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PROJECT CHARIOT - PHASE III

PROGRESS REPORT

MASTER

HUMAN ECOLOGICAL INVESTIGATIONS

AT

KIVALINA, ALASKA

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by

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March, 1961

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PROGRESS REPORT
HUMAN ECOLOGICAL INVESTIGATIONS
AT KIVALINA, ALASKA

March, 1961
Doris J. Saario

Having observed the community of Kivalina and its activities for more than one year to determine the basic elements of its subsistence cycle, the investigator is forced to conclude that it would be difficult to make anything but a general prediction as to when and where the major activities will occur next year on the basis of what happened this year or last year. There are, to be sure, certain essential activities which must be carried out if the community as it now exists is to survive. Because the community is largely dependent upon its natural resources, these must be obtained when and where they occur. Thus the activities of the village will be geared to when and where the fish, caribou, seal and ugruk occur, and the extent of the activities will depend on the degree to which these resources are needed at that time. Any attempt at prediction is tied to these factors of occurrence and need. Because the occurrence of these species is dependent upon factors in their respective environments, when, where and the degree to which they occur is by no means certain.

Several illustrations of the differences which may occur from year to year can be cited. This fall very few berries were picked, partly because the villagers were engaged in other activities and partly because of the general sparsity of berries. Salmon berries have not been available for at least two years. Should a good crop of berries appear, activities would probably be widespread. Last fall the caribou did not appear near the village until the middle of October. This year they were sighted at the end of August and extensive hunting was conducted--a full month and a half earlier than last fall. Last fall seal were sighted and obtained in the early part of November and throughout the month. In addition, large numbers of tomcod were reported along the coast. This fall a few seal were sighted but none were obtained, and a general lack of tomcod was evidenced. Several years ago

a very poor fishing season was in part attributed to a large number of spotted seal which were found at the mouth of the river.

The differences cited have not had any appreciable detrimental effect on the community, because the essential resources needed could be harvested. However, if the caribou instead of appearing early had neglected to swing down by the coast, and had by-passed Kivalina far inland, then the hunting would have been of a far different nature. Instead of being able to get the animals near the village, men would have had to travel considerable distances to obtain enough meat. If in addition the fishing had not been good, the caribou hunting would probably also have been intensified. Thus in order to predict the extent of any particular subsistence activity it would be necessary to ascertain what had occurred in alternative or complementary activities.

Included in this report are the activities since the Interim Final Report June, 1960, and prior to mid-December, 1960.

LATE SPRING HUNTING

The term "late spring hunting" may be given that hunting which occurs around the time of breakup and thereafter during the presence of the ice. This year (1960) very warm weather during late April and the first few days of May started a quick thaw. Snow disappeared rapidly inland, so much so that Noatak hunters participating in whaling at Point Hope were radioed to return immediately if they wished to do so by dog team. Kivalina and Noatak teams arriving in Kivalina on May 4th reported a difficult time on the trail. Noatak hunters going on to Noatak the following day found the hills almost completely bare of snow. Some men found it necessary to leave their dogs in Point Hope and fly home.

Sea hunting at this time was confined to the shore ice which extended out to sea about three miles. Even this ice was covered with pools of water. The Wulik River did not really break up this year, the ice simply melted. River water broke through the channel on May 4th. By May 20th the action of the river water had broken up the sea ice enough to allow limited use of boats in the vicinity of the Wulik River channel.

Hunting during May was confined largely to duck hunting, with seal being taken on the shore ice. Breakup of the sea ice sufficient to allow extensive use of boats occurred in the first week of June. Such a "breakup" implies channels of water between the ice which extend for many miles out to sea, allowing general movement of the boats over a wide area. These channels may close due to ice movements caused by wind or ocean currents. Such movements of ice away from and then back into shore occurred many times during the month of June, 1960. At times it was possible to hunt many miles out to sea; at other times movement was restricted to an area of open water 200-300 feet offshore, extending from the Wulik to the Kivalik channel.

The ice pack in which hunting is conducted is characterized by small chunks of ice and floes floating among large extensive sections of ice. These large, flat floes are those sought when hunting ugruk.

Due to the increased hours of daylight in June, hunting was conducted both day and night. Early morning (about 3:00 to 4:00 a.m.) was a particularly good time to be out on the ice waiting for seal or ugruk to appear.

Hunting is frequently hindered in late spring by fog caused by the proximity of the ice pack with the warmer land mass. Hunting was also curtailed somewhat in 1960 by men going to work on the landing field about June 24.

Termination of hunting for seal or ugruk usually occurs with the final movement of the ice far out to sea. The final movement of ice from Kivalina occurred on July 4, 1960.

Ugruk and Seal Hunting

Ugruk are sometimes hunted in the late spring by individuals going out alone in small boats but most frequently are obtained by crews of six or seven men operating from the skin umiaks.

When landing on a floe, a pressure ridge of ice is climbed and the general area scanned for ugruk with the use of binoculars. Groups of ugruk are frequently sighted sunning themselves along cracks or holes in the ice.

Due to the weight of the ugruk, only those which may be brought back by sled with little difficulty are hunted. 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.

Table 1. Sea Hunting Kill 1959-60.

	<u>Number seal killed</u>	<u>Number ugruk killed</u>
November	52	0
December	7	0
January	77	1
February	135	2
March	48	1
April	65	19
May	41	12
June	53	82

The importance of the month of June for ugruk hunting is obvious from Table 1. The upsurge in hunting comes as soon as the boats are able to get out into fairly open water. June is a very busy month for the women of the village, for they must cut and hang the ugruk meat to dry. The skins 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.

The spring take of seals is shown in Table 1. Because of the decreased amount of blubber, a great many of the seals which are shot in the spring sink and are lost. Those which are obtained are often strung on a line and preserved in the lagoon to be used later as dog food.

Beluga hunting

Although beluga are generally reported to occur in March or April, just preceding the large black whales, none were obtained at Kivalina this year until July. There were reports from hunters in June of hearing beluga sounding, but none were sighted due to the presence of fog.

The first beluga sighted during the first week of July 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 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 has sounded. Seven beluga were obtained during July, 1960.

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 muktuk is eaten fresh, it is usually boiled until tender and is often eaten with mustard. If the muktuk is to be stored, it is cut into strips about three 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 three 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.

Whaling

Participation in whaling (for the large, black whales) at Point Hope provided Kivalina people with muktuk and whale meat this spring. Five teams brought back an estimated 1,600 pounds this May. Three teams left Kivalina to travel to Point Hope to obtain additional portions. In all, about 2,300 pounds arrived in Kivalina. When word was received that the Point Hopers had killed four whales, great excitement was generated in the village, for with this number of whales being killed there would be enough muktuk and meat on hand to satisfy the needs of Point Hope and enough additional on hand to allow other villages such as Kivalina to obtain some.

Men who participated in the whaling at Point Hope received their portions as members of the crews.

SUMMER

Employment

Summer employment within the village has been exceptionally good the last two summers. 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. In the near future further construction is 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. Last summer only one man worked for the Fairbanks concern and 22 men were in Kotzebue for some period of time during the summer. Of these 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 not of long duration. One man found employment as a reindeer herder during the summer and one was employed as a digger for archaeologists.

In spite of the unusually good earnings this summer, 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 bethought 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 for the future 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 have such savings to fall back upon during the winter. Therefore, the most effective income 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.

Movements

Traveling done this spring and summer by Kivalina people reached unusual proportions. In addition to the normal traffic to Point Hope for whaling, three additional trips were made by dog team to Point Hope in May to obtain whale meat and muktuk. There was also considerable movement between the village and Ogotoruk Creek when teams went up to get diesel fuel for vehicles working on the airfield. Travel to the area just north of Cape Krusenstern was also attempted to obtain cached fuel oil, but most teams were forced to turn back because of the bad trail. Some oil was obtained from the area later by boat.

Travel by boat is quite extensive in summer. While the known Eskimo boat traveling is tabulated below, frequently boats pass Kivalina without stopping. It is known that two or three Diomedea boats made a journey to Point Hope from Kotzebue and back. Innumerable tugs and barges go up and down the coast; the "Brown Bear," the Coast Guard vessel the "North Wind," and the BIA ship the "North Star" stopped at Kivalina. One boat from the archaeological site at Cape Krusenstern made the trip to Kivalina.

Boats did not travel to Cape Thompson this year for egg-gathering. This trip, however, is an occurrence which can be expected during the first part of July during a normal summer.

In contrast to the previous summer when only three men went out to Kotzebue to work, this summer at least forty Kivalina people were in Kotzebue for some length of time. Nine men flew out shortly after the completion of work on the landing field. Four boats carrying 21 people also made the journey to Kotzebue during July. Included in this number were women and children who were going to Kotzebue to be with the men of the family while they worked. Some took the opportunity of making the trip in order to get dental attention.

This unusual amount of travel was undoubtedly triggered by the fact that the people had money on hand from having worked on the landing field, a fact which resulted in many of the people going to Kotzebue with an air of festivity. With an unusual amount of money on hand early in the season, many persons wanted to obtain supplies from Kotzebue which were in short supply in Kivalina. Some wanted to get outboard motors, washing machines or gasoline. Others just wanted to go to Kotzebue to have a good time.

One family of four flew to Noatak to work on a boat which they owned, later taking it down the Noatak River and around up the coast to Kivalina.

Additional travel was initiated when the Episcopal deacon attended a church conference near Fairbanks. The deacon's wife attended a church meeting in Seward.

One Kivalina man was employed at Chicken, near the Canadian border, by a mining concern. One man returned from the Anchorage hospital, and the high school students returned from Mt. Edgecumbe. With regard to student travel, this fall five students went to Mt. Edgecumbe; two went to a BIA school just outside Portland, Oregon and one is attending a BIA arts and crafts school in Santa Fe, New Mexico.

One additional shift should be noted. Two families left Kivalina this spring. One, the Friends missionary was transferred to another village. A replacement, who has no family with him, arrived this fall. The other family moved to Point Hope.

Dog team and boat travel in and out of Kivalina during the summer of 1960 is given below in Table 2.

Table 2. Surface Travel in and out of Kivalina, Summer, 1960.

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

FALL HUNTING AND FISHING ACTIVITIES

Caribou hunting

A significant shift in the movement of caribou this fall resulted in hunting being initiated much earlier than last year. Although last fall's general movement, south along the coast past Cape Seppings and then inland in the vicinity of the village, was duplicated this fall, the caribou were sighted along the coast just north of Cape Seppings in the last week of August instead of mid-October as last fall. This August sighting resulted in three boats traveling to this area and hunting. The first boat in the area camped at Kissimilok; the others camped further south along the coast just north of Cape Seppings. Thousands of caribou covered the hills along the coast. The hunting expedition up the coast accounted for 39 caribou. The first boat returned to Kivalina on September 2nd to find that the caribou had approached the flats just opposite the village. In spite of a heavy wind which churned the lagoon waters into white caps, most of the boats in the village with outboard motors were soon on their way across the lagoon. The first boats landed on the flats opposite the village; later boats progressed a short way up the river, stopping off at varying intervals. From a vantage point about two miles up the river, a line of hunters could be seen advancing on the caribou which moved slowly upriver. Shooting from the flats was made hazardous because of the proximity of the hunters on the flats to the caribou. With the barrage of shooting the caribou moved up the river. Hunting continued through September 5; after that most of the caribou had moved quite a distance upriver. In all, a total of 76 caribou were obtained between September 2 and September 5. Hunting was discontinued for the most part during the next two weeks with the arrival of the "North Star" and the longshoring proceedings. Departure for fish camp was on September 16 and a few caribou were taken at the camp sites. No extensive hunting was conducted although caribou were available, as most were busy fishing. Approximately 15 caribou were taken by the fishing crews.

Caribou in large numbers were reported along the coast to the south near the Mulgrave Hills on October 6th. A boat going to the area obtained 35 caribou. Hunting on the flats surrounding the village resumed in October but was conducted only sporadically, since sufficient meat was already on hand. In many cases caribou were left after being gutted, to be brought back later as dog food. The large number of wolves and wolverine in the area resulted in the loss of several of these cached caribou.

Table 3 indicates the difference in the caribou hunting pattern between the fall of 1959 and 1960. The majority of the kill during the months of September and October, 1960, came during the early parts of the month.

Table 3. Caribou Kill in Fall of 1959 and 1960.

	<u>1959</u>	<u>1960</u>
September	0	130*
October	30	189
November	100	44
December	29	37

*The total take for September includes those killed the last day of August.

Caribou were within easy hunting distance of the village this fall. Two survey flights made in the middle of September found thousands of caribou on the east branch of the Wulik River headed in an easterly direction. Bands of caribou were also sighted on the flats just southwest of the De Long Mountains. The numerous trails in the area seemed to indicate that the major portion of the band did not come along the coast, but crossed the Kivalina and Wulik rivers inland and then headed up the Wulik River.

Another flight made on December 11th found scattered bands on the east side of the Singoalik River, with from 3,000 - 4,000 between the Kivalina and Wulik rivers. Although a portion of these caribou was stationary, many were headed in an easterly direction, swinging up the east side of the Wulik River in the direction of Noatak. A survey of the Mulgrave Hills revealed only scattered bands of caribou at this time.

Fishing

Fish are a vital commodity in Kivalina. Char enter the Wulik River in the middle of August and remain up the river until June. In June they come downstream and are found in great quantities in the lagoon. This year, due to the presence of ice close to shore during frequent intervals in June, the char were thought to be even more abundant in the lagoon than usual. These fish are sometimes obtained by seining, but more frequently through

the use of 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.

With the re-entry of fish into the river in mid-August, gill nets are once more staked out on either side of the Wulik channel. Fishing with rod and reel is successful to some degree but not nearly so successful as in June. Some seining was done in the latter part of August a few miles up the Wulik River. During September, with more fish present, more seining trips were made from the village. Fishing was neglected to some degree in September, however, due to the presence of caribou in the immediate vicinity.

Two boats left Kivalina to establish fish camps on the Wulik River on September 16th. A third boat left on September 17, having awaited the arrival of the boat owner from Kotzebue. A few attempts were made to fish in the vicinity of last fall's fish camps; however, it was found that few fish were available. Thus, it was necessary to proceed above last year's camp, which necessitated much labor in pulling boats through very shallow portions of the river. 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.

An unusual occurrence this fall was the presence in the Wulik River of large numbers of salmon of the type caught at Noatak. Several boatloads 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 previous fall.

Table 4 indicates the amount of fish caught at the camps upriver and the amount of fish obtained from fishing expeditions originating from the village. The first crew arrived back on September 24, with the other crews arriving the following day. The lagoon first froze and then thawed on September 21. The lagoon froze again on October 1.

Table 4. Fishing Success by Residents of Kivalina,
Autumn 1959 and 1960.

	<u>No. Tubs</u> <u>1960</u>		<u>Pounds of</u> <u>Fish 1960</u>	<u>Pounds of</u> <u>Fish 1959</u>
Village (late August - early September)	118		11,800	13,500
Fish Camp (mid to late September)	330	841	84,100	45,000
	284			
	227			
Village (mid to late September)	98		9,800	11,100
Village (late September - early October)	186		<u>18,600</u>	<u>28,000</u>
			124,300	97,600

The author was not in the village during the latter part of September and was therefore not able to verify the figure cited in Table 4 personally. It will be noted that a greater amount of fish was caught this fall when compared with 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 this fall as opposed to two crews last fall. Besides the crews upriver, one family conducted seining operations from the village.

One crew which had been having poor success up-river 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.

Kivalina people were not the only ones to utilize the river this fall. Three men from Kotzebue flew to the river by plane and set up camp on the river to obtain fish to sell in Kotzebue. It was reported that they caught an estimated 3,400 pounds. This fish was transported to Kotzebue where it probably reached the local market.

The Wulik River is also being used in the fall by sports fishermen who fly in by plane.

This fall almost no tomcod were taken. They did not appear in the lagoon in the numbers in which they usually occur. This is in particular contrast to last fall when an unusual number of tomcod were reported to have occurred along the coast.

Fishing through the ice a few miles up the Wulik River continues to provide occasional fresh fish throughout the winter. A more ambitious project than fishing through a hole in the ice is the use of nets.

Two fairly large holes are cut on either side of the river. Then 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 another. 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.

Another method of winter fishing which has been long used by Kivalina people is the fish trap. 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 two 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 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 again 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.

Another method which is somewhat simpler is to tie a short string net about three 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 help 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. This type of fishing is done at night and only when there is no moon. Fishing by moonlight is said to be very unsuccessful.

When most of the fish appear to have been caught, the right 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.

SUMMARY OF ANIMAL FOOD RESOURCES

The number of pounds of meat and fish obtained throughout the year is indicated in Table 5. The early fall is characterized by large amounts of fish being caught. Caribou generally appear in October and continue to be available in varying degrees until the spring. The amount of seal obtained in November, 1959, was unusual as they are generally not available in numbers until late January. Ugruk also are found in January, but not until late April do they become available in numbers; the largest numbers are taken in late May and in the month of June.

In terms of weight, the fish and caribou provide the largest source of food, almost twice that of the ugruk and seal. In addition, the amount of meat provided by seal and ugruk must be figured to be roughly half of the total poundage shown. The remainder is blubber which is used as fuel. Blubber is also used for dog food if feed is short.

Table 6 is an attempt to provide some indication of the manner in which these resources are used and when they are likely to be in short supply. By examining the table, one may also gain some understanding of the manner in which these resources complement each other.

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

For the purposes of Table 6, the rate at which fish is consumed is estimated at 5,000 pounds a month. This is figured at a rate of two pounds a day for adults and one pound for the remainder of the population. Considering the ratio between adolescents and younger children in the latter group, this is thought to be a fair approximation. At this rate of consumption, the fish will be gone by March.

The rate of consumption for caribou is figured at 6,000 pounds a month, or roughly 2 caribou a month per family. 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.

Table 5, 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	41,000	5,300	10,000	-
Annual Total	58,500	47,800	109,400	98,650

*Average estimated weight per individual, 500 pounds

**Average estimated weight per individual, 100 pounds

†Average estimated weight per individual, 125 pounds

Table 6. Resource Utilization, July 1959 - June 1960.

Month	Human				Dogs		
	Pounds of Fish on Hand	Pounds of Caribou on Hand	Pounds of 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	-	-
Sept.	30,000	-	-	-	6,900	62,000	-
Oct.	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

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 last until January. The usual imbalance 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 6 is estimated at two pounds per dog per day. The fish on hand in September would be consumed at a rate of 10,320 pounds a month for 172 dogs and would last until February. The number of pounds of seal on hand each month is 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, 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 is 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 represent a period when dog food is in short supply. This situation is 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 becomes accentuated by the diminishing fish supply, sufficient amounts of caribou, ugruk and seal are on hand to provide for basic needs. By May, the supply of caribou meat has diminished and ugruk are not so available because of poor ice conditions, but ducks and geese become 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.

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 7 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 influence, the organizations and agencies listed in Table 7 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.

For a wider discussion of the make-up and function of these organizations and agencies the reader is referred to Saario's Interim Final Report June, 1960.

Table 7. Persons Selected for Positions in Formal Social Structure.

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

Table 8 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 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 Woman'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, 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 (subject 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).

In viewing the village council, we find that only two of the seven members hold more than one positions. If we assume that membership on the council is an a priori indication of status and influence, this would seem to indicate that the number of positions a man holds is not the only factor in determining leadership or influence. Or stated conversely, a man may hold no position in the village at all and still be selected to sit on the council.

Table 8. Multiple Positions Held in Formal Social Structure.

No. Posi- tions	Sub- ject No.	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	Woman's Club Pres. Health Council			
9	2	Woman's Club V.P. Health Council			
10	1	Woman's Club Sec.			
11	3	Woman's Club Treas. Health Council Church Interpreter			
12	1	Woman's Club Movie Ch.			
13	2	Health Council		Extension Service	
14	4	Health Council Chairm. 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 Manager		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

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 in the social framework 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.

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 then 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.

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 Table 6, page 22 of the Interim Final Report, June, 1960. The families in this table 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. Eight such groups are delineated and defined in the following manner:

Group I did a lot of hunting for both seal and caribou. This hunting was in part due to necessity but also reflected personal initiative and interest.

Group II did a considerable amount of caribou hunting but little seal hunting.

Group III did considerable seal hunting but little caribou hunting.

Group IV represents families who maintain an intermediate level of hunting balanced between caribou and seal hunting.

Group V represents families with more money than the average family. This is obtained by going outside the village to work. They show a greater degree of acculturation, living in frame houses and using oil heat. They did a fair amount of caribou hunting but little seal hunting.

Group VI possess money to buy native food, receive some support from other family units and appear to exhibit a loss of hunting initiative.

Group VII made up of families in which the men hold jobs in the village and do not have the opportunity to hunt regularly.

Group VIII represents families of older people in which no hunter is available.

Table 8 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 is inexplicable to the author. The only apparent reason is that he handles paper work well.

It is not proposed that the members of the council are elected on the basis of the characteristics discussed above. Rather, it is suggested that examination by "outsiders" of various elements, i.e., hunting success, degree of acculturation, etc., may provide some insight in determining latent leadership.

CONCLUSIONS

One of the primary purposes of this investigation has been to determine the degree of dependence of the people of Kivalina upon the natural resources which they hunt and harvest. That this degree of dependence is substantial has been fairly well established. However, the fact that one cannot view hunting and gathering merely in terms of subsistence or economy has only been alluded to in various sections of the past reports. It is important that these activities be viewed with reference to what they reflect about people and the village as a whole.

Outsiders viewing this way of life might conclude that it entails a good deal of hardship and that if the people had sufficient money or opportunity to leave the village and its concomitant way of life they would be happy to do so. This is a fallacy. These people need not remain where they are; they choose to remain where they are. Certain of them, to be sure, will in time move out to other villages, probably Kotzebue. But for the moment, the core of the village is composed of individuals and families to whom this place and the manner in which they sustain themselves reflects who they are and what they are. An integral part of this identity is the food they eat, the manner in which it is prepared and the manner in which it is obtained. Thus, being able to go out and hunt a caribou or ugruk means more than just going out to get food, as we might by going down to the corner grocery store; it is also an occupation employing skill. And it is much more than merely an occupation. It is an affirmation of self. The unity and all encompassing aspects of this way of life are difficult for those of us who lead fairly compartmentalized lives to realize. Our work occupies one section of our lives, our families another, our hobbies still another and so on through a long list. This is not true in a setting in which the man and wife and often children must work together to provide for the family.

Hunting and gathering provides the basis for this way of life in this village and if this is disrupted, an entire way of life is disrupted.

These factors should be borne in mind as future plans are made for the continuation of Project Chariot. As long as the way of life led by these Eskimos is not so seriously disrupted that they cannot care for themselves in their traditional fashion, things will be all right; but disruption must not proceed to the extent that substitutes for this way of life must be provided to sustain their well-being. If the Eskimo is to be able to retain his self-image and self-respect, he must be allowed to follow his own life

in his own way. Any thoughts of being able to provide a substitute represent either wishful thinking or a lack of awareness of the true situation.

The factors involved in a person's decision to move away from the Eskimo way of life are subtle and take place over a considerable period of time during which new skills and a new self-view are obtained. As long as they are allowed to come to their own decisions, however, concerning the manner in which they are going to live, and as long as they are allowed to make new adjustments on their own, learning new skills and new ways in demonstrating their self-reliance, therefore retaining their self-respect, the Eskimo need have no major problems in gradually turning to a new way of life. However, if he is not allowed this self-determination the end result will be dependency upon a government whom he may feel owes him a living since he can no longer make his own -- an unworthy end for a proud, self-reliant people.