly, many studies suggest that the Arctic as a whole will warm more than the global mean. This could mean that impacts of climate change will be felt first and most intensely by Arctic residents, reliant as they are on renewable resources for their livelihoods.

While impacts of climate change on the Arctic are difficult to predict, we can guess some of the likely changes if significant warming occurs (see Weller and Anderson, 1998). These include: melting of ice caps and glaciers and an associated rise in sea levels; changes in winds and water currents; disruption of permafrost due to warmer temperatures; enhanced nutrient cycling due to warmer soils; influxes of new plant and animal species from the South; longer growing seasons; and possibly expanded fisheries.

Impacts of such changes on renewable resources important to Arctic residents may include both “positive” and “negative”

effects, depending on one's perspective. Rising sea levels, increased coastal erosion, and more severe storms may affect Arctic communities located on coastlines. Changes in sea ice could alter migration routes of animals like bowhead whales or harp seals and affect the density of seals. Unstable sea ice could make ice-edge hunting more difficult and dangerous. Temperature and precipitation changes could affect migration patterns of terrestrial mammals like caribou and alter breeding and molting areas for birds. Changes in snow cover could make accessing subsistence use areas more difficult by snowmachine or other vehicles. These changes could also affect the growth and distribution of plants essential for survival of caribou and reindeer.

A thinning ozone layer raises concern about plants and animals (including humans) that could be damaged by increased ultraviolet radiation. As with climate change, the impacts of increased UV radiation are unclear. Studies suggest, however, that increased radiation could favor certain plants over others and could slow nutrient cycling. High UV levels could also stress freshwater ecosystems, inhibit growth in marine plants, and damage zooplankton and fish.

4.4 Industrial development and habitat degradation

Over-exploitation of marine mammals and other wildlife species in Alaska the 18th and 19th centuries has given way in the late 20th century to full-scale efforts to develop the Arctic's mineral and energy resources. Multinational or state-owned corporations, often with support of national governments, seek to develop oil and gas resources, mines for gold, diamonds, lead, zinc, and other minerals, and hydroelectric dams generating energy for consumers to the south. Along with these activities comes development of infrastructure (e.g., roads, pipelines, marine transportation systems).

Extraction of oil on Alaska's North Slope and the construction of the \$9 billion trans-Alaska pipeline is a well-known example of this development (Coates, 1993). In some cases, such activities are undertaken with support of indigenous peoples and their governments; often they are not. In recent decades, conflicts have developed with increasing frequency between customary and traditional use of renewable resources by indigenous peoples and the activities of industries seeking to extract non-renewable resources (Nuttall 1998).

Residents of Alaska's Arctic appear to have come to terms with tradeoffs involved in industrial development in their homeland, subject to careful environmental controls. The Inupiat-controlled North Slope Borough is an ardent supporter of expanded oil and gas development in the region as a means of providing jobs and income (Kruse 1986). Similarly, the NANA Corporation's Red Dog Mine reflects a careful calculus between risks of environmental contamination and rewards of shareholder jobs. The one area where Alaska's Inupiat people have expressed strong concern about oil and gas development is in off-shore areas, where risks of blowouts or spills are higher and possibilities of cleaning up a spill are low. Questions about the benefits and costs of industrial development will continue in Arctic Alaska in the years ahead, and questions about such developments' potential impacts on food security will also persist.

4.5 Animal rights activism and food security

A final issue affecting food security in the Alaskan Arctic involves animal rights opposition to consumption of marine mammals and to trade in wildlife products by indigenous peoples (Nuttall 1998, Wenzel 1991, Freeman et al. 1998). Many animal rights organizations oppose whaling, sealing, and other harvests of country foods. The most notable example of this were efforts by some groups to ban the take of bowhead whales through the International Whaling Commission in 1977.

However, Arctic Inupiat people believe that renewable resources can continue to be managed for sustainable use and can provide an important foundation for a mixed subsistence-cash economy. Inuit Circumpolar Conference (ICC) president Aqqaluk Lynge (1997) argues that: the surest guarantee of long-term environmental protection and sustainable development in the Arctic is to have Inuit on the land hunting, fishing, trapping, and gathering and acquiring and passing down traditional ecological knowledge and wisdom from one generation to the next. [But] staying on the land is expensive, for now we use snowmobiles and other modern technology. To continue to hunt, fish, and trap, we must sell our animal products in the world market.

However, many animal rights organizations and some governments oppose such activities, even when the best science available shows that catches are sustainable. Increasingly, conflicts arise because of ethical objections to the killing of wild animals for human purposes. Of Inuit demands that they be allowed to continue traditional whaling, for example, two American attorneys argue that

the Inuit's claims are at the expense of an overlooked voice—the anguished cry—of the sentient inhabitants of the deep...The whales find their own sustenance in the oceans; by what right do the Inuit expropriate the bodies of the whales to serve as their food? (D'Amato and Chopra, 1991)

The most notable examples of trade barriers affecting Arctic economies are the U.S. Marine Mammal Protection Act (MMPA) of 1972 and the European Union's Seal Skin Directive of 1983, which bans importation of seal skins. The former bans hunting of marine mammals in the United States but provides an exemption for indigenous peoples. However, it prohibits imports or exports of marine mammal products; thereby precluding opportunities for trade in sealskins and other wildlife products.

Indigenous peoples in Arctic Alaska object to these trade barriers as a matter of equity and justice and as a violation of international law. Recent critiques of these barriers focus on their inconsistency with provisions of the General Agreement on Trade and Tariffs (GATT) and provisions of the World Trade Organization (WTO). There are indications that changes in policy, particularly in the EU, may be on the horizon (Lynge, 1996). However, conflicts over animal rights agendas in the Arctic highlight differing perceptions and values: is it possible to insure continuation of sustainable use of these resources when this use is under political attack?

SUMMARY

Understanding food security in Alaska's Arctic requires a careful assessment of the mixed subsistence-cash economy in rural communities. It also requires a multifaceted, historically-informed analysis of sociocultural, economic, and cultural changes underway in Alaska indigenous communities. In particular, attention must be paid to the knowledge, perceptions, values, and concerns of Iñupiat people themselves, who have the most direct stake in issues of food security.

Research conducted on country food production and distribution in Alaska thus far has opened up new insights to the multifaceted values of these foods. More research needs to be done, particularly in light of new proposals for industrial development and other changes in Alaska's Arctic. Data on subsistence production in northern Alaska—particularly by the Alaska Department of Fish and Game, Division of Subsistence—provide rich insights to the significance of country foods over time. However, more up-to-date research is needed. Moreover, comprehensive data about the formal food economy in Alaska—including types of products, pricing, transportation systems, and relevant laws, policies, and institutions—are often lacking, in part because these data are considered proprietary. Additional data-gathering and analysis in these areas will be necessary before a more comprehensive comparison of food security can be achieved with regions beyond Alaska.

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TABLE 1
STATISTICAL OVERVIEW OF NORTHERN ALASKA REGIONS,
BY LABOR MARKET AREA

REGION	Alaska	Nome Census Area	Northwest Arctic Borough area	North Slope Borough area
Population 1998	621,400	9,402	6,844	7,403
Household Composition				
♦ median age	32.2	26.7	23.0	27.0
♦ persons per household	2.7	3.3	3.7	3.4
♦ % under 18	23.2	39.7	32.2	39.7
♦ % 18-64 yrs.	63.2	54.4	51.2	56.3
♦ % 65 yrs +	5.1	5.8	5.1	4.0
♦ % female	47.9	47.3	48.1	47.6
Demographics/ethnicity				
♦ % indigenous	16.7	80.7	87.1	56.2
♦ % white	74.2	17.9	11.7	30.7
♦ % other	9.1	1.4	1.2	13.1
Labor force				
♦ % in labor force	72.2	57.6	54.5	45.9
♦ % unemployed	7.9	11.7	16.1	5.1
Measured income				
♦ income/capita (1997)	\$24,969	\$18,383	\$19,083	\$23,725
♦ wage/salary income (1997)	32,781	26,967	38,515	57,516
Educational Attainment (1990)				
♦ % high school graduate	86.6	65.0	63.8	68.5
♦ % BA degree +	23.0	13.8	11.9	14.1



TABLE 2
NOME CENSUS AREA EMPLOYMENT BY INDUSTRY, 1990-1997

YEAR	1990	1991	1992	1993	1994	1995	1996	1997	Average annual wage 1997
Total Industries	2,905	2,866	2,969	3,122	3,204	3,281	3,414	3,563	\$26,967
Mining	163	89	66	68	59	65	77	76	58,369
Construction	54	38	37	31	68	88	54	60	42,956
Manufacturing	9	20	16	18	26	34	58	30	22,486
Trans., Comm., & Util.	186	211	217	210	216	217	266	331	23,674
Trade	376	271	294	355	368	401	431	439	16,598
Wholesale Trade	1	2	3	5	7	8	5	8	*
Retail Trade	376	271	294	355	362	393	426	431	16,374
Finance, Ins. & Real E.	83	110	138	136	152	165	187	232	20,828
Services	704	775	853	914	952	957	966	999	26,904
Government	1,327	1,345	1,337	1,373	1,362	1,355	1,374	1,396	29,807
Federal	98	95	98	92	84	85	90	86	39,677
State	234	229	223	210	214	200	203	198	49,469
Local	995	1,021	1,017	1,071	1,064	1,069	1,082	1,114	25,564
Misc. & Unclassified	3	4	8	12	1	1	1	1	1

Source: Alaska Department of Labor, Research and Analysis Section



TABLE 3
NORTHWEST ARCTIC BOROUGH REGION EMPLOYMENT BY INDUSTRY, 1990-1997

YEAR	1990	1991	1992	1993	1994	1995	1996	1997
Total Industries	2,220	2,190	2,227	2,298	2,465	2,509	2,436	2,564
Mining	266	327	337	335	343	358	360	467
Construction	43	28	9	11	23	42	24	19
Manufacturing	*	*	*	*	*	*	2	0
Trans., Comm., & Util.	192	202	210	223	230	236	251	263
Trade	152	101	127	242	224	256	243	233
Finance, Ins. & Real E.	101	80	60	65	96	90	103	125
Services	438	472	516	522	643	688	630	630
Government	1,028	974	964	895	900	837	823	809
Federal	79	78	79	75	67	63	63	62
State	84	77	79	77	73	62	60	58
Local	865	819	806	744	760	712	700	689
Misc. & Unclassified	*	*	*	*	6	2	1	0

Source: Alaska Department of Labor, Research and Analysis Section



TABLE 4
NORTH SLOPE BOROUGH REGION EMPLOYMENT BY INDUSTRY, 1990-1995

YEAR	1990	1991	1992	1993	1994	1995
Total Industries	9,185	9,208	8,400	8,823	9,570	9,085
Mining (includes oil)	5,126	5,018	4,411	4,213	4,617	4,407
Construction	373	484	387	361	623	415
Manufacturing	*	*	*	*	0	2
Trans., Comm., & Utilities	362	354	241	238	378	403
Trade	252	205	213	487	522	481
Wholesale Trade	*	*	*	*	0	0
Retail Trade	252	205	213	487	522	481
Finance, Ins. & Real Estate	138	177	167	166	166	145
Services	976	1,031	1,008	1,308	949	804
Government	1,901	1,929	1,964	2,040	2,315	2,428
Federal	107	98	78	57	70	78
State	32	64	60	59	58	58
Local	1,762	1,767	1,827	1,925	2,187	2,293
Misc. & Unclassified	*	0	5	0	0	0

Source: Alaska Department of Labor, Research and Analysis Section



TABLE 5
PERCENT OF HOUSEHOLDS PARTICIPATING IN SUBSISTENCE ACTIVITIES IN RURAL ALASKA
 (Source: Wolfe, R. J. 1999)

Area	Harvesting Game	Using Game	Harvesting Fish	Using Fish
Arctic	63%	92%	78%	96%
Interior	69%	88%	75%	92%
Southcentral	55%	79%	80%	94%
Southeast	48%	79%	80%	95%
Southwest	65%	90%	86%	94%
Western	70%	90%	98%	100%
Total Rural Alaska	60%	86%	83%	95%



TABLE 6
SELECTED WILD FOOD HARVESTS IN ALASKA
NUTRITIONAL CONTRIBUTIONS AND ESTIMATED REPLACEMENT COSTS
 (source: Wolfe, R. J. 1996)

Area and Community Size	1990 population	Annual Wild Food Harvest (lbs/person)	Annual Wild Food Harvest (total lbs.)	Percent of Population's Protein*** Reqts (44/g/day)	Percent of Population's Calorie*** Reqts. (2400 Kcal/day)	Est. Wild Food Replacement Costs @\$3/lb.	Est. Wild Food Replacement Costs @\$5/lb.
Arctic Alaska	20,380	516	10,507,255	335%	48%	\$31,521,765	\$52,536,275
Western Alaska	19,447	664	12,918,649	431%	62%	\$38,755,947	\$64,593,245
<i>Total: Rural Alaska</i>	<i>116,653</i>	<i>375</i>	<i>43,714,606</i>	<i>243%</i>	<i>35%</i>	<i>\$131,143,818</i>	<i>\$218,573,030</i>
Anchorage area	226,338	19	4,390,957	13%	2%	\$13,172,872	\$21,954,786
Fairbanks-Delta area	81,728	16	1,307,648	10%	1%	\$3,922,944	\$6,538,240
<i>Total: Urban Alaska**</i>	<i>433,390</i>	<i>22</i>	<i>9,740,012</i>	<i>15%</i>	<i>2%</i>	<i>\$29,220,036</i>	<i>\$48,700,060</i>

**Annual wild food harvests (lbs useable weight) in large urbanized areas based on mailed fish and game permit returns, game harvest ticket returns, and mailed angler surveys by the Alaska Department of Fish and Game divisions of Wildlife Conservation, Commercial Fisheries Management and Development, and Sport Fish, representing the early 1990s.

***Assumes on average 422 lbs of wild foods contains 44 grams of protein and 2.94 lbs of wild foods contains 2400 Kilocalories



TABLE 7
SELECTED WILD FOOD HARVESTS IN ALASKA
BY POUNDS OF USABLE WEIGHT
 (source: Wolfe, R. J. 1996)

Area and Community Size	1990 population	Annual Wild Food Harvest (lbs/person)	Annual Wild Food Harvest (total lbs.)	Per Capita Composition of Wild Food Harvest (pounds)					
				Fish	Game	Marine Mammals	Birds	Shellfish	Plants
Arctic Alaska	20,380	516	10,507,255	156	125	215	12	1	8
Western Alaska	19,447	664	12,918,649	487	69	71	27	0	10
<i>Total: Rural Alaska</i>	<i>116,653</i>	<i>375</i>	<i>43,714,606</i>	<i>222</i>	<i>75</i>	<i>52</i>	<i>9</i>	<i>9</i>	<i>7</i>
Anchorage area	226,338	19	4,390,957	15	5	0	0	0	0
Fairbanks-Delta area	81,728	16	1,307,648	9	7	0	0	0	0
<i>Total: Urban Alaska*</i>	<i>433,390</i>	<i>22</i>	<i>9,740,012</i>	<i>16</i>	<i>7</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

*Annual wild food harvests (lbs useable weight) in large urbanized areas based on mailed fish and game permit returns, game harvest ticket returns, and mailed angler surveys by the Alaska Department of Fish and Game divisions of Wildlife Conservation, Commercial Fisheries Management and Development, and Sport Fish, representing the early 1990s.



FIGURE 1
ALASKA'S POPULATION BY AREA, 1995
(Rural areas shown in black)

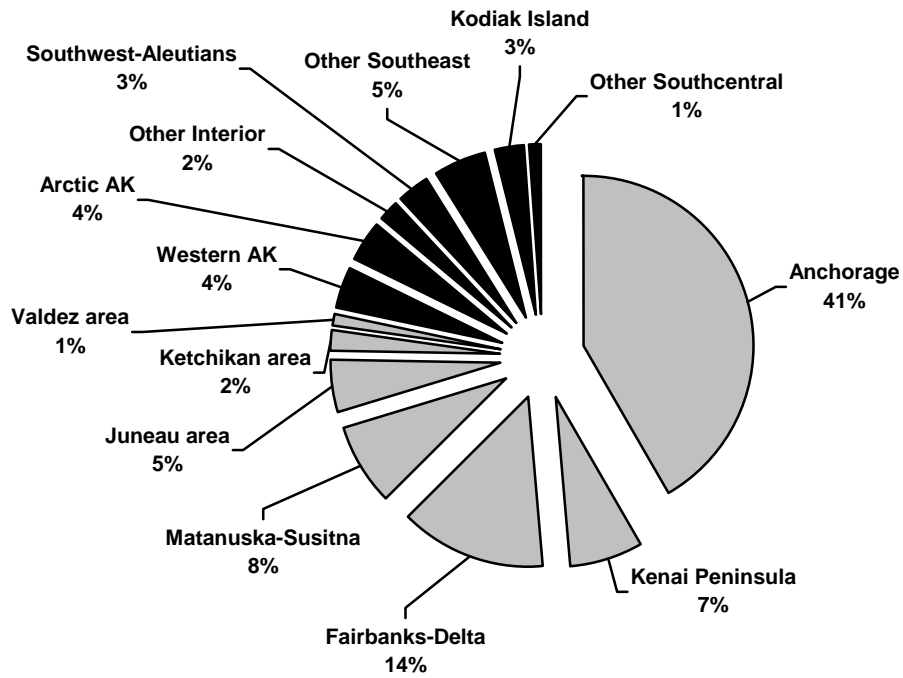


FIGURE 2
NOME CENSUS AREA EMPLOYMENT, 1997

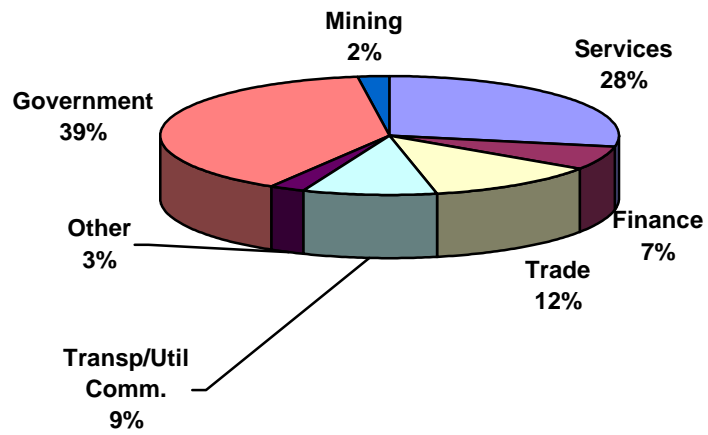


FIGURE 3
NORTHWEST ARCTIC BOROUGH AREA EMPLOYMENT, 1997

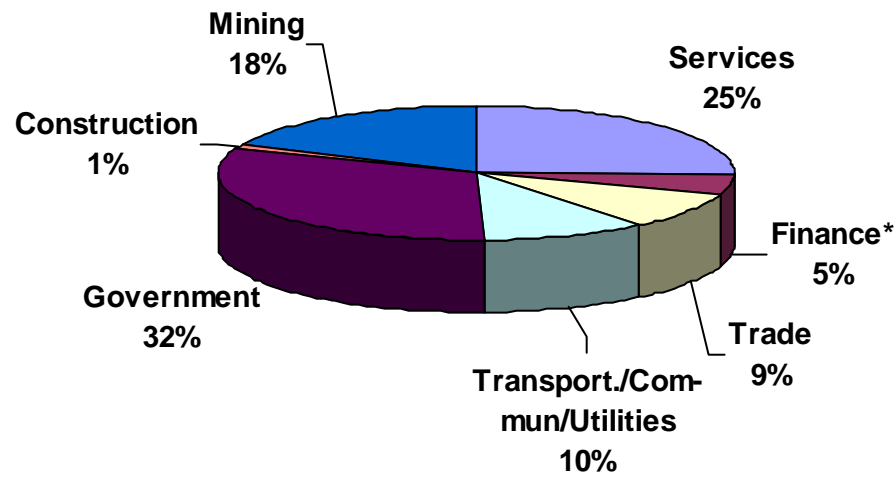


FIGURE 4
NORTH SLOPE BOROUGH AREA EMPLOYMENT, 1995

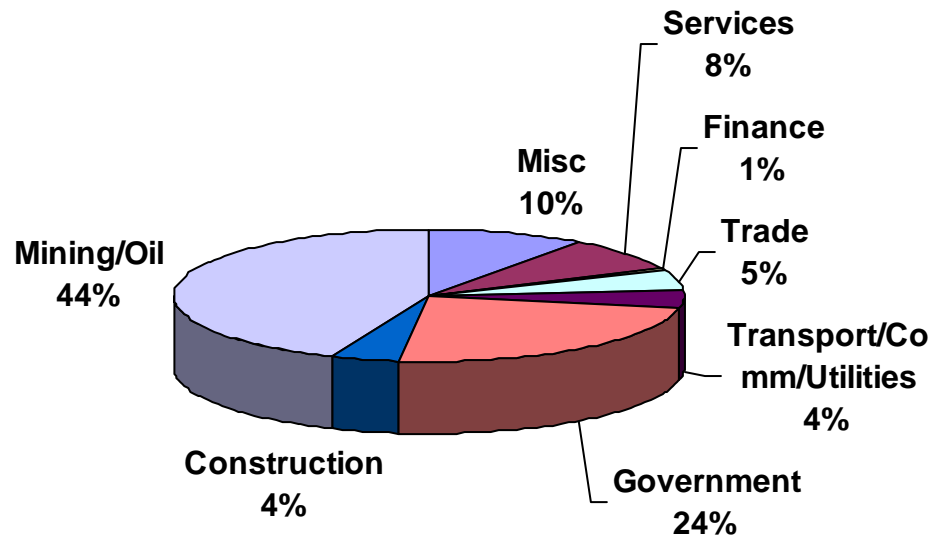


FIGURE 5
WILD FOOD HARVESTS IN ALASKA BY AREA, 1990s
(pounds per person by area)
source: Wolfe, R. J. 1996

