# LAND USE AND ECONOMY OF LIME VILLAGE

by

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# INTRODUCTION

## PURPOSE

This report is a baseline description of the contemporary local economy of Lime Village. The study was initiated by the Alaska Department of Fish and Game, Division of Subsistence in response to concerns expressed by Nunam Kilutsisti about proposed State and Federal land disposals and oil and gas lease sales in the Lime Village area and about the lack of a data base regarding to Lime Village resident's subsistence activities. The purpose of the study is to provide information concerning the contemporary local economy of Lime Village that will be useful to a variety of land and resource management agencies for land use planning and for establishing hunting and fishing regulations.

## BACKGROUND AND METHODOLOGY

This descriptive study of the contemporary local economy of Lime Village is based on information gathered through informal interviews, participant observation, and mapping of land use areas. Although the study formally took place between May 1982 and April 1983, the researcher had relatively long term contact with Lime Village and its residents before the study was initiated. She first visited the village in May 1975 and made eleven other visits varying in length from about one to three weeks between her initial visit and the beginning of this project. During the period of this study she made five field trips ranging in length from about one to two weeks.

She made the first visit of the project in May 1982 with Steven Behnke, Division of Subsistence, Alaska Department of Fish and Game, to identify local land and resource concerns and to discuss the proposed study. They visited with almost every household in the community to talk over these issues and held a meeting on May 28 which was attended by 10 people. They presented information about the changing status of lands in the vicinity of Lime Village and the proposed state oil and gas lease sale in the Holitna Basin. People's perceptions of increasing sport hunting activity in areas near Lime Village and the advantages and disadvantages of research and infomation about subsistence were discussed. Behnke described the research proposal developed by the Division of Subsistence and asked for comments on it. Overall, people seemed to be interested in the project and to approve it.

During the following visits all interested residents, including most adults and older children, participated in the project to some degree. The involvement consisted of informal interviews, participation with the researcher in economic activities, and mapping of land use areas. The involvement of a high percentage of the residents was possible because of the small population of the community. This involvement was desireable because most adults and children are actively involved in local resource harvest activities, the principle component of the economy.

The following list illustrates some of the activites the researcher participated in with Lime Villagers during the course of the study. She went on a wood gathering trip by dog sled with a nine year old boy who managed the dogs entirely by himself and who directed the wood gathering activities. She also went by dogsled with a sixteen year old boy to check his trapline and was directed by him in trapping, camping, and dog

handling skills. On a group moose hunting trip by boat she was shown hunting skills by a seventeen year old girl as well as by older, more experienced adults. The researcher also went on several caribou hunting trips with both young and middle-aged adults and elders who demonstrated hunting and butchering skills. She spent time at three different fish camps with adults of varying ages where she observed and participated in activities. Finally, she walked with the two oldest members of the village on their actively maintained, productive trapline.

The researcher was very impressed with the high degree of involvement of most residents in resource harvest activities. Elders are extremely knowledgeable in traditional skills, many of which they have continued to practice in contemporary times. They have also been very active in passing their knowledge on to the younger people. The result is a highly skilled and involved younger generation who generally appear to be committed to the way of life which they have inherited.

## PREVIOUS RESEARCH

Detailed information concerning the Dena'ina (also known as Tana'ina) of the Stony River has only recently become available. As early as the 1840's there was recognition that the people of Stony River spoke the same Athabaskan language as the people of Cook Inlet (Zagoskin 1967.) However, Osgood, in his major study The Ethnography of the Tanaina (1937), underestimated the extent of the Dena'ina language area, making only brief mention of the Lake Clark people and no mention of the Stony River Dena'ina.

The first publication to present extensive information about the Stony River Dena'ina was Kari (1978) K'qizaghetnu Ht'ana (The Stony River People), a collection of thirty stories told by Lime Villagers. The position of the Stony River people within the Dena'ina language area is presented in two recent works, Townsend (1981) and Kari and Kari (1983). Note that the description and mapping of the Lime Village land use area is more complete and detailed in this report than in the earlier literature.

# CHAPTER I

# THE PEOPLE AND SETTING

## Introduction

Lime Village, sometimes referred to as Hungry Village, is a remote Alaskan community located on the Stony River in the Kuskokwim subregion of Southcentral Alaska. During the period of this study approximately 40 people lived there in what is one of the most geographically isolated and culturally traditional communities in the State. Although many residents of the village today are of mixed ancestory the dominant cultural group of the area continues as it was in the past to be Dena'ina Athabaskan. The economy today is based primarily on hunting, fishing, and gathering activities for local use and trapping for domestic and commercial use.

## Historical Setting

The majority of Lime people today are of mixed racial descent with Inland Dena'ina Athabaskan being the dominant cultural group represented in the village. All but one Lime Village elders are primarily of Dena'ina Athabaskan descent and speak Dena'ina as their first language. The traditional territory of the Dena'ina was extensive, extending around Cook Inlet and west to Lake Clark and Iliamna Lake, and to the upper Mulchatna and Stony Rivers. North of Cook Inlet, they occupied the Matanuska River drainage and a portion of the Susitna River drainage. This area can be divided into four subregions based on dialect boundaries within the Dena'ina language. Below is a list of these

subregions with the 20th century communities that contain a significant number of people of Dena'ina heritage:

1. Inland: Lime Village, Stony River, and Nondalton;
2. Iliamna: Pedro Bay and Old Iliamna;
3. Outer Cook Inlet: Seldovia, Kenai, Kalifornsky, Kustatan, and Polly Creek;
4. Upper Inlet: Tyonek, Alexander Creek, Susitna Station, Kroto Creek, Talkeetna, Montana Creek, Knik, Eklutna, and Point Possession.

A century ago there were at least four closely related Dena'ina bands living in the Inland Region: one on the Stony River at Qeghnilen village, one at Dilah Vena (Telaquana Lake), one or more along Valts'-atnaq' (Mulchatna River), and one at Qizhjeh on Lake Clark. The Dena'-ina called this high plateau country west of the Alaska Range Htsaynen. By studying such evidence as dialect differences, one can speculate that it may be the earliest definable homeland of the Dena'ina people. The ancestors of the Upper Inlet, Outer Inlet, and Iliamna Dena'ina apparently left this region at different times, migrating to and settling in their present-day regions. A clue to this is in the name of the Stony River-Telaquana Lake people, who are called Htsaht'ana or 'the first people'. Another name for the Inland Dena'ina is Dghili Uch'en Ht'ana, 'people outside the mountains'. Other evidence that Htsaynen was the earliest Dena'ina homeland lies in the fact that the Stony River is the easternmost stream in the Kuskokwim drainage that has a large run of red salmon, the basic food fish of the Dena'ina. This must have been of major importance in defining their territory (Kari and Kari 1983).

Within the last hundred years, the Inland bands consolidated into the Lake Clark and Stony River bands with most migration to Nondalton. Qeghnilen, an important winter village located about 23 miles upriver from the present site of Lime Village, was abandoned in the 1930's after a series of migrations of Stony River people to the Lake Clark area. The remaining Stony River Dena'ina eventually settled at Lime Village and Stony River village.

## Location and Regional Setting

Lime Village lies within the western foothills of the Alaska Range near the Lime Hills on the left bank of the Stony River close to the junction of the creek called in the Dena'ina language Hek'dichen Vetnu. This name translates as "abundance stream", while ironically the stream's officially recognized English name is Hungry Creek.

Lime Village is situated approximately 63 river miles, (Brown 1963:358) or about 60 air miles upstream from the Stony River's confluence with the Kuskokwim River (see Figure 1), where the community of Stony River is located. Two other Central Kuskokwim communities, Sleetmute and Red Devil, lie below Stony River village. The former is approximately 75 air miles northwest of Lime or about 90 river miles. Lime Village is situated 120 air miles south of the upper Kuskokwim community of McGrath, which is the commercial and transportation hub of the Central and Upper Kuskokwim communities. It lies approximately 180 air miles west of Anchorage, 85 miles northwest of Lake Clark and 11 miles northeast of Tundra Lake (Orth 1967: 576).

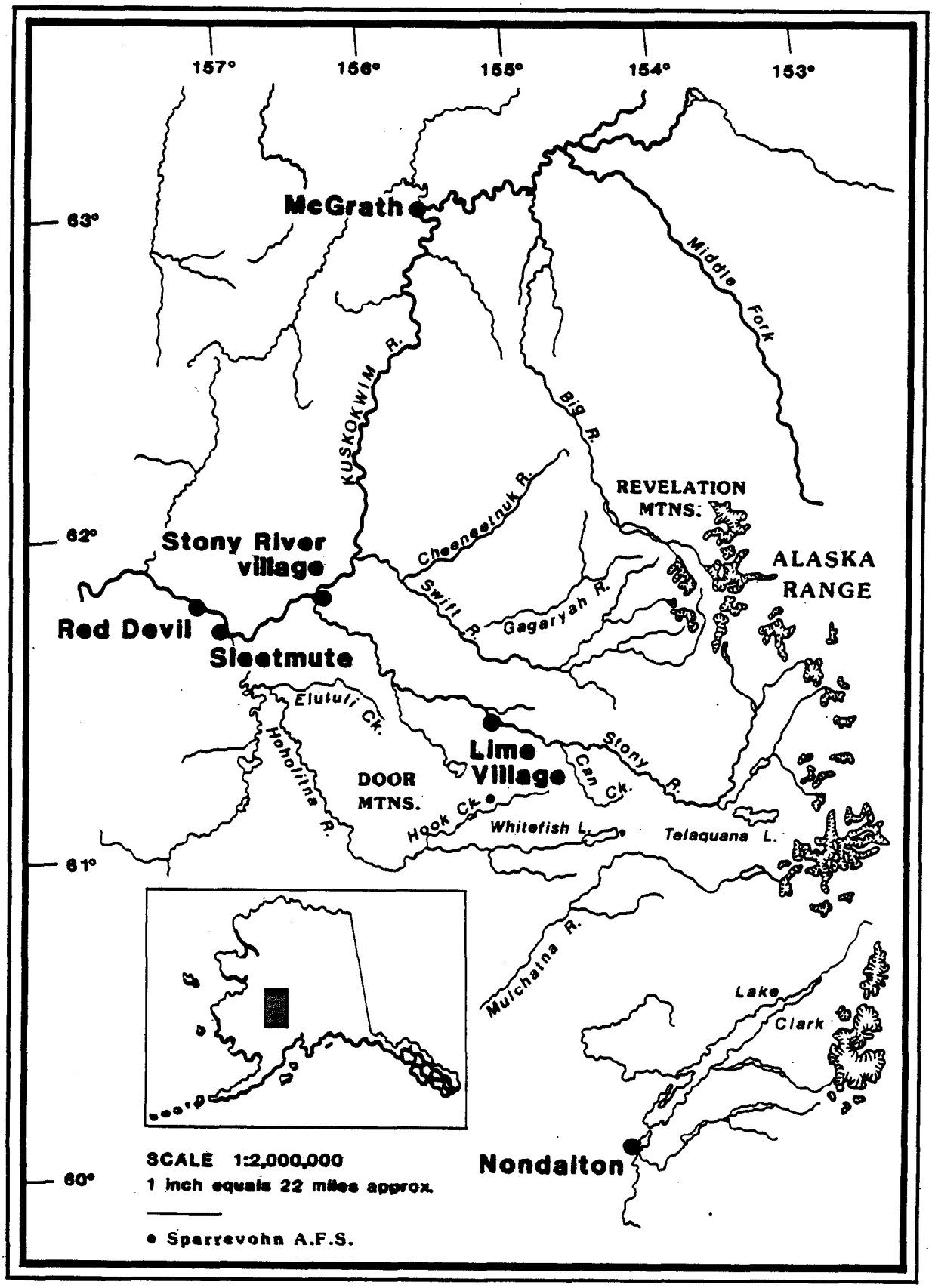


Figure 1. Lime Village: the local and regional area

TABLE 1

CENSUS FIGURES FOR SELECTED KUSKOKWIM RIVER COMMUNITIES

| | 1980 | 1970 | 1960 |
|---|---|---|---|
| Red Devil | 39 | 81 | 152 |
| Sleetmute | 107 | 109 | 122 |
| Stony River | 62 | 74 | |

From: Chapman, Bruce (Director). 1980 Census of Population Vol. 1., Part 111. U.S. Dept. of Commerce, Washington, D.C.

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The traditional land use area of Lime Village is centered on the mid portion of the Stony River. On the east it extends to the headwaters of the Stony and Swift rivers including the western slopes of the Alaska Range from the Stony River north to the Revelation Mountains. Lime Villagers have also made occasional use of the uppermost portion of the Big River via the North Babel River. Their use area is bounded on the northwest by the confluence of the Gagaryah and Swift Rivers. Some mutual use of the country between the Cheeneetnuk and Gagaryah Rivers has occurred between Lime Village and Stony River Village people although the area has predominantly been used by Stony River village people. The land use region of Lime Villagers extends west from the confluence of the Gagaryah and Swift Rivers to the Tishimna Lake area. Western boundaries are the upper Elutuli Creek and the Door Mountains. Telaquana Lake, Whitefish Lake and the upper Hoholitna River are major geographical landmarks of the southern border (see Figure 1 and Maps I, II and III -- maps are oversized and in pocket).

Lime Village people share traditional boundaries with two Athabaskan groups and one Eskimo group. North of the Swift River, on the Big

River, is the traditional land use area of the Upper Kuskokwim Athabaskans who now live largely in the villages of Nikolai and Telida. The lower Stony River and upper Kuskokwim River area is the traditional country of the Kuskokwim Ingalik Athabaskan people, some of whom now reside in Lime Village, Stony River village and other Kuskokwim river comunities. Lime residents also share a western boundary on the Hoholitna with Yup'ik speaking people.

## The Village: Facilities and Services

Lime Village has a school for primary and secondary students, a Russian Orthodox Church, a community hall and 15 buildings occupied as residences during the winter of 1982-83. The houses are a combination of log buildings of various sizes and ages constructed privately by residents and plywood frame buildings funded by the Bureau of Indian Affairs (B.I.A.) in the early 1970's. Most of the homes, including the older log houses and the B.I.A. buildings, are clustered on a high bank above the Stony River about a mile downstream from the mouth of Hungry Creek. In recent years, the village has expanded upriver to the mouth of Hungry Creek. All the newer houses are of log construction.

Most of the homes have several out-buildings, including a cache, bathhouse, and privy. The homes are not serviced with electricity, and Coleman and kerosene lanterns are the main sources of artificial light. A few families have electric generators which they use infrequently. There is no community water or sewage system, and water for home use is mostly hauled from the river or creeks in the area. One family recently installed a hand water pump in their home. While most households own

at least one radio, no private telephones or radiophones exist in the village. There is one public telephone, which works intermittently, and a radiophone in the school. Families heat and cook almost exclusively with wood, although most households own a Coleman stove which they use occasionally.

Lime Village has no store. Mail delivery is scheduled once a week from McGrath by air, weather permitting. Before 1975, mail service was from Sleetmute, a Kuskokwim River community closer in distance to Lime than McGrath but smaller and with fewer commercial facilities. Residents mail order the majority of their supplies from Anchorage or McGrath to avoid the high cost of travel to and from the village to obtain them. For most services, including medical ones, people have to travel to McGrath or Anchorage. A nurse is scheduled to visit the village twice a year from McGrath and a doctor once a year from Anchorage.

Sparrevohn Air Force Station, now partially an RCA Communincations Facility has supplied Lime Village residents with some short term jobs as well as goods and services including emergency medical aid. It is located 20 air miles south of Lime Village.

## Regional And Interregional Travel

Since Lime Village is not on a road system, most travel outside the local area is by small aircraft or small boat. The present 2,000 foot gravel airstrip, which was built in the late 1970's, is maintained by local residents through a position provided by the State Division of Aviation. Two air taxis serviced the village out of McGrath during the period of this study, with charters ranging in price from $200.00 to over $300.00. A person who obtained a seat on the mailplane paid

$60.00. The cost of flying on to Anchorage via Wien, the main air carrier servicing McGrath out of Anchorage, was $146.00 round trip coach, as of February, 1983. Alaska Air, which serviced Sparrevohn Air Force Station from Anchorage three times weekly (weather permitting), would sometimes fly the extra 20 miles to Lime on demand for passengers at a seat rate of $120.00. During the period of this study there was no scheduled flight service from Lime to the central Kuskokwim communities. The charter rates of the small commercial air taxis based in Sleetmute and Red Devil were similar to that of McGrath charter rates.

The Stony River is too shallow and rocky for barge and large boat travel, and there is no public or commercial river transportation. Lime people commonly travel by small, privately-owned boats downriver to the larger Kuskokwim communities of Stony River, Sleetmute, and Red Devil to obtain supplies and visit relatives and friends. One man, during the 1982 season, made several trips by jet boat from Red Devil to Lime hauling fuel. Winter travel by snowmachine and dogs between Lime and the Kuskokwim villages is occasional. Lime residents also make a number of trips each year to Sparrevohn by dogsled, snowmachine, and foot. Sparrevohn, is approximately a six-hour round trip by dogsled or snowmachine or a long day on foot from Lime Village.

## Demography

During the period of this study, about 40 people composing 12 to 15 households lived in Lime Village. The formation of new households by young adults was the primary cause for the range in number of households. Most Lime residents belong to one extended family consisting of the descendents of Constantine and Annie Bobby and their spouses.

Deceased in the early 1970's, Constantine and Annie Bobby (affectionately referred to as Chada "grandfather" and Chida "grandmother") are survived today by eight children, four of whom live in Lime, two in Nondalton, and two in Stony River. For the purpose of this report, the term "elder" is used to refer to the children of Chida and Chada Bobby and their spouses. Even though some of these elders are only in their 50's, collectively they represent a generation in terms of the cultural knowledge and skills they possess.

Although Inland Den'ina Athabaskan is the dominant cultural heritage of Lime Village, most residents today are of mixed racial heritage. Considerable intermarriage has taken place between the Stony River Dena'ina and Kuskokwim Ingalik at least within the last century. For example, Htsit, a location at the mouth of Stink River near Tishimna Lake, was a Kuskokwim Ingalik village earlier in this century. In the 1930s the village was dissolved and some of the people moved to Lime. One Lime elder today is of Kuskokwim Ingalik descent and originally from Htsit. Some intermarriage has also occurred over time between Stony River Dena'ina and Kuskokwim Yup'ik Eskimo people and in recent times between Lime people and non-Natives. The white population of the village was composed of two teachers and their families and several men married to Lime Village women during most of the period of this study.

In the 1970s several homesteads were opened below Lime Village in the vicinity of the confluence of the Stony and Stink Rivers. Since their occupancy, social and economic contact has been maintained between Lime Villagers and the homesteaders through the exchange of visits and to a limited degree through the exchange of local resources. The

trade and sale of commercial goods has also occurred infrequently between them.

U.S. Census figures, which begin in 1939 for Lime Village (see Table 2), show significant flux in the population over time with the

TABLE 2

U.S. CENSUS FIGURES FOR LIME VILLAGE*

| Year | Population |
|---|---|
| 1939 | 38 |
| 1950 | 29 |
| 1960 | 15 |
| 1970 | 25 |
| 1980 | 48 |

*Taken from Census of Population, 1940-1980, Vol. 1, U.S. Dept. of Commerce, Bureau of the Census: U.S. Govt. Printing Office, Washington, D.C.

highest numbers of people recorded in the first and last census counts. The figures show a decline in population through the 1960s with an increase in population during the last 20 years. The trend depicted by the census figures is probably accurate as a number of Lime Village families are known to have moved to Nondalton and Stony River Village between the 1940s and 1960s.

The accuracy of the actual census numbers is questionable, however, because people were (and still are) extremely mobile, using the village as a home base which they moved to and from seasonally. For example, the 1939 Census records 38 people in the village (16th Census of the U.S.

1940 Population, Volume 1, Number of Inhabitants Prepared Under the Supervision of Dr. Leon Truesdell, 1942; U.S. Govenment Printing Office, Washington; page 1195), then known as Hungry Village. However, a nonlocal man travelling in the area at about that time estimated there were 70 residents of the village with two families camping near Tishimina Lake for the winter. He arrived in Lime Village in mid-winter having travelled there with several Lime families who had been trapping in the Swift River area (Parks 1938.)

Lime people today are still very mobile both within the local area and within the larger regional one, sometimes for extended periods of time. Because of the dynamic flux of person between places, demographic figures for a static period of time can only partially depict the situation. One should keep this in mind in considering Table 3 and the following discussion which attempts to portray the demographic composition of Lime Village within a period of time. The period late November through early December, 1982 was chosen for the discussion as being as typical a time as any as far as the demographic dynamics of Lime Village are concerned. The degree of mobility among Lime Villagers year round does not appear to fluctuate greatly.

Between the last week in November and the first week in December, 1982, about 37 people composing 12 households were residents in the village for at least part of the time. These figures do not include the two teachers and their families or the researcher who were also present. Four residents included on Table 3 were out of the village at this time for an extended period of time, two trapping in the vicinity of Tishimina Lake and two on business in Anchorage. During this time at least some members of all households made hunting and trapping trips

out of the village within the local area. Several parties travelled by dogsled and snowmachine to Sparrevohn Air Force Station where they overnighted and bought supplies as well as hunted on the way back. Numerous trips were also made with dogs to trapping locations in the vicinity of Swift River, Why Lake, and fish camp near Qeghnilen, and other places. Some of these trips lasted two or three days while others were made within a twenty-four hour period.

TABLE 3

AGE/SEX COMPOSITION FOR LIME VILLAGE,
LATE NOVEMBER 1982 TO MID-DECEMBER 1982

| Ages | Males | Females | Total Percentages |
|---|---|---|---|
| 60-80 | (4.7%) 2 ** | * 1 (2.3%) | 7.0 |
| 50-59 | (4.7%) 2 ** | *** 3 (7.0%) | 11.6 |
| 40-49 | (2.3%) 1 * | * 1 (2.3%) | 4.6 |
| 30-39 | (9.3%) 4 **** | *** 3 (7.0%) | 16.3 |
| 20-29 | (14.0%) 6 ****** | ** 2 (4.7%) | 18.6 |
| 10-19 | (4.7%) 2 ** | **** 4 (9.3%) | 14.0 |
| 5-9 | (9.3%) 4 **** | *** 3 (7.0%) | 16.3 |
| 0-4 | (2.4%) 1 * | **** 4 (9.3%) | 11.6 |
| | Number of People | | |
| | n = 43 | | |
| | (51.1%) 22 | 21 (48.9%) | |

The number of households as well as the number of persons in a household fluctuates over time. Two new households were established

between October and the period of time Table 3 portrays and one new household between early December and the end of the year. A boy was born to one family of the village.

Using Table 3 as an indicator, Lime Village can be said to have a relatively young population, with over half of the people being under 30 years of age. Almost a third of the residents are under 19 years old with about 10 percent being of preschool age. Over a third of the population is between 30 and 50 years old, while less than 10 percent is over 60 years of age. The ratio of males to females is about even, although there are considerably more females than males under 20 years of age and significantly more males than females in the 20 to 30 year old category.

## Environment

### Setting

The Lime Village land use area environmentally is best described in relationship to the Stony River, because it is the most centralizing geographic feature of the area and the single most important one in terms of use by Lime Villagers. Lime Village is situated near the Lime Hills along the central portion of the Stony River, a glacier fed stream which flows about 195 miles from its headwaters at Stony Glacier in the Alaska Range to its confluence with the Kuskokwim River at Stony River village (see Figure 1).

The River passes through three main physiographic divisions -- the Alaska Range for about 40 miles, the Nushagak-Big River Hills for about

98 miles, and the Holitna Lowlands for the last 48 miles. The River is narrow, very swift, and single-channeled in its upper reaches where it is banked by alpine tundra and shrub thicket communities. The River widens in the Nushagak-Big River Hills area which has the Lime Hills as a distinctive topographic feature. When the River finally reaches the Holitna Lowlands, it is generally multi-channeled and has many islands (Alaska Area Office, Heritage Conservation and Recreation Service 1979.) Through the Nushagak-Big River Hills and Holitna Lowlands, the river is banked by open, low growing spruce forests, and closed spruce-hardwood forests interspersed with moist tundra and treeless bogs. While Lime Village is located in the lower portion of the Nushagak-Big River Hills region, the land use area of Lime Villagers includes portions of all three physiographic divisions. The timberline elevation of the area is generally at 2000-2500 feet.

## Plant Communities

Following is a brief description of each of the six major plant communities of the area as defined by Viereck and Little (1972) with mention of the animal resources occuring in them that are of most importance to Lime people.

Open, Low Growing Spruce Forests: Lowlands with poor drainage and north-facing slopes characterize this system, which is dominated by black spruce and generally underlain by permafrost. Tamarack, willow and paper birch may be mixed with black spruce in a forest which may be interspersed locally with treeless bogs.

Closed Spruce-Hardwood Forests: This relatively dense, tall forest occurs on moderate to well-drained sites at low to mid elevations. It

is characterized by a variety of different trees, with spruce, paper birch, and aspen dominating the higher locations and cottonwood the most abundant tree of the floodplains.

Animal resources are varied within the forest environment and some, including the large game species (moose, caribou, bear, wolf and wolverine), range widely and may occur there intermittently or only during certain seasons. Other locally significant animals found in the forest are the porcupine, snowshoe hare, marten, red fox, lynx, mink, and grouse.

In timbered country not only are there abundant trees useful for fuel and building materials but a variety of smaller food plants. These include a number of fruit-bearing species as well as fireweed, nettles, and ferns.

Over time Lime people have shown a preference for building their winter villages close to or within the forests of stream valleys in order to more easily utilize both the streams and the resources of the forest. Lime Village was first located directly across the river from the present village site in low, heavily forested country. People say the village was moved to today's higher, less timbered location because of seasonal flooding. However, as the present village has grown, it has spread upriver where the land is more densely forested and less steeply banked than that immediately down river.

Shrub Thickets: This system exists primarily in transitional situations such as between the beach and the forest and on mountains between the treeline and alpine tundra. It also appears in areas where vegetation has been altered or destroyed such as by avalanche, fire, or flood. Dense thickets of willow are often found along streams and on

river islands where they provide prime feeding grounds for moose. Heavy thickets of alder often occur above timberline where they provide habitat for bear and other animals.

Treeless Bogs: Found generally in wet, flat basins. This vegetative type has a peaty substrate that is generally underlain by permafrost. Tree growth is for the most part inhibited by the abundant moisture which often includes ponds and standing water. While some trees do occur on the drier sites, black spruce and tamarack being the most prevelant, the system is dominated by shrubs. Grass and moss of various kinds are also abundant. This is an important summer environment for moose who feed in the ponds as well as find some relief from insects there. Seasonally, it also provides habitat for some types of waterfowl including cranes.

Moist Tundra: Trees are conspicuously absent in this low growing type. Shrubs do not always dominate, but where they do they consist primarily of various willow, alder, dwarf birch, Hudson Bay tea, blueberry and other heath family members. Tussocks of cotton grass may occur in continuous stands or may be interspersed with other sedges and shrubs. The soil is characteristically wet and peaty and underlain by permafrost. Moist tundra is prevalent in the foothills and lower elevations of the Alaska Range where it is year round habitat for caribou, the single most important resource animal of this environment for Lime Village people. Bears, wolves, and other wide-ranging animals move in and out of this environment, with black bears coming to it especially in the late summer and fall to feed on berries.

Blueberries, lowbush salmonberries, lowbush cranberries, blackberries, Hudson Bay tea, and moss are plants of economic importance to

Lime people that occur in both moist tundra and treeless bog communities.

Alpine Tundra: Within the Lime Village land use area the alpine tundra community occurs in the upper portions of the Alaska Range and Lime Hills. Woody and herbaceous plants that form mats, moss and lichen are the most conspicious types of vegetation here. The soil, where it exists at all over the rock and rubble, is thin and often dry. This habitat is a home year round for Dall sheep, ground squirrels, and hoary marmots and during the summer months for caribou who move to it from lower elevations to escape the heat and insects. Some of the plant species that Lime Villagers harvest from the moist tundra occur here as do others not found in lower elevations. A group of moist and alpine tundra plants are valued for their medicinal properties.

Travelling the rugged, often dangerous terrain of mountains on foot or by sled as Lime people have traditionally done, requires specialized knowledge as well as strenuous effort. In spite of the fact that the lower country provides more easily accessible resources, people continue to go to mountain country especially in the late summer and fall to obtain resources there. Not only does this environment provide resources not available in the lower country, but people want to maintain their ability to use that type of country.

Elders note that the mountains have always been symbolic of both physical and spiritual strength for their people. They credit the Alaska Range in part for the fact that their people did not become ill during the widespread flu epidemic of 1918. They say that while many people living downriver from them became sick and died, they were living close to the Alaska Range at that time and remained well.

Elders also say that their people have always looked at the mountains, especially the Alaska Range, as a place to go when food resources became scarce in the lowlands. People could always find something to eat there if food became unavailable in the lower country.

Commercial food is now more available to Lime Villagers than it was in earlier times and people have not had to move to the Alaska Range in recent times to prevent starvation. However, besides generally preferring their traditional foods, people say that they don't necessarily believe that commercial food will always be as available to them as it is now. They are very aware of the fluctuations in animal populations within the boreal forest and say they want to continue to be able to use a variety of environments to obtain resources as they traditionally have done.

## Aquatic Environment

Besides the terrestrial biotic communities just described, the Lime Village land use area contains fresh water streams, lakes and ponds which provide resources and transportation routes for people (see Maps 1, 2 and 3). Two major river systems, the Stony River and Swift River, both of which drain into the Kuskokwim River, are within Lime Village people's traditional use area. The most central and most important for travel and for resources is the Stony River and its tributaries. Lime people today use it and the bodies of water that drain into it for all of their salmon fishing and most other fishing. Most of their hunting and trapping activities also occur within the Stony River system. The Stony River is the major transportation route for Lime

Villagers to the central Kuskokwim River communities as well as a travel route upriver to the Alaska Range.

The land area on both sides of the central Swift River has traditionally been a trapping ground for Lime Villagers. Several overland trails lead to the Swift River from the vicinity of Lime Village and also from near the old village site of Qeghnilen. People would often travel to the upper Swift River, which heads in the Alaska Range to hunt sheep and other large game animals in the fall. They would cache their meat downriver near their trapping sites. They would return back to the area from Lime during the trapping season or might remain in the area without going back to Lime until the trapping season ended. People have continued this pattern of use into contemporary times, although it is less common today than it was in the past. The trend in recent years has been to trap the area between the central Stony and Swift rivers making trips periodically from Lime that last from several days to a week.

A third stream system, the Holitna River, which contains the Hoholitna River, was used in earlier times by Lime people to travel to the Kuskokwim River. Although there has been little use of it in contemporary times, Hook Creek, a tributary of the Holitna, has maintained significance for Lime Villagers as a hunting and trapping ground up to the present day.

The lakes immediately south of Lime Village, which include Trout Lake, Kutobuna Lake, Qedeq Vena and Tundra Lake, and Tishimna Lake, approximately 30 miles west of Lime Village, have continued into the present to be of major significance to Lime people for fishing, hunting, and trapping activities. North, East and South Lime Lakes and Why

Lake have also received considerable use in contemporary times. Two Lakes, Telequana Lake and Whitefish Lake located immediately west of the Alaska Range, while traditionally very important to Lime people for resource harvest activities, have been used less frequently by them in recent times.

## Climate and Weather

The land use area of Lime Villagers generally is characterized by a mountainous transition climate close to and within the Alaska Range and a continental climate away from it. Lime Village, centrally situated in relation to these two climatic types, receives weather from both. Wind storms are channelled through mountain passes and can occur during any time of the year. Thus the weather in the vicinity of the village is usually quite variable both within a season's time and from year to year. While people are very sensitive to weather conditions and possible changes, they are hesitant to predict them very far in advance.

No official long term weather data has been recorded at Lime Village. However, it does exist for Sparrevohn Air Force Station, which represents a mountain transitional climate and Sleetmute, which has a continental climate. See temperature and precipitation information from these locations as shown on Table 4.

In general, Lime Village can be said to experience cool to warm summers often with considerable number of days that are overcast and rainy especially in the latter part of the season. While it has been known to snow in June, summer temperatures may reach into the 80's for periods of time with thunder-storms occurring infrequently. People prefer warm dry weather, especially during the salmon fishing season,

because it helps to facilitate the drying of the fish. When necessary, people continue to work and travel outdoors regardless of weather,

TABLE 4

TEMPERATURE AND PRECIPITATION IN THE VICINITY OF LIME VILLAGE

| Sparrevohn (13 years) | Sleetmute (10 years) |
|---|---|
| Average Temperature: | Average Temperature: |
| Summer- 40° to 61° | Summer- 37° to 66° |
| Winter- 0° to 20° | Winter- -12° to 24° |
| Extremes- -47° to 82° | Extremes- -58° to 90° |
| Average Precipitation: | Average Precipitation: |
| 24" including 90" snow | 21" including 81" snow |

From: Selkregg, L. 1974. Alaska Regional Profiles, Southwest Region, Anchorage: University of Alaska, page 14

although a heavy downpour can cause them to postpone activities. In spite of many cool, overcast days during the 1982 summer season, people processed a large number of salmon.

Freezing night temperatures may begin as early as late August with freeze-up usually happening between mid-October and early November. However, the Stony River has been known to freeze in early October as well as to stay open into December. People continue to use their boats in soft running ice, while they prefer not to travel in hard running ice because of possible damage to boats and danger to lives. People depend

on frozen waterways for winter travel, and a delayed freeze-up especially combined with poor snow conditions for travel on land can adversely affect resource harvest activities. The river has also been known to freeze up quickly and then reopen during warm spells, creating dangerous travelling conditions. During the fall of 1982 the river froze fast and early at the beginning of October, shortening the whitefish season. At the end of the month the water warmed above freezing long enough to thaw the ice in places and to produce a hazardous situation for river travel at least into November.

Winter temperatures are usually below freezing with several very cold spells of -30° to -50° common in a season. People continue regular work activities in temperatures down to -20° and -30°. While people will travel and work outdoors in very cold clear weather, they consider heavy blowing snow to be the worst weather to be out in and avoid it whenever possible. Daylight hours are short during the winter, but people compensate for this condition by travelling by moonlight when it is available. On December 21 the sun rises at about 9:15 a.m. and sets at about 2:45 p.m.

"Crust time", which sometimes begins as early as March and may occur through most of April, happens with lengthening daylight hours when temperatures rise for a portion of the day above freezing and drop below freezing at night. This combination of freezing and above freezing temperatures in a 24 hour period creates a hard crust on the top of the snow during the morning hours which is ideal for easy, fast travelling by sled or on foot. People especially enjoy this season of increasing light and warmth after the long, dark cold days of mid winter and get

outdoors as much as they can. Cold snaps and stormy weather, however, are still very possible during this season.

Break-up usually begins in April and becomes well-advanced in May. During this season temperatures regularly reach above freezing during the long days and sometime at night as well. Conditions for travelling by sled and on foot during breakup are very poor as the snow and ice is slushy and wet and there is much excess surface water. Outdoor travel is somewhat hampered, as it is during freeze-up, until the snow and ice melts sometime in May and people are again able to travel more easily by boat and on foot. Late spring and early summer is a time of increased activity with people taking advantage of the long daylight hours. On June 21 the sun rises at approximately 3:20 a.m. and sets at 10:40 p.m. with no period of complete darkness occuring.

# CHAPTER II

# THE ECONOMY OF LIME VILLAGE

## Introduction

Traditionally, the Stony River Dena'ina, of whom most Lime Villagers are descendents, were semi-nomadic people who travelled widely to procure resources. They maintained winter villages at base camps from which they moved seasonally to fish camps and hunting and trapping locations. Today, in spite of being more permanently based at one central location, Lime Village people continue to follow, in modified form, traditional seasonal patterns.

The contemporary Lime Village economy is based primarily on the use of local land, river, and lake resources, which include: fish, water and land mammals, waterfowl and other game birds, and plants. Large game animals, particularly moose and caribou, certain furbearing animals, and salmon and whitefish are especially important resources.

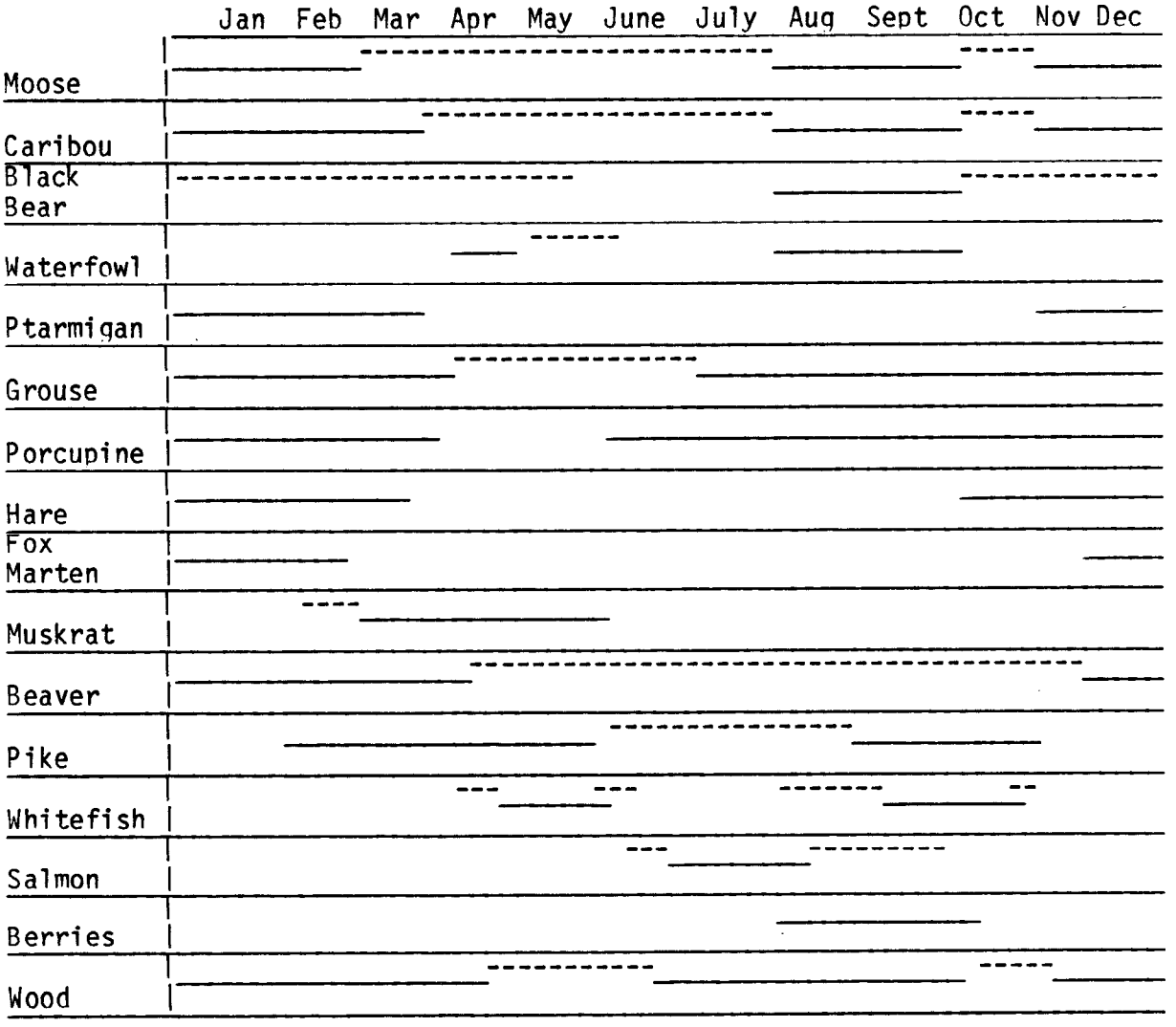
Households are largely supported by hunting, fishing, trapping, and wood gathering. Work units for harvesting and processing resources are composed of members from single or multiple household units that are usually kin-related. Most products are used personally by families or shared within the village. Some are exchanged locally or sold on export markets. Wage-paying jobs in the local area are extremely limited and usually seasonal. Families supplement their livelihood derived from local resources with some wage income and/or income in the form of federal or state assistance.

## Seasonal Cycle

The seasonal round of resource harvest activities is the basis for the annual cycle of life of Lime Village today. The seasonal cycle is diagrammed in Table 5. The year is divided into two primary seasons,

TABLE 5

SEASONAL ROUND OF HARVEST ACTIVITY FOR SELECTED SPECIES, LIME VILLAGE, 1976-83
Usual Period of Harvest _____; Occasional Effort ----------



the open-water season (May-October) and the closed-water season (November-April). These seasons define the types of transportation that people use for resource harvest activities: (boat and foot travel during the open-water season), and (foot, dog, and snowmachine travel during the closed-water season). Break-up (April-May) and freeze-up (October-November) are seasonal periods intermediate between the open and closed water seasons in which travel is limited due to poor ice and snow conditions. Smaller seasonal periods defined by available resources and weather and travel conditions also exist within the larger open water and closed water seasons and in some cases overlap with break-up and freeze-up. Following is an outline of the resource harvest and other work activities of Lime Villagers during these periods.

Today in mid to late spring (April-June) Lime Village people travel to the lake-country south of the village to fish for whitefish, grayling, pike, and suckers and to hunt waterfowl and muskrats (see Maps 1, 2 and 3). People maintain a number of spring camps in the area including at Qedeq Vena, Kutokbuna Lake and Tundra Lake. There is also some use of the lakes north of the village in the spring and fall for these purposes.

The spring fish runs and returning waterfowl are very welcome food resources for Lime people, as they arrive at a critical time when winter food supplies may be low and land mammals are difficult to hunt due to break-up and poor travelling conditions. People usually transport equipment and supplies to the camps by sled so they may begin hunting and fishing there before the ice has completely broken up and before boat travel is possible. During this season people also prepare to travel on open water again, which becomes possible at the end of the season. They

mend boats, overhaul engines, and make arrangements for obtaining fresh supplies of fuel. Boats are used to transport the harvested resources back to the village from the camps when the waterways are free of ice.

During the summer months (June-August), people concentrate back at the village and at fish camps along the Stony River to prepare for and harvest the salmon runs that begin during the last part of June and continue into August. Salmon fishing is one of the most important activities of the year, as it provides a dependable, staple food for both human and dog consumption. Most households dry large quantities of salmon for winter use. Berries start to ripen at the beginning of August and, in some years, are available for gathering into October. Households always put up large quantities of berries when available: blueberries, low-bush cranberries, and lowbush salmon berries are especially favored. People peel birch bark and dig spruce roots during the summer months to use in making birch bark containers. They also peel spruce bark, which they use as roofing and siding materials for building camps. A variety of other plants which are used for food, medicine, handicrafts, and construction projects are also gathered in the summer. During the open-water season, most households make several trips by boat to the Kuskokwim communities of Stony River village, Sleetmute, and Red Devil to haul supplies and to visit relatives and friends. Also during this season, some wage employment, usually in the form of construction work, may be available in the village for local people. Typically, some residents also seek employment outside of the village each summer, most frequently in the Kuskokwim River communities.

During late summer and fall people return to the lakes south of Lime and sometimes north of Lime and to the Tishimna Lake area to harvest

whitefish and waterfowl. People usually harvest more whitefish in the fall than during the spring season, because they want to have a good supply on hand for winter. People dry whitefish during the early part of the season and fresh-freeze it during the later part when temperatures are cold enough.

In late summer and fall people hunt the large game animals (caribou, moose, and black bear) most actively, travelling to a variety of environments to find them. They go to the mountains for caribou where they sometimes also hunt ground squirrels and marmots. Areas commonly used are the Lime Hills, the mountains immediately north and south of Qeghnilen, and Cairn Mountain.

Traditionally people regularly made trips to the Alaska Range for sheep hunting, travelling overland on foot to the upper Swift River area or by boat or foot to the upper Stony River area (see Maps 1, 2 and 3). Sheep hunting occurs less frequently today. According to Lime Villagers, moose and caribou are more abundant and accessible to them now than in the past and much more easily obtained than sheep.

Favorite fall and winter caribou hunting grounds are the hill country south of Hungry Creek and Trout Lake and the area surrounding Tundra Lake. The uplands west of the Lime Hills and north of the mouth of Can Creek are also commonly used. People look for moose, caribou, and black bear in flats throughout their land use area. They hunt moose intensively along the Stony River and its side streams including Stink River and Hungry Creek. They also use Caribou Snare Creek and other streams that drain into Tundra Lake. Can Creek is an important hunting ground for both moose and black bear.

Late summer and fall is one of the most important seasons for resource harvest activities for Lime Villagers. The approach of freeze-up, a period of time when travel is difficult, followed by winter, when game can be more difficult to procure, pressures people to put optimum energy into harvesting large quantities of resources during late summer and fall. They hunt and fish intensely as well as cut and haul large quantities of firewood by boat. This is also the season when sport hunters from other areas are increasingly competing for game with Lime Villagers in their traditional land use areas. Local people note that the increased air traffic that sport hunters bring into the area frightens game and makes it more difficult to hunt.

Trapping, hunting, and wood-hauling are the main resource harvest activities of the winter months. Besides large animals, people hunt hares, porcupine, grouse, and ptarmigan for food. Beaver is the most important small animal which they harvest both for its meat and its fur.

Lime residents commonly trap marten, fox, and mink for their fur during the winter trapping season and take wolverine, wolf and lynx occasionally. The land area between the Stony and Swift Rivers from the old village site of Qeghnilen to the vicinity of Ch'atatnadetl'ech', locally known as Black Creek, is heavily trapped by Lime Villagers. They also regularly trap Stink Creek and the Tishimna Lake area, Can Creek, the area between Tundra Lake and Sparrevohn Air Force Station, and Hook Creek.

One or more members of each household usually do some trapping each year. For most households furs are a supplementory income. However, for at least one household during the 1981-82 and 1982-83 trapping seasons, fur was a primary source of income. Especially when prices are high, trappers

sell most of their fur on the commercial market generally to Kuskokwim River traders. Some furs are kept each year to make into mittens, hats, slippers, and other clothing for family use, local exchange, or commercial sale.

Outdoor work doesn't slacken greatly even during the cold, dark months of mid-winter, as people are not adverse to being out in cold weather or travelling by moonlight. Local resource harvest activities are the primary means by which Lime Villagers make their livelihood, and they continue them year-round. However, during the Christmas and New Year season, religious and social celebrations are important and there is much visiting, feasting, and gift-giving. Individual households put on large communal dinners with food they have saved during the year especially for the occasion. As Lime residents are predominantly of the Russian Orthodox faith, they have both the Russian and American holidays to celebrate, although the Russian holidays are of most significance to them.

Late winter and early spring is a season of increasing warmth and light, which people enjoy greatly. Besides hunting and trapping, they begin fishing again, travelling especially to Tundra Lake to hook for pike. Crust-time occurs during this season, in which temperatures rise above freezing for a portion of the day and drop below freezing at night. As previously mentioned, this combination of above and below freezing temperatures creates a hard crust on the snow which is ideal for easy, fast transportation by sled. People make the most of these good travelling conditions, often hunting and trapping further away from home during this period.

## Cash Economy And The Cost Of Living

This section attempts to describe the involvement of Lime Village residents in the cash economy during contemporary times. As previously noted, Lime people are minimally associated in the cash economy and give the priority of their time and energy to local resource harvest activities. However, the high cost of transportation and imported goods within the region makes it necessary for all Lime households to have a source of cash, either through a regular monthly income or from seasonal work. Usually only one or at the most several members of a household are employed in wage work, leaving other members free to be engaged in noncommercial activities.

Local job opportunities for Lime residents are few and usually seasonal. The school has been the single most important employer both during and since its construction in 1976. Lime Village and Telida were the last Native communities in the State to obtain elementary schools. Construction of an airfield, a community hall, and a fuel line for the school have provided some short-term summer work for residents in recent years. At least five local people were employed for a portion of the 1982 summer season in the construction of teacher's quarters by the Iditarod Area School District. The District also hired several residents to supply the school with firewood for heating. Although some residents have been trained as firefighters, work has not been available most seasons including 1982.

School maintenance, school teacher, teacher's aide, bilingual aide, and health aide positions have been longer term jobs available in the village. Only the school maintenance job has been filled continuously with local people. During the 1982-1983 school year, Lime people held the

school maintenance, bilingual aide, teacher's aide, and community aide positions. The health aide job has been filled occasionally in recent years by Lime Villagers. A village administrator position was funded by CETA several years ago but did not exist during the period of this study. A Recreational Director's position has existed during the summer months for a number of years including 1982 and has been filled by a local person. In addition to the job of clearing and maintaining the airfield, which was held by a local person during the winter of 1982-1983, there was little other available wage work in the village during the 1982-1983 season.

As there are no nearby communities that offer employment options and little available wage work in Lime, residents sometimes travel considerable distances from home in order to find cash jobs. For example, one man moved his household to Red Devil during the summer of 1982 to take wage work. Among other jobs, he operated a jet boat hauling fuel from Red Devil to Lime Village. Some residents took jobs at Sparrevohn Air Force Station for a period of time during and after its construction in the 1950's but quit, they said, because working that far from home interferred too much with their local harvest activities and with their home life.

There is no commercial fishing in the local or regional area, so today fish are strictly a domestic resource for Lime Villagers. Lime residents do not regularly go outside the area to participate in the commercial fishing industry as, for example, do Nondalton residents in Bristol Bay. In the 1960s, some Lime residents joined Nondalton people to work in Bristol Bay but stopped after several years because the high costs and

low returns apparently were outweighed by the benefits of subsistence fishing at home during the summer.

The tendency, especially for long-term residents, has been to stay in the village and take short-term wage work there periodically. Some available local jobs have remained unfilled for periods of time at least in part because their requirement for scheduled hours interferes with local resource harvest. On the other hand, Lime people feel that some jobs they have been qualified to fill have been given to non-local people, such as the construction of B.I.A. houses in the early 1970s. Some residents have expressed a strong need for more locally available jobs that are preferably not generated by outside developers.

## The Cost of Living

Living costs are generally high for communities throughout the Central and Upper Kuskokwim regions because of their distance from a major transportation and service center and the difficulty of accessibility by surface transportation. Because Lime Village is the most geographically isolated of the communities, imported goods and transportation costs are especially high for residents as well as often difficult to obtain. The highest costs for most Lime Village households is transportation, comprising the price of commercial air service to travel and obtain supplies and services outside the local area, and the maintenance of their own transportation equipment and fuel. (See "Regional and Inter-Regional Travel" for specific information on travel costs.) Other major costs are household supplies, including groceries, and technological items used in the local production of goods.

Residents depend heavily on the mail plane from McGrath to avoid the high cost of air charters and air freight in obtaining commercial goods and transportation for themselves. The majority of families mail order many of their supplies from Anchorage, which is generally less expensive than purchasing them from McGrath.

Fuel is the most costly of the regularly imported products to Lime. If there is adequate space, the mail plane will haul it as air freight in five-gallon containers. According to Hub Air employees, air freight is $5.00 for 40 pounds or less and 25 cents a pound over 40 pounds. Gas at the pump in McGrath was $2.35 per gallon during the period of this study, which put the price of five gallons of gas air freighted to Lime at $16.75 or $3.35 per gallon. To charter three drums of gas to Lime during this same time period cost $315.00 for the price of the charter, plus $362.50 for the gas in McGrath or about $4.50 per gallon of gasoline in Lime.

The Stony River is too shallow for barge and large boat travel and therefore there is no public or commercial transportation on it. During the open water season, Lime residents commonly travel by privately owned boats to the Central Kuskokim communities of Stony River village, Sleetmute and Red Devil to obtain supplies and to visit relatives and friends. Most households make at least several trips there during the season, especially to obtain fuel which is less expensive procured by boat than by air. For example, during the 1982 summer season, a drum of gas in the area cost between $90.00 and $120.00. Including the cost of transportation, three drums air chartered from the area was said to cost between $600.00 and $700.00 or approximately $3.50 to $4.50 per gallon. By boat, Lime Villagers could haul the same amount for approximately

$60.00 in transportation costs or about $2.50 per gallon. However, most Lime Village boats are capable of hauling only one or two drums at a time. Individuals who charter or haul large quantities of fuel sometimes sell it in the village at a profit. During the 1982 summer season, one man made several trips by jet boat from Red Devil to Lime Village hauling gas which he sold to residents for $3.60 per gallon. During the spring of 1983 gas was selling for about $4.00 a gallon in the village.

Most of a family's annual fuel consumption is used for local transportation for hunting, fishing, wood harvesting, and other subsistence activities. More fuel for travel is consumed during the open water season when outboard-powered motor boats are the main vehicles for transportation. In the winter a household's fuel costs for local transportation are cut significantly by the use of dogs or a combination of dogs and snowmachines as the major means of travel. It is estimated that the average household used between three to seven drums of gas during the 1982 open water season. Between three and four drums of gas were consumed on the average during the 1981-82 and 1982-83 winter months if a snowmachine was used in combination with dogs for travel and eight or more if only a snowmachine was in operation.

Home consumption of fuel rises in the darker winter months due to the increased use of Coleman and kerosene lanterns. Most households also own Coleman stoves, which they use occasionally. "White gas" or "Blazo" was selling for about $5.00 per gallon in McGrath during the 1982-83 winter season. Lime families estimate they use between 5 and 10 gallons of white gas in a winter month. Wood, the main source of fuel for heating and cooking in all households, is harvested primarily by chainsaws,

which all families own, although swede saws are sometimes used to conserve gas.

Technological items used in the production of goods is another major cost for Lime Village residents. While some individuals still make and use wooden boats, which are produced at very low cost, others own aluminum skiffs, which they purchase new or second-hand at a significant expense.

During the 1982 open water season, four handmade wooden boats and at least five aluminum boats were in use in the village. One wooden boat had been made that season while another was still in good operating condition after over 10 years of service. Several aluminum boats in use were 12 and 14 years old. One had been freighted in new from Anchorage, while another had been bought second-hand in one of the Central Kuskokwim communities. The latter is the most common means by which Lime people obtain commercially made boats.

During the same season, there were at least 9 outboard motors being used in the village ranging from 10 to 25 horsepower. Residents claim that the average life expectancy of a frequently-used motor on the Stony River is usually two to three years. The price of a new 25 h.p. outboard motor on the commercial market in McGrath during the 1982 summer season was about $1,500.00. Besides the initial cost of a motor, there is also the additional expense of replacing parts that wear out or become broken. Residents estimate that during one season, the lower unit may break and have to be replaced as many as three or four times, because the streams they frequently travel on are rocky and often shallow.

During the last few years the number of operating snowmachines in Lime Village has increased, with about half the households possessing them

during the 1982-83 winter season. Most snowmachines are obtained second-hand from Central Kuskokwim communities and driven to Lime in order to avoid charter and freight costs. Besides the initial cost of the machine, there are the additional expenses of fuel and replacement parts.

On the other hand, a team of dogs is kept at relatively little expense when fed primarily on locally harvested fish and other food scraps as are all Lime Village dogs. It is estimated that during the 1982-83 winter season, most households used less that 10 percent commercial food for their dogs with several households using no commercial food.

Other commercial equipment, which household must purchase, maintain, and operate, and which are necessary for resource harvest activities, include chainsaws, snares and traps, whitefish and salmon nets, and rifles and shotguns. Although the initial expense and the operating costs of these items may be substantial, maintenance costs are low and replacement is usually not necessary every season. People are aware of the expense and difficulty of replacement of equipment and are generally very careful in the use and maintenance of it. A rifle, for example, is costly to buy new, but generally has a relatively long life and low maintenance expense. However, operating costs are high because rifles are actively used year round and shells are expensive. A box of 30-06 shells on the retail market in McGrath cost between $15.00 and $18.00 a box during the summer of 1982. At the height of the fall hunting season, the stores were sold out of them.

One Lime man estimated that a 70 mile hunting trip he commonly makes by boat from Lime Village to Stink River cost him about $50.00 in expenses in 1982. He figured that gas and oil to operate his boat cost about

$35.00, while ammunition, groceries, and other miscellaneous expenses cost at least another $15.00.

Another significant cost category for most Lime households is groceries, which they use primarily as a supplement but not a substitute for local foods. A variety of animal and fish species which provide high protein and high energy foods are relatively easily accessible to Lime Villagers through hunting, trapping, and fishing year-round. More fish and meat is consumed by Lime people than any other types of food. It is estimated upon observation that at least 90 percent of it is locally harvested. In contrast, plant foods with high starch and sugar contents are not readily available in significant amounts in the natural environment even during the summer season.

Including produce from gardens which some families grow in the summer, probably 5 percent or less of the high starch and sugar foods that people consume are harvested locally. They obtain most of these foods, which they use to complement the high protein and fat foods they produce themselves, from commercial grocers in Anchorage and McGrath. White flour, white rice, sugar, tea and coffee are the most commonly used commercial foods. Most households also order milk products (in the form of canned or powdered milk), cooking oil and/or lard, margarine or butter, and eggs. Some households also keep a supply of other canned goods on hand.

The proportion of locally produced foods and commercially purchased foods used varies between households and even between individuals within households. Older individuals consistently eat mostly locally harvested foods because they greatly prefer them over commercial foods. While younger people also prefer local meat and fish over commercial products

of the same type, they tend more regularly to supplement their local foods with commercial goods than do older people. A household's cash income and the availability of local food resources during a given time period also may determine the amount of commercial and Native food that an individual consumes. Except for infants, it is estimated that at least 50 percent of the total food intake of most Lime Villagers regularly consists of locally harvested foods. For half or more of the residents, the percentage of local foods in the diet is higher (60 to 90 percent depending in part on variables discussed earlier.)

Following are sample meals of three different Lime households during different seasons. The annual incomes of the households are described as low, average, and high in relation to other households in the village. Semicolons (;) indicate separate meals.

HOUSEHOLD NUMBER ONE

Household Number One is headed by an older generation couple whose annual average cash income is low to low-average. The number of members in the household varied over the period of this study.

| Fall 1982 | Place | Food |
|---|---|---|
| Day 1 | Village | Fried moose meat, locally-grown boiled potatoes, wild raw carrots. |
| Day 1 | Camp | Dried salmon. |
| Day 2 | Camp | Fried moose meat; boiled whitefish; boiled whitefish, fried moose meat. |
| Day 3 | Camp | Fried moose meat, potatoes, dried salmon; boiled caribou heart and kidneys, can of tomato sauce; boiled caribou tongue. |
| Day 4 | Field | Roasted caribou ribs and leg marrow. |

| | | |
|---|---|---|
| Day 5 | Village | Boiled moose intestines and heart; fried moose meat. |
| Day 6 | Village | Fried moose meat. |
| Day 7 | Village | Moose soup with rice, whitefish Indian ice cream with blueberries. (Indian ice cream or nivaqi is a favored dish that usually consists of mashed cooked fish or animal meat lard, sugar, and fruit.) |
| Day 8 | Village | Boiled pike; fried pike, pilot bread; whitefish Indian ice cream. |

| Winter 1982 | Place | Food |
|---|---|---|
| Day 1 | Village | Fried caribou meat, locally-grown boiled potatoes. |
| Day 2 | Village | Moose soup, cornmeal mush with canned milk. |

HOUSEHOLD NUMBER TWO

Household Number Two consists of an older generation couple whose annual average cash income is relatively high for a Lime Village household. While no other village residents use their house as sleeping quarters, they share meals and food regularly with at least six other people, consisting of their children and spouses and grandchildren, and frequently with a number of others who are also closely related. The older generation couple's diet consists primarily of local food. Their home is well-stocked with groceries, a high percentage of which are used by younger generation people.

| Fall 1982 | Place | Food |
|---|---|---|
| Day 1 | Village | Duck soup with rice, boiled porcupine, crackers. |

| | | |
|---|---|---|
| Day 2 | Village | Boiled black bear meat soup with rice, crackers. |

| Winter 1982 | Place | Food |
|---|---|---|
| Day 1 | Village | Boiled eggs, homemade bread. |
| Day 2 | Village | Boiled moose meat soup with rice, boiled moose tongue, smoked salmon, crackers. |
| Day 3 | Village | Boiled moose meat soup with rice, canned beans, homemade bread. |

HOUSEHOLD NUMBER THREE

Household Number Three consists of a younger generation family composed of a couple and their three children whose annual income at the time was average for Lime Village. They frequently eat their meals as a separate family unit while irregularly sharing meals with other village residents who are not related as siblings or parents.

| Fall 1982 | Place | Food |
|---|---|---|
| Day 1 | Village | Moose meat and macaroni with tomato sauce, fried silver salmon, salad made with locally-grown garden vegetables. |
| Day 2 | Village | Pancakes, syrup. |
| Day 3 | Village | Smoked dry moose meat, homemade bread, homemade highbush cranberry jelly. |

| Winter 1982 | Place | Food |
|---|---|---|
| Day 1 | Village | Fried moose meat and crackers. |
| Day 2 | Village | Bacon and toast made with homemade bread. |
| Day 3 | Village | Moose soup with rice and homemade bread. |

| | | |
|---|---|---|
| Day 4 | Village | Boiled salmon and homemade bread. |

Commercial tea or coffee, sugar, and salt were available with all meals, and canned milk, and butter or margarine with most meals (Households 1-3).

Most Lime households are subject to considerable fluctuation in cash income both seasonally as well as yearly. The 1982 annual cash income for a typical Lime household consisting of four to six persons is estimated to be between $4,000.00 to $6,000.00 or between $1,000.00 and $1,500.00 per person, with several households receiving over this amount and several under it.

However, the income of above average households as a rule reaches beyond the immediate household to lower income households most often in the form of groceries and other commercial goods. Thus, the system of sharing, which prevails in the subsistence sector of the economy, is extended at least indirectly into the cash component of the economy.

The livelihood of an average Lime household is generated through a combination of harvest of local resources for domestic use, seasonal wage work, fur and handicraft sales, and usually some type of government assistance in the form of cash, food, fuel, and medical services. It is estimated that a typical Lime household may make betweem $1,000 to $2,000 through fur and handicraft sales and $2,000 to $3,000 through seasonal wage work annually. Between 30 percent and 50 percent of the household's cash income is probably spent on transportation and fuel costs, 20 to 30 percent on household supplies including groceries, 20 to 30 percent on equipment used in harvesting local resources, and the rest for miscellaneous expenses.

These costs make it necessary for one or more members of most households to obtain some wage work annually. Whether Lime residents

will enter more heavily into the wage economy or be able to maintain their present high level of involvement in noncommercial work may depend on a combination of factors that include continued access to their traditional lands and the availability of sufficient wage work in the local area.

## Patterns of Resource Sharing and Exchange and Social Organization of the Economy

This section describes the social organization of the Lime Village economy and the patterns of resource sharing and exchange that occur within it. It demonstrates that Lime households are not isolated social and economic units but are part of a traditional sharing and exchange system upon which much of the daily life of the village is based. Many of the resources a household obtains through fishing, hunting, trapping, and gathering are acquired by working with members of other households and not as an isolated unit. A household gains material goods not only through its own work efforts, work efforts with other individuals, or through commercial channels, but also through a traditional system of sharing and exchange that reaches beyond one's immediate household and work partners. This system produces a flow of food and other material goods as well as services that are basic to the normal, daily social interaction of the village. The result is that a significant portion of the material goods a household acquires is passed on to other households. In turn, a significant portion of the material goods a household uses is obtained from other households.

## Patterns of Resource Sharing and Exchange

Lime Village residents share and exchange resources with each other extensively because the indigenous cultures of which they are a product did so traditionally, and because they are a small, relatively isolated population having limited access to non-local resources. Several types of exchanges commonly take place within the community: sharing, the use of a resource collectively by individuals without direct reciprocity expected by the producer; giving, the bestowing of a resource on another individual(s) without direct or immediate reciprocity expected; trading, the exchange of a resource for another without the use of money; selling, the exchange of a resource for money; and borrowing/lending, a party allowing another party the use of a resource he owns for a period of time.

Sharing and giving: Lime Villagers share food resources that they harvest more than they do any other resource. Traditionally, this practice insured that no individual(s) went hungry if food was available and it continues to be true today. The rare person who does not share these resources is considered by the community to be "stingy", an attribute which is strongly frowned upon. Sharing also helps to prevent waste which is also deeply disfavored by the traditional value system.

Community residents prefer moose and caribou for food to any other resources and they share them the most extensively. A fat moose is the most prestigous animal a hunter can obtain, and he usually shares some part of it with all households. If the village is out of fresh meat when a large game animal is harvested, the hunter commonly divides the meat among all the households giving a portion of each major part of the animal to each household. The ideal is for each household to receive

a variety of meat. Choice parts of the animal, such as the organs, intestines, the tongue, are often given to older residents of the village or to other persons the hunter wants to favor. If the animal is fat and of good quality, the hunters family may also invite members of other households to share in a meal of the kill.

If a household has a significant supply of fresh meat when an animal is harvested, it may receive little or none of the newly obtained meat. For example, in November 1982, 3 hunters travelling by dog team and snow-machine took a moose about 20 miles out of the village. They hauled the majority of it in the two sleds at the time, returning for the rest of it the next day. They divided it among all households except one, which had harvested fresh meat recently and not shared it. It was the only moose harvested during the late fall hunting season of 1982 and one of the last ones of the calendar year for the village. In a group hunting situation as in the example just described, often several people fire at an animal, in which case it may be unknown or at least insignificant which person is most responsible for the kill. Under such conditions, all members share also in the responsibility of dividing and distributing the meat.

The August to September 1982 moose and caribou seasons were very productive for the community with all households obtaining a plentiful supply of meat. Especially after the beginning of the season, there was little flow of fresh meat among households as almost all had a supply of it. Special efforts were again made at the end of the season to share game with those who had harvested an insufficient supply and/or to assist them in harvesting their own. When a large amount of meat is harvested at one time, especially by only one or several hunters, he or they may

butcher and haul only a portion of the animal. Other village residents are then informed of the kill and its location and told to haul their own portions, thus reducing the hunter(s) own effort and expense. The following is an example of this type of sharing.

Near the end of the 1982 early fall hunting season when the village was nearly deserted for various reasons, two men related distantly through marriage hunted together and killed four caribou. One of the hunters took two of the caribou because he had harvested little meat earlier in the season, while the other hunter, who already had cached a significant amount of meat, took one of the caribou. They told one of the few residents remaining in the village, an uncle by marriage to one of the hunters, about the fourth caribou. He then butchered and hauled it for his household and that of his father-in-law.

Lime Villagers share small game animals to a lesser extent than large game animals, because they do not provide the quantity of meat that large animals do and therefore there is less to share. Especially if an animal is of good quality, members of another household may be invited to share it at a meal or it may be given to an elder or to another household as a present. The first catch of waterfowl or fish of the season is usually shared and people continue to share them throughout the season, especially with a household that is unable to harvest its own.

People share less regularly and in smaller quantities the more abundant, dependable, relatively easily harvested resources such as salmon and whitefish. Most, if not all, households in the village have the ability and equipment to put up their own fish if they are willing to spend the time and energy doing so. A person or household which does not put up fish, simply because of laziness will not receive much sympathy

from other villagers. However, this rarely occurs. A person or household who is not able to fish due to justifiable circumstances such as illness, family problems, the need to work for cash, or environmental reasons, will be shared or traded with by other members of the village, usually by closest kin or persons with the largest quantity of the resource.

The following example illustrates this type of situation. A couple who regularly traps the Tishimna Lake area each winter usually harvests a large quantity of whitefish for themselves and their dogs there at the end of the fall whitefish season. Because of an early freeze-up during 1982, they obtained very few fish. However, households who had put up quantities of fish earlier in the season shared with them extensively.

Besides sharing and giving material resources, Lime Villagers make their skills and knowledge available to other community residents often without expecting to be directly repaid. The following examples portray some of this type of sharing that occurs in Lime.

Example 1: During the summer of 1982, an elder of the village directed his son, grandchild, and son-in-law in making a traditional-style smokehouse out of birch branches, birch bark, and poles at his fall camp near Tishimna Lake. The younger men supplied the physical labor while learning new skills.

Example 2: During a portion of the 1982-1983 winter trapping season, a woman was responsible for the family trapline while her husband was out of the village for an extended period of time. When she went to check the line, she left her children in the care of her niece and was accompanied on the trip by her brother-in-law and sister.

Borrowing and lending: The practice of borrowing and lending items that are individually owned is common among Lime Villagers. As noted

earlier, locally harvested foods especially are an exception in that they are usually shared or given away.

The length of time an item is to be loaned may be agreed upon at the time it is borrowed in consideration of the owner's as well as the borrower's needs. The lender expects nothing directly from the borrower except that he return the item if he is able. If the item is lost or broken the lender does not usually expect the borrower to replace it but may feel he has a special right to borrow from him when he is in need. It is not unusual for two households or individuals to develop a pattern of borrowing and lending specific items as the need arises. However, if an individual develops a pattern of borrowing and not returning, people will become reluctant to lend to him. However, several village residents in discussing the topic of borrowing and lending said there was nothing they would not lend a person if he really needed it. The following examples illustrate patterns and attitudes of borrowing and lending that exist among Lime residents.

Example 1: In the spring of 1982, a person loaned his sled to a party who left it on the beach overnight when the ice broke up, and the sled was washed away. The party who borrowed the sled did not replace it, and the owner apparently bore no hard feelings about it, saying it was an accident and couldn't be helped.

Example 2: One woman regularly "borrows" Blazo from an aunt and uncle and disposable diapers from a niece who has a child close in age to one of her own. They, in turn, "borrow" those items from her when they are in need.

Examples 3 and 4: [Boats and other vehicles of transportation are commonly borrowed or swapped sometimes for extended periods of time.] An

uncle and nephew traded boats for most of the 1982 summer season. For a period of a few days during late September 1982, at least a third of the boats owned by Lime Villagers were not being used by their owners. Two cousins by marriage swapped boats as one was travelling a considerable distance and needed the use of a sturdier boat than his own. A nephew who was then without use of his parents boat borrowed his great-uncle's boat, the older man then making use of another nephew's boat.

Example 5: An elder loaned his grandson the use of some of his dogs during the 1982-83 trapping season. The older person benefited by having his dogs exercised regularly while the grandson was able to trap a further distance from home by being able to travel by dog team and not on foot.

Trading and selling: The majority of economic exchanges that occur among Lime Villagers do not involve money. An item that is not shared or given as a gift is usually exchanged for another item or possibly for a service rather than for money. However, the more valuable an item is in terms of dollars in the commercial economy, the more likely a Lime Villager is to exchange it for cash whether it be with another village resident or with a person outside the local economy. Furs are the most lucrative natural resource that Lime Villagers possess and the majority of commercially valuable ones which they sell. Snowmachines, boats, boat motors, chainsaws, fuel and other especially valuable goods tend to be sold as often as they are traded.

Example 1: An uncle traded to his nephew through marriage a new sled he built in exchange for a second-hand motor which the older man wanted to use as parts. The same man traded another sled he made with a resident teacher for a quantity of fuel. He sold another sled he built to a man living in one of the Central Kuskokwim villages for $300.

## Primary and Secondary Distribution

The exchange of resources takes place through both primary and secondary systems of distribution. If the items of exchange are a natural resource, primary distribution usually occurs soon after the resource has been harvested and often in an unprocessed form. In secondary distribution, a primary recipient shares or exchanges the resources with a third party and more often in a processed form than in primary distribution. Secondary distribution serves significantly to extend the network of exchange well beyond the primary parties. For example, a woman receives four freshly caught whitefish from an older cousin who has direct access to the first fish of the season. The primary recipient takes three of the whitefish to her mother who also has not harvested whitefish yet this season and asks her to make Indian ice cream. The older woman saves one fish to eat fresh and prepares the other two as Indian ice cream. She divides it between her daughter's household and her own and saves a portion to take to relatives in Nondalton that she plans to visit in a few days. Meanwhile, she shares the meal of fresh boiled whitefish that she prepared for her family that night with an older brother.

Both primary and secondary distribution have their advantages and disadvantages. The direct transaction of resources between two parties serves not only to distribute the item but, if the exchange is viewed favorably by both parties, serves as a connecting event between them which may easily lead to other such exchanges in the future. For example, certain households regularly exchange certain goods because a favorable pattern has been established in the exchanges between them. On the other hand, secondary distribution occurs sometimes, but certainly not

always, because exchange in the past has not generally worked out satisfactorily between two parties. If exchange is desirable or necessary between them, a third party may facilitate the exchange. On the other hand, the distribution of a good through a third party, especially when the donor means it as a gift, can help to dispel the possible feelings of debt the receiver might feel.

Thus, it is not uncommon for a household to use local resources, especially food, that they themselves have not harvested and to share the resources that they have received beyond their household. The same is true to a lesser extent of goods not produced in the local area.

Potlatching is a formal means of distributing resources in the form of sharing food and giving gifts in Lime Village as well as other Native communities. For special occasions, such as a holiday, birthday, marriage, or funeral, individual or combined Lime Village households put on "potlatch dinners" in which they prepare a large meal with a variety of different foods and invite the rest of the village members to share in it. Sometimes, people from Stony River village, Nondalton, and other places come for these occasions. If there is food left after the dinner, the guests are given platefuls of it to take home with them. Households save food especially for these occasions and may spend several days or more in the actual preparation of it. Indian ice cream is a relished dish that is often made for such special occasions. In a funeral potlatch, the family may distribute the belongings of the deceased among his relatives.

## Sharing and Exchange Beyond the Village

Lime residents extend their sharing and trading practices to individuals and situations outside of the Village. Most of Lime Village's wealth is in its natural resources and in the products that people make from these resources. Lime Villagers share and exchange goods and visits beyond the village with people in other communities in order to strengthen kinship and friendship bonds. Funerals and holidays commonly serve as mechanisms to bring people together. Lime Villagers also exchange raw material and handicrafts for commercial goods produced outside the village either by dealing directly with a commercial enterprise or indirectly through an acquaintance or relative living outside the village.

Because of close kinship as well as cultural and religious ties, Lime Villagers have strong connections with Nondalton and Stony River village people and with families in Sleetmute, Red Devil, and McGrath. A party travelling by boat from Lime to Stony River village will usually harvest game they encounter and give it to people in Stony River village. For example, Lime Villagers travelling to a funeral in Stony River in the fall of 1982 took moose meat with them to share with families there. Stony River people travelling to Lime will do the same as well as possibly bring additional fuel and other commercial products to give to or trade with Lime people. Stony people will sometimes travel specifically to the Lime area to hunt and may be assisted in their efforts by Lime people or be given meat if they are unsuccessful. They are usually but not necessarily relatives of Lime Villagers.

Exchange of visits and goods between Lime people and relatives and friends in Sleetmute, Red Devil, and McGrath are also not uncommon. Also, in spite of the distance between the two communities, quite frequent

exchange takes place between Nondalton and Lime. At least several Lime people regularly go to Nondalton each year to trade or sell birch bark containers and other handicrafts.

Lime resources not uncommonly travel beyond the region to relatives and acquaintances outside of it. For example, a former family of Lime returned there during the fall of 1982 to visit and brought back dried meat and dried fish to McGrath, some of which they sent to relatives in Fairbanks. Another time, a resident of Fairbanks was given dried meat by a Lime person which was shared with mutual friends in Kenai.

Lime Villagers also exchange resources and handicrafts with commercial businesses for commercial goods or cash. They have had a long history of commercial trade with the Central Kuskokwim communities of Stony Village, Sleetmute, and Red Devil. With the change of mail service from Sleetmute to McGrath in recent times, much of their commercial trade has shifted to McGrath.

People also extend their traditional practice of barter beyond the region. For example, during the summer of 1982, one woman paid a bill she owed a grocer in Anchorage with birch bark baskets she made. That same fall, she paid for a trip she made outside the village with berries she picked.

## The Social Organization of the Economy

As a population, Lime Villagers are extremely knowledgeable and skilled in the activities of hunting, fishing, trapping, and wood and plant gathering upon which their economy is based. Most adults and older children, when not in school, spend a considerable portion of

their time in the harvesting and processing of raw materials, primarily but not exclusively for domestic use.

Males, particularly young and middle-aged adult men, are the most active hunters, trappers, and wood harvesters, although older men, women, and children are also involved in these types of work, sometimes extensively. Women also do much of the processing of the raw materials that men obtain from hunting and trapping. On the other hand, women usually assume as much responsibility as men for obtaining and processing fish. Women and children also are the main gatherers of plant materials other than wood.

The majority of Lime Village residents are related by blood or marriage, which means that most members of most work groups are affiliated through kinship lines. While members of individual households tend to share in work production for home use, work parties and partnerships are not necessarily formed between the most closely related individuals. Outside of the immediate household, such affiliations are for the most part created and discontinued as the need for them arises and disappears. However, long term partnerships do exist between people.

The following example illustrates the variability in a young adult male's hunting companions during the 1982 fall and winter hunting seasons. In September, this male went with his brother-in-law on a moose hunting excursion, and later during the same month he went caribou hunting with a second cousin by marriage. During the winter season, he went on a moose hunting trip with an uncle, an uncle by marriage, and cousin. None of his companions during any of the three hunting trips were members of his household.

On the other hand, an older generation man hunted most frequently with his wife as a companion during the 1982 fall hunting season. A nephew by marriage joined the couple on at least one trip and the uncle and nephew went along on another outing. He also hunted with a brother-in-law and son-in-law on two different occasions. Of his hunting companions mentioned here, only his wife and son-in-law belonged to his household.

When a person is in need of a work partner, he might ask an individual to join him because he is the most skillful or the most available person regardless of how closely related he is. Age and sex of individuals are also sometimes factors when individuals form work parties. While individuals of the same sex and similar age frequently work together, it is not uncommon for a work party to be composed of individuals of both sexes and varying ages including very young children. For example, during the 1982 fall hunting season, a young adult couple with their six month old child and an uncle of the woman went together by boat upriver from the village to haul wood and butcher caribou. During the same season, another party composed of a middle-aged woman and her spouse, the woman's young adult son, and adolescent niece went by boat on an overnight moose hunting trip. They camped that night at the home of a younger cousin of the woman and her spouse.

The subsistence skills that Lime Village children possess are very impressive. As infants they begin acompanying adults and older children on work excursions. As they grow, they observe and try to imitate and help with what they see others doing around them. They may be given ownership of certain equipment to encourage them in their learning. For example, several years ago, a seven year old boy began to accompany his

father on his trapline and expressed a desire for his own sets, which he was given. Although the first year he needed considerable help in caring for them, by the next year he was sufficiently independent to make his own small trapline a short way from home. He continued also to go with his father on his trapline on weekends and was taught how to drive a dog team. During the 1982-83 season, he was given a separate sled and dogs and allowed to go on long trips with his father and take short excursions by himself. Also, during the 1982 trapping season, two young girls were responsible for taking care of sets which they were given on their parents' trapline.

Girls, as well as boys, learn outdoor work skills and many Lime Village women are knowledgeable hunters, trappers, fishers, and gatherers. Traditionally in Athabaskan societies, men have been the main meat, wood, and fur suppliers with women primarily in charge of the home and in processing raw materials that men bring back. While this is generally true today in Lime Village, women's outdoor skills are very important in the economy and are not infrequently put into use. The village's small population and tendency towards female births may have operated during the last quarter of a century to give women more hunting and trapping opportunities than in a larger community where more men are available to make up hunting and trapping parties.

Although women may hunt and trap alone, they tend more than men to have a partner or be part of a larger party. In mixed company, they may (but not necessarily) take on a less active hunting role than the men. Women today also tend to work and travel less outdoors in cold weather and not to go on as many long trips. However, Lime women possess a reserve of skills and are able to work competently outdoors if a situation

demands it. Following are a number of examples that illustrate some of the different roles and skills women exhibit in outdoor activities.

Example 1: During the 1982 fall hunting season, an older couple hunting together sighted some caribou in the distance from a hill. As the caribou were coming in their direction, the man moved off the hill into the brush below, hoping to get a closer shot. The woman continued to stand on top of the hill with her gun poised. When the animals got into close enough range, both the man and woman shot, each killing one.

Example 2: Also during the 1982 fall hunting season, a party consisting of an older couple and their granddaughter were looking for moose by boat along the river. They eventually sighted a moose on an island and beached the boat, as they were not able to get a good shot before the animal ran into the brush. Leaving his wife and granddaughter in the boat with rifles, the older man took his gun and tracked the moose into the brush, finally chasing it back towards the boat where the waiting women were able to shoot it.

Example 3: Several years ago during the fall, an older man and two nieces went on an overnight trip into the mountains to hunt caribou. After walking for a good portion of the day in the rain, they reached the top of the mountain and sighted some caribou in the distance. The man immediately took off after them with his rifle while his nieces built a large fire and set up camp. The man returned a short while later and announced that he had killed several caribou. Both the man and his nieces returned to the kill site to butcher the caribou in spite of the drenching rain. After eating a meal of fresh caribou tongue and intestines, they settled into the tent for a wet night. Although it was still raining in the morning, one of the nieces managed to build another good fire on which

they cooked breakfast and dried out some of their wet bedding and clothing. Since the rain continued into the afternoon, they decided to camp at a lower elevation where they would have better shelter from the weather. Although heavily weighted down with meat and camping equipment, they continued to walk well after dark until they found the camping site they were looking for. The following day they returned to the village with some hard-earned caribou meat.

All older generation Lime residents are active and alert, maintaining their own homes and participating daily in resource harvest activities as they have done all of their lives. For example, during the 1982-83 trapping season, the oldest couple in the village ran a productive trapline which they checked regularly on foot at least three or four times a week.

Elders also take an active role in teaching the younger people of the village their knowledge and skills. For example, several years ago an older man taught his nephew how to hunt denning black bears. Since that time, the younger man has become the village's most consistent provider of winter black bear meat.

Also, a few years ago at a summer fish camp, an older woman showed her two daughters how to make and set traditional ground squirrel snares. Another elder at a spring fish camp taught a group of school-age children how to construct and use a traditional style fish fence and trap.

Until the early 1970's, the parents of the oldest generation of Bobbys today were alive and resided in the village. Having been born in the 19th century and having lived all their lives in one of the most isolated areas of the state, they represented and passed on to their

descendents a very traditional lifestyle. Their deaths represented an end of an era for Lime Villagers, who nevertheless continue to practice many of the skills that they taught them.

# CHAPTER III

# TRAVEL IN THE LIME VILLAGE LAND USE AREA

## Introduction

Within their land use area, Lime Villagers travel extensively on foot or by boat during the open water season and in the winter by foot, dog team, and snowmachine. No commercial air taxi or privately owned aircraft exist in the village and people rarely travel by air to places other than the village within their land use area. Instead, they use the waterways and an elaborate trail system to move from one place to another. Within the last few years the use of several three-wheelers has been incorporated into village transportation patterns. They are primarily used for hauling supplies from the airfield to the village.

## Boats

Lime people use several types of boats and canoes for travel on waterways which are essentially their summer "highways". Wooden boats and the commercially purchased aluminum boats are the most versatile water vehicles that Lime residents have, being useful both on the river and smaller streams as well as on lakes and ponds. Only in recent years have aluminum boats come into common use and people still make well built wooden boats. One wooden boat was built during the spring of 1982. The aluminum boats average 16 feet while wooden boats range from less than that length to 30 feet. They are powered by 10 to 25 horsepower outboard motors. All households but one owned a boat during the 1982 season and no households possessed more than one.

Although Lime people prefer to travel by boat in dry weather during daylight hours or moonlight, they rarely postpone a trip because of wet weather. They may delay a trip because of very heavy rains or, if already travelling, may camp until they let up. For example, during the 1980 season a party of five travelling by boat from Lime to Red Devil began their trip under light rains in the early afternoon hoping to reach their destination by mid evening. Although the intensity of the rain increased from light to moderately heavy, they continued to travel until several very hard downpours persuaded them to camp for the night at a nearby cabin. While high winds usually prevent travel on lakes, they don't necessarily stop travel on streams. It is not unknown for Lime people to travel on streams in dark, stormy conditions when navigational landmarks are impossible to see.

The period of time before freeze-up when ice is running in the streams is a critical and often dangerous time for boat travel. However, people are reluctant to beach their boats for the winter until it is absolutely necessary and to continue to use them in soft running ice. When there is hard running ice they prefer not to travel because hard ice has the potential of severely damaging a boat. Also hard running ice may freeze solid quickly with the possibility of stranding the boat and its passengers where they don't want to be.

Lakes present boat travellers with different conditions than streams. While water level and the location of channels are not as frequently a concern on lakes as they are on streams, boaters and canoers are more vulnerable to poor weather conditions, especially high winds. Particularly on the larger lakes, windstorms can occur suddenly, creating high waves and dangerous travelling conditions. People try to avoid

being caught in the middle of a large lake during a storm and head immediately for shore if they are. If they must continue to travel on the lake, they try to keep on the leeward side of the lake.

Lime people also make canvas canoes with spruce frames which they use especially for travelling along the shores of lakes. Traditional birch bark canoes went out of use in the area during the 1930's because, as one elder explained, they were easily damaged and needed a lot of maintenance. However, the small traditional moose skin canoe was in common use 20 years ago and has been occasionally used in the last decade. Although the frame will last significantly longer, the skin of a frequently used canoe is said normally to have a life span of two to three years.

The Athabaskans, including Lime Village people, base their directional system on the flow of streams (see Kari and Kari 1983: 43 for more information on this subject). This is evidence of how vital streams have been both in the past as well as today for the mobility of these people. Most Lime Village adults and older childern have the ability to navigate both the Stony River and its commonly used tributaries from Stony River's confluence with the Kuskokwim River, upstream to the canyon area which begins about 25 miles above the village. The river which is mostly single-channeled in its upper reaches becomes multi-channeled for the last third of its distance. Below the canyon area the river continues to be moderately swift averaging about five miles per hour. Within the canyon there are rapids which produce white water conditions in places. (Heritage Conservation and Recreation Service, Anchorage Area Office, 1979:9). People usually portage these areas unless the

water level is unusually high and then only the most skilled pilots are able to navigate this area.

In order to travel the shallow Stony River and its tributaries by boat, people memorize channel locations and are careful to avoid the boulders that frequent the streams. They also have to be aware of changes in water level, which is generally at its highest in the spring and fall but may change significantly even during these periods. Poling or paddling without the use of a motor is common, especially on tributaries during times of low water in order to prevent damage to the motor by scraping it against the stream bottom or large rocks. The Stony River generally experiences its highest water level during the summer months and its tributaries in the spring and the fall.

## Portaging

Lime Villagers portage from one body of water to another when no navigable streams connect them or when they want to shorten the distance between two places. On streams, they portage around areas that are dangerous or impossible to travel because of swift or shallow water, the presence of rapids or other dangerous conditions. For example, it is usually necessary to portage the canyons of the upper Stony River. When travelling on frozen waterways by dogsled or snowmachine, people portage large bends to shorten the distance.

Lime Villagers commonly portage between Trout Lake, Kutokbuna Lake, and Qedeq Vena, the lake east of Kutokbuna Lake, as well as from these lakes to Tundra Lake. No navigable streams connect these lakes which are very important for spring and fall resource harvest activities. While people walk on foot carrying the lighter canoes, they use dogs to drag

the boats from one body of water to the other. They do this in the spring both on the snow crust and if necessary on bare ground. As soon as the ice melts sufficiently along the shores of the lakes, they put their boats and canoes in and begin using them for travel again. At Tundra Lake people camp with their boats waiting for the ice to leave Stink River so that they can travel down it.

## Dogs and Snowmachines

Dogs are a very notable part of the Lime Village economy today. During the summer and winter of 1982 there were at least 100 dogs in the village with all but one household possessing dogs. This ratio of about two dogs to one person or eight dogs to a household has remained fairly constant over the last five years. Nondalton, on the other hand, had a population of approximately 200 people and about the same number of dogs in 1977 or a ratio or 1:1 (Behnke 1977:11 and 18).

Lime Villagers are known in the Central and Upper Kuskokwim River area for having well-trained, high quality sled dogs. They train their dogs primarily for work instead of racing and judge a dog team for the weight it can carry over a distance as much as for the speed it can travel. However, non-residents have used Lime dogs in races as prestigious as the Iditarod and a number of residents in recent years have entered dog teams in local area races. Traditionally, Lime Villagers have trained dogs for packing and for hunting both large and small game animals.

Lime Villagers also value their dogs for protection from intruding animals in the village, at fishing and trapping camps, and while out

travelling and camping. Dogs not only bark and warn off an animals' presence, but may help to ward off an aggressive animal and drive it away.

Lime households that use dogs regularly for work like to keep at least seven dogs through a winter because five or seven dogs are commonly used for pulling a sled at one time. However, as many as eleven or thirteen dogs have been known to be used at one time, especially in the spring when travel over bare ground is necessary. While some Lime households owned snowmachines during the 1982-83 winter season, all households with snowmachines also kept dogs.

Lime Village is probably one of the few communities in the state where dogs are used significantly more for transportation and work than are snowmachines. In Nondalton, which is typical of many villages, snowmachines are used primariy for work and dogs for racing. While Lime Villagers are restricted in their use of snowmachines by the high cost of fuel and machine parts and the difficulty in obtaining them, they appear to be committed to their continued use of dogs for work not only because of their traditional use of them but because of some practical advantages they see them having over snowmachines.

In recent years snowmachines have become more commonly used by Lime Villagers than in the past. They use dogs and snowmachines for travel and work both separately and in combination with one another. During the 1982-83 winter season both dogs and snowmachines were employed on short and long hunting trips. Both were also commonly used for hauling meat, wood and other heavy loads. On the other hand dogs were used more often than snowmachines for checking traplines. Although snowmachines tended to be used more often than dogs for very long trips to the Kuskokwim River communities, dogs frequently made the 60 mile round trip on the

river between Lime Village and Stink River. A sixteen year old boy made this trip alone with dogs for the first time during the 1982-83 season. Both dogs and snowmachines were regularly used for transportation between Lime and Sparrevohn Air Force Base, a round trip of approximately 50 miles.

The diet of Lime Village dogs is primarily fish supplemented with fat, meat scraps and some commercial dog food. Salmon, whitefish, pike and suckers are the fish most commonly fed to dogs because they are the fish most easily available in large quantities. People estimate that a minimum of one fish per dog per day or 200 to 300 fish per dog per winter is necessary without using commercial dog food. However, dogs working in cold weather must have two fish per day or some other additional food. Summer and fall fish supplies that run low during the winter can be supplemented as early as January by hooking for pike in lakes.

People prefer to feed their dogs fish over commercial dog food because fish is less expensive and more nutritious. Dogs are said to run and work better on a diet of fish than commercial dog food. If a person doesn't have enough dog fish for the winter, he usually prefers to use more commercial dog food in the fall and save most of the dog fish for colder weather. Lime residents have been using commercial dog food in significant amounts only since the mid 1970's when high water in the river during the month of July washed their fish caches away. By receiving some commercial dog food from Sparrevohn and making a good whitefish harvest in the fall, they were able to offset their losses and keep their dogs throughout the winter.

Lime Villagers spend considerable time and effort in feeding their dogs. Well over half of a household's yearly catch of fish is used for

dog food. Besides fishing for their dogs, they cook for them in barrel drums over outdoor fires. They also provide their dogs bedding, usually dry grass or spruce boughs, and sometimes shelter in the form of a small house or windbreak. They also spend considerable time training them.

The high ratio of dogs to people in the village and the large amount or time and energy that people spend in caring for their dogs is evidence of the importance of dogs to them and their livelihood. In Lime where people spend long working hours each day involved mostly in resource harvest and preparation activities, they can not afford in terms of time and energy to maintain the large number of dogs they do if they are not very useful to them. On the other hand, being on the fringe of the cash economy as they are, they cannot afford the high cost of fuel to run snowmachines in place of dogs without perhaps significantly altering their present way of life and becoming more involved in the cash economy.

## Travel Routes

Map 2 (oversized and in pocket) depicts an extensive network of trails within the land use area of Lime residents, who travel them by foot year round and by dog sled and snowmachine from freeze-up to break-up. Some of the trails are part of an old system which has continued to be used into the present. Others are newer trails which have been developed by people more recently as the need for them has occured. For example, trails have been developed in order to utilize new areas for trapping and wood harvesting. Trails vary in their length, the time of year they are used and the amount of use they receive. Most trails cross waterways, whether it be a small stream or a large lake. Winter trails often purposely connect with waterways in order to make

use of the open, relatively smooth space they offer. While summer trails may cross small waterways, they avoid large ones, although they may serve as a connection to them. Winter trails frequently cross flats, because at this season flats offer (as do waterways) a relatively unobstructed landscape. Summer trails, on the other hand, avoid this swampy country when possible and attempt to follow ridges which are drier and easier to traverse. Both winter and summer trails circumvent or "are constructed to avoid..." heavily timbered country because of the work involved in clearing them and keeping them open unless their purpose is specifically to make use of that country, as for example wood harvesting trails do.

The trail that runs from the village south along the left side of Hungry Creek is both a summer and a winter trail until it almost reaches Trout Lake. While the winter trail continues across Trout Lake to Tundra Lake, the summer trail branches right before Trout Lake and follows the right shores of Trout and Kutokbuna lakes. The summer trail joins up with the winter trail at the end of Trout Lake for a short ways before diverging to the right in order to avoid a small lake the winter trail crosses. The summer trail again becomes one with the winter trail just before it reaches Tundra Lake.

Although a trail may be originally made for a specific purpose, over time it will likely develop a variety of uses. Any trail, regardless of its original purpose, will probably be a hunting trail, as Lime people usually hunt wherever they travel. If the trail goes near a stand of birch, people may harvest some of the trees for wood while taking only the bark from others. If it is an old stand they may be able to harvest a quantity of birch fungi from it.

For example, the trail that runs west along the ridge above the village connects Lime Village with the Lime Hills and eventually Stink River. Immediately above the village it is used year round as a game lookout. During the summer and fall people walk along it to pick berries and travel it to the Lime Hills to hunt caribou, while in the winter they may follow it all the way to Stink River.

Lime Villagers consider a well packed trail and weather that is not stormy or extremely cold to be good conditions for travelling by dogs, snowmachines or on foot. Some of the best travelling conditions occur in the spring when below freezing temperatures at night and above freezing temperatures in the afternoon produce a crust on the snow in the morning that can hold the weight of dogs, sled, and passengers or a man on foot. During this time fast easy travel is possible off trails as well as on them. Combined with the increased daylight of this season, longer distances can be travelled during the day than were possible earlier in the winter. Conditions are also good for walking both on and off trails in the fall after the ground has frozen and before a heavy snow has occurred. However, once the waterways have frozen and boats are no longer useable, people are anxious for a good snow pack, as they can travel more efficiently with dogs and snowmachines than by foot alone.

Poor weather and trail conditions do not easily deter Lime people from travelling by dogs, snowmachine, or on foot if there is good reason for it. They will travel in very cold temperatures of -40° and -50°F if necessary, although activity usually slacks off considerably when temperatures reach -40°F. People prefer not to travel in blowing snow conditions when visibility is poor or against a cold north wind. Although people usually try to avoid these conditions, they may occasionally travel in

them. For example, one man remembers several years ago travelling with dogs across Tundra Lake in a blowing snowstorm when landmarks were impossible to see. He credits his dogs with finding the way and says he would not have attempted it had he been travelling with a snowmachine or on foot. In early December of 1982 another Lime man walked for 12 hours in a north wind while his dogs pulled a sled full of fish that had been cached at a fish camp about 22 miles upstream from the village. The wind blew for three or four days at this time and outdoor work among Lime Villagers decreased significantly.

Break-up, which usually occurs in late April and early May is a period of time when traveling conditions are poor or almost impossible both on land and on waterways. Mobility on foot, by dogs or snowmachine is hampered by melting snow, soft ground, and excess surface water. Boats are generally not useable until the end of this time when waterways have become relatively clear of ice. While Lime Villagers keep travelling during break-up in spite of difficult conditions, they have to spend considerably more energy than normal to do so.

The trail system that Lime Village residents use connects with other people's trail systems in their land use areas. All of these trail systems are not shown on the map. One trail partially depicted is the Telequana Lake trail to the Lake Clark area. Most Lime Village elders have traveled this trail in their lifetime on foot and by dogsled. Van Stone and Townsend (1970) make brief reference to the important trail from Kijik to Telaquana Lake and the Stony River. Cook Inlet Historic Sites (1975) gives good documentation of this trail (also, see Behnke 1978). There is also an historic trail to the Mulchatna River via Whitefish Lake.

Almost all travel that Lime residents have done in recent times outside their land use area has been by airplane, boat or snowmachine to the Kuskokwim River. On the other hand, Lime people continue to use the trails within their land use area extensively in combination with the use of waterways for travel routes. Travel by air to places within their land use areas continues to be minimal. Most residents do not favorably view sport hunters and other outsiders who fly into their land use area and harvest resources that Lime Villagers feel they themselves are in need of.

The skills and endurance Lime people, including young children, possess for traveling by foot are noteworthy. For example, on a school trip a couple of years ago, students ranging from preschool to high school age traveled on foot with several adults from a spring camp south of Lime to Sparrevohn Air Base in one day, a distance of over 20 miles. They went in May during breakup when travelling conditions were difficult due to very wet ground and standing pools of water on the trail. The last part of the trip was up a very steep mountain; even the youngest children did not complain or seem to get very tired, according to the adults that accompanied them, in spite of the fact that they rested and ate little along the way.

## Place Names

Map 3 depicts place names in the Lime Village land use area. The abundance of Dena'ina place names from the Lime Village land use area are striking evidence of Dena'ina use of that area. The more than 280 names presented in "the Lime Village Place Names Map" are not necessarily complete for the area, but are all of the names that have been recorded

between 1973 and 1983 by James Kari. They are a portion of the more than 1,400 place names that have been recorded for the whole Dena'ina language area. Each session on place names with Lime Village elders has resulted in refinements in the list.

Note that virtually all of the recorded Native place names for the Lime Village land use are clearly Athabaskan in origin. The breadth and density of the names is strong proof of the occupation and use of the area by Dena'ina people. Some of the recorded names are archaic Athabaskan words with no obvious meaning to modern speakers. On the other hand, many of the names give fascinating insights into the traditional life of the Dena'ina.

# CHAPTER IV

# PATTERNS OF LAND AND RESOURCE USE

## Introduction

This chapter describes the four primary activities by which Lime Villagers obtain resources from their land use area hunting, fishing, trapping, and gathering. It reviews harvesting and processing methods and discusses how the products are used and distributed.

## Hunting

While the Lime Village economy operates on the interaction of a number of major activities -- hunting, fishing, trapping, gathering, and wage work -- Lime Villagers probably spend more working hours hunting than they do in any other single occupation. Excursions out of the village are rarely single-purposed unless they are to obtain fresh meat, especially when the village is out of it. A person hauling wood by dogsled from across the river, walking to a flat to pick berries or travelling upriver by boat to prepare the fish camp almost always takes a gun with him both for protection and to obtain meat if the opportunity affords it.

Lime Villagers prefer fresh animal meat, particularly moose and caribou, as a food staple over fish and fowl, which they enjoy as a diversion in a predominately meat diet. The large game animals, moose and caribou, are hunted most frequently, since one animal provides a large amount of meat for relatively less effort than a small animal.

They are also generally desired for their flavor and food value over other game.

Besides caribou and moose, beaver probably supplies Lime households consistently with more meat than any other animal. Black bear may equal beaver in numbers of pounds consumed during years when black bear are plentiful. In recent years, the numbers of black bear in the area are said by Lime people to have declined, while caribou, moose, and beaver populations have remained steady or increased. Porcupine are also an important small game animal especially when they are available in considerable numbers as they are today.

Sheep and ground squirrels rarely have been hunted in recent years, primarily because more easily accessible game animals occur in sufficient abundance to meet people's needs. While hares occur fairly commonly, they do not contribute significantly to most Lime Villagers' diets because their meat is lean and more highly preferred meat is usually available. Small game animals, as well as bear and sheep, were probably more important in the diet in earlier times when moose and caribou were less abundant.

Guns have been in common use since the early part of this century, and most Lime households today own a variety of types. People are careful to conserve ammunition as well as meat, and it is not uncommon for a mortally wounded animal to be finally dispatched with a knife. Traditional methods of hunting with spears and bow and arrows continued after guns came into use, as early guns were not considered powerful enough to kill bears. Snaring large animals, including roping them while swimming from boats and dragging them under water until drowned, was practiced fairly commonly into the middle of the century and rarely in the last 10 to 20 years.

Young and middle-aged adult males are the most active hunters, although most older children and women know how to hunt. People hunt singly, with a partner, or in groups.

A hunting partner is commonly a spouse or an individual of the same sex and similar age. The traditional Athabaskan practice of an uncle training his nephew in hunting and other skills still exists. The composition of hunting parties varies greatly and not infrequently includes people of various ages and both sexes. Men hunt alone more frequently than women and children, who are more likely to have a partner or be part of a larger group.

Large game animals are commonly shared throughout the village and small game animals to a lesser extent. Choice parts of large game animals and fat, high quality small game animals are often given to elders to show respect and affection.

A person who kills an animal is responsible for the butchering and distribution of it. This does not mean that he will necessarily do all the work of butchering and hauling the meat himself, but will be assisted, especially if the animal is large, by other village residents. Additionally, he will not directly distribute all the meat himself, as both primary and secondary systems of sharing operate to assist him in this work. Depending in part on how accessible the site is, he may return to the site with other residents or merely tell them where it is so that they can obtain meat for themselves. While a person who kills an animal ideally is considered to be "boss" of the kill, it is customary for him to tell other people to take what they need. In a group hunting situation, often several people fire at an animal and it may be unknown or at least insignificant which person is most responsible for the kill.

When a number of people hunt together and harvest a large animal, they work together in butchering and relaying the meat to the village and in distributing it. If all the meat cannot be transported at one time, some members may start hauling it to the village while others stay behind and continue the butchering task. In other cases they may all return taking what they can and cover the remaining meat to protect it from scavengers. The original party members may choose to return to the kill site to finish the work or more likely they will tell other village residents of the location and allow them to butcher and transport their portions. The meat will then be shared among households in the village beyond those of the hunting party members usually through both direct and indirect channels of distribution. Thus, older residents and people not able to have their own meat are insured a portion of the kill. Following are several examples illustrating hunting situations.

Example 1: During the early part of 1982 fall hunting season, a lone hunter killed a moose approximately a mile inland and about five miles upriver from the village. He butchered a portion of the animal and made several trips packing it to the boat, thoroughly covering what he could not take with him. He gave the meat to his mother who shared it with a daughter and a brother, both of whom belonged to different households. The next day he returned to the site from the village with an aunt and uncle who had little fresh meat and allowed them to butcher and take what they wanted. He then informed other residents of the kill site and told them to haul what they needed.

Example 2: Near the end of the 1982 fall hunting season, a lone hunter killed a moose on a sandbar about ten miles below the village. He butchered a portion of it for his household and the household of his

father-and mother-in-law. As the kill site was not hard to locate, he merely told other village residents about the site and allowed them to haul what they wanted without returning to it himself.

Example 3: Several years ago in mid-winter when the village was out of fresh meat, two adult male cousins travelling together by dogsled spotted 9 moose approximately 10 miles in distance from them in the vicinity of Cairn Mountain. As it was late in the day and they knew they could not reach the animals before nightfall, they returned to the village without pursuing them. The next morning they and two other adult men and two older children returned to the area with three sleds. Two of the hunting party waited with the sled about two miles from where the moose were again sighted while the remaining four went towards them on showshoes. Three of the nine moose were shot and partially hauled back to the village. The rest of the village residents were informed of the kill site and told to haul out the meat they wanted. At least one member from every remaining household went back to the site and obtained meat for his family.

If a person hunting alone kills a small game animal, he will probably take it home where household members may assist hime in the work of butchering it. The animal will probably be used within the household unless it has a surplus of fresh meat or if the hunter wishes to give it as a gift to someone. A small animal that is harvested when several people are hunting together will likely be given to the household most in need of fresh meat, although it may be shared as a meal by both households, or possibly given as a gift to another household. If a number of small animals are killed by two or more persons hunting together, the hunters will probably divide the harvest unless one household is more in need of the meat than the other. If a large quantity of small animals are taken,

they will likely be shared widely. Meat is preferred fresh and is usually cooked by boiling or frying, although meat roasted over an open fire is especially relished. Surplus supplies of meat are preserved in warm weather by drying and in cold weather by freezing. Besides food, most game animals supply Lime Villagers with other useful materials.

## Moose

Lime Villagers value moose for food more than any other animal available in their land use area. Not only does an adult moose provide more edible poundage than any other animal, but the flavor of its meat is preferred by most people over that of other local or imported food sources. Traditionally, Lime people have hunted moose year-round, although contemporarily fall is their main season for harvesting moose as it was in the past. Although moose roam widely and are found in a variety of environments throughout the year, they occur most commonly in low lying areas that are drained by streams and contain lakes and ponds. It is in this environment that Lime Villagers hunt for and harvest most of the moose they take. The majority of moose were probably shot within a 20-mile radius of the village during the 1982 fall season, although a significant number were taken in the vicinity of Tishimna Lake, which is about 30 miles in distance from the village.

Lime people hunt moose both singly and in groups with residents of varying ages and both sexes often composing a hunting party except in cold weather when younger adult males do most of the hunting. During the open-water season, Lime Villagers usually travel by boat on the river and up tributaries, stopping at places where moose are known to frequent to look for fresh tracks. Poling without the use of a motor is common,

especially on tributaries, because the streams are often shallow. They also pole in order to decrease the noise and to save on gas. They follow trails leading up hills and ridges that serve as lookout points over flats where moose often browse. Islands are favorite moose hunting spots, because the animal cannot easily escape once its presence is known there, especially if there are several hunters.

Lime Villagers are expert trackers and know from examining a track the sex and relative age of the animal as well as the direction it was moving and the time span that has elapsed since it was at that place. Once a party hunting by boat has spotted fresh tracks, some of the members begin tracking the moose hoping to chase it back towards the beached boat where other hunters wait for a chance to shoot at it. Moose are said to tend to run towards open water if it is available when they are being pursued or in the winter into a heavy stand of timber. On an island, hunters try to station themselves so that they are in view of as much of the shoreline as possible in case the animal tries to escape by swimming.

Once the waterways are closed with ice and boat travel is no longer possible, hunters track moose on foot using snowshoes if the snow is deep enough to need them. If there are no fresh tracks sighted close to the village or campsite, hunters will go out further by dog team or snowmachine looking for them, often accompanying one another with separate dog teams or snowmachines. As during the open water season, they use hills and ridges as lookout points or they may stop on the ice in the middle of a lake in order to survey the shoreline easily. Once fresh tracks have been spotted, one or several individuals will track the animal on foot, hoping to get a shot at it or to scare it back towards the other hunters waiting with the sleds. Moose are wary animals with keen hearing and it

is especially difficult to hunt them in cold weather when sound travels a long distance. It is a fortunate person indeed who is able to surprise one at close range especially when travelling with dog team or snowmachine. Also, moose are usually able to out-distance a person on foot except in very deep snow or when there is a thick crust that easily holds a person on snowshoes.

Lime Villagers make use of almost all parts of a moose including the head, organs, and intestines. They contrast this behavior with that of sports hunters whom, they observe, often waste a good portion of the animal. Besides using the animal for food in a traditional way, they also tan the hides and make articles of clothing out of them as well as sinew thread and lashing used for various purposes. Traditional style moose skin boats have been made and used within at least the last decade (Kari 1978: 17-18.)

Lime Village elders note that moose are relative newcomers into their area, having arrived sometime in the 19th century. The elder Bobbys say that their great-great grandfather killed the first moose seen in the area while hunting caribou in the mountains. Since then, the population of moose has increased to the present day, when, at least in certain seasons, they are as easily available as caribou. Moose were traditionally speared, shot with a bow and arrow, and snared.

## Caribou

Caribou and moose provide people with more pounds of meat than any other animal resource either separately or combined. They serve each other, as do whitefish and salmon, both as complementary and alternative food sources. While more caribou than moose are usually taken annually,

an adult moose weighs approximately three times that of an adult caribou, providing that many more pounds of food. During the 1982 fall hunting season, Lime Villagers took over twice as many caribou as they did moose.

The caribou available to Lime Villagers are primarily of the Mulchatna Herd (Personal Comment: Robert E. Pegau, March, 1983) although animals from other herds may also range in the area. There does not appear to be any pattern of major migration through the area and caribou appear to spend the summer in the mountains, moving down to the lower hills and flats in the early fall closer to the village. In recent years, they have been sighted frequently along the river during this season. Lime Villagers probably took about one-third of the caribou they harvested along the river during the 1982 fall season. In the late fall, the caribou generally move back away from the river up to the higher hills and mountains, while tending to move down again into the flats sometime in the winter or spring.

Traditionally, villagers have hunted caribou year-round usually taking more caribou than moose in the winter months. Although caribou tend to travel in larger groups than moose, today people hunt caribou in a similar manner to hunting moose, both singly or in groups and while travelling on foot or by boat or sled. If fresh signs of caribou are sighted, a hunter will usually track the animals on foot. Caribou are less wary and not as keen of hearing as moose and can be approached more easily than moose in cold weather when sound travels greater distances. However, caribou are too fast for a man to run down on foot, as is sometimes done with moose on a good crust. Hunters often watch for the caribou from a lookout point such as a hill where they can easily watch the surrounding country for animals. They especially use the Tundra

Lake area for this purpose, as caribou frequently winter in the area. If caribou appear to be moving in the direction of a waiting hunter, he may wait for them to get into close enough range to shoot or he may try to sneak towards them.

Today, as in the case of moose, people harvest caribou almost exclusively with high-powered rifles. In the past, a common efficient method of harvesting large numbers of caribou was by building long fences made out of jack spruce in mountain passes and on the sides of mountains. The caribou were funnelled towards the fences and caught in the snares that people set in them. Especially before guns were in regular use, this was an efficient method of harvesting a large number of caribou quickly. It is reported that people took what they could use and let the rest go. Lime people do not use caribou fences today and elders say that caribou fences were last used regularly in their country during their grandfather's time. Two streams south of Lime, called in Dena'ina Viɣ Qutnu, 'caribou snare creek', are the sites of old caribou fences. One is unnamed in English while the other is recognized on USGS maps as Caribou Snare Creek (see Map 3, Numbers 64 and 97).

Caribou are apparently not newcomers to the area as moose are said to be. According to oral tradition, they have been in the country since the ancient past, although not necessarily in the numbers they are today. As with moose, Lime Villagers make use of most parts of the caribou, including parts of the head and certain organs and intestines for food. They tan the skin and make articles of clothing out of it as well as use the hide for a mattress.

## Bears

Black bears and brown bears are big game species whose populations in the Lime area are said by people there to have declined in recent years. These animals roam widely and occur in a variety of environments including those in which moose and caribou are commonly found. Although black bears are today still an important food resource for Lime Villagers, brown bears are only shot now if they are a danger or a nuisance. Several years ago when a brown bear was killed at a summer fish camp, some of the animal was fed to the dogs and some of the fat rendered for human consumption. In the past when caribou and moose were non-existent or scarce, both black and brown bears apparently had a more important role in the human diet.

Lime Villagers prefer black bear for meat in the fall when they are the fattest and most flavorful from feeding on berries. At this time, they look for them especially in flats where berries are plentiful. Black bears are also taken when they first come out of their dens in the spring and are still somewhat fat. They are killed in the late spring to midsummer only if they are a nuisance, because their meat is considered to be very poor at this time. If a bear bothers a fish camp, a hunter may wait for it at night in the smokehouse hoping to shoot it. Occasionally in recent years, black bears have been caught with wire snares hung in smokehouses.

Lime Villagers also still hunt black bears in their dens in the winter. To kill a denning bear, the hunter makes a small hole in the top of the den and then shoots down through the hole. A strong stick may be placed horizontally across the door of the hole to slow the bear down if

it attempts to come out of it. A hunter usually knows from the size of the den and from signs in the area if a single animal or a female with cubs is in the den and avoids taking the latter.

Traditionally bears were hunted with spears and bow and arrows and taken with snares or deadfalls. Today they are almost always shot with a high-powered rifle, although the traditional practice of lassoing a swimming black bear from a boat and then dragging it until it drowned continued at least until the 1950's. Spearing brown bears continued into the first part of this century, as the first guns were not considered powerful enough to kill them. Some older generation Lime residents have speared black bears.

Lime Villagers value black bears both for their meat and for their fat which they render and cook with or use in making Indian ice cream. Dried black bear gall is a traditional medicine which when drunk with hot water is said to be helpful in curing sickness (see Kari 1978:27-29 for an account of a black bear hunt).

## Sheep

Lime people have traditionally hunted Dall sheep in the Alaska Range in the fall and spring for their meat, hides, and horns. Sheep do not occur today in the Lime Hills and are less accessible now to people in Lime Village than when they lived closer to the Range in the former village of Qeghnilen. Although sheep hunting is not as common as it was earlier in the century, it has continued into recent times with people still travelling to hunting grounds by boat and on foot as was traditionally done.

One Lime resident describes a sheep hunting trip he made within the last ten years after the summer salmon season. He and another man walked overland from a fish camp located near Qeghnilen to the vicinity of the head of waters of the Swift River in the Alaska Range. They took with them sleeping bags, plastic tarps, guns, an axe, shells, cooking and eating utensils, tea, dry fish, and dry meat. After hunting for several days, they harvested three sheep and two moose. While smoking the meat they made a moose skin boat which they used to transport themselves and the meat down the Swift River to a cache located where an overland trail to Lime meets the river. They stored the meat in the cache and walked back to Lime, intending to return by dogsled during the trapping season.

Sheep were traditionally hunted with bow and arrow and with snares that were sometimes set in fences in the mountain passes similar to those built for caribou (Kari 1978:9-12.) Besides eating the meat, people made spoons out of the horns and tanned the hides. Sheep taken late in the season were especially valued for their long winter fur which people made into warm coats and sleeping bags. While sheep is not an important food for Lime people today in terms of quantity, it is a delicacy as well as an alternative resource to be turned to if game animals heavily depended upon were to become scarce.

## Hares

Both the snowshoe hare and the tundra hare, also known as the northern hare, occur within the traditional land use area of Lime Villagers, but only the former is commonly hunted today. The snowshoe hare inhabits the lowland forest, while the tundra hare occurs in open mountain and tundra country. Lime residents catch snowshoe hares in wire snares and at times

they find them in marten traps. They also sometimes shoot them, especially when they encounter them while looking for other game. In recent years Lime Villagers have also conducted hare drives, a traditional practice which involves group participation. People spread out across an island on both ends and walk toward the middle, flushing and shooting the hares as they go. This is done in the fall when the hares are easy to see and is an effective way to take a large number quickly. An alternate method is to set snares on a brush fence along one end of the island and drive the hares into them. The snares are usually removed once enough hares have been caught.

Hares are a lean meat and not a preferred food, although they probably were more important in the diet in earlier times when moose and caribou were not as abundant. Today people eat them for a change in their diet, usually boiling them and sometimes feeding them to their dogs. Traditionally the skins were tanned and made into blankets and clothing. Some hare skin clothing has been made in recent times, including a jacket.

## Porcupine

Porcupine, which are usually clubbed if encountered, are a favorite food of most Lime Villagers. Porcupine are taken year-round, but least favored during the spring months when they are generally leaner and not as flavorable. Although they are a delicacy, especially in years when they are less abundant, they are also traditionally considered to be an emergency food because they are easy to kill.

To prepare porcupine for eating, Lime Villagers first singe off the hair and quills over a fire and then scrape off the charcoaled hair and

quills. After butchering it they boil the porcupine including the feet, head, body, and certain organs until well done. The quills are sometime saved and used to make jewelry or, in the past, to decorate baskets and clothing. The front teeth were used for awls and scrapers, and people still know how to make and use them today.

Porcupine can be a nuisance, especially when their population is high, as has been the case recently in the Lime Village area. Dogs that meet up with them often spend many painful moments afterwards being dequilled. A good dog who encounters a porcupine will bark to make known the presence of the animal and then stay away from it. A rare dog will learn to flip a porcupine over on its back and bite it in the stomach without getting quilled.

## Ground Squirrels and Marmots

In recent years Lime Villagers have hunted ground squirrels and marmots in the mountains during the spring and fall, usually combining this activity with others such as berry-picking and caribou hunting (Kari 1978: 12-13.) In the spring, ground squirrels and marmots are in best condition right after they come out of hibernation and in the fall immediately before they go into it. Traditionally Lime Villagers took them with snares made out of the shafts of gull feathers, sinew, and wooden pegs. At least one elder has made these in recent years. Today, ground squirrels and marmots are usually taken with snares placed at the openings of their burrows or shot with .22 rifles.

Ground squirrels and marmots are relished for their meat, a delicacy, which is usually boiled or roasted. Today, the skins are used to make mittens and slippers, and in the past, fancy coats.

## Red Squirrels

Red squirrels are common inhabitants of the forest in the Lime Village area. Today people consider them primarily a nuisance because of their habit of entering unoccupied buildings and damaging or stealing their contents. However, some middle-aged and older people recall that in the past they were an emergency winter food. It has probably been over 20 years since anyone has used them for food. Traditionally red squirrels were snared or shot with a bow and arrow.

## Waterfowl

Lime Village residents utilize at least 3 species of geese and 15 species of ducks, some of which nest in the area. Swans nest in the area and have been traditionally harvested for their meat, their down feathers for clothing and bed filling, and their wings as sweeping tools (brooms). Cranes also occur in the area and are occasionally hunted and used for food.

Waterfowl have been traditionally hunted when they are available in the areas both in the spring and fall, but usually only in significant numbers in the fall. They are not a common food staple as are moose, caribou, and fish, but a delicacy that provide a welcome change in the diet. More importantly, they arrive at a critical time in the spring when winter food supplies may be low and when land mammals are difficult to hunt due to break-up and poor travelling conditions. During times when other fresh meat has been unavailable, waterfowl and non-salmonid species of fish have taken on the status of an emergency food for a short period of time.

When they first arrive in the spring, waterfowl tend to congregate in areas of open water which are often restricted to lake shores and mouths of creeks. Hunters spread out and wait in the underbrush or in brush or grass shelters close to these areas. Waterfowl are easier to retrieve at this time and under these conditions than when they are in flight or later in the season when the ice is less restricting or non-existent. As soon as the ice has melted sufficiently, people also hunt waterfowl on streams and lakes with wooden and aluminum boats and on the lakes with canvas canoes which have replaced the traditional birch bark canoes. Within recent years, people have also made and used moose skin boats for hunting on lakes. When hunting waterfowl, people are careful to try to shoot only at those they are sure to be able to retrieve.

In the fall, most waterfowl are harvested after the peak of the moose and caribou season when sufficient quantities of these more important food sources have been taken. Also at this time waterfowl are fat and in prime condition after feeding intensely in preparation for migration. Waterfowl harvested late in the season can also be preserved more easily because of cooler temperatures. Although Lime Villagers consume most waterfowl fresh, they sometimes partially smoke them and then, if temperatures allow, may freeze them for later use. One way to keep them fresh tasting is by freezing them in water in a birch bark basket.

Today waterfowl are generally taken with shotguns or .22 rifles. A hunter sometimes attempts to bring them close by making imitating calls solely with his voice or by using a whistle made out of empty shotgun shell or the dried stalk of the cow parsnip plant. Sometimes people set ducks they have shot as decoys on the beach to attract live waterfowl.

Within the last ten years, traditionally methods of snaring and netting waterfowl have also been used.

A hunter who harvest waterfowl at camp shares them with other members. Typically he will take some back to the village and share them with those of his household and other close kin. If he has harvested a large number of waterfowl, he is likely to distribute them more widely within the village.

Mallards are said to be the most common duck in the area, and Lime people most frequently hunt them and scoters. They prefer scoters, locally known as black ducks, over other ducks for their high fat content which they retain throughout the season. The small bufflehead is also favored because it remains consistently fat. However, an elder noted that if given the choice to shoot a mallard or a bufflehead, he would take the mallard because it is larger and has more meat. Villagers also take geese every year, although not in as large numbers as they do ducks. Villagers know the nesting sites of some ducks and have collected eggs to eat in recent years, although they use them less now than in the past. Geese, swan, and crane eggs were also used traditionally for food.

Lime Villagers most commonly boil waterfowl for eating, cooking the head, organs, and gizzard along with the meat. They also value waterfowl for their down feathers, which they use as stuffing for mattresses, pillows, blankets, and warm clothing.

## Grouse, Ptarmigan, and Other Game Birds

The spruce grouse and the ruffed grouse, locally known as the willow grouse, are lowland birds that are fairly common in the Lime area. However,

their numbers are said to have declined in recent years. A third grouse, the sharp-tailed grouse, is reported to have been seen rarely in the area. Lime Villagers take grouse year-round when they encounter them except in the spring and early summer when they are with young.

The willow ptarmigan, rock ptarmigan, and white-tailed ptarmigan are all upland birds that occur within the traditional land use area of Lime Villagers. Of the three, villagers hunt the willow ptarmigan most frequently as it travels to the lowland stream bottoms in the winter, especially when the wind blows in the mountains. It is also found in the moist tundra environment of lower elevations. Lime people encounter the rock and white-tailed ptarmigan less often, as they are exclusively upland birds.

Lime Villagers generally hunt grouse and ptarmigan in combination with other hunting and trapping activities. If there is a good supply of meat in the village and there is not pressing work to be done, an adult might go out hunting specifically for grouse or ptarmigan. Children more often hunt them alone, and they often are the first game a child takes. Today .22 rifles are usually used to hunt these birds, although spruce grouse may be killed with rocks since they do not fly readily. Traditionally grouse and ptarmigan were taken with bow and arrow or with snares. Lime Villagers eat the meat of these birds usually by boiling it. Ptarmigan feathers are sometimes still used as mattress and pillow stuffing.

Traditionally people also hunted the larger owls and sandpipers for food, but few of these have been taken in recent times. Almost any bird, including the small redpolls, chickadees, and assorted songbirds, has been considered potential emergency food for use in times of extreme

food shortage. Gull, eagle, hawk, and other bird feathers have been used in the making of snares, arrows, headdresses, and other items. People still know how to make many of these things (see Kari 1978:7-8 for an account of making an eagle robe).

## Trapping

Earlier in this century trapping was an extremely important activity for Lime people, because it provided a large portion of a person's yearly cash income. During this time period there were even less opportunity for cash jobs in the area then there is now. Well into the middle of this century, people trapped extensively throughout most of their land use area, often trapping close to where they had most actively fished and hunted in the fall. They would store their harvest in caches in the vicinity, thus insuring themselves and their dogs of an adequate food supply while they trapped.

The Swift River locality was especially important to them then as it is now for trapping. Today elders today recall that when they were young and middle-aged, seven sleds would often travel together in the late fall to the Swift River taking separate trails once they had reached the river (see Map 2). Each trapper would put his own special mark on a tree along his trapping trail to designate his use of the area.

People would sometimes trap for a month or longer, returning to the village in December for the holiday season and then often going out again to trap for another extended period of time. Although women and children would sometimes accompany men on long trapping trips, they would usually stay at home setting their own traps in the nearby areas, as would people too old to travel far. Some Lime families regularly camped and trapped

in the Tishimna Lake and throughout the winter as is the case today. In the spring when the days became longer and the main trapping season was over, people would travel downriver by sleds to various trading posts to sell their furs and buy provisions.

Today trapping is still a very significant winter and spring activity for Lime people who depend on it to supplement other sources of cash income and to obtain materials for home use. More than any other natural resource of their country, people regard marketable fur animals in terms of the money they generate.

People sell much of their raw fur to Kuskokwim traders, although they sometimes send it out of the region. They also keep some of the fur they harvest to sew into articles of clothing, which they may wear themselves, trade, or sell.

Today Lime people still trap localities that are considerable distances from the village, including the upper Swift River area; the Tishimna Lake region, inluding Stink River; Hook Creek, Caribou Snare Creek, and other streams that drain into Tundra Lake; and the vicinity of Little Underhill Creek. Heavily trapped localities closer to the village include the areas north of Lime Village between the Stony and Swift rivers, Hungry Creek and Trout Lake, and Can Creek. Trapping also occurs along both sides of the Stony River from "Black Creek" Ch'a-tatnadetl'ech' to the Underhill Creek area.

Today people don't trap away from the village for long periods of time as frequently as they did in the past. Depending in part on the location of the trapline in relation to the village, they may make a round-trip in a day or camp a night or several days to a week. Adults

who want to take school-age children with them are restricted to overnight excursions on the weekend. On the other hand, one couple spent well over a month during the 1982 winter trapping season in the Tishimna Lake area without returning to the village for an extended period until the Christmas season. They returned back there again in January 1983 and trapped into April. All Lime households did at least some trapping during the 1982-83 season.

Most Lime households trap some marten and beaver commercially each year, which are harvested in greater numbers than other furbearing animals of significant commercial value. Marten generated more cash income for most households than did beaver during the 1982-83 season, since marten prices were significantly higher than beaver. However, residents said that the marten harvest for the village was not above average that year.

Some fox, wolverine, and mink have been harvested in recent years, but their numbers are usually incidental compared to the beaver and marten taken. However, the fox harvest for the 1982-83 season was higher than average with most households that trapped, obtaining at least one. The number of wolverine taken was also higher than normal. Wolves and lynx have rarely been trapped by Lime Villagers in the last ten years. One lynx was reported taken during the 1982-83 season. Lime Villagers also take some otter and muskrat each year, which they sometimes sell on the commercial market along with other furbearing animals they trap.

As with harvesting, some of the hardest work involved in trapping is making the trail. A trapper usually follows a main public trail or a stream system as near as possible to the area he wishes to trap. If the area he plans to use has not recently been trapped, he probably will need to break a trail. He does this by going ahead of his dogs on snowshoes and

packing the snow while cutting the branches and brush that are obstructing the way. While breaking trail, he is constantly on the lookout for signs of the animal he wants to trap, which helps him to determine the best location to place his traps. During the 1982-83 season traplines varied in length from a mile or two to over 20 miles with the average probably running between 5 and 10 miles and containing 25 or more sets. People trapping in the same general area often share a central tent on the main trail as well as set up their individual tents on their own lines a convenient distance from the central tent. Today people most frequently use commercial traps and snares, although older residents, especially, know how to make traditional snares and deadfalls and still occasionally use them. Sets are baited with fish and meat scraps, to which a commercial or homemade scent made of beaver castor and other ingredients is sometimes added to attract the animals. Trappers also may take care to eliminate any human scent by rubbing the traps or snares with available materials such as spruce needles. Fences with traps, similar in style to those used for whitefish today, were used in earlier times to catch beaver, otter, and muskrat.

People usually use dogs for working their traplines, because they say snowmachines do not operate well along the rough side trails where most traps are set. Using dogs also saves on costly fuel as well as provides them with exercise. Young to middle-aged men are generally the most serious trappers, having the longest traplines and travelling the greatest distances. To a lesser extent, women, children, and elders also participate in trapping activities, although they frequently use localities calities close to home while young and middle-aged adult males trap areas more distant from the village.

Once a trapper has made a trail and set his traps, he has priority to that area. If he is not using a trapping area he has developed, he may allow another person to use it. If an area remains unused for a number of years without the original trapper indicating that he plans to use it again in the future or without his designating another user, another person may rightfully trap that area. A trapper may use a general area indefinitely by lengthening the original trail or making side trails off of it. He also may allow the whole area or a portion of it to lay fallow for a season or two in order to allow the species he has been trapping to increase their numbers.

It is not unusual for a variety of social and economic situations to exist among Lime trappers in a given year. People sometimes, but not always, trap with a partner, either from their own household or from another. They may, but do not necessarily, trap with their closest relatives. Peonle tend more commonly to form partnerships and travel with their partners on traplines that are a considerable distance from home where overnight camping may be necessary. Often a partnership is formed, because two parties feel they will benefit from sharing each other's skills, equipment, and companionship. A person learning to trap will usually have a partner so that he can become more easily orientated to an area and to proper trapping methods. Partnerships are usually relatively informal and may be terminated during a trapping season if an occasion demands it. A person may have different trapping partners for different kinds of animals. During the 1982-83 season, most Lime Villagers trapped alone or with their spouse or child.

People make various arrangements in a partnership in regards to equipment, animals and profit. Usually an individual owns his own sets

and is entitled to the animals caught in them. Partners generally set up a trapline together and then work it together or separately depending on factors that may vary within the season. In a situation where one partner is at a disadvantage because of lack of equipment, skills, or time, the more advantaged person usually shares without expecting immediate compensation.

The following example illustrates different types of trapping partnerships that occurred in Lime Village in recent years.

Example 1: Two men, one of whom was a relative newcomer to the area, and the other an elder of the village, agreed to trap marten together. Each man had his own traps and both men shared equal expenses of gas and food. The less experienced trapper supplied the snowmachine and tent from them both. His wife also sewed the holes in the raw skins to give them a higher market value. The more experienced trapper compensated his partner by introducing him to a trapping area and teaching him valuable trapping techniques. They sold the marten they caught to a Kuskokwim River trader for 30 dollars to 60 dollars a piece depending on the quality of the skin and divided the profit between them. As one man had access to an airplane, the other man took only a portion of his profit in cash and the rest in gas and other supplies which reached Lime at lower than normal cost via his partner's aircraft.

Example 2: A nephew and uncle trapped beaver together during the 1981-82 winter season in the vicinity of Vatsilyaxi. They placed 12 sets a piece along an approximately 8 mile line. They travelled the line both together and separately, each checking his partner's sets when he wasn't present. Each person, however, kept the fur caught in his own sets and sold it separately from his partner.

## Marten

Along with beaver, marten is the major furbearer Lime Villagers harvest for commercial purposes. Although more beaver are taken than marten, marten probably provide as much or more cash income as beaver. Apparently during the middle part of this century, marten were very abundant in the area and prices were high, thus providing a reliable income for people. During the summer of 1982, an elder commented that there appeared to be more marten at the present time than in the recent past.

Marten prefer spruce or mixed spruce-deciduous forests, an environment which is common between the Stony and Swift Rivers and where Lime residents do a lot of their marten trapping. They usually make pole and cubby sets to catch these animals using no. 1 traps. Most households put some effort into trapping marten each year as was the case during the 1982-83 season.

Today Lime Villagers value only the fur of the marten, although they sometimes feed the meat to their dogs or use it as bait. Some older people have eaten marten in the past and still consider it a potential emergency food.

## Red Fox

Fox roam widely and occur both in forested and open environments. With the exception of other than beaver and marten, Lime residents have probably harvested more fox for commercial purposes than any other furbearer in recent years. People sometimes catch fox in sets meant for marten, although some people actively trap fox. Rarely, they may build a

cubby especially for a fox, but usually they set the trap on or near a bait station, concealing it at least partially in the snow. Sometimes they also take fox by building a circular brush fence with snares in several openings around a bait station. During the 1982-83 trapping season, cross fox as well as red fox were harvested, with most trappers taking at least one fox. The uses of fox today and in the past are similar to those of marten.

## Wolverine

Wolverine are not uncommon in the forested areas around Lime Village. Most people don't trap them actively although one resident said he lost two from traps he set for them during the 1981-82 season. On the other hand, several were taken by trappers during the 1982-83 season. Wolverine are valued now as they were in the past for their high quality fur. Today, the fur is usually sold on the commercial market, although traditionally it was made into warm clothing for domestic use.

## Beaver

Lime Village residents have traditionally harvested beaver year-round, doing so most actively during the late winter and early spring months. During the closed water season, they set snares and traps through the ice preferably near the dams and not the lodges in order to harvest the larger beavers and to leave the young to grow. Because beaver and moose commonly share the same habitat areas along stream courses, the hunting of these two important resources is often combined. During the summer, individuals note the location of beaver lodges and make plans to

return to a locality in the winter to trap. They make known their intentions to others in order to establish their priority to trapping areas. If an area appears to be inhabited primarily by young beaver, it usually is left untrapped for a year or two until a significant number of animals have reached maturity.

Lime people value beaver for its meat as much as its fur and use most parts of the animal, including the intestines, for food and the castor for medicine and bait. The meat is usually boiled fresh, but it may be dried or frozen for future use. Beaver is the most important small game animal utilized by Lime Villagers because of the large numbers harvested and because both the meat and the fur are highly valued. In recent years, especially when bears have been on the decline, beaver probably have been a more important source of food than any other animal except moose and caribou. People sell some skins commercially and tan others at home, making mittens, hats, and other warm clothing.

During the open-water season, Lime Village residents have traditionally broken beaver dams primarily on streams where they fish. They say it is necessary in order to maintain high fish populations and in general to keep their country in good condition. They note that beaver dams obstruct stream courses that lead to important fish spawning areas and if not broken may prevent significant numbers of fish from returning. They also observe that beaver populations have remained generally high over time within their traditional land use area and that their numbers increase fairly rapidly even in areas where they are heavily trapped. Whitefish and salmon populations, on the other hand, have not remained as consistently high over time and are said to increase in areas where beaver dams are regularly broken.

Lime Villagers feel that beaver dams cause water to become stagnant and impure by impeding its free circulation. They comment on the bad smell that the water acquires where beaver dams are present. By breaking dams, they help to improve the quality of the water, they feel. They report that if beavers become too plentiful, a disease develops in the water which can affect humans. They also note that the dead fish caught in beaver dams attracts bears and wolves.

Beavers significantly affect the land as well as the water in areas they occupy. By damming streams, they create ponds where there was dry land and sometimes flood trails, good berry patches and other areas important to people. For example, in the fall of 1982, a portion of an important overland trail from the village to Trout Lake was flooded due to beaver activity.

Lime Villagers have also broken beaver dams traditionally to improve travel for themselves on small streams as well as for fish. By restricting water flow, beaver may adversely lower the water level in the streams they dam and connecting streams. Many of the small streams that people use for hunting and fishing activities are only marginally navigable with outboard motors because of low water levels, and poling without motors is often necessary even in the spring and fall when water level is at its highest. The breaking of beaver dams may raise the water in lower areas and allow easier navigation of small streams.

On the other hand, by cutting brush and trees, beaver eventually change the land by producing clearings which moose and other wildlife are attracted to. Beaver are known to be very persistant in returning to an area from where they have been disturbed and will remake a beaver dam again and again. One elder commented concerning the practice of breaking

dams, "We've kept our country good a long time because we've broken dams."

## Land Otter

Land otters inhabit streams and lakes that don't completely freeze over, making dens in banks that border these bodies of water. They are a minor fur species for Lime people who don't hunt them as actively as they do beaver. They are smart, wary animals and not nearly as plentiful nor as easy to catch as beaver. Because otters share the same environment as beaver, they are sometimes caught in beaver sets, although trappers also place sets especially for otter. Lime people also hunt them with guns when they encounter them on land or in open water. One hunter killed several by shooting them in their den during the winter of 1981-82. Otter skins are sold on the commercial market as well as home tanned and made into clothing. No one apparently eats otter meat today, but most middle-age and older generation people have tried it at least once when food supplies were low or because their elders told them to try it so that they would be accustomed to it in case they needed it for emergency food. One elder who had eaten it in earlier times said it tasted like fish caught in lakes. Traditionally otters have been hunted year round with bow and arrow, spear and snare.

## Muskrat

Muskrats are common in many of the marshes, ponds, lakes, and streams in the Lime Village land use area. People hunt them mostly in the spring, especially from April through May. As soon as the ice begins to melt

along the edges of lakes and ponds and at the mouths of creeks, they set traps on the bank, in the water close to the bank or sometimes under the ice near their houses. They also shoot muskrats from boats and canoes later in the season when the ice has melted. While people probably don't hunt muskrats as frequently as they did in the past, they sometimes still tan their skins and make clothing with them as well as sell them commercially. Traditionally, many muskrat skins were sewn together to make blankets, a very time-consuming task which is not done today. Some Lime people eat muskrats, although they are not often used for food now as they were in the past nor as commonly sought after as beaver are today.

## Fishing

Fishing is a very important component of the subsistence economy of Lime Village because it provides a dependable resource available seasonally in large quantities. In contrast, game animals, while pursued year round, are not as reliable a resource as are fish. Although preferred less than animal meat, fish is a food staple that is relied on especially when meat supplies are short. Fish resources give a stability to the economy that probably would not exist if hunting alone was the primary supplier of locally-derived food resources. One reason given by people for the move from Qeghnilen to Lime Village was the more diverse and abundant fish resources of the latter area.

Salmon and whitefish are the most important fish in terms of quantity harvested for dog and human consumption. Preferred over other types of fish for their flavor and nutritional value, they run seasonally in large numbers. Since whitefish are available in the spring and fall and salmon

in the summer, they provide a reliable food resource during three seasons. Northern pike is the third most important fish for Lime Villagers, because they are available in quantity during the winter months. Although not as highly preferred as salmon and whitefish, pike provide humans and dogs with a nutritious food when other fresh fish are not obtainable in significant numbers. Longnose suckers are also an important secondary fish harvested in quantity in the spring and fall for dog food. Arctic grayling, used for both human and dog food, are also taken in significant numbers each year. The least cisco, Dolly Varden, arctic char, lake trout, sheefish, and burbot are minor fish species that are harvested occasionally by Lime people as a source of human and dog food. Traditionally, Lime Villagers also utilized the Alaska blackfish and one or two species of stickleback for food.

Lime Villagers today obtain fish by four primary methods: fish wheels, set nets, fish fences with traps and dipnets, and hook and line. To harvest large quantities of fish, they work together in groups usually composed of single or multiple household units. Minor fish species, which are usually taken in small numbers, are most frequently procured by individuals alone or by several persons fishing together.

Lime Villagers preserve fish primarily by air and smoke drying during the spring, summer and early fall and freezing during the late fall and winter. Some households usually put up a small quantity of salt salmon every year and a few families have canned some salmon in recent years. Boiling and frying are the most common methods of preparing fish for eating, with the head and certain organs considered edible as well as the meat. Indian ice cream or "nivagi" is a favorite dish usually made out of boiled mashed salmon, whitefish or pike to which berries, lard and sugar

are added. The lard is usually rendered from moose, caribou or black bear fat.

The harvesting and processing of large quantities of fish are usually accomplished by work groups composed of either single or multiple household units. Multiple household units are usually composed of families with parent-child or sibling relationships. During the salmon season multiple household work units usually fish at camps on the river outside the immediate village area, while single household units tend to fish from their winter residences. To obtain quantities of whitefish, people fish as single or multiple household units from camps situated on streams near the lakes where some of the fish species migrate to spawn.

Camps used by multiple household units are overseen by older generation persons whose children and families fish with them. Members of the camp share equipment including fishwheels and nets and work together at harvesting and processing the fish and maintaining the camps. The fish is usually divided among households according to the degree of involvement of an individual household, while also taking into account its size and needs. Some households that fish together share the same caches and use the fish from the cache as they need it instead of taking individual shares.

The following case examples are chosen to illustrate the composition of fish production groups and patterns of distribution and sharing.

Example 1: An older woman has maintained and operated a summer fish camp outside of the village with the assistance of her children and their families for about eight years. During the 1982 season she fished there with her daughter and son who belong to her household and with another daughter and her spouse who form a separate household. An older married

daughter and her family who had fished at the mother's camp in previous summers decided that year to fish from their village residence as a single household unit.

The older woman received visitors almost daily from the village as her camp is located close to the village on the river which is the main summer travel route. They often ate with her and sometimes camped overnight. Included among visitors who did not live in the village was a son who resided in Stony River and a sister and her spouse from Nondalton. While visitors to her camp were given some fish, she divided most of the harvest between her household and the household of the daughter who fished with her.

Example 2: An elderly man and his wife run a fall whitefish camp about 30 miles below Lime Village near Tishimna Lake. The woman is originally from a village in the area that was abandoned during the 1930s. She and her husband and their children and families have continued to use the area to the present day both as a winter trapping ground and as a fall fishing site.

During the 1982 fall whitefish season, the older couple, their son, three daughters and their families composing four different households fished at the camp for about three weeks. The core group was joined by a member of the Lime Village teacher's family for an extended period of time. The camp received visitors both from the village and from other communities, including a son-in-law of the older couple who was presently living with his wife and children in Red Devil. A granddaughter of the older couple and her spouse who lived outside of the region also stayed at the camp for several days. The population of the camp fluctuated not

only according to number of guests by also in core members present at one time.

The smokehouse and equipment was used communally by camp members who divided the fish up among individual households except that those who shared a cache in the village kept their fish in common. Almost all visitors to the camp received some fish to take with them and some fish was distributed to most households in the village.

After a fishing period of about three weeks, the original camp members returned to the village and were replaced by a fourth daughter and her spouse who planned to trap in the area after they harvested whitefish for themselves and their dogs. Unfortunately for them the whitefish season was cut short by abormally early freeze-up in early October. As they were able to take only a few fish, the other households that had fished there earlier shared their harvest with them.

## Salmon: Summer Fishing

Lime Village residents use fishwheels and set-nets to harvest the five species of salmon that ascend the Stony River during the summer months. King salmon, dog salmon, and red salmon runs normally begin in late June and peak in July and the silver salmon run occurs in late August and September. The Stony River is the last stream up the Kuskokwim to have a large run of red salmon. The hump-back salmon run is small, and the number taken by Lime Villagers is insignificant.

King salmon are obtained almost exclusively with fishwheels, and residents estimate that between 8 and 10 percent of fish harvested with fishwheels are king salmon. The number of silver salmon a household

takes during August depends considerably on how successful they were during the main salmon season in July.

Salmon is exclusively a non commercial resource for Lime people today; the commercial fishing industry closest to home being in the Bethel area. Today Lime Villagers do not go outside the area to participate in commercial fishing as, for example, Nondalton residents do in Bristol Bay. In the 1960's, some Lime people joined Nondalton residents to work in Bristol Bay but stopped after several years. According to residents, the return did not outweigh the disruption of subsistence salmon fishing at home.

In recent years, Lime people have regularly maintained three salmon fishing camps on the Stony River outside the immediate village area. One of these camps is located across from the village, another about 5 miles upriver from it, and the third approximately 25 miles upstream near the old village site of Qeghnilen. The camps belong to and are overseen by older generation persons whose children and families fish with them and assist in maintaining the camps. Some of the younger families prefer to use their village residence as a fishing base, going out from there to check nets and fish wheels and returning home to process their catch.

Preparation for the summer fishing season begins by June and may include overhauling outboard motors and boats, repairing and situating fishwheels, and mending set-nets. New motors usually have to be purchased at least every three years, but nets last indefinitely if mended and well-cared for. People build their own fish wheels, which may have a life of 10 years or more, unless they are swept away by ice in the spring or

become unfastened during the summer and drift. One of the four fishwheels in use during the 1982 season drifted.

Households also get ready for salmon fishing by repairing or, if necessary, building new camp structures, which include smokehouses, caches, tent frames, and fish racks. These are usually constructed out of spruce poles or boards with sheets of spruce bark often being used for siding, roofing, and flooring material. Spruce bark is also used as a base for cutting fish because it helps keep the fish from sliding. Accessory camp items are fish cutting tables and holding pens built in the water at the water's edge to keep the fish fresh before they are cut.

Once the salmon runs have begun, people are kept very busy checking fishwheels and nets every day and hauling, cutting, and hanging the catch. Men are usually in charge of hauling the fish and women and children responsible for processing it, but men may also help with the processing especially when many fish are taken at a time.

After the fish are cut, they are hung on outdoor racks usually for a day to air dry and then transferred to the smokehouse where a smudge fire facilitates the drying of the fish and helps to keep flies away. This combination of air and smoke drying is the method Lime people use almost exclusively for preserving salmon today. In recent years, a few families have tried canning some of their harvest, and some households put up salt fish. The practice of burying fish in the ground or hanging fish in a sack in water and allowing them to ferment for a number of days before consuming them is also still practiced by at least a few families.

People make an effort to harvest only the amount of fish they can process and they make use of most parts of the fish. Besides eating the

meat, which they usually boil or fry, they use the eggs fresh for food as well as dry large quantities of them for human and dog consumption. They also cook the head and certain organs and eat them fresh as a delicacy or combine them with other scraps and feed them to the dogs. Also, in recent years, some individuals have made traditional waterproof boots out of king salmon skin, which they have sold or traded as well as used themselves (see Kari 1978:22 for additional information on this topic).

Besides hauling, cutting, and hanging fish, which may number 200 or more a day during the peak of the run, camp residents have to cook for themselves and their dogs, carry water for washing and drinking, maintain a supply of wood for cooking and smoking fires, and do any number of other miscellaneous camp chores. Also, some members of a household usually make at least several trips during the season to the downriver communities of Stony River, Sleetmute, or Red Devil to obtain provisions, especially gas which is often in short supply in Lime. While there is considerable movement to and from fish camps during the summer, people are careful not to leave the camps completely unattended because of the possibility of marauding bears or other animals.

After the salmon season is over, the dried fish is usually made into bundles of 40 fish and then carefully cached. Fishwheels are pulled to shore above the high water mark if possible and the camp is cleaned and equipment stored there or transported to the village residence along with dogs and other belongings.

Although Lime Villagers use most of the salmon they harvest to feed their dogs, it is an essential food for them as well. While they welcome it as a change in their diet throughout the year, they especially value it as a high protein food to depend on when fresh meat and other food

supplies are low. Dried salmon is also ideal for travelling and camping, since it is a light-weight, convenient, high energy food.

The salmon season, especially July which is the peak, is a very intense time for Lime residents who work extremely long, hard hours day after day. Although they set their nets to take some silvers that run from August into September, they relax from fishing as much as possible before the fall whitefish season begins. During years when fishing is poor in July, they put greater effort into harvesting the later silver run. People said the 1982 July salmon runs were especially good and most households did not put a lot of energy into harvesting silver salmon.

## Whitefish and Other Non-Salmon Species: Spring and Fall Fishing

Lime Village residents regularly maintain a number of spring and fall fish camps in the lake country south of the village and a fall fish camp near Tishimna Lake, approximately 30 miles west of Lime. During some years they also make use of other traditional spring and fall fishing areas including South Lime Lake and North Lime Lake. These camps, which also serve as a hunting base for waterfowl and big game animals, are usually located on streams close to the outlets of the lakes where some of the species of fish that use the streams migrate to spawn. They are situated if possible on a somewhat elevated spot in close proximity to an open flat where game can be easily spotted and berries can be harvested.

At least six species of fish are commonly harvested from these camps, the most important in terms of quantity and food value for human consumption being the broad and humpback whitefishes. The smaller round

whitefish, the longnose sucker, northern pike, and Arctic grayling are also usually taken in significant numbers each year. Arctic grayling is also caught with hook and line in the river in small numbers especially during the spring and fall when the ice is running.

People harvest fish at and spring and fall camps by building pole or stick fences with traps across the streams and dipnetting the fish from the traps. In the past they also took salmon by this traditional method, which was used in earlier times by many indigenous groups in Alaska. The fish fence with trap is reset every season and may be moved to different parts of the creek with changes in water level. It is removed from the creek as soon as families have harvested enough fish to meet their needs. Especially in the spring when fish are going up the creek to spawn, people are very careful about the length of time it is left in. Sometimes during this season they set nets rather than fences across or along one side of the streams because nets are easier to place and move than are fences. A fence and trap may last up to five years if it is cared for well by mending it and putting it in the smokehouse to dry. More than one resident noted the superiority of fences over set nets and fishwheels in that the fish generally remain alive and fresh in them until removed. This, they say, is less often the case for fish harvested by net or fishwheel. Sometimes a dam of brush is situated in the stream as a substitute for a fence. This method is used especially when a person is not planning to fish long and doesn't want to put the extra effort into building a fence.

A spring and fall camp is similar to a summer salmon camp in that it usually consists of a smokehouse, cache, canvas tents for sleeping and eating quarters, and fish racks. It may also contain a platform for

storing fish that are caught late in the fall season and frozen instead of dried. The camps are maintained and used by extended family groups as are the salmon camps. Many of the work activities are similar to those at the summer camps, although some are distinct due to differences in environment and in methods of harvest.

In the spring people usually set up a camp and haul supplies to it in April using dogs and snowmachines for transportation, as the streams do not become ice free for boat travel usually until May. The mouths of streams, however, tend to open in April and people begin harvesting fish there as early as possible. Once the streams are free enough of ice, people begin navigating these narrow waterways by boats, poling without the use of motors in very shallow places. They have to know exactly where the channel is located and be aware of changes in water level to avoid hitting rocks and scraping bottom. Thus, spring and fall camps are not as easily accessible as salmon camps which are conveniently located for transportation on the river.

People usually harvest more fish in the fall than in the spring because they want to have a plentiful supply on hand for the winter, the season during which fresh fish is the least available. Also, fish are more easily preserved during cold weather than warm weather when it is more subject to rot, mold, infestation by insects. Fish taken late in the fall season has the advantage of being frozen fresh instead of dried first and fish taken earlier in the fall season need less drying than fish caught in the summer and spring. People prefer fresh frozen fish over dried fish for its nutritional value. People also usually harvest less fish in the spring than in the fall because they want to let as many fish as possible spawn. However, some fish such as suckers,

which are always plentiful and only valuable as dog food, are harvested in large amounts during either season if they are needed. Several Lime households put up large quantities of suckers during the 1982 spring season.

Because of its flavor and perceived superior nutritional value, most Lime residents prefer the large whitefish over salmon and other fish as a food staple for themselves and their dogs. While a good take of salmon during the summer may somewhat affect the amount of whitefish people harvest, they usually put considerable effort into the fall fishing season. For example, even though the 1982 season was exceptionally good, households that use the fall camp at Tishimna Lake planned to spend the usual amount of time, mid-September through mid-October, harvesting fish there. They began preparations for the season in August by hauling provisions, repairing equipment and also building a new smokehouse. They were fishing there on schedule by mid-September but were cut short in their time by an abnormally fast, early freeze-up during the first week of October. This occurrence also affected people fishing at camps south of Lime.

## Pike: Winter Fishing

Lime Village residents regularly fish for pike in Tundra Lake and other area lakes beginning as early as February and continuing into May. They hook them through the ice and catch them in open water with nets and fences. Another method that has been customarily employed is to shoot a rifle into the midst of a school of them which apparently stuns them and allows them to be grabbed by hand.

Although pike are not easily taken in large numbers during the winter through the ice, they are a welcome change in the diet for humans and dogs when other fresh fish are largely unavailable. They are harvested in greater numbers more easily and efficiently in open water with nets and fences which people set in the mouths of creeks in the spring and fall. People sometimes dry them in quantity as several families did during the 1982 spring season. Pike serve as an important supplementary food, especially in the winter and spring during years when fall fish supplies run short. Some pike are also caught in the river during the summer months in nets set for salmon.

## Gathering

As in the past, plants continue to supply Lime Village people with firewood and building materials essential to their livelihood. While quantity-wise local plants do not contribute significantly to the diet, as do local animal and fish resources, plants do add variety to it and provide important vitamins and minerals. Certain plants have also been traditionally used for their healing and medicinal properties. Besides providing heat, building materials, food, and medicine, local plants are also useful in the daily life of Lime Villagers for a variety of miscellaneous purposes.

### Trees and Large Shrubs

Wood gathering occurs year round in Lime, although it slacks off during the summer months. During the fall before freeze-up and in the spring before breakup as well as throughout the winter, Lime residents

spend considerable time cutting and hauling wood. They heat their homes and their steambaths and cook for their dogs exclusively with wood and cook for themselves with wood the majority of the time. The school is heated partially with wood which the school district paid residents $150.00 a cord for supplying during the fall and winter of 1982.

Most Lime households own at least one chainsaw, and most adults and older children know how to operate them. While people use chainsaws frequently for harvesting wood, they still also employ swede saws at times, because they save on fuel and are easy to transport. Both men and women participate in wood harvesting activities although men assume the major role.

Important considerations for a person choosing a wood-cutting site are its convenience to home and the availability of dry spruce wood there. Woodcutting areas are not owned, although cutting a trail to an area usually gives the party priority to it because of the work involved. Once a person has cut wood, ideally he is the owner of it regardless of where he has stacked it (e.g. along the trail or by his house).
Except in a case of extreme need, it is improper to take another household's wood without permission, although most people will share wood with someone in need. There is considerable sharing and borrowing of wood, especially at camps.

Sometimes temporary partnerships are formed for harvesting wood. For example, during the 1982-83 winter season, one man trapping beaver alone found a good stand of dry spruce in the area. Thus his trips to check his snare line acquired a second purpose, that of harvesting wood. Since a cousin assisted him in the work, he in turn assisted his cousin in obtaining green wood which he needed.

During the winter of 1982-83 the majority of Lime households cut wood across the river from the village and as directly opposite their homes as possible. Some woodcutting was done in back of the village, although good timber is not plentiful there. In the winter, some wood is also taken on islands and inland, down and upriver, within a five mile radius of the village. However, most winter wood is harvested within a mile or two of home. During the winter, wood is usually hauled on sleds pulled by dogs or snowmachines. A person without use of dogs or snowmachine may pull the sled himself or carry the wood if the wood is close to home. As the village is situated on a steep hill, it takes considerable energy to get it to its destination.

One man who possessed only one dog during the winter of 1981-82 used it regularly to haul dry wood from a river island about a mile from his house or sometimes from along a creek near his house. He would go sometimes for a half a day or more taking tea and some dried meat or fish with him and cut wood with a chainsaw or a swede saw when he needed to conserve gas. He would do this whenever he had extra time in order to supplement the wood he had gotten in the fall by boat.

In the winter, residents spend much of their "spare" time gathering wood, and it is not unusual for them to be out in temperatures as low as -30° and, if necessary, they will work in colder weather. A Lime Village elder recalled that his father would easily harvest 10 cords of wood a winter. He continued to cut wood in his old age until he became bedridden a few years before his death.

During the open water season, Lime Villagers prefer to cut wood upstream from the village or camp, close to the bank or on islands. They transport it as logs tied to the back of the boat or cut into

sections and hauled in the boat itself. Driftwood is also collected off the beach during the summer and used especially for cooking dog food. Most wood is taken within a 5-mile radius of the village during the open water season, although some cutting was done at least 10 miles upriver during the 1982 fall season. As it is easier to haul wood with a boat than with a sled, people try to get in a good supply before freeze-up. They generally go further for it in the open winter season than in winter, saving the wood closer to home for cold weather. On the other hand, travelling by sled gives a person considerably more flexibility as to where he may harvest his wood than he has in the open water season. During the open water season wood harvesting is restricted primarily to stream banks because of boat transportion. If a person is lucky, he may find good quality wood that a beaver has cut in a convenient place as was the case for at least one man in the fall of 1982.

Lime Villagers are expert at judging the quality of wood and its best potential use. Generally they do not clear cut but select trees as they need them for specific purposes. Dry spruce, usually in the form of standing dead trees, is the most frequently sought-after type of wood used winter and summer for quick-starting, fast-burning fires. Locally known as dry wood, Lime Villagers constantly note the location of such trees and remember them for future use. As dry spruce is in limited supply and in heavy demand, people often make their own "dry wood" by peeling the bark off of spruce trees, usually in wide strips which they use in the construction of buildings and to cut fish on. After peeling a spruce tree, ideally, they let it stand for one to three years to let it dry well before they cut and use it. They try to select trees from dense stands so those that are left will have a better chance to grow.

Birch is the most popular wood after dry spruce, being favored for its hardness and its ability to burn a long time. It is used dry or green for firewood especially in the winter when long-burning, hot fires are necessary. Cottonwood is considered low quality wood because it does not dry well like spruce or burn long like birch. However, it is sometimes used for firewood in the winter to supplement the birch and spruce and in the summer to make a smokey fire, or "smudge" under drying fish. Residents of the larger B.I.A. houses estimate that they use over 10 cords of wood a winter to heat their homes.

While Lime Villagers use most of the trees they harvest for fuel, they have many other uses for them, some of which are mentioned below. Besides constructing most of their buildings out of spruce, Lime Villagers build fishwheels, fish fences, and boats out of it. They use spruce roots as string and rope and spruce pitch as caulking material, medicine, and chewing gum.

Lime people use birch wood to make sleds, spoons, and tools. Out of the bark, they construct a variety of containers, including baby cradles. They also use the bark for roofing and siding material for buildings. The cambium and sap of both birch and spruce are used for medicinal purposes. Cottonwood buds are also used as a medicine as well as the cambium of alder. From the latter, a coloring for skins and snowshoes is also made. Willow stems and branches are used for fish hangers, lashing material, basket rims, and variety of other purposes.

Most board lumber that residents use is split by hand or chainsaw from local trees. One family operated a small sawmill near their home from 1976-79, which produced approximately 50,000 board feet and provided residents with some relatively inexpensive commercial lumber.

Lime Villagers appear to practice good forest management in selectively cutting trees for their use. It is significant that most of their wood can still be taken close to home, even though the village has existed in the area for over 50 years. The fact that the land is little scarred by their continual use is also noteworthy.

## Small Plants

While trees and large shrubs are the most important plants for Lime Villagers in terms of resources obtained, they make use of the smaller plants for food, medicine, and other needs. Although wood and some of the other materials obtained from trees can be harvested year round, most food and medicinal plants are available only from May to October when the temperature is warmer. While men are the primary harvesters of trees, women and children mainly gather the smaller plants, although men sometimes assist, usually as part of a family group.

Traditionally the people of the Central and Upper Kuskokwim region ate primarily meat and fish, high protein and fat foods, and Lime Village residents are no exception today. Although local plant foods provide only a small percentage of food intake of Lime Village people in terms of quantity, they are enjoyed as a supplementary food for the variety they give to a primarily meat, fish and starch diet. Local edible plants are nutritionally valuable mainly for their vitamin and mineral contents. A few of them have a high sugar or starch content.

Berries are the most relished of the plant foods and are gathered in greater quantities than are any other type of vegetation used for food. Blueberries, lowbush cranberries, (lingonberries) and cloudberries (lowbush salmonberries) are the most preferred fruit and are usually picked

in sufficient quantities to store for winter. People also sometimes gather enough highbush cranberries and blackberries to preserve for future use. Northern red currants, nagoonberries, bog cranberries, and rosehips are of minor significance to Lime Villagers today. They may pick some and eat them in the field or take them home to consume fresh. A favorite way to eat berries is in Indian ice cream or with sugar and canned milk. People commonly preserve berries by layering them with sugar and keeping them in a cold place. Some families also make jams and jellies out of them. Most berries become ripe in August and early September after the main salmon season is over.

Lime Villagers also harvest the roots, stems and leaves of certain plants for food today. The most popular is the root of the wild potato, also know as wild carrot, which is dug in the spring before the frost leaves the ground or after the first frosts in the fall. Most people eat them fresh either raw, boiled, or fried and sometimes add them to Indian ice cream. In the past, most households apparently kept quantities of them for winter use, although in recent years apparently only a few families have preserved them.

Other plant foods used occasionally are the stems and leaves of sourdock and wild rhubarb, the young shoots of nettles, fireweed, certain ferns, and some species of willows. These plants are harvested in the late spring and early summer and are usually eaten fresh, raw or boiled. People also cook some of these herbaceous plants for their dogs.

Hudson Bay tea is a important beverage and medicinal plant which people use a substitute for commercial tea and as a medicine for colds and other illnesses. Other plants that have continued to be used for

medicinal purposes into contemporary times are roseroot, wormwood and certain type of moss.

Lime Villagers use grass for a variety of purposes, including bedding material for their dogs and insulation for roofs of buildings. They use the tall grass which grows abundantly in the swampy areas around their whitefish camps in a number of ways. They regularly cut it and lay it on the wet ground in the vicinity of he fish fences and on trails. One elder commented that by doing that she "helps build Alaska." She notes that she and her parents have done this systematically over many years and there is much more dry ground in the area than there was originally. People also lay grass especially in the areas where they pile and clean the fish, changing it systematically as it becomes unclean. This helps to prevent breeding of flies and an unpleasant odor in the vicinity. There are many other traditional uses of plants which are not discussed here.

During the 1982 summer season, at least four households grew small gardens, the main crops being potatoes, cabbage, turnips, and other hardy vegetables. For several years in recent times, there was a large communal garden across the river from the village which was apparently discontinued in favor of private gardens.

# CHAPTER V

## CULTURAL CONCEPTS AND VALUES RELATED TO LAND USE PRACTICES

Lime Villagers have a strong sense of geographic and social identification with their traditional lands (see Maps 1, 2 and 3) which they feel they have rightfully inherited from their ancestors. Because of this inheritance and their own continued occupany and use of these lands, they feel that they are entitled to them today. In the Dena'ina language the nominalized verb ht'ana means "people who possess an area." A place name followed by ht'ana identifies a group of people as the collective owners of an area. For example, K'qizaghetnu ht'ana translates as "Stony River people;" Nundaltin ht'ana, Nondalton people; Tubughnen ht'ana, "Tyonek people." By being identified with an area through traditional and kinship ties, one acquires the right to occupy and use an area. One also inherits a common value system in regards to how one occupies and uses the land.

An essential part of this traditional value system is proper conduct towards nature. There are many rules for the respectful treatment of the land, water, and sky and their resources. A few of those most commonly mentioned by people today are discussed here.

A very important ethic is not to waste resources. Lime Villagers practice this by making an effort not to harvest more of a resource than is needed and by using as much as possible of a resource that has been harvested. The parts of a resource that are used vary according to the nature of the resource. In the case of most edible game the head, legs skin, and organs are used as well as the body meat of the animal. If the animal is an herbivore, the intestines also may be used. Lime People

also try to avoid waste by making a strong effort to prevent the loss of a wounded animal. By doing this they are also attempting to follow another traditional value, which is to respect life and prevent needless suffering. Additionally, Lime Villagers prevent waste through their system of sharing, which distributes a resource beyond the households of those who harvest it. The system also works to allow people to have fresh meat more regularly and more frequently than if the resource were not shared. Lime Villagers contrast their behavior regarding waste with that of sport hunters they have observed. They note that while some take the meat, others kill only for the horns, as they have found carcasses rotting in the field. In any case, few non-local hunters use an animal as thoroughly as Lime Villagers have been taught to do and are therefore wasteful according to the residents' value system.

Showing respect to one's elders is another traditional ethic that Lime Villagers adhere to in their land and resource use practices. They do this by giving choice parts of animals they harvest to their elders and by making other local resources available to them when they are in need of them. They also tend to leave the areas closest to the village for them to hunt, trap, fish and gather in.

Another traditional value of Lime Village people is to avoid making extreme changes in the natural landscape or defacing it. One example of Lime people following this principle is in their wood harvesting practice of selectively taking trees instead of clear-cutting them. These values contrast with how they perceive outsiders operating. They cite an incident that occurred when the airstrip was being built in the village in 1978-79. A tractor being driven overland from Sparrevohn Air Force Station apparently spilled diesel fuel in several places. People mentioned

finding oil on lakes and ponds and were concerned about the effect it had on the wildlife of the area. They said they found fish dead on the beaches and that they had a very poor harvest of whitefish that year. One elder expressed his concern as, "Lime Villagers don't want oil because it spoils the animals." Other people noted that they had found gas and oil cans floating in a nearby lake the preceding summer. They also mentioned finding rusted gas drums and evidence of spilled oil on a lake in the Hoholitna drainage and expressed concern about more trash being left by surveying and exploration crews in the future.

A traditional practice of Lime Villagers is the alternate use of localities within their land use area. Alternate use areas are necessary, they feel, in order to prevent overharvesting of certain resources. This is especially true for game such as marten which have a limited home territory and do not roam widely. For such game, a trapper usually moves his line to another location after several years in order to allow the area he has been trapping to replenish itself. Alternate use areas are also necessary for game animals that roam widely and are not predicitably available in a locality. If a hunter does not find them in one area, he needs the option of travelling to other areas to find them. This is especially true for the large, very important game animals such as caribou and moose. Lime Villagers have also traditionally maintained alternate fishing locations in order to prevent inadequate harvests which may be caused by poor runs, flooding of certain streams, or other circumstances. Lime Villagers feel strongly that they need continued access to all of their traditional lands in order to maintain the option of alternate use areas.

# CHAPTER VI

# CONCLUSION

The results of this research on the contemporary economy of Lime Village show it to be heavily dependent on local resources today, as it has been in the past. The primary occupation of the majority of residents throughout the year is the harvesting and processing of local resources for local use, and to a lesser extent for trade or sale outside of the community. To procure these resources residents travel extensively throughout their traditional land use area on foot, by boat, and by sled. The fact that residents have had relatively open access to these lands over time has been a key factor in their ability to maintain an economy heavily dependent on local resources.

A second component of the economy is cash income which is generated primarily through part time and seasonal wage work, and through government assistance programs. While Lime Villagers have remained minimally involved in the cash economy over time, their ability to harvest local resources today is dependent on some cash income to provide them with costly fuel and other commercial goods used in the harvesting and processing of local resources.

A traditional kin-based system of exchange operates to distribute locally harvested resources among village residents. It also serves to distribute commercial goods among village residents. The system works to prevent waste and to insure that no one in the community is without essential resources.

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APPENDIX A

GLOSSARY OF TERMS FOR SELECTED SPECIES

UTILIZED BY LIME VILLAGE RESIDENTS[1]

(FROM DENA'INA NOUN DICTIONARY

COMPILED BY JAMES KARI, 1977 (WITH MINOR REVISIONS))

MAMMALS

| English | Scientific | Dena'ina (Tanaina) |
|---|---|---|
| Hare, snowshoe hare | Lepus americanus | hvaya, nehvaya |
| Tundra hare, northern hare, "jackrabbit", | Lepus othus | yis vaya, qgehcheh |
| Hoary marmot, "whistler" | Marmota caligata | k'qushiya |
| Arctic ground squirrel, parka squirrel | Spermophilus parryi | qunsha |
| Beaver, large beaver | Castor canadensis | chu |
| Muskrat | Ondatra zibethicus | tuɣchuda |
| Porcupine | Erethizon dorsatum | nini |
| Wolf | Canis lupus | tiqin |
| Red fox | Vulpes vulpes | q'anlcha, ggaggashla, dasdeli, |
| Cross fox | Vulpes vulpes | chavadushga |
| Black fox | Vulpes vulpes | k't'esha |
| Black bear | Ursus americanus | yeghedishla, shesh |
| Grizzly bear | Ursus arctos | ggagga |
| Marten | Martes americana | k'cheghuxa |
| Mink | Mustela vison | tach'ich'a |
| Wolverine | Gulo gulo | idashla |

| English | Scientific | Dena'ina (Tanaina) |
|---|---|---|
| Land otter, river otter | Lutra canadensis | aggeya |
| Lynx | Felis lynx | kazhna |
| Moose | Alces alces | k'uhda'i |
| Barren Ground caribou | Rangifer tarandus | vejex |
| Dall sheep, mountain sheep | Ovis dalli | nudyi |

FISH

| English | Scientific | Dena'ina (Tanaina) |
|---|---|---|
| Salmon | Oncorhynchus | ɣiq'a |
| King salmon, chinook salmon | O. tschawytscha | ɣiq'aka'a |
| Humpback salmon, pink salmon | O. gorbuscha | qughuna |
| Red salmon, sockeye salmon | O. nerka | ɣiq'a, t'q'uya |
| Dog salmon, chum salmon | O. keta | nulay |
| Silver salmon, coho salmon | O. kisutch | nusdlaghi |
| Lake trout | Salmo namaycush | zhuk'udghuzha |
| Dolly Varden | Salvelinus malma | qak'elay |
| Dolly Varden, (mountain resident) | | dghili juna |
| Sheefish | Stenodus leucicthys | shish |
| Arctic grayling | Thymallus arcticus | ch'dat'an |
| Humpback whitefish | Coregonus pidschian | hulehga |
| Least cisco | Coregonus sardinella | ghelghuɣi |
| Broad whitefish | Coregonus nasus | telay |
| Round whitefish | Prosopium cylindraceum | hesten |

| English | Scientific | Dena'ina (Tanaina) |
|---|---|---|
| Northern pike | Esoc lucius | ghelguts'i |
| Longnose sucker | Catostomus catostomus | duch'ehdi |
| Burbot, loche, ling cod | Lota lota | k'ezex |

BIRDS

| English | Scientific | Dena'ina (Tanaina) |
|---|---|---|
| Canada goose | Branta canadensis | ndalvay |
| White-fronted goose | Anser albifrons | k'dut'aq'a |
| Snow goose | Chen caerulescens | ch'iluzhena |
| Mallard | Anas platyrhynchos | chadatl'ech'i |
| Pintail | Anas acuta | tsendghinlggesh |
| American wigeon | Anas americana | sheshinya |
| Northern shoveler | Anas clypeata | vedushqula |
| Green-winged teal | Anas crecca | qulchixa |
| Canvasback | Aythya valisineria | veq'es dasdeli |
| Lesser scaup | Aythya affinis | jija vek'ilggeyi |
| Greater scaup | Aythya marila | jija vek'ilggeyi |
| Common goldeneye, | Bucephala clangula | tsiq'unya |
| Barrow's goldeneye | Bucephala islandica | tsiq'unya |
| Bufflehead | Bucephala albeola | sukna tsighaɣ |
| Harlequin duck | Histrionicus histrionicus | tus qet'ay |
| Scoter (any) | | jijalt'esha |
| Black scoter | Melanitta nigra | venchix va'idetsiggi |
| White-winged scoter | Lagopus deglandi | venaq'a qa'ilch'eli |

| English | Scientific | Dena'ina (Tanaina) |
|---|---|---|
| Surf scoter | Lagopus perspicillata | venchix va'ilch'eli |
| Spruce grouse | Canachites canadensis | eɣdyin |
| Ruffed grouse (willow grouse) | Bonasa umbellus | k'deɣneni |
| Willow ptarmigan | Lagopus lagopus | q'ach'ema |
| Rock ptarmigan | Lagopus mutus | jeɣ q'ach'ema |
| White-tailed ptarmigan | Lagopus leucurus | qatsinɣgqat |
| Sharp-tailed grouse | Pedioecetes phasianellus | k'eɣteli |
| Sandhill crane | Grus canadensis | ndaɣ |

PLANTS

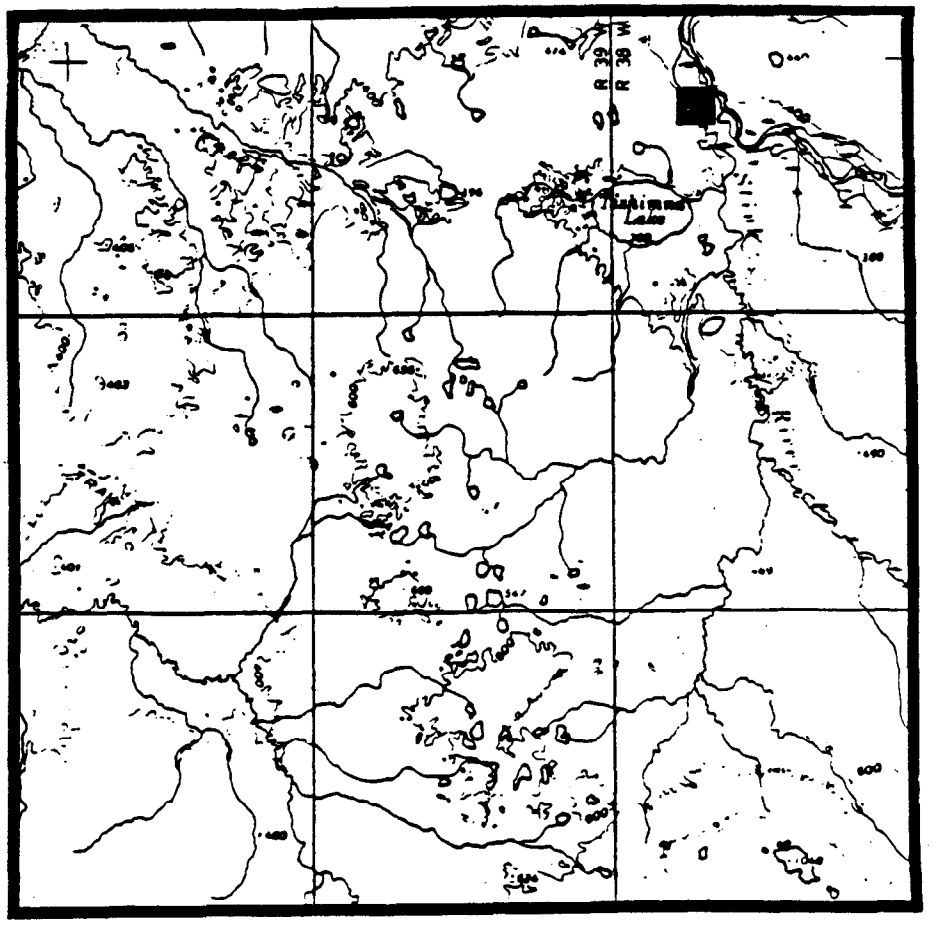
| English | Scientific | Dena'ina (Tanaina) |
|---|---|---|
| White spruce | Picea glauca | ch'vala |
| Black spruce | Picea mariana | ch'vala |
| Jack spruce, stunted spruce | Piglauca, P.mariana | ch'vach'etl'a |
| Juniper | Juniperus communis | chint'una |
| Tamarack | Larix laricina | ch'dat'an luziya |
| Paper Birch | Betula papyrifera, | q'eytsay |
| Kenai Birch | B. kenaica | q'eytsay |
| Cottonwood | Populus balsamifera | eseni |
| Aspen, little cottonwood | Populus tremuloides | t'eghes |
| Thin-leaf alder, red alder | Alnus incana | q'esh |
| Mountain alder | Alnus crispa | q'enq'eya |
| Willow | Salix | ch'etl' |
| Shrub birch, buckbrush | Betula nana | eɣyes |

| English | Scientific | Dena'ina (Tanaina) |
|---|---|---|
| Sweet gale | Myrica gale | dlin'a lu |
| Blueberry, mountain blueberry | Vaccinium uliginosum ssp. alpinum | giga, giga gheli |
| Low bush blueberry, bog blueberry | Vaccinium uliginosum, ssp. microphyllum | q'ach'ema giga |
| High bush blueberry, Alaska blueberry | Vaccinium ovalifolium | gigantsa |
| Trailing black currant | Ribes laxiflorum | nindghuna |
| Northern red currant | Ribes triste | jeghdenghultl'ila |
| Low bush salmonberry, cloudberry | Rubus chamaemorus | nqutl' |
| Nagoonberry, frogberry | Rubus arcticus | nughuya giga |
| Low bush cranberry, lingonberry | Vaccinium vitis-idaea | k'inghildi, hey giga |
| High bush cranberry | Viburnum edule | eʔtsunʔtsa |
| Bog cranberry, little cranberry | Oxycoccus microcarpus | tsink'enuʔtesa |
| Bearberry, kinnikinnick | Arctostaphylos uva-ursi | nents'ezi |
| Blackberry, crowberry | Empetrum nigrum | gigazhna |
| Rosehips | Rosa acicularis | nkix |
| Bunchberry, ground dogwood | Cornus canadensis, C. suecica | ch'enʔq'ena |
| Mountain ash | Sorbus scorpulina | shishgguna |
| Grass | Gramineae | k'echan |
| Sedge, wide grass | Cyperaceae | tl'egh |
| Horsetail | Equisetum | tahgiga |
| Wild celery, cow parsnip | Heracleum lanatum | ggis |
| False hellebore | Veratrum viride | ch'ishkena |

| English | Scientific | Dena'ina (Tanaina) |
|---|---|---|
| Sour dock, wild rhubarb | Rumex arcticus | kashi |
| Wild rhubarb | Polygonum alaskanum | hultseɣi |
| Indian potato, Alaska carrot | Hedysarum alpinum | k'tl'ila |
| Hudson Bay tea | Ledum palustre ssp. decumbens | k'eluq'ey |
| Wild onion, wild chive | Allium shcoenoprasum | hdenɣghik'i |
| Nettle | Urtica gracilis | ch'qeɣch'ixa |
| Pink plumes, bistort | Polygonum bistorta, P. viviparum | tl'analyi |
| Fiddlehead fern | Dryopteris dilatata | uh t'una |
| Indian rice, chocolate lily | Fritillaria camschatcensis | qinazdli |
| Fireweed | Epilobium angustifolium | ch'deshtleq'a |
| Wormwood | Artemisia tilesii | ts'elveni |
| Pineapple weed, chamomile | Matricaria matricarioides | unhlashga |
| Roseroot | Sedum rosea | hushtnila |
| Moss (general); green land moss, includes house moss | Ptelium crista castrensis, and other spp. | nan |
| White moss (white sphagnum) | | nan ggeya |
| Red moss (red sphagnum) | | nan dasdeli |
| Ground lichen (general); caribou moss, reindeer lichen | Cladonia spp. | k'udyi |
| Artist's fungus | Ganoderma applanatum | ɣch'ix |
| Black birch burl, fire starter | | k'atnitsayi |

ADDENDUM TO MAP 1

A cabin site used by Lime Villagers today was omitted from Map 1. Its location near the confluence of the Stink and Stony rivers appears on this inset. This cabin and other sites on Map 1 are dipicted in their approximate locations.



ADDENDUM TO MAP 1