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FINAL REPORT

MASTER

HUMAN ECOLOGICAL INVESTIGATIONS
AT
KIVALINA, ALASKA

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by
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December 1962

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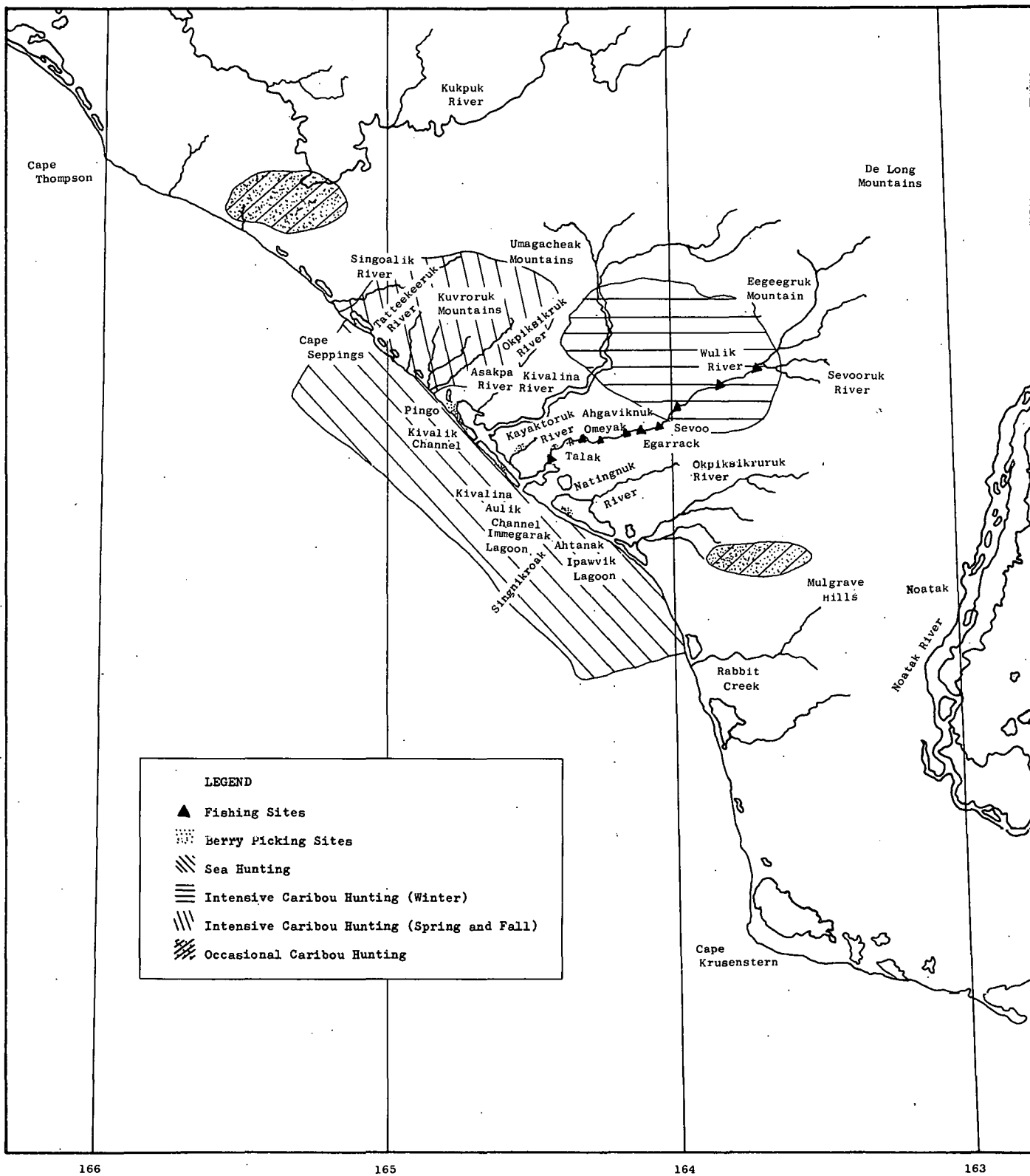
INTRODUCTION

The investigation of human ecology at Kivalina, Alaska, was undertaken as a part of the United States Atomic Energy Commission's Project Chariot, one phase of Operation Plowshare. The research period covered 22 months extending from August 1959 to May 1961. The study was concerned with learning the human ecology of the area to the southeast of the site of a proposed underground atomic detonation at Ogotoruk Creek on the northwest coast of Alaska. Focal point of the study was the village of Kivalina ($67^{\circ}45'N.Lat.$, $164^{\circ}30'W.Long.$) (See Figure 1).

The objectives of the study were essentially fourfold:

1. to determine the human ecologic balance of the area
2. to determine the extent to which the local population was dependent upon their natural resources
3. to determine the species of plants and animals utilized, the manner and intensity of this utilization, and the areas in which the species were obtained
4. to attempt to determine the values attached to the native subsistence economy and the manner in which these values may effect the present and future ecologic balance.

Residence within the village of Kivalina allowed the investigators to acquire first hand knowledge of the annual cycle and subsistence needs of the community. This information, coupled with the tabulations of kills of various species the areas in which they are hunted, and the seasonal factors which affect hunting, provide a framework within which it is possible to ascertain the needs and hunting patterns of the residents of Kivalina. The ascertainment of the values attached to a hunting economy by the residents was necessarily more of a qualitative than quantitative nature. Such values are more readily ascertained for individuals through observation and discussion than for the community at large. To determine the latter, the community social structure was viewed in terms of individual prestige, power, and leadership.



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Figure 1. Kivalina and vicinity, showing localities and the major hunting and gathering areas of the village residents. Note: Eegegruk Mountain, elev. 2240, is the local name for Mt. Jarvis. The site of Mt. Jarvis is incorrectly given on the 1951 edition, Noatak quadrangle, Alaska Reconnaissance Topographic Series, U.S.G.S.

THE VILLAGE OF KIVALINA

The Eskimo village of Kivalina is situated on the northwestern coast of Alaska approximately 42 miles southeast of Ogotoruk Creek and 115 miles northwest of Kotzebue.

Cape Seppings lies to the northwest, surrounded by low foothills of the De Long Mountains which extend to the sea along the Kivalina River. To the south can be seen the Mulgrave Hills which form the southern boundary of general Kivalina activity. The coastal plain between the Kivalina and Wulik rivers is interrupted by several hills, the highest of which is Mt. Jarvis, 2240 feet.*

The village site is located on the southeastern portion of a barrier bar which encloses a lagoon approximately 11 miles in length. The Wulik and Kivalina rivers flow into the lagoon from their headwaters in the De Long Mountains of the Brooks Range to the northeast. The original names of these rivers, Aulik and Kivalik, respectively, have been retained as the names of the channels which the rivers form through the barrier bar. The Aulik channel is located on the southeast border of the village, while the Kivalik channel is approximately 6 miles to the northwest. Thus, Kivalina is actually situated on an island, and in the summer, water transportation is required to reach the mainland.

The village is arranged roughly in two rows along the lagoon and the Chukchi Sea; it consists of 24 dwellings, the school, the Episcopal and Friends churches, the native store, and two new prefabricated steel buildings--the Alaska National Guard building and the Caribou Hoof Jewelry Workshop.

Housing

Half of the 24 dwellings are sod-covered houses which tend to be clustered about the northwestern portion of the village. In the construction of these houses, a wooden framework of lumber or split driftwood logs is surrounded by layers of sod blocks, after a thin layer of dry sod has been placed next to the wooden frame. The sod layers extend completely up the walls and frequently onto the roof, so that the entire house is covered with sod with the exception

*Mt. Jarvis (locally known as Eegeegruk Mountain) is incorrectly placed on the 1951 edition, Noatak quadrangle, Alaska Reconnaissance Topographic Series, U.S.G.S.

of windows and a skylight in the roof. As the sod has a tendency to fall away from the house, a second layer of sod is sometimes placed against the first to prevent it from slipping and to increase insulation. The insulating quality of the sod is often impaired by the burrowing of mice.

Some sod houses utilize only a skylight for illumination while others use both windows and a skylight. The more recent sod houses, built by young married couples, tend to eliminate the skylight entirely.

As sod houses tend to become damp in the summer, the people move out into large, white wall tents as soon as the ground becomes dry.

Many of the frame houses are fairly old, dating back to the 1920's. Three frame houses were originally constructed as stores; two belong to men who are union carpenters; two were built recently by families who have just moved into Kivalina; and the most recent was constructed in 1959 by a young married couple with the aid of money the husband earned by working in Fairbanks during the summer.

All houses have storm sheds about the entrance to decrease the amount of cold air that enters when the door is opened. Double doors or pieces of canvas hung over the door are also frequently used at the entrance into the house proper.

Fuel

Fuel is a major problem for Kivalina in the winter. The never-ending task of getting firewood is the most disliked chore of the Kivalina man. The nearest forests are in the Noatak Valley and are too far away to be utilized for firewood by the people of Kivalina. Hence, the man in search of fuel is forced to resort to driftwood and willows, the latter mostly green. A whole sledload of either type lasts only a short time, and at least during the coldest periods of winter, one household will consume three or four sledloads a week and still go without heat during the night. Since a wood-gathering journey is a minimum of 4 miles round-trip, and usually 10 to 40 miles round-trip, someone in every wood-burning household must spend considerable time on the trail just to obtain an adequate supply of fuel. About 80 per cent of the households depend largely on wood-for

fuel, and more do when cash is limited. Thus, a Kivalina family is fortunate when it is able to utilize seal blubber, coal, or fuel oil, oil being the epitome.

Driftwood logs are collected from the beaches up and down the coast during the summer and are saved for winter use or sold to the store. The value of a log depends upon its size and condition. A log in good condition, 11 feet long with a diameter of 8 inches is worth about \$9.00. Collection of driftwood generally extends from the Mulgrave Hills or Rabbit Creek on the south to a point about 15 miles south of Ogotoruk Creek on the north. The area between Cape Seppings and Ogotoruk Creek appears to be a particularly favorable location for the collection of driftwood. During most of the winter the driftwood in this area is blown free of snow, but it is too far away to be visited often solely to get firewood.

Willow is used for firewood to a much greater extent in winter than is driftwood. The heaviest concentration of willows in the area lies along the Wulik River; the region from about 10 to 20 miles up the river is the chief wooding area of the Kivalina Eskimos. The Kivalina River is also lined with a substantial growth of willows, and the region from about 4 to 15 miles up this river is the second most heavily utilized wood-gathering area. In addition to the two large rivers near Kivalina, almost all the streams between the Cape Seppings region and the Mulgrave Hills have some willow growth along their courses and are frequently visited by men looking for wood. The majority of the trips to these smaller streams are dual-purpose journeys, e.g., combination wood-gathering and hunting expeditions, etc.

Wood is supplemented by blubber in the winter, especially after intensive sealing activities begin in February. Blubber is also burned alone if no wood is on hand. A chunk of blubber is placed on an inverted can, generally a two pound coffee can, which has holes punched in the sides and top. When a piece of paper is ignited beneath the can, the blubber melts; the oil drips into the can and burns. A 5-gallon can of blubber, about 40 pounds, will last for about 1 day if burned alone. When this amount of blubber is burned with wood, it lasts 2 or 3 days.

Water

The acquisition of water during the winter does not generally present too great a problem for Kivalina, although it does take some time and effort on the part of the men and boys. Immediately after the rivers freeze in late September or early October, water is obtained through holes in the thin ice and is hauled to the village in tubs or buckets on sleds. At this time of year, it is necessary to cross the lagoon to the mouth of the Wulik River, about a half-mile away, in order to get fresh water for drinking. Water suitable for laundry purposes can be found somewhat closer. During this period the men always check the water for its salt content, as there is a constant influx of ocean water into the lagoon because of tide and wind action. The latter becomes a serious problem only during and after a strong wind from the south; such a wind drives the salt water across the lagoon and some distance up the river. When such a wind appears to be picking up, someone from virtually every household in the village goes out for water before the task becomes too difficult. Occasionally a strong south wind at this time of year floods the lagoon ice with salt water, thus making the trip to the river almost impossible.

From the time the ice reaches a thickness of about 1 foot until it reaches a thickness of about 3 feet, water is obtained in the form of ice blocks. These are cut with a saw at the mouth of the river, or a short distance into the lagoon from the river, and are hauled to the village by dog team or by hand-drawn sled.

When the ice becomes too thick to be cut easily with a saw, a different method of acquisition is used. By this time, usually late November or early December, the lagoon ice has been split with numerous small cracks running in all directions. A man wishing to get ice searches for a fairly deep crack located far enough toward the river so as to provide fresh-water ice. When such a crack is located, a small hole is chopped in the ice about 8 to 16 inches from the crack and parallel to it. If the hole is correctly made, a slab of ice (varying in size according to the quality of the crack, the distance of the hole from the crack, and the air temperature) is split off from the main body of ice and can be pried up from it.

Such a slab is shaped somewhat like a quarter of a round ball that has been slightly elongated at the equator. Under the best of conditions, an experienced ice-chopper can acquire pieces weighing from 150 to 200 pounds by this method, although such slabs are seldom sought because they are too unwieldy and are easily dropped and broken. As the winter progresses, the lagoon ice becomes continually fresher, and by the end of March, ice suitable for drinking water can be obtained just a few yards from the village, unless flooding has occurred late in the year.

The ice is brought back by sled and is placed in the house in a water barrel which might be a converted oil barrel or a galvanized garbage can. The containers are covered and usually have a spigot faucet at the lower portion of the barrel.

Water in the summer is obtained from the Wulik River, a short distance from the mouth, and is transported back to the village in 50-gallon oil drums which are placed in wooden rowboats. The water is then frequently transferred to similar barrels or other covered containers located on the shore of the lagoon. The water is taken from these as it is needed.

Sewage Disposal

In the summer months sewage is disposed of by dumping it into old house pits, pits in the ground, or barrels sunk into the ground. Attempts on the part of an Eskimo sanitation aid, employed by the Alaska Department of Health, to get the villagers to use a covered barrel with a pit dug beneath has thus far proven unsuccessful. In winter the sewage is placed in 50-gallon oil drums which are deposited on the sea ice to be carried out to sea during the break-up.

Transportation

Transportation in the summer is by boats, and everyone in the village owns or has access to a wooden rowboat. The rowboats are fitted with 50-gallon oil barrels which are used to haul water from the Wulik River.

Large, open, skin boats, called "umiaks" or "umaypaks," are used for sea hunting in the spring, for seine fishing, for the collection of driftwood, and for general transportation purposes.

The size of the boats is determined by the number of "ugruk" (bearded seal, Erignathus barbatus) skins required to cover the wooden frame. There are two boats requiring six skins and three requiring eight skins in the village. An eight skin umiak is capable of carrying 2.5- to 3-ton loads.

Outboard motors are now used, although it has been less than 12 years since the first one was acquired. There are eight outboard motors in the village with the 14 and 18 horsepower sizes being preferred.

Kayaks are used during the winter to retrieve seals and ugruk shot in open water. They are usually carried on the dog sleds when sea hunting.

Dog teams are essential for winter transportation and hunting. There are about 175 work dogs in the village, with an average of eight dogs to a team. They are used for hunting caribou and seal, for collecting firewood, and for general transportation. As a definite relationship exists between dog team efficiency and hunting success, it is necessary that a sufficient amount of dog food be on hand in order that both dogs and humans may benefit.

During the winter months, dogs are fed about 2 or 3 pounds of food a day. Frozen fish is sometimes used. During the winter, seal blubber is used as fuel and the remainder of the seal is used for dog food. Male caribou obtained in the fall are also frequently used as dog food. When food is short, cooked rolled oats or blubber is used. Seal oil is frequently added to dog food if it is available in sufficient quantity.

SOCIAL STRUCTURE

The formal elements of Kivalina's social structure are minimal. The social environment includes both formal and informal components. Some of the structural or formal aspects of village life are discussed below, as well as some of their informal implications.

Village Council

The most conspicuous structural feature is the village council which is composed of seven members. The officers consist of the president, vice-president, secretary, and marshall.

The council is the recognized authority for dealing with outside agencies which have business with the village. Acquiring the backing of the council is the first step toward successful completion of projects concerning the village.

Many village economic factors are subject to council control. The council appoints the store manager and assists him in an advisory capacity. It establishes prices for many of the native products sold to the store and determines the quantities which can be bought for re-sale. In order to obtain more money for the village treasury, the council in early 1960 instituted a 2 per cent sales tax on items sold at the store. This money is used for council projects. A possible long-range goal is securing a generator to provide electricity for the village.

In addition to these duties, the council establishes certain rules within the community and upholds sanctioned modes of behavior. Behavior which is of a disruptive nature may be brought to the council's attention if the individuals involved lack strong family connections and support within the village. In such cases the council may review the situation and attempt to serve as a reconcilatory force, lecturing the disputants on the proper mode of behavior. When members of families strongly placed within the community create disturbances, the family is generally left to handle the problem. An example of this occurred recently when a fellow who had been drinking and continually causing disturbances was "complained" to the U. S. Marshall in Nome by his brothers. He was given a short

jail sentence and upon his release went to live in another community. The need to call in outside forces occurs infrequently, however, since public opinion is usually a sufficient regulatory force. It may be noted that drinking is not expressly forbidden by the council and that occasionally liquor is ordered from Nome or Fairbanks. Nevertheless, drinking has not become a problem within the community. Lack of money may be one contributing factor to this situation, but it also probably reflects Kivalina's view of itself as being a "quiet" village.

Although the village is of such a size that most of the men have served on the council at one time or another, the present council is composed of predominately young men. One of the attributes sought in council members is the ability to understand and deal with the various forms and documents which pass through their hands. This ability is gained through education or experience and it is particularly important that the president of the council possess this knowledge.

The council is a focal point about which the constructive energies of the village can be drawn. Utilizing this potential requires initiative on the part of the council and cooperation from the village. This potential has been utilized to some extent in Kivalina but far from the degree to which it is capable.

Women's Club

The women's club is an organization of community women whose purpose is to provide the women with an opportunity to socialize and work on projects to help the community. Money is obtained by bake sales or by raffling quilts made by the women. The club is also in charge of obtaining 16 mm. movies from a distributor in Anchorage which are shown three times a month during the winter. Admission price is 50 cents for adults and 15 cents for children. Usually enough money is obtained to cover the cost of the movie and still leave a small profit. The money thus obtained is contributed to council projects or used in a manner to benefit the community. It also serves as a loan fund for those individuals who run short of cash, a situation that occurs quite frequently in many families.

The women's club also serves as a means by which certain women in the village exert influence which would otherwise have to be exercised in a more informal manner. When the women are coalesced under the leadership of two or three women, the women's club becomes a very powerful factor in village affairs.

Health Council

The health council consists of a group of five women chosen by the U. S. Public Health nurse to assist in administering aid to people who are sick or injured. The health council works in conjunction with the Bureau of Indian Affairs teachers who maintain scheduled radio contact with the U. S. Public Health Service hospital in Kotzebue every day but Sunday. Persons who are ill or injured report to a clinic held by the teacher in the late afternoon. Those individuals unable to go to the clinic are visited by members of the health council, who then report their findings to the teacher. When radio contact is made with the doctor in Kotzebue, the cases and symptoms are described. The doctor then attempts to diagnose the case and prescribe treatment. A supply of drugs and medication is kept on hand at the school. Cases of serious illness or injury and cases which prove impossible to diagnose via radio are sent into Kotzebue by plane.

There are also several qualified mid-wives in the village who have been trained by the Public Health nurse. Babies are delivered in the home by the mid-wives except in cases where complications are expected to occur. These latter cases are sent to the Kotzebue or Anchorage hospitals.

Sanitation Aid

The Alaska Department of Health employs an Eskimo sanitation aid in the village, whose job is to help foster better sanitary conditions within the village. His primary concern is with water and sewage problems.

Extension Service

The University of Alaska Extension Service has an Eskimo representative in the village to help the 4-H clubs for boys and girls. He also supervises work with the Boy Scouts and Girl Scouts. Some gardening was inaugurated during the summer of 1960, but gardening efforts were not continued in 1961.

The Extension Service also sends films to the village. These cover a variety of subjects, but the majority in the past have dealt with child development.

Welfare

The Division of Welfare of the State Department of Health, Education and Welfare employs a village welfare agent who handles applications for welfare and makes recommendations concerning them. Individuals may apply for Aid to Dependent Children, Old Age Assistance, or Aid to the Blind.

In order to be eligible for Aid to Dependent Children a child must be in need; must be under 16 years of age, or if still attending school between 16 and 18 years of age; must be living with designated relatives; and must be deprived of parental support because of death, mental or physical disability, or continuous absence of the parents.

In order to be eligible for Old Age Assistance the individual must be in need and over 65 years of age.

Welfare payments fluctuate with need, and in the summer months they may be discontinued or decreased.

The Bureau of Indian Affairs, U. S. Department of the Interior, provides general relief for families who are not eligible for State welfare. They also undertake the support of families who are eligible for State welfare but who have not yet been picked up by that agency. Individuals who have just been released from tuberculosis hospitalization are not supposed to do strenuous work for at least 6 months and are helped by the Bureau of Indian Affairs.

Welfare has sometimes been viewed with concern by some people who feel it fosters in the recipient an attitude of dependence upon the government and a disinclination to work for oneself. Also, the money has not always been used for the purposes for which it was

intended. Without commenting on the philosophical aspects, it would appear that in Kivalina there is a real need for the money which is received and little abuse of the original intent. This may in part be attributed to judicious handling by the local welfare agent.

National Guard

At present there are nine men in the local Alaska National Guard unit. Advanced training programs frequently take men to other parts of the country. A yearly encampment is held in Anchorage for the National Guard units, generally in the spring. A new 20 x 60-foot, prefabricated armory which was constructed by the U. S. Army Engineers in 1960 has an oil heating system and an electric light plant. The National Guard unit also has a radio with which they maintain radio contact with their headquarters in Nome.

Pay received for participation in National Guard activities represents a welcome source of income, especially in the spring following the Anchorage encampment.

Churches

There are two mission churches in Kivalina: the Friends mission, which is affiliated with the Friends Church of Whittier, California, and the Episcopal mission. A lay reader conducts services for the Friends mission, and an ordained deacon conducts services for the Episcopal mission. The Episcopal priest at Point Hope also makes trips to Kivalina.

There has been church influence in the village since its inception about 1900, as the first teachers were also Friend's missionaries. In spite of this early contact, the majority of the village belongs to the Episcopal church. Services are held by both churches three times a week with morning and evening services on Sundays and a prayer meeting on Wednesday evening. The churches play an important role in everyday life, and their influence appears to be particularly strong among the older generation. Sunday is observed as a day of rest and generally no hunting is conducted on this day. At fish camp, operations also cease on Sunday. This observance is relaxed, however, when necessary.

School

Most parents in Kivalina want their children to go on to school. The acquisition of an education is regarded as an attribute which will determine the village leaders of tomorrow--as it does today. At Kivalina, schooling is offered through the eighth grade by the Bureau of Indian Affairs. Those students wishing to attend high school must travel to Mt. Edgecumbe near Sitka, in southeastern Alaska. This high school serves native high school students from all parts of Alaska. As the number of applicants to Mt. Edgecumbe is high and the space is limited, only the most qualified students have the opportunity of attending. Some of the overflow has been directed to Bureau of Indian Affairs schools outside of the state, with some students attending high school in Oregon. One young man with an interest in arts and crafts has been sent to school at the Santa Fe Arts and Crafts School. The Friends church runs a high school in Kotzebue which village children may attend; there is a dormitory for students from outlying areas, but this is not large enough to accommodate many students, and finding additional housing for the students presents difficulties. A Bureau of Indian Affairs high school is scheduled to be built in Kotzebue also; however, there will be no dormitory facilities.

The school at Kivalina is located in a modern plant which includes a classroom and living quarters for the teacher and his family. Electricity is furnished by a diesel generator and heat is supplied by oil space heaters.

The school serves as a social center for the village, providing a meeting place for the various organizations, a show house for the movies, and a hall for general meetings.

The school, or more particularly the teacher, plays a vital role in the internal workings of a village. The teacher functions in an advisory capacity to the village. He attends council meetings, checks store reports before they go out, is responsible for the clinic, handles regular and medical radio traffic, provides breakfast for the school children in the morning, and keeps records on almost all aspects of village life. The teacher is in a very sensitive position and can do much to create harmony or discord within a village.

ANNUAL SUBSISTENCE CYCLE

The village of Kivalina still subsists mainly upon a hunting and fishing economy, and the acquisition of food must be carried on constantly. The annual subsistence cycle for the Kivalina people may be summarized as follows:

In August and until mid-September, berry picking is an important part of the women's activities. Fish begin to arrive in the middle of August, but intensive fishing does not generally begin until the first of September. Activities from September to the first part of October revolve mainly about fishing, with fish camps being established on the Wulik River. Tomcod fishing through the ice of the lagoon is engaged in from the time of freeze-up until the ice becomes too thick, generally about the end of November.

The arrival of caribou in the autumn initiates caribou hunting by the men. This activity continues until the rivers begin to break up in the spring and travel conditions become difficult, which is usually the latter part of April.

Trapping of the snowy owl begins about the middle of October and lasts for about a month while the birds are migrating south along the coast.

Fur trapping begins in November and is concerned mainly with fox, wolf, wolverine, and land otter. Trapping for muskrat and ground squirrel takes place in the spring.

The last of October or the early part of November finds some seals along the coast, and a few are taken at this time. By the middle of December the sea ice is usually thick enough to allow hunters to proceed out to leads to hunt, but this activity is hampered by short hours of daylight and frequent stormy weather. Participation in Christmas activities also causes a cessation of hunting.

Although some seal hunting occurs during the first part of January, the hunting conditions do not become particularly good until the latter part of January. February is considered the best month for seal hunting, and it becomes the focal point of activity during this month.

Ugruk sometimes are sighted in January and February and are taken whenever possible. When they become more frequent in March and early April, hunting pressure increases. Increased hours of daylight and warmer weather find many more seals on top of the ice in March and April. Beluga, or white whales, also generally become available in March or April. However, at times the first kill is not made until July. Sea hunting continues on the ice in May and then proceeds from the umiaks when the ice breaks up in late May. Hunting from umiaks continues until late June or early July.

About the middle of April many Kivalina people go to Point Hope to take part in the whaling activities there. A whaling camp was established in Kivalina during the latter part of April 1960 but was not re-established in 1961.

The middle of April also usually finds birds arriving in the area, though sometimes they do not arrive until about the first of May.

Gull eggs are gathered about the first of June, and in July men usually travel to Cape Thompson to get eggs from the cliff-dwelling murre. During the latter part of June and the early part of July the women begin picking "greens," and edible plants. The summer months are also occupied by gathering driftwood along the coast and hunting occasional caribou.

May to October comprises the general employment season for those men who acquire work in the summer months. When work is not available in Kivalina, these men may go to Kotzebue or even Fairbanks to seek employment.

In August the berries begin to ripen and the cycle begins anew.

Figure 2 summarizes the annual subsistence cycle graphically. Figure 1 shows the geographic areas surrounding Kivalina that are utilized most heavily in subsistence activities.

Fish

Fish play a vital part in the subsistence economy of the Kivalina people. The major portion of the fish catch consists of the Dolly Varden char (Salvelinus malma) which is called "Ahkalupik"

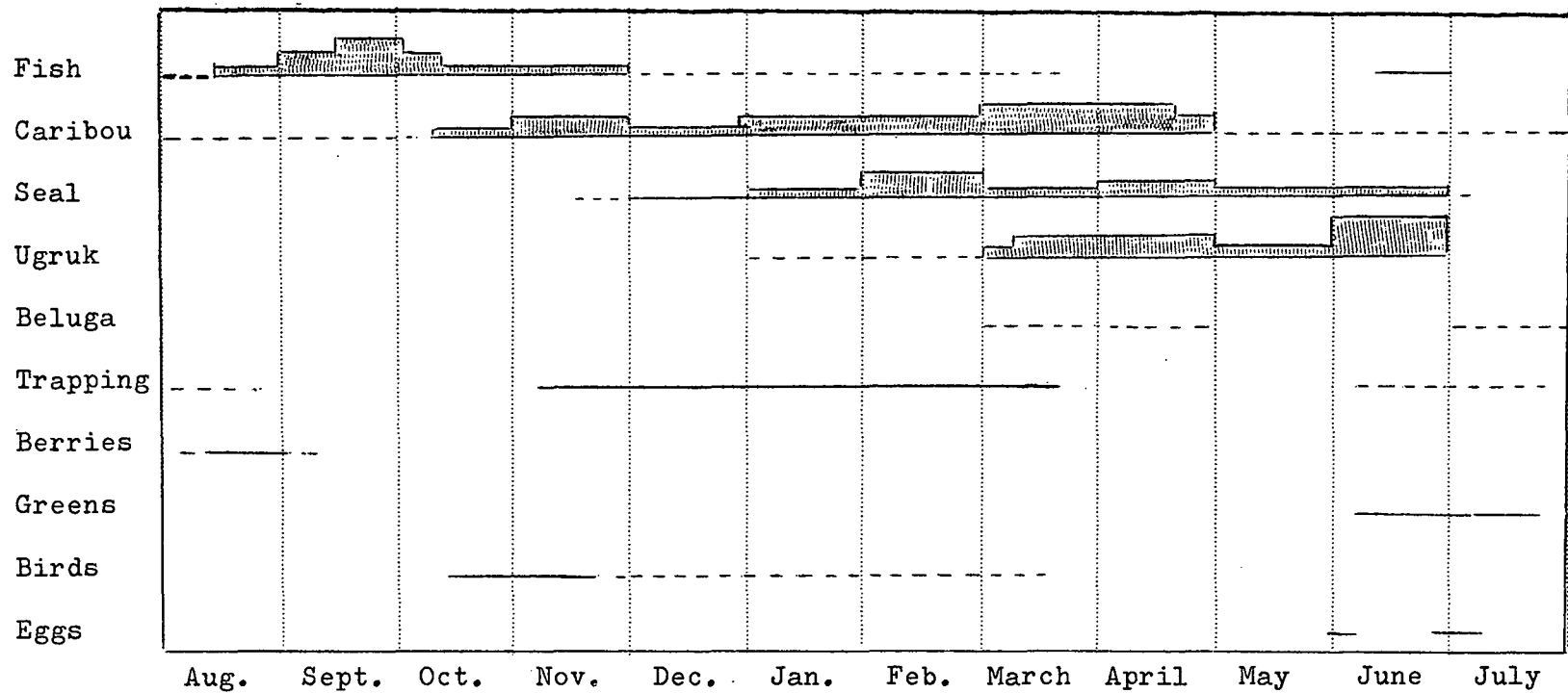


Figure 2. Annual subsistence cycle of Kivalina residents. This cycle will vary in approximate time of occurrence and intensity from year to year. The cycle which has been illustrated is that which is reported to normally occur.

or the Kivalina trout. It is renowned in the region for its large size and good eating.

Spring and Fall Fishing

The char leave the streams in June and some fishing occurs at that time. These fish are sometimes obtained by seining, but more frequently by gill nets or rod and reel. At times during the month of June it is possible to obtain char with almost every cast of the line. The fish obtained at this time are eaten fresh or hung to dry and later stored in seal oil for the winter. Approximately 10,000 pounds were obtained in June 1960.

The major fishing activities of the year occur in the fall when the fish return to the streams. The char begin to arrive in mid-August and are reported to return in distinct waves. The first wave is said to consist of medium-sized and small fish; the second, of small fish; the third of fairly large fish; and the last of the very largest fish accompanied by small fish and found in association with whitefish (Coregonus spp.) or "Kahlrak." The last wave appears to arrive toward the end of September.

Early arrivals are caught with rod and reel and by means of gill nets set near the Aulik channel. The amount of fish obtained in this manner probably does not exceed 1,000 pounds. Large scale fishing begins when the fish arrive in sufficient numbers to warrant seining activities. The 1959 seining operations, with boats fishing on the lower portions of the Wulik River, began on September 1. Seining operations started on August 23 in 1960.

The most intensive seining takes place at fish camps established on the Wulik River. No seining is conducted on the Kivalina River because it is too shallow and has few fish except grayling (Thymallus arcticus). Departure for fish camps is largely determined by the arrival of the "North Star," a Bureau of Indian Affairs vessel which brings supplies in once a year to Bureau of Indian Affairs schools and native stores. Departure is delayed until after the "North Star" is unloaded. This delay is motivated in part by the fact that the people earn money for longshoring and also by the fact that the store must pay for the use of the LST type landing ship when it

is necessary to use them to bring the supplies from the ship to the shore. Therefore, the store and ultimately the people save money by having the unloading proceed as rapidly as possible.

Two crews went upriver to establish fish camps on September 16, 1959; a third crew used the village as a base for fishing activities. In the fall of 1960, two crews using large, eight-skin umiaks and one crew using two, six-skin umiaks established fish camps on the Wulik River. A fourth crew, using an eight-skin umiak, did some fishing from the village. Departure dates for two of the crews in 1960 was September 16, with a third crew leaving September 17.

Make-up of the crews, which include both men and women, appears to be largely determined by family relationships. However, there is always room for anyone who wishes to fish.

The catch is divided equally among the crew members, with the owner of the boat receiving an additional share for the use of the boat. The person owning the seine net is also entitled to a share for its use. However, when the same person owns the boat and the net, the second share is usually not claimed. Frequently, the net of some individual unable to participate actively in the fishing is used and this person then receives a share of the fish. One woman on each crew serves as the cook and she receives a full share of the fish.

Permanent fishing sites are not maintained. Movement is occasioned by the availability of fish. However, certain locations on the river have natural advantages which cause them to be utilized frequently as fishing sites. Fishing sites extend up the river as far as the base of Mt. Jarvis. In 1959 the shallowness of the river prevented the establishment of sites beyond Sevoo, a point on the Wulik River about 14 miles from Kivalina. Sites were established that year at a point between Sevoo and Egarrack, at Ahgaviknak, at Omeyak, and at Talak. The first three locations were within 4 miles of Sevoo. The last site was about 4 miles from Kivalina.

In the fall of 1960, a few attempts were made to fish in the vicinity of the previous year's fish camps; it was found, however, that few fish were available. Thus, it was necessary to proceed above

the previous year's camps. The river level was higher than in 1959, and ultimately, fish camps were established between Sevoo and the base of Mt. Jarvis, and the major portion of the fish were obtained from this area.

Generally, portions of the river to be fished are of such a width that the seining net can be stretched completely across it with the aid of a boat. In preparation for loading the net into the boat, the net is first straightened by stretching it out in shallow water. The net is then loaded by starting with the pole at one end and folding the net, section after section, into the boat so that the poles at the end of each section lie together. The net is placed in the boat so that the weighted end is hanging over the edge. When it is time to install the net, the long ropes attached to the end last loaded are held by people standing on a sandbar at the river's edge. The boat is then poled across the river and the net is payed out over the side until the entire net is strung in the water across the river. The net is then worked upstream. Depending on the conditions of the far shore, the boat crew may get out and walk the net upstream, or they may carry it upstream in the boat by poling; the people on the sandbar carry the other end of the net upstream.

When enough fish have been stopped by the seine, the boat returns to the side of the river from which it originally started, carrying the end of the seine with it. Fish are thus trapped in the arc of the net. When the boat touches shore, the people from the boat jump into the water, grab the supporting poles, and help bring the net closer to shore. While pulling the net in, they keep one foot hooked around the base of the net and drag it along the bottom in order to prevent fish from escaping beneath the net. When the net has been dragged into very shallow water, the top is folded over so the fish are trapped in the folds of the net. The fish in each section of net, between the support poles, are consolidated by grasping the top and bottom of the net and flipping the fish along until they are in one portion of the net. One edge of the net is then placed over the edge of the boat where someone in the boat puts a foot on it to anchor it. The fish are then heaved up and over the edge into the boat. This emptying procedure continues section by section, until the entire net has been emptied.

Galvanized tubs are used to remove fish from the boat after seining operations. The fish are deposited on a sandbar near the camp until fishing at that site has been completed. Then willow nests are constructed for storing the fish. The nests are made by driving stakes in the ground in a circle and weaving willows between the stakes to form a nest. Willows are then placed on the bottom of the nest and the fish are stacked within. The fish are sometimes placed in burlap sacks in order to facilitate their later removal. When all the fish have been put away, willows and driftwood are placed on top in order to secure the fish from animals (this is not always successful). The fish are transported later in the winter by dog team.

Fishing sometimes proceeds until the river freezes over. The boat is then left upstream and the people walk back to the village or are returned by dog team. In 1959, both boats were able to return to the village before the river froze completely, although it was necessary for one boat to force its way through the ice which had formed on the lagoon and the lower portion of the river. The lagoon froze over on September 24, 1959, and one boat returned home through the ice on the 26th. A thaw, which started on September 27 allowed the last boat to return through open water on the 29th. Fishing was resumed from the village on October 2 and continued until October 7, 1959, when freezing weather once more set in. In the fall of 1960, the first crew arrived back on September 24, with the other crews returning the following day. The lagoon first froze and then thawed on September 21; it froze again on October 1, 1960.

Table 1 indicates the amount of fish obtained during fishing operations in 1959. Estimates of total catch were obtained by counting the number of tubs removed from each boat and multiplying this by the weight of a tub, which is approximately 100 pounds.

A comparison of the number of pounds of fish caught during the first weeks of September and October, 1959, indicates a steady increase in the intensity of the fish run. Boat No. 1 caught almost twice as many fish in 4 days of fishing during the first week of October as it did for the same number of days during the first week of September. The most successful fishing appeared to occur during the latter part of September. The one boat (Boat No. 3) operating from the village during that

TABLE 1. Fishing success by residents of Kivalina, Autumn 1959

	Boat Number	Number Days Fished	Total Crew Days Fished	Pounds Fish Caught	Total Pounds Fish	Average Pounds per Crew Day
September 1-9						
Village	1	1	4	5,400	13,500	1,687+
	2		1	2,300		
	3		3	5,800		
September 16-29						
Fish Camp	1		9	23,000	45,000	2,647+
	2		8	22,000		
Village	3		3	11,100	11,100	3,700
October 2-7						
Village	1		4	10,000	28,000	2,333+
	2		4	8,800		
	3		4	9,200		
			40		97,600	

period had the highest average of fish caught per days fished. While this figure is not an impossible one, nor even an unlikely one if the fishing was very good, it should be noted that the author had no opportunity to check the fish catch in the village, because at this time she was a crew member on one of the boats upriver. It was possible to visit the fishing sites of the other crew upriver and their reported catch compares favorably with estimates made by the author at that time.

If the reported catch from the village during the latter part of September 1959 is accurate, the high degree of fishing success may have been a result of greater flexibility in the selection of fishing sites in the lower portions of the river; also, the fish run probably was heavier in that part of the river at that time. Activities based at camps upriver were restricted in movement by shallowness of sections of the river, making it necessary to fish the same parts of the river several times and thus decreasing the amount of fish caught per unit effort.

Nevertheless, the fish caught upriver represent almost half of the total catch. One advantage of fishing upriver is that fishing can continue longer than fishing from the village, because the upper portions of the river do not freeze over as soon.

The reported arrival of fish in groupings of size appears to be somewhat substantiated by the pattern of catches observed at fish camps upriver in 1959. The first site, which was located about 12 miles upriver, yielded a predominance of fish about 10 inches in length. At the succeeding camp, about 2 miles downriver from the first, fish averaging about 15 inches in length made up the bulk of the catch. The fish obtained at the third camp, about 4 miles from Kivalina, averaged about the same size. From 10 to 12 very large fish, averaging 36 inches in length, were obtained at all the sites with no increase in the frequency of catch being observed. However, it was reported that in the past some catches have consisted almost entirely of the large fish.

The reported late arrival of the whitefish was substantiated by the fact that about half of the catch obtained on the lower reaches of the Wulik River beginning on October 2, 1959, consisted of

whitefish. Of the total catch of 28,000 pounds obtained during October, an estimated 12,000 pounds consisted of whitefish.

Fishing success in the fall of 1960 is shown in Table 2 where it is compared to 1959. The author was not in the village during the latter part of September 1960 and was therefore not able to verify the 1960 figures personally. It will be noted that considerably more fish were caught in the fall of 1960 than in the fall of 1959. This increase may be accounted for in part by the fact that there were three crews located at fish camps upriver in 1960 as opposed to two crews in 1959. Besides the crews upriver, one crew conducted seining operations from the village as was the case in 1959.

One crew which had been having poor success upriver was aided by a band of caribou which crossed the river and drove the fish into the area of the river in which the crew was working.

An unusual number of salmon (Salmo) were present in the Wulik River in the fall of 1960. Several boat loads were reported to have been obtained. Whitefish were also obtained from the lower reaches of the Wulik River in approximately the same numbers as were obtained the fall of 1959.

The Wulik River is also utilized by other persons. In the past, Noatak people are reported to have fished the upper reaches of the Wulik River when weather conditions permitted travel by dog team. They are reported to have stored their fish along the river in willow caches similar to those used by the Kivalina people. In recent years, little or no fishing, except for incidental excursions, has been conducted by the Noatak people on the Wulik River.

During the fall of 1960, three men from Kotzebue flew into the Wulik River and set up camp to obtain fish to sell in Kotzebue. It was reported they caught about 3,400 pounds of fish.

The Wulik River is also used by sport fishermen who fly in by plane.

TABLE 2. Fishing success by residents of Kivalina, Autumn 1959 and 1960.

	Pounds of Fish 1960	Pounds of Fish 1959
Village (late August-early September)	11,800	13,500
Fish Camp (mid to late September)	84,100	45,000
Village (mid to late September)	9,800	11,100
Village (late September-early October)	<u>18,600</u>	<u>28,000</u>
	124,300	97,600

Winter Fishing

Winter fishing plays a fairly significant part in the economy of Kivalina, although it is less important than the fall fishing or than either caribou or seal hunting. Of the 24 family units in the village, only eight had members actively engaged in winter fishing in 1960, and four of these did by far the greatest amount of fishing.

There are three types of winter fishing in Kivalina: "hooking," netting under the ice, and "trapping." All fishing in the winter of 1960-61 took place on the Wulik River. In normal years some hooking is also done through the ice on the lagoon, but when it was discovered that the tomcod (Boreogadus saida), or "Ooack," did not arrive as usual, fishing on the lagoon stopped. Dolly Varden is the major type of fish sought in the winter fishing and is by far the most frequent caught. Grayling (Thymallus arcticus), or "Sulupowak," are also caught; and in October, a few salmon are obtained, although unwanted.

"Hooking" is the predominant type of winter fishing in Kivalina. It consists of fishing through a small hole chopped through the ice. A small stick serves as a rod, and regular commercial spoon hooks or locally-made ivory or tooth hooks are used as lures. Fish caught by this method are set on the ice to freeze until the fisherman returns home. Virtually all tomcod fishing is done by the hooking method, normally during the months of October and November, and, if the ice is not too thick, into December on the lagoon ice. During the winter of 1960-61, the tomcod fishery was a total failure since the fish failed to appear in the lagoon as they usually do. No precise statistics were kept on the Dolly Varden and grayling catch, but a fairly close estimate of the year's total for both species is 1,200 pounds. On more than one occasion, a single fisherman filled a 100-pound sack in one day's fishing, but such success is extraordinary. More often, a day's fishing would produce anywhere from nothing to about a dozen fish, mostly small ones.

A more ambitious project than hooking is the use of gill nets under the ice. Two fairly large holes are cut on either side of the river, and a series of smaller holes is cut extending between

the larger holes across the river. One end of a net with a long line attached is placed in the large hole on one side of the river and is stretched across the river by passing it from one small hole to the next. Long lines on either end of the net are tied to poles. When wishing to secure fish from the net, one end of the net is pulled out onto the ice, the line at the other end of the net being long enough to allow a portion of it to remain on top of the ice. It is then possible to re-set the net by pulling on the line on the opposite side of the river.

Only one man in the village put out nets under the ice during the winter of 1960-61. He had three nets which were located approximately 2 miles up the Wulik River from Kivalina. He visited these nets almost every day, except Sunday, from shortly after freeze-up in the first week of October to the first week of March. He estimated that his total catch for the winter was about 350 pounds; of this, he sold 200 pounds in Kotzebue in February, and the rest was consumed by his family during the winter.

Trapping is another method of winter fishing which has been long used by Kivalina people. Trapping is the most elaborate means of winter fishing employed by the Kivalina men, and it is usually conducted on a large scale, with as many men joining in the operations as wish to do so. Such fishing usually takes place during the months of January and February and sometimes in March; it is done at night and only when there is no moon. The reason for the latter is that the fish (reportedly) move upriver when there is a moon, but downriver when there is no moon, the latter period being better for trapping.

To prepare a fish trap, a shallow portion of the river is selected which is likely to be fairly free of ice. Stakes are driven into the river from both sides of the river with each side angling downstream toward the middle of the river. The space between the stakes is filled with twisted willows so that the only passageway left for the fish is a gap about 2 feet wide in the middle of the river. Stakes are driven on either side of the gap. A conical willow weir which has a rectangular wooden frame lashed at its mouth is placed in the gap so that the wooden frame is supported from behind by the two stakes. The wooden rectangle has short extensions at the bottom to help anchor the weir, and has

long extensions at the top which serve as handles. The willow weir is bound in the center, forcing the willows at the far end close together. They are flexible enough to allow the passage of fish but close as soon as the fish has gone through, thus trapping the fish in a long cylindrical string net, the mouth of which has been tied to the forward side of the center lashings on the willow weir. The far end of the net is tied closed. When enough fish have entered the net, the far end is lifted out onto the ice, untied and the fish dumped out on the ice. The end is then re-closed and the net placed back in the water.

A somewhat simpler trapping method is to tie a short string net about 3 feet long to the rectangular frame. Then a shaven stick or piece of wood is placed on the bottom of the river at the mouth of the net. It is then possible to look down and see the fish as they cross over the stick into the net. When several fish have entered the net, it is hauled out of the water and the fish dumped out. The net is then replaced.

To encourage the fish to go downstream and enter the net, holes are cut in the ice upstream. Then bags containing ashes, seal oil, gasoline, or other irritant materials are lowered into the holes. This is frequently enough inducement for the fish to retreat downstream and into the net.

When most of the fish appear to have been caught, one side of the willow barrier is removed to allow fish to proceed upstream. When sufficient time has elapsed, the barrier is replaced and fishing is resumed.

No trapping was conducted during the winter of 1959-60; and during the winter of 1960-61, only one trapping expedition of nine men set out from Kivalina, departing on January 17 and returning on January 22. After three days of searching, a spot some 45 miles up the Wulik was chosen for the trap site. No fish appeared at the marker, and the whole operation was given up after one night's fishing. The reasons given for the failure were the unseasonably warm and wet weather (it rained), the lack of fish reportedly due to a number of otters in the region, and the fact that the new moon

was already up by the time the trap was ready. Two other reasons might be the lack of organization of the fishermen and lack of persistence.

Fish Utilization

Fish are used primarily as dog food, though they are a staple of the human diet, also. Most of the catch of Dolly Varden char obtained during September is utilized for dog food because it is too early for freezing. When fed to the dogs, the fish are often cooked into a stew with leftover scraps; this stretches the fish so that similar amounts of fish last twice as long. During the winter, frozen fish is sometimes fed directly to the dogs. Tomcod is not usually fed to the dogs and when it is it is usually cooked; dogs have become sick from eating raw tomcod.

Fish for human consumption are prepared in a variety of ways. Fish taken during the spring and summer are often dried as panniktuk and stored in seal oil. Such panniktuk is well liked and is consumed rapidly, seldom lasting beyond early winter. Fresh fish are most frequently boiled or steamed, although some are baked or fried; soup is popular. The whitefish is preferred as "kok" (i.e., in the raw, frozen state); this dish provides a frequent noon meal for Eskimo families. Eggs taken from the grayling are eaten when fresh.

Caribou

Although the caribou is a vital factor in the Kivalina village economy, the animal is still somewhat of a novelty in the region. As is well known, caribou were absent from the Kivalina area for about half a century, returning finally in the mid-1940's. The depopulation of the animals in the region had been so complete that some men now in their forties never saw a caribou until they were in their twenties, and even then, they had to go far inland to do so. In recent years, greater and greater numbers of caribou have come closer to the village. As the caribou population has increased, the Kivalina hunters have had to spend less time and effort in pursuing them, and the caribou-hunting range of the men has diminished. This historical change

must be kept in mind when generalizing about the caribou-hunting patterns in Kivalina, as must the unpredictability of seasonal movements of the caribou themselves.

Caribou Hunting Season

Differences in caribou hunting patterns from year to year are tied largely to differences in caribou movements. The first sightings of caribou in the vicinity of the village generally occur in October. In the fall of 1958, the caribou were reported to have moved south toward the village along the coast, passing very close to the village, and then moved inland, with the bulk of the herd reportedly having wintered in the foothills of the Brooks Range and De Long Mountains. The season was characterized by fairly long hunting trips by the Eskimos into the interior to secure caribou, except during the time they were moving past the village.

In the fall of 1959, the caribou again moved along the coast, but they swung inland in the vicinity of the Kivalina River, proceeding to the north-northeast for about 15 or 20 miles and then swinging to the east, crossing the Wulik River in the vicinity of Mt. Jarvis. Most winter hunting took place within the area between the Kivalina and Wulik rivers. Although there was considerable movement back and forth between these rivers, the main concentration of the herd appeared to center on the upper reaches of the Kivalina River.

Hunting in December 1959 was hampered by stormy weather in the early part of the month and by participation in Christmas activities in the latter part of the month. The short hours of daylight, and the need to gather wood as fuel during these hours also lessened hunting activity.

Although most caribou hunting in January 1960 took place on the Kivalina River, there was some hunting conducted in the hills behind Cape Seppings. Peter Lent reports that in early February 1960 the caribou located between the Kivalina and Wulik rivers in the De Long Mountains began a movement north to the Kukpuk drainage and thence to the coast. By the end of February there were no caribou remaining in the Kivalina and Wulik drainages.

Most hunters concentrated on seal hunting during the early part of February 1960, but during the latter part of the month decreased seal hunting opportunities and the increasing number of caribou in the Cape Seppings area stimulated caribou hunting in that vicinity.

Increasing hours of daylight; clear, sunny weather; and the proximity of the caribou, spurred intensive caribou hunting activity during the month of March 1960. Hunting was conducted in the hills behind Cape Seppings, on the upper reaches of the Singoalik and Okpiksikruk rivers, and near the Kukpuk River. The majority of the herd consisted of cows. On March 23, 1960, a party which had been hunting near the Kukpuk River reported that when they started to shoot at a group of several hundred caribou, the animals began to move inland. This apparently marked the movement of the cows inland, and, although hunting continued in the area, decreasing numbers of females were obtained. By the middle and latter part of April most of the kills were of males found in small groups in the hills and along the coast.

Table 3 shows the approximate number of caribou killed by the Kivalina hunters during the winter of 1959-60.

In the fall of 1960, the caribou apparently repeated the pattern of 1958, except that they arrived at the end of August. They came along the coast from the northwest and passed the village on the far side of the lagoon. Hunting pressure from the villagers forced the caribou inland up the Wulik River. A large concentration of caribou were sighted along the headwaters of the Wulik River in the middle part of September.

The winter of 1960-61 was a good year for caribou in Kivalina (See Table 3). Large numbers of the animals were in the region during September, and the fall and early winter hunting was in effect a continuation of what had begun in August. In October the animals were close to the village, sometimes within 2 miles or less. They remained in the region throughout October, November, and into December, constantly moving around, and occasionally disappearing for a few days but then returning. Not infrequently during this period, the hunters would stand on the roofs of their houses with binoculars and scan the adjacent flats and the nearby hills for

TABLE 3. Caribou kill by Kivalina hunters during winter 1959-60 and 1960-61

	1959-60	1960-61
September	0	130*
October	30	98
November	100	44
December	29	37
January	41	85
February	53	80
March	117	69
April	37	76
May	0	?
June	0	?

*Includes kills made in the last few days of August.

bands of caribou before setting out. At this time, as well as throughout the winter, most men hunted by themselves rather than in groups.

During the first two-thirds or so of October, the hunters concentrated their attention on the biggest bulls, both because such animals are fat at this time of the year and because by shooting a big bull one can get more meat per shot than with cows or calves. As the rutting season begins, hunting emphasis shifts to cows, because the meat of the rutting bulls has a strong and offensive odor and taste. When the rutting season is over, about mid-December, the hunters begin to hunt both bulls and cows with more or less equal emphasis.

Caribou hunting tapered off around mid-December 1960 and did not begin again in earnest until the end of January. On the 19th and 20th of January 1961, rain cleared the seaward end of the Mulgrave Hills of much of its snow cover, and caribou moved into the region in numbers shortly thereafter. Since seal hunting was especially poor and since the caribou in the hills were reported to be very fat, two expeditions, totaling seven men, went camping in the area for 3 days and secured 42 animals. Four other men, hunting singly, shot 14 animals in the same area during the same period, making for a total of 56 caribou killed in the Mulgrave Hills in 3 days.

When the above flurry of activity was over, caribou hunting receded somewhat into the background again, while attention was focused more on seal hunting and trapping. Ample, if not great numbers of caribou remained in both the Cape Seppings region and the Mulgrave Hills throughout February and March and were hunted from time to time though not heavily.

Toward the end of March, the animals in the Mulgrave Hills moved inland, thus ending caribou hunting in that region for the winter. At the same time, however, several groups of caribou were concentrated in the Asakpa River Valley, and they were rather heavily hunted for about a week before they moved on.

Caribou hunting, during the first part of April 1961, was rather sporadic, mainly due to inclement weather, well-stocked larders, and the greater priority of seal and ugruk hunting at this time.

During the second half of the month, the weather worsened considerably, bringing seal and ugruk hunting to a standstill. The larders rapidly emptied and caribou hunting increased considerably. All of the hunting during this spring period was done in the hills behind Cape Seppings. The animals were starting to move inland at this time, however, necessitating several brief camping expeditions to the region during the last ten days or so of April 1961.

Caribou hunting continues until the rivers break up in the spring and traveling becomes difficult, usually the latter part of April. Some caribou hunting is done in the summer, especially in conjunction with wood gathering along the coast between Cape Seppings and Ogotoruk Creek. Hunting is also conducted during egg gathering operations at Cape Thompson in July. Approximately nine caribou were reported killed during egg collecting in 1959, with 10 to 15 more reported killed along the coast during the summer.

Caribou Utilization

The butchering, skinning, storage, and preparation of the meat and skins of caribou for various purposes follows a fairly consistent pattern from the fall to the spring, although there are a few variations. In October, when there is little snow on the ground and the river ice is still thin, most carcasses are left where they are shot. The meat is hauled to the village as soon as conditions are favorable for sled travel.

If several animals are killed close to each other, they are piled together, and sometimes they are cached beneath caribou skins. Cached animals are usually cleaned and frequently skinned before they freeze, depending on the uses for which the meat and skins are intended and on how bad the weather is when they are killed. Occasionally, the lower edge of the skin covering cached caribou or the tail of a cached caribou is singed, ostensibly as a deterrent to animals which might molest the meat. At times a 5-gallon can is hung by the meat with a stick attached inside to serve as a clapper. Normally, however, nothing is done to secure the meat against such damage, and cached meat is sometimes lost to such animals as wolves, wolverine, foxes, etc.

Throughout the rest of the winter, unless food is short, a hunter will normally not shoot more than a sledload of caribou. Major exceptions occur when a number of especially fat caribou are located, as happened in January 1961 in the Mulgrave Hills.

A caribou carcass is almost always cleaned at the place where it is shot, but frequently it is brought home for skinning and further butchering. If a man is a considerable distance from the village and has shot a number of caribou, he will probably either butcher them completely and bring them all back with him, or clean them all and only bring two or three back to the village for butchering and then return for the rest at a later date.

The normal butchering process is about the same whether it is done in the field or in the house. The entire job is usually done with nothing more than a sheath knife. First the animal is cleaned and skinned. Then the legs are removed from the body. The ribs are cut on either side of the breast-plate on the chest and are cut near the backbone from the inside and cracked off. The head is cut from the neck. When the animal is fat, the head will be saved in its entirety; in any case, the tongue and the jaws are kept. The eye balls and the fat behind the eyes are frequently saved also. Most foetuses (from February through April and into May) are thrown away, but some are kept and eaten, especially by the old people, and some are fed to the dogs.

When a carcass is frozen, it is usually hacked apart with an axe or machete.

Caribou, with the exception of bulls in the fall, are used mainly for human consumption, although when dog food is short they are also used for dogs. Virtually every part of it is eaten by the Eskimos of Kivalina, although there may be a few exceptions. Of course all the meat from the body is eaten. The entire head is boiled and the meat and brains eaten; the eyes, jaws, and the tongue are especially enjoyed. The bones are generally boiled with the meat in stews and soups. The marrow of the leg bones is eaten either fresh or boiled. If the caribou is fat, most of the viscera is saved and eaten. Various parts of the stomach of a fat caribou are eaten after the contents have been removed, and even the contents

are sometimes saved and eaten. The fat is beaten with seal oil to the consistency of light mashed potatoes, then mixed with berries, other fruits, or bits of caribou meat and eaten as Eskimo "ice-cream." The kidneys are sometimes saved, though they are mostly eaten raw immediately while they are still warm after being taken from a recently-killed caribou. The heart and liver of the caribou are either thrown away or eaten depending on the individual's personal taste; usually they are eaten. Viscera from caribou that are not fat are almost always left for the foxes, ravens, etc. The only exception to this might occur when only one or two caribou have been shot close to the village, in which case the hunter brings the viscera home to be used as dog food. Although the Eskimos have a great number of recipes for various dishes, the greater part of the meat from a caribou, when cooked, is boiled, frequently in sort of a thick soup or thin stew with rice, dried macaroni, and the like. The brain is sometimes fried; meat from the hindquarters is often fried; and the liver is almost always fried. Kok, in the form of frozen caribou, is a common item on the menu of the Kivalina family and is also commonly eaten on camping trips. Extra meat from summer kills is dried and stored in seal oil.

Calf skins and skins of caribou killed in August are preferred for making parkas, pants, socks, and mittens as the hair is short and does not fall out as readily as that of the winter skins. Skins to be used for mukluks, mattresses, and sleeping bags are considered best when taken in October because the hair is a desirable length and thickness at that time. In any case, the basic preparation of the skins is the same, regardless of the month during which they are obtained, or the purpose for which they are intended. First, the skin is dried, preferably outside if the weather is not too bad. Leg skins to be used for mukluks are usually cut off from the rest of the skin and dried inside since they do not take up too much room inside the house. When the drying is completed, the skins are scraped, wetted, and left to hang overnight. As a skin begins to get dry again, it is stretched by scraping it again. The skins are then ready for cutting and sewing after they have been softened. Skins to be used solely for mattresses seldom go through the entire process

listed above, drying and scraping, or sometimes merely drying being sufficient.

The caribou-skin mukluk most commonly in use in Kivalina, the "isiktook," is made with ugruk-skin bottoms and caribou-leg uppers, eight legs being required for one pair. Caribou-skin mattresses are also in universal use by hunters (or others) when on camping trips, but are seldom employed at home. Caribou-skin sleeping bags are rather rare in Kivalina, only two men having used them during the winter of 1960-61. One final item which is made from caribou skins is the insole for mukluks. Insoles can be taken from anything but spring skins; they are normally cut from the belly or the snout of the caribou.

A remaining item of importance from the caribou is sinew, which is taken from either the back or the legs of the animals, especially fat ones. Sinew is used mainly for thread for sewing mukluks and skins, though it has been largely replaced by dental floss.

Recently, with the establishment of the Caribou Hoof Jewelry Project in Kivalina in 1959, caribou hoofs have been saved as raw material for fashioning jewelry, buttons, buckles, etc.

Seals

Seals are another important factor in the economy of the village. Two species predominate in the waters of the village: the ringed seal or "netchek" (Phoca hispida), and the bearded seal or "ugruk" (Erignathus barbatus). (In the vernacular of the northwest Alaskan coast, these species are referred to as "seals" and "ugruk," respectively, and will be so called here.) In addition, the harbor seal (Phoca vitulina) is taken occasionally by Kivalina hunters, and rarely the ribbon seal (Phoca fasciata) is taken.

The general area which sea hunting encompasses extends from Rabbit Creek on the south to Cape Seppings on the north, with hunting emphasis between the village and Cape Seppings. The distance to which hunting extends out to sea depends on wind and ice conditions but apparently seldom exceeds 10 to 15 miles from land.

Seal and ugruk hunting require much more skill than caribou hunting and are considerably more dangerous. A successful seal hunter must

be a fairly good shot, as his target is normally only a few inches in diameter and is usually moving, except when a curious animal rises high in the water to look around or when an animal is on the ice. It is interesting to note that even the most experienced seal hunters in Kivalina undergo a mild case of "buck fever" when they go seal hunting for the first time each winter, missing several times before the first kill is made. After that, the good hunters seldom miss. The most important element of skill in seal hunting is knowledge of the ice--of the influence that various winds and currents have on various types of ice in different places, and of how to judge and react to ice movements. It is this latter knowledge, rather than shooting ability, that really characterizes the seal hunter in Kivalina. Thus, of the 37 potential winter hunters in the village in 1960-61, all of whom qualified as caribou hunters, only 12 had the skill to enable them to venture considerable distances out on the ice unaccompanied by more experienced hunters; and five or six winter hunters had never been on the ice at all.

The ever-present dangers in seal hunting are drowning, being crushed under piling ice, and drifting out to sea on ice that has broken off from the shore. Even the most expert of seal hunters is vulnerable to these dangers, and virtually every man comes close to disaster sometime during his seal hunting career.

Although seal hunting is usually an individual enterprise, when proceeding out on thin ice hunters are likely to go in pairs; or they will at least remain in the general vicinity of other hunters in the eventuality of being drifted out. Several precautions are taken to avoid this happening. A close watch is maintained on the current of the water. Many hunters state that a change in the current will precede a change of the wind. Thus, while the wind might be blowing from the south and the ice should be moving in toward shore, the current may be moving out. One method of determining the flow of the current is to drop an empty cartridge case into the water and watch the direction of the resultant air bubbles. If proceeding far out on the ice, the hunter may take a fix on a landmark by lining it up with an object at hand. He will then frequently check this. If he notes that his position has subsequently shifted, he knows that the ice has opened up behind him. A more convenient method is to

place a compass at some point nearby, and then to check the compass reading from time to time. If the compass reading changes, the hunter has an indication that the ice has moved. Should a returning hunter discover that the ice is beginning to move out, he will fire three shots to warn the hunters still out on the ice.

Ice conditions are of extreme importance in determining the success or failure of a winter's seal hunting, and ice conditions are to a large degree the result of wind conditions. The November and early December winds have perhaps more influence on the winter's ice conditions than do the winds at any other time. The most desirable winds at this period are from the northwest ("neegyukpukhyakh") as they bring the old thick ice ("pikaliuk") onto the shore from far out in the Arctic Ocean. Such ice usually brings polar bears, arctic foxes, and numerous seals with it. The old ice is fairly thick, and if the winter ice has "pikaliuk" as its base, it is much safer to go out on throughout the winter than if it is all new ice. If the winds do not bring "pikaliuk" ice, the ocean will be frozen over with new ice, and even if it attains a thickness of 8 feet or more, it is always distrusted by the Eskimos.

Wind from the east ("acharnuk") has more effect upon the frozen ocean off Kivalina than any other wind. A strong east wind will usually split the ice off from the shore and break it up, in spite of a strong onshore current. No hunter will venture out on the sea ice during a strong east wind. When the ice has withstood a strong east wind, it is regarded by the Eskimos as being much safer than ice which has not had such a test.

A south wind ("oongalukh") piles the ice on the shore from some 15 to 20 miles to the southeast of Kivalina apparently clear to Point Hope. It is a good wind for seal hunting, because it cracks the ice but brings no danger of drifting out. Wind from the west ("eekugnuk") has somewhat the same effect, but it piles the ice around Rabbit Creek and not so much around the village. When a west wind is accompanied by a strong current from the west, sealing is poor; the seals never come to the surface of the water, not to mention out on the ice. North winds ("neegyukpuk") have little effect on the ice between Cape Seppings and Rabbit Creek, but reportedly

break up the ice to the north of Cape Seppings and pile ice around Cape Krusenstern. No hunter goes out on the ice if there is more than a mild breeze from the north.

Seal Hunting Season

Seals are usually first sighted off the coast in late October or early November. As a rule, a belt of ice one to several hundred yards in width has been built up along the shore by this time, and the men hunt along its edge. If the sea should happen to be ice-covered at any time during these months, seal hunting stops because the new ice is unsafe and hunters cannot reach open water for sealing.

A seal hunter's basic equipment at this time, and throughout the winter, consists of the following: rifle and ammunition; an "unakh," which is a pole some 4 to 6 feet long with an ice pick at one end and a hook at the other; a "niksik," which is a three or (normally) four-pronged hook attached to a wooden float and a long line; a short stool ("neekeewotuk") or piece of caribou skin upon which to sit; and a white parka cover. In addition to the above, most Kivalina seal hunters have either kayaks or open skin boats which are small enough to be carried about easily on the owner's sled. In November, the hunter proceeds along the ice edge on foot or with his team until he spots a seal in the water. He then leaves his sled a short distance from the water and, wearing his white parka for camouflage, sneaks forward (crouching whenever the seal appears), sits on his stool or caribou skin a few yards from the water, and waits for the seal to reappear. If an animal is shot very close to the ice edge, it is hooked with the unakh and hauled onto the ice. If it is shot several yards from the ice, the hunter will usually throw his niksik and attempt to hook it with that. If the dead seal is some distance away from the edge of the ice, the hunter will retrieve the carcass with his kayak. When a hunter is unsuccessful at one spot after waiting for a time, he moves further along the ice until he spies another seal or thinks he has located a favorable spot. Once a seal is shot and retrieved, it is frequently left on the ice to be picked up on the hunter's return journey.

December seal hunting follows somewhat the same pattern as November hunting. In some years the shore ice extends out to sea several miles by mid-December and may be thick enough for the hunters to proceed out on it; in other years, however, hunting is sporadic because the sea is fairly well covered with ice which is still too thin for travel.

Seal hunting increases during the month of January and is in full swing by February. Hunting during this period normally takes place out on the ice along cracks and open leads. The hunter goes to a patch of open water and waits for seals to appear. If none are seen (a rare event at this time of year) the hunter proceeds further. The seals are retrieved from the water by the same methods mentioned above. A hunter will normally kill as many seals as he can. If he obtains more than one sledload, he will haul some to the shore and then return for the others. He will then bring as many home as he can or wishes to haul.

The warmer days of March bring a marked change in seal hunting techniques. As the sun gets higher and the air gets warmer, more and more seals are seen sunning themselves on top of the ice. Ugruk normally begin to appear with some regularity at this time and are observed in ever increasing numbers throughout March and April. A seal or ugruk lying on the ice presents a larger, more stationary target than does the same animal in the water. In addition, retrieving an animal shot on the ice is more likely and easier than one shot in the water where they may sink or drift under the ice, etc. Retrieval problems of water-shot ugruk are especially serious. Ugruk usually sink fairly soon after being shot, and a large ugruk is much too heavy for one man to haul out of the water by himself, although he can usually do it with the aid of his dogs. Thus, the emphasis in March and April is normally on sunning rather than swimming animals.

The best seal and ugruk hunting conditions in March and April are warm, calm days when there are numerous small holes or cracks where the animals can climb out onto the ice surface but few large leads. Hunters at this time of year frequently climb piles of ice and look around for the black dots on the ice which signal a sleeping ugruk or seal. It should be noted that if many ugruk are about, a

hunter will almost invariably overlook seals in favor of the much larger ugruk. When a sunning animal has been sighted, the hunter hides his dogs and stalks it. If the surface of the ice is fairly rough, his task is much easier. If the ice is absolutely flat, the hunter must crawl for some distance over the frequently wet, but in any case cold, ice in order to get within shooting range of his quarry.

With increased daylight and sunshine one danger of being out on the ice for long periods of time is snow blindness. For this reason, hunters wear sunglasses, which have replaced the Eskimo snow goggles formerly used. In spite of wearing sunglasses, some hunters suffer from snow blindness, particularly if they have made constant use of binoculars. The Eskimo remedy for snow blindness is to drive a small thin, sharp knife horizontally through the flesh of the bridge of the nose. One hunter reported that he had had a severe case of snow blindness a few years previously and that such an operation had enabled him to resume hunting the next day.

After the sea ice breaks up in late May or early June, seals and ugruk are found floating on pan ice or floes. They are sometimes hunted by individuals going out alone in small boats, but most frequently ugruk are obtained by crews of six or seven men operating from the skin umiaks.

Large, flat floes are sought when hunting ugruk. When landing on a floe, a pressure ridge of ice is climbed and the general area scanned for ugruk with the aid of binoculars. Groups of ugruk are frequently sighted sunning themselves along cracks or holes in the ice. Due to the weight of the ugruk, hunting is limited to those which may be brought back to the umiak by sled with little difficulty.

In contrast to caribou hunting when all the members of the party except those holding the dogs participate in the shooting, the responsibility of shooting the ugruk is frequently given to the best shot in the group. He will approach to a fairly close range and obtain as many as possible before the others take fright and dive into their holes. On other occasions two or three men may shoot at the group. The remaining members of the crew gut the animals, load them on flat wooden sleds, and haul them back to the skin boat where they are loaded inside. Should the water become too rough or the

load within the boat prove excessive, the animals may be slung over the sides of the craft. Ugruk obtained on such expeditions are divided equally among the crew members.

Sea hunting continues from the umiaks until the last of the pan ice has blown out to sea, usually late June or the first part of July. Because of the decreased amount of blubber, a great many of the seals which are shot in the spring sink and are lost.

In 1959 an unusual number of seals were taken during November near the Kivalik channel. These seals may have been drawn to this area by large schools of tomcod which were entering the lagoon by this channel. The concentration of tomcod at this point may have been caused in part by the fact that the Aulik channel near the village had become blocked by sand and gravel. (This was reported to be the second time this has occurred within the memory of the people, the first time being many years ago.) Some harbor seal were found in the area at this time although only about 10 were taken. Most of the seals, however, were ringed seal.

Seal hunting in November 1959 was conducted from the coast along which shore ice was beginning to accumulate. By the middle of December the shore ice extended several miles out to sea and was thick enough to enable hunters to go out on.

Seal hunting increased in January 1960 along small leads, and increased markedly in the latter part of January and the first part of February. During this time seal hunting was ideal: the weather was good; a lead extended along the heavy shore ice about 4-5 miles offshore and came to within a half mile of shore near the Kivalik channel; and many seals were present. A good deal of open water was also present in the area about Cape Seppings.

These ideal seal hunting conditions were abruptly terminated on February 10, 1960, by strong northwest winds which continued for 4 days. This was followed by a few days of moderate northwest wind which then shifted to south and southeast winds for the remainder of the month. The latter winds brought ice in from the south and closed the open leads. During February the weather was for the most part windy and cloudy and the seals were not yet sunning themselves on the ice. Thus, it was necessary to hunt them in the open leads. However, even when

small areas of open water were found, the seals were not numerous during the latter part of February; possibly unfavorable currents contributed to their scarcity.

March 1960 brought many days of clear, sunny weather with only occasional days of strong north wind. The increasing hours of daylight contributed to longer hunting hours. The lead offshore, which had been closed during the latter part of February, opened and closed again during March. Although hunting conditions were more favorable, seals were not available in great numbers. Part of this may be attributed to the retreat of the females to their pupping lairs in the ice. At this time seals taken by the hunters consist largely of males. Seal hunting was also curtailed by the participation of potential hunters in other activities: there was a movement of people out of the village to attend the Friends church quarterly meeting in Noorvik; eight National Guard members left for a 3-week training encampment in Anchorage; and the closeness of the caribou drew a number of hunters to the hills in the Cape Seppings area.

By the latter part of March, more and more seal were found sunning themselves on the ice. This became increasingly true during the month of April. With more seals becoming available on the ice and with the movement of the caribou inland, seal hunting became more intensive.

During April 1960 the lead along the shore ice continued to open and close, but this had little effect on the hunting so long as seals were found on top of the ice. When the lead would freeze over or close and the currents were favorable, hunters would proceed far out on the relatively thin ice to hunt. Sometimes this distance would extend 10 to 15 miles offshore.

Although April proved a good month for seal hunting, the main interest in the latter part of April was divided between hunting ugruk and maintaining a whaling station which had been established on the ice near the village.

A few ugruk were taken prior to April in 1960, but takes increased after mid-April (See Table 4). One ugruk with a young pup was reported seen on the ice near Kivalina on April 26.

The 1960-61 season got off to a bad start when few seals appeared in November and December, and very few were killed. There was little

TABLE 4. Seal and ugruk kill by Kivalina hunters, 1959-60 and 1960-61

Month	Number seal killed		Number ugruk killed	
	1959-60	1960-61	1959-60	1960-61
September	0	0	0	0
October	0	0	0	0
November	52	0	0	0
December	7	5	0	0
January	77	27	1	0
February	135	30	2	1
March	48	31	1	15
April	65	37	19	9
May	41	22	12	12
June	53	?	82	?
July	0	?	0	?

wind of any kind in November, and no old ice came down from the northwest. There was no ice on the ocean at all until November 22; at this time -20°F . temperatures froze the surface of the water for about 200 to 300 yards from the shore, and there were a few pans of ice floating beyond that. The ice came and went (except for the strip along the shore, which remained) for over a month, and the ocean did not freeze over completely until Christmas day. All the ice was of course new rather than pikaliuk ice. December and January were unusually warm, and thus even the new ice was not as thick as it normally would have been and was correspondingly more dangerous to travel on than usual. When colder weather and stronger winds finally came on the first of February, they came from the north. Since a north wind has little effect on the sea ice off Kivalina, very few cracks at which hunting could take place formed and the sea was covered with a solid blanket of ice throughout February, which is normally the best month for sealing.

March 1961 brought the coldest temperatures of the winter. Thus, at a time when the weather would be getting warm and bringing the seals and ugruks out onto the ice in a normal year, the temperature went down to the minus 40's F., reaching a low of -50°F . about March 13. Any cracks which formed were frozen over within a few minutes. The weather finally warmed, and seal hunting was almost normal for the first 2 weeks in April. Finally, on April 17, the first strong east wind since freeze-up hit the coast, and it lived up to its reputation. Within a few hours after the wind hit, the ice had developed a crack about 200 yards offshore, extending many miles along the coast in both directions from the village. Within 2 hours the ice had vanished into the mist, and when the skies cleared 2 days later, the ice was not in sight. Fortunately, no one went seal hunting on April 17. The remainder of the month brought mostly bad weather, with snow and high winds and poor ice conditions. Thus, seal and ugruk hunting was at a standstill throughout the last two weeks of the month.

The monthly take of seals and ugruk during 1959-60 and 1960-61 is shown in Table 4. The annual take for a number of recent years is shown in Table 5.

TABLE 5. Estimated seal and ugruk kill, Kivalina, 1954-1960†

Species	1960*	1959	1958†	1957	1955	1954
Ringed seal	152	545	500	600	425	265
Ugruk	37	104	135	120	35	0

† Data for 1954-58 were obtained from the Bureau of Indian Affairs Combined Game Fur Take Report which is compiled by the B.I.A. village teachers.

*May and June, important sea hunting months, are not included for 1960-61 because of the termination of investigations in early May.

Seal Utilization

When a man kills a seal or ugruk, he has with one shot acquired food, clothing, fuel, and dog food, and occasionally (in winter) kayak and other types of skin-boat covers, and rope. No part of the seal or ugruk is ever discarded. Anything not directly used by humans is consumed by the dogs. Seals and ugruks are brought whole to the village, where they are skinned and butchered, usually by the women.

The first ugruk obtained by each household is shared by the entire village, with other women coming over to help cut it up. At any other time when a woman helps with the cutting, she is also entitled to a portion of the ugruk. When a great many ugruk are being obtained, the women of each household are usually left with the task of cutting it alone. June is a period of intense activity for the women, all of them busy cutting, hanging, and drying meat.

In skinning the carcass, a cut is made around each of the flippers and the head. A lengthwise cut is then made down the belly from the neck-cut to the hind-flipper cut. The skin may be separated from the blubber during skinning, or the blubber may be removed with the skin and separated from it later. After skinning, a seal is butchered in much the same manner as a caribou. First the viscera are removed, and then the flippers are cut off. The ribs are separated from the rest of the body by cutting them first on either side of the breastplate and then cutting and cracking them off along the spinal column.

The skins of ugruk are flensed of blubber, holes are slit along the edge, and they are stretched out on the ground to dry by means of stakes driven through the holes. A pole is often placed beneath the skin to allow for air circulation. In the winter, the seal skin is dried inside the house. Winter ugruk skins are usually rolled up and placed in a sack and so kept until June, when they are taken outside to be stretched, etc.

Seal skins to be made into "nalaukh" are treated more extensively. First they are placed in drums of seal blubber and fat for 1 to 3 weeks, at the end of which time the hair can be easily removed. The

skin is then scraped and cleaned and then is placed in soapy water to soak for a few days. It is then kept in a pan of snow for 2 or 3 days, new snow being continually added as the old melts. While the skin is still wet, it is taken outside and stretched as tightly as possible by staking it out on the snow so that it freezes in the stretched position. When it has frozen, the skin is scraped on the inside. Finally, the skin is hung outside for several weeks until it has bleached to a very white shade. The resultant "nalaukh" is cut and used for tying-strings for mukluks (its chief use), for trim or tops of mukluks, and for dog collars; it is also an important item of trade with the Noatak Eskimos.

Seal skins are used to make parkas, mukluks, mittens, and winter hunting pants. Waterproof mukluks are best when made from winter skins, and "nalaukh" must be made from winter skins. Scraped seal skin and skins from young ugruk are cut into rope. Seal skins are also used to cover kayaks. The skins of older ugruk are used to cover umiaks and for mukluk bottoms. Seal skin pokes are used as storage containers.

Seal pokes are made by skinning out the complete seal and reversing the skin so that the fur side is inside. To do this, the mouth is slightly enlarged by cutting and the skin is separated from the blubber with a sharp knife, first about the head and then over the rest of the body until the skin has been loosened over the entire seal. The seal carcass is then removed through the enlarged mouth opening. The flippers are skinned out with only the phalange bones remaining with the inverted skin. The phalanges of one flipper are usually cut off, leaving a hole in the skin that can be used as a pouring spout if seal oil is stored. This opening may be tied off or plugged when not needed. The mouth opening is tied together and is readily re-opened if meat or berries are to be removed. All other apertures in the body are sewn closed to provide a watertight container.

Seal carcasses are utilized primarily as dog food. The liver and intestines are saved for human consumption, the liver usually being fried or eaten as kok. When seal meat is eaten by humans it is mostly boiled,

and any and all parts of the animal may be cooked together in the same pot. Ugruk are utilized more in the human diet than seals, but the stomach, head, liver, and lungs are usually given to the dogs.

In winter, extra meat is kept frozen. In summer, most of the seals are used immediately for dog food, surpluses being preserved for short periods by tying the carcasses on lines in the lagoon. Most ugruk meat is dried and made into panniktuk. Meat which is to be dried is left hanging for about 2 weeks; if it rains, the meat is covered. Some meat is left to hang until the surface is dried, then taken down and cooked before placing it into seal oil. Ugruk flippers are sometimes wrapped in a cloth and placed in a shallow hole in the ground which has been lined with grass. The ground is replaced over the meat and it is allowed to remain there until such time as the fur can be pulled away from the meat. It is then removed, washed and is ready to eat. Meat prepared in this manner is called "unack."

The inner muscle of ugruk intestine is scraped off, placed on top of fresh blubber, minced, and served as "kayak."

Blubber is used extensively for food, either being cooked along with meat or consumed as oil. Some oil is made from seal blubber, although ugruk blubber seems to be preferred. Much of the ugruk blubber is used to make seal oil. Blubber used to make oil is put into clean oil barrels or seal pokes. The poke or barrel is then stored in some shaded area, because direct sunlight causes the oil to become too strong and rancid. Five gallons of blubber generally yields a somewhat less amount of oil.

Seal and ugruk blubber are also used as dog food; they are used only in conjunction with lean meat and are never used with fish. A dog is only fed a very small cube of blubber with his meat unless it is very cold weather, then he might perhaps receive a 2- or 3-inch cube.

Blubber is used as fuel in the winter. Usually it is cut into strips for this purpose and is burned with willow or driftwood. It is also burned alone, however, if no wood is on hand (See Fuel). When properly used, blubber burns both longer and with a hotter flame than either willow or driftwood.

Other Sea Mammals

Beluga

Although the beluga or white whale (Delphinapterus leucas) is generally reported to occur in March or April, just preceding the bowhead whales, none was obtained at Kivalina in 1960 until July. There were reports from hunters in June of hearing beluga sounding, but none was sighted due to the presence of fog.

Beluga tend to stay out in open water, although occasionally in early spring they occur in leads. When shot in a lead, they are hauled up on the ice by means of lines attached to dog teams and are then cut up and divided among the hunters.

The first beluga sighted during the first week of July 1960 were moving in schools along the coast. Once beluga are known to have been sighted, a single rifle shot is sufficient to bring the men of the village running to the beach. One or two boats are put out to sea to keep the beluga close to shore. Men on shore run along the beach keeping pace with the beluga and stopping to shoot as soon as the beluga sound. They try to hit the back of the neck which appears out of the water seconds after sounding occurs.

Although the white shapes of the beluga are clearly discernible from shore, it is generally a waste of ammunition to shoot until the whale sounds because of the deflection of the bullet by the water. When shooting commences, the beluga may turn and head back in the opposite direction, followed again by the men on shore. The beluga shot are forgotten until the hunt has ceased, the general area of the kill being indicated by an arrow drawn on the beach. Often the dead beluga will float until picked up by the boats and towed to shore. Those which sink are easily seen on the bottom and are brought to the surface by means of a weighted hook and line.

Hunting is also conducted from boats which pursue the beluga at sea. Men stand balanced in the boats and shoot down over the side as soon as the beluga have sounded.

An estimate as to the intensity of beluga kill may be derived from Table 6.

TABLE 6. Estimated beluga kill, Kivalina, 1954-1960[†]

Species	1960*	1959	1958	1957	1955	1954
Beluga	7	11	14	16	6	6

*May and June, important sea hunting months, are not included for 1960-61 because of the termination of investigations in early May

[†]Data for 1954-58 were obtained from the Bureau of Indian Affairs Combined Game Fur Take Report which is compiled by the BIA village teachers.

When beluga are obtained by means of the group effort of the village, they are divided among all the family units. When obtained by boats hunting up and down the coast, they are divided among the boat crews. When a beluga which has been shot and lost is found later, it becomes the property of those finding it. If the beluga has been dead 24 hours or more it is generally only used as dog food.

The cutting of beluga, as opposed to ugruk or seal, is a man's job. Long knives or machetes are used to cut the muktuk into squares and to strip it from the carcass.

The tail flukes of the beluga are considered delicacies, and those of the first beluga shot are cut into strips and a portion given to each child in the village.

If the beluga muktuk (skin plus blubber) is eaten fresh, it is either eaten raw or is boiled until tender and then often eaten with mustard. If the muktuk is to be stored, it is cut into strips about 3 inches in width. Alternating slashes are then made in the strip, cutting it almost all the way through. The slashed strips are then placed on drying racks to hang in the sun. Generally about 3 days of drying is sufficient, with care being taken that the skin portion of the muktuk does not separate from the blubber portion. The strips are eaten as is or put away in oil for winter use.

The blubber is occasionally used to make oil. The meat is sometimes eaten or dried as panniktuk. Often the meat is used as dog food.

Bowhead Whales

Many of the Kivalina people are experienced whalers and journey to Point Hope in the spring to work as members of the whaling crews there. Participating in whaling (for the large bowhead or black whale, Balaena mysticetus) provides Kivalina people with muktuk and whale meat. When word was received in 1960 that four whales had been killed at Point Hope, great excitement was generated in Kivalina, for with this number of whales there would be enough muktuk and meat to satisfy the needs of Point Hope and enough additional to allow other villages such as Kivalina to obtain some. In all, about 2,300 pounds of bowhead were brought in to Kivalina in 1960.

In 1960 whaling was instituted at Kivalina when Dr. Murray Johnson arranged to have a darting gun and bombs sent to the village. An Eskimo hunter was put in charge of this equipment and it was specified that it was for the use of the entire village and that the entire village would share any whales obtained.

A whaling camp was established on April 22 on the ice, near an open lead about 3 or 4 miles from the village. Watch was maintained by a revolving crew of men, allowing different men from day to day to go seal hunting. When the lead was closed, some of the men stationed at the whaling camp also did seal hunting in the nearby areas.

Although two whales were sighted the first day the camp was established and three were seen later, conditions were never such as to enable the crew to approach the whale and throw the harpoon, and no whales were taken.

Polar Bear

If ice conditions permit, and especially if old ice drifts into the area, some polar bear (Thalarctos maritimus) are seen by Kivalina people. An average of two or three are seen each year. The only bear shot during the period of this study was shot about 14 miles inland up the Wulik River on January 2, 1960. The bear had apparently been feeding upon the fish that had been stored by the Eskimos in willow nests along the river in the fall.

Walrus

Although many dead walrus (Odobenus rosmarus) are found along the beach in the Kivalina area and are used as dog food, it is unusual to find a live one in the area. A walrus was found sleeping on the beach and was killed about 2.5 miles southeast of the village on October 31, 1959.

Fur Animals

Trapping for furs is a secondary activity in Kivalina. The time and effort spent in trapping and hunting fur bearers depends to a high degree on current fur prices and the relevant individual's current financial situation, i.e., on how much he needs the money and on how well he can afford to buy traps if he needs new ones. Somewhat higher fur prices in 1960-61 brought somewhat increased trapping effort in Kivalina, but lack of animals and very casual and unsystematic checking and care of the traps on the part of the men resulted in a rather unimpressive take.

The trapping area of the Kivalina men is about the same as their general range, i.e., between Cape Seppings and Rabbit Creek on the coast and inland to Mt. Jarvis. Some traps are outside this area, however, which may explain in part why they are seldom checked. During the winter of 1960-61, 18 men had 181 traps out. Of these, 67 traps were no. 4's, 22 were no. 3's, 63 were no. 1-1/2's and 9 were no. 1's. Thus, it can be seen that the emphasis on wolves (Canis lupus) and wolverines (Gulo luscus) (no. 3 and 4 traps) was about the same as that on foxes (Vulpes fulva) (no. 1-1/2 and no. 1 traps). The larger traps were spread along virtually all of the larger creek and river valleys in the area, while the smaller traps were placed almost exclusively along the coast or a short distance out on the sea ice. The greatest concentration of small traps was along the coast from Rabbit Creek to a point about 15 miles to the northwest of it. In this region there were so many traps so close together that one had to be careful where he went with his dog team; more than one dog stepped into a trap.

Arctic foxes (Alopex lagopus) are trapped along the coast north and south of Kivalina, with trap lines extending north to within a few miles of Ogotoruk Creek. While some arctic fox live inland throughout the year, many inhabit the sea ice and reach shore when ice conditions permit, i.e., when old ice comes close to shore.

Some trapping of ground squirrels (Citellus parryii) is attempted in the fall, but most of it is concentrated in the spring along the southeastern portion of the lagoon and the northwestern

end of the lagoon near the Kivalik Channel. A Kivalina family established themselves at the mouth of Kissimilouk Creek, just southeast of Ogotoruk Creek, in the spring of 1961 to trap ground squirrels. They were trapping for pelts, but during May, when neither caribou nor seals were available, they used the meat for themselves and their dogs. The dressed carcasses were boiled for several hours until the meat fell from the bones, and then both the meat and broth were consumed.

Raw furs are sold to the Kivalina Native Store for a nominal price; the store in turn sends them to the open market. When the skins are resold on the open market, the trappers will receive any additional money due them.

Wolverine and wolf skins are almost invariably kept by the trapper and cut into parka ruffs and trimmings, or are sold by him to other villagers who use them for the same purposes. The skinned carcasses are usually thrown away or fed to the dogs.

Table 7 shows the take of fur bearers by Kivalina trappers for several years. With the exception of the figures obtained during the present study, 1959 and 1960, records were obtained from Bureau of Indian Affairs reports.

Birds

Birds provide small, though definite portions of the Kivalina Eskimo's diet, especially during the spring and summer months.

Waterfowl

Prior to the enforcement of the Federal Migratory Bird Treaty Act, Eskimos hunted ducks, especially eiders, during the spring months, primarily in May and June. Although ugruk and some seal are available at this time, caribou are scarce and the waterfowl provided needed additional subsistence as well as a welcome variety in the diet.

TABLE 7. Fur take by Kivalina trappers, 1955-1960*

Species	1960	1959	1958	1957	1955
Red fox (<u>Vulpes fulva</u>)	10	9	5	1	7
Arctic fox (<u>Alopex lagopus</u>)	18	15	2	1	28
Lynx (<u>Lynx canadensis</u>)				6	
Mink (<u>Mustela vison</u>)					1
Muskrat (<u>Ondatra zibethicus</u>)			12	8	7
Land otter (<u>Lutra canadensis</u>)	1	3		1	1
Ground squirrel (<u>Citellus parryii</u>)		1	13	12	16
Weasel (<u>Mustela</u> spp.)		3			1
Wolf (<u>Canis lupus</u>)		4	1	3	2
Wolverine (<u>Gulo luscus</u>)	18	10	10	3	5

*The records for 1956 were missing from the files.

Bird Eggs

Kivalina men travel to Cape Thompson by boat in the early part of July to gather "crowbill" or murre eggs. Eggs of both the common murre (Uria aalge) and the thick-billed murre (Uria lomvia) are collected.

Three boats left Kivalina about July 5, 1959, and remained at Cape Thompson for a week. The birds were reported to be late, however. Usually eggs can be collected immediately if boats go up about this date, but in 1959 the birds were not laying eggs abundantly until about the date the boats departed, which was July 11. Snow, which was reported to have occurred in this area at that time, may have been a contributing factor in this delay.

Three particular cliffs are reported to be utilized by Kivalina people. Two of these are located on either side of Emmikroak Creek. The cliffs to the north of the creek are called "Imnapat," meaning "higher than the hills to the south." The cliffs to the south of the creek are called "Taktalurat," meaning "all black rocks." These cliffs are reported to be quite low and eggs can be collected by means of ladders. To the south, just beyond the next small creek, are the "Iragaroat" cliffs. The Eskimo name indicates that the cliffs "look like hands."

In collecting eggs, a man is lowered over the side of the cliff on a rope. The man on the rope slips the eggs he collects into the neck opening of the calico parka cover he is wearing. This cover is tied off at the waist by a belt. When sufficient eggs have been collected, he signals a man on the beach who then sends up a container attached to the other end of the rope. The eggs are transferred to the container and lowered to the beach. The eggs are usually put into empty Blazo boxes for transport back to the village.

About 11 Blazo boxes (approximately 10 gallons each) of eggs were collected in 1959 by the crews of three boats. Two of the boats had six-man crews, while the third had a four-man crew. The first two boats collected 5.5 and 4 boxes of eggs, respectively, while the third collected 1.5 boxes.

No egg-gathering parties from Kivalina visited the Cape Thompson cliffs in 1960.

The eggs are eaten fresh and there is seldom any attempt made to preserve them. While the eggs do not constitute a major factor in their diet, the people have a great liking for them and the men undergo considerable risk in obtaining them.

Approximately 60 murrelets were reported killed by the crews during the egg collecting. These are eaten and are reported to be preferred half raw.

Gull eggs, probably those of the glaucous gull (Larus hyperboreus), are collected along the Wulik River about 2 miles from the village. These eggs are collected around June 1. About 150 eggs were reported collected during 1959.

Some duck eggs are also collected around the village in the spring.

Snowy Owl

Trapping for snowy owls (Nyctea scandiaca) begins in mid-October and continues for about a month. The owls tend to follow the coastline on their southward migration, and traps are set on stumps and piles of driftwood which extend along the coast and lagoon from the landing field to the Kivalik channel. A total of 50 traps were set in the fall of 1959 by four individuals, and 98 birds were captured. Traps are checked at irregular intervals, although if a northwest wind has been blowing the traps are checked more frequently as the wind tends to bring the owls along the coast.

Snowy owls are frequently boiled and made into a tasty soup.

Berries

Berry picking begins when the berries ripen about the second week of August. Although blackberries and cranberries are available on the tundra to the northwest of the village, most berries are picked at locations up and down the coast and up the rivers. Groups of women proceed to these sites in umiaks, leaving the village in the morning and usually returning in the evening. The species listed below are utilized.

Blackberries (Empetrum nigrum). "Pohnrock."

There appear to be three areas other than near the village in which the picking of blackberries is concentrated. One area, Pingo, is located on the coast at the northwestern end of the lagoon. The other sites, Singnikroak and Ahtahnak, are on the coast approximately 10 and 15 miles, respectively, southeast of the village. The areas north and south of the village are reported to alternate in productivity from year to year. Most berry picking occurred at Pingo in 1959, with one group of women camping in the area overnight. About 200 gallons of blackberries were picked in the fall of 1959.

Blackberries are used as dessert and eaten with seal oil. They are stored in wooden barrels or seal pokes with a small amount of seal oil. The berries are sometimes mixed with blueberries or with wild spinach, Rumex arcticus.

Blueberries (Vaccinium uliginosum). "Ahsayvik."

Most blueberries are picked at locations on rivers northeast of the village. While some berries are picked on the Kayaktoruk River, a small stream between the Wulik and Kivalina rivers, this is often very shallow and difficult to navigate. Most activity is therefore concentrated on the Wulik River. In 1959 Wahngahnik, about five miles up the Wulik River, was the area most utilized. Blueberries were not very plentiful in 1959 and few attempts were made to acquire them; only about 15 gallons were harvested.

Berries are stored in wooden barrels or seal pokes. They are sometimes mixed with blackberries. Some are made into pies, though they are often eaten with seal oil and sugar.

Salmon berries (Rubus chamaemorus). "Ahpik."

These berries are most often found in association with "niggerheads" in slightly swampy areas. Most are picked along the lower reaches of the Wulik and Kyacktoruk rivers, although they also occur in other suitable habitats along the coast. No salmonberries were picked in 1959, although in 1958 considerable quantities were obtained. The poor season was attributed by some to the unseasonable snow which occurred in July 1959. It is reported that the berries often alternate between good and bad years.

These berries are also stored in barrels and pokes and are eaten with seal oil and sometimes sugar.

Cranberries (Vaccinium vitis-idaea). "Kimingnak."

Cranberries occur along the coast on the tundra in association with blackberries. They do not become ripe until about the second week of September. Only about 10 gallons were picked in 1959 and these were acquired in the vicinity of the village.

Cranberries are usually made into jam by cooking them, adding sugar, sometimes a small amount of flour and occasionally a teaspoon of vanilla. The jam is stored in jars.

Roots

Only one root appears to be collected extensively. This is the Eskimo potato, Hedysarum alpinum, which is called "masue." The root of this plant is collected and stored by mice in the fall, and much of the masue is gathered by Eskimos by discovering the storage places of the mice. Hummocks in the tundra which exhibit evidence of digging and many holes are likely places to look for masue. Eskimos test the hummocks with the heel of their foot until a soft portion is found. The soft area is dug into and turned over with the aid of a masue pick which is frequently a long, thin piece of iron attached to a wooden handle about 2 feet long. If masue is discovered, the best roots are taken and something is left for the mouse in return. This may be a willow leaf or a part of a cracker. Twigs are then placed across the hole to support the sod which is replaced. Roots are also collected by digging up the plants themselves.

Some masue is collected by women when at fish camp up the Wulik River in the fall. It is also collected on the lower reaches of the Wulik River.

Masue roots may be boiled and eaten with seal oil or eaten raw. Approximately three large burlap sacks were collected during the fall of 1959. The roots are generally eaten immediately.

Edible Plants, or Greens

Edible plants, or greens, are collected in the spring, generally in late June or early July. Most greens are used immediately with only wild spinach, Rumex arcticus, being stored in quantity. The following species are known to be utilized, and there are probably more.

Wild Spinach (Rumex arcticus). "Koach."

This plant appears to be the only green collected in quantity, and is also the only green stored in quantity. About 130 gallons were harvested during the fall of 1959. Wild spinach occurs in slightly swampy regions all along the coast. Some is picked across the lagoon from the village site and in areas immediately to the north and south of the lagoon.

The leaves are cooked, then mixed well. They may be stored alone in barrels and pokes, but are more frequently mixed with blackberries. This mixture is used as dessert and eaten with seal oil and sugar.

Willow Leaves (Salix pulchra?). "Surah."

Edible willow leaves occur in many places along the coast. The most convenient place to pick them appears to be at the southeastern end of the lagoon. About 2 gallons were picked in the fall of 1959.

They may be eaten immediately, often with meat, or may be stored with seal oil for later use.

Wild Celery (Angelica lucida). "Eegoosik."

Wild celery occurs immediately northwest of the village where most is picked. The stem is peeled and eaten raw or may be stored in seal oil. The leaves are sometimes picked and eaten soaked in seal oil.

The small amount picked during the spring 1960 (about 15 bunches) was used immediately.

Wild Chives (Allium schoenoprasum). "Aneak."

This plant is collected in small quantities immediately northwest of the village. It is eaten raw or may be cooked with meat.

Summary of Animal Food Resources

The number of pounds of meat and fish obtained throughout the year of 1959-60 is indicated in Table 8. In terms of weight, the fish and caribou provided the largest source of food in 1959-60, almost twice that of the ugruk and seal. In addition, the amount of meat provided by seal and ugruk must be figured to be only about half of the total poundage shown. The remainder is blubber which is used as fuel or, if feed is short, as dog food.

Table 9 is an attempt to provide some indication of the manner in which these resources were used in 1959-60 and when they were in short supply. By examining the table, one may also gain some understanding of the manner in which these resources complemented each other.

Fish and caribou provided for human needs, while fish and seal provided dog food. Both human needs and those of the dogs were fulfilled by ugruk in the early spring. In June the bulk of the ugruk kill was dried to provide panniktuk for the winter months.

For the purposes of Table 9, the rate at which fish was consumed was estimated at 5,000 pounds a month. This was figured at a rate of 2 pounds a day for adults and 1 pound for the remainder of the population. Considering the ratio between adolescents and younger children in the latter group, this was thought to be a fair approximation. At this rate of consumption, the fish should have been gone by March.

The rate of consumption for caribou was figured at 6,000 pounds a month, or roughly two caribou per family a month. In terms of caribou, those obtained in October were consumed immediately. November provided a surplus. This surplus, plus the caribou obtained in December, was sufficient and provided some to carry over into January. Thus, caribou meat was always available.

Panniktuk is a much more difficult item to estimate in terms of weight, since there is considerable loss of weight in drying. Yet, if almost half of the weight is estimated to be lost through drying, some figure can be arrived at. If figured on a total basis and on the rate of consumption of 1,650 pounds a month for the village, the panniktuk would have lasted until January. The usual imbalance

TABLE 8. Resources obtained, July 1959-June 1960

Month	Pounds of Ugruk*	Pounds of Seal**	Pounds of Fish	Pounds of Caribou†
July	-	-	-	125
August	-	-	-	-
September	-	-	69,600	-
October	-	-	28,000	3,750
November	-	5,200	1,800	12,500
December	-	700	-	3,625
January	500	7,700	-	5,125
February	1,000	13,500	-	6,725
March	500	4,800	-	14,625
April	9,500	6,500	-	4,125
May	6,000	4,100	-	375
June	<u>41,000</u>	<u>5,300</u>	<u>10,000</u>	<u>-</u>
Annual Total	58,500	47,800	109,400	50,975

*Average estimated weight per individual, 500 pounds.

**Average estimated weight per individual, 100 pounds.

†Average estimated weight per individual, 125 pounds.

TABLE 9. Resource utilization, July 1959-June 1960

Month	Human					Dogs	
	Pounds of Fish on Hand	Pounds of Caribou on Hand	Caribou Surplus	Pounds of Ugruk on Hand	Pounds of Panniktuk on Hand	Pounds of Fish on Hand	Pounds of Seal on Hand
July	-	-	-	-	-	-	-
August	-	-	-	-	8,550	-	-
September	30,000	-	-	-	6,900	62,000	-
October	25,000	3,750	-	-	5,250	51,680	-
November	20,000	12,500	6,500	-	3,600	41,360	2,600
December	15,000	3,625	4,125	-	1,950	31,040	350
January	10,000	5,125	3,250	200	300	20,720	3,850
February	5,000	6,625	3,875	500	-	10,400	6,750
March	-	14,625	12,500	250	-	80	2,400
April	-	4,625	11,125	4,750	-	-	3,250
May	-	375	5,500	3,000	-	-	2,050
June	-	-	-	20,500	-	-	2,650

occurs, however, and some families are out of panniktuk by early winter, while other families have supplies on hand until spring.

In viewing the dog food situation, the rate of consumption of fish indicated in Table 9 was estimated at 2 pounds per dog per day. The fish on hand in September would have been consumed at a rate of 10,320 pounds a month by the 172 dogs then in the village and would have lasted until February. The number of pounds of seal on hand each month was figured in terms of meat, the blubber being excluded. Since seals are generally used immediately as dog food, unless there is quite a bit on hand, one can see that by the end of February 1960, 13,500 pounds of seal meat would have been utilized. If the blubber were used as dog food, this figure would be almost doubled. If 13,500 pounds of seal meat were used as dog food, fish need not have been used, thus extending its availability into March. With a decrease in the number of seal obtained after February and with the fish having been completely utilized, late March and early April represented a period when dog food was in short supply. This situation was in part alleviated by the appearance of ugruk in greater numbers during the latter part of April. While the need for human food at this time also became accentuated by the diminishing fish supply, sufficient amounts of caribou, ugruk, and seal were on hand to provide for basic needs. By May, the supply of caribou meat had diminished and ugruk were not so available because of poor ice conditions, but ducks and geese became available. With the disappearance of the snow and the ice breaking up, the dogs are not used as much, therefore decreasing the amount of dog food needed.

It should be noted that Table 9 was constructed on the basis of resources on hand and probable rates of consumption. The actual situation would vary from family to family.

The resources which were obtained during the year 1960-61 are indicated in Table 10. The figures indicate considerable differences in various food resources obtained when compared to 1959-60. Many more caribou were obtained in 1961, and there was an increase in the fish catch. Although the data do not include the seal and ugruk kill after May 8, 1961, a comparison of the figures for the two years reveals that the ugruk kill of 18,500 pounds to May 8, 1961,

compares favorably with the former year's kill of 17,500 pounds through the entire month of May of 1960. The very poor seal hunting year experienced in 1961 is shown by the sharp decrease in pounds of seals obtained. When compared with the previous year's kill, only 15,200 pounds had been obtained by early May as opposed to 42,500 pounds in 1960.

Although the utilization of resources is necessarily determined by the relative amounts of the resources on hand, Table 11, indicating resource utilization during 1961, has been drawn up using the same rates of utilization as the previous year, in order to facilitate comparison. Thus, it will be noted that if human consumption of fish had remained the same, there would have been a surplus of dog food on hand until the month of June. Undoubtedly, people would continue to eat fish as long as they had them on hand, but this surplus along with the surplus of caribou on hand provided a source of dog food in spite of the fact that the seal hunting was very poor. Thus, in 1961, diminished resources in one area were offset by increased resources in another area. Unfortunately, fluctuations in various resources can not always be expected to occur in such a complementary manner, and the year 1961 serves to underline the nature of the dependence of the inhabitants of the Kivalina area upon the natural environment.

TABLE 10. Resources obtained July 1960-May 1961¹

Month	Pounds of Ugruk*	Pounds of Seal**	Pounds of Fish	Pounds of Caribou†
July	-	-	-	-
August	-	-	-	-
September	-	-	95,900	16,250
October	-	-	18,600	12,250
November	-	-	-	5,500
December	500	500	-	4,625
January	-	2,700	-	10,625
February	500	3,000	-	10,000
March	7,500	3,100	-	8,625
April	4,500	3,700	-	9,500
May	6,000	2,200	-	-
June	-	-	9,800 est.	-
Annual total	18,500	15,200	124,300	77,375

¹Data as of May 8th. No data on later May and June ugruk and seal kill.

*Average estimated weight per individual, 500 pounds.

**Average estimated weight per individual, 100 pounds.

†Average estimated weight per individual, 125 pounds.

TABLE 11. Resource utilization, July 1960-June 1961

Month	Human					Dogs	
	Pounds of Fish on Hand	Pounds of Caribou on Hand	Caribou Surplus	Pounds of Ugruk on Hand	Pounds of Panniktuk on Hand	Pounds of Fish on Hand	Pounds of Seal on Hand
July	-	-	-	-	10,250	-	-
August	-	-	-	-	8,600	-	-
September	30,000	16,250	10,250	-	6,950	95,500	-
October	25,000	22,375	16,375	-	5,300	85,180	-
November	20,000	21,875	15,875	-	3,650	74,860	-
December	15,000	20,500	14,500	-	2,000	64,540	250
January	10,000	25,125	19,125	-	350	54,220	1,600
February	5,000	29,125	23,125	250	-	43,900	3,100
March	-	31,750	25,750	3,500	-	33,580	4,650
April	-	35,250	29,250	2,250	-	23,260	6,500
May	-	-	23,250	3,000	-	12,940	7,600
June	-	-	17,250	-	-	2,620	-

MONEY ECONOMY

Money is a necessary adjunct to the present day mode of Eskimo life. Almost all of the inhabitants of Kivalina have cash income from summer or local employment, welfare, unemployment compensation, or sale of natural products.

Summer employment within the village has been exceptionally good recently. Employment was provided for most of the male inhabitants of the village during the summer of 1960 by the completion of work on the landing field. The previous summer initial work on the landing field, construction of the National Guard Armory, and the construction of the Jewelry Workshop provided summer employment within the village.

Money earned within the village from work on these projects came to just over \$4,000 in the summer of 1959. The summer of 1960 found the villagers earning just under \$14,000 within the village. These earnings cannot be expected to be duplicated in the future unless some new construction takes place within the village. Such construction in the near future appears unlikely. Future summer earnings will come principally from work obtained outside of the village as has been the case in the past. During the summer of 1959 three men were employed by a mining concern near Fairbanks and three men found employment in Kotzebue. In the summer of 1960 one man worked for the Fairbanks concern and 22 men were in Kotzebue for some period of time during the summer; of these latter men, only four sought long term employment, three working in construction and one working for the tug and barge company as a sailor. The majority of the other men found occasional longshoring jobs, but these were of short duration. One man found employment as a reindeer herder during the summer and one was employed as a digger for archaeologists. Occasional fire-fighting provides some employment.

Local, year-round employment positions are held by the school janitor and Bureau of Indian Affairs household help, store manager, postmaster, jewelry shop manager, mission lay reader and deacon, sanitation aid, and welfare agent. Cash may also be earned by making jewelry at the Kivalina Jewelry Workshop.

Welfare payments include state Aid to Dependent Children and Old Age Assistance. The Bureau of Indian Affairs gives help to those who are in need and do not qualify for state aid.

Unemployment compensation is available to those men who have worked during two of the yearly quarters.

The sale of natural products to the store consists mainly of fish, although other items such as wood in the summer, ivory from dead walrus found on the beach, and seal rope are sold. For the most part, items sold to the store are those which are marketable within the village. During the spring of 1960, however, the store bought seal skins for re-sale to outside agents at a price which varied from \$2.50 to \$4.00 per skin.

Other sources of income include payment for National Guard service, mail order refunds, etc.

The two major outlets for expenditure of money are the ANICA (Alaska Native Industries Cooperative Association) store and the mail order houses. The expenditure of money through the mail order houses becomes most pronounced during the Christmas month, as is indicated in Table 12 showing the breakdown of mail order expenditures during the 1959 calander year.

TABLE 12. Quarterly mail order expenditures in 1959

Jan. 1, 1959	to April 3, 1959	\$ 2,813
April 4, 1959	to June 26, 1959	985
June 27, 1959	to October 16, 1959	2,807
October 17, 1959	to January 8, 1960	<u>4,258</u>
	Total	\$11,027

An indication of the types of commodities purchased at the store can be obtained from Table 13 which shows a partial breakdown of the store order from Seattle which was received in September, 1959. The breakdown has been figured f.o.b. Seattle which was \$12,497. With

TABLE 13. Annual ANICA store order, Kivalina, 1959

Item	Per Cent of Purchases	Cost
Food		
milk	10%	\$4,243
coffee	10%	
sugar	8%	
flour	6%	
cracker	4%	997
fruit	4%	
tea	1%	508
butter	1%	
jam	1%	
Cigarettes	9%	1,121
Ammunition	8%	850
Heat and Shelter		
Coleman stoves, lamps	3%	742
tents	1%	
coal	1%	
Dry Goods		
cloth	3%	581
gloves	2%	
Lumber	2%	305
Radio and flashlight		
batteries	1%	181
Dog Harnesses	1%	149
Items under \$100		2,820
TOTAL		\$12,497

freight charges and insurance, the cost in Kivalina was \$16,638. These figures do not take into account inventory on hand but they do indicate the major items for which money is expended. The remaining items not included in the breakdown were those which came to less than \$100 dollars, or less than 1 per cent of the total order. It is apparent from Table 13 that the bulk of the purchases at the store consist of four items: milk, sugar, coffee, and flour. For the remainder of their diet, the Kivalina people are dependent upon natural resources.

Table 14 summarizes the sources and expenditures of cash in Kivalina during 1959. Estimates have been based on store reports, interviews, and records of employers. Summer earnings during the summer of 1960 were unusually good, but in spite of this, many of the villagers were without ready cash by early fall. The money earned within the village allowed many people to travel to Kotzebue; and, although some work was obtained there, the expense of living in Kotzebue plus the opportunities for spending money resulted in most of the money being utilized by fall. Major expenditures were for such items as outboard motors, washing machines, oil stoves, fuel oil, gasoline, and food staples.

Such an expenditure of money might be thought by some to be ill advised. When so relatively little money is acquired during the year, why not save some of it for the winter months? This is not the place to discuss Eskimo philosophy, but if one reflects upon the degree to which they are dependent upon the natural resources, the availability of which is unpredictable, one can see that it is necessary for them to have a flexible outlook on life which would allow for the fact that perhaps the fishing won't be good, or perhaps the caribou won't show up. Perhaps they will have more than they need or perhaps they will have very little. It is almost impossible to plan carefully or to provide entirely for the future. Thus, if one has gotten by on a minimum of cash in the past, one will be able to do so in the future; so while the money is available in one big chunk, the tendency is to purchase some of the major, durable items.

Some individuals attempt to save money by putting it into savings accounts or government bonds, but most do not. Therefore, the most

TABLE 14. Income and expenditure of money, Kivalina, 1959

<u>Sources of Income</u>	<u>Amount</u>
Summer Employment	
Outside village	\$13,868
Within Village	4,390
Annual Local Employment	9,290
Welfare	
State	5,699
Bureau of Indian Affairs	674
Unemployment	4,957
Natural Products	2,203
Other	850
	<u>\$41,931</u>
 <u>Expenditure of Income</u>	
Store	\$29,211
Mail Order	11,028
	<u>\$40,239</u>

effective income for Kivalina residents is that which comes in on a regular basis such as that obtained from regular employment within the village, unemployment insurance, and welfare payments. Obtaining work during the summer not only provides money for major expenditures but also in many instances insures unemployment insurance income during the winter months.

ECOLOGICAL RELATIONSHIPS

Natural Resources--Money Relationships

The basis of the human ecological balance in Kivalina rests primarily upon fish, seal, caribou, and money. Tables 15 and 16, which indicate the monetary income and the take of caribou, seal, and fish by families, have been constructed to facilitate an examination of these factors as they relate to the hunter and to one another. The tables should not be construed as representing the exact amounts of these resources available to each family. The tables are intended to show the relative degree of available resources and hunting intensity among various family units, and in this respect they are felt to be an accurate portrayal. Income has been estimated on the basis of summer wages and income which has been available during the intervening winter months from welfare, unemployment compensation, and local work. The amounts of fish indicated are those originally at hand but do not take into account possible later redistribution or sale. The number of seal and caribou taken represent conservative estimates of the village kill.

It is apparent from Table 15 that a wide range existed within the village in 1959-60 as to the number of seal, caribou, or fish acquired by various families. A high percentage of the caribou hunting kill was concentrated in six families (Nos. 1-6). The seal kill was concentrated in seven families (Nos. 1-3; 7-10). In four families (Nos. 7-10) the main emphasis was on seal hunting while in three other families (Nos. 4-6) the emphasis was on caribou hunting. When a preference in hunting was indicated by the remaining families it was generally for caribou hunting. Thus, it appears that caribou hunting is important to the entire village, for it should be noted that even the families who concentrated on seal hunting obtained about as many as the majority of the village.

TABLE 15. Income and take of game by Kivalina families September 1959-
April 1960

Groups	Family	Number Adults	Number Children	Money	Number Hunters	No. Dogs	Tubs of Fish	No. Seal	No. Caribou
I	1	5	2	\$2500	2	13	53	37	36
	2	5	5	2500	2	18	92	31	34
	3	3	2	400	1½	8	18	35	25
II	4	4	2	400	1	8	47	9	38
	5	2	2	300	1	8	47	3	34
	6	2	6	2000	1	10	--	2	26
III	7	2	3	700	1	10	69	85	12
	8	3	4	300	1	8	12	44	16
	9	3	4	800	1	10	40	34	17
	10	2	5	800	1	8	30	27	9
IV	11	3	2	800	1½	10	60	10	15
	12	2	6	300	1	8	48	17	17
	13	4	0	400	1	8	47	11	14
	14	2	4	300	1	8	34	11	9
V	15	4	0	3000	1½	9	24	3	16
	16	2	2	3000	1	13	70	3	18
	17	2	1	1500	1	--	--	4	20
VI	18	4	2	1100	1	9	26	4	17
	19	3	5	1300	1	9	17	3	10
	20	2	0	1000	1	6	22	2	10
VII	21	2	6	1500	1	8	18	10	7
	22	2	1	800	1	--	--	--	--
VIII	23	2	0	400	½	8	23	--	7
	24	1	1	600	--	--	--	--	--
	25	2	2	600	--	--	--	--	--

TABLE 16. Income and take of game by Kivalina families September 1960* - May 1961

Groups	Family**	Number Adults	Number Children	Money	Number Hunters	No. Dogs	Tubs of Fish	No. Seal	No. Caribou
I	9	3	4	\$2000	1	10	81	13	37
	6	2	6	1000	1	10	57	14	28
	1	5	2	2500	2	13	90	22	52
	3	3	2	400	2	8	54	10	40
	26 [†]	2	1	1500	1	9	37	9	26
	8	3	5	300	1	8	37	10	25
II	5	2	2	300	1	8	31	2	28
	13	4	0	400	1	8	56	1	27
	12	2	7	300	1	8	37	0	25
	4	4	2	400	1	8	37	1	21
IV	2	5	6	1000	2	18	122	15	16
	7	2	3	700	1	10	75	13	10
	20	2	0	1000	1	8	32	9	9
	11	3	2	800	1½	10	98	8	9
	14	2	4	300	1	8	26	3	7
V	15	4	0	2000	1½	8	52	1	2
	16	2	2	1500	1½	13	58	2	9
	17	2	2	2000	1	--	32	0	7
VI	18	4	2	1100	1	8	26	0	4
VII	21	2	6	1500	1	8	26	0	13
	22	2	3	600	1	--	33	0	8
VIII	23	2	0	1000	1	8	33	0	14
	24	1	1	600	--	--	--	--	--
	25	2	2	600	--	--	--	--	--

*In order to make the 1960-61 hunting data more comparable to 1959-60, the caribou data from September 1960 have been excluded from this table because of the unusually high number of caribou killed and because of the type of hunting practiced. Much of the hunting in September utilized boats in order to range up the river and along the coast, a practice at great variance from previous years; also, the large totals tend to distort the pattern of hunting practices of individuals on a year-long basis. The caribou figures used in the table represent the normal hunting in winter by use of dogs.

**Families Nos. 10 and 19 left Kivalina.

[†]Family No. 26 represents a young married couple. The hunter provided for Family No. 6 in 1959-60 while his brother was out of the village. Thus, the hunter in Family No. 6 in 1960-61 was not represented in the village in 1959-60.

This hunting pattern is understandable since caribou form a food staple for human consumption during the winter months. It is also a function of the fact that most caribou hunting is done in groups and the kill evenly divided.

In most families a caribou will last about 2 weeks; thus at least two a month would be needed. Over a 7-month period, or from October to April, at least 14 to 16 caribou would be needed. Such an estimate would of course vary with the size of the family and the available food on hand. With regard to those families (Nos. 1-6) in which a much larger number of caribou was obtained, the increased hunting may in part be explained by the need to provide meat for other dependent family units.

Fish and seal are used primarily as dog food. Dog food is of prime importance in the winter months, for without a dog team it would be impossible for men to hunt caribou, secure fuel, or carry out any of the many functions which require transportation. Thus, if humans are to survive in the winter, the dogs must survive.

The primary source of dog food in the fall and early winter is fish. If the consumption of fish per dog is figured on the basis of 3 pounds a day, an average team of eight dogs would consume 24 pounds of fish a day. In a month this would equal 720 pounds of fish. If 85,000 pounds of fish was distributed equally to 25 households, each would receive almost 3,500 pounds of fish and this amount would last about 5 months or from September to January, if used for dog food. The fish catch was not equally distributed in 1959 as is indicated in Table 15.

Intensive seal hunting usually begins in the latter part of January or the first part of February, Thus, in most years, seals become plentiful about the time that the fish supply is running low. The availability of seals at this time provides a source of dog food when it is then badly needed. The average dog team consumes about one seal a day.

There does not appear to be an average number of seal required per family. Since seal and fish are used primarily as dog food, one would expect that with an insufficient supply of fish on hand there would be an increase in seal hunting. If Table 15 for 1959-60, is examined with this in mind, the families can be placed in roughly four categories:

1) Those families which did not have sufficient fish on hand and did hunt seal.

2) Those families which did have sufficient fish on hand and did not hunt seal.

3) Those families which did have sufficient fish on hand and did hunt seal.

4) Those families which did not have sufficient fish on hand and did not hunt seal.

Although it would be impossible to arbitrarily set what an adequate supply of fish would consist of, for the purposes of this discussion it was set at 40 tubs, or 4,000 pounds. With this criterion, in 1959-60 three families (Nos. 3, 8, and 10) fell within the first category of not having enough fish and also doing considerable seal hunting. In the second category, which had sufficient fish and did not participate in a great deal of seal hunting, we find six families: Nos. 4, 5, 11, 12, 13, and 16.

We are then faced with cases contrary to our expectations, such as category three when families which did have considerable fish also engaged in a lot of seal hunting, as was the case with Families No. 1, 2, 7, and 9. The first two families seemed to be special cases within themselves. These families had sufficient fish and also hunted considerable seal and caribou. This may in part have been a result of having two active hunters in each family and of having a large number of dogs and quite large families. This explanation is not really adequate, however, for to an observer in the village there was also a factor of

initiative and interest. These families appeared to possess a desire to hunt which went beyond the level of just meeting needs. Family No. 2 in particular served as a dispensing center to other families who did not have sufficient native food on hand. This surplus was given to the needy or sold to those who had money. Family No. 7 also served in this capacity, although the hunter in this family was actually maintaining the needs of three household units (his own, No. 6, and No. 24). His younger brother (No. 6) concentrated on caribou hunting while he did the seal hunting. They then interchanged the products. Again, in this case there was a pride and initiative displayed which was also shared by another brother, No. 9.

Another contradictory instance is category four where families who did not have sufficient fish still did not hunt seal, as is the case with Families No. 6, 14, 15, 18, 19, 20, and 21. The hunter in Family No. 6 has already been discussed above. The hunter in Family 14 had almost enough fish to qualify under our criterion as having sufficient fish; and the hunter in Family 21 was employed in the village and was unable to hunt regularly. The hunters in Family 15 showed an attitude quite different from that of Families No. 1, 2, and 7, in that they apparently lacked the impetus and interest to do much hunting. They represented a more acculturated element and for the most part were skilled laborers; their having considerable money may have been a factor in their lack of interest in hunting.

Hunters in Families No. 18, 19, and 20, exhibited the same disinclination to do seal hunting. These families had an income slightly above that of the majority of the village, but it was obtained through a combination of welfare payments and some work by the men in the summer.

Families No. 23, 24, and 25 were older persons living alone with no hunters in the families, except that the son in Family 23 was in the village intermittently. Families No. 24 and 25 were

supported in part by welfare payments and in part by help from relatives in other family units.

On the basis of the foregoing, there appears to be a factor of interest or prestige which influences hunting intensity and provides sufficient surplus in some families to serve as a supply source for families who do not possess sufficient native foods. It should be noted, however, that hunting skills have not been evaluated in the above analysis. In order to provide a more accurate picture, hunting success in relation to time expended should be included. Another factor which should be taken into account is the amount of food which was stock-piled during the spring and summer months, especially with regard to human food sources. Food acquired in the spring and summer months appears to provide the foundation of the winter food supply.

If we were to assess the influence of money on hunting intensity, we might assume that with more money there would be less hunting, and visa versa. Families No. 15 to 21 seemed to show less hunting with more money, but Families No. 1 and No. 2 did not. Here again factors of interest and initiative play a part. There does not appear to be a minimum money level which induces more hunting activity. One reason may be that it is necessary to have money to buy ammunition in order to hunt extensively.

It is possible to artificially and arbitrarily divide the families into certain groupings which seem to have a fair degree of consistency among them (See Tables 15 and 16).

Group I represents families which did a lot of hunting, some of it because of necessity and some of it due to personal initiative and interest.

Group II concentrated on caribou hunting, Group III on seal hunting. Again there are factors of need; interdependence of family units; and, particularly with regard to seal hunting, skill.

Group IV represents families who maintained an intermediate level of hunting, balanced between caribou and seal hunting. This group did more seal hunting than Group II. A subjective estimate as to why they

did not obtain more seal is that they were not so skilled as the hunters in Group III, nor did they possess the initiative of Group I.

Group V represents families which had more money than the average family. They also showed a greater degree of acculturation--living in frame houses, and in two instances using oil heat.

Group VI possessed money to buy native foods, received some support from other family units, and appeared to exhibit a loss of hunting initiative.

Group VII is composed of men who held jobs in the village and did not have an opportunity to hunt regularly. However, the hunter in Family 21 did have a dog team and did some hunting.

Group VIII represents families of older people in which there was no hunter available. They depended upon relatives for native foods.

At first glance the hunting patterns of 1960-61 appear markedly divergent from 1959-60 (compare Tables 15 and 16). The only major change which took place, however, was that Group III had in effect disappeared because of very poor seal hunting. No one in the village caught many seal, and, as this was the characteristic which distinguished Group III, it has blended into other groups. It should be noted that Families No. 10 and 19 had left the village and that Families No. 8 and 9 from Group III shifted up into Group I. The men's abilities as seal hunters put them in this category and distinguishes them from Group II. It is likely that their increased caribou hunting was a result of poor seal hunting conditions. On the other hand, the hunter from Family No. 7, who in 1959-60 had caught twice as many seal as anyone else in the village, did not elect to hunt caribou even though seal were not available.

Two of the three families which formed Group I in 1959-60 still retained that position in 1960-61. Family No. 2 shifted into Group IV. This family contained two hunters, one of which usually concentrated on seal hunting and the other on caribou hunting. In 1960-61 their caribou hunting was not at all extensive, perhaps because the caribou hunter in the family had assumed other duties in the village.

Group II remained basically the same as in 1959-60, except that one member, No. 6, moved into Group I, and two members of Group IV (Nos. 12 and 13) moved into Group II, probably because of the availability of caribou.

Group IV had one addition from Group VI (No. 20) because of an additional amount of seal hunting. The other groups remained the same, except for some families leaving or entering the village.

With regard to the amount of fish available and the amount of seal hunting done, only two families (Nos. 6 and 20) changed positions; they did a little more seal hunting. Of the remaining families, no others increased their seal hunting, whether or not they had sufficient fish; and those families which had hunted seal whether or not they had fish continued to hunt seal. Therefore, it seems probable that lack of sufficient dog food is not an incentive to hunt seal, but rather that those who hunt seal do so because they possess the skill to meet the challenges it represents.

The foregoing discussion has been an attempt to evaluate some of the ecological relationships which exist in Kivalina. Although some families participate in more hunting than others, it is evident that for the village as a whole, hunting and fishing resources provide the basis of subsistence.

Leadership and Prestige

A problem of interest to many agencies dealing with Eskimo villages is that of establishing where the leadership within the village lies. One formula which has been advanced for establishing this is to select those individuals who hold several positions within the structural framework of the village, such as postmaster, janitor, or sanitation aid.

In an attempt to determine how well such a formula works for picking out the leaders in Kivalina, Table 17 was constructed to show the organizations and agencies which make up the structural framework of positions in Kivalina. The persons who function in each of these organizations and agencies are identified by number. It is therefore possible to see which individuals serve in more than one capacity.

In order to differentiate to some degree between those organizations in which the positions are filled by a decision within the village, those which are filled with the advice or selection of the village council, and those which are presumed to be filled primarily on the basis of decisions made by agencies outside of the sphere of village

TABLE 17. Persons selected for positions in formal social structure, Kivalina, 1960-61

Village Selection	Joint Selection	Agency Selection
<u>Village Council Members</u>	<u>ANICA Store</u>	<u>Welfare Agent</u>
Subject	Subject	Subject
1 President	15 Manager	14
2 Vice President	16 Director	
3 Sec.-Treasurer		<u>Postmistress</u>
4. Marshall		Subject
5	<u>Sanitation Aid</u>	14
6		
7	Subject	<u>Janitor BIA</u>
	16	Subject
		18
<u>Women's Club Officers</u>	<u>Jewelry Shop</u>	<u>Election Board</u>
Subject	Subject	Subject
8 President	17 Manager	16 Chairman
9 Vice President		7
10 Secretary		19
11 Treasurer		
12 Movie Chairman		
		<u>National Guard</u>
<u>Health Council Members</u>		Subject
Subject		15 NCO
8		
9		<u>License Agent</u>
11		Subject
13		2
14 Chairman		
		<u>Extension Service</u>
		Subject
		2
		13
		<u>Churches</u>
		Subject
		20 Deacon Epis.
		11 Translator
		7 Organist
		21 Lay Reader F.
		22 Elder
		14 Organist

influence, the organizations and agencies listed in Table 17 have been placed under three separate headings. Those placed under a heading of "Joint Selection" are those in which an outside agency has some say as to whether or not they wish to abide by a village council decision. Those which are termed "Agency Selections" are not under council influence but are frequently filled with advice and influence from within the village.

Churches present a slightly different situation. Although the leaders are selected by outside agencies, those lower in the hierarchy gain their positions from within the church membership, just as the members of the Health Council and the officers of the Women's Club are selected by the female portion of the population. The village council is the only organization in which persons are selected by the entire village.

Table 18 provides a clearer breakdown of the number of positions which various individuals occupy within the formal social structure. In this table the lower church hierarchy has been placed under the "Village Selection" column.

It will be noted that with the exception of the church deacon, church elder and the lay reader, all but two individuals selected by outside agencies also hold positions for which they were selected by people within the village. The National Guard NCO should probably not be included in these considerations, since his selection is more closely regulated by requirements within the agency. This is also true of the church leaders. With regard to the churches, there is an implicit desire not to involve church leaders in internal village politics in order that their church leadership not be impaired by the conflicts which inevitably ensue.

It is apparent that some individuals hold a number of positions. This is especially true of the women, Subjects 8-14. Five of the seven women listed hold more than one position. Of these five women, three hold positions in both the Women's Club and the Health Council, indicating that the leadership among the women is fairly well concentrated. Of the other two women, one works with girl's 4-H and is on the Health Council and is therefore again involved in the women's sphere; the other woman, however, is the chairman of the Health Council,

TABLE 18. Multiple positions held in formal social structure

Sub- ject No.	No. Posi- tions	Village Selection	Joint Selection	Agency Selection	Group No.
1	1	Council President	-	-	III
2	3	Council Vice Pres.	-	Extension Agent License Agent	I
3	1	Council Secretary	-	-	VI
4	1	Council Marshall	-	-	I
5	1	Member	-	-	III
6	1	Member	-	-	V
7	3	Member Church Organist	-	Election Board	I
8	2	Women's Club Pres. Health Council			
9	2	Women's Club V.P. Health Council			
10	1	Women's Club Sec.			
11	3	Women's Club Treas. Health Council Church Interpreter			
12	1	Women's Club Movie Chrm.			
13	2	Health Council		Extension Service	
14	4	Health Council Chrm. Church Organist		Welfare Agent Postmistress	
15	2		Store Manager	National Guard NCO	VII
16	3		Store Director Sanitation Aid	Election Board	I
17	1		Jewelry Shop Mgr.		II
18	1			Janitor	VII
19	1			Election Board	II
20	1			Church Deacon	IV
21	1			Church Lay Reader	IV
22	1			Church Elder	VIII

is influential in the church, and also holds the position of welfare agent and postmistress. The latter two positions are both of importance to the entire village. By holding a total of four positions, she fills more roles than any other individual in the village.

If we ignore the village council for the moment and look at the remaining eight subjects (Subjects 15-22) we find that of the eight men, only two hold more than one position (Subjects 15 and 16). Of the remaining six, two are church leaders (Subjects 20 and 21).

If we assume that membership on the village council is a priori indication of leadership and if we further assume that holding a number of positions is also an indication of leadership, we would expect to find that those persons holding a number of positions would also be on the village council. In viewing the results we find that two of the four men in the village who hold more than one position are indeed on the council.

Since only seven men serve on the council we could not expect to find all the men who might be chosen for the council to be serving at the same time. Thus having two men who hold a number of positions on the council seems to indicate that by finding individuals who hold a number of positions we also find persons in leadership positions. The next question which comes to mind is whether those individuals holding the most positions are the strongest leaders. Here we find ourselves trying to define leadership.

Leadership at best is a difficult characteristic to assess. Among Eskimos it becomes even more difficult because, with a few uncharacteristic exceptions, no one wants to be considered "the boss." In a community where cooperation is a necessity, persons who unduly exercise their authority or attempt to "boss" people around, are quickly resented. Thus when there is a decision to be made which affects the group and no one has been specifically assigned to make such a decision, the matter is likely to reach an impasse for some time before someone steps forward and makes a suggestion.

We find that the problem of leadership resolves itself into at least two aspects: that which manifests itself by implementing the work of outside agencies and that which is latent within the village and which may be reflected in internal village roles. It

is from this pool of latent leadership within the village that, it appears, a majority of the council members are drawn.

What then of the individuals who hold a number of positions? In determining their influence, attention should be paid to the types of positions they hold. If they hold a number of fairly responsible positions, such as Subjects 14 and 16, one can assume that they wield a certain amount of influence simply because of these positions. Further, one may assume that they are fairly responsible persons, who are willing to serve as mediators between the outside agencies and the village and to implement the programs of the agencies. It should be noted, however, that because of the positions they hold and the functions they serve, these persons are also subjected to a great deal of criticism within the village.

We may assume then, that by identifying individuals who hold a number of positions, particularly those dealing with outside agencies, we may be able to find persons who exert a certain amount of influence because they are willing and able to assume responsibilities which many others do not want or are unable to assume. However, it should be remembered that the organizations and agencies in which these positions are held are essentially non-Eskimo and represent a framework which has been imposed upon them from without. Therefore it is hazardous to use these positions as criteria of prestige or leadership, if one is attempting to define these factors in Eskimo terms.

Undoubtedly today positions in this framework of organizations and agencies have taken on some degree of importance, and certain influence and prestige can be derived from it. This fact has allowed some individuals to gain status which they were unable or unwilling to gain in Eskimo terms. There are, of course, individuals who maintain prestige both in Eskimo terms and by being able to deal with outside agencies. Of all the organizations in the framework, the village council probably comes closest to reflecting Eskimo prestige. However, even here there are distortions.

Undoubtedly many characteristics contribute to leadership; one of these is prestige. In this community in which hunting plays so large a part, one assumes that a good hunter still attains a certain degree of prestige. Assuming this is true, to what degree is this

prestige reflected in selecting members of the village council? In order to find some indication of the answer to this question reference was made to Tables 15 and 16. The families in these tables are placed in fairly distinct groups with regard to degree and type of hunting, i.e., seal or caribou and/or amount and source of money (See pages 82 and 83 for description of groups).

Table 18 indicates that three men from Group I; two men from Group III; one man from Group V; and one man from Group VI were selected for the village council. Thus out of seven men on the council, five were from the groups which did the most extensive hunting. One man was drawn from Group V which represents a more acculturated element. Although quite divergent from many of the others in his aims, he exhibited initiative and determination in leaving the village, getting a job, and earning enough money to build a frame house. The selection of the man from Group VI may have been a result of the fact that he handled paper work well. It appears, therefore, that hunting prestige may play a role in selecting members of the village council.

In summary, it would appear that by locating individuals who hold a number of positions, one is able to find persons who possess some degree of leadership. However, it is likely that this leadership will be of a type which is more closely related to that of western cultures than to that which may, for the sake of convenience, be termed leadership in an Eskimo sense. While such individuals may also maintain a similar position in Eskimo terms, it is likely that a certain amount of hostility has been generated toward them because of the positions they hold and the duties these positions necessitate.

The village council probably comes closest to representing the leadership of the village, although one cannot assume that all council members are leaders, since some of them appear to be selected mainly because they handle paper work well. In addition, persons who are not members of the council may wield a great deal of influence. In this respect, the subtle but pervasive influence of the women should not be forgotten.

Thus, if one can find who are the most highly regarded individuals from an Eskimo standpoint, one is likely to come close to determining the locus of influence or leadership in the village.

Acculturation and Values

It is obvious that changes are taking place in Kivalina and other Eskimo villages, particularly with regard to material culture. Why are these changes taking place? Are the changes really as great as they appear to be? Are other changes taking place which are less apparent but more significant? These questions pertain to the degree of acculturation which exists in Kivalina today.

Although acculturation is reflected in many ways, perhaps the most important element of change is a shift in the values of the individuals involved. It is therefore necessary to know something of the basic values of the people involved and then to determine what changes may be occurring in these values.

What are values? Clyde Kluckhohn (1958:25-27) has stated that one may usefully think of values as abstract and perduring standards which are held by an individual and/or a specified group to transcend the impulses of the moment and ephemeral situations. From the psychological point of view, a value may be defined as that aspect of motivation which is referable to standards, personal or cultural, that do not arise solely out of an immediate situation and the satisfaction of needs and primary drives...values, then, are images formulating positive or negative action commitments. They take distinctive forms in different cultures, tend to persist tenaciously through time, and are not mere random outcomes of conflicting human desires. They are standards which complicate the individual's satisfaction of his immediate wishes and needs.

Values are part of the culture of a group and are instilled into children growing up in such a society by the process of socialization. Values are derived from the history and experiences of the group, and it is often possible to find the origin of present values by investigating the past experiences of the group. Historically, certain values are developed simply because they are necessary to the survival of the human species in its natural environment. In temperate climates or in societies which have developed modern means of dealing with the natural environment, these influences are not so readily apparent as they are in an environment which enforces strict requirements upon its inhabitants.

The environment faced by early Eskimo groups living in the arctic was a demanding one. As a consequence, certain values developed which were closely linked to and determined by the natural environment. Margaret Lantis (1959:37-38) has discussed six basic Eskimo values; and she says while "it must not be assumed that all six are equal in scope, i.e., equally pervasive in culture or personality...each is dominant in its field of human endeavor and interest, while exerting some influence on other fields." Lantis' basic Eskimo values, relating to the major sectors of Eskimo life, are as follows:

- (1) Possession of goods--Devaluation of possessiveness of goods
- (2) Interpersonal relations--High value of good socialization, of passive type
- (3) Social morality--Value community survival above individual survival
- (4) Religion--Value human and animal souls (and spiritual experience) above body
- (5) Economy--High value (and necessity) of hunting
- (6) Performance--High value of skill and ingenuity

If we accept these as being basic Eskimo values which developed in the arctic before the time of white contact, is it possible to find reasons for their existence in the physical environment?

If man is to live in the arctic, certain adjustments to the environment must be made. We have seen that many Kivalina houses are constructed of sod, huddled close to the ground so that an additional insulation of the snow covers them in winter. These structures are representative of earlier houses and are small and therefore easier to heat. Clothing construction made the best use of the resources available and provided the best protection from the elements. The abundance and variety of food were determined by the cycles and availability of various animals in the area. Fuel, or the lack thereof, was determined by the vegetation and the driftwood deposited by the sea or the amount of blubber available. The type of transportation was determined by the terrain and the kind of animals hunted. Kayaks and umiaks were developed for sea hunting and dog sleds for land hunting.

Before these physical adaptations could be made, certain attributes were necessary in the people themselves. They had to develop craft skills to construct the utensils they needed out of the materials which were available to them; this required ingenuity and manual skill. They had to learn the best way to secure the animals needed for food and clothes and had to become very observant of the habits and habitat of these animals.

The Eskimos lived in small groups of two or three families and found that in order to survive they had to become self-sufficient. They had to be independent, self-reliant, and patient in order to procure a living. Because of the close quarters in which they lived and the close, almost continuous contact with other people in confined areas through long periods of harsh weather, they had to learn to cooperate with one another. They had to learn to control their tempers and harness their aggressiveness, because everyone was essential to the process of keeping alive, and harmony was necessary. The roles of the men and women became clearly defined and both were of great importance. The man had to be a good hunter and provider of game. The woman had to prepare the food and store it so that it would be available when needed. Her skills at sewing and clothing construction were necessary so the man could survive the elements. The family was a closely knit, basic unit, and the children achieved close identification with their parents.

The relation of the Eskimo to the elements in a cosmic sense took the form of his deepest needs and fears. His survival depended upon the animals and the elements. Beliefs and rituals developed with relation to these animals and elements which attempted to placate the powers assumed to be residual in them. The Eskimo was closely tied to and dependent upon the environment in all the areas of his being.

Although many factors influence the development of values, it is evident that the physical environment of the Arctic played a decisive role in the development of Eskimo values in this area.

If Eskimos no longer lived under the same conditions which existed when the values were formulated, would they continue to cling to their earlier values or would their values change?

The following section will discuss the changes which have taken place in Kivalina during a period of prolonged historical contact with white influence.

Period of Historical Contact

Although the Eskimos in the Kivalina area had had sporadic contacts with white people, it was not until the school was established on the coast in 1905 that they had any prolonged contact with them. Prior to the establishment of the school, many Eskimos lived inland along the Wulik and Kivalina rivers, followed the caribou herds in the winter, and came down to the coast in the spring to hunt seal and ugruk. After the school was built, many of the people moved close to it so that their children might go to school.

One version of the selection of the site for the school is that the captain of the ship bringing up the building supplies for the school saw the tents at the southern end of the lagoon and, thinking that this was the camping area of the Kivalina people, unloaded the supplies at that spot, thereby establishing the location of the future village. Actually, most of the people gathered at the northern end of the lagoon for their summer camping. Outlines can still be seen of some of the sod houses that had been built at the northern end. However, the early U. S. Bureau of Education (U.S.D.I.) reports indicate that there were 12 sod houses in the immediate vicinity of the school so that when it opened there were 34 children on hand to attend.

While the establishment of the school was undoubtedly one factor in the decision to move to the coast, many other factors were probably involved. At this time there was a scarcity of caribou which may have influenced movement to the coast. Sheldon Jackson, Commissioner of Education, and others had arranged for the introduction of reindeer into the Seward Peninsula to provide the Eskimos with a steady source of meat. The Eskimos were trained to care for the reindeer and could obtain animals of their own to start a herd by serving an apprenticeship with the government herds. Such a herd, owned by two Eskimos, was brought into the Kivalina area in 1903, about the same time the school was being established. Many Kivalina people worked as herders,

with the families moving along with the men to keep track of the deer. In time, several people earned their own deer, and the Kivalina Reindeer Company was formed. By sending the carcasses and hides to Seattle, aboard the government ship, "U.S.S. Boxer," the people were able to receive staple items in return. A store was set up by the reindeer company and the staples were sold to the people, with the profits going to the reindeer company. Reindeer continued to be herded in the area until 1946 when the last of the deer ran off.

The loss of the reindeer herd has been attributed to many causes, ranging from their mingling with caribou herds which passed through the area, to the lack of careful herding on the part of the herders. With the dissolution of the reindeer company, the store joined the Alaska Native Industries Cooperative Association, which was formed under the auspices of the Bureau of Indian Affairs to provide a method of extending credit to establish stores and to provide a means for the stores to obtain wholesale goods. The high price of furs during the 1920's and early 1930's brought about the establishment of another store in the village by people from Kotzebue. This second store was abandoned in the mid-1930's when the price of fur fell. However, it is interesting to note that at one time the economy of the village was such as to support two competing stores.

The influence of the church was introduced into the village with the first teachers, as they were also Friends missionaries. The village was also visited at intervals by the Episcopal priest from Point Hope. Since regular church personnel were not readily available, the work of the church often depended upon members of the congregation. These individuals might be teachers or natives of that particular faith. Church work and influence was not constant until regular churches were built.

With the advent of World War II, further changes came to the village. Some men joined the army and all the men left in the village became members of the Alaska Scouts. Air transportation increased into and out of the village, and additional governmental agencies became involved in village affairs.

Factors Influencing Acculturation

It is evident that many changes have taken place in Kivalina since 1900. How pervasive has white influence been? The agents of western culture which have had the most influence are those which have been most closely connected with the village.

Church Missions--With the exception of the school, the church mission groups in Kivalina have probably had the most influence on changing the old values. However, the changes which have occurred have not been universally beneficial. Conflict has been generated not primarily because of the difference between Christianity and the old beliefs, but because two churches with different approaches to Christianity have been active in the village. Thus, the village has been split into two different factions. While factions frequently occur among small groups of people living together, the existence of an institutionalized difference allows some latent hostility to become polarized about these particular institutions. The existence of the factions might not be so obvious were it not for the differences in the prohibitions of the churches. One church specifically prohibits smoking, drinking, and card playing and discourages the traditional native dances. The other church takes a more lenient view and encourages the traditional native dances. Accordingly, the congregations of the two churches find themselves on the opposite sides of issues which are essentially foreign to their basic philosophy.

In the past, apparently, there has been considerable friction between the two church groups, but at present the need for cooperation within the village has brought about a measure of self-discipline within the community group. Neither group will knowingly do anything to antagonize the other. A measure of tolerance has been gained and each group respects the right of the other to follow the beliefs of its own church.

While this conflict would seem to attest to the acceptance of Christianity by the villagers, in all likelihood a large gap remains between what Christianity means to most Eskimos and the doctrine and philosophy of the churches. There are some anxieties and fears for

which a belief in a Christian God can provide answers. For those who truly believe, there is the Christian faith, hope, and assurance of salvation. However, for most Eskimos there are still problems and fears which are not alleviated by Christianity. Old beliefs are not within the ethos of the Christian church. Thus, the beliefs and the reactions to them continue. It is quite likely that internal conflicts within individuals occur due to this dicotomy of belief, but this conflict is not readily apparent. Though most members of the community are faithful church members, some individuals go their own way with only occasional appearances in church.

The foregoing discussion does not mean to infer that the church is not an important factor in the life of the Eskimo community. Quite the contrary situation is true, as the churches wield a considerable amount of influence. It behooves anyone who wishes to establish a friendly relationship with the community to make the acquaintance of the pastors of the local churches and to attend services.

Schools--The school has been a powerful agent of social change since its establishment in 1905. Most older villagers have not extended their education beyond the eighth grade; those who did, most often left the village. In recent years, some youngsters have gone out to Mt. Edgecumbe or other schools for high schooling, but the majority of the population still does not have an education beyond grade eight. Table 19 shows the grade in school attained, the average age of each group, and the number of males and females in each group. These data are as of February 1958 and do not include children in school at the time.

The average grade level attained for the entire out-of-school population was 4.6. As can be readily seen, the fourth grade appears to be the point at which many men dropped out of school, while the women of approximately the same age level continued on to the sixth grade. However, of the thirteen persons who went beyond the sixth grade, eleven were men and only two were women.

The recent increased interest in education is evidenced by the difference in the average ages of the various grades attained; the

TABLE 19. Educational attainment of Kivalina residents, February, 1958

Grade Attained	Total Number	Number Females	Number Males	Current Average Age
None	2	1	1	88
Beginner	2	2	0	53
1st	4	1	3	51
2nd	6	3	3	56.8
3rd	8	1	7	39
4th	15	4	11	39.6
5th	5	2	3	34.8
6th	11	10	1	36.7
7th	5	1	4	28.6
8th	6	0	6	26.1
9th	2	1	1	21.5

younger people have gone further in school than their elders. The difference is even more significant than the averages indicate, since of the thirteen persons who went beyond the sixth grade, four were over thirty years of age; the remaining nine were all in their early twenties or younger.

The increased educational attainments since 1958 are strikingly illustrated by Table 20 which indicates the number of students finishing grades eight through twelve up to the spring of 1961.

It is difficult to account for this new surge of schooling with certainty. It is likely, however, that part of the increase resulted from the influence of teachers interested in seeing students go on in school and from the fact that one family in particular, with several children, wanted to see their children get a higher education. The combined effort provided the initial movement, and many children have followed in the succeeding years. A limiting factor in the near future, however, may be the lack of available high school facilities (See page 14).

The basic conservatism of a culture is belied in this instance by the feeling among the parents of Kivalina that their children should get an education. Perhaps their own occasional bewilderment about the world they find impinging upon them, makes them want their children to cope with this world in a better fashion. It is unlikely that many parents view education as a means to other goals, such as their children's complete departure from the village.

Eskimos are pragmatic people and recognize the advantages that education offers. Unfortunately, education, when it extends to the high school level, means that children must live away from home during the school year. This separation from the family causes disruption of normal developmental processes because children can not draw upon their parents when faced with new challenges, new expectations, and new experiences. During a very formative period of their lives, they are surrounded by influences quite different from those in which they have grown up and to which they are expected to return. As a result of this experience it is probable that many students echo one Kivalina girl's comment that "she felt as though she were divided into two different people."

TABLE 20. Educational attainments, 1958-1961

Grade Attained	Total Number	Number Females	Number Males	Current Average Age
8th	2	1	1	15.5
9th	6	4	2	17
10th	1	0	1	17
11th	2	1	1	19
12th	2	0	2	21

As a result of going away to school, some young people drift away from the village and enter a new life. Some return to find that there is little real opportunity in the village to utilize the knowledge gained in high school. Those who find that they would like to move to larger cities and different surroundings often find family responsibilities preventing it.

Not all of the young people of the village will go on to high school. It will be interesting to note in the future whether there are enduring discernible differences in attitude or behavior between the young people who return to the village after attending high school and those who remain in the village either by choice or through lack of opportunity.

Government Agencies--A third major factor influencing acculturation is the impact of specialized government agencies. These agencies provide medical care, welfare, and unemployment insurance compensation, thus cushioning the rigors of survival. No longer does any Eskimo face the possibility of starvation. As a result, the impact of the environment has been reduced and in like degree so has the necessity to prepare oneself to deal with the environment.

Medical care has also affected the composition of the population. Tuberculosis has been brought under control, and the tragic decimation of the population by diseases introduced by the white man has been brought to a gradual halt. The balance, in fact, has begun to swing in the opposite direction. Older members of the community live longer, and the death rate of infants, although still comparatively high, has been reduced. In the past, many infants died of upper respiratory disorders, primarily pneumonia. Though many infants still become ill, the use of penicillin and other antibiotics has reduced the mortality rate appreciably.

Although modern medicine has been accepted by the Eskimos as a means of dealing with illness, many people still use their own home remedies. Such remedies still in use include lancing, or blood letting, to help aches in joints or other parts of the body, and the piercing of a fold of skin above the bridge of the nose to alleviate snow blindness.

Thus, both types of medical care operate in the village at the same time. Although most persons can be prevailed upon to accept modern medical help, a gradient of acceptance exists within the village. Some persons make consistent use of the available medical facilities; others do so with reluctance. This reluctance appears to stem from the wish not to make a fuss over being ill and also from the fear that they might have to leave the village and go to the hospital. Although many patients enjoy the comforts available at the hospital, most soon become restive and eager to return home to their families.

Welfare services do not appear to have had a detrimental effect in the village, although it is a service which some outside white persons have viewed as encouraging dependence on the government and a lack of initiative. Most of the welfare payments in Kivalina are either Aid to Dependent Children or Old Age Assistance. Since part of the old Eskimo value orientation included helping those who were in need and unable to help themselves, the help attended by the government agencies appears as a normal and reasonable action.

So long as the majority of families are able to subsist by their own efforts, welfare will probably remain a welcome help for people who would otherwise be the responsibility of the village. However, should circumstances arise whereby the village might not be able to gain their own livelihood and find it necessary to rely mostly on welfare payments to exist, the resultant emotions and reactions would probably be most detrimental.

The only consistent source of money in the village during the winter months is derived from welfare and unemployment compensation. Most families in the village are usually eligible for one or the other. Those families not having a fairly steady source of cash income usually have a difficult time in the winter. One incentive for working in the summer months is to become eligible for unemployment compensation. If steady employment were available during the summer months it is likely that many more men would work.

The school, the churches, and the various government agencies, on the one hand, expose Eskimos to the white man's ways of viewing and dealing with the world. On the other hand, the old values continue to

operate and become reinforced by continued dependence upon the environment. In spite of the continual reinforcement of old values, it is apparent that changes are being wrought. Do these changes cause conflict or have the values of the people actually changed? What degree of acculturation has Kivalina attained?

Value Shifts and Degree of Acculturation

Acculturation is not so much reflected in the material culture as in the state of mind, the attitude, the approach, the kind of hopes for the future which the people possess. What effect has the introduction of white man's values had on Kivalina? To what degree have they succeeded in shifting basic Eskimo values?

The socialization process, which is conducted mainly by the family, is the most important means of conveying values to children. During the process of socialization the child is taught what is expected of him and what he may expect from his family, from the community, and from the world in general. Although originally the families in Kivalina were fairly homogeneous in their training, now a gradient of training exists, ranging from instilling most of the old Eskimo teachings and expectations to training children to have typical "white middle class standards." In spite of these differences, however, permissiveness of children remains the rule, and basic expectations of cooperation and family responsibility still pervade.

With the loss of general extended family living, there is less direct influence of the older generation on the young, although there is still far more than is usual in most American communities. Children grow used to being cared for not only by the mother and father, but also by older brothers and sisters, aunts, uncles, cousins, and grandparents. While the close family unit still exists, with its strong differentiation of male and female roles, it is generally confined to the nuclear family.

The training of children is no longer confined to learning their parents' roles. Now children spend a good portion of their time in school where they are exposed to a world beyond their own. In some cases, this school learning is accompanied by training by the parents to meet the roles prescribed by Eskimo culture. In other cases, the

Eskimo training has for the most part been neglected, with boys in their early twenties never having hunted on the ice or trapped. In this latter situation, it may be that some of the fathers feel themselves to be inadequate teachers, but in most instances it is a result of the lack of necessity, coupled with the parents' desire for different goals for their children.

A view of the young, unmarried people of the village today, particularly the young men, reveals that some of them are strongly oriented toward an Eskimo way of life and have a great interest in hunting. Others are interested in directing their goals toward a life away from the village. The majority, however, seem to have no definite idea of what they want to do. They do not appear to be particularly interested in hunting, nor are they attempting to develop necessary Eskimo skills. What their future will be is not clear, since they do not appear to be interested in learning a skilled white man's trade either.

Most of the young girls have become proficient in the arts of homemaking, but few have seriously tried to learn the specialized skills of the Eskimo wife, such as making parkas and mukluks.

With the utilization of modern implements, many tasks requiring skill and ingenuity are no longer necessary. There are still a great many challenges in the daily life of the Eskimo, however, which require that skill and ingenuity be used if one is to deal with these challenges successfully. Although some young people are learning the old Eskimo skills, it is unlikely that the same degree of proficiency will be acquired by the younger generations.

The white man's value with regard to the possession of goods tends to contrast sharply with the old Eskimo values in some respects. If by hard work and diligence a white man acquires a store of goods, he is accorded sole right to these goods and he is free to do with them what he likes. If an Eskimo in Kivalina, through diligence and foresight, plans to have a barrel of gasoline on hand in the spring when there is often a shortage of gasoline in the village, he is placed in a difficult position. Everyone without gasoline will want to buy his, and he is placed under considerable community pressure to share a commodity which is in short supply. Although some changes

have taken place, the old Eskimo value is still strong enough in the village so that the person who decides not to share his gasoline is placed in a very uncomfortable position.

In terms of social morality, there is no longer a question in Kivalina of actual survival for either group or individual. However, as was illustrated by the example in the discussion of goods, the welfare of the community still takes precedence over that of the individual.

The changes which have taken place with regard to religion have been discussed previously. Although the forms of religious expression have changed considerably, it is questionable that the old beliefs have been completely eradicated.

The introduction of a money economy has been progressively more apparent through the years, but for the most part it is of a complementary nature and does not disrupt the traditional hunting and fishing subsistence cycle, since wage earning is generally conducted during the summer months when hunting activity is at a low level.

While the subsistence methods of the majority of the families of the village are quite similar, differences do exist. The differences are sketched in Table 15 which indicates the hunting success and money income of the families in the village. An attempt (pages 80 to 84) was made to discuss these groupings in terms of the factors which distinguished them. Perhaps the most striking detail to emerge was the fact that some groups with a high income did a great deal of hunting, while others with a high income did relatively little hunting. In looking for an answer as to what, other than hunting, distinguishes the two high income groups, we find that the group that did little hunting obtained their money by working at a skilled trade. The other group obtained money from a variety of sources but did not possess a skilled trade. They also differed in the expenditure of the money they earned.

The money earned by skilled labor was spent on building frame houses, equipping these houses with oil stoves, and buying fuel oil to run these stoves. The building of such houses and the use of such stoves also presupposes that the builder will continue to attempt

to be employed and earn money in order to maintain the way of living he has decided upon. These individuals have committed themselves to the work world of the white culture.

The expenditure of money earned on jobs as laborers is more difficult to account for. The laborers have continued to live in sod houses and utilize wood stoves as a means of heating. It is likely that their money has gone toward the purchase of such major convenience items as outboard motors and washing machines, but the maintenance of the sod house and the disinclination to learn a skilled trade indicate that they are reluctant to become more dependent on a money economy.

Thus, the degree of acculturation of a family cannot be judged by how much money they make, or how many modern conveniences they use, but rather by the degree to which they have committed themselves to becoming dependent on money for fuel and food. The entire village has become acculturated to some extent, for all families are dependent on at least some money to buy food staples, gasoline for lamps, guns and ammunition, and fuel for outboards. These innovations represent changes in form, not changes in function, i.e., if a boat which was formerly propelled by oars or sails is used for the same purpose, the use of an outboard motor is simply a change in the form of power.

Differences in type of leadership and prestige also exist. Primary leadership and prestige in Kivalina still rests with those individuals who show the greatest proficiency in maintaining the Eskimo way of life. If this ability is combined with an ability to deal with the white world, the prestige and leadership is enhanced.

A secondary type of leadership, which revolves about the ability to conduct dealings with the outside world, has developed in Kivalina. This outside world has impinged to such an extent that it has become an unavoidable part of the Eskimos' environment. The more the community becomes geared to white ways, the greater this secondary type of leadership and prestige is likely to become.

Changing World

The picture of the people of Kivalina which emerges from the foregoing discussion reveals an orientation around a basically Eskimo way of life. It also reveals that a process of change has been in progress and is gaining new impetus every day. Change has been particularly evident within the past 20 years and it will continue to occur. However, there is likely to be no drastic change in the attitude of the present village so long as the present middle-aged generation continues to dominate it. Kivalina residents are for the most part happy and satisfied with their lives, including the occasional uncertainties and hardships. Some of their children will continue to feel the same way about village life, and if they have a better education, which many will have, they will be better able to comprehend and handle the changes yet to come. Some young people will have a difficult time adjusting to village life after being introduced to life beyond the village, and some may leave.

Problems may arise for either or both groups of young people, with the more acculturated ones finding that they cannot slip easily into the white man's world and the Eskimo oriented group finding that the white man's world continues to impinge more and more. Still less fortunate are the young people whose parents no longer know which world they really wish to belong to and are therefore ambivalent about which world to train their young for.

An Eskimo adopting a white man's way of life need not depend primarily upon the natural environment for his existence. He can learn a skill, earn money, and buy food and fuel. In this manner his physical needs can be met. But what of the other characteristics he has acquired and developed? He has learned from his parents and grandparents what they had learned from their parents and grandparents. He has learned that it is a good thing to be self-reliant and independent; that cooperation and non-aggressiveness are admirable traits. He has learned that his role as a male is clearly defined and is very necessary to the survival of his family. These views are a part of him. They are things which are termed right and good and which ought to be if he is to live up to what is expected of him. Perhaps he is

not very self-reliant or cooperative, but he knows that he should be. And these are the same values he will in all likelihood attempt to pass on to his children. However, in attempting to adjust to a white man's wage world, he may find that he has difficulties in reconciling what he ought to be with whom he must be if he is to become a success as a wage earner. Independence and self-reliance are fine traits in any culture, but they require different modes of expression in different cultures. The Eskimo will find that his time is no longer his to do with as he pleases. He must spend the prescribed number of hours on the job and will in all likelihood find himself taking orders from someone in a higher position. He will probably find his non-aggressive qualities misunderstood and sometimes exploited in the competitive society he has decided to join. If he is out of work and his wife is working, he will find that she is capable of filling a role which should be his. How does he reconcile these contradictions and what they do to his self-image, or to the person he views himself as being?

Not all Eskimos find the answers to these problems. Some may slowly accommodate to the white world; others may alternate between the white and Eskimo world; some may be able to utilize the best of each world; and others may give up completely and just drift.

Although it is tempting to generalize about the acculturation problems of the Eskimo and the future of the Eskimo, the fact should be kept in mind that it is not really possible to speak of the Eskimo. We have noted the wide range of differences within one small village. It is likely that a much wider range of differences exists from one Eskimo community to the other, depending upon the historical past of the people and the nature and the degree of outside contact which has influenced their lives.

Eskimos remaining in the village have to make their share of adjustments, too, especially since the advent of statehood for Alaska. Since the transfer of Alaska to the United States from Russia, the Eskimos have had the rights of American citizenship, but they have not had to bear as many of the responsibilities as their neighbors to the south. They have in many respects been a ward of the government, which, particularly through the Bureau of Indian Affairs, has looked

out for their interests. To be sure, in many instances an attempt was made to train the Eskimos to take over the responsibilities of looking out for themselves and in some instances progress has been made.

The state of Alaska, however, appears to take the attitude that the Eskimos must share the same responsibilities as the other citizens of the state. They are now required to have hunting, fishing, and trapping licenses. Although provision is made for the fact that they must support themselves through these means and they are therefore able to get these licenses for 25 cents, the philosophy has been put into effect and in time all will undoubtedly find themselves buying full-priced licenses. Recently the Eskimos have found themselves hindered in the quest for food by the restrictions of an international treaty with regard to hunting ducks. Natives are now required to have boat licenses for their craft and must have permits to buy or sell ivory. State policemen are to be stationed in more and more of the larger villages. In some areas schools have been turned over to the state. The Bureau of Indian Affairs teachers hold many responsibilities other than teaching, such as checking over store records, maintaining radio communication, administering medical supplies, etc. In the state schools the teachers are required only to teach. The villagers are expected to take care of their own problems without the assistance of the village schoolteacher.

Considerable conflict of opinion exists as to whether the Eskimos should be trained as rapidly as possible to live in a white man's world or whether they should be protected from it and encouraged to lead their old way of life. Ideally, the Eskimos should be able to continue their present way of living so long as it remains the manner in which they want to live. At the same time they should have sufficient education to understand the continually increasing elements from the outside. They should be sufficiently trained in jobs so that they may earn enough money to buy the things which would make their life easier. If they can incorporate useful elements of the white man's way of life and continue to lead their own lives, they will have adjusted to a new environment, one which is slowly enveloping them and which in many ways is more difficult to cope with than that of the natural environment.

SUMMARY

The village of Kivalina consists of 24 occupied dwellings ranged along the shore of the Chuckchi Sea with a population of approximately 150 people. The formal social structure of the village is minimal, with the village council being the closest approximation to a governing body. The council deals with problems which affect the village as a whole. Village representatives of federal and state agencies deal with other activities within the village.

The economy of the Kivalina people is based primarily upon the natural resources which the people obtain in their annual hunting and fishing cycle. Money has become important in that it is necessary to purchase basic staple food stuffs, ammunition, guns, gasoline, etc.; however, since the usual employment period for those men with jobs is during the summer months, such employment does not interfere greatly with the basic subsistence cycle.

The major phases of the subsistence cycle include the major fishing effort in the fall; caribou hunting, which extends from late fall to early spring; seal hunting, which generally has its major emphasis in February and continues throughout the winter and spring; and ugruk hunting, which begins in late spring and peaks usually during the month of June. The ecological relationships between the various species hunted, in terms of when they become available and the degree to which they are utilized, indicate that all are important to the economy of the village, although one species may assume more importance if major fluctuations in the catch of the various species occurs.

Although many changes have occurred in recent years within the village, basically the best hunters of the village are accorded the same respect and prestige which has been theirs in the past. However, a new area of prestige or leadership has been growing and will continue to grow in the future with the need for people who can communicate and interact with the outside white forces which are impinging more and more upon the village.

In spite of the many changes which have occurred in the village, it is probable that most of the villagers retain the old Eskimo values

and that the drive to acculturation is expressed more in the goals and attitudes of the people rather than in the modern conveniences they employ. In this respect the increased interest in higher education is probably a more significant indication of acculturation than the use of outboard motors. Although the acculturation process is in progress, it appears that the core of the village is still oriented toward Eskimo thinking and values. Thus, the hunting and fishing economy which provides their subsistence, is also closely linked with those things which Eskimos feel are most important as a way of living.

CONCLUSION

With specific reference to the possible effects of the proposed nuclear excavation of Project Chariot upon the lives of the Kivalina people, so long as they are able to continue the pattern of their normal lives, particularly with regard to hunting and fishing, the village should suffer no serious repercussions from the detonation. However, should there be a serious disruption of the annual subsistence cycle, serious repercussions could be expected. The Eskimo people are closely tied to the land and the sea, not only in terms of their physical survival but also, and perhaps more importantly, in terms of who they are. Restitution can be made so that physical well-being is maintained, but how does one go about restoring the identity of a people?

LITERATURE CITED

- Kluckhohn, Clyde. 1958. The Scientific Study of Values: In: 3 Lectures. University of Toronto Installation Lectures, p. 25-54.
- Lantis, Margaret. 1959. Alaskan Eskimo Cultural Values. Polar Notes, 1:35-48.
- Thomas, Dana. 1908. Annual Report of the Introduction of Reindeer into Alaska. Government Printing Office, p. 61.

APPENDIX

POPULATION

Tables I and II indicate the population composition of Kivalina, and Table II shows the fluctuations from 1955 to 1959. Table III tabulates the births and deaths from 1955 to 1959

TABLE I. Kivalina Census, 1955-59.

Date	Total Population	Adult Males	Adult Females	6-18 Years	1-6 Years	Infants
March 1955	129	39	29	35	16	10
March 1956	117	36	26	30	20	5
March 1957	133	45	26	34	24	4
November 1957*	150	48	30	39	24	9
March 1958	146	49	30	33	26	8
November 1959	145	41	29	41	28	6

*Census figures, with the exception of 1959, were obtained from the Bureau of Indian Affairs Annual Census taken by the schoolteacher each March. A second census was taken in November 1957, and this is included. The 1959 figures also represent a November census.

TABLE II. Age and Sex Distribution, 1959

Age in Years	Males	Females
Infants	1	5
1-10	22	23
11-20	19	9
21-30	14	6
31-40	9	10
41-50	7	2
51-60	3	4
61-70	3	4
71-80	0	0
81-90	0	1
90+	1	0

TABLE III. Births and Deaths, 1955-59

Year	Births			Deaths				
				Adult		Infant		
	Male	Female	Total	Male	Female	Male	Female	Total
1955	3	3	6	0	0	0	0	0
1956	1	1	2		1	1	1	3
1957	4	7	11			1		1
1958		2	2	1				1
1959 (Nov. 1)	<u>3</u>	<u>5</u>	<u>8</u>	<u>—</u>	<u>—</u>	<u>1</u>	<u>1</u>	<u>2</u>
	11	18	29	1	1	3	2	7

The shift shown in Table I in number of individuals in the 6-18 age bracket between 1958 and 1959 is inherent in the census dates, the 1958 census having been taken in March while that of 1959 was taken in November. Thus, the infants indicated in 1959 were all born this year; most of the infants of 1958 have moved into the 1-6 bracket but perhaps six of them moved into the 6-18 bracket.

Table II shows that out of a total population of 145 in 1959 there were 79 individuals younger than 21, compared to 66 individuals who were 21 or older. As may perhaps be surmised from the age distribution, there were 35 males who could have been considered hunters. The sharp decrease in the number of males between the 30 and 40 age groups may indicate a movement of unattached males away from the village. This may be influenced by the unbalanced male-female ratio which exists in the 11 to 30 age span. No reason for this imbalance is evident.

Table III indicates a fairly high infant mortality rate. All of the infants died of pneumonia or upper respiratory infections. The adult female died of pulmonary tuberculosis. The adult male was drowned in a hunting accident. There has been a natural increase of 22 individuals in the population between 1955 and 1959.

SURFACE TRAVEL MOVEMENTS,
FALL 1959 THROUGH SPRING 1961

The movement of people to and from the surrounding villages is impelled by various reasons. A number of people from other villages who visit Kivalina during the winter are hunters who stop by while in the general area. Others make special trips to visit friends and relatives in the village. Some Kivalina people made trips to other villages for visiting, but most have other reasons for traveling.

Dog team travel becomes possible as soon as there is some snow cover on the ground and continues until the snow has gone. Some travel is possible along the coast as long as the shore ice is firm.

The increasing hours of daylight in the spring bring a concomitant increase in travel between the villages. The greatest concentration of dog team travel by Kivalina people is in the latter part of April when teams go north to participate in whaling activities at Point Hope.

The following is a monthly log of the trips made to and from Kivalina from October 1959 through April 1961.

October 1959

1 team and 1 passenger from Pt. Hope (Don Foote)

November 1959

1 Kivalina team and 1 passenger to Noatak (Don Foote)

2 Kivalina teams to Kotzebue, one week (sell fish)

December 1959

1 team and 1 passenger from Pt. Hope, 3 days (Rev. Lawton)

2 Kivalina teams and 2 passengers to Pt. Hope, 10 days (visit)

January 1960

2 teams from Kotzebue, 1 week (hauling freight)

February 1960

2 teams from Pt. Hope, one on to Kotzebue, 2 weeks (visit)

2 teams and one passenger from Pt. Hope, 2 days (Rev. Lawton)

3 teams from Noatak, 5 days (hunters)

2 teams from Noatak, 4 days (hunters)

1 Kivalina team and one passenger to Ogotoruk Valley, 2 weeks
(Dr. Pruitt)

1 Kivalina team to Pt. Hope, 3 weeks (visit)

March 1960

- 1 team and 2 passengers from Noatak, 2 days (visit)
- 2 teams from Kotzebue, 1 week (hunters)
- 1 Kivalina team and 2 passengers to Noorvik, 10 days (Friends Quarterly Meeting)
- 1 Kivalina team to Noatak, 1 week (visit)
- 1 Kivalina team Kotzebue, 10 days (visit)

April 1960

- 1 team and 1 passenger from Noatak, 8 days (visit)
- 4 teams and 1 passenger from Noatak, 1 day (on way to Pt. Hope)
- 2 teams from Noatak, 2 days (hunters)
- 1 Kivalina team to Kotzebue, 4 days (get stove oil)
- 1 Kivalina team to Kotzebue, 1 week (visit)
- 1 Kivalina team to Ogotoruk Valley and Pt. Hope, 2 weeks (Dr. Pruitt)
- 2 Kivalina teams and 1 passenger to Pt. Hope (whaling)
- 1 Kivalina team and 1 passenger to Pt. Hope (whaling)
- 3 Kivalina teams and 3 passengers to Pt. Hope (whaling)
- 1 Kivalina team to Noatak, 2 days (pick up sled)

May 1960

- 3 dog teams and 1 passenger from Kotzebue (help family move)
- 4 dog teams and 7 passengers to Kotzebue (family moving)
- 5 Kivalina teams back from whaling at Point Hope
- 4 Noatak teams from Point Hope whaling
- 1 team from Point Hope
- 1 Point Hope team to Point Hope
- 4 Kivalina teams to Point Hope
- 3 Kivalina teams from Point Hope

July 1960

- 1 boat from Point Hope on way to Kotzebue
- 1 boat from Point Hope for visit return to Point Hope
- 4 Kivalina boats to Kotzebue
- 1 Kivalina boat returns from Kotzebue

August 1960

- 3 Kivalina boats from Kotzebue
- 2 boats from Kivalina to Point Hope (to return Point Hope boat)
- 1 Kivalina boat from Point Hope

September 1960

- 1 boat from Kotzebue to hunt caribou then return
- 1 boat from Noatak brought by Kivalina people

October 1960

(Unknown; author absent from village)

November 1960

- 2 Point Hope teams to Noatak, 1 day (picking up dogs and fish)
- 2 Point Hope teams to Noatak
- 2 Kotzebue teams in from Noatak
- 3 teams (2 Kotzebue and 1 Pt. Hope) to Kotzebue

December 1960

- 1 team in from Noatak
- 1 team in from Pt. Hope
- 2 teams in from Pt. Hope

January 1961

- 1 Kivalina team to Noatak (to buy dogs)
- 2 Kivalina teams to Noatak (to buy hardwood)

February 1961

- 1 Kivalina team from Noatak
- 2 Kivalina teams from Noatak
- 2 Kivalina teams to Kotzebue (to sell fish)
- 3 Kivalina teams to Pt. Hope (visit)
- 2 Kivalina teams return from Kotzebue
- 3 Noatak teams to Kivalina (for seal hunting)
- 4 Noatak teams to Kivalina (for seal hunting)
- 3 Noatak teams return to Noatak
- 3 Kivalina teams return from Pt. Hope
- 4 Noatak teams return to Noatak

March 1961

- 9 Kivalina teams to Noatak (for Quarterly Meeting of Friend's Church)
- 1 Kivalina team to Noatak (for Quarterly Meeting)
- 9 Kivalina teams return from Noatak with 1 visitor
- 1 Kivalina team returns from Noatak
- 3 Point Hope teams to Kivalina (for visit)
- 2 Point Hope teams return to Point Hope
- 1 Kivalina team to Noatak (to return visitor)
- 2 Kivalina teams to Pt. Hope and Pt. Lay (to look for work at radar site)

April 1961

- 2 Noatak teams to Kivalina (enroute to Point Hope for whaling)
- 1 Kivalina team returns from Noatak
- 1 Noatak team to Kivalina (enroute to Point Hope for whaling)
- 1 Kivalina team to Point Hope (for whaling)
- 2 Point Hope teams to Kivalina (visit and trade sleds)
- 1 Noatak team to Kivalina (trade sleds and pick up seal)
- 3 Noatak teams to Kivalina (visit and hunt seal)
- 1 Kivalina team returns from Point Hope
- 1 Point Hope team returns to Point Hope
- 1 Kivalina team to Point Hope (for whaling)
- 4 Noatak teams return to Noatak
- 1 Kotzebue team to Kivalina (enroute to Point Hope for whaling)
- 1 Point Hope team returns to Point Hope
- 2 Kivalina teams to Point Hope (visit and whaling)
- 1 Kivalina team to Point Hope (whaling)
- 1 Kivalina team to 10 miles SE Ogotoruk Creek (spring camping)

SPECIMEN DATA--UGRUK AND SEAL

TABLE IV. Specimen data from some ugruk (Erignathus barbatus) taken by Kivalina hunters, spring 1960.

Date	Sex	Measurements					Gonads (length x width in mm.)		Total Weight (pounds)
		Hind Flipper (inches)	Front Flipper (inches)	Tail (inches)	Total Length (feet and inches)	Blubber Thickness (inches)	Left	Right	
Feb. 29		13	8	4	7'5"	-	-	-	-
March 9 ⁽¹⁾	M	-	-	-	-	-	-	3.0x1.5	-
April 6	F	12 1/2	-	4	5'4 3/4"	1 1/4	2.5x(2-1.6) ⁽²⁾	2.5x(1.9-1.4) ⁽²⁾	-
April 24	F	14	9	4	8'	-	-	-	-
April 25	M	15	9	4	7'	-	-	-	-
April 28	-	14 3/4	7 1/2	4 3/4	(3)	-	-	-	-
June 14	F	12 1/2	9	5 1/2	7'5"	-	4.3x2.7	4.5x3.0	-
June 14	F	15	9	4	7'8"	-	5.0x5.2	2.5x2.7	-
June 14	F	13	7 3/4	4	7'7"	-	-	-	-
June 14	M	12 1/2	8 3/4	-	6'1"	-	-	-	-
June 17	M	12 1/2	9	5	6'11 1/2"	1 3/4	4.8x2.4	4.5x2.3	-
June 17	F	14	9 1/2	6	7'3 1/2"	-	4.9x3.9	4.9x3.8	-
June 17	F	-	8	3 1/2	5'7"	-	3.3x1.9	2.3x1.6	-
June 17	F	11 1/2	7 1/2	6	5'8"	-	3.2x1.5	2.5x1.3	-
June 17	F	14	4	5	7'5 1/2"	-	-	-	-
June 17	F	12 1/2	9	5 1/2	7'5"	-	-	-	-
June 17	F	14 1/2	9 1/2	5 1/2	7'9 1/2"	1 1/2	-	-	-

TABLE IV. (CONTINUED)

Date	Sex	Measurements					Gonads (length x width in mm.)		Total Weight (pounds)
		Hind Flipper (inches)	Front Flipper (inches)	Tail (inches)	Total Length (feet and inches)	Blubber Thickness (inches)	Left	Right	
June 18	F	11	7	5	6'3"	-	-	-	
June 18	F	-	-	-	-	-	4.5x3.0	4.3x3.0	-
June 18	M	-	-	-	-	-	5.5x3.2	6.3x3.6	-
June 19	M	-	-	-	-	-	7.0x3.7	6.5x3.7	-
June 19	F	12 1/2	8	3 1/2	6'6"	-	3.5x1.8	3.0x2.0	365
June 19	M	14	8	5	7'5"	1 1/2	-	-	525
June 19	F	12 1/2	8	3 1/2	7'1 1/2"	2 1/4	4.0x3.0	5.0x3.3	595
June 19	M	13	8	4 1/2	7'5"	-	6.4x4.0	6.5x4.1	-
June 19	F	14	9	5	7'6"	-	4.0x3.0	2.5x4	591
June 19	M	13	7 1/2	5	5'11"	-	5.0x3.0	5.5x3.0	410
June 19	F	12	7	4 1/2	6'3"	2 1/2	-	-	-
June 20	F	13	7 1/2	4 1/2	7'10"	-	-	-	-
June 20	F	14	8 1/2	5	7'4 1/2"	-	-	-	-
June 20	-	12	-	4 1/2	7'6"	-	-	-	-
June 20	M	10	7	4	5'	-	3.4x1.7	3.0x1.5	-
June 20	F	-	-	-	-	-	3.5x2.0	3.0x2.0	-
June 23	F	13	8 1/2	5	7'1"	-	-	-	-

(1) Weight of stomach--8 lbs.; weight of skin--20 lbs.; weight of blubber--38 lbs.; weight of meat--60 lbs.

(2) Two measurements taken because of irregular shape of ovary.

(3) TL measured along ventral surface from tip of nose to anus--7'1 1/2".

TL measured along dorsal surface from tip of nose to tip of tail--7'6".

TABLE V. (CONTINUED)

Date	Sex	Measurements (in inches)					Blubber Thickness	Gonads (length x width in mm.)		Weight (in pounds)		
		Hind Flipper	Front Flipper	Tail	Total Length			Total	Blubber	Meat		
March 30	M	8	6	3	42 3/4	-	-	-	82	-	-	
April 5	M	-	-	-	-	1 3/4	5.3x3.2	5.5x3.2	113	56 ⁽⁵⁾	56 1/2 ⁽⁶⁾	
April 5	M	9 3/8	7	3 3/4	49 1/4	1 3/4	5.6x2.9	6.0x2.9	109	-	-	
April 6	M	9 1/2	6 1/8	3 1/2	46 1/2	1 3/4	4.5x2.5	4.5x2.3	-	-	-	
April 6	F	9 1/4	7	3	47 1/4	-	-	-	-	-	-	
April 6	F	9	6 1/4	3	45 3/4	-	-	-	-	-	-	
April 6 ⁽⁷⁾	F	9	5 3/4	3	43 3/4	2	-	-	-	49	43 ⁽⁸⁾	
April 6	M	9 1/2	6 3/4	3	45 1/4	-	-	-	-	-	-	
April 7	F	8 3/4	5 3/4	3	45 3/4	-	2.8x(1.9-1.5) ⁽⁹⁾	2.5x1.9	100	-	-	
April 11	M	7 1/2	5 1/2	2 1/4	39 1/4	-	-	-	-	-	-	
April 11	F	8 5/8	6 1/2	3	47 1/4	-	-	-	-	-	-	
April 11	F	8 5/8	6 1/2	3	42 1/4	-	-	-	-	-	-	
April 11	M	7 3/4	5 3/4	2	40 1/2	-	-	-	-	-	-	
April 21	M	9	6	3	46	1 1/2	-	-	102	-	-	
April 26	-	9 1/2	6	3	47	-	-	-	120	-	-	

(1) Baculum--9.5 mm; weight of skin--6 lbs.

(2) Meat weight includes hind flipper.

(3) Weight of skin with front flipper--8 pounds.

(4) Meat weight includes hind flipper and skull.

(5) Blubber weight includes skin.

(6) Meat weight includes head and viscera.

(7) Weight of skin--5 1/2 lbs.

(8) Meat weight includes flipper and viscera.

(9) Two measurements taken because of irregular shape of ovary.

TABLE V. Specimen data from some seal (Phoca hispida) taken by Kivalina hunters, spring 1960.

Date	Sex	Measurements (in inches)					Blubber Thick- ness	Gonads (length x width in mm.)		Weight (in pounds)		
		Hind Flipper	Front Flipper	Tail	Total Length	Total Length				Total	Blubber	Meat
Feb. 3	F	-	-	-	-	-	-	2.0x1.0	2.3x1.1	-	-	-
Feb. 3	M	-	-	-	-	-	-	2.4x1.3	2.3x1.1	-	-	-
Feb. 3	M	-	-	-	-	-	-	2.6x1.3	2.9x1.3	-	-	-
Feb. 3	M	-	-	-	-	-	-	6.2x3.6	5.8x3.7	-	-	-
Feb. 4	F	-	-	-	-	-	-	3.3x1.6	3.4x(2.5-1.5) ⁽⁹⁾ (pregnant)	-	-	-
Feb. 4	F	-	-	-	-	-	-	2.2x1.6	2.8x1.7	-	-	-
Feb. 4	F	-	-	-	-	-	-	3.0x1.9		-	-	-
Feb. 5	F	-	-	-	-	1		-	-	-	-	-
Feb. 5	F	-	-	-	-	1 1/2		-	-	-	-	-
Feb. 5	-	-	-	-	-	1		-	-	-	-	-
Feb. 5	-	-	-	-	-	2 3/4		-	-	-	-	-
March 12	M	-	-	-	-	1 3/4		7.0x4.0	7.3x4.3	-	-	-
March 12	F	-	-	-	-	2 1/4		2.5x1.3	2.0x1.0	-	-	-
March 17 ⁽¹⁾	M	9 3/4	8	3	42 1/2	2 3/4		2.6x1.6	2.6x1.4	-	42	32 ⁽²⁾
March 17	F	9 1/2	7 3/4	3 3/4	46	3		3.3x1.3	3.0x1.5	-	-	-
March 17	F	8 1/2	7	3	40 1/2	1 1/2		3.0x1.3	2.6x1.2	-	-	-
March 18 ⁽³⁾	M	-	-	-	-	1 3/4		6.0x3.0	6.4x3.2	-	43	32 ⁽⁴⁾
March 30	M	8 1/2	6	2 1/2	47	-		-	-	100	-	-
March 30	F	8	6 1/2	3	52 1/2	-		-(pregnant)	-	146	75 ⁽⁵⁾	47 1/2 ⁽²⁾

