Tracks in the Wildland

A Portrayal of Koyukon and Nunamiut Subsistence

Nelson • Mautner • Bane

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1982

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Native language orthography by Eliza Jones (Koyukon) and Larry Kaplan (Nunamiut), Alaska Native Language Center, University of Alaska, Fairbanks
Editing, layout, and cover by K. Fiedler Morack and Joseph A. Tetro, Anthropology and Historic Preservation, Cooperative Park Studies Unit, University of Alaska, Fairbanks
Typesetting by The Lettershop, Fairbanks
Printing by Walsworth Publishing Company, Marceline, Missouri

Project funded by National Park Service
Contract CX-9000-5-0040

First printing: 1978 (as Occasional Paper No. 9)
Second printing: 1982

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ACKNOWLEDGMENTS

This study of Koyukon and Nunamiut subsistence is based on field research conducted in the Koyukuk River villages, Anaktuvuk Pass, and scattered family settlements in the central Brooks Range. The work was carried out between September 1976 and July 1977, but it also incorporated information based on our earlier experiences in this region.

The research project was supported by the National Park Service, under contract number CX-9000-5-0040, and was administered through the Cooperative Park Studies Unit, University of Alaska, Fairbanks. We are grateful to the National Park Service and the University of Alaska for initiating and sustaining this research and for providing exceptionally fine cooperation and assistance throughout all phases of its undertaking.

To the people of Hughes, Huslia, Allakaket, Alatna, Bettles, and Anaktuvuk Pass, we owe our profound and heartfelt thanks. Members of virtually every family in these villages extended their kindness and hospitality to us and contributed in various ways to the body of information we present here. It is our highest goal that this report should accurately reflect their lifeway and, in so doing, provide a document of significance and value to the people themselves.

Some people in the villages have made a special contribution to our study and our living experiences, and we would like to mention their names here. In Hughes, we thank especially Lavine and Suzi Williams, Henry and Sophie Beatus, Alfred and Helen Attla, Joe and Celia Beetus, William and Rita Koyukuk, and Abraham (now deceased) and Martha Oldman. In Huslia, our sincere thanks to

Steven and Catherine Attla, Fred and Edith Bifelt, Edwin and Lydia Simon, Cue and Madeline Bifelt, Tony and Emily Sam, Herbie and Shirley Vent, Bobby and Mary Vent, Butch and Marie Yaska, and the late Chief Henry and his wife Bessie. Those who were exceptionally helpful in Anaktuvuk Pass include Roosevelt Paneak, Raymond Paneak, and Ellen Hugo.

Mrs. Eliza Jones, of the Alaska Native Language Center, provided invaluable help with Koyukon terminology and place names, and she contributed her own knowledge of Koyukon culture. Mr. Robert Belous and Dr. T. Stell Newman, both with the Alaska Area Office of the National Park Service, have advised and assisted us in many ways. Ms. Ilyne Miller and Ms. Denise McDermott handled the administrative details of this project, not only with uncommon efficiency but also with a very special kind of spirit and personality.

Mr. Zorro A. Bradley, of the Cooperative Park Studies Unit, University of Alaska, has extended to us every conceivable form of assistance and kindness. We offer our deepest thanks to Mr. Bradley, and to his wife Nattalie and daughter Pat, for being a second family to us all. Finally, the authors of this report acknowledge a very special kind of debt to Mrs. Barbara Bane, whose assistance, friendship, and understanding has meant so much to all of us.

Tracks in the Wildland

Part I

THE SETTING

by Richard K. Nelson

Human beings have lived on the lands of Alaska for some 10,000 to 20,000 years, perhaps even longer. Throughout this incomprehensibly long span of time, they have supported themselves entirely by hunting, fishing, trapping, and gathering the wild products of their natural environment. Only during the past 80 or so years has there been any other way to sustain human life here—has there been any option to what is now called "subsistence."

Until the present decade, few Alaskans gave much thought to subsistence. Those who lived on the resources of the land were content to follow the pattern of their ancestors or to live as pioneers on the northern frontier. They had neither time nor inclination to analyze their lifestyle or concern themselves with ensuring its perpetuation. Those residents who lived on the produce of stores and supermarkets, hunting or fishing only for sport, had little reason to contemplate the culture and economy of their rural neighbors.

Most Alaskans can fondly recall those years of innocence. The land was immense and open to all, the population was small and scattered, and the supply of fish and game often exceeded demands upon

it. Subsistence—the procurement of food, clothing, heat, or shelter from natural resources for purposes of self-support—was always available to those with the knowledge and ambition to pursue it.

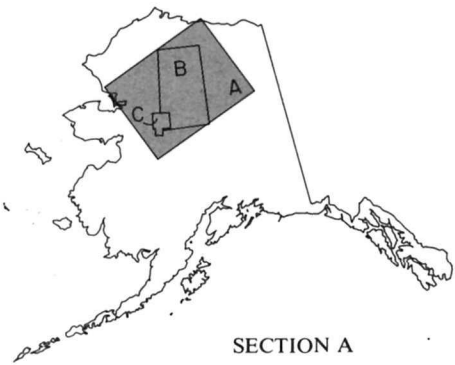
In those days, a study of subsistence activities, such as the one we present here, would have been regarded as an interesting but esoteric curiosity. For this reason, very little research was done and writings on the subject were scarce.

It appears now that subsistence will be among the most strongly affected aspects of Alaskan life, and for the following reasons: First, drastic population growth brought about by the construction of the Alaska oil pipeline created increased pressure upon and competition for a diminishing resource of fish and game. The pipeline also created high-paying jobs, temporarily attracting some rural Alaskans away from the land and exposing them to a multitude of acculturative influences.

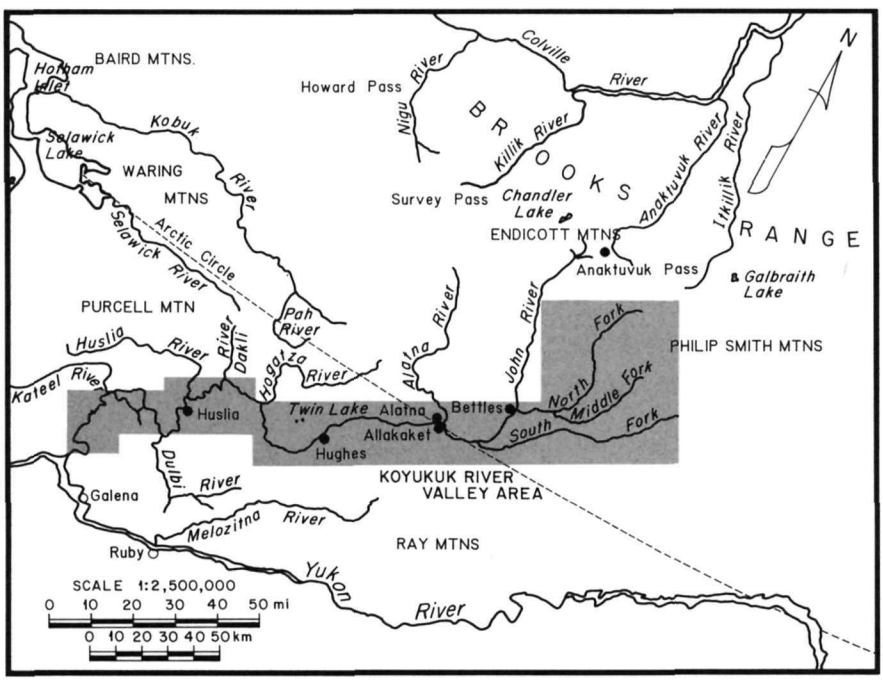
Second, the Alaska Native Claims Settlement Act created a massive influx of money, which was mandated to bring every Native Alaskan into a corporate structure, and further served to erode traditional lifeways. Uses of the land by the new corporations were susceptible to conflict with subsistence activities, and corporate employment drew some Native people away from hunting and gathering pursuits.

Combined with this development, and most important from the perspective of the present study, the land claims settlement act provided for the division of Alaska's land among three parties. The Native people would receive title to 40 million acres; the state of Alaska would select almost 105 million acres; and the federal government would receive some 80 million acres of "National Interest" lands to become units of the National Park, Forest, Wildlife Refuge, and Wild and Scenic River systems. This meant that Alaska would no longer be a free and open land, accessible to all according to need or inclination, largely unfettered by regulation or private concern. The Native people, the state, and the federal government would establish a complicated mosaic of land ownership, with elaborate rules governing each designated unit and with vastly different interests holding sway over the uses of the terrain.

As a result of these changes and many others not mentioned, the viability of subsistence living in Alaska has been somewhat, if not seriously, endangered. Can the lifestyle of hunting, trapping, fishing, and gathering survive in the face of population growth, acculturation, social and economic change, and conflicting land management goals? How can the agencies involved with Alaska's land and people make wise decisions affecting this ancient but threatened way of life and protect those who pursue it? It is our conviction that information-gathering is the first step toward answering these questions and solving the problems they entail.



SECTION A



MAP 1. THE STUDY AREA

Chapter 1
THE STUDY

This study is part of an effort, supported by the National Park Service through the University of Alaska, to understand the nature of subsistence lifeways in rural Alaska. It is the final result of research conducted among the Koyukon Athabaskan Indians and the Nunamiut Eskimos, the people who live on lands within and around the proposed Gates of the Arctic National Park. Our principal goals were to document past and present subsistence activities of the Koyukon and Nunamiut people, the knowledge and perceptions that underlie these activities, their significance in the Native economy, their importance as the basis of Native lifestyle, and their role in overall cultural patterning.

The National Park Service has recognized a serious need for this kind of information, as it has assumed responsibility for the management of vast areas within the state of Alaska. Many of these areas have long been and continue to be utilized for subsistence by the people who live in or near them. Local economies and lifestyles therefore are significantly affected by National Park Service policies toward the continued use of renewable land and water resources for subsistence purposes. Restriction of traditional use patterns in new parklands may create serious economic problems for local residents and could undermine cultural patterns which have developed through a close association with the surrounding natural environment.

Plans for new parks in Alaska have incorporated the philosophy that subsistence is a valid economic base for rural residents and that hunting-gathering communities represent a living cultural resource that should be fostered in the national interest. Indeed, rural Alaska

contains most of the intact Native American cultures remaining in existence; it is one of the few places on earth where hunting-gathering peoples still survive; and in its wildlands are found the last true American pioneers.

The present study is the second in an ongoing effort to gather information on subsistence in and around future parklands. The first was carried out in 1974-75, among the Kobuk Eskimos of northwestern Alaska; it entailed much the same kinds of research presented here. A conscious effort has been made to follow similar research designs and presentation formats in the two projects. Further subsistence studies were underway in six other proposed park areas within Alaska as this report was being prepared.

Information contained within this report centers upon the following major topics:

1) Descriptions of subsistence activities undertaken by Eskimo and Indian villagers;
2) Documentation of land areas known and utilized for subsistence purposes;
3) Analysis of the relationship between fluctuating resource availability and subsistence activities;
4) Description of cultural practices and beliefs directly related to subsistence activity;
5) Analysis of the special roles of women in the subsistence sphere of village life;
6) Examination of the nature of dependency on subsistence; and
7) Analysis of present and future trends in subsistence, with policy suggestions.

Methods of Study

Research was conducted among the Koyukuk River Indians and the Nunamiut Eskimos between September 1975 and December 1976. The work included all five villages on the Koyukuk River and the

single Nunamiut community of Anaktuvuk Pass. Some data from the previous year's work among Eskimos of the upper Kobuk River was also incorporated into this study. The following report was prepared during the winter of 1976-77.

Research in the upper Koyukuk villages of Hughes, Allakaket, Alatna, and Evansville, as well as Anaktuvuk Pass, was undertaken by G. Ray Bane. Mr. Bane and his wife, Barbara, resided at their home in Hughes from September 1975 until June 1976. Following this period, they moved their residence to Evansville, where Mr. Bane assumed employment with the National Park Service and added other responsibilities to his research tasks.

Mr. Bane's studies involved delineating areas of subsistence utilization for the entire southern and central Gates of the Arctic region. In addition, he drew upon seven years' residence among the Koyukon to prepare descriptions of subsistence activities, annual cycles, travel methods, and to analyze policy problems related to the general subsistence issue.

Richard Nelson and his wife, Kathleen Mautner, resided in the village of Huslia from September 1975 until mid-July 1976. During this time, they also spent approximately two months in the upriver community of Hughes. Dr. Nelson's work focused on cultural and ideological dimensions of Koyukon subsistence, environmental dynamics affecting subsistence, and the nature of dependency on subsistence. Ms. Mautner studied women's participation in the subsistence endeavor and assisted in all aspects of the Huslia research.

In ethnographic studies such as this one, research techniques have an important bearing on the kind and quality of information that is obtained. It is important to emphasize that the researchers came into this study with previous experience in the area—long term residence in the case of Mr. Bane and numerous earlier visits in the case of Dr. Nelson. This was a considerable factor in gaining initial consent to do the studies and greatly facilitated all phases of the project.

An important methodological foundation of the project was participant observation, which involved observation of the full range of subsistence activities through actual participation in them. This

meant taking part in all aspects of daily social and economic life within the community. Use of this approach was essential to gaining an understanding of the village lifestyle, the nature of subsistence activities which make that lifestyle possible, and certain cultural traditions which derive from the practice of subsistence.

Much of the substantive information contained here, however, could not be gathered by direct observation only. Data on ecological processes, traditional ideology, attitudes toward the perpetuation of subsistence living, and other subjects were gained verbally. Part of this information came during the course of daily social interaction, but the remainder was obtained through paid formal interviews with especially knowledgeable individuals. Material from these conversations and interviews, as well as from our direct observations, was recorded daily in written logs.

Documentation of place names and subsistence areas was accomplished through household surveys and map interviews. Mr. Bane visited most of the families in the villages of Hughes, Allakaket, Alatna, Evansville, and Anaktuvuk Pass, as well as settlers living in scattered areas of the Gates of the Arctic region. During these visits, household members were asked to locate specific places in which they carried out subsistence activities and to define general areas utilized for procuring various resources. This led to the detailed compilation of resource places and subsistence zones presented in the appendices of this report. Map interviews were also utilized to collect place names, record their meanings, and document personal associations with specific places. In this way, a picture of known and utilized land areas was compiled.

Communities Studied

Koyukon Athabaskan Indians live in four widely separated villages along the Koyukuk River (additional Koyukon settlements are located on the Yukon River). The farthest downriver village is

Huslia, situated at 65°42' north latitude, about 70 air miles north of Galena. Huslia is a relatively new village (founded in 1949), whose population of 159 (1970 census) derives from the entire Koyukuk drainage. Many families trace their background to the upper portion of the river, and most older community members have hunted in the southern Brooks Range.

Sixty-five miles northeast of Huslia is the village of Hughes, with a population of 85. Members of this community were drawn either from the immediate vicinity or from upriver, and again many older people (as well as some younger ones) have traveled into the Brooks Range for hunting.

Allakaket is situated about 60 miles northeast of Hughes and is nearly astride the Arctic Circle. Most of its people are from the middle and upper Koyukuk River drainage. Directly across the river from Allakaket is the small community of Alatna which derives its population from Kobuk Eskimos who emigrated to the Koyukuk near the turn of the century. Considerable intermixture has taken place between the two groups whose combined population is about 175.

Forty miles east of Allakaket is the uppermost village of Evansville, also called Bettles. Its total population of 57 is predominately non-Native, but it includes about 15 Eskimos, Indians, and mixed-bloods. Evansville is designated as a Native village under the Alaska Native Claims Settlement Act. Most of its non-Native residents are either employed by the government or operate private businesses.

The total population of Koyukuk River villages was approximately 475 in 1970; it may have increased to about 500 since that date. Three Caucasians reside permanently in Huslia and two live in Allakaket. All are males who have married Native women, all have children, and all pursue an essentially Native lifestyle. Aside from these individuals, the entire population of the Koyukuk villages other than Evansville is Native.

The village of Anaktuvuk Pass is situated about 85 miles north of Evansville, in one of the major valleys dividing the Brooks Range. Its

population of approximately 100 Inupiat-speaking Eskimos maintains the closest ties with coastal communities of the North Slope. Anaktuvuk Pass is part of the Arctic Slope Regional Corporation (established by the Native claims act), and the Koyukuk villages are members of the Doyon Corporation.

Chapter 2
THE NATURAL ENVIRONMENT

The Koyukon and Nunamiut homelands encompass a broad crescent of highly diversified terrain in northcentral Alaska. At the southwestern end of this crescent, a broad flat some 100 miles long and wide surrounds the lower and middle course of the Koyukuk River. Isolated and virtually hidden amid this flatland is the settlement of Huslia, situated on a low sand ridge that provides an island of dry ground during the periodic spring floods. From the top of this ridge, mountains lying to the north and east are visible beyond the shimmering flats.

Moving upriver, the flatlands give way to hills and mountains that impinge closely upon the Koyukuk, creating a steep valley through which it flows. Hughes is located near the midpoint of this valley, in a setting of exceptional peace and beauty. The nearby terrain includes high and low mountains, gentle ridges, flats of varying sizes, and narrow flood plains. Directly behind Hughes, the lower slopes of 4,000-foot Indian Mountain afford a clear view of the Brooks Range, which lies about 50 miles north. The wall of distant snowcapped peaks stretches east and west, vanishing into the haze.

Mountain ridges paralleling the river give way to another large flat northeast of Hughes. The villages of Allakaket and Alatna are situated near the west side of this flat. The Alatna River flows into the Koyukuk at Allakaket and allows residents easy access to the Brooks Range and its foothills which begin less than 30 miles to the north. A second nearby river, the Kanuti (*Kk'oonootna*)* facilitates

*When possible, Native equivalent words will be given in italics in the correct orthography for the region. In this case, the Kanuti River is actually *Kk'oonootna* in the Koyukon Athabaskan language —ed.

travel south into the flat country and the flanking Ray Mountains.

East of Allakaket, the flatlands broaden and the Koyukuk splits into its north and south forks. Evansville is located on the northeastern side of this flat and on the north fork of the Koyukuk. Nearby peaks of the Brooks Range dominate the view here, and lower mountains rise to the east and south.

Almost directly north of Evansville, a broad valley transects the Brooks Range. The John River runs through this valley, rising from headwaters on its north side. The village of Anaktuvuk Pass is located at these headwaters, just where the valley begins opening onto the broad plains of the North Slope. Tall, rugged mountains flank the settlement on both sides, and the entire region is dominated by mountains and valleys of every description.

Anaktuvuk Pass is the only village of concern here that is not oriented primarily to the Koyukuk River. Elsewhere, the Koyukuk is the single dominant feature of the landscape, and the livelihood of its inhabitants is closely tied to the environment that it creates. The major Koyukuk headwaters are located in the Brooks Range north and northeast of Evansville. All of these streams are swift and clear, as is the river itself as far downstream as Hughes. When the Koyukuk enters the flats below Hughes, it becomes sluggish and brown with silt, and so it remains all the way to its confluence with the Yukon.

Like other large interior rivers, the Koyukuk follows a twisted, meandering course, especially where it flows across the flats. Tracings of its geologic history are revealed by innumerable sloughs, oxbow lakes, meadows, timbered ridges, and meander scars scattered everywhere along its flanks. The riverbed is continually shifting today, restructuring the environment and creating an important dynamic element in riverine ecology.

Besides the river itself, the Koyukuk valley contains innumerable tributaries, ranging from major watercourses hundreds of miles long to insignificant creeks that trickle down over the banks. The large flats are a veritable scrambling of streams, wandering through a landscape of swamps, muskegs, ponds, and lakes of every size and shape. In some areas there is more water than land, and when the river floods there may be no land at all. These periodic floods, which

occur in the springtime, apparently prevent many of the lakes from drying up.

The river and its tributaries, as well as the lakes, are key elements of the human environment for all Koyukuk settlements. From the water itself come fish, waterfowl, and mammals dependent on aquatic habitats. The shifting of watercourses creates an endless process of plant succession, which helps to support game such as moose, black bear, and snowshoe hare. The water surfaces themselves facilitate travel during both the cold and warm seasons.

Climate

The region encompassed by this study is characterized by a continental subarctic climate, except for Anaktuvuk Pass, which is on the borderline of the arctic climatic zone. Temperature extremes here are among the greatest on earth, ranging from about 90°F in the summer to -60°F or colder in the winter. Almost as remarkable as the intensity of winter is its duration. At Allakaket, the mean temperature is below freezing for seven months of the year, from October through April; and for five of these months (November through March) the mean is below zero (°F). During the normal course of winter, there are spells of -40° to -50°F or colder temperatures lasting from one to several weeks. Thaws are extremely rare during the five mid-winter months.

Seasonal changes are abrupt, making for a very brief spring and fall. The thaw comes in late April, with the break-up of river ice in early or mid-May. Summer weather follows very quickly, and from May through September the average daily high is above 50°F. Freezing temperatures return by late September, and the river freezes early in October.

The continental nature of climatic conditions is also seen in very low precipitation amounts. More of this annual precipitation falls as rain during the summer months, especially August, and the very low evaporation rates prevent the country from becoming arid. The

underlying permafrost also helps the land retain moisture by supporting abundant lakes and muskeg bogs. Even though the winter snowfall contains less water, the amounts are quite large, and the lack of thawing makes for deep winter cover.

Surface winds are generally light, although breezes are common in summer and storm winds occur at all seasons. Winter snows ordinarily come with storms moving inland from the Bering Sea, and they are accompanied by powerful northerly or westerly winds. Local terrain causes great variation in wind speed and frequency, thereby influencing temperature and precipitation as well. Allakaket, for example, is in an area of calm and extremely cold winter weather where powder snow lies deep and undisturbed for weeks on end. Neighboring Hughes is far more windy and therefore has higher average temperatures during the cold months.

Anaktuvuk Pass is particularly notable for the winds that rush through this natural mountain passage between coastal arctic and interior subarctic air masses. Partly because of this activity and partly because of its location near the arctic slope and Beaufort Sea, Anaktuvuk Pass has a more subdued daily and annual temperature range than the Koyukuk River villages. The warm seasons are noticeably shorter here as well.

TABLE 1. SELECTED CLIMATIC DATA

		Allakaket	Evansville (Bettles)	Anaktuvuk Pass
January	Mean maximum temp.	-6.6 (°F)	-2.6 (°F)	-7.5 (°F)
	Mean minimum temp.	-28.8	-17.7	-22.2
	Overall mean temp.	-16.7	-10.1	-14.9
July	Mean maximum temp.	71.2	69.5	60.8
	Mean minimum temp.	45.1	47.7	40.7
	Overall mean temp.	58.1	58.6	50.8
Annual mean temp.		20.5	22.1	13.4
Highest recorded temp.		92	88	91
Lowest recorded temp.		-70	-65	-56
Annual total precipitation		13.8"	14.0"	10.7"
Annual total snowfall		75.9"	91.0"	63.1"

(Source: U.S. Department of Commerce n.d., 1963)

At these northerly latitudes, near or above the Arctic Circle, day length is subject to drastic change in the course of a year's passage. During mid-winter the night holds strict dominance, as the sun rises for only an hour (or not at all in much of the Brooks Range country). A long twilight period extends the "day" to 6 or 7 hours, however, and moonlight or the aurora can diminish the blackness of night. Heavy clouds may reduce the hours of light by half and curtail or eliminate some outdoor activities. Changes in the light cycle occur rapidly, as the sun remains above the horizon for 6 or 7 minutes more (or less) each day after the solstice.

From about April 15 until August 15 (at the latitude of Allakaket or Evansville), there is continual daylight, as the sun never sinks far enough below the horizon to cause darkness. In the Brooks Range, the sun does not set for one or more weeks during mid-summer. It does fall near the horizon, though, so that mountain valleys are in shadow while golden sunshine illuminates the peaks above. Continual daylight is extremely important to those who live from the land because it allows uninterrupted activity during this brief season of abundance.

Vegetation

Vegetation of the Koyukuk River drainage is broadly classified as boreal forest or taiga, but this characterization gives a deceptive impression of homogeneity. Rather than a vast expanse of timber, the land is covered by diverse plant communities, patterned according to differences in elevation, drainage, permafrost development, soil type, fire history, and climate. In the low country, closed forests, open forests (muskegs), bogs, and shrub thickets intermingle to form a similarly complex pattern. Mountain slopes and valleys create another mosaic—one of forests and thickets in the lower elevations, stands of trees giving way to moist tundra higher up, and, finally, uniform alpine tundra prevailing above approximately 3,000 feet. The same transitions occur going north along the John River to Anaktuvuk Pass.

Despite its apparent disarray, this complexity sorts itself into a few identifiable plant community types. One of these is the closed forest of white spruce, paper birch, and balsam poplar which occurs in well-drained places along rivers and on hillsides. Beneath the forest-canopy is a scattering of shrubs (such as willows and heaths) growing from a carpet of moss. Where fires have occurred, forests of quaking aspen or birch predominate, with shrubs and young spruce comprising the understory. Along the rivers, stands of large balsam poplar are quite common. Forests containing very large white spruce and paper birch occur frequently along the Koyukuk River, providing an excellent source of building materials and firewood.

Areas that are poorly drained, north facing, and of high altitude and/or high latitude often support open forests of black spruce with scatterings of birch or white spruce. Thick sphagnum moss usually covers the ground, with sedges, grasses, and heath shrubs growing in association. Muskegs of this sort are very common in the Koyukuk valley and Brooks Range. In extremely wet situations, muskegs are replaced by treeless bogs, dominated by small shrubs such as resin birch and a variety of heaths (for example, blueberry, cranberry, and Labrador tea).

Shrub thickets are another very common plant community throughout this region. Along the rivers, they contain tall stands of willow and alder, and they are especially common on periodically flooded, alluvial deposits. Elsewhere, on the flats and mountain slopes, they are made up of scrubby alder, willow, and resin birch thickets. These communities often provide excellent habitat for moose, snowshoe hare, ruffed grouse, and other game species.

At higher elevations throughout the Koyukuk and Brooks Range, alpine tundra vegetation hugs the windswept terrain. This plant community includes various lichens, forbs, grasses, and shrubs, growing in a dense mat. In many areas, patches of barren rocky ground disrupt the continuity of living cover. The alpine tundra provides habitat for important game species such as caribou, brown bears, and Dall sheep, making an excellent walking terrain for man.

In the northern portions of the Brooks Range, around Anaktuvuk Pass and out onto the North Slope, broad expanses of moist tundra

cover the land. Cottongrass tussocks with associated sedge and low growing shrub species form the most widespread community type; but in some locations the dwarf shrubs dominate and tussocks are rare or absent. Common shrub species include American green alder, resin birch, mountain avens, willows, and heaths such as bearberry and Labrador tea. Moist tundra is the primary habitat of caribou, and as such it is an essential component in the subsistence ecology of many northern communities (Viereck and Little 1972:15-22).

Animal Life

Boreal forest species of animals dominate the low country throughout the Koyukuk drainage, but tundra species are equally important in the mountains and north of the Brooks Range. Animals of both the forest and tundra are utilized for subsistence by residents of all communities around the proposed Gates of the Arctic.

At the present time, moose is by far the most important mammal in the economy of all Koyukuk villages, and it is hunted to a lesser extent by the Anaktuvuk people. Moose are found throughout the low forested country, expecially where extensive willow thickets occur along the meandering rivercourses. Since these animals have only occupied the Koyukuk drainage during the present century, other species have dominated in past subsistence economies.

Caribou are the tundra counterpart of moose, from a subsistence standpoint. This smaller ungulate is the economic mainstay for Anaktuvuk people and contributes to the larder of all Koyukuk villages. Caribou are found along the Koyukuk River only during the winter when herds scatter into the southern flats and mountains. Anaktuvuk Pass is a prime migration route, where large concentrations may occur during the fall and spring. Major population changes affect caribou, and during the past 5 to 10 years their numbers have decreased from about 250,000 animals to less than 50,000. This reduction has nearly eliminated them from the present village economy, except for some limited hunting allowed in

Anaktuvuk Pass and other Eskimo communities to the north and west.

Dall sheep inhabit steep mountain slopes in the Brooks Range and are hunted by residents of Anaktuvuk Pass and the upper Koyukuk villages. In the absence of caribou, sheep are likely to become increasingly important, especially for the Anaktuvuk people.

Black and brown bears, the other big game species of this region, are regularly utilized for subsistence. Their distribution is nearly ubiquitous, although brown bears prefer the tundra country and black bears stay mostly in forest lands.

Smaller mammals include a diversity of species which are used for meat, fur, or both. Snowshoe hare, muskrat, and beaver have been in the past the most important sources of meat for the Koyukon, and their hides were also extensively utilized. Presently they are of secondary importance to the big game species. Other small mammals include arctic ground squirrel, marmot, porcupine, red squirrel, wolf, red fox, wolverine, otter, marten, mink, least and shorttail weasel, and lynx.

About 130 species of birds have been recorded in the areas covered by this study. All of the culturally or economically significant species are named in Koyukon and Eskimo taxonomies. From a subsistence perspective, the most important birds are the 17 species of ducks and geese which contribute substantially to the people's diet; of secondary importance are the grouse, ptarmigan, loons, and grebes. Many other bird species contribute peripherally to the diet or are important for religious and cultural reasons.

Rivers, creeks, and lakes of the boreal forest ecosystem comprise a remarkably productive habitat for fish. Along the major river systems, fish are perhaps the most stable and productive resource over the long run. In the area of this study, the villages of Huslia, Hughes, Allakaket, and Alatna have access to excellent fishing areas, while Evansville and Anaktuvuk Pass are less fortunate in this regard. Chum (dog) salmon are the most important single species in the Koyukuk, although some kings, silvers, and sockeyes are also taken. Several species of whitefish provide an often abundant

harvest, and sheefish, grayling, pike, burbot (louche), and sucker are also present in good numbers. Some of the larger Brooks Range lakes support populations of lake trout.

TABLE 2. NUMBERS OF SPECIES KNOWN BY KOYUKON ATHABASKANS IN 1976

	Named	Utilized
Mammals	24	20
Birds	83	37
Fish	14	13
Plants	31	28
Totals	152	97

(See appendix A for complete list of species named and utilized.)

Part II

THE NATURE OF SUBSISTENCE ACTIVITIES

by G. Ray Bane

The Native peoples of the Koyukuk River and Central Brooks Range are recipients and transmitters of environmental knowledge and skills gathered and refined over countless generations. This is not to say that the rural Native of today lives as his grandparents did 60 years ago or as his ancestors did 100 years ago. New technology, opportunities for employment, modern education, and changing political and economic situations have had a significant impact on his life and have brought about considerable changes. However, many Natives continue to acquire a substantial portion of their livelihood directly from the environment, and virtually all express an affinity to their natural surroundings. Thus, many skills and much of the accumulated environmental knowledge of the past continue to survive and function in the modern scene.

It should be noted that not all skills and knowledge are of equal importance in the life of a Native. Those which relate to "prime" resources or which give the greatest return for time and effort invested are most likely to be shared and retained by the greatest

number of persons. Skills and knowledge pertaining to "secondary" resources or less productive alternatives are likely to be retained by fewer people. Such "secondary" skills and knowledge are most likely to be lost when a group becomes more secure and has new alternatives to which to turn. Thus, the young adult Native of today may be fairly well-versed in the hunting of moose, caribou, and bear but only marginally knowledgeable in the harvest of marmots, muskrats, and hare. He or she may know how to set a fish net and seine but be less able to construct and set a wicker trap for blackfish or a stream trap to catch migrating whitefish. It is only when major resources fail and when "new" alternatives prove to be unsatisfactory that the "old" skills relating to secondary resources are likely to be revived.

Fortunately, the "alternative" skills continue to exist in the active minds of many older adult Natives. They are the living library of their culture, capable of providing vital information to the young. The older persons have been forced often to rely on secondary resources in the past, and they may be heard doubting the reliability of present-day imported resources. They know that to live off the land one must be willing and able to locate, harvest, and utilize a broad spectrum of resources with a variety of techniques.

When considering subsistence it is important to remember that it is a life built on alternatives. One cannot understand such a lifestyle if he concentrates only on the "obvious" activities such as the harvest of moose or the catching of salmon. It is necessary to understand the relationship of a subsistence-oriented people to all of their potential resources.

Another word for "alternatives" may be "flexibility." Nature is rarely if ever in a state of static balance. Weather patterns change from year to year, stream beds alter constantly, lakes slowly fill and die, wildlife populations are always in a state of flux, migration routes shift; the examples are endless. Persons dependent upon wild resources must be flexible to take advantage of these dynamics. A loss of flexibility in any aspect of subsistence threatens its overall viability.

A certain degree of flexibility has already been lost in most rural Alaskan communities through conscious or unconscious choice or

through restrictions and limitations imposed by outside forces. When nomadic and semi-nomadic Native groups were drawn into a settled community life, one to which they gradually adapted, they surrendered a considerable degree of their subsistence flexibility. An increased dependence on modern imported convenience and technology required a cash income and eventually led to the need to divert attention and efforts away from basic subsistence activities to non-subsistence wage employment. The removal of children from the daily and seasonal round of subsistence activities so that they could enter formalized education programs interfered with their training in the adaptive skills and knowledge required to subsist in a wild environment. Wildlife management regulations required the abandonment of certain subsistence activities. The designation of private property and restrictive land management classifications may have a considerably negative impact on the flexibility of subsistence-oriented rural populations.

Chapter 3
HUNTING

Native and non-Native subsistence-oriented persons living within the Gates of the Arctic region rely heavily upon hunting to obtain a substantial portion of the protein they consume. To a somewhat lesser degree, hunting also produces such raw materials as furs, leathers, sinew, and the rawhide used in the manufacture of clothing and other items necessary for daily life. Surpluses of these items are often converted into cash or bartered for non-local resources.

Hunting plays an important role in the social and cultural aspects of a subsistence lifestyle as well as in the economic sphere. Within villages it is common for two or more men to become hunting partners by traveling together and sharing the rewards of the hunt. Meat and hides are distributed by the successful hunter among other villages, thus benefitting others while earning status for himself. Cultural events such as funerals and potlatches involve the consumption and distribution of resources gained through hunting. The ritual bear party of the Koyukon Athabaskans is largely based on the relationship between the hunter and this culturally important animal.

Moose Hunting

Moose (*Alces alces*) are common throughout the Koyukuk Valley and the central Brooks Range. This largest species of the North America deer family has experienced fluctuations in population and range in the past, with Native informants relating a particularly low population density during the first three decades of this century. Dur-

ing the last two decades, the moose population expanded significantly both in numbers and range with sightings of moose becoming increasingly frequent as far north as the mouth of the Colville River on the Arctic Ocean. A series of severe winters, deteriorating feed, and predation by both man and natural predators has seemed to slow this expansion recently.

Moose tend to follow set seasonal patterns. During the summer months, they generally move into higher elevations to feed on tender highland plants and probably to escape the heavy concentrations of insects in the marshy lowlands. By August most moose have gained a thick layer of fat and are in prime physical condition. A general movement back into the river valleys occurs at this time.

The month of September signals the onset of the rut, and bulls begin competing for available cows. Mating continues into fall and the mature bulls rapidly lose their reserve of fat; their flesh also becomes stringy and distasteful. Cows, on the other hand, retain their prime condition well into mid-winter. As winter advances and the snows deepen, the moose begin to "yard up" or congregate on willow bars along the rivers and streams. When spring arrives, the animals, now lean and rangy, once again begin drifting away from the rivers and back into the high country.

The moose is the most important land mammal to the subsistence dependent residents of the Koyukuk River area. Well over 60 percent of all meats consumed by such persons consists of moose flesh. Moose are also important as a source of raw materials used in the manufacture of clothing, skin scrapers, and rawhide. A family of six of seven persons may consume between two and five moose per year depending upon the availability of other meat sources.

The Nunamiut Eskimos of Anaktuvuk Pass also harvest and consume moose, but moose are definitely of secondary importance in relation to caribou and possibly sheep. Moose meat is eaten primarily when caribou meat is unavailable. Unlike the Koyukon Indians, the Nunamiut do not tan moosehides, although they may use them to manufacture rawhide. The secondary importance of moose to the Nunamiut may in part be explained by the fact that this animal is a relatively recent addition to the local fauna, and its numbers are not

great enough for it to sustain a harvest equal to that of the caribou. However, with current decline in caribou numbers, it is reasonable to expect an increase in the harvest of moose by Anaktuvuk residents.

Koyukuk Natives have historically harvested moose all year round or whenever the need arose. There are, however, definite times when moose are particularly desired. Moose are taken in mid-August and early September so that they can be converted into dried meat, a light and easily carried food supply. Moose hides, especialy cow hides, are desired at this time of year for boot bottoms. Prior to the availability of home freezers, most families would try to obtain a fat cow or young bull in late September or early October so it could be kept by freezing. In late December or January, the desire for fresh meat often encourages hunters to seek out a fat cow. Moose are also harvested in March and April when the hides are somewhat thinner and good for such clothing as mittens, gloves, and trim on other garments. The spring weather also makes it easy to air-dry large amounts of meat for summer consumption.

The fall moose hunt continues to be one of the most important subsistence activities carried out by residents of the Koyukuk Valley. Today the time when this hunt begins is largely—although not entirely—determined by legal hunting seasons established by the Alaska Board of Game. Virtually every adult male, as well as a few adolescent males and women, actively engage in fall moose hunting. In the villages, conversation centers on where moose were sighted, their condition, who had shot a moose, and on other topics pertaining to the hunt. There is a sense of urgency as fall advances, because without a fall moose, a family may be forced to purchase very expensive commercial meats or to rely on the charity of others.

During the fall of 1975, moose hunting began in mid-September in the village of Hughes. All fall hunting was carried out via outboard-powered riverboats. Because of the relative proximity of productive moose habitats, at least 40 percent of the moose harvested that fall were taken on one-day trips involving no more than one night of camping. The remaining 60 percent of the fall moose harvest involved extended river journeys of up to a week in duration, although several such hunts included the search for bear and water-

fowl. A few parties extended their hunt simply for the sake of pleasure.

It should be noted that moose populations near the villages of Allakaket, Alatna, and Bettles are relatively small, and persons from these communities may be forced to spend considerable time searching for these animals. Whereas it is unusual for residents of Huslia and Hughes to travel more than 50 river-miles in search of a fall moose, residents from Allakaket must occasionally travel more than 100 river-miles and spend proportionately more time in such a hunt.

While moose may be found at virtually any location along interior waterways during the fall, Koyukuk River Natives have discovered, over many years, particularly productive moose hunting sites. Certain sloughs are well known for their concentrations of moose. Marshes, particularly those near a navigable waterway, are favored hunting spots. Certain bends in a waterway are known to be frequently used as moose crossings. Low willow-covered islands in a river are also known for producing an attraction for moose.

Not only must a hunter know where to hunt a moose, he must know when to hunt it too. Koyukuk Natives prefer to look for moose either in the early morning just after daybreak or in the evening just before dusk. At these times moose tend to move onto river bars or into open marshes. During mid-day, moose usually move back into the brush, away from the rivers. The exception to this pattern is late September when mature bulls in full rut become increasingly restless, cease to eat, and are almost continuously on the move.

For an extended fall moose hunt, two or three men will often travel together in one boat. The day before the hunt begins, they will load the boat with sleeping bags, food, axes, a tool chest, rifles, shotguns, ammunition, binoculars, extra insulated clothing, hip boots, rain gear, cooking utensils, a lantern, extra gloves, extra outboard props and repair parts, sheets of plastic to protect meat, and other necessary items. A tent and campstove may be included if the weather has been particularly wet or cold. Seven or eight 5-gallon cans of mixed gas will be included in the load.

Ideally the hunters will leave the village just before light and cruise slowly along the river, alert for moose standing on open bars. Several

stops will be made so that the men can climb a cutbank and walk back to known marshes and lakes where moose may be feeding. Side streams will be entered and checked for any sign of game. Concentrations of moose tracks or signs of extensive feeding will be noted to be checked later, perhaps on the way home. As the day wears on, the hunters will stop to check the edges of willow-covered islands and bars for fresh moose signs. One man may noisily walk the length of such an island while the other two position themselves on either side of its far end to shoot any moose which may be chased out into the open.

Camp will usually be set up in the afternoon near a known moose crossing or a particularly productive marsh or lake. In the evening the hunters will again check the nearby bars and marshes before retiring for the night.

When a moose is spotted, the hunter will immediately note the size of its antlers and general condition. A large bull late in the season may be so far into rut as to be unsuitable for human consumption. A moose with its ribs pushed noticeably against the hide or with its pelvic bones standing out, giving the rump an uneven appearance, is likely sickly and too thin to shoot.

If the moose is judged acceptable, the hunter will attempt to shoot it either in the neck or shoulder for a quick kill with minimum damage to the meat. Hunters are always afraid that a fatally wounded moose will stumble into a lake or river before dying, tremendously complicating the butchering process. It is rare for a moose to be killed outright by the first shot, and it may require several hits before it dies.

Koyukuk Natives are very cautious about approaching a downed moose. It may be simply stunned and could suddenly rear up in attack. Even a fatally wounded moose will convulse and thrash about, severely injuring anyone foolish enough to be in range of its slashing hooves. To check if a moose is dead the hunter will reach over its back with the barrel of his gun and touch its eye.

Methods of field butchering a moose vary, depending upon the sex and size of the moose, the distance it must be carried, the need for the hide, and other considerations. The hide may be carefully

removed intact if it is to be used for clothing or rawhide; otherwise it may be left attached to the flesh during field butchering. The carcass is usually divided into the following sections:

2 hind legs including rump
2 fore legs including shoulder
2 rib sections
1 sternum
1 neck
1 head—usually minus the antlers
1 pelvis
1 backbone

Other separate parts include the tongue, kidneys, heart, liver, and intestinal fat. All of the aforementioned parts are taken to the village to be used as human food.

When men are hunting as a party, the kill will be shared equally regardless of who does the shooting. Upon returning to the village, a successful hunter will usually distribute a portion of his kill to all families. This is particularly important if it is one of the first kills of the season.

The meat from a fall moose is hung in a partially enclosed smokehouse to slowly age before final butchering. A smokehouse usually has a low roof supported on poles over four walls which rise approximately two-thirds of the way up the poles and have a gap of 18 inches or more at the top for the free passage of air. A series of dry poles are suspended horizontally across the inside of the shelter and the large sections of meat are hung with strong lines from the cross poles. A cool smudge fire of rotten poplar or willow is maintained in a metal pot beneath the hanging meat. The smoke repels flies and aids in curing the meat.

After several days of aging, the meat is prepared for final preserving. Prior to the availability of home freezers, the meat would be cut into strips and hung over a slow smudge fire to dry if the weather were mild, or it would be cut into heavy slabs and hunks to continue hanging in the smokehouse if temperatures remained below freezing. A certain percentage of the meat continues to be processed into dried strips, but most fall moose meat is now preserved in home freezers.

The hunting of moose in the winter is usually an individualistic activity. As the deepening snow restricts the movement of the moose, local hunters will note where tracks are plentiful and show signs of long occupancy. Willow bars and birch thickets are favorite feeding sites for moose in winter. A hunter may spot his intended prey well in advance of actually killing it, taking note of its sex, size, and general condition. When his meat supply begins to become depleted, usually in mid-to-late winter, the hunter will go in search of his moose.

In *Hunters of the Northern Forest* (1973:102-108), Nelson gives an excellent description of the stalking of a winter moose by a Chalkyitsik hunter. The same basic technique is followed by Koyukuk Natives. A hunter in search of a winter moose will search likely locations until crossing what appears to be fresh tracks. He will determine their freshness by feeling the consistency of the snow within them. Loose, non-crusted snow usually means the trail is only two to three hours old, while crusted snow indicates a passage of several hours. The hunter is usually looking for a cow in mid-winter. If the tracks are linear with no sign of side thrust as the animal moved through the snow, then it is probably a bull. If the tracks show a slight swinging motion then they indicate a cow.

Rather than attempting to follow the winding and meandering trail of the moose, the hunter will try to cut across the meanders on the downwind side of the trail, stopping frequently to listen for the sounds of his prey ahead. He will occasionally loop in where he expects the moose trail to be, checking its freshness and any sign that his prey may be frightened. Eventually he will pass downwind of the moose and loop inward to find the moose behind him. At that point he will carefully work his way back until he sights the animal and is able to shoot it.

The butchering and care of a winter-killed moose is basically the same as a fall moose except that the snow helps to keep the meat clean, and it is usually easier to transport home by dog team or by snowmachine.

Prior to the present relative abundance of moose and the introduction of snowmachines, winter moose hunting was often a long and arduous undertaking. Moose were so sparse in the early decades of

this century that men often snowshoed several days before crossing a single trail. A determined hunter would literally walk a moose into the ground, remaining on his trail for days until a good shot presented itself. The meat would then be cached until a dogteam could be driven to it to move it home.

Caribou Hunting

Caribou (*Rangifer arcticus*) are the true nomads of the North, almost constantly drifting back and forth across the expanses of tundra and open boreal forest of northern Alaska.

A mature bull caribou (*paŋniq* in Inupiaq Eskimo) ranges from 5¼ to 6½ feet in length, 3¼ to 3½ feet in height at the shoulder, and 150 to 400 pounds in weight. A mature cow caribou (*kulavak* in Eskimo) averages one-third smaller than a bull (Palmer 1954:303). By early fall, a mature bull caribou is an impressive animal. His body fills out with heavy layers of flesh and fat over a thickset neck and trunk. A large creamy-white cape covers his neck and foreshoulders. His antlers sweep back and up into a large C-shaped curve over the head and neck. A heavy layer of congealed fat develops along the top of the back, often reaching a thickness of 3 inches over the rump. Cows also fill out in the fall, although on a somewhat later schedule than bulls.

The caribou is physically well-adapted to an arctic tundra and taiga environment. Its coat is made up of long, hollow hairs that provide excellent insulation against the cold. Caribou hooves are wide and well rounded with a hollow center and sharp edges. The spreading hooves and dew claws give a large supporting surface for travel on snow and soft earth (Palmer 1954:303). The eyesight of a caribou is inferior to the smaller North American deer, but they have excellent hearing and smelling abilities.

The highly specialized diet of the caribou consists primarily of lichens and mosses, allowing it to thrive in areas where other grazing animals would perish (Freuchen and Salomonsen 1958:10). It will

also feed on green willow shoots, cloudberries, and coarse tundra grasses.

The caribou is a gregarious animal usually found in the company of several others of his kind. The size and makeup of a caribou herd varies according to the season, weather, available feed, predation, and instinctive drives. Herds of 5 to perhaps 400 caribou have been observed in the Koyukuk Valley by the writer over a period of some 8 years. The much-publicized migratory herds of countless thousands are, in reality, very brief and localized occurrences. Actually such migrations are made up of many loose bands of caribou all moving in the same general direction and forced into temporary close association by geographical restrictions. In areas of few restrictions, migrations may laterally cover 30 to 60 miles with 2 miles or more separating individual bands of caribou.

Caribou migrations and populations are notoriously unpredictable and unstable. For several years, large numbers of caribou may annually or seasonally move through the same general area and then, for many known and unknown reasons, fail to appear in a given year. This is one of the primary reasons that the human population of the resource-sparse northern Brooks Range has historically been both small and highly mobile. Without relatively predictable primary resources, plus a variety of alternate food and other resources, a given subsistence-dependent population is constantly in threat of losing the foundation of its livelihood.

Caribou in small bands may be found scattered widely throughout the Brooks Range in the summer months, but the great majority move out toward the coast of the Arctic Ocean. A rare straggler is occasionally seen on the Koyukuk River, but for all practical purposes, caribou are absent in this area during the months of June, July, August, and September.

In late August the caribou of the North Slope begin a slow movement southward, gradually joining in bands that are drifting in the same general direction. In September the congregations become larger and the pace increases. Early September usually finds the lead bands of the migration entering the northern foothills of the Brooks

Range. With variations, the main migration body usually enters the mountain passes by the latter part of September, moving purposefully towards the sheltered mountain valleys and the moss-carpeted forests of the south slopes.

It is the fall migration of caribou that provides the Anaktuvuk Eskimos with the bulk of the meat and skins necessary to sustain their subsistence needs. If the migration begins early enough and passes within a reasonable distance (20 miles) of the village, it can mean a bonanza of meat and skins. Bulls are in their prime in late August and early September before they enter into rut. After the rut begins, hunters must concentrate on harvesting cows.

Until recent years a large percentage of the early fall caribou hunting by the Nunamiut people of Anaktuvuk Pass was done on foot. The hunters would walk several miles from the village to position themselves at points known to be frequently used caribou routes. They might carry with them a wide-mouth bag slung over the back and in which they would have ammunition, matches, a file, a lunch of dried meat and other foods, tea, sugar, a tea pot, and a cup. They also carried a hunting knife and perhaps a pair of binoculars. Their rifle was usually a .222, a .22 hornet, or some other medium-caliber weapon. Occasionally two or three men would travel together, but since the introduction of firearms these hunts were most often individualistic.

Upon spotting a band of caribou the hunter would carefully observe it to determine its sexual make-up, general route of travel, and if it appeared to have been frightened recently. Frightened caribou are difficult to approach. If the band appeared desirable, the hunter used depressions, willow cover, and other natural features to place himself near the route of the caribou without being detected. As the caribou passed, he would place his shots so as to pick off the leaders and thus keep the band milling. He would also attempt to first shoot those on the far side of the group so as to cause the others to shy toward his position. The neck was always the favorite target, because a shot here quickly killed the caribou and spoiled very little meat and hide.

With the shooting over, the hunter would skin each carcass, being particularly careful not to damage the leg skins. The carcasses would be dismembered in much the same way that moose are dismembered by the Koyukuk people, except that the hind quarter consisting of the pelvis and two legs were left as one unit.

With the butchering completed, the hunter would place the hides hair down in a depression between tussocks and make compact piles of meat on them. Other hides, hair up, would be used to cover the piles. Rocks or tussocks would be placed around and on the skins to weight them down. If willow branches were available, each pile was often covered with these branches. Covering the caches of meat helped to prevent ravens, jays, and other birds from eating and spoiling the fat and flesh.

The successful hunter usually took time to boil some tea and cook some fresh meat over a willow or moss fire. If the hour were late, he would roll up in caribou hides and spend the night. The next morning he would either continue hunting or walk home to get his dogs and sled to begin transferring his meat back to the village. He usually carried back in his pack such choice pieces of his kill as the tongues, hearts, kidneys, and backstrap to share with his waiting family.

With the introduction of the snowmachine, fall caribou hunting has undergone substantial changes. Few men engage in hunts exclusively by walking. Virtually all hunters travel now over the frozen tundra and thin snow via snowmachine, pulling a low flat-bed plank sledge. In response to the possibility of breakdowns and the ability to herd caribou, it is common for two or more snowmachine-mounted hunters to travel together.

Upon reaching a caribou herd, the hunters may opt to approach them on foot or, more likely, drive to them on their machines. Usually caribou will run before the hunters get closer than 80 to 200 yards. The hunters will stop and dismount at this time and fire at the fleeing caribou until they move out of range. The hunters will then remount and pursue the caribou until once again they are within range. Depending upon the terrain, snow cover, and other factors, the hunt may cover several miles before ending.

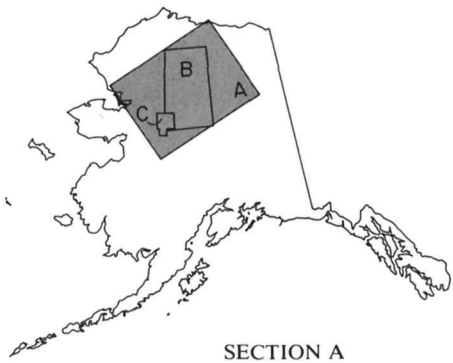
Occasionally a group of snowmachine-mounted hunters will engage in a drive. One or more machines will attempt to circle the herd and direct their flight toward a group of waiting hunters, or they will divide their forces and drive on either side of the herd. This involves a certain amount of risk, however, from rifle crossfire.

Once the actual shooting is completed, the carcasses will usually be dragged to one or more central locations for butchering. Usually only the internal organs are removed. One to four caribou will be tied intact on a single sledge to be pulled back to the village. The remaining carcasses will be moved back to the village in relays. Final skinning and division of the carcass will be accomplished in the village.

On their southerly migration, caribou may begin to filter into the upper Koyukuk Valley in early or mid-October, although it may be as late as mid-November before any significant numbers begin to appear. There seem to be three major migration routes into the Koyukuk: the John River Valley, the Alatna Valley, and the Pah River-Kateel River valleys. During the late 1960s, caribou rarely moved further south than a point just below the village of Hughes, although small bands wintered in the upper reaches of the Kateel River-Selawik River headwaters. However, in the early 1970s, large numbers of caribou began moving into the flats above the village of Huslia, eventually going south of this village. There is some indication that this southerly expansion of range has begun to retract again.

Because of the confines of the interior forests and the need to break trails through relatively deep snow, the migratory movements of caribou through the Koyukuk Valley can be narrow in lateral span and fairly rapid in passage. It seems as if the caribou are in a rush to reach wintering grounds as they pass through the Koyukuk region.

The wintering grounds for caribou passing through the Koyukuk Valley varies greatly from year to year. Because of recent extensive forest fires which destroyed feed, caribou now rarely spend any appreciable time near the villages of Allakaket and Alatna. Small groups may winter in the flats south of Bettles or in the high country to the north, but numbers have been small over the past few years. The open rolling hills near the headwaters of the Melozitna River



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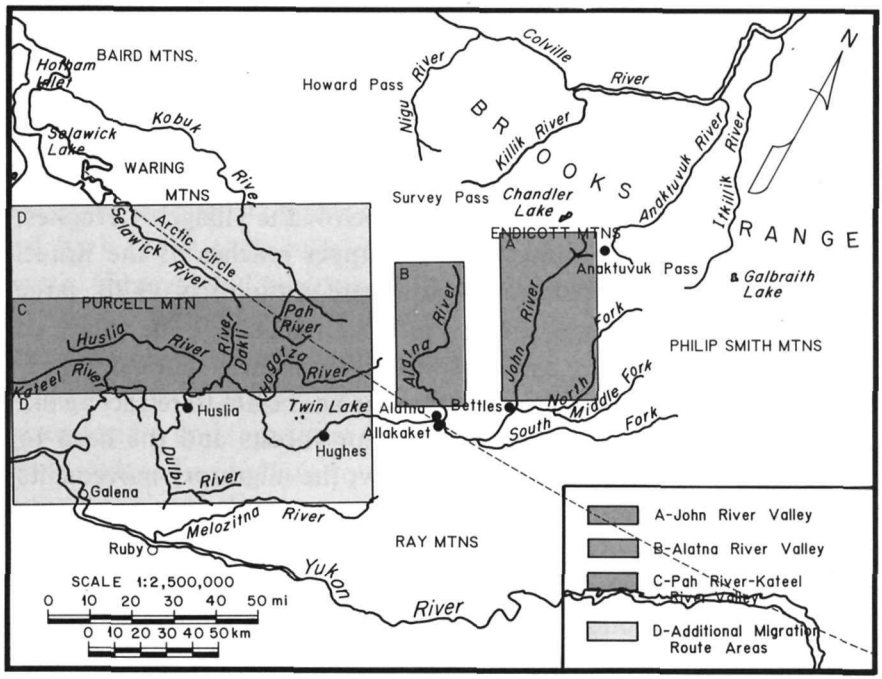


MAP 2. TRADITIONAL CARIBOU MIGRATION ROUTES

have been frequently used as wintering grounds for large numbers of caribou. The high hills and low mountains east of Hughes usually have varying numbers of caribou wintering on them. Other winter grounds include the flats of the Hogatza River, the Dulbi Slough flats, and the upper Huslia River.

Caribou hunting among the Koyukuk people was apparently more important in the nineteenth and early twentieth century than it is today. Several older informants spoke of the practice of traveling overland into the hills near the headwaters of the Kanuti and Melozitna rivers in the past to hunt caribou. One reason for such extensive hunting may have been the relative scarcity of moose during this period. Caribou were dispatched by men on snowshoes using bows and arrows. If the snow depth and crust were just right, a man could outrun a caribou. With the introduction of firearms, however, a hunter's effectiveness was greatly increased.

Today Koyukuk villagers hunt caribou by snowmachine or dogteam, with the former being the most popular. As with the Nunamiut, caribou hunting is largely an individualistic activity, although two or more men may occasionally travel together during such a hunt. Because of the forest, hunters are rarely able to chase caribou any distance. However, in the deeper soft snow, caribou cannot run as fast nor as far as they can on the treeless tundra. Koyukuk people often dismount and strap on snowshoes while hunting caribou in timbered country. When caribou are encountered in open areas, such as the windswept tops of low mountains or treeless mountain passes, the technique of hunting is basically the same as that of the Nunamiut.

During the time the caribou have traveled from the North Slope to the Koyukuk River, they have lost considerable weight. The mature bulls are usually in full rut when they arrive in the treeline, so hunters must concentrate on shooting cows. The hides are thick and the hair brittle by November, although leg skins are still useable for boot tops. Cow hides are usually in somewhat better shape than those of the bulls and are valued for making the rawhide used in filling snowshoes and as lashing for sleds.

Koyukuk Indians have said that while they are superior to the Eskimos in hunting moose, the Eskimos surpass them in caribou hunting. Observations of the writer would seem to support this generalization. The Eskimos with whom the writer has hunted seemed to possess skills superior to those of the Koyukuk Indians in predicting caribou behavior, selecting the most prime animals, and carrying out successful hunts. The Koyukuk are, nonetheless, quite skillful in their hunting activities.

As winter progresses, the days becoming shorter and the weather more severe, caribou hunting gives way to other activities among both the Nunamiut and Koyukuk Natives. Once the fall migration ends, the caribou assemblages become increasingly smaller and more scattered. Usually bands of caribou remain in the Brooks Range for the winter, and when the meat supply is low or if a hunter desires some fresh meat, he may take an occasional caribou. When the Nunamiut relied primarily on dogs for transportation, constant hunting was necessary to feed them. Now, however, dogs are rarely used for pulling sledges so the need for continual caribou hunting has declined.

Not only are caribou more scattered and in generally poorer condition during the mid-winter months, they also become increasingly wary and more difficult to approach. From the observations of Native people and the personal experiences of the writer, it was learned that caribou become particularly alert as the temperature drops and the air becomes calm. A hunter may be able to easily approach within 50 yards of a caribou in mild weather with a light breeze and precipitation but find it impossible to move within 400 yards of the same caribou over the same terrain when the temperature is -30°F or colder, the winds calm, and the skies free of precipitation. Thus, as hunting caribou in mid-winter becomes increasingly unprofitable, attention is usually focused on such activities as trapping and gathering fuel.

Caribou hunting regains its position of importance during the early spring months of March, April, and May. The rapidly increasing daylight, generally mild weather, and the tendency of the herds to begin congregating make this an excellent time to be out hunting.

The primary purpose for spring caribou hunting is to obtain a supply of meat before the herds move out of range for the summer months. Both the Nunamiut Eskimos and the Natives of the Koyukuk Valley will preserve this meat by cutting it into strips and thin slabs and hanging it on open racks to air dry. A certain percentage of the meat will be frozen in home freezers among the Koyukuk villagers and in underground ice cellars by the Nunamiut.

Spring caribou hides are generally too thin, full of warbles and fly larvae, and shedding too much to be of any practical use except for the leg skins which may be used for summer boot tops.

The overall harvest of caribou by the Nunamiut and Koyukuk people varies according to the availability and the abundance of animals, the weather and snow cover, the number of persons to be fed, the availability of alternate food sources (fish, moose, sheep, bear, and other utilized species), and a cash income. The Nunamiut of Anaktuvuk Pass may require between 40 and 50 caribou for a family of seven persons while a Koyukuk family of the same size may utilize 20 to 30 caribou per year depending upon the harvest of fish and moose.

The northwestern Alaska caribou herd has recently experienced a substantial decline in numbers, dropping from an estimated total of 200,000 in 1970 to approximately 50,000 in 1976 (Alaska Department of Fish and Game statistics). In response to this decline, the Alaska Board of Game closed all caribou hunting in the Koyukuk Valley and established a limit of 20 bull caribou per family for the residents of Anaktuvuk Pass. At the time of this writing, the effect of these and other conservation measures had not been determined, but the Alaska Department of Fish and Game expected that this decline would continue, requiring even stricter control measures on the harvest of caribou.

The closure of caribou hunting will mean a substantial loss in potential meat, skins, sinew, rawhide, and minor tool items to Koyukuk Natives, particularly in the upper river villages. However, the availability of fish, moose, waterfowl, beaver, bear, and other potential food species should alleviate much of this loss. It should be expected that the search for and harvest of these alternate food

sources will increase to overcome the loss of caribou, and/or there will be an increased demand for imported foods requiring cash expenditures.

The Nunamiut are in a much more sensitive position when it comes to caribou. The north-sloping highlands of the Brooks Range are relatively poor resource lands when compared to the arctic coastal regions or interior riverine areas. Fish resources are both sparse and difficult to harvest. Moose numbers will not sustain the harvest required to feed the population of Anaktuvuk. Waterfowl are virtually absent from the areas. Dall sheep populations can provide little more than a supplement to the present diet, and bear numbers are also low when compared to lands further south. Thus, the Nunamiut Eskimos of Anaktuvuk presently face a very uncertain future in subsistence living.

If caribou numbers continue to decline, and if the human harvest of these animals is further curtailed or possibly eliminated, there appears to be little doubt that the residents of Anaktuvuk will either be forced to import virtually all the meat consumed and/or exploit distant resources such as the fish of the Colville River or the sea mammals of the Arctic coast. Both alternatives will require a considerable cash expenditure, and at present there is no local economy capable of generating such wealth.

The harvest of sheep, bear, moose, and perhaps marmot will likely increase in the Anaktuvuk region as caribou become less available. As local game populations decline, it will become necessary for residents to travel further afield. Eventually, of course, distances and difficulties of obtaining such resources will negate their value, forcing even greater dependency on imported resources.

Black Bear and Brown Bear Hunting

Both the black bear (*Ursus americanus*) and the brown and grizzly bear (*Ursus arctos*) occur in the Koyukuk drainage and the central Brooks Range. Black bears, however, are much more common in the

forested lowlands of the south slope of the Brooks Range, while grizzlies are more common in the higher elevations and on the treeless plains of the North Slope. Bears (particularly black bears) are generally much more plentiful on the southern drainages of the Brooks Range than they are on the north flowing drainages.

Both black and brown bears are hibernating creatures, spending the winter months in their dens under the snow. Bears begin leaving their dens in mid-April and early May depending upon the warmth of the weather. Contrary to common belief, both brown and black bears are still fat when they emerge from their dens, but they quickly become lean in their early searchings for food. It is during these wanderings that bears are particularly irritable and mischievous, often demolishing unoccupied camps, cabins, and caches.

During the spring and early summer, bears wander about feeding on the carrion of winter kills, roots, and any game they are able to catch. With the advent of summer their diet shifts to berries, marsh grasses, roots, and fish. Spawning salmon and other fish concentrations are an important food source to bears throughout the region.

As summer slips into fall, bears gain a heavy layer of fat. Their bodies literally roll in layers as they graze across a blueberry patch. The onset of winter finds them seeking suitable dens for their long hibernation. Black bears usually make their dens in the forested hills and lowlands, while brown bears seek out the high alpine tundra for their winter homes. Some will excavate dens into the sides of hills, mounds, or banks, while others will select a natural cavern formed by overhanging rocks or an old windfall. Each den is lined with dry leaves and grass, and once the bear enters for the winter, the entrance is plugged with sticks, dirt, grass, and other refuse.

Both among the Nunamiut of the Central Brooks Range and the Koyukuk Indians, the hunting of bears is an important subsistence and cultural activity. A mature bear offers a hunter a source of rich fat, a large supply of meat, and a sizeable skin, although the Koyukuk Natives have certain cultural restrictions on the use of such skins. Prior to European contact, the femur of a bear was used to shape the head of spears and the rib bones were occasionally fashioned into arrowheads.

Before the introduction of firearms, bears were hunted and killed with spears (*pana* in Eskimo). It required a particularly brave man, armed only with a spear, to rush an adult bear and then to taunt the bear into attacking. As the bear rose up to lunge on his tormentor, the hunter planted the butt of the spear in the ground and aimed its point so that it would enter near the collar bone of the bear. As the bear fell onto the spear the hunter rolled away, hoping the bear would be unable to continue the attack. Occasionally a party of men would attack a bear, thereby increasing the chance of success. The last known killing of bear with a primitive spear in the Koyukuk Valley area occurred during the late 1800s, according to an elderly Native informant.

The Koyukuk Athabaskans of the past employed a special snaring technique for the harvesting of black bears. This technique was used primarily by men too old to participate in the more active means of taking bears. The bear snare (*gaabeeł*) consisted of a rawhide line made from bearded seal skin obtained from Kobuk Eskimos, a willow loop, and a special birch bark basket with seams overlapping in a clockwise pattern.

The snare was placed in a tall straight spruce tree near a well-traveled bear trail. All branches of the spruce tree were cut off of one side flush with the trunk to a height of approximately 12 feet. The birchbark basket full of fish was hung on a branch just above the trimmed area. The rawhide line was secured at one end around the tree trunk under the basket with the other end extending down to an elongated willow loop which held it out horizontally from the trunk. The rawhide line formed a noose of approximately 18 inches in diameter, which was supported by the willow loop. This snare was set approximately 9 feet above the ground.

A bear smelling the fish and seeing the basket hung in the tree would climb up the trimmed area, pushing his head through the willow loop and its supported rawhide noose. As it descended, the noose, tied with a special non-slip knot, would tighten and kill it. Bear snares were set in the latter part of August and were checked each day by the owner.

Bear hunting becomes a major activity among present-day Koyukuk Athabaskans in early October and continues through November. By late December most bear hunting has ended and will not be resumed until the bears begin leaving their dens in the spring. Hunting at this time will only be carried out briefly because the bear's condition rapidly deteriorates. Very little bear hunting will be done again until the following fall.

Bear hunting among the Koyukuk Athabaskans is an activity that far transcends the meeting of simple biological needs. To these people the bear is invested with particularly powerful spiritual powers and, when carried out by culturally prescribed methods, the killing, treatment, and consumption of a bear is literally a religious act. Thus it is impossible to accurately describe Koyukuk bear hunting without including supernatural beliefs and prescribed behavior.

According to Native custom, a man planning to hunt a bear must not verbalize his plans. He must also never speak in a boasting manner about his successes in such hunts or in any way demean the bears he has killed. To do so would insult the bears and the hunter would soon lose all of his luck, possibly going for years without finding another bear. According to Koyukon belief, a bear must favor a hunter before it allows him the opportunity to kill it.

In all elements of subsistence, but particularly in bear hunting, luck plays a very large part in the eyes of the Koyukuk Athabaskans (see chapter 12). Without luck, or the proper relationship with the environment, skill is worthless in bear hunting. The bear will reveal himself only to those it favors. One man may walk right by a bear and never see it while another will easily spot it as though drawn to the spot. According to the Koyukuk Athabaskans the difference is summed up in the word "luck."

The fall bear hunt immediately after freeze-up is the high point of the male seasonal activities. Parties of several men leave the village on foot carrying packs containing their necessary camp gear. Very little food will be taken, as the hunters expect to live off the land. Light tarps are carried in place of bulky tents. The bear hunting party roams the flats and foothills, camping in particularly promising areas

and spending two or three days carefully searching the local terrain for bear dens or signs of recent bear activity.

Bear dens may occur in a variety of places, but Native hunters have learned that bears tend to den on dry well-drained land. The exposed roots of large spruce, thick patches of diamond willow, and sandy banks are particularly favored by bears. As the hunters search, they watch for patches of moss that have been pulled from the earth or tall grass that has been torn away. They also look for crude nests which bears often make near a den they are excavating. All of these signs indicate that there is an occupied den in the nearby vicinity.

Over the years a great many bear dens have been discovered by Koyukuk hunters. When a man discovers a new bear hole and takes a bear from it, it becomes known as his den: that is, "Joe's bear hole." Other hunters usually allow the "owner" of a known bear den the opportunity to be first to check it each fall. The locations of particularly productive bear holes are passed from father to son. As men search for bears in the fall they characteristically check all known bear dens in the vicinity. Usually, a great many old dens must be checked before one is found that is occupied.

As two or more hunters progress separately through an area, they maintain contact by occasionally striking a tree with a stick. It is forbidden to yell back and forth as this will frighten off any bears in the vicinity. The only time one should cry out is when discovering an occupied den.

Once a den is discovered, and its entrance appears to be purposely plugged up, the hunter will sometimes cut a long curving rod to poke back into its tunnel. Most den tunnels curve before the nest area is reached. When the stick strikes something soft the hunter will hold it against the obstruction and try to detect any breathing movement. If the bear is not completely asleep it may rush out of the den, in which case the hunter must be ready to quickly respond and shoot it. If the bear does not leave the den, the hunter will carefully withdraw the rod and lay it on the roof of the den at the same angle it was injected into the hole. The end of the rod should be resting directly over the sleeping bear.

With the hibernating bear located, the hunter and his companions will sometimes cut heavy poles and brush and securely plug up the entrance of the den to prevent their prey from escaping. At the spot above the den nest, they will chop and dig a hole perhaps 6 inches in diameter. If enough light can filter through the hole, it may be possible to see the bear and to allow the hunter to shoot it in the head. Otherwise, a rod will be lowered to "feel" for the bear. Once the bear is located, one hunter may hold the rod steady while another aims and fires his rifle along its length.

Often bears can be hunted in their dens by a much simpler method. The hunter simply disturbs the animal until it comes up into the den tunnel or pokes its head out the entrance, and then he shoots it. Or in many cases a hunter looks into the den tunnel, using a flashlight or torch to locate the animal inside. If he can see it clearly, he is able to aim and shoot effectively from the den entrance.

From time to time, one may discover a den occupied by a sow bear and one or two yearling cubs. These cubs are often two-thirds the size of a full adult. It is the obligation of the hunter to take all occupants of a den. If the bears did not wish to be taken they would not have revealed themselves, and to not take them would be an act of disrespect.

The slain bear or bears will be removed from the den and skinned on the spot. The small bone just under the tongue will be discarded. The intestines, heart, lungs, and any bone or other parts not to be taken should be burned to prevent other animals from defiling them. The hide may be kept, although it usually is not. A bear hide continues to have "life" for three years, and so it cannot be used for clothing or anything else until this time has passed. Only women who have experienced menopause may scrape and tan a bear hide.

If a man or hunting party is some distance from the village and takes several bears, they will cache the meat and pack back only a small percentage of their kill. Later they will use dog teams—and, lately, snowmachines—to retrieve the meat.

According to custom, the man who actually kills a bear retains very little of the meat for himself, perhaps only a forearm or hind-

quarter. The ribs, fat, and other choice cuts are usually frozen and preserved for village potlatches. It is particularly important to have large quantities of bear meat for memorial potlatches. Other parts of the bear such as the neck, forearms, head, and paws are used to host a bear party in honor of the bear that has been killed. Bear parties, by tradition, are attended by males only and are usually held outside the village limits soon after the bear meat has been returned to the community.

Although bear hunting significantly declines after mid-winter, it does not cease entirely. When traveling overland via snowshoes, dog team, or snowmachine, a Native hunter is always alert to signs of possible bear dens. An air hole often forms in the snow covering a bear den. The snow around the hole is usually stained yellow. If a man sees such a sign, he will dig out the den and harvest its occupant. As a man travels along a trail with his dog team he notes the dogs' behavior. The writer drove his team of dogs along a well-packed trail daily for over a week and noticed the team sniffing the air and glancing off into a patch of birch trees each time a certain point was passed. This observation was discussed with a local Native hunter who then spent several days searching around the area until he found and killed a bear in a snow-concealed den. Small predators, such as marten, weasels, and foxes, are often drawn to a bear hole by its odor and may walk up to it and circle it out of curiosity. A hunter, seeing where such creatures have deviated from their general path of travel and circled such a spot, will suspect a bear den. As mentioned earlier, to find a bear den obligates the hunter to harvest its occupants.

Summer bear harvest usually consists of simple chance encounters with bears while carrying out other activities such as checking fish nets, cutting wood, or traveling by boat. There seems to be less emphasis on the taking of bears at this time. However, people who reside at fish camps or engage in activities that require them to travel in the woods are always alert for bears, and they usually carry a firearm or have one nearby in anticipation of encountering an aggressive bear.

Sheep Hunting

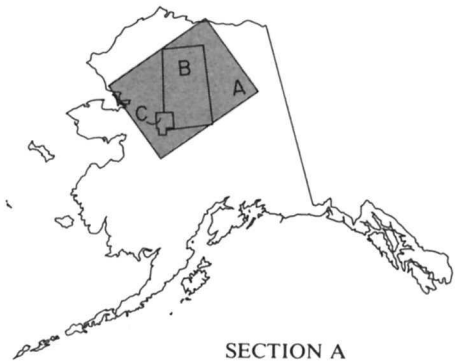
Dall sheep (*Ovis dalli*) occur throughout the Brooks Range, although population concentrations are not uniform. Dall sheep reach a height of 3-1/3 feet at the shoulder and may weigh up to 200 pounds (Burt and Grossenheider 1952:239).

Historically the Anaktuvuk Eskimos have harvested mountain sheep throughout the highlands of the central Brooks Range from the Itkillik River westward to beyond the Killik River. The Koyukuk Natives concentrated their sheep hunting in the mountains of the upper Alatna River, the John River, and the Middle Fork of the Koyukuk. Over the past two decades, the sheep hunting range of these two groups has decreased considerably, with the Anaktuvuk Eskimos tending to concentrate their sheep hunting in an area from the headwaters of the Anaktuvuk River westward to Chandler Lake. The Koyukuk Natives have all but abandoned sheep hunting except for rare fall hunts into the upper Alatna Valley or upper John Valley via river boat.

Prior to the legal restrictions placed on hunting, sheep were harvested year-round by both Native groups, although it was most desirable to take sheep in the fall when they were in prime condition. Both groups knew where concentrations of sheep were located and what routes of travel they were most likely to use in their daily rounds of feeding and resting. Although sheep have keen eyesight and are naturally quite wary, hunters know that they concentrate their attention on slopes below them, and it is possible to approach sheep fairly closely from above.

Sheep skins have been used by both the Koyukuk and Anaktuvuk people for parkas, mittens, and other pieces of clothing. The sinew was used as thread, and the horns have been used as containers. Sheep meat and fat has been an important supplement to the diet of the Native peoples, although its importance has declined somewhat in recent years.

The hunting of sheep usually requires considerable walking, climbing, and packing of heavy loads over rugged terrain. Thus the return



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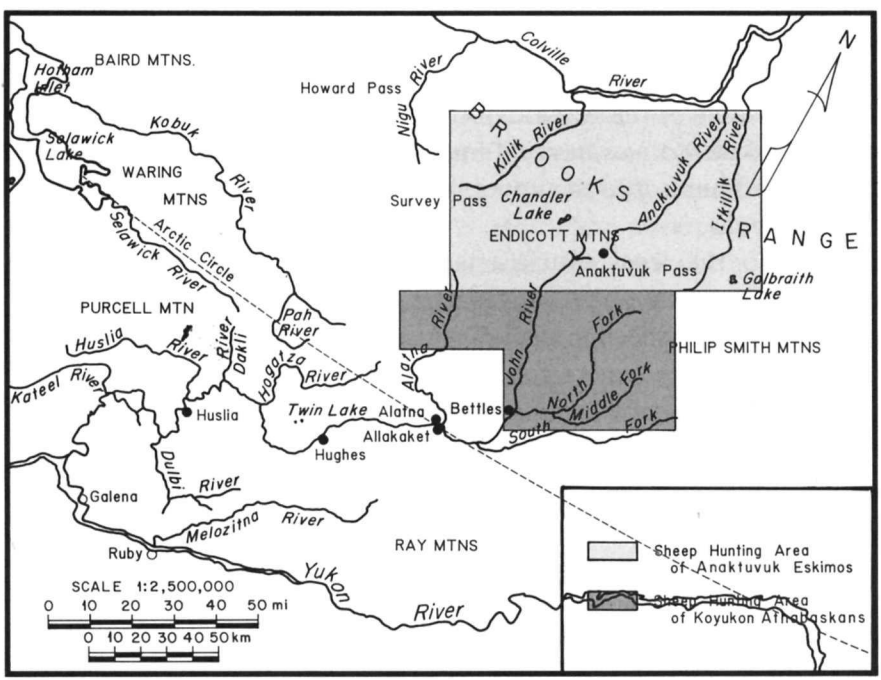


MAP 3. TRADITIONAL SHEEP HUNTING AREAS

for the time and effort invested is relatively small, particularly when the legal harvest is limited to one adult ram per hunter. Prior to such legal restrictions, a single hunter might take six or seven sheep per year. Today the annual harvest of sheep for the Native population of the Koyukuk Valley probably averages no more than ten, and the annual harvest by Anaktuvuk residents is perhaps twice that number at a maximum.

Goose and Duck Hunting

A variety of geese and ducks migrate annually through and/or nest in the drainages of the Koyukuk River (see chapter 2), and many of these species pass beyond the northern interior to the great marshlands of the North Slope. Rather than consider each individual species and its exploitation, the following discussion will group all these waterfowl into two basic categories: geese and ducks.

Northern Alaska is devoid of all migratory waterfowl from October through early April. During the mild days of late April, scattered flights of ducks and geese begin making exploratory flights over the middle Koyukuk, searching for melt pools and bare earth on which to rest and feed. Depending upon the weather, the frequency of these flights increases until by mid-May and early June the marshlands of the Koyukuk Valley are filled with the cries of nesting and traveling waterfowl.

The highlands of the central Brooks Range provide a very sparse habitat for migratory waterfowl. Small populations of such birds may inhabit some of the highland lakes and marshes, but their numbers are so low and distribution so scattered as to constitute a very minor resource for the Anaktuvuk Eskimos.

By mid-June the geese and ducks have paired off and scattered themselves through the marshes and sloughs to nest and raise their young. Aerial surveys of the Koyukuk region have located particularly active breeding grounds in the marshlands south of Hughes and the swampy flats of the Kanuti and South Fork rivers. Marginal

breeding grounds were noted in the narrow lowlands of the upper Alatna River and the North Fork of the Koyukuk River.

As summer fades into fall, young waterfowl are seen on training flights led by the adult parents. By mid-September waterfowl once again appear on the main river. Soon the undulating "Vs" of migrating birds are seen pointing south, and with freeze-up, the land is once again vacant of waterfowl.

Prior to the introduction of modern firearms, ducks and geese were taken with snares, bows and arrows, and by hand during the molting season. Spring was often a time of starvation among past Koyukuk Athabaskans, as fish and meat supplies had been exhausted, so the return of the geese and ducks heralded the end of lean times.

The Natives of Huslia, Hughes, Allakaket, and Alatna are particularly active waterfowl hunters. Until the late 1950s and early 1960s, goose and duck hunting was an integral part of the spring camping practice. In April, families would leave their villages by dog teams and travel over the crusted snow to the still frozen marshlands nearby. Tent camps were established in scattered locations near lakes and streams, and muskrat hunting and trapping was carried out simultaneously with the hunting of geese and ducks. As the lakes and streams flooded with melt water, men carried out their hunts in small canvas-covered canoes. Waterfowl meat taken at this time of year was dried or preserved by burying in protected snowdrifts or next to the exposed permafrost.

While the practice of establishing spring camps has declined somewhat in recent years, the Koyukuk Natives continue to rely heavily on waterfowl as a subsistence resource. With the introduction of home freezer units, it is now possible for local families to easily preserve waterfowl meat.

Waterfowl hunting is now carried out with shotguns, usually 12- or 16-gauge and "pump" types with a few "automatic" loading types. A few waterfowl may be taken with .22 rimfire rifles or even large caliber rifles, but only by chance encounters.

The Native hunters of the Koyukuk utilize extensive knowledge in their harvest of waterfowl. Not only do they know the lakes and sloughs most frequented by migratory ducks and geese, they also can locate specific places where waterfowl are most likely to cross or land. Some men, particularly younger men, and some women are expert callers of ducks and geese, mimicking their cries and drawing them within shotgun range. The more accomplished hunters can accurately predict the time when various species of waterfowl will cross a given point, and depending upon the weather, how high they will be flying. These hunters often make decoys out of shot waterfowl by supporting their heads upright with sticks driven into the ground. The dead birds are then scattered in the open with the rods holding their heads upright to give them a life-life appearance.

Fall hunting usually entails traveling by riverboat along navigable waterways and shooting at waterfowl flushed up from along the banks. Fall hunting is not as productive as spring hunting, and the birds are not in as good a condition for consumption.

Porcupine Hunting

Porcupine (*Erithizon Dorsatum*) are common throughout the lowlands of the Koyukuk Valley and its tributaries and may be found less commonly at the edge of the treeline near the crest of the Brooks Range.

Both the Nunamiut and the Koyukuk people prize the rich fat and flesh of porcupine and will take them whenever encountered. They are usually killed with a small caliber rifle or clubbed to death. The porcupine is relatively slow moving and is easy to run down.

When a porcupine is killed in the fall it will be roasted whole over an open fire without skinning. The fire singes off the quills. Those porcupines taken in the spring and summer are usually skinned before cooking, as the small developing quills cannot be removed by singeing.

Miscellaneous Hunting

The preceding species covered in this chapter are the main focus in the hunting activities of the Koyukuk Natives and Anaktuvuk Eskimos. However, several other species of smaller animals are taken with firearms by both groups. These include wolves, wolverine, fox, marmot, ground squirrels, red squirrels, ptarmigan, owls, and virtually any furbearer which one may encounter while traveling. The harvest of ptarmigan is covered in chapter 7. Other animals taken through hunting are used primarily for their hides, and these will be discussed in the section dealing with trapping.

Chapter 4
TRAPPING

Before firearms and mechanical transportation become available to the Natives of the northern interior of Alaska, their effective killing range was extremely limited. To overcome this limitation, they, and other primitive hunter-gatherers, learned to harvest wildlife with such devices as deadfalls and snares. These devices, coupled with a thorough knowledge of the behavior patterns of the target animals, allowed men to hunt *in absentia* and thus extend their predatory effectiveness. It is likely that remote harvesting techniques produced as much or more food and furs than did the activities limited to men and their hand weapons.

The taking of large animals, such as moose, sheep, caribou, and bear by such remote devices as snares and deadfalls is no longer practiced by people of the Koyukuk or central Brooks Range. There are now legal sanctions against such activities, and modern firearms and other technology make it largely unnecessary. Trapping is limited at present to the harvest of furbearers.

When the Natives of the northern Alaska interior first came into contact with Europeans, they discovered these people desired two local resources: gold and furs. Gold required skills and technology not available to Native residents, but furs were a resource that aboriginal people were skilled in harvesting. The trade goods—and later, cash—offered for wild furs encouraged Natives to focus considerable time and energy on the trapping of furbearers. The introduction of steel traps and snares significantly added to the productive potential of Native trappers, and trapping became a major industry of northern Alaska.

Commercial trapping required Native men to devote substantial time and effort in the pursuit of furbearers. The time that had once been devoted to hunting was now consumed by trapping and related activities. The introduction of modern firearms, commercial fish nets, imported foodstuffs, manufactured clothing, and other items allowed Natives to more efficiently and easily meet their immediate needs and free them for trapping activities.

The competition and financial rewards for furbearers caused the Native to seek out and exploit untapped fur resources. The upper Koyukuk Natives exploited a total trapping area that extended from the central John River in the northeast to the upper reaches of the Galena Flats in the south. The northwestern part of this area extended from Purcell Mountain along the Hogatza River into the upper Alatna River. The southeastern part began in the south on the middle Melozitna River and extended northward to Twin Lakes. The Nunamiut carried out trapping activities from Galbraith Lake westward to the upper Nigu River and from the Colville River south to the middle John River.

While virtually all of the described area was exploited for fur, the most productive and prized regions were the marshy flats, wide river valleys, and low bordering foothills. Here one could find resident populations of beaver, mink, otter, muskrat, and marten, as well as the more mobile game species such as wolf, wolverine, fox, and lynx. In the ecologically rich lowlands, one could exploit a relatively small territory for a high return on invested time and effort.

Trapping in the rugged highlands tends to be considerably less productive than that of the lowlands. Wolf, wolverine, fox, and some lynx and marten frequent the highlands, but their populations are usually widely scattered and highly mobile. Highland trappers must exploit relatively large areas and be able to quickly shift traps as game populations move from one location to another.

Territoriality is an important factor in the trapping activities of Koyukuk Natives, particularly in regard to trapping among the productive lowlands. When a man has trapped a given terrain for several years, it becomes known as his trapline, and others will avoid placing traps in the same area. Although such trapping territories are usually

irregular in shape and may be varying sizes, local people usually know where such traplines are located and respect the rights of their "owners."

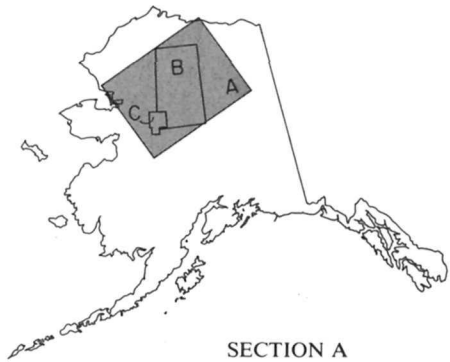
Trapping territories infer exclusive use only for the setting of traps and do not exlude others for such non-trapping activities as hunting, fishing, wood cutting, and travel. According to several informants, one may travel through another's trapping area as long as he does not disturb the owner's traps. Untrapped wolves, wolverine, lynx, and other such predators may be shot on sight wherever they are encountered.

Territoriality apparently is more a factor among the Koyukuk Athabaskans than among the neighboring Eskimo populations. The scattered and highly mobile fur populations of the mountainous highlands discourage the "ownership" of traplines, and there appears to be no overt recognition of individual trapping territories.

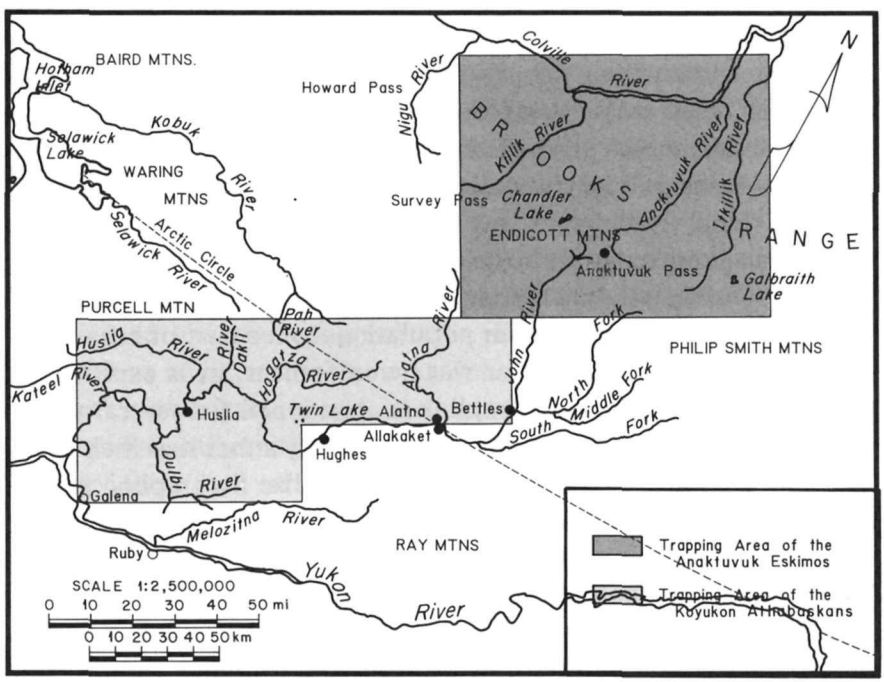
Today the most productive trapping areas adjacent to the Koyukuk River and its tributaries are divided among local residents into individual traplines. A trapline remains the property of a given individual, however, only so long as he makes continued use of it. While an individual may refrain from using his trapline for two or three years in order to allow fur populations to recover, or because of other factors such as illness or wage employment, he is expected to show intention of use. If a trapline is abandoned for several years, others may eventually move into it and possibly annex it as their own.

When a man is unable or unwilling to utilize his trapline for an extended time, he will usually "lend" the line to a male relative. While the relative uses the line, he is acting as the owner's agent and helps to maintain the ownership of the territory. No "rent" or other reimbursement is paid for such use. Established traplines are usually taken over by a male offspring or near relative when the original owner becomes too old or is otherwise unable to trap.

It has been a cultural pattern of the Koyukuk people for young married couples to reside in the village of the wife, at least for the first several years of marriage. Also, a family may, for various reasons, decide to move to another village to reside. Such moves often mean that the newcomers must find a trapping territory. There



SECTION A



MAP 4. TRADITIONAL TRAPPING AREAS

are two recognized traditional means for such persons to gain access to a trapline. A group of village leaders may meet and direct the newcomer to a territory that has either been abandoned or is not in use. A newcomer may also be taken on as a "partner" by a resident relative. The relative will take the newcomer to his trapline and allow him to utilize part of the territory. Eventually, the newcomer may expand into unused adjacent land and gradually gain recognition for having his own trapline.

Fur trapping continues to be a viable economic practice among the Koyukuk Natives, Nunamiut Eskimos, and a limited number of non-Natives, although its importance has diminished since the 1940s. Virtually all adult Native men consider themselves to be trappers, although at present they may not be actively engaged in trapping. Trapping is seen as a safeguard against times when wage employment is difficult to obtain. It supplements seasonal summer employment in such occupations as firefighting and bargeline and construction work.

Trapping serves as more than simply a source of income among Koyukuk Natives. Becoming a successful and active trapper is one means of acquiring recognition as an adult male. Successful trappers are accorded both respect and prestige by other villagers. Villagers recognize that a successful trapper possesses a considerable amount of environmental skill, ambition, and luck. All three qualities are highly regarded.

Koyukuk people who plan to actively engage in winter trapping normally begin preparing for this activity during the summer months. Those depending upon dog teams for transportation (a growing number) will attempt to harvest and dry as many salmon as possible for dogfood. Snowmachine owners will purchase repair parts and attempt to save enough money for fuel. During early fall these men will begin cutting firewood and rafting it back to the village so that their families will have fuel for winter. If trapping cabins or tent sites are near navigable streams, the men may use boats to carry supplies and equipment to these sites prior to freeze-up. Tent camps may be established at this time, and cabins repaired or constructed.

Today actual trapping usually begins in early or mid-November, when lakes and waterways are reasonably safe for travel and there is enough snow to lubricate sled runners. Marten and mink are prime target species during the early winter months, although traps are also set for otter, lynx, wolf, wolverine, fox, and other furbearers. A single trapper may set up to 200 marten traps spaced ¼ mile to 3 miles apart depending upon game abundance.

As the days shorten and temperatures plunge to -50° and -60°F, most trappers reduce their activities. Many furbearers, particularly smaller species, become less active at this time or remain beneath the snow, making trapping only marginally profitable. By late December most Native trappers have returned to their villages and will remain home until early or mid-February.

Late winter and early spring trapping tends to concentrate on the harvest of beaver and otter in the Koyukuk Valley. Wolf, wolverine, lynx, and fox continue to be sought and trapped throughout the season by both Koyukuk and Nunamiut villagers.

It has been noted that the Koyukuk people are particularly conservation-conscious in the harvest of most furbearers, particularly those species which are non-migratory. Beaver are considered to be especially vulnerable to over-harvest, and most trappers will pull their sets from a beaver house after two adults have been taken. Wolf, wolverine, and fox are considered to be less affected by trapping, and little effort is made to limit the take of these predators. The custom of recognized traplines encourages men to practice conservation so as to maintain a sustained yield from their territories.

Trapping is a major foundation block in the subsistence lifestyle of Koyukon and Nunamiut people. Skills directly related to and encouraged by trapping include the making of snowshoes, sleds, a knowledge of wildlife behavior, wilderness survival techniques, and dog mushing. For young men to become successful trappers and attain social status, they must acquire the skills and knowledge of their elders. This encourages communication between generations and helps to perpetuate cultural customs and beliefs.

Presently, there are about ten non-Natives actively harvesting furbearers along the Koyukuk River drainages. All but two of these

men trap in the northern third of the Koyukuk drainage. Four of these men are married to Native women.

The major species of wildlife taken primarily through trapping—beaver, muskrat, wolf, wolverine, river otter, lynx, marten, mink, and red fox—are discussed individually in this chapter. The following sections describe the basic techniques, both past and present, for harvesting each kind of animal. They also include some of the Koyukuk Athabaskan beliefs and practices which directly influence the taking of each species.

Beaver

Beaver are an important wildlife resource for the Koyukuk villagers. These large rodents are common in lowland lakes, sloughs, slow flowing streams, and they are relatively easy to hunt during periods of open water.

Prior to the imposition of game laws, Koyukuk Natives hunted for beaver during the late spring and early fall months using deadfalls,

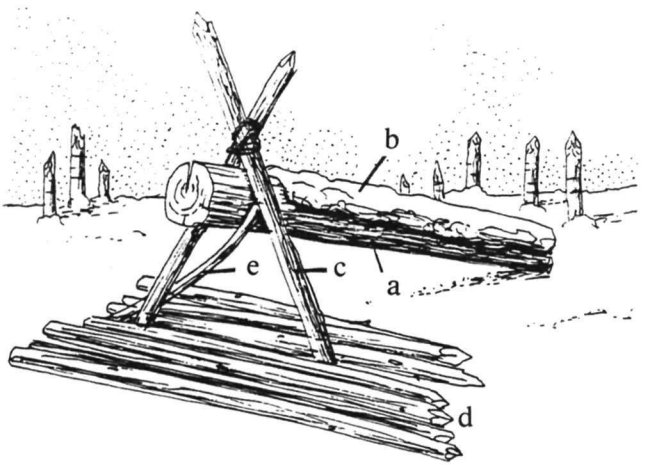


FIGURE 1. A BEAVER DEADFALL SET: *a,* GREEN BIRCH LOG; *b,* MUD AND DIRT WEIGHT; *c,* BIPOD SUPPORT; *d,* PLATFORM; *e,* GREEN WILLOW (WHEN A BEAVER CHEWS THROUGH THE BAIT, THE BIRCH LOGS FALLS).

primitive weapons, and—later—rifles. A special deadfall called a *kk'aakkoda,* used to harvest beaver, would be placed across a trail created by beaver dragging brush down from the mud banks to the pond or stream containing their house. Men also hiked considerable distances during the late spring and early fall to spend several weeks seeking out and shooting beaver. The pelts and half-dried flesh would be laboriously backpacked to the villages at the end of these hunts.

Today, beaver are taken primarily by traps and snares set beneath the ice during the winter trapping season. The trapping of beaver is a laborious affair requiring the cutting of thick ice and the skillful setting of traps or snares. There are numerous techniques for setting

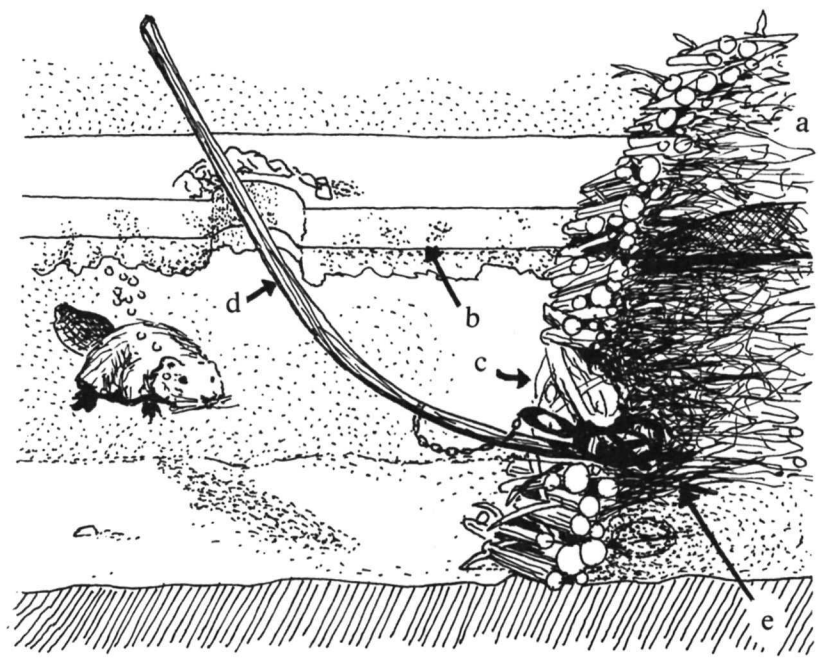


FIGURE 2. AN UNDERWATER TRAP SET FOR BEAVER: *a,* BEAVER DEN; *b,* ICE ON THE SURFACE OF THE POND; *c,* DEN ENTRY; *d,* LONG CURVED DRY POLE; *e,* TRAP SET AND SECURED TO POLE.

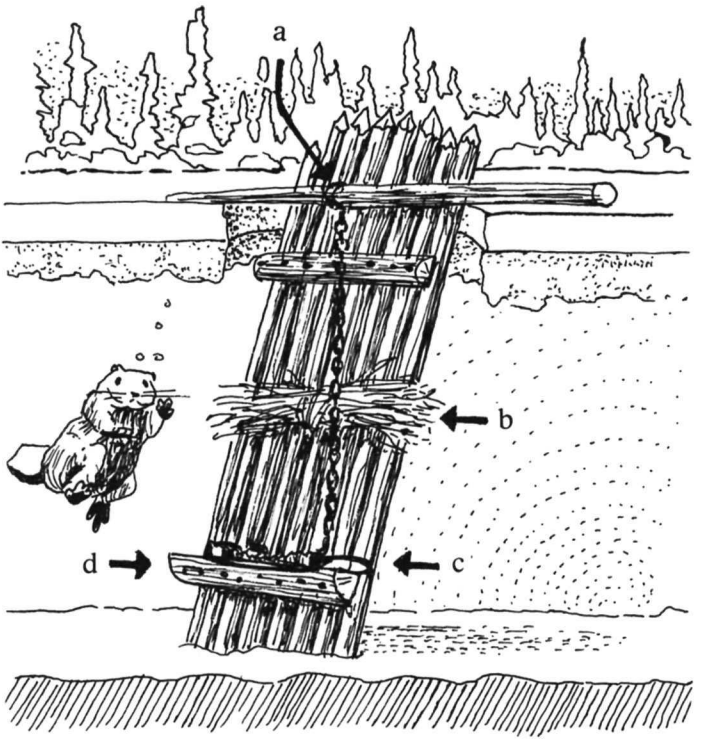


FIGURE 3. AN UNDERWATER BEAVER SET USING A TRAP AND BAIT: *a*, CHAIN SECURED TO TOGGLE; *b*, BAIT (YOUNG COTTONWOOD); *c*, SET JAW TRAP; *d*, SPLIT LOG PLATFORM NAILED TO VERTICAL POLES.

beaver traps (see figures 1, 2, and 3). The traps used for beaver are usually no. 4 or no. 48.

Snares are considered best for taking beaver when the ice is thin. The biggest drawback in using snares is the fact that after beaver die they float up and may freeze into the thickening ice.

As was noted earlier, it is customary for Koyukuk trappers to harvest two adult beavers from each beaver house and then remove all traps and snares. This is to ensure a sustained yield, although when the available feed is eventually decimated, the beaver will abandon a given house anyway.

Muskrat

As the beaver, the muskrat is a resident of lowland lakes and marshes. "Pushups" on the scattered lakes attest to the local abundance of these animals.

Muskrat skins and flesh are "most prime" (at their best) during the late winter and early spring months from January through the month of May. Most muskrat harvests occur from April through May. In April trappers primarily use small, no. 1 steel traps; the May harvest also involves traps as well as small caliber (.22) rifles. In the past, the Koyukuk people shot large numbers of muskrats just prior to and immediately after spring break-up.

Before the introduction of steel traps and firearms, the Koyukon employed a wicker trap for the harvest of muskrats. This trap was conical in shape, roughly 5 feet in length, with the top opening 18 inches in diameter. The mouth of the trap narrowed downward into a small funnel entrance into the trap body. Such traps were suspended across holes in lake ice caused by blackfish, with the mouth of the trap submerged 4 inches below the water surface (see figure 4). When a muskrat swam to the surface to breath, it would subsequently dive into the trap. Occasionally a board would be placed across the top of the ice hole, forcing the "rat" to dive as soon as it surfaced rather than allowing it to possibly crawl out on top of the ice. According to an elderly informant, wicker traps were highly efficient, often catching up to ten muskrats from one location.

Steel traps today have replaced the wicker trap in the harvest of muskrats. Traps are placed inside muskrat pushups next to the water hole opening. Pushups usually have two rooms, so the trapper blocks off or collapses one room to force the muskrats to climb out onto the set trap. The top of a pushup is carefully removed so that the trap may be placed. Afterwards, the top is covered with sticks and brush, and snow is banked over the hole. Such sets are checked often and it is possible to harvest several rats from a single pushup.

As spring progresses, the snow disappears and water floods over the marshes and lakes. Pond and lake ice lifts and becomes steadily shrinking ice islands. Muskrats may be seen busily swimming along

the edges of lakes and sloughs or resting atop floating ice. As the muskrats gain more freedom of movement, steel traps become less productive, and hunters begin using .22-caliber rifles to harvest rats.

When hunting with these rifles, hunters may either walk alongside marshes shooting muskrats that may be retrieved on foot, or they

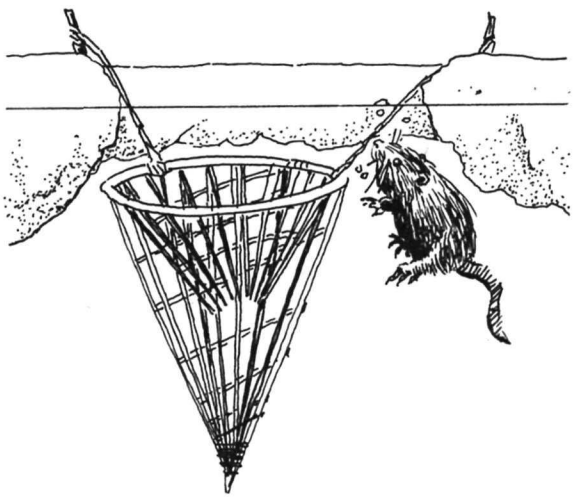


FIGURE 4. A WICKER MUSKRAT TRAP.

may paddle about in light canvas-covered canoes, portaging from one waterway to the next, shooting from their craft. When the river ice flushes out and spring water floods over the flats, Natives may use outboard-motor-powered boats to cruise sloughs and flooded lakes in search of muskrats.

Harvested muskrats are skinned by the "casing" method. Pelts are stretched and dried on elongated triangular boards. The carcasses are cleaned and may be prepared by frying or roasting. During late spring, carcasses are often stretched on sticks and placed where the sun and wind will dry the meat. Such dried meat is used for summer consumption.

Muskrat harvests of 500 to 1,500 per family were common up through the early 1950s. As the demand for these furs declined and

villagers became less mobile due to commitment to schools and other village-based functions, the harvest of muskrats was reduced. At the present time, muskrats continue to be hunted and trapped by the Koyukuk people, particularly in the late spring, but the average family take is substantially smaller than during the 1940s.

Muskrats present some danger to Koyukuk hunters. Muskrat pushups and ice hole entrances often draw schools of blackfish. These fish swarm around the ice hole, causing the surrounding ice to wear away. Such cavities are often hidden by a snow cover, and an unsuspecting traveler has often blundered into such a hazard. Results may range from an uncomfortable dunking to drowning or freezing. A cornered muskrat or one defending its young is said to be able to leap several feet high and will attack a threatening man. Natives say such rats will attempt to reach and rip a man's throat.

When muskrats are seen on top of the snow or ice during the winter, it is interpreted as an indicator of a long warm spell approaching. When rats are found to be adding new mud to the inside of a pushup, it foretells of a long-term cold spell approaching.

Wolf

Wolves are harvested entirely for their pelts. Wolf skins are used in the manufacture of parkas, mittens, boots, and trim on clothing. Wolf pelts are often traded and bartered within and between Native communities. Recently, the commercial demand for wolf pelts has resulted in prices up to 200 dollars being paid for them, and a considerable number of wolf pelts are sold to commercial fur buyers.

Koyukuk Athabaskans consider the wolf to be one of nature's "smartest" animals. According to Native lore, a wolf can read a man's thoughts by looking him in the eye. A man is also unable to kill a wolf as long as it is staring him in the eye. Apparently, very few wolves were hunted prior to contact with Europeans; they were too wise to be caught in a deadfall, and could literally grab an arrow that might be shot at them. It may also be that local wolf populations

were quite low during the 1800s when there was a general scarcity of moose and caribou.

The Nunamiut Eskimos have long been renowned as expert wolf hunters and trappers. Men spotting wolves will often follow them on foot for several miles in order to get close enough for a shot. Most wolves taken by Anaktuvuk men today are harvested either by baited steel leghold traps or by pursuit via snowmachine.

At present, wolves are actively sought by all Koyukuk hunters and trappers. The harvest of wolves begins in November and extends through March while pelts are in prime condition. From April through October, wolf pelts are either worthless for clothing or of marginal value.

Prior to the introduction of snowmachines, it is likely that 85 percent of the total wolf harvest was accomplished through the use of steel leghold traps. Set traps continue to account for at least 40 to 50 percent of the annual wolf harvest. Heavy double spring traps such as the no. 48 or no. 4 are favored for trapping wolves.

There are numerous "sets" used to catch wolves. Some of the more commonly used styles used by the Koyukuk trappers include the placing of traps around the partly consumed carcass of a wolf kill, the burying of bait (for example, rotten meat or the urine of a dog in heat) near a packed trail with set traps between the trail and bait, and the placing of animal scraps in some open area (lake, hillside, or similar location) with traps concealed nearby. In all cases the traps are buried under a light cover of snow.

Except in the instance of discovering a recent wolf kill, Koyukuk people generally avoid placing wolf traps in areas of heavy brush. According to informants, wolves are too cautious when approaching confined areas to blunder into a trap. Wolves are less cautious in open terrain and more prone to be curious. A trapper must use clean gloves when setting wolf traps and otherwise avoid leaving human scent nearby.

Occasionally, a hunter will encounter wolves while traveling by dog team or on foot. In this situation a hunter will attempt to approach as close as possible behind concealment, being careful not to pass upwind of his prey. If the wolves have already spotted the

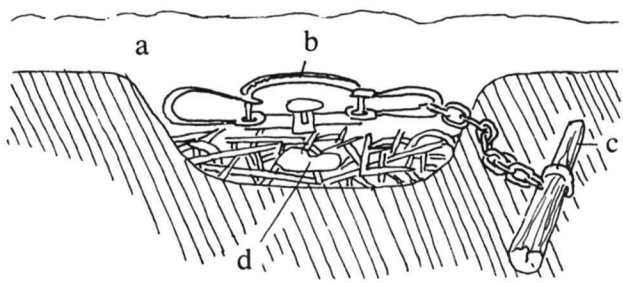


FIGURE 5. A WOLF TRAP SET UNDER SNOW: *a*, PACKED SNOW TRAIL; *b*, CONCEALED TRAP; *c*, DRY SPRUCE TOGGLE; *d*, BAIT BURIED UNDER ALDER OR WILLOW BRUSH.

hunter or if no concealed route is possible, the hunter will lay on the ground with feet and arms up in the air and roll about imitating an animal. If the ruse is successful the wolves will grow curious and approach close enough for the hunter to shoot one or two before they can run away. Wolves are sometimes drawn by the sight of a dog team, particularly if the driver is concealed, and may approach within firing range. A trapper from the village of Allakaket was able to shoot four wolves as they ran towards his anchored dog team during the fall of 1975.

During the fall of 1973, a hunter from the village of Hughes shot and wounded a large wolf near the village. He tracked the wolf for three consecutive days on snowshoes before finally giving up the chase. This persistence conveys the value placed on acquiring wolf pelts.

The introduction of the snowmachine has had a substantial impact on all hunting and particularly on the harvest of wolves. Hunters mounted on snowmachines are now able to track and give chase to wolves with relative ease, although many wolves are able to escape a pursuing machine by running into heavy timber or rocky terrain. Snowmachine hunting is most successful in the late winter and early spring when snow depth is sufficient to cover rough terrain and

makes it difficult for the wolf to run. It is estimated that 50 to 65 percent of the annual wolf harvest is accomplished using snowmachines.

Harvest numbers for wolves are currently unavailable, but it is estimated that the villages of Huslia, Hughes, Allakaket, Alatna, and Evansville take an annual total of between 100 and 160 wolves. Annual harvest fluctuates widely due to such variables as weather, snow depth, availability of prey species (caribou and moose), number of active hunters and trappers, and the price of fur.

Koyukuk Athabaskans place significant spiritual importance upon the wolf. According to mythology, a man and a female wolf once mated, resulting in the birth of a boy. Men and wolves continue to be closely related, and the killing of a wolf is accompanied by several rituals. Traditionally a man who killed a wolf would change his clothes before entering his home, leaving the hunting garments outside. The man should remain apart from his family for two days.

The carcass of the wolf is treated with respect. Before skinning a wolf, a piece of moose fat or dry fish is placed between its jaws. After skinning, the nose section and skin are dried, the food offering is secured, and the remains are hung in a tree somewhere distant from the village. The lower jaw must be removed from the carcass and all joints of the skeleton must be cut and broken; the stomach must be opened. The dismembered carcass may be placed near a drift pile distant from the village and possibly burned in the spring. Unless these rituals are carefully observed, the hunter or trapper may lose his luck in hunting wolves and may be struck with a malady of seizures and crippling pains in his joints.

It is forbidden to eat the flesh of wolves lest the person doing so father children who will be as wild and destructive as wolves. Such children will eventually meet violent ends.

The behavior of wolves is meaningful to Koyukuk Athabaskans. For instance, wolves howling near a village may be announcing an impending death in the community. When a wolf kills a dog near a village or when wolves fight near a community, people view the event as an omen of ill luck.

Wolverine

Wolverines are found in all environmental zones of the Koyukuk region. According to informants, wolverine populations were much higher in the past than at present, although an increase in wolverine numbers has been noted during the past three years (mid-1970s).

Koyukuk and Anaktuvuk people place a considerable value on wolverine skins as material for clothing trim and parka ruffs. Most of the skins are kept for local use, although a few are sold each year to commercial fur buyers.

Prior to contact with Europeans, Koyukuk Indians caught wolverines with a specially designed double deadfall. Wolverine were also taken with deadfalls by former Nunamiut hunters.

Wolverines are presently harvested through the use of steel traps, snares, and firearms. Wolverine trapping usually begins in October and ends in March. It is doubtful that the annual harvest for the entire Koyukuk drainage exceeds 100 animals; it is probably less than 30 for Anaktuvuk Pass.

The trapping of wolverine follows the same basic procedure as that used for wolves. Large traps (no. 48 or no. 3) are placed around wolf kills or bait piles. Bait may also be suspended over a concealed trap (see figure 6). Heavy steel cable snares are also suspended across packed trails leading to or from bait piles placed in brushy areas (see figure 7).

Wolverines are solitary creatures and tend to be highly mobile. However, it is not unusual for an individual wolverine to frequent a given area for several days if food is available. Wolf kills, a camp with a tempting cache of food, or even animals caught in a man's trapline will encourage a wolverine to remain in the vicinity. A trapper finding the sign of this creature will immediately begin setting traps and snares along its routes of travel and/or near whatever it is eating.

Koyukuk Athabaskans consider the wolverine to be invested with supernatural powers, and it is often referred to as the *doyon* or leader of the animals. Koyukon people say that a wolverine cannot be

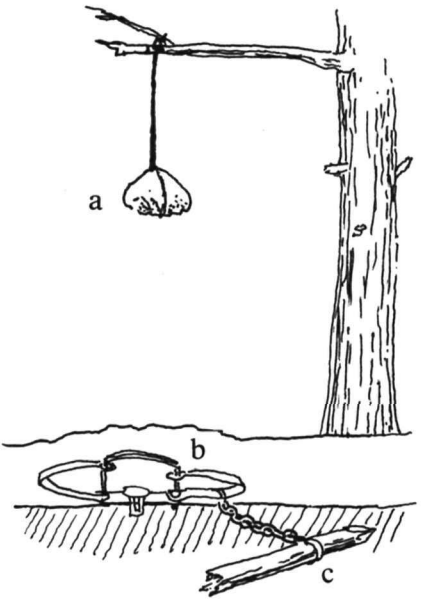


FIGURE 6. A WOLVERINE TRAP SET: *a*, BAIT; *b*, CONCEALED TRAP; *c*, SPRUCE TOGGLE.

caught in a trap unless it really wants to be. A wolverine can easily wreck the heaviest of traps; but if it wishes to be taken, a very small trap will hold it. Wolverines have been known to spring several traps just to show a man that they are more powerful than he is. If a trapper does catch a wolverine at the beginning of the trapping season, it is an indication that the trapper will enjoy good luck throughout the season. Koyukuk Athabaskans believe that if a wolverine passes a man's camp or cache of supplies without attempting to break into and destroy his property, it is an omen of ill luck.

In the past a special feast would be held to celebrate the taking of a wolverine. The animal would have such food as dry fish or moose fat inserted between its jaws and new moosehide boots would be placed upon its paws.

After the feast, the animal would be skinned by the hunter and the hide scraped and dried. A woman was not permitted to do this work nor were children allowed to touch the carcass. After drying, the hide was put away for one year to allow the "life" to go out of the hairs. An old woman past her menopause would then tan the pelt.

The skinned carcass of a wolverine was still extremely potent and had to be handled by a prescribed ritual. All joints had to be broken, and the body was carried to a place away from the village and thoroughly burned. A man had to be careful not to stand in the smoke of such a fire or he would suffer attacks "like being torn apart." The nose and lips of the wolverine were carefully cut away and taken back out to the trapper's trapline to be hung in a tree. This ensured future luck in catching wolverine.

All of these rituals, with the exception of the special feast, continue to be practiced by Koyukuk Athabaskans today. It is interesting to note that wolverine are infamous robbers of traplines, and the

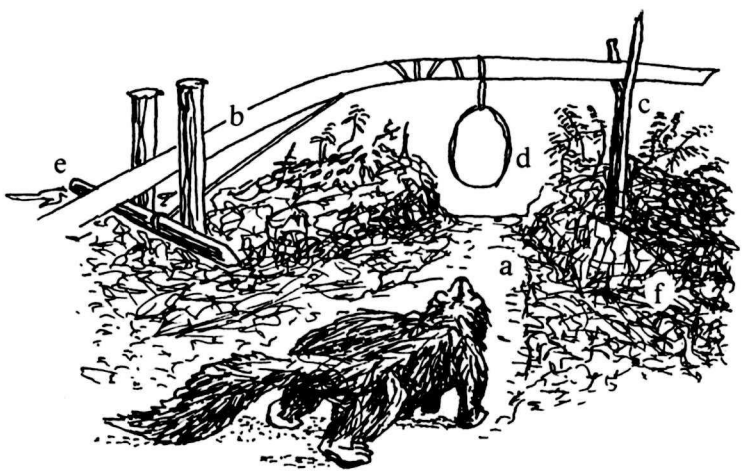


FIGURE 7. A SNARE SET FOR WOLVERINE: *a*, WOLVERINE TRAIL; *b*, TREE LIMB OVERHANGING THE TRAIL; *c*, TREE SUPPORT; *d*, SNARE 8 INCHES IN DIAMETER AND 4 INCHES FROM THE GROUND; *e*, DRY SPRUCE TOGGLE; *f*, BRUSH PLANTED TO FUNNEL WOLVERINE INTO THE SNARE AND TO OBSCURE THE SNARE LOOP.

Koyukon say that a person who dares to steal fur from someone else's traps will eventually suffer seizures and attacks "like being torn up by a wolverine."

River Otter

River otters are found throughout the lowland waterways of the Koyukuk River and its tributaries, but they are rare within the subsistence zones of the Nunamiut. As a rule of thumb, wherever one finds beaver, there is a chance of encountering otters.

Otters are found around deep lakes and creeks where there are fish and other prey such as ducks, beaver, or muskrats. They may live in caves under cutbanks or occasionally in deserted beaver houses. During the winter, otters frequent areas where submerged springs or other water action keeps the ice open. During warm spells the sliding trails of these creatures may be seen radiating from open holes in river or lake ice.

Conical wicker traps were employed in the harvest of otter until the 1920s. Such traps were made of closely woven strips of spruce forming an elongated cone roughly 10 feet in length. The mouth of this cone was 12 inches in diameter and funneled down to a throat 3 to 4 inches in diameter.

The favored location for such traps was the narrow band of water joining two lakes. Two wicker traps would be placed in such a spot, each pointing in opposite directions. Close-fitting poles were driven into the bottom of the waterway to form fences funneling into the wicker traps.

Today, otters are trapped by placing large leghold or large connibear traps along lake outlets, sides of narrow sloughs and streams, and on frequently used slides leading into water. Snares placed near beaver houses occasionally catch an otter. Otter trapping extends from November through spring.

Otters are sometimes taken with firearms in the spring and early fall. However, the number taken with guns is quite small.

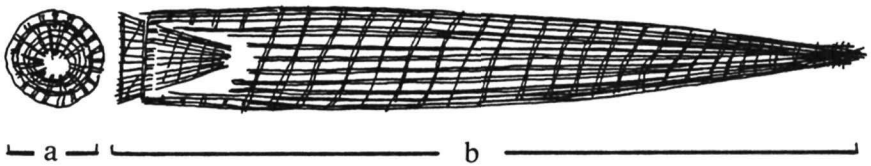


FIGURE 8. A WICKER OTTER TRAP: *a*, OPENING IS 12 INCHES IN DIAMETER; *b*, LENGTH IS 10 FEET.

The ritual treatment for river otters includes disposing of the bones in a lake rather than in flowing water to ensure that more otters will be found and caught in the future. Women should not touch an otter until they are past menopause. It is also considered a very bad sign to see an otter catch a duck, because this means there is an impending death in the family.

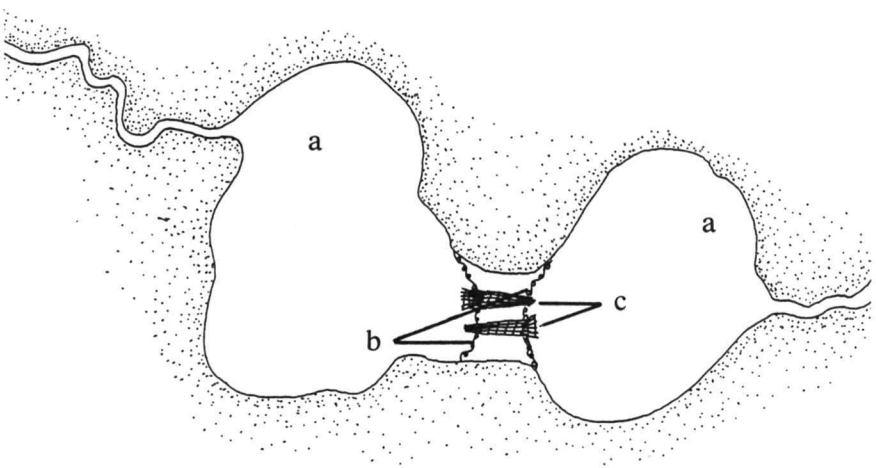


FIGURE 9. WICKER TRAPS SET FOR RIVER OTTERS: *a*, LAKE; *b*, FUNNELING FENCES; *c*, WICKER TRAPS.

Lynx

Lynx are found virtually throughout all environmental zones of the Koyukuk drainage, although they are most common along stream banks and lowlands where hares tend to frequent. Lynx also occur in the highlands of the Brooks Range, but they are usually less plentiful there than in the lowlands.

Koyukuk Natives utilize the skin and the flesh of lynx. Lynx skins are used in the manufacture of mittens and coats and are also sold commercially. The flesh of lynx is an excellent food and is eaten by Koyukuk men.

Lynx are harvested from November through February. Harvest usually ends after February when the cats begin mating and then raising their young during the spring and early summer.

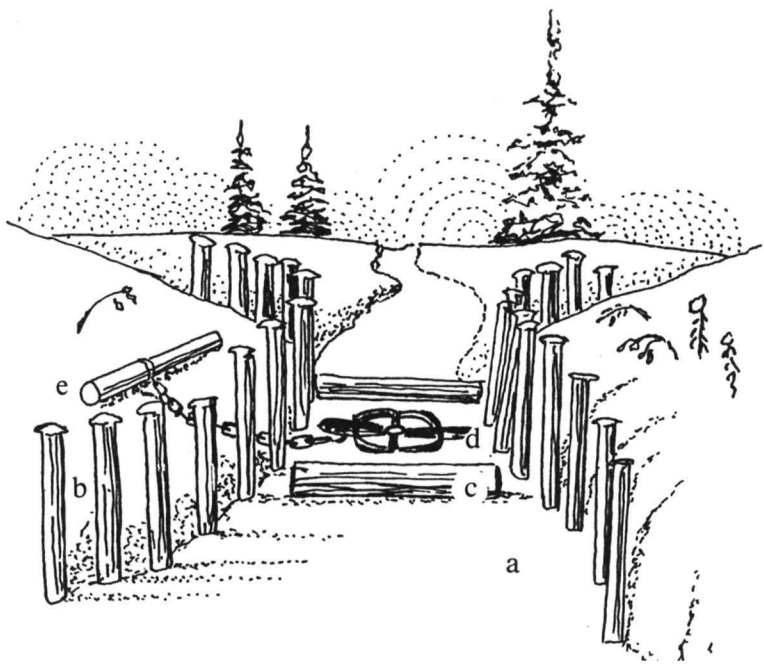


FIGURE 10. AN UNBAITED LEGHOLD TRAP SET FOR LYNX: *a*, RABBIT OR SNOWSHOE HARE TRAIL; *b*, FENCE TO FUNNEL LYNX INTO TRAP; *c*, SMALL LOGS TO FORCE LYNX TO STEP INTO TRAP; *d*, LEGHOLD TRAP; *e*, SPRUCE TOGGLE.

Koyukuk Natives caught lynx with rawhide snares and deadfalls prior to contact with Europeans. Presently, they take the animals with steel cable snares and leghold traps.

Lynx snares and traps are generally placed in timbered or brushy areas where prey species such as hares, ptarmigan, red squirrels, and other small game abounds. Willow-covered river bars are particularly favored for lynx trapping. Lynx tend also to follow packed rabbit trails or snowshoe trails when traveling and hunting in thick brush. Upon discovering lynx sign in the brush, a trapper will begin placing unbaited no. 1½ or no. 3 leghold traps directly on snowshoe packed trails.

Steel snares are suspended over packed trails, particularly those showing sign of past use by a lynx. Such snares have a loop diameter of roughly 8 inches with the bottom of the loop 5 inches off the surface of the snow. The snare may be attached to a solid object such as a tree or heavy brush, or it may be secured to a heavy dry pole toggle. Sticks and twigs are often set alongside the edges of the trail to guide a lynx to the snare or trap and to conceal the noose of a snare.

Lynx often do not fight or attempt to escape when caught in a trap or snare. When Koyukuk Natives find an entrapped lynx, they rig a noose to a large pole, loop the noose over the lynx's neck, and then

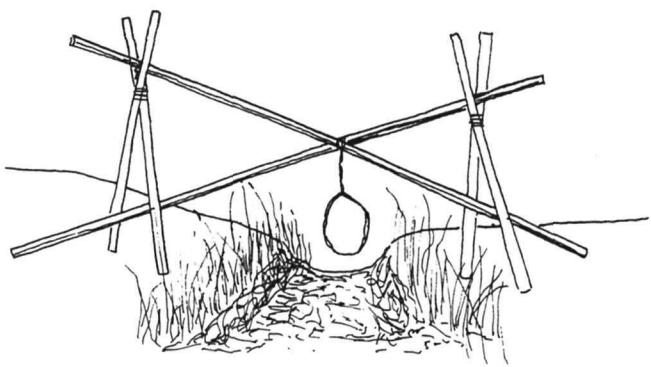


FIGURE 11. A SNARE SET FOR LYNX.

quickly kill it. Trappers will often set several rabbit snares around the area where lynx traps have been set, hoping to encourage a lynx to remain in the vicinity to feed on snared rabbits until it is caught.

Ritual treatment of lynx includes breaking the joints of a skinned carcass, burning the remains, and restricting women from eating the flesh. If a trapper inadvertantly allows a lynx to spoil in a snare or trap he must burn the entire animal and the device it was caught in. The area around the spoiled lynx must be raked clean and all debris burned. To ignore these rituals will cause one to suffer "fits" and other ailments.

Marten

Marten are found in the low hills and forested mountain slopes of the Koyukuk region. They extend their habitat into the forested highlands but are relatively sparse in such areas. These small predators subsist on such small game as hares, red squirrels, spruce hens, mice, and ptarmigan. According to Native informants, marten will also catch fish where hollow ice is found during the winters.

Marten are considered harvestable from the end of October through the month of February. According to informants, female marten begin shedding belly fur in the spring just before mating begins. During the mating period, marten travel extensively and the hides quickly become worthless.

Up through the 1920s, marten were harvested primarily through the use of deadfalls. Informants in their 50s and older still recall when deadfalls were in common use for catching marten. An elderly man from Hughes constructed a traditional marten deadfall for the investigator. Two trigger systems were used. Figures 12 and 13 illustrate the deadfalls when completed (specific details for construction appear in appendix B).

Trigger assembly B consisting of a crooked alder and pliable diamond willow stem is apparently of greater antiquity than assembly A. Deadfalls of similar design varying primarily in size were used by

Koyukuk Natives in the taking of other game species ranging from wolverine to red squirrels.

Today marten are harvestable primarily by light steel leghold traps, using trap sizes from no. 1½ to no. 0. Such traps are placed in a variety of sets including sheltered "cubbies," pole sets, and simple exposed sets with little or no effort made to conceal them (figures 14 and 15).

An elderly trapper rated the pole set as the best technique for taking marten, because mice and shrews can not reach and spoil the fur of the entrapped animal. The cubby set prevents the trap from being covered and rendered inoperative by fresh snowfalls. The open trap set is the easiest and quickest to set, but it is the most vulnerable to being covered by snowfalls or robbed by other predators.

Bait used for marten traps includes spruce hen wings, parts of hares, and "sour" frozen fish. All are effective in drawing marten, but "high sour" (pervasively rotten) fish is favored by many trappers because of its strong odor.

An active trapper may set 50 or 60 marten traps, depending upon the signs of productive capacity in a given area. Where marten signs are particularly good, traps may be set only a few score yards apart. One informant described his marten trapline as consisting of four individual trails each roughly 14 miles long radiating out from his

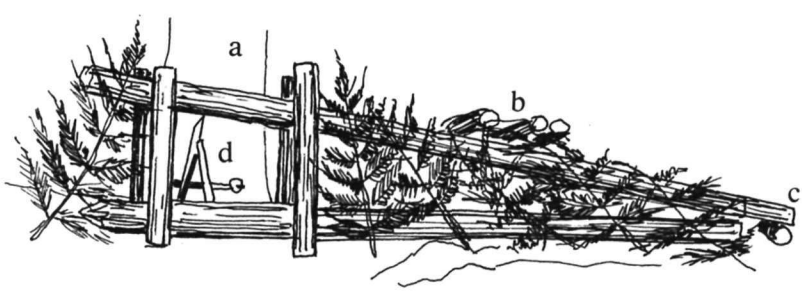


FIGURE 12. A MARTEN DEADFALL SET: *a*, SPRUCE TREE WITH OVERHANGING BOUGHS TO KEEP SNOW OFF THE SET; *b*, WEIGHT LOGS; *c*, "KILLER" LOG; *d*, BAITED TRIGGER (SEE APPENDIX B FOR CONSTRUCTION DETAILS).

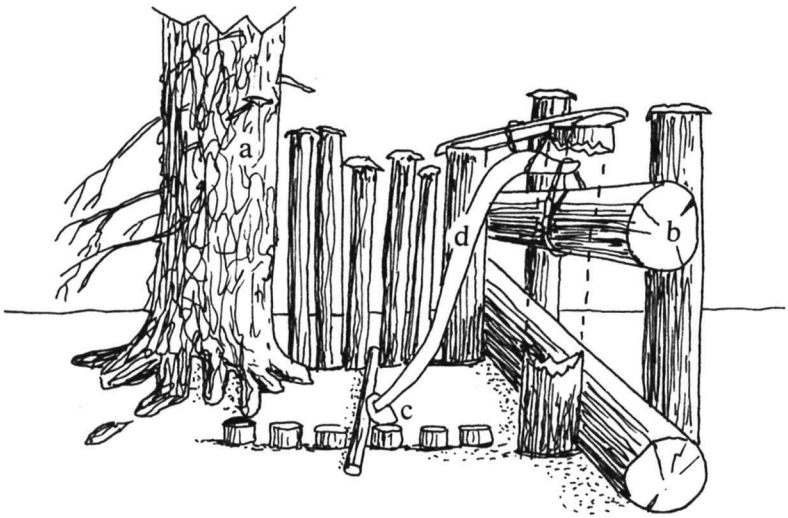


FIGURE 13. A MARTEN DEADFALL SET: *a*, SPRUCE TREE; *b*, "KILLER" LOG; *c*, BAIT; *d*, CROOKED ALDER WITH DIAMOND WILLOW LASHING (SEE APPENDIX B FOR TRIGGER ASSEMBLY DETAILS).

base camp. Each line would be checked on an average of once every three days.

Harvests of marten vary widely from one year to the next as marten populations fluctuate. Apparently, localized marten populations are prone to periodic shifts. An elderly trapper stated that marten will abandon an area for two or three years and then suddenly reappear. He attributed these shifts to rises and declines in local prey populations. This same informant felt that he would have a successful trapping season when he had caught 30 to 50 marten. Individual catches of 100 or more marten per season are possible in the Koyukuk region, but such catches are not common.

Koyukuk Athabaskans believe that if one sees a marten with a black streak in the middle of its face, then an early break-up will occur.

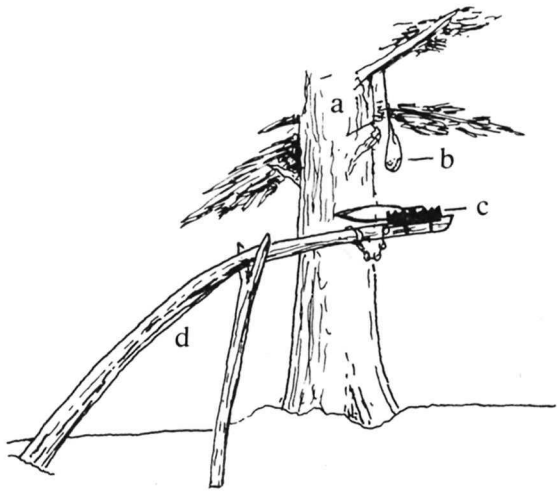


FIGURE 14. A MARTEN POLE SET: *a*, SPRUCE TREE; *b*, BAIT SUSPENDED OVER TRAP; *c*, TRAP SECURED TO POLE; *d*, WOOD POLE AND SUPPORT.

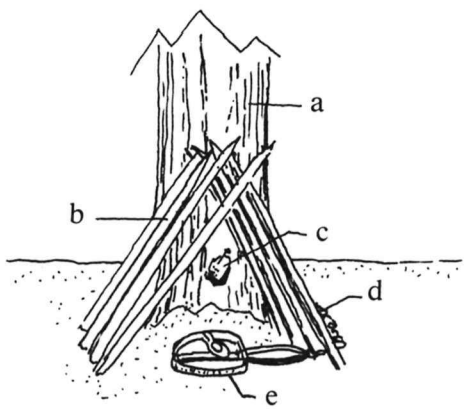


FIGURE 15. A MARTEN CUBBY SET: *a*, SPRUCE TREE; *b*, FRAMEWORK FOR CUBBY HOLE; *c*, BAIT TACKED TO TREE; *d*, TRAP CHAIN TACKED TO TREE; *e*, TRAP.

Ritualized treatment of marten includes the burning the carcasses. It is considered bad luck to allow a marten to lay and spoil in a trap. If this occurs, the trapper will develop sores on his hands and his children will develop draining ears. A marten found spoiled in a trap must be thoroughly burned. Women are not permitted to eat the flesh of marten, and men should not eat the tendons, liver, or heart of this predator.

Mink

Mink inhabit the marshy lowlands of the Koyukuk drainage, particularly the wide lake-dotted flats of the Dulbi River, Kanuti River, and the south fork of the Koyukuk. Mink populations become sparse rapidly as one ascends the upper tributaries of the Koyukuk. These small predators are found living along the cutbanks of lakes, creeks, and lake outlets. During the winter, mink trails are often seen following the edges of waterways or radiating out to muskrat houses in larger lakes. Apparently one of the major prey species for mink is blackfish, although they will also catch and eat small game species.

Koyukuk Natives consider the mink to be an industrious creature. One of the highest compliments one can pay to another person is to say he or she works "just like a mink."

Mink are harvested from November through February. Most are taken before the mid-winter snows make it difficult to find trails and set traps.

Prior to the availability of modern traps, Koyukuk people used small deadfalls and sinew snares to harvest mink. A somewhat smaller version of the marten deadfall would be placed on or near a mink runway baited with rotten fish. Spring pole snares were also suspended over runways. A small block of dry wood attached to the noose knot prevented the mink from biting through the sinew.

Presently mink are harvested with small steel traps such as the no. 1 Victor and small connibear traps. Traps are placed directly on run-

ways or at the openings to dens. A light covering of dry grass and dusting of snow is used to obscure traps.

According to one of the elder trappers in Hughes, mink were far more plentiful during the first half of this century than now. Catches of 100 mink were common for trappers in those days, and in 1952 one trapper caught 300 in a single season. Reportedly, the Department of Fish and Game began tagging mink in 1952. This made the mink angry to be hurt "for nothing" and they moved out of the area. It is believed that the decline in beaver was also caused by a government tagging operation.

Red Fox

Red fox and their two color variations (cross fox and silver fox) are found throughout all environmental zones of the Koyukuk region and Brooks Range highlands.

Koyukuk and Nunamiut people utilize fox for clothing trim and occasionally to manufacture parkas. The flesh is not eaten by Koyukuk Athabaskans, but is occasionally eaten by Nunamiut. Pelts are sold to commercial fur buyers.

Prior to European contact, fox were harvested through the use of deadfalls. Today they are taken with steel snares or no. 1½ leghold traps. Traps are often placed about the carcass of a wolf kill or pile of bones and meat scraps placed in an open area.

Chapter 5
TRAVEL AND TRAIL SYSTEMS

The arctic and subarctic interior of northern Alaska is an environment of very low productivity and diversity when compared with the more fertile temperate zones to the south. Vegetation experiences extremely slow growth rates, requiring ungulates and other herbivorous wildlife to move frequently in order to find suitable grazing and browsing. Predator species likewise must be highly mobile in order to follow their prey and distribute their exploitation so as not to decimate their food sources. Man may be considered the ultimate predator in this highly fluid scene, and he must also adapt to the need for mobility if he is to gain his livelihood from the natural environment.

Both the Koyukuk Athabaskans and Eskimos and the Nunamiut Eskimos have responded in various ways to the demand for mobility. Both groups continue to place a high value on the ability to move quickly and efficiently from one place to another while gaining the maximum use of the area traveled.

Mobility is directly and indirectly affected by such factors as weather, topography, vegetation, and technology. All must be given consideration when addressing the problem of mobility among the Native peoples of northcentral Alaska. For the purpose of efficiency, the discussion of travel methods is divided into two seasonal categories: winter and summer.

Winter Travel: Freeze-up to Break-up

Winter is the true essence of northern Alaska. For seven to eight months of the year the waterways are locked in ice, and snow covers the land except where the winds scour the unprotected earth. Temperatures may range from slightly above freezing to 80 degrees below zero F. The lowest temperature recorded by the writer during seven years of residing in the Koyukuk Valley was -82°F. Wind may accentuate the cold, driving its chilling factor to more than an equivalent of -100°F.

Winter both demands mobility and provides the environmental conditions required to attain it. Available wildlife populations drastically decline and become more scattered during the winter months. Migratory birds abandon the north country, edible vegetation is lost under snow and ice, and such game species as bears, marmot, ground squirrels, and beaver either hibernate or carry out their activities beneath the protective snow cover. Also, as winter progresses, the available wildlife usually undergoes physical deterioration, requiring a proportionately larger harvest than that of the summer and fall. However, as it limits and scatters resources, winter also solidifies the land and water and provides a lubricant, snow, to facilitate travel to these resources.

Clothing

The first item of importance to a winter traveler is clothing. Not only must clothing ward off low temperatures, but it also must not impede mobility. Although each group has met the need for functional clothing in different ways, both the Koyukuk Natives and the Anaktuvuk Eskimos have designed their clothing to be relatively light and loose fitting.

Traditionally the Koyukuk Athabaskans utilized tanned moosehide in the manufacture of most major clothing items. Tanned moosehide was light and it provided an excellent wind-break. Other

animal skins such as caribou, fox, and hare were also used, particularly for inner insulation clothing. Apparently the hooded parka was introduced into the Koyukuk by the Kobuk Eskimos and the Nunamiut Eskimos. The marten fur cap with large fur-lined ear flaps, a distinctive trademark of the Koyukuk Athabaskans, met the need for facial and head protection. Mittens of such fur as lynx, wolf, and moosehide usually had long gauntlets that overlapped the sleeves of a winter jacket.

The Nunamiut Eskimos used caribou hide for their clothing. They scraped the skins to a subtle softness rather than laboriously tanning them. Inner clothing was made often of light fawn skins. A pair of caribou skin breeches, hair out, extended to just below the knees. Skin boots with knee-high caribou leggings and bottoms of either bull caribou with the hair turned inward for very cold weather or seal skin for moist weather covered the feet. A hunter often wore two hooded parkas, an inner one of doe skin with the hair turned inward and a somewhat larger one with the hair facing outward. Facial ruffs for these parkas were often made of wolf, wolverine, and occasionally the neck skin of a bull caribou. Wrist-length mittens of caribou skin, dog skin, or wolf would protect the hands.

The traditional winter garb of the Natives of north-central Alaska has been altered significantly over the years and particularly during the past two decades. Most of the Koyukuk and Nunamiut people wear commercially manufactured parkas, usually of a quilted, down-filled material, although several older men of Anaktuvuk Pass continue to wear caribou skin parkas. Skin pants have largely been replaced by commercial, insulated overpants or quilted snowmachine coveralls. Virtually all underclothing is now cotton, wool, or other commercially purchased material. Mittens continue to be, for the most part, made locally along aboriginal designs using animal skins, although virtually all persons wear a pair of cotton gloves inside their mittens. Rubber-bottomed boots (shoepacs) with felt liners have made inroads into Native footwear, but most active men continue to rely on caribou skin boots among the Nunamiut or a moosehide-bottomed boot with canvas uppers among the Koyukuk people.

These boots are much warmer and lighter than commercial shoepacs, but shoepacs are superior in damp or wet conditions.

Weather Forecasting

Weather to subsistence-oriented persons is not just an interesting topic for conversation. It is a vital concern, and Natives of northcentral Alaska are constantly attuned to the slightest variation in weather conditions. One need only travel for a few days in a winter-locked arctic environment to understand how important a slight increase in wind velocity, a rise or drop in the air temperature, the clarity of the air, and a fall of fresh snow can be. All of these, and more, directly influence mobility, and may affect survival.

Weather in the northern interior and particularly within the mountains of the Brooks Range can be extremely localized. The writer has traveled through "weather alleys" of only a few miles in width where temperatures are 30 degrees (F) colder than surrounding areas, where winds may be rushing along at gale force while two miles away it is calm, or the snowfall may be double that of the adjacent land. Thus, it is possible for an unsuspecting winter traveler to leave home on what appears to be an excellent day and within several miles find himself in severe weather conditions.

Cloud cover is one of the first weather signs noted by a traveler. A cloud formation known commonly as "mares' tails," or *gayagua* by Eskimos, is an indication of strong winds aloft and Natives know such formations usually foretell strong surface winds within 24 hours. Clouds forming along one side of mountain peaks are also the sign of approaching gale winds. Heavy, dark clouds, especially on the western or southern horizons, are usually a sign of an approaching snowstorm. A high, thin overcast with light precipitation is an indication of continuing stable weather, although this condition may produce a "white-out," making travel difficult.

A particular type of precipitation referred to as "devil snow" by Koyukuk Natives often occurs at the onset of a particularly intense

spell of cold weather. It is not a true snow for it may filter out of a cloudless sky. Rather, it is fine ice crystals formed when a layer of intense cold air slips over a layer of warmer air. The moisture in the warmer air precipitates out as frost. Very little or no wind occurs during such precipitation and the "devil snow" may accumulate to an inch or more in depth. Temperatures of -65° to -70°F usually follow such a snowfall and these temperatures will often persist for several days.

While not actually caused by a cloud cover, an approaching storm is often foretold by a softening of the horizon or a reduced sharpness of the contours of the mountains. Suspended ice crystals and wind-stirred snow dust usually precede a storm by several hours, allowing an alert traveler to begin seeking suitable shelter before it arrives.

Suspended ice crystals also result in "sun dogs" and rings of haloed light around the moon. Sun dogs, after a spell of relatively mild weather, are interpreted as the beginning of intense cold. A haloed moon will often signal the approach of a snowstorm.

When a snowstorm has been raging for several days and a sudden clearing trend is noted on the southern horizon, Koyukuk Natives usually expect several more days of bad weather to follow. However, if clearing begins along the western or northern horizon, a general improvement is expected.

Wind is a prime concern to Native winter travelers; it can and does increase tremendously the severity of cold temperatures. It also causes white-outs which obscure obstacles, depressions, and other travel hazards. In areas of deep uncompacted snow, wind will cause drifting, thus obliterating a packed trail.

Both the Nunamiut and Koyukuk people have learned where particularly intense winds occur. Specific areas in the Nunamiut country known for "wind tunnels" are:

1) The upper John River below the village of Anaktuvuk Pass—subject to strong north winds;
2) The Chandalar Valley—subject to northerly gales;
3) The Killik Valley—subject to strong southerly gales; and
4) Howard Pass—subject to particularly violent northerly gales.

Within the subsistence range of the Koyukon, there are also locations noted for wind:

1) Dakli Pass to the upper Selawik—subject to chilling westerly gales;
2) The Koyukuk River approximately 15 miles south of Hughes—subject to prolonged strong north winds;
3) Indian Mountain—subject to sudden severe northeasterly gales;
4) Red Mountain area on the Koyukuk River north of Hughes—subject to particularly strong north winds;
5) Lower John River from Sheep Creek down to Timber Creek—subject to prolonged north winds.

A Native expecting to travel into and through these areas is alert for plumes of snow blowing off mountain tops, increasing haze, and other indications of a possible change in weather. He plans his activities accordingly.

The danger of strong winds cannot be over-emphasized. The writer and his wife were once traveling by dogteam between the villages of Hughes and Huslia. A gale force north wind arose approximately 25 miles south of Hughes causing, at one point, the sled, dogs, and riders to be whipped out of control and blown across a sheet of thin glare ice covering a particularly turbulent stretch of water. The entire assemblage narrowly escaped breaking through and being swept under the river ice. The sled was continuously tipping over, making progress extremely laborious.

The major factor of an arctic and subarctic winter is the coldness; all other elements revolve about the temperature. Periods of intense cold may occur anytime between the end of October and the beginning of April, but mid- and late winter usually register the lowest air temperatures. During the winter of 1971, in the village of Hughes, there were 37 days between the first of January and the end of March in which the temperature dropped below -40°F. Nineteen of these days occurred in successive order and temperatures from -60°F to -82°F occurred on 13 of these days. The village of Allakaket, some 60 miles north, was colder for a considerably longer span of time during this same winter.

As the temperatures descend below -30°F, travel becomes increasingly uncomfortable and difficult. Wildlife movements are greatly reduced during cold spells, so trapping is generally unprofitable. Snowmachines, chainsaws, and other machines become very difficult to operate in the intense cold, and metal becomes brittle. The threat of personal injuries through frostbite, exposure, or complications from other accidental injuries increases as the temperatures plunge.

Generally speaking, most surface travel of any distance is greatly reduced when temperatures drop below -35°F. Most outdoor activity is of short duration and usually relates to the necessities of obtaining fuel or perhaps traveling a short distance to retrieve a cache of food.

From several years of traveling with both Koyukuk Natives and Eskimos of western and northern Alaska, it was found that the most preferred temperature range for surface travel was between +15°F and -20°F. Below this range, travel was increasingly uncomfortable, and above it, river ice tended to become weaker, dogs and machines tended to overheat, and the snow cover would begin to soften.

Surface Conditions

When discussing the surface conditions of the study area, one must address two basic environmental zones: (1) the boreal forested taiga of the Koyukuk Valley and its several northern drainages and (2) the open tundra of the northern Brooks Range and northern foothills. Each has its own unique mixture of environmental properties that produces surface conditions characteristic of the area. One must also address the two forms of water which dominate the winter landscape: snow and ice.

Snow Conditions Affecting Winter Travel

Snow is winter's whitewash of a frozen land. To the inexperienced person this cover has a simple uniform appearance, but the experienced winter traveler knows that the snow cover is anything but

uniform. Both laterally and vertically, snow has a variety of physical properties which stem from a host of environmental variables. Each type of snow has an effect on surface travel, and the traveler is forced to adjust to each to remain efficiently mobile. Table 3 summarizes several important conditions of snow, where and when they occur, and the effect they have on the winter traveler.

Ice Conditions Affecting Winter Travel

Ice is the pavement that makes rivers and lakes the highways of winter surface travel. This surface, however, is not uniform and winter travelers must be aware of many variables that will affect the conditions of ice. Table 4 describes a few of the ice conditions which directly affect winter travel.

Winter Surface Travel

Winter surface travel is by foot, snowmachine, or dogteam. Foot travel usually requires the use of snowshoes, except that Anaktuvuk people have access to areas where they can travel without the aid of snowshoes.

Snowshoes

Both the Nunamiut and Koyukon have historically depended upon the use of snowshoes to traverse areas of deep soft snow. Both groups manufactured their own snowshoes until recent years. The Athabaskan Indians of the Koyukuk Valley continue to construct excellent lightweight snowshoes, although the number of active craftsmen has declined. The Anaktuvuk Eskimos now purchase their snowshoes through retail outlets in Fairbanks or Anchorage, or through catalog companies.

A well-made pair of Koyukuk snowshoes can best be described as functional art. A small, sharp-toed, trail snowshoe used for walking behind a dog team has gone out of use, and all current snowshoes

TABLE 3. SNOW CONDITIONS AFFECTING SURFACE TRANSPORTATION

Type	Place/Time of Occurrence	Specific Location	Effects
Fresh-fallen powder			Makes dog team travel difficult; snow machines may bog down
Wind-packed snow *siḷḷiq, sitliq**	Occurs in areas of sparse vegetation cover and where strong winds are prevalent	North Brooks Range	Will usually support several hundred pounds; excellent for surface travel
Rough snow *qayukłaq**	Occurs in areas of wind-packed snow		Dog sleds are slightly affected; snowmachines much more so
Granular snow *pukak**	Usually occurs under soft snow or wind-packed crust; can be exposed in open, windy areas		Dogs, men, machines, and sleds lose traction, slip, and become bogged down
Deep soft snow	Is found in moderate amounts in wind-sheltered valleys	Southern slopes of Brooks Range; Koyukuk Valley	Arduous snowshoeing necessary to break new trails if snow depth exceeds 2 feet
Ground drift *natiġviksuq**	Is fine granular snow blown along the surface		With strong winds, travel can be very uncomfortable
Icy crusted snow	Occurs whenever temperatures rise above freezing and/or rain occurs		Causes rapid wearing of snowshoes and will cut the feet and legs of sled dogs; snowmachines are less affected
Frost crystals "devil snow"	Occurs during extremely low temperatures; the crystals may accumulate to 3 inches deep	Mostly Koyukuk Valley; rare in the highlands of the Brooks Range	Produces severe drag on sled runners; creates sore feet for dogs; any wind will quickly dissipate this frost
Snow cornice *mapsaq**	Occurs whenever windblown snow is carried over a sharp embankment	A serious concern in the Brooks Range; less so in the Koyukuk Valley	May begin a general snow avalanche
Melting snow *auksałaq**	Occurs primarily in late spring		Severely retards travel; huskies develop sore feet; shoe webbing soaks, snowmachine tracks pack with heavy wet snow

*Inupiaq Eskimo synonym(s)

TABLE 4. ICE CONDITIONS AFFECTING SURFACE TRANSPORTATION

Type	Place/Time of Occurrence	Specific Location	Effects
Thin ice *maptugitchuq**	Is most common in the fall just after freeze-up; occurs over upwelling water, turbulent riffles or strong currents, or where snow or animals or warm temperatures retard freezing	Over any water, local residents know probable specific locations	May break under a traveler's weight, causing him to fall into freezing water
Hollow ice	Occurs when a stream level drops after initial freezing then freezes again	Mountain streams; Koyukuk lowlands	May break under a traveler's weight
Glare ice	Is found where strong winds sweep away snow cover or where water overflows, causing "glaciering"	A few scattered areas in the Koyukuk Valley; very common in the highlands of the Brooks Range	Difficult for dogs and machines; dogs and men are prone to sprain muscles while slipping or skidding on these areas
Rotten ice "needle ice" *auniq**	Occurs during the spring when the snow cover melts away and the ice is exposed to direct sunlight		Extremely abrasive, will quickly wear through the foot pads of dogs; if a traveler falls into this ice, pulling himself out is very difficult as the ice will continue to crumble
Overflow *siiqsinniq**	Occurs when water is subjected to pressure, and it flows through cracks in the ice and onto the surface; can occur at extremely low temperatures	A particular concern in the main Koyukuk Valley	May soak footgear and other clothing, risking freezing; snowmachines may become completely inoperable when traversing an extensive overflow
Bare earth *nuna**	Windswept highlands and north-south valleys where the snow-cover is thin or virtually absent	Major concern in the highlands of the Brooks Range; less so on the southern slopes of the Brooks Range and main Koyukuk Valley	Snowmachines are severely pounded and jarred, sled runners drag and are worn away, dogs' feet are cut and bruised by sharp rocks

*Inupiaq Eskimo synonym

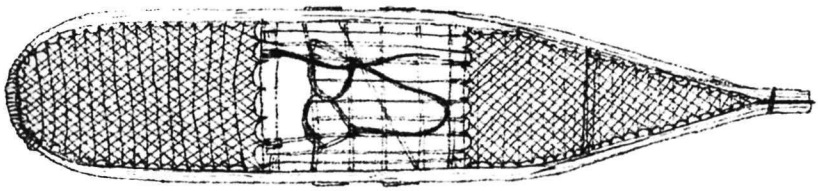


FIGURE 16. A KOYUKON SNOWSHOE.

conform to the round-toed elongated model. Such snowshoes may vary in length from 48 inches for women and children up to 60 inches for cross-country hunting in deep snow; widths range from 9 inches to 11 inches. The snowshoe frame is constructed from two, long, thin pieces of birchwood bent both laterally and vertically to overlap at an upswept rounded bow. The two pieces are joined at the back to form a long tapering tail. Three lateral cross-pieces are morticed between the outside frame roughly dividing the interior of the snowshoe into quarters (¼s). The toe and heel sections are filled with a fine mesh webbing of caribou rawhide. The section on which the foot rests is filled with a wide mesh webbing of heavy caribou or moose skin rawhide.

The Koyukuk Athabaskans have developed a very functional and simple binding for attaching the snowshoe to the foot. It consists of a single strand of tanned moose hide roughly 1½ inches wide by approximately 30 inches long. Wearing a pair of soft-soled moosehide boots, a Koyukuk traveler can rapidly kick into or out of

FIGURE 17. A KOYUKON SNOWSHOE WITH THE BOOT HARNESS IN USE.

this harness without bending over. If one falls through thin ice while wearing snowshoes this quick release feature can be a life saver.

Well into the middle decade of this century, Koyukuk adults spent a major part of the winter walking on snowshoes. They often hunted moose and caribou on foot, and men on snowshoes established and maintained trails for dogteams. Traplines and snare lines were run by both men and women wearing snowshoes. Even when traveling by dogteam, people usually walked on snowshoes to reduce the sled load and help break trail for their teams. Without the development of the snowshoe, it is doubtful that aboriginal man could have successfully inhabited and exploited the winter environment of the interior subarctic.

The introduction of modern snowmachines has resulted in a decreased use of snowshoes, but all serious winter travelers in the Koyukuk Valley continue to consider snowshoes as an essential part of their working and traveling equipment. When the snow is deep and soft, even snowmachines must have a trail packed for them. Trappers still require snowshoes to make their sets, and hunters must occasionally track their prey through heavy brush.

The modern snowmachine is capable of traveling on top of a snow crust that will not support a human. This often leads to carelessness on the part of young men when they fail to carry a pair of snowshoes on their travels. Breakdowns can and have occurred many miles from a shelter, leaving the driver to struggle in waist-deep snow until help arrives. Older, more experienced men say that being without snowshoes in the winter is like being crippled.

The Anaktuvuk Eskimos also use snowshoes but are considerably less reliant upon them than their neighbors to the south. The land they exploit is usually open tundra or sparsely forested taiga. Relatively light snowfall and wind action keep much of their range either covered with windpacked snow or exposed.

Dog Teams

The husky (*qipmiq* in Inupiaq Eskimo, *ɬeek* in Koyukon Athabaskan) has tremendously influenced the cultural development and subsistence ability of both the Athabaskan inhabitants of the

Koyukuk Valley and the Nunamiut of the central Brooks Range. When dogs assisted or replaced humans in drawing sleds and toboggans, it freed these persons to engage in other activities.

Prior to the 1920s, the average dog team was 3 or 4 dogs, both for the Nunamiut and Koyukuk people. During the 1920s and 1930s, the demand for wild furs led trappers to acquire larger dog teams so as to exploit larger trapping territories. The farther and faster a man could travel, the more furs he could harvest. Furs meant money, and money purchased the imported goods that became necessary to an improved standard of living. Particularly active trappers were known to have teams in excess of 15 dogs.

The decline of the fur market did not result in a significant reduction in the number of dog team members. As Native families congregated in settlements and abandoned their nomadic lifestyle, competition for local resources increased. Large dog teams continued to be necessary to reach and harvest untapped resources such as available fuel, game, and furs.

With the advent of snowmachines, the use of dog teams virtually disappeared. Men sold their dogs to distant dog team racers to acquire money to purchase snowmachines. Non-racing dogs were often shot or simply left unused and chained to a post. Harnesses rotted. On the Koyukuk many fish camps fell into disuse as it was no longer necessary to dry large numbers of salmon to feed teams of sledge dogs. When the writer and his wife arrived in Huslia in 1967, the use of dogs for practical work and travel had declined to one team of seven dogs. A much larger kennel of racing dogs was maintained by a local man, but these dogs were not used in subsistence-type activities. The villages of Hughes, Allakaket, Alatna, and Bettles had also experienced similar declines in sled dogs, although Allakaket retained a larger number of dogs than the other communities. The village of Anaktuvuk apparently experienced their decline in sled dogs somewhat later, during the late 1960s and early 1970s, with the decline perhaps even more drastic than along the Koyukuk.

During the late 1960s, a growing interest in sledge dogs developed among the residents of the Koyukuk Valley. This was in large

measure due to an increase in village celebrations which included competitive dog team racing. Local non-Native school teachers also developed dog teams, lending some status to their use. The disadvantages of using snowmachines (initial high cost, difficulty in obtaining repair parts, rapidly increasing price of fuel, and other problems) led some men to re-evaluate the use of sled dogs.

By the fall of 1976, dog teams had once again become common in the villages of Huslia, Hughes, Allakaket, and Alatna. While most teams would be categorized as "racing teams," several men were using their dogs for hauling fuel wood and traveling around their traplines. Practical subsistence use of dogs was particularly common in the villages of Hughes and Allakaket.

The use of sled dogs has all but disappeared as an element of the Anaktuvuk subsistence economy. One man is presently training a team of dogs but does not rely on it for hunting, trapping, or hauling fuel. A school teacher also has a team for recreational purposes. Most village families have one or more huskies tied near their homes, but these are rarely if ever used. Small, non-husky pet dogs are very common in Anaktuvuk.

It should be recognized that the term "husky" does not limit itself to a narrow set of physical standards. A sled dog may be rangy or compact. It may weigh anywhere from 35 pounds to over 100 pounds. Its hair may be long and shaggy or relatively short and close-packed; its color may be black, white, rust, spotted, blond, and any shade of these colors.

While villages were still relatively isolated and dogs were the primary source of winter surface transportation, strains of huskies with characteristics distinct to a limited area were developed. However, with the increase in travel, the decline in dog use, and the emphasis on light-boned racing type dogs, these strains have been significantly modified or lost. The increase in non-husky pet dogs in the villages has led to considerable cross-breeding.

Today the sled dogs of the Koyukuk River are generally light-boned rangy dogs with relatively short coats. Most adult huskies range from 40 to 55 pounds. Large, heavy dogs are not favored as they are generally slower than the lighter dogs. The few remaining

sled dogs in Anaktuvuk Pass seem to be heavier and stockier than Koyukuk River dogs.

People unfamiliar with dog teams are often surprised at the ability of huskies to move heavy loads and travel long distances. The true practical value of sled dogs is basically determined by the amount of weight they are able to pull and the distance they can travel in a given length of time. Both of these criteria include such factors as endurance, stamina, and speed. During the author's residence in the Eskimo community of Wainwright in 1963, Native teams of seven dogs were observed hauling a total weight of 1,780 pounds for a distance of 1 (one) mile at a speed of roughly 2½ miles per hour. These teams would make three or four trips each day hauling ice, bringing the proportion of weight carried per dog to an average of 254 pounds. Such loads, however, are practical only for short distances. Teams of nine to eleven dogs have also been observed pulling a load of approximately 560 pounds and traveling 100 miles in two days. From these and other observations, it was concluded that an average working husky (65 to 70 pounds) could pull 100 pounds for a distance of 50 miles in 9 to 12 hours providing that the trail was relatively smooth, packed, and level. Thus a team of ten dogs in good condition should be able to transport a sled load of 1,000 pounds up to 50 miles in one day depending upon trail and weather conditions. During the winter of 1975, two men traveled via dog team the 80 miles or more of winter trail between Hughes and Huslia in one day (see also Anderson, et al. 1977:485).

While sledge dogs historically provided Native peoples with a system of transportation well adapted to their arctic and subarctic environment, sledge dogs have also placed a burden upon their owners. The dogs must be fed, and they consume considerable food in order to meet the demands of pulling and combatting environmental stresses. How much food a working husky requires depends upon such variables as the size and physical condition of the dog, weather, available shelter, and the work being performed. The writer found that a team of eleven huskies of medium size (65 to 80 pounds) pulling a sled load of approximately 500 pounds across varying arctic and subarctic terrain with temperatures ranging from -70°F to +10°F

consumed an average of 30 pounds of frozen whitefish and 1 pound of tallow each day. A 50-pound bag of commercial dog food would feed this team for approximately three days as long as it was supplemented with a daily total of 1 pound of tallow. When fed dried salmon, each dog would consume an entire salmon plus tallow each day. These and other observations indicate that a working sled dog will consume between 2 and 5 pounds of food per day. Thus a team of ten huskies may consume between 20 to 50 pounds of food per day.

The Koyukuk Natives rely primarily on fish to feed their dogs. Salmon are netted and dried during the summer months. In the fall, the villagers of Hughes and Allakaket engage in seining to harvest rich runs of whitefish. These fish are allowed to freeze for winter use. Both dry and frozen fish are usually cooked in large tubs of water and served as a warm soup to the dogs. Some moose meat, caribou flesh, and table scraps are also fed to the dogs.

As fish are not plentiful and are difficult to obtain in the Anaktuvuk area, the Eskimos sustain their dogs on caribou, the same basic diet they utilize themselves. When dog teams were still the primary method of winter transportation, men were forced to shoot scores of caribou to maintain them. The writer has seen a team of nine huskies devour an adult bull caribou in three days without any sign of overfeeding. Just to feed his dogs, the Nunamiut hunter of a decade ago would harvest an estimated 50 to 70 caribou. Sheep, moose, and small game supplemented this canine diet of caribou.

Huskies can and do subsist on the intestines, bones, and less desirable parts of animals taken primarily for human consumption. During the summer months, Koyukuk River dogs are usually fed on the boiled intestines and heads of salmon that have been netted and cut for drying. Both the Nunamiut and Koyukuk people have used the internal parts of caribou, moose, waterfowl, ptarmigan, and other game to feed their dogs. Most homes keep a "slop bucket" into which all food scraps are thrown to be later used as dog food. Thus, to a certain extent, the utilization of sled dogs helps to reduce wastage of wildlife resources by partially fueling the means of surface transportation.

In summary, the future of the dog team in the study area is uncertain. During the early-to-mid 1960s, it appeared that the sled dog as a practical element in the overall subsistence economy was doomed to extinction. An increasing material standard of living, a greater focus on obtaining wage employment, a general shift away from such seasonal activities as living in fish camps and trapping camps, and the introduction of the versatile snowmachine coupled with a relatively cheap supply of fuel all led to the virtual abandonment of the husky as a work animal.

Over the past decade, however, the dog team has made a substantial comeback in the villages of the Koyukuk Valley, although it is definitely secondary to the snowmachine. The causes of this comeback include an emphasis on dog team racing and the status gained from such racing, the rapid increase in the cost of both snowmachines and gasoline, a general resurgence of interest in traditional Native life by the young, the availability of a cheap, easily obtained food supply for dogs, and the recognition that the dog team is more dependable and adaptable to certain environmental demands than is the present-day snowmachine. Several Native families see the value of keeping dogs as security against an uncertain future in the availability of fuel and machines.

Even with these advantages, it is doubtful that the dog team will eclipse the snowmachine as the primary vehicle for winter surface transportation. Within the Koyukuk region, sled dogs will continue to serve primarily as a "back-up" for snowmachines and as a source of recreation. However, if current fuel prices increase by a factor of two or three, or if fuel rationing becomes a reality, then there is a good possibility that dog team use would, to a certain degree, regain its place as the primary method of winter transportation.

When compared to the dog teams in the Koyukuk Valley, those of Anaktuvuk do not seem to have a promising future. There is little apparent interest in sled dogs at present. The Anaktuvuk Eskimos lack a plentiful supply of fish for feeding dogs, and the feeding of dogs on caribou is now forbidden by state game laws. To maintain dogs it would be necessary to import commercial dog food. A team of five to seven dogs would then likely cost as much as a

snowmachine to maintain, and it is unlikely that the Anaktuvuk people would willingly exchange their snowmachines for dog teams.

Dog teams are currently being used by two non-Native trappers in the John River valley. One man uses five dogs, while the other drives a team of seven. Both men use locally caught fish and imported commercial feed to keep their dogs. A trapper living near Bettles is presently raising huskies with the express purpose of using them to travel his trapline. A non-Native storeowner in Bettles uses a team of huskies to haul fuel and to offer winter wilderness trips to persons interested in traveling in the Brooks Range.

Snowmachines

The snowmachine is the dominant means of winter surface transportation in northern rural Alaska today. Within the study area, virtually every village household with an active adult male engaged in some aspect of subsistence has access to at least one or more snowmachines. Snowmachines are used for hunting, trapping, hauling fuel, hauling garbage to the dump, going to the store, traveling to visit relatives in a distant village, hauling ice and drinking water from a freshwater lake, meeting the mail plane, and other, similar tasks. Men, women, and children may be seen operating snowmachines in the villages.

Snowmachines vary in size, horsepower, and expense ranging from approximately 1,200 dollars for the lighter models to over 3,000 dollars for the larger high-horsepower machines. The cost of delivering a machine to a village averages about 180 dollars. A new 25- to 30-horsepower machine delivered to Anaktuvuk would cost approximately 2,200 dollars. Fuel costs an average of 2 dollars per gallon, and a machine will travel between 2 and 10 miles on each gallon of fuel. Men who actively use their machines have been known to consume over seven 55-gallon drums of gasoline per winter (385 gallons) or roughly 750 dollars worth of fuel. Repair and maintenance parts for a machine (spark plugs, drive belts, replacements for worn skiis, new cleats, and other accessories) may cost between 250 and 300 dollars or more each year. Under the work and travel demands placed on snowmachines in a village, few operate more than three

years, and many last less than two years. Thus, the snowmachine has become one of the major expenses for most rural Native families in the study area.

Prior to the introduction of snowmachines, the burden of maintaining the winter transportation system along the Koyukuk was borne primarily by the women. Women spent the summers catching and drying salmon for the winter's dog food. The village men sought wage employment in such seasonal work as firefighting, being crew members on the river barges, laboring in the mines, or doing construction work in Fairbanks. The cash earned by these men went to supplement trapping incomes for the purchase of clothing, store food, guns, outboard motors, and other necessities. Today the burden of providing for winter transportation has been shifted from the resource harvesting activities of the females to the wage earning efforts of the males.

The shift from dog teams to snowmachines has led to shifts in environmental exploitation. Steep mountain passes that were negotiable by dog team are now avoided in favor of more gentle terrain. Winter trails now avoid areas where overflow is frequent. Once snow depths exceed 2 feet or more, men are hesitant to "snowshoe out" new trails, as breaking trails for snowmachines is usually more difficult than it is for a dog team. Due to the wind chill factor and the reluctance of motors to operate in low temperatures, most men rarely run their machines in temperatures below -40°F.

Travel on foot has decreased also, making the pursuit of game more prevalent. Intense utilization of terrain and resources within a few miles of each village has occurred as more people have acquired access to machines. Team hunting and travel have increased, as it is safer to travel with more than one machine in case of mechanical breakdown.

The use of snowmachines has also resulted in a certain degree of breakdown in communication between generations. Prior to snowmachine use, young men commonly traveled with their fathers or other older men via dog team. The relative quiet and slow pace of such travel encouraged communication, allowing the young man to ask questions and the older one to transmit knowledge and skills

relating to the environment. Thus knowledge accumulated over many generations was passed from the old to the young. Presently, the traditional lines of communication have been short-circuited by the introduction of modern technology. Speed, noise, and distance separate the driver of a snowmachine from his passenger who may be riding the sled behind him. There can be only minimal commmunication while the machine is moving.

Money is the transportation equalizer of today. A youth with the necessary cash can purchase transportation equal or superior to any adult; he does not have to go through the long process of acquiring a dog team and learning the skills involved in its use. This freedom and the independence from relying on older village men discourage the transfer of traditional environmental knowledge, skills, and attitudes.

Rural villagers have adopted the snowmachine and incorporated it into their lifestyle. In a surprisingly short span of time, they became heavily dependent upon snowmachines for virtually all activities involving winter surface travel. They have been willing to expend a substantial portion of their cash incomes to purchase machines and fuel, and rising prices have not yet deterred their usage. All indications are that given present local trends, the use of snowmachines in rural villages will continue to increase as will the dependence upon cash-generating activities and the demand for improved lines of communication and transportation between urban supply centers and rural communities. Of course, the snowmachine is only one of the influences (although an important one) which is developing stronger dependence ties with urban areas. Table 5 (previously published in Anderson et al. 1977) is designed to display the relative characteristics and capabilities of the dog team and snowmachine.

Sleds

Whether traveling via dog team or snowmachine, the winter traveler is dependent upon some sort of sled to carry his supplies and to transport the resources he harvests from the environment. Within

TABLE 5. SNOWMACHINE AND DOG TEAM COMPARISONS

	Dog Team (up to 10 dogs per team)	Snowmachine (up to 40 hp)
Purchase price	Usually obtained through breeding. Adult husky: $30-$60. Lead dog: $75-$500	$1,200-$2,000 including freight
Required accessories	Sled, harnesses, lines, snow hook, brake, snaps, chains, dog pans	Sled, hitch, spark plugs, drive belts, tools
Fuel	Fish, tallow, caribou, oats, rice, commercial food	Gasoline and oil
Fuel consumption	2-16 lbs. of food per dog; 10 dogs: 20-60 lbs. food per day (computed as "wet" weight not dry weight)	5-10 miles per gallon depending on horsepower, load, trail conditions, and speed; may use 3-8 gallons per day when actively hunting and traveling
Replacements and repair parts	Purchase or breed for new pups; young dogs of minimal use until 1 year old	Purchase directly from local or distant outlets
Average speed	4-9 mph, 5 mph for distances up to 50 miles with medium load and good trails	15-20 mph with medium load and good trail
Top speed	15-25 mph with light load; only trained racing teams can sustain such speeds beyond 2 miles	10-50 mph; can sustain high speeds for duration of fuel, but high speeds increase possibility of machine or human injury
Weight-pulling ability	Up to 2000 lbs. for distances less than 5 miles depending on trail conditions; deep soft snow drastically reduces possible loads; dogs have advantage of excellent traction	Up to 1000 lbs. for indefinite distance providing that the machine can be started, traction is good, and trail is smooth and level; snowmachines will "spin-out" or wear out belts with extreme loads in loose snow or on steep hills
Adverse environmental conditions affecting use	Deep soft snow, thin crusted snow, warm temperatures, glare ice, high winds, weak ice	Overflow, white outs, strong winds, severe cold, steep hills, glare ice, weak ice
Care when not not in use	Requires constant feeding and care	Requires little or no care

(continued)

Table 5 *(continued)*

	Dog Team (up to 10 dogs per team)	Snowmachine (up to 40 hp)
Possible travel distance in one day at average speed	50-100 miles with medium to light loads (long trips usually limited to less than 70 miles in one day)	200-300 miles (long trips usually limited to less than 150 miles per day)
General dependability	Generally very dependable within physical limits	Generally dependable for first year and decreasing dependability thereafter
Average service life	9-11 years	2-4 years
General strong points	Dependability, may be fed from local resources, self-producing, long service life, may be eaten or fed to other dogs in emergency situations	Fast, not subject to tiring, covers long distances, requires no care in summer, handling skills easy to acquire, highly maneuverable, may be replaced through simple purchase
General weak points	Subject to diseases and injuries, may run away, requires care when not in use, must be trained, possible fighting, relatively slow, requires considerable fishing and hunting to feed, becomes bored and difficult to handle if continuously driven on same trails for long periods of time	Subject to unpredictable breakdowns, difficult to handle in overflow or spinouts in deep snow, difficult to obtain spare parts, expensive to purchase and operate, relatively short service life, dependent upon nonlocal sources for materials and fuel, relatively high occurrence of human injuries

the study area, there are four basic styles of winter sleds currently in use: the basket sled, the Yukon sled, the scow sled, and the toboggan.

Basket sleds are used throughout the study area, but they are secondary to scow sleds in Anaktuvuk. All basket sleds in use along the Koyukuk River, with a few rare exceptions, are constructed by village men from locally harvested birch. These sleds vary in size and weight according to the use for which they are intended. Work or freighting sleds may be up to 14 feet long and have an outside width of 28 inches and an inner basket width of 22 inches. Racing sleds may have a total runner length of 6 feet, a basket length of 3 feet, and an

outside width of 20 inches. Sleds designed to be hauled behind a snowmachine are generally heavier and broader than dog sleds and they are equipped with a metal hitch to attach to the rear of the machine.

Basket sled runners may be shoed with steel, plastic, or be left bare according to the weather or use of the sled. Steel is preferred for wet snow, exposed gravel and earth, and year-round use behind snowmachines. Plastic, a recent introduction, is used on racing sleds and light working sleds pulled by dogs. Plastic is usually used in "middle" temperatures (+ 10° to -20°F). Bare runners are preferred for intense cold (-30° to -60°F).

Prior to the use of snowmachines, "gee poles" were commonly used to steer heavily loaded sleds. A gee pole was simply a long spruce pole lashed to the right side of the sled so that it projected at a slight angle upward beyond the sled's bow. A man would either ride a pair of short skiis attached to the tow line of dogs or run along on snowshoes while holding the pole and guiding the progress of the sled. The use of gee poles has all but disappeared with the shift to snowmachines.

The Yukon sled, a crude version of the basket sled, is designed for hauling heavy loads of freight such as logs, frozen meat, and other materials. Its stanchions are blocks of wood bolted to broad runners. No railing or handlebars project above the bed slats. This style of sled is still quite common on the Koyukuk but is not used by the Anaktuvuk Eskimos.

At one time Yukon sleds were pulled by dogs while being steered with a gee pole by the driver. During the winter of 1975/76, two such

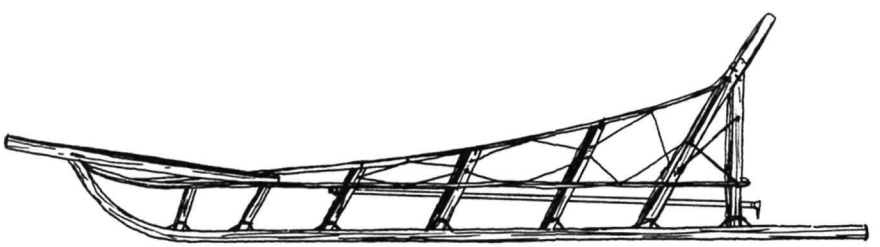


FIGURE 18. A BASKET SLED.

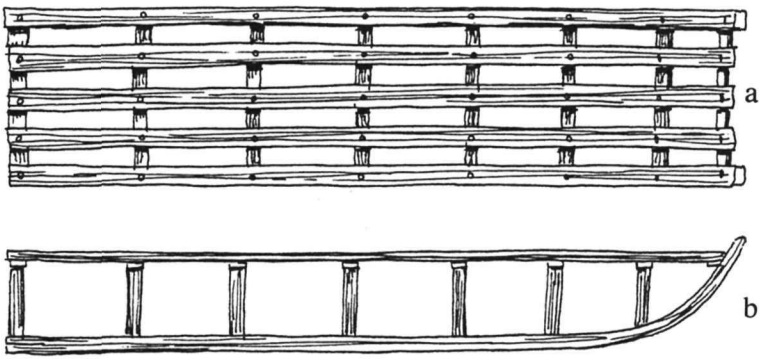


FIGURE 19. A YUKON SLED: *a*, TOP VIEW; *b*, SIDE VIEW.

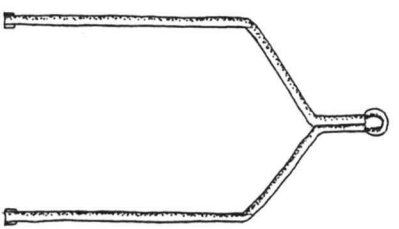


FIGURE 20. ONE TYPE OF METAL HITCH.

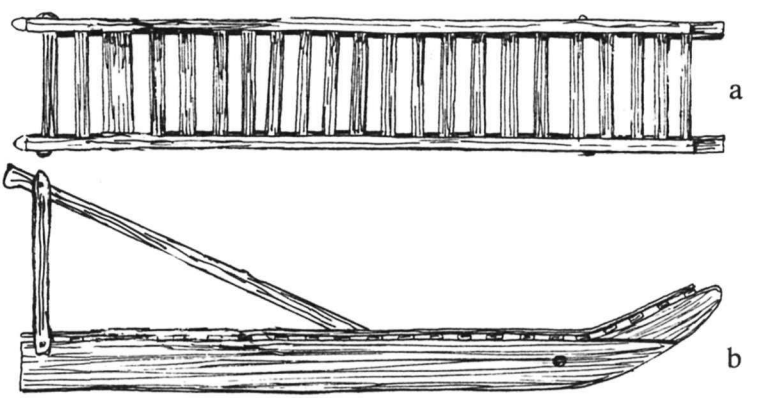


FIGURE 21. A SCOW SLED: *a*, TOP VIEW; *b*, SIDE VIEW.

sleds were used by men of Hughes for hauling firewood with dog teams. Most Yukon sleds of today are equipped with metal hitches and hauled behind a snowmachine.

Scow sleds consist of two plank runners with a bed of cross slats nailed across the top of the runners. When designed for passenger use, handlebars are placed at the rear.

Scow sleds are used primarily in Anaktuvuk, although two exist as wood-hauling sleds in Bettles. This simple sled design has not been adopted by the majority of Koyukuk villagers, as it is not well suited for use in deep soft snow.

Until recently, Anaktuvuk Eskimos would travel south into the treeline to harvest spruce logs for sled parts. When possible, straight-grained drift logs with the root base attached were split and sawed into planks roughly 2 inches thick, 6 to 3 inches wide, and 8 to 12 feet long. Boards were also made to be used as the bed of the sled. A few sleds made from locally harvested spruce continue to be used by Anaktuvuk Eskimos, but most new sleds are made of imported precut spruce planks. These sleds are usually shoed with steel runners necessary to withstand the abrasion of exposed rock and gravel.

Scow sleds have been adapted to use with snowmachines by making them wider (24 to 30 inches), somewhat shorter, and without railings and handlebars. These sleds are towed on a long line behind the snowmachine.

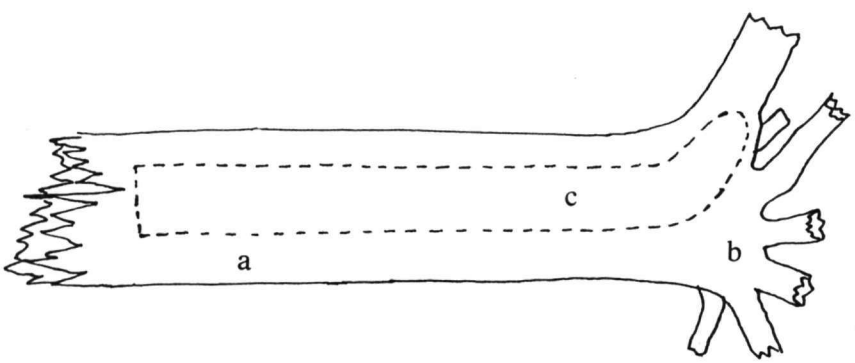


FIGURE 22. A SPRUCE LOG USED FOR SLED PARTS: *a*, TREE TRUNK; *b*, ROOTS, *c*, OUTLINE OF SLED PLANK.

Shelter

To exploit the scattered resources of their winter-locked environments, the Koyukuk and Anaktuvuk people must be willing and able to spend considerable time beyond the protective confines of their villages. To do so requires techniques for obtaining shelter and comfort without compromising mobility.

Permanent and semi-permanent shelters have been used by both the Koyukuk people and the Nunamiut of Anaktuvuk. When a man plans to make frequent use of a given area over a period of years for hunting and/or trapping he will often construct a small log cabin. Such cabins usually have a floor space of no more than 12 by 14 feet with low walls and shallow-pitched rooves covered with sod. These cabins are commonly furnished with a small wood-burning stove (often handmade from a 50-gallon drum), bunk bed, table, and log-stump chairs. When in use, the cabin will contain a gasoline lamp, candles, bedding, fuel, bow saw and ax, cooking and eating utensils, food, and extra dry clothing.

Shelter cabins are most commonly found on well-established traplines and are considered the property of their builder and/or trapline owner. All travelers, however, feel free to make use of available shelter cabins. No payment is expected or made for such use, although the user usually replaces any wood he may burn or food he may consume.

A "half-house" is occasionally constructed by trappers and/or hunters who expect to make frequent long-term use of an area but do not wish to spend the time and effort to build a full cabin. Half-houses are simply low log walls with a tent mounted on top to form the upper part of the walls and roof. The tent, usually 10 by 12 feet or 12 by 14 feet, has the bottom of its walls tacked to the log walls, and it is supported by a strong frame of poles. Occasionally the floor of such a shelter is excavated to a depth of 1 or 2 feet. Furnishings for a half-house are the same as for a full shelter cabin.

The wall tent is the most commonly used temporary shelter in the study area. These canvas tents vary in size from 7 by 7 feet to 12 by 14 feet, with the 10- by 12-foot tent being the most commonly used for

winter shelters. Trappers and hunters will often erect wall tents in sheltered locations in areas to be used and make use of them throughout the winter. These tents serve as "line camps" and are usually spaced so a traveler can easily reach such a shelter in a day's travel.

Koyukuk people prefer to establish tent shelters within a spruce grove with a good supply of dry wood nearby. They will avoid stands of particularly large mature spruce because of the danger of high winds toppling such trees onto their shelter. Anaktuvuk men usually search for a large stand of willows or a wind-sheltered canyon to set up camp. The test of whether a site is adequately wind sheltered is the hardness of the snow. Hard snow indicates exposure to the wind while soft snow indicates good shelter.

When pitching a wall tent, particularly if it is planned to be used for an extended period, Koyukuk people will first clear the floor space of snow. A stout, dried spruce ridge pole supported by crossed poles and/or nearby trees will hold up the tent. A thick mat of green spruce boughs is placed on the floor. The bottom walls of the tent are folded inward and weighted down with heavy poles. A bedding of caribou skins, sheet metal wood burning stove, wooden grub box, lantern, and other necessary basics will complete the furnishings.

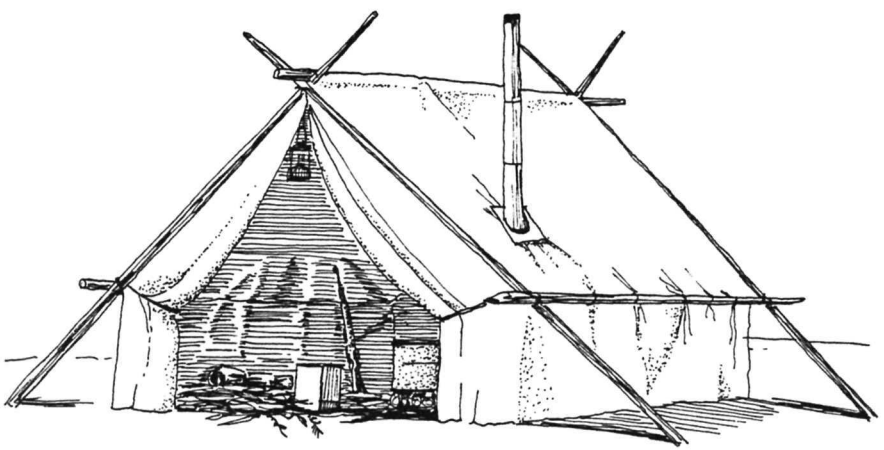


FIGURE 23. A CANVAS WALL TENT COMPLETE WITH FURNISHINGS.

Sometimes, a man will travel into or through an area where no pre-established shelter is available. If he plans to be out for several days, particularly in sub-zero temperatures, he will usually carry an 8-by-10 or 10-by-12-foot canvas wall tent plus all the aforementioned camping items on his sled with him.

The Native people of northcentral Alaska did not always have access to such modern conveniences as canvas tents, metal stoves, or gasoline lanterns. Also, because of the need or desire to travel lightly, it was not possible to carry such bulky and heavy items with them. Under these circumstances they developed the true art of arctic survival: the ability to protect oneself from a harsh environment using locally available resources and a minimum of tools and personal effort.

"Siwashing" is the slang term used by the Koyukuk people to describe camping without a tent. Within the memory of many older persons, this occurred when men traveled long distances on snowshoes and lived on what little they could carry on their backs or

FIGURE 24. A SIWASH CAMP UNDER A LARGE SPRUCE TREE WITH A SPRUCE BOUGH BED AND THE GROUND THAWED AND WARMED BY A POPLAR WOOD FIRE.

what could be easily obtained from the land. While not as common today as it was in the past, winter siwashing is still practiced by a few men when conditions warrant. It requires one basic tool, the small boy's ax that is carried by virtually all travelers.

A Native traveler planning to siwash camp will attempt to find a stand of spruce out of the wind. Within such a grove he will seek out a relatively large spruce tree with broad, overhanging branches. Using one of his snowshoes as a shovel he will clear a broad patch of snow from beneath the tree. Green spruce boughs will be placed in a thick mat under the tree near its trunk. Bedding, if any is carried, will be laid on this mat of boughs. Directly in front of his shelter, the Native traveler will build a large fire so that it reflects heat back under the tree. The camper will search for a standing dead poplar tree, preferably one that has begun to rot in its center. This will be cut and packed back to the campsite. Poplar wood tends to burn slowly and does not throw off sparks as does spruce. It will keep the campfire burning throughout the night.

If the weather is particularly cold (-30°F or lower) or if bedding is scarce, the Native traveler may build a hot fire directly over the spot where he intends to sleep. After the fire thaws and heats the bare earth he will extinguish the fire, place a mat of spruce boughs over the warmed spot, and sleep on a heated bed. A second fire will be built nearby to burn throughout the night.

A variety of siwash camps are known and used by Koyukuk travelers, depending upon the circumstances of the situation. Snow caves, lean-tos, tarp "half-tents," and many other techniques are utilized. One older Athabaskan informant with considerable experience in winter travel and camping stated that it is tabooed to sleep in the open without any type of covering overhead. One should always at least sleep under a tree, lean-to, or tarp. Shelter from the debilitating energy radiation loss to an open sky is a sound survival principal which has become a religious rule among the Koyukuk Athabaskans.

The Nunamiut Eskimos have had to adjust to the open sweeps of exposed tundra as well as to the northern fringes of the boreal forest. Within the forest they made use of the same basic camping tech-

niques as their Athabaskan neighbors, but the tundra required different adaptations. A few basic shelter adaptations of the Nunamiut are:

1) *Miḷiq,* a temporary shelter with a bench area and covered with a skin or tarp (figure 25);
2) *Tupigaun,* a temporary shelter just large enough to sit in and pull a tarp over (figure 26);
3) *Killigun,* a snow block shelter with a tarp roof (figure 27);
4) A narrow snow trench with a snow block roof (figure 28).

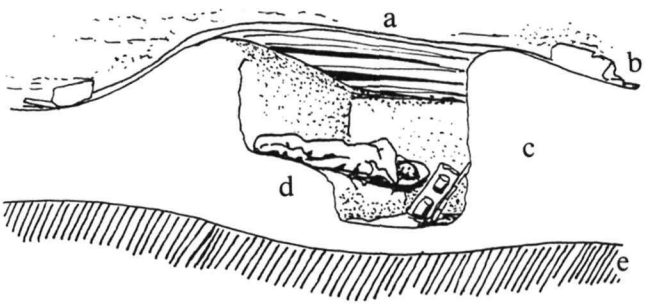


FIGURE 25. A NUNAMIUT *MIḶIQ: a,* TARP; *b,* WEIGHT STONES; *c,* SNOW; *d,* BENCH; *e,* EARTH.

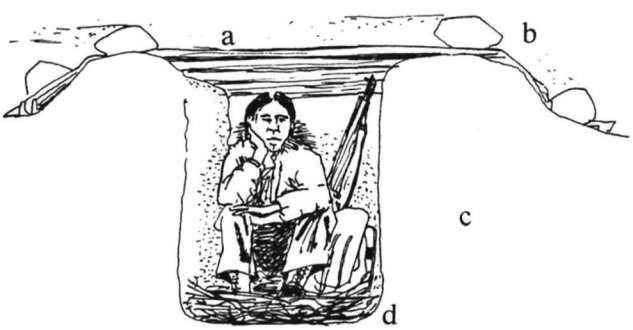


FIGURE 26. A NUNAMIUT *TUPIGAUN: a,* TARP; *b,* WEIGHT STONES; *c,* SNOW; *d,* WILLOW MAT.

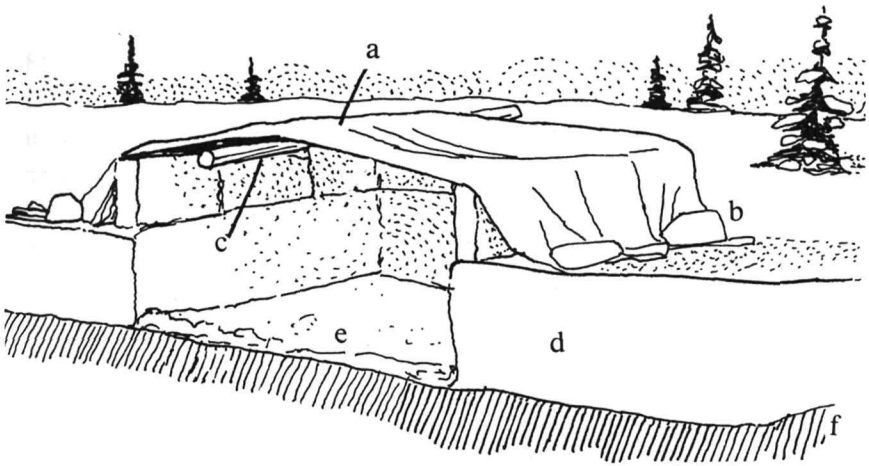


FIGURE 27. A NUNAMIUT *KILLIGUN: a,* TARP; *b,* WEIGHT STONES; *c,* POLE; *d,* SNOW; *e,* FRESH SNOW; *f,* EARTH.

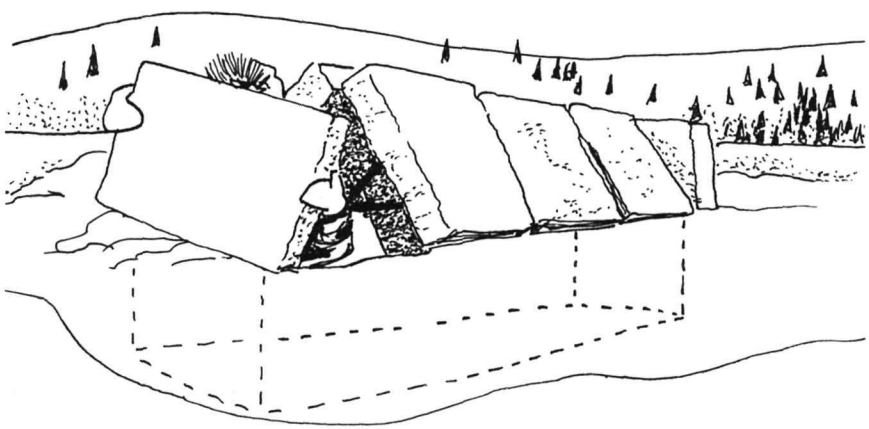


FIGURE 28. A NUNAMIUT SNOW TRENCH WITH A SNOW BLOCK ROOF, SNOW BLOCK END PLUG, AND A FLOOR COVERED WITH MOSS, WILLOWS, OR GRASS.

Summer Travel: Break-up to Freeze-up

Summer in the north is both brief and intense. Lasting only 3 to 4½ months, summer must provide enough energy and nourishment to the land and its creatures to carry them through the long demanding winter. All resident species of life, including man, must take full advantage of summer and its products in order to subsist in an arctic and subarctic environment. Mobility is a basic ingredient in successful exploitation by man of summer's opportunities.

Transportation in the winter deals with many variables, but land and water are frozen into a relatively uniform firmness. This allows man to apply the same modes of transportation to both surfaces. Summer causes the separation of these two basic ingredients by returning water to its liquid form. Land also takes on new properties, varying from soggy marshlands to dry rocky mountain slopes. With the melting of the leveling snow cover, the uneven profile of tussocks, rocks, banks, deadfalls, and other contours reveals itself, forcing adjustments in surface travel. Summer surface transportation is best divided into two basic categories: by land and by water.

By Land

Until recently land travel in the study area was synonymous with foot travel. In the not too distant past, both Koyukuk and Nunamiut people were experienced hikers.

Hiking

Up through the 1940s, the Athabaskan hunters of the Hughes and Huslia area would hike eastward across marshlands and low mountains to the Melozitna Valley where they hunted beaver, bear, moose, and other wildlife. Skins and dried meat were backpacked as the hunters returned to the Koyukuk. The Native residents of the Allakaket area traveled by foot to exploit harvests of marmot, moose, sheep, and bear throughout the south slopes of the nearby

Brooks Range, especially the mountains of the Alatna Valley and John River Valley, and the low mountains of the Ray Mountains at the headwaters of the Kanuti River. The use of pack dogs was an integral part of such travel.

The Nunamiut were, at one time, perhaps the supreme hikers of all the Alaska Native groups. Watercraft is of very minimal practical use in the highlands of the Brooks Range, so the inhabitants of this resource-sparse land learned to rely on their legs instead. Using their huskies as pack animals, the Nunamiut hunters ranged throughout the central Brooks Range in search of sheep, caribou, marmot, wolves, bear, and other game. This summer range extended from the headwaters of the Nigu eastward to beyond Galbraith Lake, a distance of approximately 200 air miles.

The hunting of wolf pups for bounty money was the motivation for long walking trips well into the 1950s. Usually small parties of two to five men with eight to eleven pack dogs would depart from the main summer camp of Anaktuvuk in early June. The men would carry light loads including a rifle, binoculars, ammunition, hunting knives, matches, perhaps some dry meat, a rain jacket, and other personal items. Most men carried a staff to help them cross streams and maintain balance on rough terrain. The pack dogs would be loaded with tarps, bedding, extra clothing, staples, cooking gear, extra ammunition or perhaps a small hand press for reloading cartridges, warm jackets for the men, an ax, files, a rope, and other articles. A canvas wall tent might be taken if the hunt was to be particularly long. It was expected that the men would feed themselves and their dogs primarily from game taken along the route. Such hunts could last for four to five weeks and might include up to 150 miles of travel. It was common for such hunting parties to cover 30 miles in one day.

Less extensive trips for meat hunting, berry picking, and other subsistence purposes also involved foot travel for the Nunamiut. Active hunters were often absent for several days while following wolves or hunting such game as sheep or caribou.

Over the past two decades, foot travel has declined for both the Nunamiut and Koyukuk villagers. To a certain extent the Anaktuvuk

Eskimos rely on light, chartered aircraft to move them to desired hunting and gathering sites. Koyukuk villagers rely more on the use of powered watercraft and have reduced their summer exploitative subsistence range and activities to exclude lands and resources requiring extensive walking. An exception to this tendency is the continued extensive walking during the fall to harvest bears.

ATVs

A recent addition to summer surface travel has been the growing use of "all terrain vehicles" (ATVs) in the Anaktuvuk area and trucks in the community of Huslia. Both tracked and balloon-tire off-road vehicles have begun appearing in Anaktuvuk. These vehicles are used in the village for hauling freight and for other local travel. The range and purpose of these machines are being expanded as men become familiar with their potential; for instance, people are using ATVs for cross country trips for hunting sheep.

The village of Huslia has developed approximately 12 miles of dirt roads. Several families have purchased pickup trucks and had them delivered via river barge. These trucks are used during the summer months to haul firewood, for travel to spring camps, for limited hunting, and to move freight within the village.

By Water

The rivers, streams, sloughs, and larger lakes are the liquid highways of summer for interior Alaska. People of the Koyukuk anxiously await the river ice break-up so that they can launch their boats and travel through the summer-freed waterways.

Kayaks

Kayaks were once used by the Nunamiut of the central Brooks Range to exploit the fish resources of local lakes and to carry out limited hunting. The summer and early fall hunting of caribou was often done by kayak. These craft were narrow with rounded bottoms

somewhat over 16 feet long. The wooden frame was covered with three bull caribou skins leaving only a circular opening on the deck for the paddler (Ingstad 1954:88-89).

Apparently the last kayaks used by the Nunamiut were burned for fuel during a particularly cold winter in the late 1940s (Ingstad 1954:88-89). They have used a few small wooden rowboats in recent years to set fish nets in such places as Chandler and Tulugak lakes. These boats are usually left at the lakes throughout the year.

Canoes

Small open canoes have been a part of the subsistence equipment of Koyukuk hunters since well before their contact with Europeans. At one time these light maneuverable craft were covered with birch-bark, but they now have painted canvas skins.

The Koyukuk canoe is approximately 30 inches wide at its beam and 14 feet long. Its frame is a latticework of spruce slats. It is propelled by a slender single-bladed paddle or by two light poles.

Koyukuk hunters once traveled extensively by canoe. Men would travel up the Koyukuk River and its tributaries by paddling and poling along shallow bars. The canoes were often portaged overland to be used in hunting muskrat, waterfowl, moose, and other game. Canoes were also used to set and check fish nets.

Canvas-covered canoes are still made and used by Koyukuk people, although to a much lesser degree than in the past. In 1975 there were four useable canoes in the village of Hughes and an estimated seven in the village of Huslia and six in Allakaket and Alatna. No canvas-covered canoes were in evidence in Bettles.

A few commercially manufactured aluminum canoes have appeared in the Koyukuk villages. Most of these have been purchased from recreational boaters who float down the Koyukuk River and sell their canoes for a low price rather than pay the air freight to take them home.

Canoes are now used primarily in the late spring and early fall for the hunting of waterfowl and muskrats. No extensive travel is now carried out via canoe.

Rafts

Rafts were important watercraft well into the 1950s among Koyukuk people. Families who often traveled over the spring snow to establish spring camps would build log rafts to carry themselves back to their villages. Residents of Huslia told of building large log rafts in the spring, then camping on them while floating down the Koyukuk to the Yukon River; at the mouth of the Koyukuk they sold the raft for houselogs and firewood and established summer fish camps. Hunters also used small rafts in the early fall to carry home their harvest of sheep, moose, and other game.

Rafting is now limited to the transporting of houselogs and firewood from locations upstream from the home villages. During spring high water, Koyukuk men often harvest large straight spruce trees from stands along the river and adjoining streams and sloughs. These logs are made into large rafts tied together with rope and nailed to cross-poles. An outboard-powered boat is lashed to the stern of such a raft to act as a steering tug. Firewood rafts of dry spruce logs are also made in the early fall and towed downstream to the village where the logs are pulled to the top of the riverbank by caterpillars or pickup trucks.

Skin Boats

According to an elderly Huslia man, crude skin boats were once used by Koyukuk Athabaskans. Hunting parties would range the foothills and mountains of the upper Kanuti, South Fork, Alatna, and John rivers during the late summer and early fall, collecting the meat and skins of sheep, moose, caribou, bear, and other game. When it came time to go home, they constructed a large boat from sapling trees, lashing the pieces together with rawhide and split spruce roots. This "bull-boat" was formed from two or three moosehides sewn together and stretched over the frame. Handmade paddles and poles were used to guide the boat with its load of meat, skins, and men downstream to the village or main camp. Nunamiut men would occasionally use moose hide canoes to float down the John River to obtain trade goods in Bettles and Allakaket. After freeze-up they would walk back into the mountains. It seems that

these craft quickly fell out of use with the introduction of plank poling boats in the early decades of this century.

Poling Boats

It was the poling boat that revolutionized watercraft travel for the Koyukuk Natives. Apparently introduced by early prospectors during the latter part of the nineteenth and early years of the twentieth century, this boat design and the tools necessary for its construction allowed Native residents to move relatively large loads both upstream and downstream.

The poling boat was a long, shallow-draft craft sometimes exceeding 30 feet in length. It had a relatively narrow, flat bottom with flaring sides and tapered square ends. The bow curved gently upward. Construction was of whipsawed spruce planks usually made locally by the builder.

These early plank boats were moved upstream by poling or lining with dogs and/or men. Where the river had long flat gravel bars, huskies were often used to pull the boat upstream. A long, stout line ran from the side of the boat to a gangline for the dogs. Three or four harnessed huskies, trained for this work, walked along the water's edge pulling the boat. A man sat at the stern of the boat steering with a paddle. At the end of each bar, the dogs were loaded into the boat and ferried to the next bar, usually just across the river. When encountering stretches of river without open bars the man pushed the boat along with long, slender spruce poles. Poles were also used to help guide the boat in shallow water. When dogs were not available, humans became the draft animals at the end of the boat line.

The poling boat was still in common use into the late 1940s and early 1950s. A Hughes resident told of traveling via poling boat up the Koyukuk with his family in the early 1950s. Three dogs were used to help move the boat; it required three days to travel approximately 80 miles of waterway.

Inboard Marine Motors

During the 1930s, gasoline-powered inboard marine motors became available to Koyukuk Natives. These motors required

relatively large crafts, and the "gas boat," a wide, flat-bottomed, shallow-draft craft, came into use. These gas boats were often 7 to 10 feet across at the beam and up to 35 feet long. They were usually partly decked over and had a pilot house structure amidships. Only a few families could afford such large powered boats. Two or more families would often travel in a gas boat, sharing the expense. This craft was also used to tow several poling boats and their occupants upstream to fish camps, distant villages, hunting areas, and other places. The size and the relatively slow speed of gas boats limited them to being primarily freighting craft.

Portable Outboard Engines

It was the advent of the portable outboard engine that caused the demise of the poling boat and the inboard gas boat and reduced the use of the small canoe. At first, outboard motors were attached to poling boats, but as the motors grew more powerful and heavier it was necessary to build wider boats. The slow, gas boats, which could not compete with the faster and more versatile outboard ones, were pulled up onto the top of the banks where a few may still be seen rotting.

Most riverboats used by Koyukuk villagers of today are locally constructed of imported plywood and lumber. Such boats have flat bottoms, square sterns, and most have pointed bows. Their lengths range from 12 to 30 feet, and they are relatively broad, having beams up to 5 feet across for the larger boats. Flat-bottomed aluminum riverboats began making their appearance on the Koyukuk about 1967, and they have rapidly gained in popularity and numbers. At the present rate of increase, imported aluminum riverboats on the Koyukuk River should outnumber locally made wooden boats within three or four years.

In 1967, when the writer first arrived in the Koyukuk village of Huslia, literally every household owned or had access to one or more riverboats powered by outboard engines. The 18-horsepower outboard was the standard motor at the time with a very few 33-horsepower outboards in use. In 1976, the size of outboards in-

creased from 35-horsepower to 45-horsepower, with 50-horsepower motors relatively common.

Outboard-powered riverboats are used extensively by Koyukuk River villagers in such subsistence-related activities as the harvest of firewood, houselogs, sled-building birch, edible plants, moose, bear, waterfowl, fish, and muskrats. Boats are also used to establish and supply trapping camps before freeze-up, to move persons and supplies to fish camps, and to complete a host of other essential activities. Without functional watercraft and navigable waterways the Koyukuk region would be an extremely difficult land from which to gain a subsistence livelihood.

The outboard-powered riverboat, like the snowmachine, places a considerable financial burden upon its owner. Observations and records of the writer indicate that a moderately loaded riverboat powered by an outboard engine of 25 to 35 horsepower averaged 4 miles to each gallon of gas consumed. With a heavy load moving against the current this average could drop to 3 miles per gallon. Gas costs average 2 dollars per gallon when mixed with oil. A boat trip of 80 miles would cost approximately 40 dollars in fuel. Considering other expenses such as wear on the engine and boat, maintenance of this equipment, and other expenditures, this cost would likely rise to 50 dollars. Thus, an average-powered riverboat costs approximately 62 cents per mile to operate. This is probably a conservative estimate as many outboards last only two or three years and are usually replaced by new, more powerful, and more expensive machines.

By Air (Aircraft)

In rural isolated Alaska villages, light aircraft is the bus, truck, and private taxi all rolled into one. Of the five main communities on the Koyukuk River (Huslia, Hughes, Allakaket, Alatna, and Bettles) and the village of Anaktuvuk, only Huslia receives river barge service. Except for this limited support, all non-local products are delivered by aircraft. Airplanes also move passengers between villages and

urban centers, carry mail, bring medical aid, welfare, and other services to the remote rural communities.

It was only natural for pragmatic villagers to seize upon the subsistence potentials of aircraft. Since the 1930s, Native families have utilized chartered aircraft to move them and their dogs to distant, hard-to-reach trapping areas and, occasionally, to carry persons between the village and summer fish camps. However, these trips were very expensive, particularly to Natives with a limited cash income, so this access was limited.

During the late 1960s, privately owned small aircraft began to appear in the villages. These planes were usually owned by local non-Native school teachers. Several employees of FAA and other non-Native residents of Bettles also acquired private aircraft. In 1967, there were an estimated 6 privately owned aircraft in the study area. By 1976, that number had grown to 20 private aircraft based within the same area. During the same time the number of non-local private aircraft visiting the villages for various reasons increased dramatically.

The pilots and owners of these light aircraft often assisted local villagers by reporting game movements, carrying supplies to hunting and trapping camps, and searching for missing or overdue travelers. Pilots based in the small villages usually developed close ties with one or more village men and would fly them out to hunt moose, caribou, or waterfowl.

Over the same decade, per capita income in the villages has risen significantly due to increased wage employment opportunities, monies from the land claims settlement, and government-supported social services. Among other things, this growth in available cash has resulted in more frequent use of chartered aircraft for activities relating to the harvest of local resources as well as for non-subsistence purposes.

It is a paradox that while local use of aircraft for subsistence has increased, many villagers have come to view the small aircraft as a threat to their livelihood. The increased state population, growing number of non-resident sport hunters, and declining game populations near urban areas has led to increased hunting pressures by non-

local persons within the study area. Virtually all of these non-local hunters make use of small aircraft to reach and harvest game. Hunting guides are highly dependent upon light aircraft in their work. Local residents see increased numbers of light airplanes flying around, particularly in the fall, and they believe that food is literally being taken from them by persons who have no real need for the animals they kill. In one case, this apparently led to the destruction of a disabled light aircraft by a group of young villagers.

Trends and Problems in Subsistence Transportation

Peering into the future is a chancy business, because many unknowns prevent a clear view. However, in regard to the problem of mobility as it relates to subsistence, the effort is justified. Developments which may affect this mobility could have profound impact throughout the entire subsistence complex.

Throughout the examination of subsistence transportation, there has been a constant trend away from reliance upon muscle power (human and dog) toward more use of and dependence upon mechanical power for transportation. This continuing shift has resulted in changes in sled and boat designs, increased emphasis on mechanical skills, loss of certain alternative transportation (for example, kayaks, poling boats, dog teams, and pack dogs), shifts in area exploitation, and changes in hunting techniques.

Mechanical transportation has also led to social changes in rural villages. Snowmachines and outboard engines have become status symbols. Less time required for subsistence has led to more social interaction in Native communities—with related problems and adjustments. Changes have also occurred in the transfer of traditional environmental skills and knowledge from one generation to the next.

As villagers increase their use of machines, their need for cash incomes also increases. Most subsistence activities are non-cash generating or result in very little income. Villagers must focus more

and more upon non-subsistence cash generating sources in order to provide for subsistence mobility. The conflict is obvious.

The introduction of machines such as outboard engines and snowmachines has tremendously increased the mobility of villagers and given them added advantages in the harvest of game and other resources. However, this development has its own innate liability. Unlike past transportation techniques (dogs, poling boats, canoes, and other means) which could be developed and maintained locally, mechanical transportation requires almost total dependence on non-local resources, products, and supply outlets for its maintenance and support. Machines do not reproduce, and they cannot be "fed" from subsistence harvests.

Rural villages of northern Alaska are literally at the outer fringes of the national supply system. In every community but one in the study area, all supply connections to the "outside" are limited to one method—aircraft—a limited and expensive vehicle at best. Any major disruption in this single tenuous link with distant supply centers would make it extremely difficult to maintain local mechanical transportation.

Gasoline is the lifeblood of village transportation, and yet, each year the cost and difficulties in obtaining an adequate supply of fuel increases. Anaktuvuk residents often buy one or two 5-gallon cans of gas from pilots, draining it directly from the plane's tanks. All indications are that petroleum products, and particularly gasoline, will become much more expensive and difficult to obtain in the future. Any major reduction in fuel availability either through increased pricing or rationing would, under present circumstances, severely reduce the mobility of rural villagers.

Subsistence in northern regions is dependent upon high mobility, so any development which limits this movement has a negative impact on subsistence. Subsistence-dependent persons losing one source of transportation must either turn to other sources of transportation or find other, non-subsistence ways of making a living. If the aforementioned trends continue, any one or any combination of developments could result in: (1) increased use of dog teams,

(2) return of more non-motorized water travel, (3) increase in foot travel, (4) loss of rural population foods, (5) increase in welfare support, (6) seasonal or permanent scattering of population across subsistence territory to maximize harvest of resources, (7) economic development of Native lands and resources to obtain cash income, (8) increase dependency upon seasonal employment to support expense of living in rural communities, and (9) shift of rural populations into fewer and larger communities, such as Barrow, Huslia, and Galena. Needless to say, this list could be expanded.

Chapter 6
RESOURCE AND HARVEST SITES

To a non-local person unfamiliar with the dynamics of subsistence, there would seem to be little difference between two streams that flow across the same basic terrain and contain the same species of fish or a group of marshlands scattered across the poorly drained lowlands. One highland mountain valley would seem to be essentially like any other, and the expanses of tundra would appear to be almost monotonously uniform. It would also seem reasonable to non-resident people that should a person or group lose access to a given area, it would be relatively simple to move into and utilize another area with the same basic physiographical features.

To the subsistence-dependent resident who makes intensive use of the wild resources, the surrounding terrain is a complex maze of micro-environments, each with characteristics and potentials that make it unique from all others. Each river is a special river with a set of physical properties that must be learned if one is to effectively exploit its resources. Each bend in a river is different, for while one bend may offer excellent opportunities for seining, the next may, for various reasons, be unsuitable. From an aircraft, valleys and mountains may appear essentially alike; but to the resident hunter and trapper, each is like a complete person with its own individuality. One valley will fill with deep soft snow while another is always scoured clean of a snow cover. The vegetation and ledges of one mountain favor sheep populations while the neighboring mountain is relatively barren. Birch trees may be common in a general area, but trees suitable for building sleds and snowshoes may be found only at

specific and scattered locations. The outlet of one lake will lend itself to the setting of a fish trap while the next lake does not.

Over generations of depending upon and exploiting the natural environment the Native peoples of the Koyukuk Valley and Central Brooks Range have become familiar with the hidden resource mosaics of the land. The non-Natives who have adopted a subsistence lifestyle have quickly realized the need to see their surroundings in terms of specifics rather than generalities. The longer a person or group lives in and exploits a given area, generally the more efficient they become in such exploitation. Knowing the particulars of an environment and knowing how to make use of those specifics is what determines the success—and the survival—of subsistence practitioners.

In the appendices are subsistence resource maps displaying land utilization patterns over the past two decades. To obtain this information the researcher visited approximately 90 percent of the resident households within the study area and requested the inhabitants to pinpoint on topographic maps the specific sites where they placed fish nets, harvested berries, hunted wildlife, had traplines, cut firewood, and performed other subsistence-related activities. It should be noted that due to the limits of such maps it was not possible or practical to display the intensity of use. However, with only a few exceptions, resource sites are the common knowledge of most long-term residents of a given subsistence area. Utilization of such sites fluctuates according to the availability of other resources, distance from habitation sites, accessability, productivity, and other variables.

Part III

THE ROLE OF KOYUKON WOMEN IN SUBSISTENCE

by Kathleen H. Mautner

Many Alaskans who hear the term "Native subsistence" visualize Eskimo and Indian men hunting and trapping, and they see families operating summer fish camps. The extremely important role played by women in Native subsistence activities has never been adequately recognized, nor has it been the specific focus of any published ethnographies.

In the Koyukon Athabaskan village of Huslia on the Koyukuk River, strong, tough, and hard-working women are the ideal; they are admired by everyone. Women enjoy being outdoors and often speak of being "lonesome for camp" when they remain in the village for too long. They look forward with great pleasure to going out to set and check their snarelines, to hunting and trapping alone or with their husbands, and to moving out to spring camp and summer fish camp.

I am deeply indebted to all the women of Huslia for everything I learned there, and am especially grateful to one special resident for being both my teacher and friend. She exemplifies the ideal Koyukon woman.

She is now in her late forties. As a child, she was adopted and raised by her grandfather, one of the last great medicine men on the Koyukuk River. Thus she had an extremely good education in the Indian beliefs and is a strong adherent of them today. From age 15 to 19, she provided the sole support for her grandfather and his ailing wife. She had her own dog team and hunted, trapped, and fished for her family.

Every year, for the last 25 years, her husband has been away working on the Yukon River barges from May 1 through October 1. She and her children have accomplished all the subsistence activities in his absence. They have traveled widely hunting muskrats in the spring, have run their own summer fish camp, have hunted moose, ducks and geese in the fall, and have brought in their fall supply of firewood. One summer and fall, she and her children cut and dried 2,000 fish, shot 2 moose, and brought in 2 cords of firewood. In addition, she has had her own trapline and snareline, tanned several moose and caribou hides per year, sewn new boots and mittens for her family and others, and cooked and cared for her children every day.

The Koyukon Athabaskan women of Huslia participate to a high degree in both the economic and supernatural realms of their subsistence lifestyle. While they are harvesting and utilizing subsistence resources, women must also be careful to follow all the correct rules of behavior to show respect for the animals with which they interact in their environment.

Huslia women possess vast knowledge for success in hunting, trapping, snaring, fishing, and gathering, and for tanning and sewing skins, using birch bark, and preparing Native foods. In addition, their adherence to taboos, designed to assure luck in obtaining the animals upon which their society depends, adds a spiritual dimension to their relationship with the environment. The ideal Koyukon woman is immersed both physically and spiritually in her subsistence lifestyle.

The following passage illustrates what was said at the traditional puberty seclusion, in which an old woman taught a young girl all the

taboos she had to follow and instructed her in the behavior expected of her. This event epitomized the relationship between the supernatural and economic role that the Koyukon woman played in subsistence. As it has been illustrated here, Koyukon Athabaskan women are still extremely active and important in both realms of subsistence today.

> Old woman: I have been a good and steady worker: I made shoes and moccasins, parkies [parkas], and clothes of all sorts; I sewed from early morning till late in the night, never resting from the work. Will you do the same?
>
> Young woman: Yes, I will.
>
> Old woman: I was one of the most skillful at making nets. I caught the salmon in large quantities, cut them and dried them; and, every summer, I filled up a whole cache with silver salmon and dog salmon, enough to last my family until the next season, and more. Will you do as I did?
>
> Young woman: Yes, I will.
>
> Old woman: I have taken good care of my children: I never left them in want of anything; I kept them well-dressed and warm. Will you do so?
>
> Young woman: Yes, I will. (Jette 1911:700-701)

Chapter 7
THE ROLE OF WOMEN IN HARVESTING SUBSISTENCE RESOURCES

Koyukuk River women continue to have an important role in harvesting subsistence resources. Although hunting, trapping, and fishing are traditionally thought to be men's activities, men do not view women who are competent in these skills as a threat to their masculinity. Instead, they see women as necessary and irreplaceable partners in this harsh, northern environment.

Huslia women have learned how to hunt by going out with their husbands, so that when the men are ill or away working, they can carry out this essential task themselves. Both women and men trap, snare small game, and fish. In fact, fishing has become even more a female activity now that men are so often absent in the summer performing wage labor.

Interior Alaskan people have depended quite heavily upon fish and small game for survival; these resources are generally more abundant and their populations are more stable in this boreal forest environment than big game such as moose and caribou. Athabaskan women are often the main providers of fish and small game.

One old Koyukon woman with an indolent husband has been active in hunting, trapping, snaring, and fishing throughout her lifetime; she has built everything from log cabins to birch bark canoes. Not surprisingly, she was her family's most productive provider. Another woman in her late 40s, whose husband died about 10 years ago, has procured the resources needed to support her large family and trained her children to help her as they came of age.

The following segment of a mourning song, composed for a woman who died in 1907, gives praise for her skill in fishing and

hunting and indicates the respect accorded to Koyukon women who achieve success in the subsistence quest:

> . . .in all directions she piled up things; in all directions she shot her arrows. . . .
>
> (Jette 1911:713)

Since husbands and wives are economically interdependent for survival in their environment, the descriptions of women's roles in harvesting subsistence resources will include the complementary role of men. These roles will be described according to the annual cycle which will include traditional as well as modern subsistence activities.

Traditional and Modern Female Roles

Traditional and modern Koyukon Athabaskan subsistence is based upon the hunting of big game (moose, caribou, and bear), the trapping or hunting of furbearers (wolf, wolverine, lynx, otter, fox, mink, marten, muskrat, and beaver), the snaring of rabbits and ptarmigan, the hunting of migratory waterfowl, and fishing. "Throughout all seasons of the year the Koyukuk Indian nuclear family spent most of its time together and there was a good deal of group participation in all phases of the food quest" (Clark 1974:90-91).

During the times when caribou and moose were scarce, the most important subsistence activities were fishing and hunting and trapping of small game. Late winter was traditionally the time of food scarcity, and starvation occurred occasionally. It was at these times that people had to rely on the dried fish they had stored during the summer and on whatever small game species were available (see Loyens 1966:37 and Sullivan 1942:136 for the Yukon River Koyukon).

The Koyukon led a nomadic lifestyle, dictated by the location and availability of resources. There were three distinct elements of social organization—the band, the camp, and the household. The band was a group of 50 or more people, centered around a matrilineal core of

extended families and exploiting a specific territory (Clark 1975:151). Each band consisted of several camps. These were aggregates of five or six families, the largest number of people that the resources of a given area could support (Loyens 1966:80-81).

The individual households usually consisted of a man, his wife (or wives) and children, and their married daughters and families (Clark 1975:162-63). They lived in semi-subterranean winter houses made of logs and poles covered with sod, moss and bark-covered summer houses, and skin-covered tents for hunting and trapping trips (Loyens 1966:59). The summer and winter dwellings constituted semi-permanent villages, with one to three houses in each, and a population of 15 to 45 people. During the rest of the year, individual family groups hunted and fished (Clark 1974:96-97).

Marriages were arranged by parents. A girl married after her first puberty seclusion of a month and a boy at around 20 years of age. The boy had to work for his father-in-law to prove his competence at hunting and fishing, and the girl showed her acceptance of him if she started sewing with the skins and furs he brought her (Loyens 1966:68-69).

Within each household, the males shared their work and the females did the same. The oldest woman would direct the activities of the younger women. They shared in the fishing, snaring of small game, tanning, sewing and cooking for the household (Clark 1975:164). A sexual division of labor was necessary so that all the chores would be completed. Certain tasks were seen as exclusively male or female, while others could be performed by either sex:

> Woman's tasks were: sewing, tanning, hauling water, manufacturing baskets, weaving the fine netting on snowshoes, sewing birch bark on canoes, gathering spruce pitch, pitching the canoe seams with spruce gum, making nets, taking up fish from the net, cleaning fish, making snares for rabbits and fowl, and snaring these animals.
>
> Men's tasks were: building the house, the cache, the canoe, the fish trap, manufacturing the snowshoe frame, spearing

> fish, hunting both in groups for caribou and bear and alone for geese and moose, making shavings to start the fire.
>
> Work considered proper to be performed by either husband or wife was: cooking, taking fish from a fishtrap, setting traps, shooting, washing and dressing the children, sawing and splitting wood, gathering wood, lighting the fire, cooking dog food and feeding the dogs (Loyens 1966:50-51).

These roles of men and women remain essentially the same today, even though culture change has been occurring since the first white men came into the Koyukuk River area in 1884 (Clark 1974:79). The gold rush in 1898 brought many more whites into the region, and permanent Native villages began to be built near mining camps and trading posts. Later, missionaries arrived and then schools were established. These events accelerated the change from a nomadic lifestyle to the more sedentary village existence seen today (Clark 1974:99). Huslia was established as a permanent village with a school in 1949, which caused a decrease in the mobility of the people but not in the degree of their subsistence activity.

The extended family still often lives under one roof and cooperates in subsistence activities, with the oldest members directing the younger ones. Marriages are no longer arranged, and they take place at a later age for females. Women are now less able to leave the village on extended hunting and trapping trips with their husbands because they must care for their children who are attending school. But they still get out as often as possible, and some of them have the added responsibility of running summer fish camps alone when their husbands take seasonal wage employment.

On the occasion of a boy's first hunting or trapping success or a girl's first snaring or sewing accomplishment, the parents still bring the child to the home of a respected old person to whom the child presents his first animal or her first pair of moccasins. Thus, it is believed that the good luck of the old person will be transferred to the young. In spite of all the changes that have taken place, subsistence is still very much alive.

Annual Cycle of Subsistence Activities

Fall (after Freeze-up) and Early Winter

Traditionally, families left by boat for their fall and winter camps in late September, just before freeze-up, carrying stores of dried fish and berries accumulated during the summer. There were two to three semi-subterranean sod-covered houses at each camp, with about two families in each house (Sullivan 1942:60-61). With the arrival of Euro-Americans, just before the turn of the century, log cabins took precedence as winter dwellings.

The fall-winter camps were located near good streams, tributaries, or lake outlets where basket-style fishtraps could be set (Sullivan 1942:62-63). The traps were made from strips of spruce tied with willow, and consisted of a smaller cone inserted into a larger cone. The fish swam into the narrow end of the small cone and entered the large cone, where they were trapped. Fishtraps were also used in conjunction with weirs, fences of stakes on either side of the trap that directed the fish into it. This method of fishing was regularly used until about 1950 on the Koyukuk River (Clark 1974:151-52).

The men made and set the fishtraps then went out together on extended hunting trips for moose and bear, while the women and children tended the traps and removed the whitefish, pike, grayling, and suckers caught in them (Clark 1975:158). Fishtraps were left in the water until just before freeze-up, then removed. After the ice was frozen they were replaced and could be used all winter long (Sullivan 1942:65-66). After freeze-up, the men also constructed keyhole traps for louche (burbot) in the river, and the women set gill nets under the ice in the lakes or river for whitefish and pike (Clark 1975:159).

In late October when the caribou arrived from the north, many family groups would join together in a communal hunt. They constructed long fences with snares set in openings along their length, and then groups of people drove the caribou into the enclosures. When the caribou tried to escape, they were caught in the snares then shot by people in hiding nearby (Clark 1974:160). In November, the

men left for their traplines and returned periodically to their families at the winter camp. While they were gone, the women and children tended the fishtraps and nets and set snares for rabbits and ptarmigan near the camp (Clark 1975:159).

Today, because the children attend village schools, families can only go to fall-winter camps for short periods of time. But male trapping partners still go out to their traplines for extended stays, and women trap with their husbands when they can get older children or relatives to care for the children in school.

Basket-style fishtraps are rarely used now, although the older people still know how to make them. Keyhole traps for louche, still made and used by some men, consist of two flaring wings of willow stakes driven into the bottom of the river, with an oblong willow picket enclosure at the center in which the fish are caught as they swim upstream (Clark 1974:68).

Both men and women set gill nets under the ice in the river or lakes for whitefish, pike, grayling, some sheefish, and louche. When the ice is about 6 inches thick, holes are made so the net can be set underneath it and secured to vertical willow poles at each end. The net can be left in place all winter—if the ice does not become too thick and the extreme cold does not freeze the waterhole too solidly. Should this happen, the net is pulled out and replaced again in March. Huslia people set about 15 nets in Long Lake near the village during the fall of 1976, in addition to the many nets put in the river.

The old-style caribou fence set with snares is no longer used. Caribou often come into the Koyukuk country during the winter, but it is now primarily the men who go out to hunt them. However, women like to participate in these hunts if they get the chance. One woman, who is known as an excellent shot, speaks with pride of the time she went caribou hunting with two men—each of them shot three caribou and she shot the biggest.

Bear hunting is an exclusively male activity still actively pursued today, especially during late October and November when the bears have just gone into hibernation. A woman can only shoot a bear if it is threatening her life or if she is past childbearing age and follows all the rules for skinning it and taking proper care of the meat. She will

not go out specifically to hunt bears, but if she comes upon one and knows the village needs the meat, she will shoot it. A 60-year-old woman shot and cooked a bear for a potlatch in the summer of 1976.

Huslia woman commonly go moose hunting together in the fall and winter if their husbands are away at wage jobs. They bring their children or relatives along to help butcher and pack the meat; they are proud of being able to bring meat home to their families. They also go moose hunting with their husbands, simply because they enjoy being outdoors traveling and hunting.

Women also play an important role in the procurement of firewood throughout the year. People are extremely active cutting firewood before freeze-up and in early winter. To make sure they have an ample supply for the coldest mid-winter months, when it is unpleasant to be out in the woodyard. A husband and wife often work as a team. He cuts down the trees and she removes the limbs; then he cuts the logs into smaller lengths, and she piles them on the sled. Once the wood is hauled home, all members of the family take turns splitting it into stove-sized chunks with an ax. Nearly all Koyukuk River village homes are heated with wood, so this keeps people very busy. If her husband is sick or away from home, a woman will go to the woodyard alone. There were many days when we saw a 60-year-old woman pass by our cabin hauling an empty sled with her snowmachine; we watched her return hours later with a heavy load of freshly cut wood. Some women like to get wood just to be outdoors and to get out of the village for a while. One woman said she gets "lonesome for working at wood" if she does not do it regularly.

Subsistence activities are not so intense during the shortest, coldest days of mid-winter. Traditionally, people from neighboring camps would gather together at the time of the winter solstice for a series of potlatches in commemoration of the dead. They sang songs for those who had died and praised men for skills in hunting, trapping, and good management of food (Sullivan 1942:124-26). Today a similar potlatch takes place on New Year's Day, featuring Indian songs and dances, and feasts of Native foods prepared by the women.

Winter Snaring and Trapping by Women

Formerly, Koyukon people held communal rabbit drives during the times when snowshoe hares were plentiful. A V-shaped fence was constructed in a place close to where the rabbits gathered to feed in the evening. People would hide in the brush until the hares congregated, and then they would jump out and make noise, driving the animals into the fence where they were snared or shot with .22-caliber rifles. Today on the Koyukuk River the population of rabbits is very low so these drives are not possible.

The primary method for obtaining rabbits today is by setting out a snareline. The snares are made in essentially the same way now as they were in the past, except that today they are constructed of commercial picture-hanging wire rather than with braided sinew. The most common type of snare is set by fastening the small noose from a sapling or stick so that it hangs in the animal's trail, then placing sticks or brush on either side of the trail to direct the rabbit into the snare.

Huslia people described the use of ptarmigan nets at times when these birds were abundant. Men and women working together hung a weighted net from an arrangement of willow sticks. They waited in hiding until the ptarmigan came to feed on willow bait set at the bottom of the net. When the ptarmigan were in position, the net was released to fall over them. If the ptarmigan population increases in the future, as it has cyclically in the past, these nets will once again be used for catching them.

At present, ptarmigan are snared in willow patches. Little "fences" of fresh-cut brush are made with openings here and there. Snares are placed in these openings, and the birds are caught when they gather to feed on the fence.

In the past, people snared rabbits, ptarmigan, grouse, and sometimes even robins in the summer. "We were always hungry then," remembered one elderly Native.

These days, many women and some men set out snarelines for rabbits and ptarmigan after the first snowfall and remove them in the

spring. They have to be checked daily; however, if a woman has her menstrual period, she cannot kill an animal that is still alive in the snare. To break this taboo will cause her bad luck in trying to snare that animal in the future. For this reason, women often bring their children along.

If a woman sets her snares in the same area every year, the area is considered to be owned by her. Snareline ownership is often passed from mother to daughter, but if the area is not used regularly, ownership can be forfeited.

Snowshoe hare and ptarmigan populations are at a low point now on the Koyukuk River, but in the past they have been periodically abundant. At times when moose and caribou populations were low, this small game constituted the major part of the fresh meat supply during the winter. In the village of Allakaket the rabbit catch was high during the fall of 1961, ". . .the older women averaged ten rabbits a day during the early part of the season and continued to catch three or four a day throughout December" (Clark 1974:41).

Today in Huslia, women and couples of all ages put out snarelines near the village, and one rabbit every couple of days is the usual catch. Rabbits and ptarmigan are also shot with .22-caliber rifles whenever someone is out and happens to see them. If the moose population on the Koyukuk River declines, as it has elsewhere in Alaska, people will once again have to rely even more heavily upon the hunting and snaring of small game.

Although trapping is now a predominantly male activity, "everyone used to trap" until the school was established in 1949, keeping women at home more of the time. Women used to have their own traplines near their winter camps; these were separate from their husband's traplines which were longer and much farther from the camps. Huslia's three oldest grandmothers were known as fine trappers in their day. One of their sons recalled that his mother would leave their trapping cabin on snowshoes at the crack of dawn, run around her entire trapline, and return in the afternoon, still running. Until several years ago, when she was weakened by illness, another women would get up at 5 o'clock in the morning, run several miles from the village to check her traps, and return by 8 AM to get her

children ready for school. Some women still maintain their own traplines today, although the majority of them trap with their husbands.

Women must be very careful when they are trapping because there are many taboos to observe. Women are allowed to trap or shoot any animal except a wolf. If a woman catches a wolf by mistake in another animal trap, she must not touch it, but must go find a man and get him to remove it from the trap and skin it. Then they must both burn the carcass with an offering of dried fish and fat to appease the wolf's spirit.

The source of this taboo is an old Koyukon *kk'adonts'idnee* or origin story in which a girl who just had her first period came upon a wolf, in the time when wolves were human. The wolf already had two wives, but he said to her, "You will be my wife."

The wolf brought her home, but his two wolf wives could smell her and knew she was a human being. She proceeded to have one boy child from the wolf and then the wolf killed his two wolf wives. After he had killed them, the spirits of the two wolf wives ate up the insides of the human wife, killing her as well. That is why it is *hutlaanee* (taboo) for women to have anything to do with wolves until after childbearing age.

Lynx, wolf, wolverine, and otter cannot be skinned by a woman who catches them in her traps. She must either ask her husband or pay another man to do it. If a woman is past childbearing age and is not able to get a man to do it, she may skin them; however, she must "talk nice" to the animal as she burns good food for it. These taboos also originate in the origin stories (see chapter 9 for further discussion of women's taboos).

Late Winter and Early Spring

When the longer days of late January approached, families traditionally left their winter houses and went out together on extended hunting trips. During this time, they lived in conical-shaped skin-covered tents. The men trapped and hunted caribou and moose,

while the women looked for blackfish "breathing holes" and made and set traps for them (Clark 1975:159-60).

Although blackfish traps are no longer used as extensively as they once were, some people still own and use them, and most of the older women know how to make them. Blackfish are found in big lakes where the water is deep. March is the best time to look for their breathing holes—the ice openings where they swarm on the water surface to get oxygen—and this is where the traps are set.

Blackfish traps and other basket-style fishtraps are made from straight-grained spruce that will split easily. The correct type of spruce tree should be a foot in diameter with bark that is not too rough or lumpy. The best wood to use is from the base of the tree. After the tree is cut down, about four feet of wood is taken from its lower end. The bark is removed and the wood is then split in half; each half is split in half; each quarter is split in half; and so on. Finally, there is a pile of spruce sticks each about 2 inches wide, half an inch thick, and 4 feet long. These sticks are shaped into a funnel, and this is reinforced along the outside with horizontal strips woven over and under the vertical strips and lashed with line. A second funnel about one third as long is inserted into the larger funnel. When the blackfish swim up to their breathing hole, they are trapped as they swim back down (figure 29).

In late winter, gill nets are set again under the ice in the lakes and rivers, yielding catches of whitefish and pike. Beaver trapping was, and still is, an important activity from February through late April. The fur is sold or used locally in sewing, and the meat is considered a delicacy. Women often go out with their husbands to assist them in setting and checking beaver traps or snares and to help with the preparation of hides. One Huslia woman, known as an excellent beaver trapper, has always had particularly good luck catching them.

Spring Camp

In the past, with the first thaw of late April, families would move to spring camps located near productive lakes. The period of late

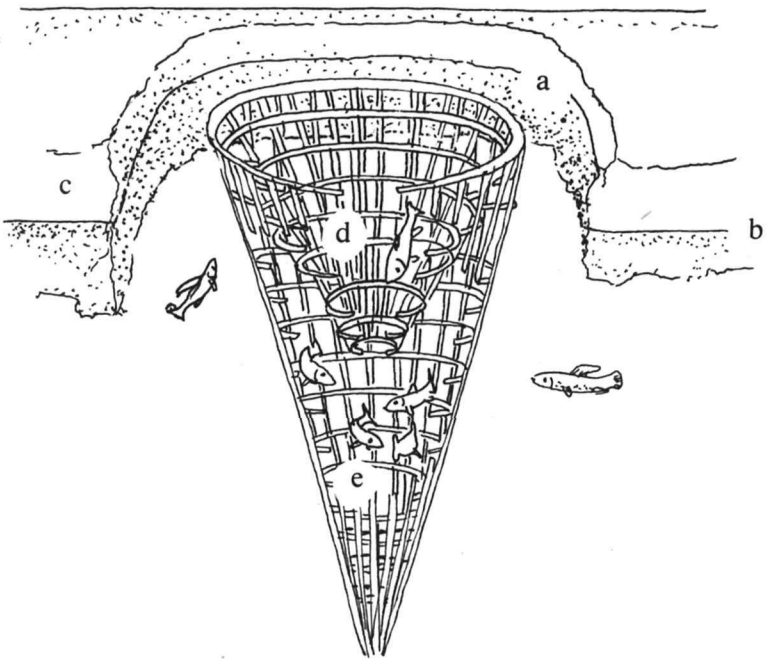


FIGURE 29. A KOYUKON BASKET-STYLE TRAP FOR BLACKFISH: *a*, WATER HOLE; *b*, WATER LEVEL; *c*, ICE; THE FISH SWIM UP TO THE "BREATHING HOLE" AND THEN DOWN THROUGH THE SMALL FUNNEL (*d*) INTO THE LARGER FUNNEL (*e*) WHERE THEY ARE TRAPPED.

winter and early spring was traditionally the time of food shortage and occasional starvation, so the fresh muskrat and waterfowl meat acquired at spring camp was a welcome relief. The men hunted and trapped muskrats and beaver; and, in May, they hunted the returning ducks and geese. The women also trapped muskrats and set gill nets when the lake ice thawed for whitefish, pike, and suckers. Sometimes there were two separate spring camps, one for the men and one for the women (Clark 1975:160). Women were also busy skinning the muskrats, plucking the ducks and geese, and drying all of this fresh meat (Sullivan 1942:137).

Families today must postpone leaving for spring camp until the last week in May if they have children attending school. However, before

school is over for the year, both men and women still actively hunt and trap muskrats, and some families will set up camps for several days at a time in late April and May. Before break-up, traps are set in muskrat pushups on the lake ice. After break-up, they are hunted from boats or the shore with .22-caliber rifles as they swim along in lakes and sloughs. Muskrat fur is highly valued locally for parkas used by men and women, because it is light, warm, and water repellent. The fresh meat is highly esteemed and it provides a welcome change of diet. Fishnets are also set by women near their spring camps when the lake ice thaws.

Women express excitement at being outdoors at this time of year, and they often go out in pairs to hunt muskrats. Three young women set up their own camp recently and now more and more young people are doing the same each spring.

Early Summer

The river ice usually breaks up by the end of May, and this marks the official end of spring. Traditionally, people returned from their spring camps to their semi-permanent winter villages, where a big potlatch was held in early June (Sullivan 1942:138). Then some people moved to the tributaries of the river to fish for whitefish and pike moving out of the lakes (Clark 1975:161).

Today some families still set up camps next to sloughs or lake outlets where the fish are moving back into the river as the water drops after break-up. Other families set gill nets and check them daily by taking a boat ride from the village. Nets with 5- or 6-inch mesh are set across slough channels or stream mouths. People also fish with hook and line.

We camped at the mouth of a slough with a Native family for the first two weeks of June. The following description of early summer camp activities is taken from my field notes:

> When we arrived by boat at the spot they chose for our camp, the husband and wife worked as a team to set it up. Both of them cleared the brush to make spots for the tents. The husband cut poles for the tents and put them up, while the wife cut spruce boughs for the tent floors and firewood for the stove. He ran the boat, procured poles for the fish racks, and made a fish cutting table, while she set the fishnet, removed the fish from it daily, and cut the fish for drying.
>
> The best catch was fourteen whitefish and two pike at one check of the net, but the average catch was four to five whitefish and several pike. The net was first set in a channel of the slough, but the water rose temporarily, so it was moved further up the slough to a lake outlet. When the water dropped again in a few days, it was set a third time at the mouth of the slough.
>
> Fresh fish was eaten daily for lunch and dinner and was boiled, fried, or roasted over a campfire. The rest was dried both for the dogs and people and when done, it was bundled to be taken home and stored in the cache.
>
> Birch bark and spruce roots were gathered by both husband and wife. She immediately made dish washing and fish rinsing pans and all-purpose containers out of birch bark for camp use, plus fancy baskets to sell later. The husband cut down a spruce tree and fashioned new canoe paddles for himself and for sale.

Early summer is also the time when people set up camps for cutting house logs, and they continue to do so all summer when they have the time. Families travel by boat to an area known for its good supply of trees suitable for log cabins, and they set up camp there. One family camped for 10 days in June of 1976 and cut 110 logs for 2 cabins. Everyone participates in the work, which sometimes lasts until 2 AM. The men usually cut the trees, while the women and children remove the limbs and peel off the bark. When they have procured enough logs, they haul them to the river bank and lash them into a raft which is floated back to the village.

Summer Fish Camp

Koyukuk River people have always awaited the days when fluff from willow catkins drifts abundantly through the air, a sure sign that the arrival of salmon is imminent. This is the time for moving into the summer fish camps which are set up along the main river. The first king salmon and dog (chum) salmon arrive on the Koyukuk River by about July 4, and the run lasts for several weeks. The run of silver (coho) salmon begins in about early August and also lasts for a few weeks.

Formerly, among the Yukon River Koyukon, a ceremony was held when the first king salmon was caught. The fish was laid on a bed of willow branches, willow twigs were dipped in the river, and drops of water were sprinkled over the fish with the saying, "pull your canoe up here."

If women wanted to participate in the ceremony, they had to wear cords of twisted willow bark around their necks and wrists. The fish was cooked and a piece was given to each person at the camp. The purpose of the ceremony was to encourage many more fish into the nets and traps (Sullivan 1942:20-21).

Traditional salmon fishing was done with twisted willow bark or rabbit sinew gill nets, fishtraps, dipnets, spears, and sinew lines with antler fish hooks (Clark 1974:148-53). The men made and set funnel-shaped fishtraps which were used with a weir to guide the fish into the trap. Both men and women used dipnets in eddies. The dipnets had a long handle to hold a 6-foot-long conical-shaped net made of twisted willow bark or rawhide with a framework of spruce strips (Sullivan 1942:7; Loyens 1966:37-39).

Some older women in Huslia still know how to make fish nets of willow bark. They peel the bark from the willow in long narrow strips and then peel off threadlike pieces of the inner bark. They then twist these together two pieces at a time in their hands. The finished pieces are spliced together, wound around a net shuttle, and then used for sewing the fish net. When not in use, a willow bark net has to be stored underground in a cool, damp place so that it will not dry out

and break. The floaters for the nets were made of spruce or cottonwood bark, the sinkers of stone or antler.

Traditional fish camps were set up on the river bank by the end of June. The camp consisted of sleeping tents, fish-drying racks, and a smokehouse. The family owned its campsite and the place where they set their net as long as they continued to use it regularly. If it was abandoned for a few years, the family forfeited its right of ownership (Sullivan 1942:10-11). The men set basket traps at the entrances to side streams and helped the women set nets in eddies. Men would also go away on short trips to hunt moose and waterfowl, and this meat, when returned to the village, was cut and dried by the women (Clark 1974:91). It was the women's job to cut all the fish for drying, but her husband helped her if the catch was large. There was no shame attached to performing women's work (Sullivan 1942:14). People worked well into the evening, aided by the long twilight hours. They knew the importance of storing as much fish as possible to get them through the winter and the period of scarcity in the spring. By mid-September, almost all the camps were deserted—it was too cold and there were no more fish (Sullivan 1942:29, 56).

Today's summer fish camps are essentially the same as those described above, except that traps and dipnets are rarely used. With the introduction of commercial cotton twine on the Koyukuk, ". . .nets nearly completely supplanted traps for salmon fishing" (Clark 1975:157).

Fishwheels introduced to the Yukon River Koyukon by Europeans now provide the main method of salmon fishing there, and they are more productive than nets or traps. Fishwheels cannot be used on the Koyukuk, however, because the current is too slow to turn the wheel and the water is clear enough for the fish to see the wheel and swim around it.

Presently, a woman and her children often run a fish camp without her husband, summer being the most common time of year for men to leave for wage employment. At the height of the runs, over 200 fish may be caught daily. At such times two people are kept busy cutting the fish while others rinse and hang them, and still others may

turn them and keep the smudge fires going. There is sometimes also a run of small whitefish with the dog salmon, and people set 4-inch-mesh nets for these fish, close enough to the shore where salmon will not be caught in them. The small whitefish, the king and silver salmon, and the richest of the chum salmon are dried for people, while the majority of the chum salmon are dried for dog food. Some families still maintain dog teams for both racing and traveling, and dried salmon is the principal dog food. People without dogs may sell the "dog fish" to those who are unable to fish or who run out during the year.

Making and mending fish nets is the woman's job. Some women still make their own nets out of cotton or nylon twine, although most of them order commercially made nets and only do their own mending. Nets are torn after each fish run and must be mended before they can be used again. Women still make their own sinkers by sewing small rocks in oblong cloth bags. They make floaters of dry poplar wood or bark.

Most gill nets are 75-100 feet long and 8 feet deep, with varying mesh sizes for different fish. Many people own several nets of different sizes: one for small whitefish (4-inch mesh), one for whitefish, pike and suckers (5-inch mesh), and one for dog and silver salmon, large whitefish, and sheefish (6-inch mesh). Mesh size was traditionally measured by stacking the fingers from one or both hands to a certain width, and it was known that each kind of mesh was "so many fingers wide." Today mesh is measured with a wooden net gauge, and nets are sewn with a homemade net shuttle around which the twine is wrapped.

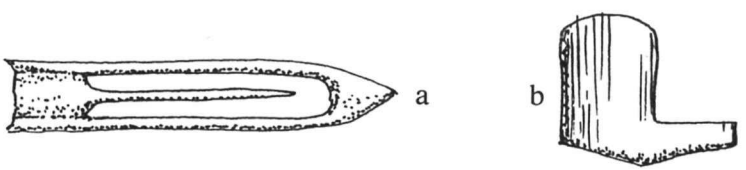


FIGURE 30. TWO KOYUKON TOOLS NOW USED TO MEASURE AND CONSTRUCT GILL NETS: *a*, NET SHUTTLE; *b*, NET GAUGE.

Nets are set in eddies by tying a long rope to the shore end of the net which is then attached to a stake or tripod of poles on the river bank. The woman lets the net out slowly from the front end of the boat while someone runs the boat backwards out into the eddy. At the other end of the net is a line with a heavy anchor; this is dropped to prevent the net from moving with the current or being pulled out of place by king salmon.

Nets must be checked at least twice a day during the peak of the runs. People who don't want to catch so many fish roll up the shore end of their net part way. During the summer of 1976, which was considered an exceptionally good one for fishing, the dog salmon catch after July 4 included:

July 5: 7 fish
July 6: 57 fish
July 7: 80 fish
July 8: 93 fish
July 12: 93 fish
July 13: 97 fish
July 14: 137 fish
July 14: 200 fish

The run peaked at about 200 fish per day for less than a week, then it gradually declined. Catches also included 1 or 2 king salmon daily.

Some Koyukuk River families still continue the traditional practice of traveling to the Yukon River for the silver salmon run in August, because the silvers are so much richer in oil there. They camp and fish with relatives or friends for a couple of weeks and return with the highly prized Yukon fish. The average number of fish cut and dried in a good summer ranges from 1,000 to 3,000, depending upon the size of the family and the dog team. In 1975, one family dried 20 bundles of 40 fish each for dog fish, 6 bundles of 50 fish each for dog fish, and 300 eating fish. Another family cut and dried 1,700 fish, but ran out in late winter and had to buy more; and another with a large dog team cut 3,000 which lasted all year. There are some seasons, however, when the runs fail and very few salmon are caught.

Women and children gather berries in late summer when the fish runs slow down. They go to particular areas known to be good for each type of berry; they pick blueberries when they are ripe in August and cranberries in September. Traditionally, berries were stored in watertight birchbark baskets covered by a bark lid sewn on with spruce root and put in underground caches for winter use (Sullivan 1942:35). Today the berries are preserved in freezers, and their main use is in the preparation of Indian ice cream for potlatches and other events.

Women like to bring their children to summer fish camps to keep them active and away from the village where they will get bored. Young people enjoy being out at camp even though they have to work so hard. When school starts again in September, many young people are sad that they must leave camp life and return to the village.

Early Fall

By the middle of September, families left for their fall-winter camps once again, taking the stores of dried fish, meat, and berries they had prepared during the summer. Few people today can go out to fall camp, except occasionally those who do not have school-aged children.

During September, some Huslia men and women set gill nets in the river for sheefish, whitefish, pike, some louche, and a few remaining salmon. Further upriver, at the villages of Hughes and Allakaket, families go seining for these fish (mainly several species of whitefish) just before the ice begins to run in the river. Seining was introduced to the Indians by Kobuk Eskimos who came to live at Alatna, across the river from Allakaket, during the gold rush (Clark 1974:72). Seining is not done in the river at Huslia because there are too many snags which would ruin the nets and there are no good gravel bars (which are excellent spots for seines).

Seining nets are 150 to 200 feet long, and seining crews are often composed of two couples and their children. One or two people must stand on shore to hold the rope attached to one end of the net. They walk gradually down the beach as two people in the boat play the net out; another person paddles the boat out from the shore and then back in, forming a wide U-shape. When the boat gets back to the shore, everyone jumps out and begins to pull the net in and up onto the beach. The fish are then removed from the net and tossed into a pile where they are killed with clubs. Thousands of pounds of fish can be caught in four or five days of seining, and there is no need to dry them because freeze-up is imminent. These fish are used for dog teams and for human consumption. A favorite delicacy is raw frozen whitefish dipped in bear grease.

September is also the time to hunt ducks and geese as they migrate south for the winter. Husbands and wives usually go out together; women are best at calling in geese because their voices are higher pitched. A camouflaged "blind house" is built for concealment, and when a flock approaches, they are called in and shot. The women do most of the plucking, dry some of the meat, and freeze the rest.

Quite a few men are still away at wage jobs during early fall, and this is the most common time for women to go out together hunting moose. They will also shoot ruffed grouse and spruce grouse with .22-caliber rifles if they come upon them. Women bring their children along as they travel the river in search of moose; and when they shoot one, everyone helps to butcher it and pack the meat down to the boat. The meat is either cut up and put into the freezer or, if it is close to freeze-up time, it is hung in quarters in the smokehouse.

Chapter 8

THE ROLE OF WOMEN IN PROCESSING SUBSISTENCE RESOURCES

When Native subsistence is discussed, most of the attention is focused on the harvesting of resources, and the woman's work in processing these resources is often overlooked. This includes the arduous task of tanning skins; sewing mukluks, mittens, parkas, and other winter clothing with skins; trading these items with Eskimo women; working with birch bark; and preparing Native-style foods. These skills require extensive knowledge, practice, and hard work, thus, the women who are good at them are well respected within their society. Such activities are not seen as "mere women's work" but as valuable skills that are as necessary to survival as the harvesting of resources.

Included in this chapter are details for tanning moose, caribou, and beaver skins, information for making two types of birchbark containers, and directions for the preparation of some Native dishes. Additional recipes as well as the details for sewing fur socks, mittens, caribou legging boots, and canvas boots may be found in appendix C.

Tanning Animal Skins

After the New Year, a woman may hear a Canada jay call *"k'iltɬeeyt, k'iltɬeeyt,"* which sounds like a woman scraping a skin. This is a sign that she will soon be cleaning a skin, and she answers the bird by saying "I hope it's soon."

Tanning a moose or caribou skin is a very difficult and time-consuming job that takes place over the course of a year. Summer skins have to be cleaned immediately, but those acquired in fall and winter can be hung outdoors to freeze until the woman is ready to work on them. Women prefer to clean skins in February when they can be hung out to freeze-dry during the lengthening days. Skins are put into the tanning solution in the summer, because wringing must be done outdoors where the pungent odor of the rotten moose brain solution is not too overwhelming. Smoking is also done outdoors, usually in the early fall. Although tanning is mainly women's work, men will assist whenever help is needed.

Traditionally, women would tan from three to four moose hides per year, and ten caribou hides (tanned caribou skin without the hair was used for summer clothing). At the present time, most women tan from two to four moose hides and three to five caribou hides per year. They prefer to tan more moose hides than they will use, so that they can trade the surplus with Kobuk Eskimo women for desired Eskimo products (trade is discussed later in this chapter). The most important use for moose hide is for skin boot soles—home-tanned hides are tougher and much longer lasting than commercially tanned hides. Tanned moose hide is also used for summer moccasins, slippers, mitten palms, and gloves. Tanned caribou hides are used primarily to make fancy beaded gloves, children's clothes and seams, ties, and trim for skin boots. Women not only sew for their families, but also bring in some money by sewing items ordered by teachers, preachers, doctors, nurses, and pilots who work in the area.

One Huslia woman tanned three caribou and four moose skins during 1976. Several years ago when she was sick and in bed after two operations, she said, "I just cried for working at my skins—it's my hobby."

Quite a few young women are learning how to tan, so this skill is not being lost. A man from Huslia expressed his admiration and respect for an 80-year-old woman, "She scrapes her moose skin faster than any woman in the village. That woman is tough—you should see the muscles in her arms!"

Tanning Tools

It is believed that a woman's tanning luck is transmitted with her tools, so the tools of an expert tanner are prized possessions passed down through the generations. The following list describes the tools used for tanning moose, caribou, and furs.

Scraper

The *bik'eelugha* is used mostly on large hides to scrape the skin side of furs and caribou leggings and to scrape frozen moose hide after the flesh and hair have been removed (figure 31).

Scraper

The *k'inghuł* is used to scrape caribou leggings and small furs (figure 32).

Flesher

The *baahaa k'ilk'aayee* is used to remove flesh from the meat side of moose and caribou skins (figure 33).

Sharp Butcher Knife

A sharp butcher knife is also used to remove flesh from the meat side of moose and caribou skins and to "shave" the hair from the hair side of these skins (figure 34).

Dull-bladed Caribou Bone Scraper

The *tł'in k'ilk'aayee* is used to scrape both the skin and the hair sides of caribou skins after the flesh and hair have been removed and while the skin is thawed (for moose skin, the sharp butcher knife is used on thawed skin). To make the caribou leg bone scraper, clean the bone from the lower foreleg of a caribou, cut down the center of the ridge in the bone with a saw to split the bone in half, and then lightly file one edge so that it is like a dull-bladed knife (figure 35).

FIGURE 31. SCRAPER (*BIK'EELUGHA*): USED PRIMARILY ON LARGER HIDES; MADE BY HEATING AND BENDING A 10-INCH FILE AND INSERTING IT INTO A WOODEN HANDLE.

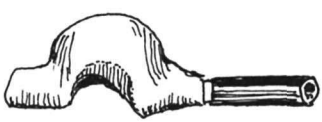


FIGURE 32. SCRAPER (*K'INGHUŁ*): USED PRIMARILY ON SMALLER HIDES; MADE WITH A PIECE OF A SHOT GUN BARREL WHICH IS FILED ON THE WORKING EDGE AND FIT INTO A CARVED WOODEN HANDLE.

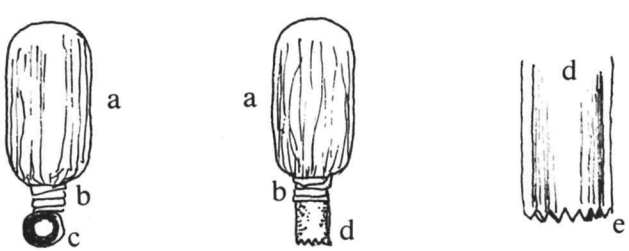


FIGURE 33. TWO TYPES OF FLESHERS (*BAAHA K'ILK'AAYEE*): *a*, ROUNDED, HEAVY BIRCH HANDLE; *b*, CARIBOU RAWHIDE; *c*, TRAP SPRING; *d*, CARIBOU LEG BONE; *e*, DETAIL OF BONE EDGE.

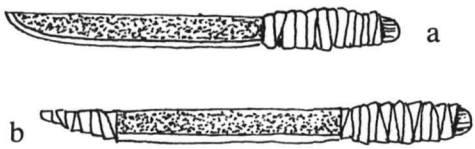


FIGURE 34. BUTCHER KNIVES: *a*, SHARP BUTCHER KNIFE WITH AN 8-INCH BLADE: *b*, DULL KNIFE WITH BOTH ENDS WRAPPED FOR HANDLES.

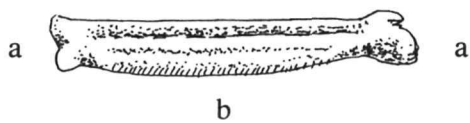


FIGURE 35. CARIBOU BONE SCRAPER (*TŁ'IN K'ILK'AAYEE*): *a*, JOINTS USED AS HANDLES; *b*, FILED WORKING EDGE.

FIGURE 36. WOMAN'S KNIVES (*TŁAABAAS*): *a*, BONE OR WOODEN HANDLE; *b*, SAW BLADE; ONE TYPE IS SHARP AND THE OTHER HAS A ROUNDED, DULL BLADE.

A dull-bladed butcher knife can also be used for the same purpose. The last few inches of the knife's sharp end are wrapped with tape or cloth so that is has two handles for scraping (figure 34).

Sharp Woman's Knife

The *tl̷aabaas* is an all-purpose knife used to scrape moose and caribou skins after they have been removed from the tanning solution. Using it helps to remove excess liquid and soften and stretch the skin (figure 36).

Round-edged Dull-bladed Woman's Knife

This *tl̷aabaas* is used to scrape moose and caribou skins after they are tanned during the final stretching and softening process (figure 36).

Birch Pole

Caribou and moose skins are draped over a birch pole while removing the flesh, hair, and membrane. To make the pole, cut down a small birch tree about 5 inches in diameter (birch is used because there is no sap which would stick to the skin). Cut off a straight section of the tree about 3½ feet long, and then, with a sharp knife, peel off all the bark down to the wood until the pole is very smooth (any lumps left on it will tear the skin). Finally, round the top of the pole. Some women make a frame to support the vertical pole in front of them while they sit in a chair and scrape.

Tanning and Taboos

Certain taboos must be followed to guarantee good luck in tanning. For example, it is *hutl̷aanee* (tabooed) to scrape any skins at night, because in *kk'adonts'idnee* (origin story) times a sockeye salmon woman was killed at night while scraping a skin with her long nose.

There are specific taboos to observe while tanning moose and caribou:

1) You must not walk under the pole where the skin is hanging, but go around it. Violation will cause the skin to dry up and tan poorly.
2) You must not drink too much liquid while tanning, or the skin will not wring out correctly.
3) You must never use metal for your wringing pole. One woman said she used metal once and has had back luck since then.
4) You must always put the hide into the tanning solution head end first.
5) After the skin is tanned and before it is smoked, you must trim off the edges of the hide, where the holes have been, and place them up on a pole away from the village or out in the cache. They must never be thrown on the ground or in the trash, but must be allowed to rot naturally in a place where animals cannot get them. This is to show respect for the moose or caribou, which helps to ensure that you will have good luck tanning it in the future.

There are also taboos for tanning furs. Only older women past child-bearing age can tan wolf, bear, wolverine, otter, and lynx hides. Violation will cause crippling in a young woman's children, "just like they are eating away at our bones. Lynx is worst."

In addition, old women must wait a year to tan these skins. It is *hutlaanee* to work on a "fresh" skin that is less than a year old.

One woman said that she worked on a fresh wolf skin once, although she knew she was doing wrong, because a white man wanted a tanned skin right away. Three days later, on her way to the woodyard, she saw fresh wolf tracks and knew this was a bad sign. She was badly injured that day when a falling tree struck her. Not surprisingly, she vows never to disobey that taboo again.

Tanning Moose and Caribou Hides

Seven steps must be followed for tanning moose and caribou hides:

Step 1. Removing the Flesh and Hair from the Skin

It takes an expert about 6 hours to remove the flesh and hair from one moose skin. She will use a sharp butcher knife, as well as a fleshing tool, to remove the flesh.

The thawed skin is placed over the vertical birch pole, meat side out. Then, using the butcher knife, the meat is lifted with one hand and trimmed off with the knife. When the fleshing tool is used, a section of the skin next to the part being cleaned is folded under it for extra padding so it will not tear. The skin is held with one hand and the flesher with the other, and the meat is removed with strong downward thrusts. This process is completed when white skin shows on the entire meat side of the hide. The meat scraps are saved for dog food.

The hide is then turned over so that the hair side is out and the hair is "shaved" off with a sharp butcher knife. The woman cuts against the direction that the hair grows and is careful not to make holes in the skin. The hair can be shaved off more easily if the skin side of the hide is wetted first and the hide is left overnight in a plastic bag. The hair is often saved for making boat pillows or padding for dog houses.

Another method for removing the hair is to wet the cleaned skin side with a mixture of lukewarm water and Fels Naptha soap. It is then left in a sealed plastic bag for a week, with daily wetting to keep it moist. A third option would be to place the whole skin in a bucket of lukewarm soapy water for a week, with a weight over it to keep it submerged. This process loosens the hair so that it can be plucked out easily by the handful. It also rots the skin slightly, making it easier to tan.

Step 2. Scraping the Skin after the Flesh and Hair are Removed

All the remaining hair follicles and membranes must be removed from both sides of the skin or it will not tan. This step is done differently for moose and caribou. Moose skin is staked out flat just off the ground to freeze-dry during the winter. After it has dried, the stakes are removed and it is scraped all over both sides with the scraping tool. If this step has to be done on moose skin during warm weather, it is done the same way as with caribou, except that the sharp butcher knife is used as the scraping tool.

For caribou skin, the hide is wetted and left in a plastic bag overnight. It is draped over the vertical birch pole the next day and both sides of the skin are scraped clean, using a dull butcher knife or a caribou leg bone scraper. The blade edge is angled upward and the scraping motions are made downward. If the skin is scarred or has blowfly holes, it can tear easily; it must be scraped more gently in these places. In places where the skin is unusually thick, it must be scraped with extra effort.

The Kobuk Eskimo method for tanning caribou hide is sometimes used. After removing the flesh and hair from the skin and scraping the meat side a second time, the hair side is not scraped again. In this way, the hair side of the finished skin will be like smooth leather rather than like suede, which would be the skin's texture if it were scraped again.

After being scraped the second time, the moose or caribou skin is hung outdoors to freeze-dry in the late winter sun of February through April, using a horizontal pole placed up high enough so dogs cannot get at the skin. (Dogs will eat a skin during any stage of the tanning process.)

Step 3. Putting the Skin in the Tanning Solution

Before placing a moose skin in the tanning solution, it must be laid out flat 5 or 6 feet above a smudge fire in the smokehouse for 12 hours on each side. This softens the skin, makes it less slimy, and thus easier to tan. Then a light coat of Wesson Oil is applied to one side of the moose skin, putting more on the thicker back and hip areas.

To make the tanning solution, a big laundry tub is filled about half-full with lukewarm water. A bar of Fels Naptha soap is added and mixed until the water is very soapy. A pint of rotten moose brains is then strained through a cheesecloth into the water and mixed in. The skin is folded in thirds and the head end is put into the solution first. The skin must be wetted until soaked, using a rag and the bar of Fels Naptha soap; this action will soften the skin while it is gradually put into the mixture. It is rolled up under the water as it softens, another segment is then wetted and rolled up until the whole skin is completely rolled and under the water. Then it is soaked for 24 hours.

Caribou skin can be tanned in a plain soapy water mixture, or in a soap and brains solution as for moose. However, much less solution is needed, and it does not have to be smoked or coated with oil before placing it in the tanning mixture. It is also not as stiff as moose skin and so it will usually not need to be wetted and rolled up; it can be put whole into the solution.

After being soaked for 24 hours, both moose and caribou skins are removed from the solution and draped over the vertical birch pole with a washtub under it to catch the drips. Both sides of the skin are scraped again to stretch and soften it. A dull *tłaabaas* or dull butcher knife are used for caribou, and a sharp *tłaabaas* is used for moose. Then the skin is put back into the tanning solution for another 2 or 3 days.

Step 4. Wringing the Skin

After a moose or caribou skin is removed from the tanning solution, it is hung across a smooth, clean pole about 2 to 3 inches in diameter, suspended horizontally outdoors or in the smokehouse. A washtub is placed under it to catch the drips, and dirt and dust must be kept off of the skin as much as possible. A dull *tłaabaas* is used for caribou, or a sharp one for mooose, and the entire surface of the skin is scraped gently to remove excess liquid.

Six holes (about 2 to 3 inches in diameter) are made along the tail end of the hide. A piece of hemp or cotton (not nylon) rope is tied through each hole, making loops of equal length so the hide will

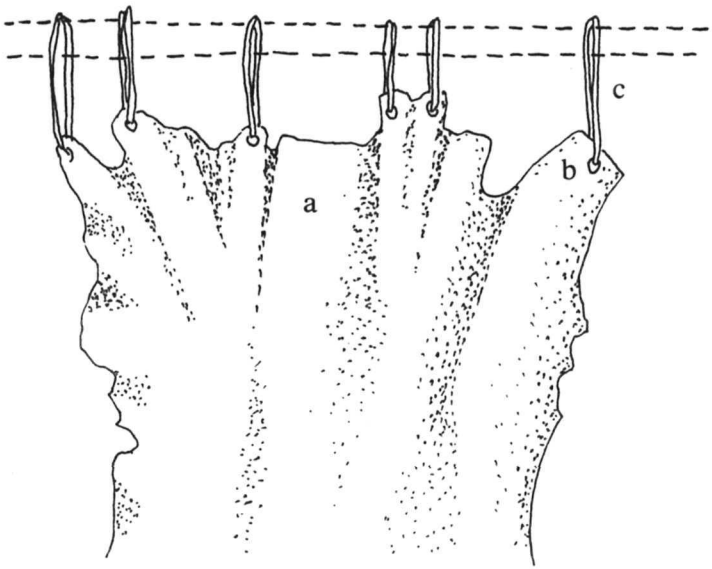


FIGURE 37. PREPARING A HIDE FOR WRINGING: *a*, TAIL END OF HIDE; *b*, ONE OF THE SIX HOLES THROUGH WHICH THE ROPE LOOPS (*c*) ARE TIED TO STRETCH THE SKIN EVENLY.

stretch evenly. Similar loops are tied through about four holes made at the head end of the skin. The hide is then rolled up very tightly from each side, with the smoother side of the skin out, until each side meets in the center. The rolled-up moose hide is tied in three places along its length to keep it from unrolling, but this is not necessary for caribou skin.

Two sticks, each about 2 feet long and 2 inches in diameter, are needed. The first three rope loops on the tail end of the skin are put over one of the sticks, and the stick is then placed behind a tree or solid vertical pole. The three remaining rope loops are placed over the end of the stick. The stick is tied at a right angle to the tree or pole at about chest height so it will not slip down. The same is done with the rope loops at the head end of the hide, but this time the stick is secured at a right angle to a non-anchored wringing pole. This should be about 5 feet long and 2 to 3 inches in diameter.

Caribou skin is small and it can be wrung by one person. The wringing pole is held upright and the skin is stretched as far as possible lengthwise. The skin is wrung in a clockwise direction, giving it three slow twists at a time and about a minute interval for it to drip after every three wrings. When the skin is finally wrung into a tight lump, the wringing pole will be next to the stationary pole, and must be tied securely to it. The skin is covered with a tarp and left to drip for an hour or so. Then it is uncovered and wrung again completely

FIGURE 38. WRINGING A HIDE.

in a counter-clockwise direction, until the wringing pole is once again next to the stationary pole. It is covered again and left for a couple of hours, then it is ready for the next step.

The same wringing process is done for moose skin, except that two or three people are necessary because the skin is so large. So much tension is created during the wringing, that if one woman was doing it and the wringing pole slipped, she could be severely injured. To prevent this from happening, a 50-foot length of ½-inch manila rope is used as a pulley. One end is tied to the wringing pole then stretched out to another permanent pole a few yards away and wrapped twice around this structure. One person holds the end of this rope to keep tension and to feed rope to the person who is wringing the hide (Attla 1971:13). Two people often work together at the wringing pole, wringing it in both directions as for caribou hide. When finished, the skin is covered with a tarp and left overnight in its tightly wrung position so that it can continue to drip.

Step 5. Stretching and Working the Skin with the Hands to Tan it

When the skin is unwound from wringing, it is untied from the poles and sticks, and all the rope loops are removed. A moose skin is hung over a horizontal pole in the smokehouse or outdoors, while a caribou skin is simply placed in the lap over a piece of plastic (to keep the odor from permeating the clothing). The skin is stretched in all directions; and, at the same time, it is worked all over in a circular motion with the hands. A piece of the skin is held in one hand and another piece next to it is held in the other hand, then both pieces are twisted vigorously in a circular motion and rubbed against each other. The skin is stretched and worked with the hands until it is thoroughly soft.

Step 6. Final Stretching and Softening

A length of rope is placed parallel to the horizontal pole and up next to it. The skin is draped in half over the pole, then the half of the skin nearest the rope is wrapped around both the rope and the pole.

This holds it in place for scraping. A dull-bladed round-edged *tl'aabaas* is used to scrape it from top to bottom, all over, with hard downward thrusts, using the whole body weight while holding the bottom edge of the skin with the other hand. Both sides of the skin are scraped in both lengthwise and crosswise directions so that it will stretch evenly. This final stretching and softening process should tan the skin completely. However, if it has not softened, it must be put back in the tanning solution and the whole procedure must be repeated.

Step 7. Smoking the Skin

A mixture of rotten spruce and rotten willow wood is used to smoke hides. During the entire summer, rotten spruce is gathered from the center of old stumps where it has crumbled, become fairly dry, and can be broken off in square-shaped chunks. Enough spruce chunks to fill a medium-sized packsack are sufficient to smoke two hides. Rotten littletree willow is gathered in summer and early fall. Slightly more rotten willow than rotten spruce is used in the smoking mixture. The rotten wood is crumbled with the hands into a washtub until a thick layer covers the bottom of the tub, then hot coals are added to start it smoking.

To prepare the hide for smoking, the edges full of holes are trimmed off. Any remaining holes in the skin are patched with masking tape or pieces of canvas. The skin is folded in half and sewn up the sides and all along the bottom edge, except for a 2-foot wide opening into which a canvas chute about 3 feet long is sewn. The chute conducts the smoke up into the hide from the tub of smoking wood (Attla 1971:54). The tub of rotten wood must be checked every hour or so to make sure that it is still smoking and that nothing catches on fire. The skin is smoked until the inside turns the correct tawny brown shade. Smoking can be done outdoors or in the smokehouse, and its purpose is to soften the skin further, color it, and give it the characteristically pleasant smell. (For further details see Attla 1971.)

Dying a Skin

Alder bark was used traditionally to dye caribou skins a reddish color; it was also used to color porcupine quills that were used as beads in decorative work. Some women still dye caribou hide when they want a red-toned skin for fancy boot trim, ties, seams, or fancy beaded gloves.

Alder bark is removed from green (fresh-cut) alders in the spring or summer. If it is not used immediately, it must be stored in a cool, dark place so it will not dry out. To make the dye, small strips of the inner bark are peeled off and then soaked in a small amount of water overnight; they are boiled if a darker color is desired. Next, the bark strips are removed from the water and dried, and the water is saved. The bark is then crumbled by hand into tiny pieces and put back in the water. The wet bark pieces and some of the colored water are applied to one side of the skin. The skin is folded in half, something heavy is placed over it, and it is left like this for two or three days. The pieces of bark (which can be used again) are removed, and a reddish brown colored skin should be the result.

Tanning Marten, Mink, Otter, Squirrel, Lynx, and Fox Skins

Several small fur-bearing animal skins are all fairly easy to tan and are done the same way. The hide must first be well cleaned of all meat and fat and then stretched out to dry. When it is dry, the skin side is scraped gently with an Indian-or Eskimo-style scraper to remove the adhering membrane and to soften it. Then a light coat of Wesson Oil is rubbed on the skin with a rag and it is left overnight. The next day, the whole hide is washed in lukewarm water containing Fels Naptha soap; it is then rinsed thoroughly to remove all the soap. As the hide is drying, it is stretched and thoroughly worked with both hands in a circular motion until dry. This is done over the entire surface of the skin side of the hide by holding a piece of the skin in one hand and

another piece next to it in the other hand. Both pieces of skin are twisted vigorously in a circular motion while being rubbed against each other.

Tanning Beaver, Muskrat, Wolf, and Wolverine Skins

Beaver is the most difficult small hide to tan; muskrat, wolf, and wolverine hides are tanned by using the same process.

1) The skin side is scraped gently with the Indian-or Eskimo-style scraper to remove the adhering membrane. The edges of small beaver hides are very delicate and hardly need to be scraped at all, so the center of the skin is scraped the most. The beaver skin is then worked with the hands in the same manner as were the hides of marten, mink, or other similar furbearers.
2) The whole hide is soaked overnight in a solution of lukewarm water and Fels Naptha soap.
3) The hide is rinsed the next day until all the soap is removed; usually two rinses are enough.
4) The hide is stretched and worked all over with the hands in a circular motion until it is dry. Then, a thin coat of Wesson Oil is applied all over the skin side and it is worked with the hands again.
5) The skin side is wet with a rag until it is thoroughly soaked. The hide is folded in half with the wet part on the inside, or if tanning two hides, they are placed skin-sides together in a cool spot on the floor and left overnight.
6) On the next day, the hide is worked with the hands in a circular motion and stretched all over as it is drying. This is continued until the hide is dry.
7) The skin is scraped gently all over with a dull scraper to complete the tanning. Sometimes, a large beaver skin does not become tanned the first time and the whole process must be repeated.

Tanning Caribou Leggings

Caribou legs are skinned by cutting a straight line up the middle of the front of the front legs and the back of the back legs—over the "knee" in both cases. When the leg skins have been removed, they must be tacked onto something flat to freeze-dry outdoors in the winter.

When they are dry, the leggings are scraped with either Eskimo-or Indian-style scrapers. If they are being scraped on the floor, they are placed on cardboard and cushioned with a rug or something soft. If a person prefers to sit while scraping, the leggings (or any small skin) can be clamped to a piece of plywood of the correct height. They are scraped hard enough to remove all the adhering membrane, with the finished legging white and soft.

A mixture of lukewarm water and Fels Naptha soap, or one of sourdough starter and water, is applied to the skin side until it is soaked. The leggings are placed with the skin sides together in a cool place on the floor overnight. The next morning, they are stretched as they are drying. It is especially important to stretch the ankle area in both directions if the skins will be used to make boots. When dry, they are scraped lightly with a dull scraper. Too much scraping will cause them to become too soft—they should have a little stiffness remaining in them for use as the upper part of skin boots.

Sewing Skins

An old Koyukon belief said that if a woman threw out her fingernail parings, she would lose her deftness at sewing and tanning, so she would save them in her hair (Jette 1911:259). Today, expert skin sewers remain highly admired and valued by members of their society because skill in producing Native clothing is so important for survival in the north. One Huslia woman, who no longer has time to sew now that she has a full-time wage job, expressed the value placed on sew-

ing, "Before I was the health aide, my house was rich; now my house is poor."

Sewing activity is greatest during fall through mid-winter; it diminishes when people are involved in intensified outdoor subsistence activities during spring and summer. Although down parkas are now more commonly used than fur parkas, the latter may still be used for long winter trips in preference to down because they are so much warmer; almost every adult owns a locally made fur parka. No western-style footwear has yet been found to replace Native-made skin boots for warmth, durability, and lightness.

In the fall, women are busy making skin boots, mittens, and parkas, as well as repairing old ones to prepare their families for winter. In addition, these items are made as Christmas presents for family and friends and to fill orders from white people in the area. Women also make fancy boots and gloves for family members to wear on special occasions and when visiting other villages. Many pairs of boots and gloves are also made for trade with the Kobuk Eskimo women. Women also do the very important sewing for funerals. When a person dies, female relatives sew the beaded moccasins and gloves in which the person is buried. Within a year a memorial potlatch is held, and women will sew many different things to be given away to those who helped during the funeral.

During the winter of 1975/76, the Huslia Sewing Club met once a week and the one in the village of Hughes met twice a week. Women and girls of all ages participated, providing a good opportunity for the young to learn these skills. School girls usually begin by learning to do beadwork on a piece of moosehide, and then they make a pair of moosehide slippers or fur mittens as their first project. Young married women learn to sew skin boots and other items for their husbands and children. In 1975/76 skin-sewing classes taught by local women were given at village schools, and both girls and boys attended. Some Huslia boys had made themselves skin boots with moosehide soles. The parents believed sewing to be an important survival skill for the boys who might tear their boots or mittens while they were out hunting or trapping.

Before the arrival of Euro-Americans in Alaska, all clothing was made from hides. The older women still know how to make traditional types of clothing, although it is no longer necessary to make some of them today. Old-style waterproof boots were made of unscraped caribou leggings with naturally waterproof moose leggings for soles. The warmest traveling boots came up to mid-thigh and were made of caribou leggings with "fur side in" caribou skin soles. "Instant" boots for children were made of the back leg of caribou. These were "peeled" off so that the back "knee" of the caribou leg skin became the heel of the little boot. The skins were sewn at the toe after being cut at the desired foot length. They were then turned inside out, stuffed with moss, and hung out to dry.

The warmest winter clothing for men and women were caribou fur parkas, with the hair on the inside, and caribou fur pants. Summer shirts and pants for men and women were made of caribou hide tanned without the hair and decorated with fancy porcupine quillwork.

People used rabbit skins as socks and also braided them into blankets and parkas. Strips 1 (one) inch wide and 6 to 8 feet long were twisted so that only the fur side was showing and were then woven together in a close mesh netting (Sullivan 1942:111-12). They used small bear hides to make men's and boy's clothing as well as dog harnesses; and they used moose fetus hides for children's clothes. Sandhill crane and swan leg skins were used for seams in boots and gloves.

Traditional skin carrying-bags were made of one or two tanned caribou hides, depending upon the size desired; they had a babiche or rawhide drawstring at the top and were provided with wide strips of tanned caribou for carrying straps. The larger packsacks had a tumpline that went across the forehead for heavier loads. Women used these bags to transport rabbits from their snarelines or to carry frozen fish from nets and traps in the river (Clark 1974:62, 136).

King and silver salmon skin was used for waterproof parkas, pants, and boots for wet weather use. The skins were dried in the

summer with some meat on them, and in the winter they were scraped, washed, hung out in the cold to dry and then sewn with sinew. The strongest part of the king salmon skin, the back, was used for boot soles (Sullivan 1942:31-32). A children's vest of salmon skin was made for protection against dangerous spirits.

Although these old-style things are no longer being made, women are still extremely busy manufacturing skin boots, gloves, mittens, slippers, fur caps and parkas, and parka ruffs. Caribou-legging boots with moosehide soles are the warmest winter boots, and canvas boots with moosehide soles are the most popular "work boots." (See appendix C for patterns and instructions for making the boots.) The toughest boots are made of wolf leggings, but they can only be worn by men. In 1976 a Huslia woman sewed a pair of these for her husband, and her young daughter made the fancy beaded tops for them. Many pairs of beaded moccasins and gloves were made to exchange with Kobuk Eskimo women for caribou leggings which were in short supply on the Koyukuk.

Every male in the village owns a marten skin cap and most people own at least one pair of beaded moose or caribou hide gloves for "visiting around town," a pair of beaded moosehide slippers for wearing indoors, and a fur parka for village celebrations and for long winter trips. Muskrat parkas are the most common for women, while men have parkas of beaver, wolf, lynx, or wolverine—furs taboo for women to wear.

Every parka has a ruff, most commonly of wolf fur, which frosts very little in cold weather and provides important face protection from bitter cold winds. Ruffs are made by piecing together matching strips of fur. A piece with long guard hairs is placed in the center, with matched side pieces having shorter hair. Fancy ruffs are made with a thin strip of wolverine fur sewn in front of the wolf fur. Wolverine becomes even less frosted than wolf fur, but is used less extensively because the hide is so much harder to obtain.

Everyone also has at least one pair of cloth-lined fur mittens to be worn in cold weather with one or two pairs of cloth gloves inside

them. Women's mittens are usually made of beaver, mink, or rabbit, while men's mittens are sewn from the hides of wolf, lynx or lynx leggings, and otter.

Many people still use moosehide moccasins during dry summer weather. The Koyukon obtain bearded sealskin boot soles in trade from Kobuk Eskimos and use them during periods of wet snow, especially during the spring thaw.

Pillows and mattresses made of moose or caribou hair, mixed with feathers to prevent clumping, are sometimes made for use in boats and camps. Some women save goose or duck feathers and down to make jackets, quilts, socks, and pillows. Ptarmigan feathers are not used because it is believed that they will cause early graying of the hair.

A Hughes woman estimated that she makes about 20 pairs of boots a year. A Huslia woman made 2 pairs of skin boots in one day during her spare time. This same woman once made 30 pairs of boots during a summer in which she was too ill to set up her fish camp. Another Huslia woman recorded the items she sewed from October 1974 to October 1975:

4 pairs calfskin boots
8 pairs caribou legging boots
2 pairs big fur mittens
4 pairs beaded gloves
4 pairs beaded slippers
2 pairs canvas boots
4 pairs kids' boots
assorted vests, beaded purses, and other articles

Women carry their sewing equipment in a sewing bag called a *bits'eedaakkogga*. This bag was formerly made entirely of moosehide, but today it is made of decorated canvas with patches of moose or caribou hide through which pins and needles are stuck. Ordinarily, this bag contains a thimble, skin needles, beadwork needles, thread (dental floss, sinew, or waxed cotton thread), a razor blade or small *tł'aabaas* for cutting furs, and a pencil or pen for tracing patterns (figure 39).

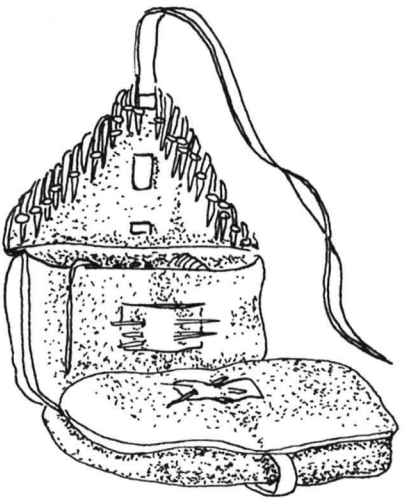


FIGURE 39. A KOYUKON SEWING BAG (*BITS'EEDAAKKOGGA*).

Most of the older women still prefer to sew with sinew because it is much tougher than dental floss. Back or leg sinew from caribou is preferred over moose sinew, which can be used but is less flexible. Strips of sinew are dried, and then thread-sized pieces are easily peeled off. A thin piece is twisted in the hands in one direction only and then a second piece is twisted in the same way. These two pieces are then twisted together, also in the same direction. The needle is threaded with the thinner end of the sinew.

When cutting furs for patterns, women cut only on the skin side, using a sharp razor blade or woman's knife. Scissors are never used because they will ruin the fur. Fur pieces are sewn together on the skin side only, using an overcast stitch while holding the seam together and tucking the hair back down with the needle or a scissors so that it does not get caught in the stitches. The directions and patterns for sewing fur mittens, fur socks, canvas boots, and eight-skin caribou legging boots can be found in appendix C.

Filling Snowshoes

Filling snowshoes is often a woman's job, and many Koyukon women aged about 45 and older are skilled in this craft. Locally made snowshoes are preferred over commercially made ones because of their lightness. Men fashion the birchwood frames, which consist of two side pieces with three cross braces. They are slightly upturned and rounded at the front, and V-shaped at the back. Snowshoes for use on trails are about 4 feet long and 6 to 7 inches wide at the center; those used in deep snow off the trail are about 5½ feet long and 10 inches wide (Clark 1974:65).

Women lace the front and back sections of the snowshoes with untanned caribou rawhide or babiche. The fleshed and dried caribou hide with the fur removed is cut into a continuous strip about ¼ inch wide. It must be wetted before using if it is too dry and stiff. A special needle is used for lacing the rawhide into the snowshoe frame; the needle, made of a thin piece of metal or bone about 4 inches long and ¼ inch wide, has a hole in its center through which the rawhide is threaded. Loops are made through holes along the inside edges of the frame, and the babiche is laced through these in an elaborate pattern running from top to bottom and side to side.

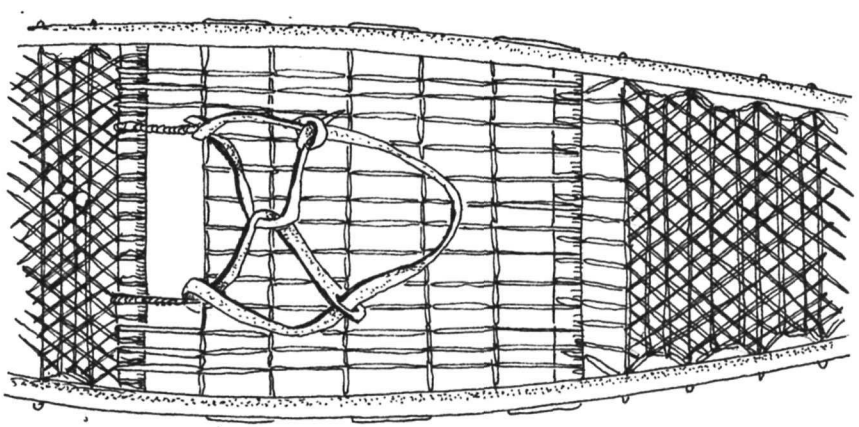


FIGURE 40. BOOT HARNESS AND CENTER SECTION OF A KOYUKON SNOWSHOE.

The center part of the snowshoe is often prepared by the man, using crisscrossed strips of heavy, untanned moose babiche. The foot harness is made with a tanned moosehide thong.

A finished pair of Koyukon Athabaskan-made snowshoes are truly exquisite. "Stuck (1915) gave many accolades to the Koyukuk Indians from the South Fork for their superiority in making snowshoes, and he believed they were the finest he observed in all the areas he visited in Alaska" (Clark 1974:145).

Trading Partnerships

The Koyukuk Athabaskans and the Kobuk Eskimos had trading partnerships long before Euro-Americans arrived in the area. Trade between the Koyukuk and Kobuk people was part of a larger network linking the summer trade fair at the mouth of the Tanana River with another fair on Kotzebue Sound. Indians on the upper Koyukuk also traded with their Eskimo neighbors, the Nunamiut, who lived in the Brooks Range. While the Huslia-Dulbi area people traded mainly with the Kobuk Eskimos, the lower Koyukuk River people from the Kateel River area traded via the Yukon River with the Norton Sound Eskimos (Clark 1974:209, 213).

Two men would establish a trading partnership, usually as the result of a combined hunting and trading trip taken into the partner's territory. When a partnership was agreed upon, a ceremonial exchange of gifts took place and a feast was given for the new partner. This initiated further feasts in which the partners were invited to trade in each other's villages (Clark 1974:235).

The Kobuk Eskimos went to the Kotzebue area to trade their wolf, wolverine, and fox pelts for seal oil, whale fat, sealskins, and sealskin boot soles. Some of these coastal products were in turn traded to the Koyukuk people for beaver, marten, wolf, and wolverine skins, tanned and untanned moosehide, Indian-style moccasins, and fringed caribou skin garments. This trade with the Kobuk Eskimos brought cultural change to the Koyukon by 1838, almost 50 years before the actual arrival of Euro-Americans on the Koyukuk River.

The Koyukon were linked through the Kobuk people to the Alaska-Siberia fur trade that brought such European goods as flour, tobacco, metal knives, rifles, and ammunition to the area (Clark 1974: 176, 219-20).

Today this trade with the Kobuk Eskimos is still very important, but it is now mainly the women who establish trading partnerships. Because of air travel and snowmachines, women now travel much more frequently between the areas, often bringing something they have made and giving it to a woman with whom they have become friends. This initial action usually develops into a trading partnership, because the friend will soon reciprocate the gift by sending or bringing something she has made. Most Huslia women have partners on the Kobuk; one woman has a partner in Kotzebue. The partnership between the Huslia woman and the Kotzebue woman began several years ago when several Kotzebue people visited Huslia, and the Eskimo lady was given some beaver skins and tanned moosehide. In return, the Indian woman later received a fancy Eskimo-style muskrat parka from her Kotzebue friend. This exchange established their trading partnership.

The most common items used in trade from Huslia women to Kobuk women are beaded moosehide moccasins, slippers and gloves, tanned moosehide, and beaver, wolf, marten, lynx, and other furs. The most common items given in trade from the Eskimo women to the Indian women are sealskin boot soles, seal oil, caribou leggings, sealskin rawhide, and finished caribou legging boots with sealskin soles.

As was noted above, caribou leggings are highly valued because they make the strongest and the warmest winter boots. Since caribou are much more abundant on the Kobuk River than on the Koyukuk, women must often get the necessary leg skins in trade. They also have to acquire waterproof, bearded seal boot soles, which are necessary in wet snow conditions when moosehide soles will simply soak up the wetness like a sponge. Seal oil is a luxury item that the Indians say they hunger for when they do not have it.

The Indian product most highly desired by the Eskimo women is tanned moosehide. Moose are not as plentiful on the Kobuk as they

are on the Koyukuk, so the women there have never learned to tan moosehide. Tanned moosehide makes the strongest and best quality winter boot soles for use when the snow is dry—when sealskin soles are too slippery. Beaver, wolf, wolverine, marten, and other fur-bearing animals are also not as plentiful on the Kobuk, and their furs are needed for ruffs, parkas, mittens, trim, and other clothing needs. Indian-style beadwork on beaded boot tops, moccasins, slippers, and gloves is a luxury item desired by the Kobuk people the same way that seal oil is a luxury for the Indians.

Trade among women is important to procure items needed for making the winter clothing necessary for survival in the far north. The largest volume of trade today occurs during the "April spring carnivals" held in Koyukuk and Kobuk villages. To attend these events people traverse the intervening mountains by snowmachine, dog team, or chartered airplane each spring. Most of the Kobuk women who attended the Huslia carnival in 1976 brought caribou legging boots with sealskin soles for their trading partners who displayed them proudly during the carnival events. Either they received tanned moosehide and beaver and other furs in return or they would wait for moosehide, furs, or a pair of Indian beaded moccasins to be sent to them later. Younger Eskimo women who had not yet been to Huslia also brought boots they had made, and they established partnerships with Huslia women. The Indian women who went to the Kobuk carnivals that year brought tanned moosehide, beaded moccasins and caribou skin gloves, or furs for their trading partners.

Making Birchbark Containers

Birch bark had many more uses in former times than it does today. Baskets sealed with spruce pitch were used to store fish, berries, and oil in underground pits, for carrying and storing water, for urine containers, for boiling foods with hot stones, and for plates and cups (Clark 1974:133).

Birchbark canoes 10 feet long and 2 feet wide were used by the men for hunting, and a 20-foot long bark canoe was used by women for fishing and moving families from one camp to the next. The canoes were propelled with single-bladed paddles and were poled in shallow water (Clark 1974:138).

Women did all the sewing on birchbark canoes. They sewed pieces of bark together with spruce root, and then they sewed the bark to the canoe frame which was built by the men. The men placed spruce ribs into the canoe and the women then applied spruce pitch to the seams. The pitch they used was heated over a fire and then mixed with grease to prevent brittleness. A repair kit with spruce pitch and pieces of birch bark was always taken along on boat trips (Sullivan 1942:3-4).

Some older women still know how to make baby-carrying seats called *tł'oł*ɬ which were made of birch bark. To use the *tł'oł*ɬ a layer of sand covered with moss was put in the seat to soak up urine and was changed daily. The baby was strapped into the seat and it was put inside the back of the mother's parka or just carried or used as a seat. Apparently it had no shoulder straps.

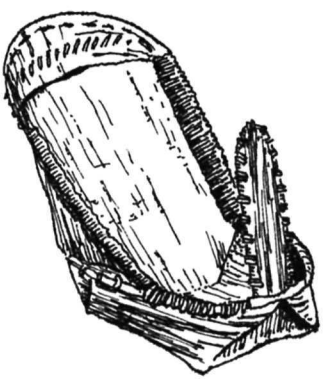


FIGURE 41. A KOYUKON BABY-CARRYING SEAT (*TŁ'OŁIŁ*).

Today, birch bark is still used for roofing on some village log cabins and for smokehouse roofs at camp. One woman referred to it as "our sheet-iron." It is also used at camp for making dish-washing and hand-washing containers, fish-rinsing pans, berry-gathering baskets, and all-purpose containers. Fancy baskets are also made and sold to outsiders by a few women in the village.

Gathering the Bark of the Birch Tree

To make birchbark containers, the first step is to obtain the bark when it can be peeled easily from the birch trees. Some people say the best time is in the spring and early summer; others say it comes off more easily in early July when more moisture has accumulated under it. The bark must look fairly smooth and not have too many cracks, which means it is too dry, or too many big knots, which would make it more difficult to use. The horizontal "eyes" on the bark should be short—about an inch or so long. The "long-eyed" bark is more brittle and tears too easily.

The bark is removed from a tree by slicing only through the outer layer with a pocket knife, making a straight cut down the length of the tree trunk about 3 or 4 feet long. A horizontal cut about 2 inches long is made at the upper and lower edges of the vertical cut, then the pocket knife is eased gently under the entire length of the cut to loosen the bark. It is peeled off slowly with the hands, going around the entire circumference of the trunk. Only the outer layer of the bark, which is white on the outside and yellow to brown on the inside, is removed. Leaving the thick inner bark intact prevents the tree from being killed. After a gathering trip, stacks of about ten pieces of bark are rolled together, keeping the brown sides out and the eyes horizontal to the roll. This is opposite to the direction that the bark wants to roll. These bundles are then tied and stored in a cool, dark place.

Gathering the Spruce Roots

Spruce roots are needed for sewing birch bark together. The best places to find these roots are in mossy ground close to river or lake banks where the ground is moist. The roots of spruce trees with long, skinny branches are supposed to be the best, and certain areas are known for their excellent roots. Roots that are too large or too dry are not acceptable because they are tough and brittle. The best roots are about ¼ inch in diameter, moist, and flexible. They are dug out by first removing the upper layer of moss and dirt until good ones are found. Each root is then pulled up gently and followed along its length to get the longest possible piece.

The bark can be peeled off with a pocket knife either before or after splitting the root. Then a small knife-cut is made in the root's end to open the split—usually this split is angled so it follows the line of "dots" made by cutting off the branching rootlets. Splitting the entire root is done by holding one half of it in the teeth and easing the other half off slowly. The split is kept even by pinching and dividing the root and angling it one way or another at the splitting point. The root should be fairly flat and from 1/8 to ¼ inch wide for sewing—some thicker roots must be split in fourths to achieve the correct size; in this case the inner core of the root must be scraped off each quarter with a pocket knife. When finished, roots are rolled up and stored in bundles in a cool, dark place. They must be soaked in water for at least an hour before being used to restore their flexibility. When spruce roots are not available, willow roots can be used although they are not as strong.

Gathering Willows for Basket Rims

Willows must be gathered just before a basket is to be made, otherwise they will dry out and lose their flexibility. Dark red-colored diamondleaf willow branches are used for basket rims because they are tougher and more resilient than littletree willows. Branches of the

diameter and length desired for the basket or container rim are gathered from live (not dry) willows. The bark is left on the willow if the root stitches will be widely spaced so it shows; or the bark is peeled off with a pocket knife if it will be hidden by the root sewing. Highbush cranberry branches can also be used for basket rims.

Making Birchbark Containers

A Traditional Berry Basket

To make a traditional birchbark berry basket (*kk'eeyhtł'ok*), one needs a rectangular piece of bark about the general size desired for the basket. A piece of bark 25 by 30 inches will make a large basket (figure 42). Four dots are marked on the inside of the bark equidistant from each corner—the further the dots are from the corners, the deeper the basket will be. Four thin "toothpicks," made of dry birch

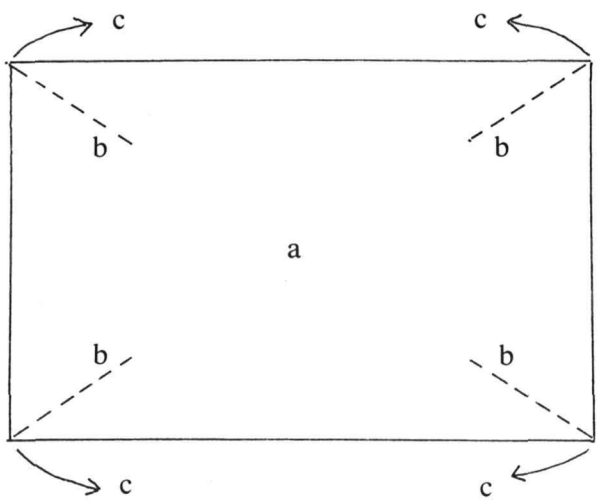


FIGURE 42. RECTANGULAR PIECE OF BIRCH BARK NEEDED TO MAKE A KOYUKON BERRY BASKET: *a*, BROWN SIDE; *b*, FOLD LINES; AFTER FOLDING BROWN SIDES TOGETHER, FOLD POINTS OVER THE LONGER SIDE IN DIRECTION *c*.

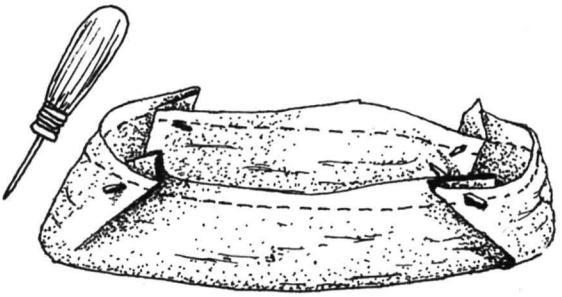


FIGURE 43. SHAPING THE BERRY BASKET: USING AN AWL MADE WITH A BIRCH HANDLE AND A FILED NAIL, FOUR HOLES ARE PUNCHED THROUGH THE LAYERS OF BIRCH; THESE FOLDED CORNERS ARE THEN TACKED IN PLACE WITH BIRCH PICKS; THE EDGE OF THE BASKET IS TRIMMED ALONG THE DASHED LINE .

filed to a point at the ends, must be ready for tacking each corner in place as it is folded. One corner of the bark at a time is softened by holding the brown side near a fire until it softens and starts to curl. If it is held too close, it will catch on fire; a safer way to soften the bark is to soak it in water first. Each corner is then folded from the dot along the straight line out to the edge of the bark. Each corner-fold is then folded back against the longer side of the rectangle, a hole is

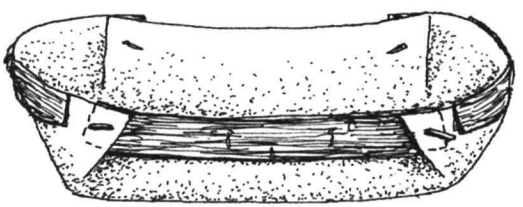


FIGURE 44. REINFORCING AND TRIMMING THE BERRY BASKET: PIECES OF BIRCH BARK, BROWN SIDE OUT, ARE ADDED WITH THE LONGER SIDE PIECES TACKED UNDER THE CORNER FOLDS.

poked all the way through the bark layers with an awl, and the folded corner is tacked in place with the birch pick. Each corner is tacked so that the top edge of the fold sticks up a little above the side of the basket—this gives the basket a rounded contour. The two long sides of the basket are then trimmed with scissors as shown with the dotted lines, making sure that both sides are even (figure 43).

Four additional strips of bark are cut for the four sides of the basket. These are sewn on with the brown side out to add reinforcement and for color contrast. The pieces are as long as the distance

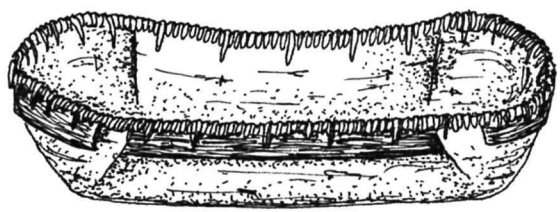


FIGURE 45. A COMPLETED BIRCHBARK BERRY BASKET (*KK'EEYHTL'OK*): SPRUCE ROOT IS USED TO WRAP A WILLOW BRANCH AND SEW IT TO THE RIM OF THE BASKET.

from corner to corner on each side, with the longer pieces fitting under the folds. The width of the strips should be about half or less the height of the basket (figure 44).

The roots, awl, and a willow branch (with bark peeled) slightly longer than the circumference of the basket must be ready. The willow is placed along the rim of the basket and it is sewn on with the root, beginning about 2 inches from the thicker end of the willow. The thick end of the root, sliced to make a point, is used to poke through the awl holes, and the willow is bent gently to shape the basket rim while sewing. The side pieces must be added with the

brown side out and trimmed to fit the top of the basket as it is being sewn together.

The Athabaskan style of attaching the willow rim begins by first winding the root around the willow only a couple of times so that the end of the root is secured. Then a hole is poked with the awl through the bark about an inch down the side of the basket, and the root is sewn through the bark from the outside to the inside. The root is brought back up and then wrapped around the willow only about six to eight times, and then another hole is stitched through it. The willow rim is sewn all the way around the basket top. The protruding thick end of the willow is trimmed with a pocket knife so that it fits over the thin end without bulging, and the root used for sewing is sewn over this last part tightly, wrapping it securely. The end of the root is then tucked under the last stitch (figure 45).

A Traditional Fish Packsack

To make a traditional fish packsack (*kaanaatł*), a rectangular piece of bark approximately 32 inches by 48 inches is needed (figure 46). Each line marked on the bark is cut and then tacked with dental floss so the bark will not tear. The ends are folded to meet each other, so

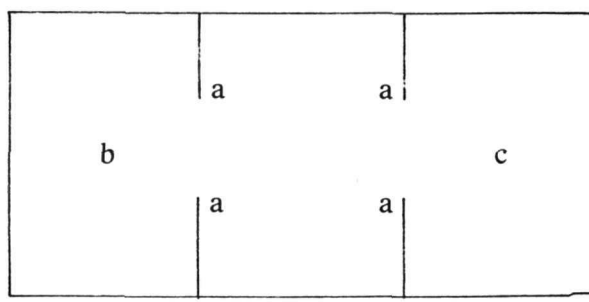


FIGURE 46. RECTANGULAR PIECE OF BIRCH BARK NEEDED TO MAKE A KOYUKON FISH PACKSACK: *a*, CUTTING LINES; SIDE *b* IS FOLDED TO MEET SIDE *c*.

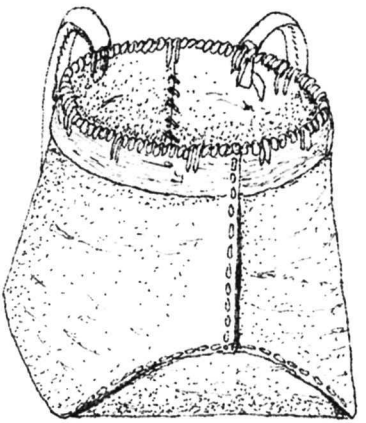


FIGURE 47. A COMPLETED KOYUKON FISH PACKSACK (*KAANAAT'*): THE WILLOW RIM IS WRAPPED AND SEWN WITH SPRUCE ROOT TO THE TOP EDGE WHICH IS TRIMMED AND REINFORCED WITH A STRIP OF BIRCH BARK; THE SIDE SEAMS ARE SEWN WITH SPRUCE ROOT.

that the container is slightly smaller at the top than at the bottom. Each side seam is sewn together with spruce root from the outside. The basket maker pokes holes with an awl and uses the same overcast stitch as when sewing with thread. The extra bark is trimmed with scissors from the seam edges.

The protruding bottom pieces are folded up over each side, their top edges are rounded off with scissors, and they are sewn onto the packsack along the rounded edges with a regular overcast stitch. The top of the packsack is also trimmed with scissors so that it is even.

A willow branch with the bark peeled is needed for the rim. A piece of bark a few inches wide and as long as the circumference of the top is also needed. This piece of bark is sewn on along the top with the brown side out for reinforcement and color. The willow rim and extra piece of bark are sewn on the packsack with root, using the same stitching as described for the berry basket.

Food Preparation

Native food is sacred to the Koyukuk people, and its preparation is usually the woman's job. Cooking is not viewed as "just women's work," but it is seen as a highly valued contribution to the good quality of daily life, and the food is eaten gratefully. Men can also cook Native foods and they always cook for themselves when they are out on hunting or trapping trips. A man will gladly cook for his family if his wife is sick or too busy with other work. Girls are taught to cook at an early age. Elaborate dishes like "moosehead soup" may be prepared by the time a girl is a teenager, and they are indicative of considerable skill and practice.

Before the introduction of metal cooking pots by Europeans, food was boiled by dropping hot rocks into waterproof birchbark containers filled with meat or fish and water. Most of the meat and fish procured during the warm part of the year were preserved by drying, and that consumed immediately was boiled or roasted over the campfire (Loyens 1966:49).

The modern Koyukon use a greater variety of cooking methods. Meat and fish are often boiled as "soup" with fat and bone left intact to make a rich broth. They are also fried, roasted, or baked in the oven in a covered pan. Half-dried meat and fish can be reconstituted and then boiled or baked. Some of the meat and fish are still fully dried, a common traditional practice of food preparation and preservation. Several recipes for preparing traditional Native foods are in appendix D, along with directions for cutting and preparing waterfowl and fish for drying.

Native foods are extremely important in the diet of Huslia people. Although supplemented by imported foods, Native foods are the focal point of most meals and without them people say that they "always feel hungry."

Dry meat and fish are sent to relatives in Fairbanks and Anchorage who get "hungry for Native food." A few indolent families in the villages, those who run out of meat and fish and have to "live off the store," are pitied and said to be "living poor."

During the late winter of 1976 when we stayed in a trapping camp with a Huslia couple, we ate the following meals: breakfast always consisted of pancakes, coffee, and warmed-up meat or fish left from the previous night's dinner; lunch included leftover meat, dried or frozen fish dipped in seal oil or bear grease, and crackers and tea; and dinner was boiled or roasted caribou or beaver meat or cooked fish. Dried fish or dried meat was carried as trail food and was supplemented with crackers and tea. At our early summer fish camp with a Native family during the same year, we ate fresh fish twice a day, for lunch and dinner, varied with moose or beaver meat once or twice a week. Half-dried fish roasted over the campfire was a favorite accompaniment to the pancake breakfasts. Similar eating patterns are also followed when people are home in the village, although more imported foods are available there.

The Koyukon Athabaskans believe that fish and meat must always be handled with respect and must not be wasted. To do otherwise would offend the spirit of the animal and bring bad luck or sickness to the offender. This also applies to animal and fish guts and bones. Fish entrails and the remains of water animals were formerly put back in the water with the words, "Be made again in the water."

Remains and bones of land animals, including hair removed from hides and the edges trimmed from a tanned hide, cannot be carelessly left to rot. They should either be elevated from the ground or placed on dry ground under a spruce tree (Clark 1970:86-87). While they are in the village, people do not throw animal or fish bones in with the other garbage, which would be disrespectful, but will put the bones in separate containers and burn them.

In addition to cooking daily for their families, women play an important role in cooking for potlatches. People save their best fish and best cuts of meat to contribute to these feasts. When a potlatch is to be held, men go around to all the village households and collect the meat. They take it to a male household in which it is cut up, and then they pass it out to each household for the women to cook.

Koyukuk people believe that when a person dies, everyone must eat at his or her house to nourish the spirit of the deceased. After the

person is buried, food is burned periodically at the grave to continue nourishing the spirit. The first few days after a person dies and before the funeral is held, people from surrounding villages gather in the person's house and eat daily meals there. Village women are extremely busy cooking big pots of meat and fish to keep all the visitors well-fed. In the meantime, the men go hunting for fresh meat for the funeral potlatch, and the women cook it on the day the potlatch is held. Many large pots of moosehead soup, bear, moose, caribou and waterfowl meat, fresh and dried fish, and Indian ice cream are prepared by the women. These are brought to the place where the potlatch is held and placed on the floor on a big piece of canvas or plastic. Non-Native foods, such as crackers, tea, canned fruit, and cakes are also contributed; but the Native foods make up the bulk of the feast and it is not considered a real potlatch without them.

After the food has been distributed to everyone, men and women stand up and make speeches. Some of these speeches always include a "thank you" to the women who cooked all the food an thus enabled the village to "put up such a good potlatch."

Chapter 9

THE SUPERNATURAL ROLE OF WOMEN IN SUBSISTENCE, THE TABOO IN ATHABASKAN SOCIETY

In addition to the important economic role that women play in the harvesting and utilization of subsistence resources, there is also a supernatural dimension to their role in subsistence. There are hundreds of taboos, or *hutlaanees*, that women must obey in order to ensure success in subsistence pursuits.

The first and less important types of taboos must be observed by pregnant women and young males or females to produce the ideal physical qualities of lightness and agility. These qualities were especially important in pre-Euro-American contact times when all hunting was done with the bow and arrow or spear. Even today, people who are slow moving and heavy are thought to be handicapped in making a living from the land. It is a real compliment to say of someone, "he is light on his feet."

An example of the first type of taboo restricts pregnant women from melting ground snow for water; they must use the lighter snow that hangs up on branches so their children will be born light and able to move quickly. They cannot eat any meat from an animal's tail bone or their children will be born slow and clumsy; and they cannot eat swan meat because this is a heavy bird and would cause their children to be heavy.

Young people and women of childbearing age cannot eat jaw meat from caribou, moose, or bear because these animals turn their heads slowly, and this would cause them or their children to move that way. Pregnant women cannot eat louche eggs because they are large and heavy and their children would be born with large, clumsy legs.

The second and more important types of taboos relate to the power women have to bring good or bad luck in subsistence activities. Some of these taboos concern the direct effect of women on men, but most of them are followed to show respect for the animals with which women interact in their environment. Women can cause bad hunting luck by merely stepping over a man's feet or, more seriously, by not treating an animal correctly.

The Koyukon believe that all animals have spirits and that these must be treated respectfully. The major ritual animals—bear, wolf, wolverine, lynx, and otter—have the most powerful spirits and thus they have the strongest taboos. The spirit is the "preternatural protector" of the species, and if not treated properly, the species will become aloof to the hunter or trapper (Jette 1911:604-605). To ensure a plentiful food supply and to remain unharmed, these spirits must be treated correctly, "[A]. . .ritual is performed to propitiate the animal's spirit. . .and to preclude it from causing mishaps to either the hunter or his family" (Clark 1970:83).

The reason that women possess a special power to bring good or bad hunting luck is that from the onset of puberty through menopause they are menstruating, and it is believed that the menses has its own powerful spirit. Because of this attribute, women can feminize men and cause them bad hunting luck. A woman can also offend animal spirits, especially during the time when she is having her period, and bring bad hunting luck to herself and others, possibly even causing sickness or death. A discussion of the traditional women's puberty customs will shed more light on this system of beliefs.

Most Koyukuk River women today who are age 35 and over have experienced puberty seclusion in either short or long form, and these women still follow many of the taboos. Although puberty seclusion is no longer practiced today in Huslia, the upriver villages of Hughes and Allakaket are more traditional in this respect. Two younger girls from Allakaket, who were attending high school in Huslia, had had their first period the previous year in Allakaket. They both were sequestered behind a blanket for a week in a cornered-off section of

the house and had to oberve many taboos. Parents of Huslia's teenage girls were extremely proud of these Allakaket girls and set them up as examples for their own daughters. Although the younger females of Huslia are less strict in following all the taboos, there is still strong social pressure to obey them. Blatant violators are scorned and blamed for assorted misfortunes and bad luck. One woman who follows the taboos strictly is spoken of with great admiration, and her adherence to them is seen as the reason for her good health and rich life. Those who are in poor health or who are often short of food are likely to blame it on the violation of some taboo either by themselves or by some young female.

It is believed that the menses (*hutkaa*) has its own spirit that contains the essence of feminity. Thus, the woman at this time is easily prone to the bad luck that can be caused when animal spirits are not treated correctly. It was partly for this reason that seclusion was practiced by women after the onset of menstruation. In addition, a woman was most receptive to external influences during this time and was instructed in the taboos she must follow by the oldest woman of the camp. Finally, because menstrual matter was thought to contain the essence of the female nature, a woman had to avoid all contact with men, as any contact would render them unfit for male pursuits (Loyens 1966:66-67).

Upon the occurrence of her first period, a girl was sequestered for a year in a special shelter in the summer or in a cornered-off area of the house in the winter. She had to avoid all male contact and wore a special hood that sheltered her eyes when she went outside. She wore porcupine amulets such as the horny soles of the porcupine feet in her socks; and the only fresh meat she was allowed was porcupine. This was because of the easy parturition of this animal that she wanted to acquire for herself. The old woman made sure that the girl had a plentiful supply of food piled near her to ensure that her later life would be likewise. While people were moving camp, a girl undergoing her first sequestering had to walk behind the others. If she came across a moose or caribou track, she had to plant the top of a sapling spruce tree in the track before stepping over it. If she

neglected to do this, bad luck would befall the men hunting these animals (Loyens 1966:66-67, 94).

The taboo most rigidly followed today is the one prohibiting menstruating females from eating freshly killed animals. They must wait until the animal is "really dead"—1 day for fish and 3 to 4 days for game. Violation will cause bad luck for the one who caught the game, the weapon or net that took the game or fish, and the place where the catch occurred. The bear meat taboo is the strongest. If a woman eats bear when she has her period, the man who killed the animal will have bad luck hunting bear until he turns gray. Breaking this taboo shows disrespect for the animal and the country. A Huslia woman told of how her relatives had almost starved in 1937. Their misfortune was blamed on one of the young girls at the camp who had eaten some fresh bear meat while she had her period.

Other taboos followed today relate to a woman's direct effect on men. A woman must not look while a man is shooting or he will have bad luck. A woman of childbearing age cannot step over a man's feet, legs, clothing, or hunting equipment, nor can she wear his clothes. Any of these would cause bad hunting luck. Men will always move their feet out of the way when a woman passes in front of them. Once, two 11-year-old girls who were visiting me warned me not to step over my husband's caribou skin boots which were lying on the floor. If a shotgun is "full of bad luck" and cannot hit anything, the owner may shoot it through a woman's dress, "like killing that woman." Then it will be able to kill animals again.

There were also some traditional practices which indicate that the *hutłaa* (menstrual matter) could bring good luck. It contained a special power against evil spirits because it represented the life-giving, procreative force. Women saved menstrual rags and used them as a remedy to prevent disease in children. Mothers who had lost several children would make harnesses of menstrual drawers for their other children to protect them from sickness and death (Jette 1911:257, 703).

The following taboos, many of which are still adhered to, are listed according to animal species. These taboos show the powerful rela-

tionship that women have with animal spirits, one that gives them the ability to affect the success of subsistence pursuits.

Fish Taboos

When a woman has her period, she must not check her fish net nor pass over the net in a boat or she will have bad luck fishing (Jette 1911:703). If a menstruating woman eats fresh fish that has not first been left overnight, her family's fish net and the place where it was set will have bad luck. If this does happen, they must burn a certain plant under the net to remove the bad luck. Girls in their first year of puberty must not handle or cut freshly caught fish.

A Huslia woman said that hundreds of pike used to congregate at the mouth of a spring in a particular lake. Now there are no more pike there because a pubescent girl violated a taboo. Her walking across the area during the annual pike fishing season caused the resource to become depleted. Girls in their first year of puberty must never be involved with fishing of any sort.

Beaver and Marten Taboos

When a man is out trapping beaver, his wife must keep busy all day to imitate the industriousness of the female beaver. This will encourage the beaver to go to her husband's traps. She must also remain faithful to her husband while he is gone or the beaver will reveal her unfaithfulness when it is caught by moving its reproductive organs or by having a bowel or bladder movement (Jette 1911:606). While menstruating, women cannot eat beaver meat and must not go hunting or trapping beaver. One old woman, who failed to take a beaver while I was out with her, blamed her bad luck on the fact that I had my period at the time.

When a man sees that a marten has wandered around his trap and urinated on it but has not touched the bait, he knows that his wife is being unfaithful at home. Her faithfulness ensures his good trapping luck (Sullivan 1942:94).

Lynx, Otter, and Mink Taboos

After a lynx has been caught and its body is in the house, females cannot say its name *kaazina* but must use synonyms like *k'akk'aant'oya* or "the follower." Otherwise, its powerful spirit will cause bad trapping luck. Women can trap lynx, but they cannot eat its meat, wear its fur, or skin it, for the same reason (Sullivan 1942:99). People say that if you offend a lynx, it never forgets, and you will have bad luck with it for the rest of your life.

Women cannot refer to the otter by its name *bilaazona* but must call it *bizeeya* or "shiny black." Women can trap otter, but cannot skin or eat it or wear its fur. If offended, its spirit would bring bad trapping luck and would cause her children to become high-strung and unclean like the otter. For the same reasons, young women must stay out of a house where otter is being cooked so that they will not come into contact with the steam. Mink cannot be eaten by women lest they or their husbands have bad luck trapping it; eating it would also cause their children to cry often like mink.

Wolf and Wolverine Taboos

Traditionally, when a man caught a wolverine in his trap, a ceremony was held in the village. The animal was dressed up and placed on the floor and a potlatch was held in its honor. Only old women could attend but they could not eat any food. If a young woman attended, the wolverine spirit would bring bad trapping luck, sickness, or death to her family (Sullivan 1942:102-103). Although

this ceremony is no longer held today, the trapper still presents the wolverine with a gift of fat and good food; he then burns its carcass out in the woods with more food.

Women should not trap or skin a wolverine. They must not say its name *niłtseeł* but must refer to it as *tł'onyee* or *hułbaaghayee*, both of which mean "clothing trim." Violators will have mean children and will cause bad trapping luck.

Women cannot trap, shoot, or skin a wolf. They can wear wolf and wolverine fur as parka ruffs and trim, but not as boots or whole parkas. Violation will bring sickness to the woman and her children and bad luck in hunting and trapping these animals to the men.

Bear Taboos

The greatest number of taboos for a particular animal are those for bears. Women must not say the name for black bear (*sis*) but must call it *hułzinh*, which means "something black." The name for brown bears must never be mentioned—they are referred to as "big animals." To show respect for bears, men will even refer to them by these names when they are going to hunt them. A person must never "talk big" about hunting bears. During the bear hunting season, men avoid too much contact with women; and women cannot ask men anything about their bear hunting. Men must not talk about women when they are out bear hunting and must not sing bear songs (to bring good hunting luck) in the presence of women.

Once a bear has been killed, the men hold a "bear party" or potlatch for the animal; women are not allowed to attend. The paws are removed and the eyes are slit so that the bear's spirit can neither run nor see to cause bad luck. Food is burned for it; and the men eat the paws, head meat, and selected meat from the forequarters (Clark 1970:84).

Bear parties are held so that the best parts of the bear can be eaten in a "clean" place—that is, away from where females have walked.

When bear meat is brought back to the village, the head must be left behind in the woods and the meat that is brought back must be covered so that women cannot see it. Bear meat for potlatches is always cut up in an all-male household; and after it is cooked, it is kept in a separate area at the potlatch so that it will not be passed around mistakenly to women. Women can eat no part of the brown bear. They can eat only the hindquarters of the black bear and then only if they are not menstruating and if the meat is 2 to 3 weeks old. Of all the taboos, those for bears are the most strictly followed today.

Women cannot eat meat from the bear's head, and only old women can eat bear paws and cut up bear for cooking. One woman ate bear tongue when she was 13 because her uncle, who did not believe in the taboo, talked her into it. Now, her husband says jokingly, "That's why she's so mean today."

A girl cannot eat any bear meat for the entire year after she has her first period. Females should not pick pussy willow buds because bears eat them in the spring. Only women past child-bearing age can shoot a bear.

Women also have the power to frighten a bear away by exposing their genitals to the bear and saying, "My husband, that's me." The bear will then be ashamed and will run away. One 7-year-old girl said she had succeeded in doing this to frighten away a black bear from their fish camp.

Women must not sleep on bear hide or wear clothing made from this skin. A Huslia woman told of visiting a home in which a bear hide was used as a rug. There was no place to sit where she wouldn't be touching it and this made her extremely nervous. Finally, when someone asked what was wrong, she explained and the hide was rolled up out of her way. One man, who sold a bear hide to a white woman who used it for a rug, had bad luck hunting bears for the next 10 years.

The source of all women's bear taboos is found in an origin story in which a bear becomes a woman's husband and then tears her apart in their home:

> Improperly treated bear spirits can be extremely dangerous. In women they can cause sterility and vulnerability to abduction and seduction by prowling bears; and men may suffer from physical weakness, loss of hunting luck and would most certainly never kill another bear. Both sexes may suffer from crippling rheumatism and imminent starvation.
>
> (Clark 1970:84)

Part IV

CULTURAL AND ECOLOGICAL DIMENSIONS OF SUBSISTENCE

by Richard K. Nelson

Ancient or traditional cultures are often remembered for the monuments that they have left behind—the megaliths of Stonehenge, the temples of Bangkok, the pyramids of Teotihuacan, the great ruins at Machu Pichu. The Indians and Eskimos of Alaska have created no such monuments, but they have left something far greater, far more unique, and far more significant as a human achievement. This legacy is the vast Alaskan land itself, unaltered and unspoiled despite having supported human life for countless centuries. Only because these Native inhabitants nurtured it so well do we have this great legacy of land to preserve today.

As we set portions of Alaska's land aside for preservation in its natural state, we might keep these facts in mind. Native occupation is a part of this natural condition, and Native cultures have exerted an impact of the mind upon it for millennia. This has created dimensions in the natural history which go far beyond those known to ourselves and which lend it a unique richness. This cultural dimension is perhaps no less an integral part of the ecosystem than is the

non-human fauna. New Alaskan parklands therefore have an extraordinary potential for preserving a total environment, by maintaining not only its natural biota, but also by fostering the rich cultural tradition that is in the truest sense a part of this environment.

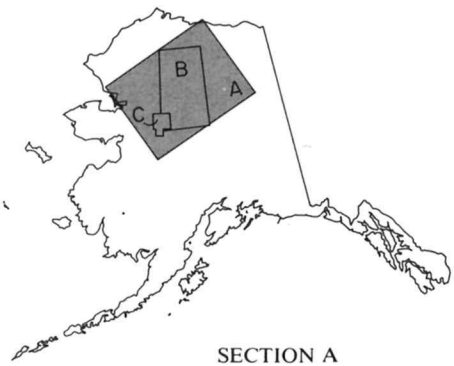
Chapter 10
SUBSISTENCE AND ENVIRONMENTAL DYNAMICS

If any single characteristic dominates subsistence economies of the Alaskan interior, it is instability. This results from two environmental factors: (1) frequent, pronounced changes in population levels of resource species and (2) irregular spatial distribution of these species. Thus, people who follow a subsistence livelihood face constant shifts in the availability of resources as these populations rise and fall. Subsistence users are compelled to travel widely over the terrain to locate and utilize specific resource places.

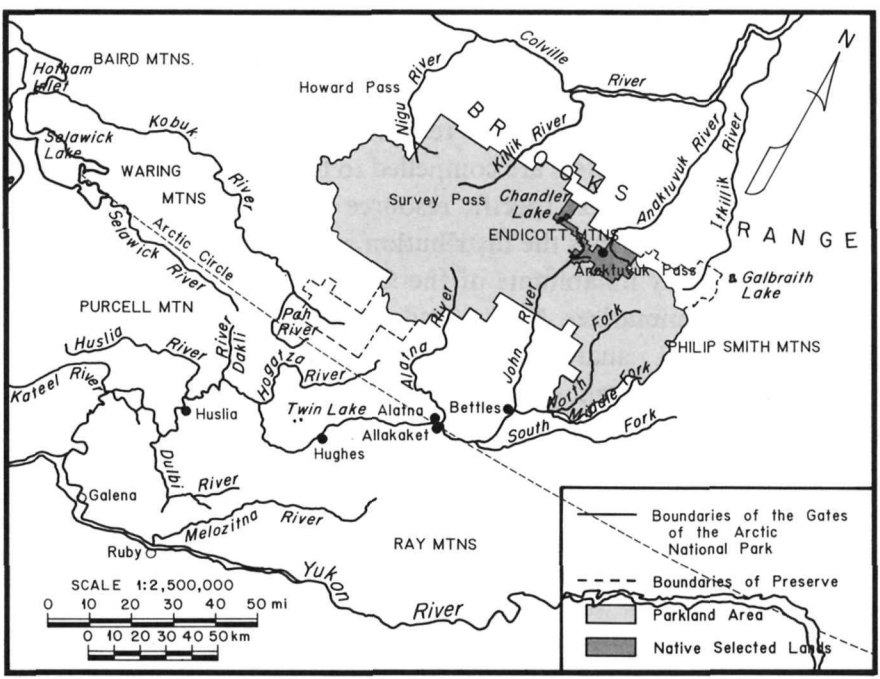
This chapter describes the distribution and population patterns of species utilized by inhabitants of the Gates of the Arctic region. In addition, it summarizes Native and non-Native explanations for these phenomena, analyzes their impact on past and present subsistence economies, and describes Koyukon approaches to the conservation of resource species.

Spatial Distribution of Resources

Plants and animals utilized for subsistence in the Koyukuk and Brooks Range regions are, for the most part, distributed very unevenly over the terrain. Each species tends to be concentrated in specific places, which are very limited in size and scattered in a complex, largely inexplicable pattern. Therefore, from a subsister's viewpoint, the environment is comprised of a myriad of specialized resource places. These places cannot be predicted by simply knowing



SECTION A



MAP 5. GATES OF THE ARCTIC NATIONAL PARK

the vegetation and landform distributions because they apparently arise from differences in microhabitat, or from factors that defy immediate explanation. For the hunter-gatherer, every area on the face of the land presents a unique arrangement of resource potentials. Every hillside, muskeg, river bend, lake, creek, mountain slope, and stretch of flatland is characterized by its own set of resource potentials.

For this reason, success in the harvest of resources depends on a thorough familiarity with the natural landscape. Furthermore, resource places do not produce uniformly over the passage of the year. They are affected significantly by seasonality and by special conditions such as temperature, snowfall, or water level. Subsistence activities are therefore predicated upon knowing the profusion of potential harvest places at any point in time and under any set of circumstances. They also depend upon the mobility to reach these places during productive times.

Examples of Distribution

Almost every species utilized by residents of this region is restricted to specific places within its overall distribution. The following examples are selected to illustrate manifestations of this pattern.

The physical environment creates localized conditions that strongly affect living things. Most of these conditions are entirely obvious, because they derive from features such as lakes, rivers, or mountains; but some are less visible, such as gentle slopes or soil conditions. A few are quite subtle indeed. Specifically, weather conditions are subject to marked local variation throughout interior Alaska, and this determines many aspects of resource distribution.

In the Koyukuk drainage and Brooks Range country, there are striking and important local wind patterns. Some mountain valleys, for example, funnel powerful winds that drift and harden the snow, determining the growth of vegetation and distribution of animals and affecting man's winter travel. Wind patterns also influence temperature, creating pockets of intense winter cold in some places and

appreciably moderating the cold in others. Specific wind areas are too numerous to mention here, but it is worth noting that while many relate to prominent landforms, others occur in the midst of broad flats and cannot easily be explained. (A few general areas known for their wind patterns may be found in chapter 5.)

Vegetation resources are also localized in subtle but important ways. Although spruce timber is scattered in large and small patches throughout this region, only certain stands are of the correct size and growth form for specific uses. Thus, villagers travel great distances along the timber-lined Koyukuk River to reach patches of spruce that are tall, gently tapering, and straight grained. In windy areas, by comparison, the grain often spirals so that the trees cannot even be split for firewood.

Fishing sites are always highly localized according to water conditions, species of fish, and seasonality. Salmon nets, for example, are placed in certain eddies along the Koyukuk River, and whitefish nets are set in others. In the middle Koyukuk, the mud banks erode easily, and so eddy configurations are constantly changing. Along the upper river, rocky banks in some areas give permanence to the eddies. Fall seining places are located only along certain gravel bars where whitefish and sheefish congregate for a few weeks each fall and where flood waters do not deposit roots or logs that entangle the nets.

Fish are subject to many kinds of local distribution. Some lakes, or specific parts of lakes, produce quality fish of a particular species at certain times of the year. Each villager knows of many potential sites for netting, trapping, or hooking fish, depending on season or need. Thus, one creek mouth in *Hodo'odin* Lake has thin ice in late winter, and often attracts schools of blackfish. Fat pike can be hooked in the shallow place where a certain small creek (one of many) empties into the Huslia River. Huslia people also note that most species of river fish taken near their village have less fat and are therefore of poorer quality than those caught near upriver villages. They believe that the better fish pass Huslia in midstream and so avoid the villagers' nets.

Waterfowl are another important resource that can only be sought effectively by those who know specific gathering places. In the area

of each village, certain lakes, sloughs, and stretches of river are strongly favored by resting waterfowl or are located where migrating flocks tend to cross on low flights. Some of these places are used by mixed flocks and others by only one species. A slough near Huslia is frequented by migrating Canada geese but rarely has the preferred whitefronted geese. Snow geese congregate in one lake not far away, and at a certain time of day they fly to a specific sandbar on a nearby river.

Similar patterns exist for both land and aquatic mammals—patterns which shape the hunting and trapping activities of all residents in this region. Certain lakes, or groups of lakes, support large populations of muskrat or beaver. Some creek systems are unusually rich in mink or otter; particular mountain areas support abundant populations of marten; and some willow stands are notable for their ability to produce hares.

Large game is similarly localized. Sheep are found on some mountain slopes, but are absent on many others. Moose favor specific lakes in late summer, particular willow stands in mid-winter, and prefer to follow certain trails when moving through different areas of the land. Caribou have specific routes of migration during the fall and spring and may concentrate in localized wintering places.

The implications of all such patterns are quite clear. A successful hunter-trapper-fisherman must know them well and utilize them constantly to harvest the resources needed for subsistence. Years of teaching and experience underlie this knowledge, which changes constantly as the environment undergoes its natural evolution.

Explaining Resource Distribution

Throughout the Gates of the Gates of the Arctic region, there is a tendency for certain restricted areas to be very rich in a variety of animal species, while others are relatively poor. These areas may be quite diversified—hills, lakes, rivers, and muskegs—or they may be fairly uniform, such as a lake-muskeg flat. There is no apparent

reason for the abundance or scarcity in such areas, but the Koyukon Indians have a traditional way of explaining them.

In chapter 12, the former activities of Koyukon shamans will be described. One of these activities was attracting animals to certain areas, often for their own benefit but sometimes for the sake of others as well. Thus a trapper might give small payments to a shaman who would make medicine to bring animals into his trapline. In this way, localized areas of abundance were created.

A tract of land just west of Huslia is known for its exceptional wealth of fur animals. "It's a funny little place," one man commented, "especially because it's got so many fox, beaver, muskrats, and mink."

This country is rich by design. In former years, it was a medicine man's trapline, and he constantly worked his power to make the small area productive enough to support him. In this way, he also affected surrounding lands, attracting their game and rendering them poor as a result. The old shaman died almost 20 years ago, but the effects of his medicine have not yet worn off. Eventually, it is said, the magnetism will fade and the animals will scatter out more evenly.

Entire regions were affected similarly by the use of medicine. For example, one Koyukuk village is surrounded by lands that are relatively rich in game and fur animals. This was caused by shamans who attracted animal spirits and kept them in "houses" within the desired region. In this way, they worked for the good of all people in their area, draining wealth from other localities and bringing it into their own.

Lethal battles of power raged between medicine people who were trying to overcome one another in the quest for environmental wealth. It is said that such a battle caused a former abundance of marten near Huslia to vanish when they were taken away to another part of Koyukon territory.

An individual related that once a man without medicine power had a strong dream that he had discovered some "animal houses" belonging to shamans. He listened beside them and heard what he thought were many caribou antlers clacking inside one house. So in his dream he took this "house" to his own area and broke it open.

That year he expected to have caribou in abundance, but instead there were millions upon millions of mosquitoes: "He had no medicine power, so I guess medicine people wanted to teach him a lesson. That year was the only time I saw dogs die from so many mosquitoes."

Resource Population Dynamics

Plant and animal species used for subsistence are, of course, subject to drastic regular changes in availability: plants bear fruit only during the summer, waterfowl migrate in and out of areas, bears hibernate, animal furs are seasonal in quality. But aside from these predictable variations, there are irregular changes which can create short- or long-term scarcity, even absence, of important resource species. Some of these changes are markedly cyclic, following an approximate 10-year periodicity that characterizes certain species throughout North America's boreal forests. Others are aperiodic, taking anywhere from a few years to many decades between subsequent high or low points. The livelihoods, and even the very lives, of interior Alaskan Natives have been seriously endangered when several key species fell to low populations levels simultaneously.

The following discussion covers the existence and nature of population changes affecting virtually every resource of importance within the Gates of the Arctic region.

Vegetation Dynamics

There are two dynamic processes in vegetation which affect subsistence economies. The first of these processes is the dramatic fluctuation of berry crops from year to year. Cranberries and blueberries, the most important plant foods used by Koyukuk Athabaskans, may produce abundant harvests one year and virtually nothing the next. Sometimes only one species is affected, but cold weather or hail

may damage all species for that year. People do not mention longer-term fluctuations in berry crops.

Long-term changes in vegetation are a regular occurrence in the boreal forest, however, due to wildfires which often burn large areas during the summer. This second process may destroy mature stands of timber that would otherwise be utilized, or they may leave patches of killed trees that soon dry and become excellent sources of firewood.

Fish Population Dynamics

The most important kinds of fish used by Koyukuk people—salmon and various species of whitefish—are all subject to pronounced changes in population or availability. The older Koyukon Indians note that salmon (primarily chum or dog salmon) experience sharp oscillations in numbers from year to year. Abundant harvests, with individual catches of 1,000 to 2,000 fish, can be offset by seasons when catches may amount to less than a hundred fish.

Catches of pike, sheefish, and whitefish in the rivers are also subject to variations caused by population changes, movements, or adverse water conditions for netting. Even more dramatic changes affect fish populations in lakes. Long Lake, near Huslia, once produced rich harvests of broad whitefish each fall, "sometimes more than people could handle."

Originally these whitefish were very fat, but later they became lean, and at the same time their numbers declined. Finally, during the past few years, the take has dwindled to nothing at all, and this important resource is presently gone.

Sometimes a flood will rejuvenate such a population, but often it has the opposite effect. Numerous whitefish-producing lakes in the Huslia region have been ruined when floods brought pike into them. Pike rapidly exterminate whitefish which are a far more valuable resource. Two large lakes midway between Huslia and Hughes were

formerly so rich in whitefish that large camps were maintained there to catch them. But pike came in with a flood, and these excellent resource places were completely disrupted.

Bird Population Dynamics

Koyukuk people have noted long-term changes in the numbers of many bird species, ranging from the much utilized types to those never utilized at all. Old people frequently mention that songbirds are far less common today than in the past. They lament their absence because the woods were formerly alive with song and are now relatively less so. They note also the population decline of predatory birds such as owls; they attribute this to the present scarcity of hares, grouse, and ptarmigan. Cyclic changes in willow ptarmigan, ruffed grouse, and spruce grouse are well known to the Koyukon. All three species are presently at very low levels in this region, almost eliminating an occasionally important element from the winter diet.

Waterfowl are highly esteemed as food and are therefore hunted enthusiastically. But they vary in abundance from year to year, sometimes inexplicably and sometimes because of adverse weather during migration times. People say that some species, such as goose and shoveler ducks, have become consistently less common than in the past. Interestingly, the numbers as well as the quality of waterfowl fluctuate. Ducks are fat and excellent in some years, lean and poor in others. Geese are uniformly fat in the spring, but more lean in the fall.

The availability of waterfowl in given localities is also affected by changes in the condition of lakes and meadows. As lakes become overgrown or filled in, the lack of water eliminates summer and fall waterfowl habitat. But these changes sometimes create meadows which are attractive to waterfowl in the early spring. Eventually, brush overgrows the meadows and they become unsuitable for use by these birds.

Small Mammal Population Dynamics

Most small game and fur species experience population changes of sufficient magnitude to affect village economies. Of these fluctuating species, the snowshoe hare is perhaps most important because it can be a vital food resource during periodic population highs. Hares can be so prolific that they literally pound the snow hard in the willow stands, or so scarce that a track is rarely seen. Usually, their numbers oscillate in a roughly 10-year cycle between consecutive highs or lows. In the middle Koyukuk drainage, however, hares nearly vanished in the mid-1960s; they have only recently begun to increase again. The presence of predators, especially lynx and owls, varies somewhat in concert with hare populations.

The other small mammals important in the Native diet, muskrats and beaver, also experience significant increases and declines. Muskrats may almost vanish from a whole region, as they have recently along much of the Koyukuk River, then become abundant again 5, 10,or perhaps 20 years later. Beaver were apparently absent from much of the Koyukuk drainage until 30 or 40 years ago. Before that time, men traveled overland to the Melozitna River area to hunt them in the spring and fall. But once beaver came into the Koyukuk region, they became so abundant that even small lakes often had three or four houses along their shores. In the past decade their numbers have undergone a marked decline, apparently due to a widespread lowering of water levels in the lakes.

Fur animals such as mink, marten, fox, and wolf all vary considerably in numbers from year to year and over longer spans of time. Marten, for example, were restricted to hilly and mountainous areas surrounding Huslia until the early 1960s when they expanded out onto the flats. Since that time, they have become quite common in areas far from the timbered slopes. Wolves were formerly so rare in the same area that people seldom trapped them. But when moose moved in during the 1940s, wolves came along with them, becoming common 10 years later. They have fluctuated from year to year, declining to some extent more recently.

Bear Population Dynamics

During some former times, bears were the only resident big game animal available to the Koyukuk people, and so they were extensively hunted. Brown bears were found only in the mountain country until recent decades when they spread down into the Koyukuk Valley itself. Black bears have always been present, and they are unique among the important animal species because their population is relatively stable. Some Koyukuk people feel that black bears are less common today than in the past, but others say that bears must be increasing because they are less intensively hunted today. In any case, they provide a fairly constant resource, and the number taken depends upon fall hunting conditions (deep snow will curtail the hunt) and the extent of people's need for meat.

Moose, A Critical Resource

Of all the mammals, birds, and fish utilized by Koyukuk villagers today, moose is by far the most important. But it has not always been this way, because moose were once entirely absent from this region. Local economies, therefore, balance precariously upon a single species whose numbers may change drastically at any time. For this reason, moose population changes are discussed at length here.

According to the oldest living Koyukon people, there was a time, perhaps 100 years ago, when moose were never seen in the entire Koyukuk Valley. In order to hunt these highly valued animals, the Indians undertook a long and difficult journey up the river to present-day Bettles, then trekked east into the Ray Mountains and the Yukon drainage beyond.

Sometime before 1900, moose began filtering westward into the extreme eastern tributaries of the Koyukuk, down the Yukon, and up into the headwaters of the Melozitna River. During the first quarter of this century, men from all Koyukuk settlements went periodically

to the Bettles or upper Melozitna areas for moose hunting. The animals were still fairly scarce, and when killed they were too bulky to transport over long distances to the villages. This limited their role in the Native economy, although the meat and (especially) the hide were considered extremely valuable. Thus, hunters on snowshoes would often track a moose for days until they finally managed to overtake and kill it.

During the 1920s moose began appearing in the Koyukuk Valley; they reached the Hughes area by 1927 and quickly increased to a fairly high population level there. At this time, however, there were still no moose in the huge flats surrounding Huslia. Older residents emphasize that not one moose track was to be seen there. Then one year, probably 1938, someone killed a moose near the mouth of Hogatza River, at the edge of the flats. Within a few years a substantial herd had developed in the flats and was increasing toward a peak of population that came some 20 years later.

By all accounts, moose continued to increase throughout the Koyukuk Valley until sometime in the late 1960s when the herd had become quite large and vigorous. Then a period of gradual decline set in. Perhaps it had already started before 1970; but during that winter, deep snow and intense cold precipitated a die-off. Since that time the herd has decreased, particularly in the upper Koyukuk. The Allakaket people are now experiencing difficulty in finding moose and must travel far to have any hope of success. At Hughes, the situation has not become serious, but fewer animals are being seen and residents often mention the increasing effort that must go into their fall hunts. Huslia is the least affected Koyukuk village, though moose have decreased there over the past 5 or 6 years.

Village residents are extremely concerned about this change, particularly in view of reduced populations in the surrounding regions of Alaska. People from neighboring areas are extending their hunting range upriver along the Koyukuk, and pressure from distant urban areas grows at an alarming rate. Continued decline in the moose population seems almost inevitable, but the villagers are urgently seeking ways to forestall it by curtailing excessive hunting pressure.

Caribou, A Crisis Species in Decline

The economic role of caribou in the Eskimo villages of northern Alaska parallels that of moose among the interior Indians. But of all the Eskimo communities, none is more heavily dependent on caribou than Anaktuvuk Pass. In fact, its subsistence economy rests upon this one resource. Caribou are also a major resource for the Koyukuk people during the years when they migrate into the region for wintering. This species, however, is subject to dramatic changes in population, which strongly affect village economies throughout its range.

Elder Koyukon Indians and Kobuk Eskimos agree that caribou were common in both of these areas during the last century. In the Kobuk Valley, at least, this fact is substantiated by abundant caribou remains in archeological sites from that period. According to the Koyukon, caribou were hunted long ago in the Purcell Mountain and Zane Hills area, some 50 miles north of Huslia. This hunting continued until sometime before 90 years ago. Herds were also present in the Kokrines Hills near the Melozitna River and around Indian Mountain (near Hughes). During the 1840s, early white explorers found caribou hunting an important subsistence activity among the people of Nulato, a Koyukon village on the Yukon River (Loyens 1966:43).

But this period of abundance did not last. By 1865, the explorer William Dall mentioned that all big game was very scarce around Nulato, the caribou having left this area. It was perhaps somewhat later when they also vanished from the mountains north of Huslia and then eventually from the Kobuk Valley, still farther north. Records indicate that the arctic caribou herd experienced a severe decline, reaching a low point in the late 1880s. At this time, the herd withdrew into a core area of ideal habitat in the western North Slope (Hemming 1971:5).

It is difficult to ascribe any cause to this population decline and resultant shrinkage of range. Surely it did not result from subsistence hunting—firearms were extremely scarce and ineffective at this time, and the Native population of northwestern Alaska was probably

decreasing (because of introduced diseases). The most likely explanation is that a cyclic phase of decline had set in, its cause as undefinable as the cause of similar cycles that affect many northern animals (including caribou in other areas).

This perspective is reinforced when the herd's subsequent growth is considered. By the turn of the century, the arctic caribou herd began a long period of increase. As the herd multiplied in size, its wintering range expanded to the east, west and south, into areas abandoned long before (Hemming 1971:3, 5). Then, in the 1940s, caribou reappeared in the Kobuk Valley and (shortly later) along the Koyukuk. Around 1947, the first large herd moved down from the north and wintered in the Huslia region.

It should be emphasized that during this period of increase in the numbers of caribou, the Native population of northwest Alaska rebounded from its own low ebb after the turn of the century. As the number of subsistence users grew, so did their efficiency. Sophisticated firearms were introduced, larger dog teams greatly increased hunter mobility, and frequent airplane flights to the villages allowed easy sighting of the location of the scattered herds. But these pressures did little to forestall the continuing increase of caribou.

During the earlier period when the arctic herd was absent from their immediate hunting territories, Kobuk and Koyukuk people were forced to make adjustments in their range and economies. The Eskimos traveled far north into the Brooks Range and Noatak Valley, looking for mountain sheep and scatterings of caribou. The Indians went south and east into the Kokrines Hills and Melozitna Valley where caribou (probably from the Porcupine herd) occurred sporadically until about 1930. According to Koyukuk people, these caribou came from the south and were larger in size than the arctic animals.

After caribou reappeared in the 1940s, their numbers continued to increase. Kobuk Eskimos hunted the animals near their villages every year; and Koyukuk Indians took them intermittently until about 1960 when they also began encountering herds every year. Caribou migrated into both areas during the fall or early winter, scattered widely for the coldest months, then gathered up and moved north

again in spring. They resumed their position as a basic resource in the Native economy.

Continued subsistence utilization throughout the arctic herd's range apparently did little to stem the cycle of population growth. Kobuk and Koyukuk people noted consistent increases in caribou numbers and a gradual extension of range farther toward the south.

Eventually, the arctic herd had to reach a level of maximum growth. In 1969, its numbers were estimated at 242,000 animals. This meant it had doubled its size in 21 years, since a count of 119,000 animals was made in 1948 (Hemming 1971:5). The reason for this growth is apparently as difficult to understand as the reason for the decline a century earlier. Nonetheless, a biologist who studied the herd surmized in 1974 that it was time for the cycle to begin ebbing (Robert Pegau, personal communication). That prediction was confirmed during the winter of 1976 when aerial surveys revealed a total population of between 30,000 and 50,000 caribou in the arctic herd. Emergency regulations were quickly promulgated, severely limiting the take for all Eskimo communities and closing hunts for Koyukuk villages.

The causes for this decline, once again, have not been satisfactorily explained. Suggestions that subsistence hunting might have provided the impetus do not seem plausible, since caribou underwent a full cycle of decline and increase during the past century, in the constant presence of these harvests. There is no evidence to indicate that the increases in takes were sufficient to account for the loss of approximately 200,000 animals in a few years' time. Of course, once the herd was reduced to a certain number, the annual take of some 25,000 animals would begin to have a strong effect. Thus, the harvest was necessarily curtailed.

The arctic caribou herd has shown considerable instability in the past, and it seems likely that cyclic phases of population growth and decline will continue in the future, despite efforts to prevent or minimize them. Sound management should be utilized wherever possible, and takes should be regulated when necessary. But it seems unlikely that subsistence hunting has been or ever will be the motive force underlying these natural cycles.

Non-ecological Explanations for Population Changes

The Koyukuk Indians have watched resource populations rise and decline for generations, and they have a variety of ways for explaining these phenomena. Some of their explanations apply only to particular species, and others are general. In addition, some are ecological or empirical in nature, while others are founded upon non-ecological or supernatural principles.

The Koyukon explain some declines in resources species as the result of offences against their protecting spirits. Sheefish, for example, have become far less common in the Koyukuk River around Hughes. Many villagers feel that this decline occurred because fishery biologists took live sheefish from the area and transplanted them elsewhere. This action was offensive to the protecting spirit, and now sheefish have diminished as a result. Similar decreases in marten and beaver populations are said to have followed live trapping and tagging projects elsewhere along the Koyukuk.

Hundreds of pike formerly gathered at the mouth of a spring in a lake between Huslia and Hughes and people went there to catch them, using special hand snares. Today the spring remains, but the pike are gone. This change was said to result from violation of a taboo, when a pubescent girl came into close contact with the area during fishing activities.

Recent tendencies for overall decline of game populations are sometimes explained as the result of diminished adherence to the taboo system. As more and more rules are ignored, especially by the younger generation, a growing number of species become gravely offended. Sullivan (1942:121) notes that during his stay in Nulato, a general scarcity was felt to result from the disappearance of shamans who formerly attracted game into their region.

Cycles of population increase seem to generate less concern and are frequently left unexplained. However, a sudden dramatic growth of small mammal populations is of sufficient interest to require some interpretation. Snowshoe hares are sometimes so rare that their tracks are non-existent, but then they suddenly appear "out of nowhere."

The traditional Koyukon explanation is that hares come with a blizzard, falling from the sky with a heavy, windblown snow. Similar rapid increases in muskrat populations are said to result when large numbers of these animals emerge from the mud.

Ecological Explanations for Population Changes

The Koyukuk Indians have developed a sophisticated understanding of the interrelatedness among environmental phenomena. This ecological perception is identical to the one familiar in western scientific thought. The following discussion includes a summary of Koyukon empirical explanations for resource population changes; in so doing, this summary accounts for most of the biological interpretations that have been set forth by western scientists.

Floods are regarded as an essential factor in creating ecological cycles because they revitalize lake habitats in the river valleys. Lake fish populations require periodic flooding from the river if they are to remain healthy. If floods do not occur for several consecutive years, fish in some lakes will die off entirely to be replaced only when another surge of water occurs.

In the Koyukuk flats (as along the Kobuk River to the north), water levels in the lakes have fallen over the past 40 to 45 years, and floods are less common than in the past. This has caused a decline, especially in recent years, of aquatic mammals such as muskrats and beaver which cannot live in lakes that freeze to the bottom. Waterfowl populations have also declined in these areas; lake-dwelling fish are less abundant; and the numbers of predators such as mink have decreased as a result. Each spring the villagers hope that flood waters will spread over the lowlands and regenerate them once more.

Koyukon Indians are aware of the various interactions between the populations of predator and prey species. They say, for example, that vole and lemming populations exercise a strong determining effect on the numbers of mink, weasel, marten, and fox. When abundant "mouse" (vole or lemming) tracks are seen on the fall snows,

trappers look for increased catches of fur animals. Hares are similarly regarded as a key species, controlling especially the number of lynx in a given area.

Villagers are also very familiar with the ecological effects of wildfires which exert a strong dynamic influence over their environment. They have seen the results of fires time and again, the destruction of mature timber stands, the emergence of forbs and brush thickets, the giving way to deciduous trees, and finally the slow return of the forest. The villagers' land is covered by vegetation in all stages of succession, and they know which animals are fostered by each one. Like western biologists, they recognize fire as an important cause of population shifts in various resource animals.

They do not, however, view fire as a creative force. Given a choice, it seems that they would prefer to do without what they consider an instrument of destruction. After all, the natural vegetation would be highly diversified without fire, because differences in terrain and the wanderings of the rivers assure that much of the land will be open or in thickets regardless. What the Koyukon fear most, in fact, is the barren land that is created by fire. They see no advantage in waiting one or two decades for the return of a fully productive habitat, especially in areas near their villages. For this reason, they can be expected to oppose strenuously any suggestion to remove controls on wildfires.

The Koyukon live in a land where change is the norm, and where stability is seldom mentioned. Old timers have watched the river tear at its banks and carry timber stands away, while elsewhere it builds sandbars for new thickets to spread across. They have seen lakes become meadows, meadows become thickets, and thickets become forests. They have crossed fire-burned wastelands, then returned years later to find them rich and alive with game. They have felt the weather "grow old," losing its strength to produce the long and bitter winters of years past; and they have seen the animals vacilate between periods of abundance and times of scarcity, each in its turn, cycle after cycle. It is small wonder that they perceive the interrelatedness of nature with such ease and clarity, living as they do in a natural laboratory for the study of change.

Resource Levels and the Subsistence Economy

At any specific point in time, the subsistence resource potential in the interior Alaskan environment derives from a composite of cycles. Changes in animal population levels and the availability of other resources affects the livelihood of people who depend closely upon the ability of the environment to provide.

Abundance, Shortage, and Starvation

Ordinarily, some species will be in phases of abundance, others will be scarce, and still others somewhere between these stages. There are periods of years, however, when important species coincide at high population levels. This was true until a few years ago in the Koyukuk-Brooks Range region, when moose and caribou were both at peak abundance, and secondary resources such as fish, bears, and beaver were all at or above "normal" levels. At no time within memory had there been such wealth to harvest.

Unfortunately, population cycles of major food species can also reach simultaneous low levels, causing periods of scarcity. This brings about the possibility of temporary hardship, food shortage, or (in times past) starvation:

> From childhood they have heard stories about families who perished from hunger in the cold winter, and perhaps they themselves felt its pinch when their supplies ran low before the spring-hunt was over. Persistent reminders of extreme want, even of famine, keep vividly before their consciousness the necessity of expending their full energies during the fishing season, and impel them to concentrate both their thoughts and their activities on the food quest.
>
> (Sullivan 1942:29)

Even when resources are at a low ebb, there is little or no danger that food will run short during the summer or fall; and there is always a surplus to store in caches for winter use. But often this cached food must be liberally supplemented by winter hunting, trapping, and

fishing. If resources are generally scarce, winter subsistence activities may provide very scant returns. This is especially true when long spells of intense cold weather come after mid-winter. Most animals "hole up" during such weather, and those unable to do so (notably moose and caribou) become very difficult to approach in the clear, still cold. Weeks may pass then, during which every little game is caught.

In former times, people sometimes exhausted local resources by middle to late February. This forced them to move their camps to richer surroundings, but deep snow and bitter cold could make this very difficult. Usually, however, they had enough stored food to get through this lean season, "People used to really hope for a short winter and early break-up. They watched the days get longer, and it just made them happy. If the winter was short, then they had a good chance to make it."

Strangely enough, however, extreme hardships most often came later on, when the presence of spring was clearly evident. By this time, stored supplies were often gone, and people watched anxiously for the emergence and arrival of game. But if the thaw began and then a cold spell set in, real hardship could result. Open water re-froze, causing waterfowl to return south and preventing the emergence of muskrats and beaver. Hares were difficult to catch in snares because crusted snow freed them from their established trails. If any moose or caribou were present in the area, they could not be approached on the noisy crust.

In former years, people were sometimes reduced to searching the bare places beneath trees for little migratory songbirds that froze to death there. As recently as 1937, in the Huslia region, a family ate these birds to survive during a spring cold spell. Another life-saving food during shortages is the small but abundant blackfish which can be netted through holes in the ice. Before this century, people sometimes experienced such severe famine that women tried to sustain their husbands by breast-feeding them. Since men had to work harder, they were likely to die more quickly than women.

After rifles became available, people no longer died of starvation. Since that time, shortages have only been severe enough to cause

weakness from extreme hunger. Koyukon adults have experienced many times of shortage, and they feel that today's natural abundance is transitory. They know, of course, that imported foods will be available to see them through hard times now. But still, there is a deeply felt uncertainty about the years ahead. The staple game animals are now entering a period of decline, and wild foods will soon become more difficult to obtain.

Large Game and Small Game Economies

During the modern era, village economies in the Koyukuk-Brooks Range region have focused on the use of big game species. This was not a matter of human choice, though people certainly prefer to use a few large animals rather than many small ones. It was dictated by the nature of the resources base—caribou and moose were abundant and small game (except fish) was scarce.

Thirty years ago, the situation was reversed. Koyukuk River people subsisted primarily on snowshoe hare, grouse, ptarmigan, beaver, muskrat, waterfowl, and fish. The only large animals available were black and brown bears which were hunted extensively but could not be taken in large numbers. In spite of its diversification, this economy was clearly less productive than the big game economy that replaced it.

Older Koyukuk residents usually emphasize their former dependence on snowshoe hare and ptarmigan through the winter months, and on fish during the summer and fall. In this group, the hare is often singled out as being the most important. One man recalled his mother regularly bringing in catches of 40 hares from routine checks of her snare line. They were "always" abundant during the years after caribou vanished and before moose arrived here. "If it wasn't for rabbits," one elder concluded, "we wouldn't be alive today."

Accounts of the Yukon River Koyukon differ by emphasizing a heavy reliance on fish, perhaps because the Yukon is far more productive in this regard than the Koyukuk. Fish was the staple food

throughout the summer, and a change of diet was only possible during occasional communal duck hunts. Periods of one or two months might pass when people literally tasted no meat at all (Sullivan 1942:43). Koyukuk people describe their earlier summers in much the same way, except that bears were sometimes hunted instead of waterfowl.

Yukon people also set up their winter habitations beside reliable fishing sites, especially along streams where fish traps could be made. These traps were maintained throughout the winter and were considered far more reliable than hunting as a source of food (Sullivan 1942:62-63, 66). In those times, a good provider was measured by his ability to construct workable fish traps (Loyens 1966:69).

This picture was destined to change, however. By the 1940s, moose and caribou populations were rapidly increasing and expanding their range. Somewhat later, and at scattered points in time, the small game species underwent severe declines. During the present decade, snowshoe hares, grouse, and ptarmigan have remained at low population levels in the Koyukuk drainage. Elders note that the numbers of waterfowl have decreased from earlier levels and there are increasing pressures from "Outside" to place restrictions on subsistence harvest of these species. Finally, salmon—the most important secondary resource—are surely becoming less abundant as stocks are reduced by commercial exploitation.

At the present time, small game and salmon resources show little sign of imminent population growth. Unfortunately, the major big game species are also declining. Caribou are already scarce or unavailable; and, if mooose continue their tendency to decrease, the Koyukon may soon face an extreme shortage of meat. Clearly, they would be forced to depend on fish as a staple food at a time when salmon are also declining. Only whitefish would remain as a reliable staple, unless positive trends emerge in other species.

Needless to say, Koyukuk villagers have become very protective of their moose, careful to husband the resource with prudence, concerned that it is the vital link holding them to their traditional livelihood, "If we had no moose now, I guess we would be a hungry bunch of people."

Subsistence Range and New Parklands

There is one critical variable that enters into the equation of declining resource populations and continuing subsistence needs. This is the size of the subsistence range. As resources become scarcer, people must use larger areas to harvest the same amount of food. A wide-ranging approach is especially important here, because resources are concentrated in specific localities that are scattered broadly across the land. For a hunting economy to survive, people must travel to these dispersed resource places; mobility is the key.

Previously, people achieved the needed mobility during the periods of scarcity by moving their camps. Travel was slow and laborious, and so permanent villages were impossible. The land was unrestricted and open to all, allowing an almost complete freedom of movement.

Today, technological changes permit the necessary mobility without requiring that people live in scattered nomadic camps. Snowmachines and large dog teams allow hunters to range widely from a permanent village—travel out to distant areas, procure game, and haul it back in a relatively short span of time. During the summer, motorized boats accomplish the same purpose. If resources do become scarce, modern subsistence users can expand their range sufficiently to maintain their economy. The process remains unchanged from remote generations past, but its mode of implementation has been altered.

There is one critical variable, however, which must be considered. This is the problem of access to traditional lands. Alaska's land is now in divided ownership, creating a patchwork of boundaries intersecting the formerly undivided subsistence range. Since the rivers and mountains bear little relationship to these lines, access across them will be essential if viable subsistence economies are to remain in existence. Resources are subject to constant change; and, because of this fact, subsistence ranges can never be stabilized within specified limits. They will always expand, contract, or draw themselves into new shapes as the environment may dictate.

New Alaskan parklands are an important variable in determining future subsistence ranges. Some of these lands encompass areas

presently used for subsistence purposes. Others include areas traditionally utilized but infrequently or never visited by village hunters today. Throughout the state, resources have been at an extraordinarily high level for several decades, constricting use areas to a portion of their former size. Now, as important resources decline, we can expect to see these areas expand into now fallow lands. In other words, some unused parklands will be utilized again.

Alaskan parklands fit into the subsistence picture in four ways:

1) some are regularly used on a yearly or seasonal basis;
2) some provide optional subsistence lands during periods when utilization ranges shift or expand;
3) some provide the extended habitat lands required by game species that do not range exclusively within subsistence areas; and
4) some are not directly used but provide "feeder" areas from which subsistence resources are derived (for example, fish spawning grounds, calving areas, denning sites).

Traditionally, subsistence activities have been determined heavily by the ebb and flow of natural resources. But today, many new variables have emerged as Alaskans are drawn more closely into the national economic and cultural sphere. Many decisions will dramatically affect the future of subsistence activities, but none more than those determining the impact of boundaries drawn across the land.

Husbanding the Resources, Traditional Koyukon Approaches

Earlier in this chapter, the Koyukon Indians' awareness of interrelationships among natural phenomena was noted. Having made this observation, it is not surprising to find among them a highly developed conservation ethic, focused upon the maintenance of resource species and an avoidance of waste. This subject requires special attention here, because recent discovery of wasteful practices

by some Alaskan subsistence hunters has generated the erroneous assumption that "all Natives are wasteful" or lacking in the conservationist impulse. Our studies among Athabaskan Indians show that this is not the case.

Conservation Ethic and Sustained Yield

A pragmatic approach to the conservation of natural resources is strongly manifested among Koyukuk villagers. Sustained yield principles are applied in the full range of hunting, trapping, fishing, and gathering activities. The following examples describe and illustrate this approach.

The Koyukon, like all other Alaskan Native peoples, have always hunted waterfowl during the springtime. Ducks and geese are highly valued as food, especially at this season when they are in prime condition. During some years they are also the only source of meat available after the thaw. But near the end of the spring season, Koyukon hunters avoid killing female waterfowl because they are mating and preparing to nest. Some people avoid taking waterfowl altogether at this time, preferring to encourage maximum reproductive potential for the resource.

The Koyukon may also avoid using young animals or plants, knowing that they will become more valuable with age. Thus, timber is cut selectively, leaving the smaller trees for a future time when they will be large and maximally useful. The same thinking applies to the preference for large meshed nets used in fall seining by upper Koyukuk villagers. These seines allow the small whitefish to escape, so they can grow to full size before being caught.

Trappers very carefully manage resources in their traplines, assuring the best possible long-term yields. They are especially cautious about beaver, and they express pride in their ability to trap these animals over many years without depleting the population. Newly made beaver houses, or those with small feed piles (indicating a small number of occupants), are usually left untrapped. Snare and trap sets are made to select the larger, more valuable animals; and after two

are caught, the sets are generally removed. This leaves a nucleus of young animals behind. A Hughes man reported taking only one beaver from each house in his area because of natural declines in the population there. It is always considered best to take a few animals, even under these conditions, because doing so is thought to stimulate population growth.

Similar management practices are followed with other species as well. One man criticized himself for taking too many otters from his trapline in a single year, feeling that he might reduce the local stock by doing so. Another said that a long familiarity with an area allows trappers to learn where mink dens are located, but this knowledge makes them too efficient. They must regulate their own takes carefully to avoid over-harvesting.

The Koyukon people are especially concerned today with conserving big game populations. Black bears can be taken fairly easily in the springtime, and in former years they were often hunted at this season. But today, other food sources are available during the spring, and so bears are usually not hunted until they become fat and rich in the fall. "You know, we really like to hunt bears in the falltime," a Huslia man explained, "so we talked about it and decided to leave them alone in the spring."

When Koyukuk people learned of the decline in caribou herds, they reacted favorably to severe emergency restrictions on their take. In community meetings with state Fish and Game Department representatives, they immediately recognized the value of such limitations and gave their unanimous acceptance. The people are also deeply concerned today about the conservation of moose, in the face of growing pressure from "Outside hunters."

Attitudes Toward Waste

The localized and non-migratory nature of many boreal forest resources tends to generate an understanding of human use impacts on population levels. This has led to the idea of sustained yield and to an ethic of waste avoidance. Since resources are clearly finite and

subject to decline, people should take only what they need and use whatever they take. Koyukon tradition strongly emphasizes these values, reinforcing them with threats of supernatural retribution for violators. Indeed, avoidance of waste is one of the strongest themes in Koyukon religion.

If someone kills an animal and then leaves it unused or neglects to retrieve its meat, bad luck or illness will befall him. Thus, meat should be utilized to appease its soul. For example, a man who killed a starving bear butchered it, covered the meat with brush, and told his son, "we'll come back to pick this up later."

The useless meat was not retrieved (note that bear meat is tabooed for dog food), but these cautions ensured against supernatural punishment for waste. Incidentally, the brown bear is the one animal that is killed both for use as food and for self protection, being considered too dangerous to have in areas where people regularly camp or travel. It is also disliked for its habit of killing black bears in their dens.

Koyukuk people make a concerted effort to locate and retrieve wounded game and are genuinely upset if an animal is lost. A Hughes man who could not find a wounded bull moose made a long trip back to the village to get help in finding it and hauling its meat to the river. He could have shot another, but this was not what he chose to do.

According to Jette (Koyukon Dictionary n.d.), the Koyukon word meaning "to use" is always understood to mean "to kill" or "to catch." The two concepts are virtually inseparable. Practically all animal species are considered potentially valuable sources of food and so must be preserved as much as possible for the uncertain future. As a Huslia woman explained, "People never kill animals for no reason, because they know there's times when they will need to kill anything they can find."

Competitors in Nature

Living as close as they do to the resources of their environment, the Koyukon might be expected to resent competition for these resources

by predators. This would be especially true for wolves which feed on the moose and caribou that are so essential in contemporary village economies. But the Koyukon are far more moderate in this regard than are many hunters in our own society who take game primarily for sport.

Koyukuk people express varying attitudes toward the wolf. They become resentful when wolves are abundant in an area, and moose either become scarce or move elsewhere as a result. At this point, they feel that wolves must be hunted and trapped to keep their numbers in check. But they strongly oppose outside controls such as aerial hunting, and they are universally against eliminating wolves altogether. Wolves do supply valuable hides for indigenous use and for sale and they have a proper role in the overall environmental scheme.

A Koyukon elder pointed out that wolves usually hunt with care, checking out animals "to see which one they want." If a kill is left behind, they will usually come back and feed on it repeatedly until just the bones remain. Only when there are too many wolves in a pack do they indulge in overkill, and this is when hunters should reduce them to moderate numbers.

People do not fear annihilation of game stocks by wolves, perhaps because they have watched the moose population grow steadily despite constant predation. In fact, they often note that before moose appeared in the Koyukuk country wolves were extremely scarce. Later, the populations of both species increased together, and the two have remained common ever since. It is quite clear then that wolves are not exterminating their prey in this region.

The only other competitor that affects game resources of importance to the Koyukon is man himself. In recent years, Outside hunters have come increasingly into the Koyukuk region, primarily to hunt moose. Local people feel that these competitors pose a serious threat to their economy and are pressing for means of limiting them.

Chapter 11
THE USES AND MEANINGS OF SUBSISTENCE FOODS

"Food is the Meaning of Our Lives"

Today, as in the past, Koyukon and Nunamiut villagers continue to sustain themselves primarily by the use of resources from the surrounding land. This is true despite a century of influence from the Outside, which has caused many changes in the patterns, but not the fact, of subsistence. Although imported foods have become quite significant in the Native diet, village economies would certainly collapse if subsistence should become impossible. At the present time, there is no other viable means of sustaining these communities.

But aside from economics, there are other very important dimensions which reinforce the Native people's dependency upon subsistence. Our studies of Koyukuk villages find that food from the land provides much more than sustenance alone—indeed it is a focal point of Koyukon culture. Native food is a source of psychological well-being, it comprises the matrix for social and ceremonial events and is a vital component in traditional religious practices.

Food Attitudes and "Psychological" Dependencies

Locally obtained meat and fish are overwhelmingly the staple foods in Koyukuk households. Midday and evening meals usually center around a Native dish, such as boiled or fried meat, meat "soup" (with vegetables and rice or noodles added), or one of several

fish preparations. The fare is varied by using different kinds of game and different preparations each day.

In a typical winter week, evening meals will consist of moose meat on three or four days, interspersed with fish, caribou, bear, grouse, hare, or waterfowl (stored from the fall). During the warmer months, fish and fowl are eaten much more often, with proportionately less big game. Throughout the year, dried fish and leftover meat are important for lunches and snacks.

Some "white man food" is included in every meal. The most important items are bread and butter, crackers, vegetables, canned fruit, coffee, tea, and milk. Sugar and salt are considered indispensable by most villagers today. Only the morning meal,however, tends toward a dominance of imported food. Breakfast usually means hotcakes and coffee, but sometimes cereal or even bacon and eggs will be eaten. Leftover meat or fish is commonly eaten at the morning meal as well.

From an outsiders' perspective, the villager's diet is narrowly circumscribed, lacking the diversity permitted by access to supermarkets. But the people are thoroughly accustomed to this diet (most have known little else since infancy) and have considerable difficulty getting along without it. People who leave the villages, even for a short time, complain that Outside food has too little meat; and no matter how much of it they eat, they are still hungry. A man who left his village to attend a meeting described these feelings, then added, "A bunch of us Natives finally went out late at night to find a restaurant, and we all bought great big steaks. Didn't matter how much it cost. After we ate that we were alright again."

Another man commented, "If I don't get that meat every day, especially our wild meat, I really miss it bad. I just got to have it."

This feeling may be difficult for a non-Native to understand; after all we are talking about foods that satisfy ourselves completely. But it becomes very comprehensible when the situation is reversed, when the outsider finds himself restricted to an exclusively Native diet. Under these conditions, it seems that no amount of food will drive away the pangs of hunger, even when further eating would be embarrassingly extravagant. The only cure for this malady and the anxiety

it produces is a dose of familiar food. This immediately satisfies the craving, be it physiologically or psychologically derived.

The outsider's reaction to a "monotonous" Native diet seems founded partially on our own inability to detect subtleties in the flavor of subsistence foods. Village people, who often use little or no seasoning, have an extremely refined taste for differences in meat and fish. Thus, what seems unvaried from one standpoint is quite diversified from another.

Koyukuk Indians and neighboring Eskimos are especially aware of taste and quality differences related to fat. Most animal species have a fat and lean cycle according to season, and this strongly influences their pattern of utilization. Individual birds vary considerably, but expert hunters can often pick out the fat ones and shoot for them as they fly overhead.

Beaver can be trapped easily during the fall, but the Koyukon prefer to wait until spring because they are fattest at this time; the same attitude applies to muskrats. Seasonal qualities of big game are especially well known. Black bears are considered poor eating in the summertime, and reach a peak of excellence in the late fall. This relates to both fatness and to qualities imparted by a diet of berries. A bear's condition remains good through early spring, but it quickly becomes poor after break-up.

Fat cycles of moose and caribou are known in the finest detail, and if food supplies are not short, kills are made selectively on this basis. During each season or part of a season, hunters know which animals are likely to provide the fattest and tastiest meat, according to sex, age, phase of the rut, presence or absence of calves, and local feed.

Other factors also enter into desirability of animals for food. Some of these are due to location. Yukon River salmon are much higher in quality than Koyukuk salmon. Pike caught in certain lakes during early winter are considered inedible because they "taste like moss." Beaver living in shallow places (less than 2 feet deep) also have a poor taste that renders them suitable only for dog food.

Feeding patterns also influence the desirability of meat. Thus, ruffed grouse are excellent after eating berries in the fall, but are less tasty in mid-winter. Spruce grouse "taste like pitch" during the

winter and are much better in the fall. Moose have "sweet tasting" meat in August, but their change in feed in early September lessens their desirability. Later on, the bulls stop feeding altogether during rut; they simultaneously develop a pungent odor, rendering them unfit for use as food.

Living from the land does not, therefore, preclude developing refined food preferences. During times of plenty, hunters can sometimes choose game on the basis of taste and richness. But when food supplies are not abundant, subsisters cannot afford this luxury and must take whatever they can get.

Treatment of Food

Although the Koyukon Indians may have discriminating tastes for wild foods, they are unfalteringly respectful toward all produce that comes from the land. Generations of direct dependence on the resources of an often frugal environment has instilled an acute awareness that plants and animals are the source of human life. Perhaps it was the fickle nature of these resources that evoked supernatural sanctions regulating their proper treatment.

This is why most Koyukuk people take pains to cover all cached food, lest it be defiled in some way by scavengers or dogs. Even when meat is carried around outside (from the smokehouse into the home, for example), it should be covered or wrapped. This is essentially a formal, symbolic act showing care and respect. Meat from some spiritually powerful animals is also stored for several days, until it is considered fully dead, before it is used.

Koyukuk villagers observe a profusion of food taboos, some intended to show respect for the animals involved. For instance, porcupine and fish should not be eaten at the same meal, because the fish spirit is offended by proximity to this animal (Sullivan 1942:113). Brown bear meat is always cooked in a bachelor's house, where it

cannot come into contact with women. Violation would offend the bear's spirit and bring harm to the women involved.

Special treatment of food protects people from contagious effects as well. Thus, young boys avoid eating grebes, lest they become slow and clumsy. Children and young people do not eat any animal's heart, because it would make them frighten easily or suffer heart problems. Young women abstain from eating cloudberries, because they rot easily and would therefore cause early aging. One elder lamented the decline of breast feeding in favor of bottle feeding, "You know, all those kids today are getting raised on milk from cows, not from their mothers any more. I think that's why they start to act like animals."

Respect for food is also shown in the way it is eaten. Those who adhere to tradition will not eat outdoors without somehow formalizing the meal—making a fire and perhaps putting down a bed of spruce boughs on which to sit. In past years food was always heated, but today people might just gather around a fire while eating the food cold. "If you don't make a fire, you'll just stay hungry. You might even get sick."

It is also taboo to eat while walking around, or to sing or whistle at the time of eating, because these things divert attention from the food. The woman who described these rules explained that violation "would show no respect for the food; just like you're playing around with it."

Such behavior can cause people to lose their hunting luck. They could also have some other bad fortune.

When meals are finished, there are rules for proper disposal of waste or uneaten portions. Often these are used as dog food, but if not,they should be burned or placed in the woods somewhere. Traditionally, a person would say, "I am sorry, that's my food," while disposing of such remains. This was a formal apology for not using part of a creature (Clark 1970:86). Once, while breaking camp, I watched a woman hang the unused neck of a waterfowl in a tree, saying that perhaps something would eat it later. In this way, she avoided the appearance of simply tossing it away.

The Importance of Sharing Food

For the Koyukon, food is not only the source of life and the tie that binds man irretrievably to nature, it is also a link which holds people together as members of a common social and economic community. Sharing is a cardinal virtue in Koyukon society. It is a source of pleasure and prestige for those who give; it is a means of economic security for those who receive.

From their earliest years, Koyukon children are taught the importance of sharing and of giving hospitality. Indeed, when a child takes his first animal of any species, he gives it away to an elder and keeps nothing for himself. In return, the old person is expected to confer luck upon the fledgeling (c.f. Loyens 1966:52).

> Once, long ago, a family was starving in early spring. They had nothing to eat except a few fish, little songbirds and cranberries that had remained through the winter. Whenever the man of this family got a little food, he did a terrible thing. Instead of sharing, he ate it himself. Then one night, while the others slept, he mixed a bit of fish with cranberries gathered by the others. When he tried to swallow it he choked, and everyone knew from the sound that he was eating. This was a great, unpardonable shame, and it has never been forgotten. Old people continue to tell this story to the children, so they will know that they must always think first of sharing.

A sense of communality was essential in the past, when sharing was the best insurance against starvation. During times of shortage, food sharing maximized everyone's chances of survival. Today food is given to those who cannot provide well for themselves, such as the old and the ill. One spring, for example, a man was injured and could not hunt. The men with whom he shared a camp hunted muskrats each day until they had 40 apiece; they then hunted for their sick companion until he also had 40 muskrats.

If a moose or other large animal is taken during a time when fresh meat is scarce, it will surely receive wide distribution throughout the community. Hunters might also present an entire animal (for example, a moose, bear, or beaver) to a family that needs it. This form of

sharing even has a special Koyukon name. Reciprocity is not demanded or expected, though sometimes a small gift is made to the benefactor.

Sharing is also carried out irrespective of physical need, perhaps as a means of solidifying social bonds. Thus, a successful hunter usually gives some of his catch away, even to people who are well supplied with meat. Among the Nulato Koyukon, if a man does not share as expected, people might say, "He is trying to be like a whiteman; he doesn't want to help other Indians, doesn't want to give it away unless he gets something" (Sullivan 1942:77-78).

Communalism is especially important when group hunts are undertaken. If a bear is taken from its den, the men eat certain parts together and save others for a later "bear party" outside the village. Some highly preferred portions are set aside for village potlatch feasts. The successful hunter keeps only a small amount for use in his own household. Sometimes the successful hunter in a group keeps nothing at all for himself (cf. Loyens 1966:41).

The social recognition and prestige of sharing is often more valued than access to the desired resource itself. Sometimes when two men hunt together and each kills a moose, they give their animals to each other in an act symbolizing the importance of sharing. Mourning the death of a lifelong friend, an aged Koyukon man spoke the highest praise, "When I was young, he always gave me food. Whenever I went to his house, there was plenty there, and we ate from him."

Uses of Food in Socio-Religious Contexts, The Potlatch

Native foods have special significance from still another standpoint. They are essential elements of the potlatch, a social and religious event unparalleled in importance to the Koyukon Indians (and other Alaskan Athabaskan groups). The potlatch is a communal feast held to celebrate a social event or holiday or to memorialize a person's death. It is attended by all members of a community and often by people from surrounding villages, as well. An important

funeral potlatch may attract several hundred people—a large crowd indeed, considering the size of settlements in this area.

Ethnologists may be uncertain as to the origin of this cultural institution, but the Koyukon are not. According to their oral history, which is interpreted literally, the potlatch originated during that remote time when the world was being created in its present form:

> Long ago, the Wolverine was boss over all the animals. Once the Red Fox told Wolverine that he had seen a little "house" with food in it, alongside a trail. Wolverine asked if he had eaten the food, and Fox said no, he had left it alone. Wolverine was disgusted by this, and so he got all dressed up in his fine clothes and went out after it. Before leaving, he warned that if a red sun rose the next day that something had happened to him.
>
> Next morning the sun was red, and Fox went out to look for his companion. He found the wolverine dead at the little "house," which in fact was a baited deadfall. Wolverine was brought back, and everybody had a meal there beside his body, which was still dressed in finery. This began the tradition of the potlatch.

These beginnings, in the Koyukon equivalent of Biblical times, lend a particular sanctity to the observance of potlatches today. There are several kinds of potlatches, however, some religious and some basically secular. These include:

The Funeral Potlatch

The potlatch held at the time of burial is a kind of "last supper" with the spirit of the deceased.

The Memorial Potlatch

The memorial potlatch is held several months to a year after a death. It is a final ritual for the dead and a testimonial for those who attended to funeral duties.

The Social Potlatch

Social potlatches or "covered dish" feasts are held on special occasions or holidays which are usually secular but are sometimes partially religious in nature. These social feasts are less oriented toward Native foods than the other types.

Secular potlatches are usually referred to as "covered dish" feasts, which indicates a lesser importance than a real potlatch. These events often feature many imported foods, because they are not being held to honor or feed spirits of the dead. They are held for such occasions as house warmings, national holidays, and village celebrations. These events are of considerable social significance because they serve to reaffirm a strong sense of community, both within and between villages. They are also a formalized recognition of food as a force that bonds people to life and to one another.

By far the most important potlatches are those held to honor or memorialize the dead. Among the Koyukon, if not Alaskan Athabaskans in general, these religious potlatches have an emotional impact and cultural significance that reduce all other community events to virtual irrelevancy. It must be experienced to be understood. Potlatches are not only the paramount manifestations of Native religious practice, they are also "harvest celebrations," featuring the most excellent Indian food preparations and conferring proper recognition upon those who are providers. Ordinary foods are not considered adequate for a real potlatch, and so the most preferred game must be available if the event is to be held at all.

When a person dies (or is near death), people from all communities in the area converge on the village where the funeral is soon to take place. For several days before the funeral, everyone comes to the home of the deceased to visit and, most importantly, to partake of food. Large quantities of meat and fish are given by members of the community for this purpose. Those who eat this food are said to be "having their last meals" with the one who has died. The spirit of the

departed person is believed to linger among the living for some time, and so this spirit is present during the "last meal." These meals are also held if someone is near death, especially if the person cannot eat. In this case, people "eat for" the one who suffers and whose spirit has already begun to wander.

Shortly after a deceased person is buried, the funeral potlatch is held. This is the formalized "last meal" with the spirit of the dead, and it is here that Native foods assume their highest importance. Hunters from the village (and from surrounding communities as well) contribute great amounts of meat and fish—the best parts from the finest animals that they have taken—to be prepared for the potlatch. Some of this meat, particularly from fall-killed black bears, waterfowl, and fresh, fat moose or caribou has been specially procured for this purpose or saved for many months in case a potlatch takes place. Hunters generally avoid using the best parts of their kills themselves, setting them aside for distribution to the community at potlatches or feasts.

If prized animals or cuts of meat are in short supply, the Koyukon feel that they must be obtained because they constitute the vital essence of the potlatch observance. This refers specifically to moose, bear, and/or waterfowl. Such foods are necessary because they are given to the spirit of the dead person and also because they symbolize the effort that has been made to obtain them on behalf of the deceased and his family, "The work is where the meaning comes from. We always try to give the best things we have for a potlatch, and lot of these things are hard to get."

Potlatch meat is collected from people throughout the village then redistributed for preparation. Just before the event begins, the food is brought to the community building where people are gathering. Huge pots and tubs are arranged on the covered floor at the center of the room where everyone can see them. They are filled with steaming bear ribs and backbone meat, the finest boiled meat of moose or caribou, waterfowl soups, moosehead soup, "Indian ice cream," and the highly esteemed slabs of bear fat. Modern potlatches also include some storebought food, such as pilot bread, tea, coffee, and canned fruit.

Once the array is complete and everyone has arrived, the room becomes quiet. It is time for the speeches. One at a time, people come forth and stand by the assemblage of food. Here they speak praises for the potlatch and the people who have come to participate, eulogize the one who has departed, explain the value of perpetuating Indian customs, and acclaim the pre-eminent importance of food. Elders who follow tradition will also extoll the virtues of wild foods, the meanings of feasting together, the good fortune of successful harvests, and the appreciation that people must feel toward those who provided the food. An old shaman, no longer living, is remembered for having said, "Food is the foundation of our lives," and for explaining that Indians and Eskimos are all one people because they sustain themselves on the same plants and animals from the land.

Sometimes, the deceased has malingered and wasted away, unable to eat or benefit from food. It is said then, "He suffered for food," to remind people that he will now be fed from this rich feast. Assembled here are the best foods that he knew, and it is for him that they are given. Such a death occurred at Huslia in 1976, and people were actively encouraged to eat large amounts of food for many days. In this way the suffering spirit was relieved.

During the funeral times, people sing eulogy-songs which they have composed to memorialize the deceased. These songs nearly always commemorate some ability in hunting, trapping, fishing, or other subsistence skill possessed by the man or woman who died. They may recount the person's travels or his special familiarity with areas of the land (cf. Sullivan 1942:126).

As soon as the speeches are finished, the potlatch foods are passed out to everyone attending. Each person eats something of what he receives, but most of the food is taken home to be eaten later. When all of the food has been distributed and people have finished eating, the potlatch is over.

A portion of each kind of food at the potlatch has been set aside, however, especially those most preferred by the deceased. These are taken out and placed on a fire which consumes them entirely. In this way, through burnt offerings, the spirit of the dead takes part in the

potlatch feast. Here is a crucial moment of the potlatch, yet it does not occur amid the crowds of people attending and is not ordinarily seen by an outsider.

Within a year after a death and funeral, a memorial potlatch must be held. This important event is traditionally held at mid-winter (New Year's time, nowadays), and it is often far more elaborate than the initial funeral potlatch. If the deceased was an old and respected person, hundreds of people will attend, a large feast will be prepared, and lavish distribution of material goods will be made. This potlatch is held to honor the deceased and to repay those who composed eulogy-songs or otherwise assisted with the funeral. Incidentally, if no one has died in the previous year, a smaller mid-winter potlatch is still held as a memorial to all who have passed on in recent decades.

Great outlays of Native food are required for the memorial potlatch, and the event is similar to the funeral potlatch. In this event, however, belongings of the deceased are given away as remembrances to those who knew him. In addition, large amounts of goods such as animal hides, newly made skin clothing, and storebought items are given away by the family of the dead. Potlatches for old and important people may entail literally thousands of dollars in goods and subsistence products. Burnt offerings for the spirit of the dead are another important part of this potlatch. If all these things are not done, the Koyukon believe that more death will come to the same family, and so the memorial potlatch is always faithfully held.

Those who eat at the funeral potlatch are participants in a ceremony, something that goes beyond the physical act of eating or the social act of feasting together. Food, particularly the assembled Native delicacies, has become a vehicle for communion with the dead, in keeping with traditional Koyukon belief. It might be compared to a sacrament; but it differs in not being symbolic, for the spirit of the departed partakes of the feast. The potlatch is a fundamentally religious event—the basic meaning and intent has changed very little despite a century of contact and Christianization.

Food for the Spirits

During the months following a death and its attendant ceremonies, the ritual of food-burning is repeated at frequent intervals. Usually it is carried out at the graveside and again includes the foods most enjoyed by that person in life. This continues regularly for a year and then intermittently for up to 20 years or more. It is done to comfort and appease the spirit which may disturb people if it is neglected:

> A woman said that she recently had an upsetting dream in which her long deceased grandfather told her, "Everything is really nice where I am, but I need water." She felt very sorry because she had neglected to burn food for him for a long time before the dream. The next day she burned food and poured plenty of tea and liquids on the fire, and after that she felt happy.
>
> (Kathleen Mautner, Huslia fieldnotes)

The following account of food burning at the Huslia cemetery illustrates the simple but very important ceremony involved:

> There is a special food-burning place at the graveyard. A little box of wood is kept next to it. C. built a fire and then proceeded to put into it dried meat, dried fish, and dried moose fat (all cut in small pieces). She wanted to burn beaver meat because it was her young nephew's favorite meat, but didn't have any, so she burnt chicken instead.
>
> Each time she burnt a different food, she would say in Koyukon, "Antla (here), this food is for you, because it is what you liked when you were living. Please watch over Huslia people so that no one will get hurt or become sick. And give us luck in our hunting."
>
> This was done while she was kneeling.
>
> (Kathleen Mautner, Huslia fieldnotes)

For the Koyukon, spirits of the dead are still a part of the living world. They are capable of bringing luck or ill fortune, and therefore

must be accorded proper treatment. People are continually aware of these spirits which move invisibly among them and influence daily events in many ways. They also realize that the step into the spirit world is a short one, and it may be taken suddenly and without forewarning. The Koyukon await the day when they too will become spirits, dependent upon the living for gifts of the food that sustained them in life.

> At a lonely spring camp long ago, a family faced starvation. The wife's father had become so weak that he could only be moved about on a sled or carried from place to place. Others in the family kept themselves alive by eating bits of clothing and the babiche lacing from their snowshoes. One day the old man's daughter finally caught a louche, and she roasted its prize liver for him. But when she gave it to him, he was too weak to swallow. There was no hope for him now. He could only motion feebly with his hand, telling her to throw a bit in the fire.
>
> Momentarily he would die, and the food that eluded him in life he would have at last on the spirit side of the world.

Chapter 12
IDEOLOGICAL DIMENSIONS OF SUBSISTENCE, A KOYUKON EXAMPLE

For countless centuries, the Koyukon Indians have sustained themselves by a direct and intimate relationship with their surrounding environment. This close daily interaction and dependence has profoundly influenced their ways of perceiving nature and has provided the source for major themes in their culture.

Koyukon perceptions of nature are aligned on two separate levels. The first of these levels is empirical knowledge. The practical challenges of survival demand that hunter-fisher-gatherers acquire a deep factual understanding of every facet of their environment and the methods for utilizing it. In short, they must become sophisticated natural historians, especially well-versed in the fields of ecology and animal behavior.

But their perception of the natural environment extends itself beyond the empirical or objective level (as westerners would define it), into the realm of the spiritual. Thus, Koyukon mental culture includes an elaborate system of supernatural concepts for explaining and manipulating the environment, concepts which are entirely different from our own. In this system, the natural and supernatural worlds are inseparable, and environmental events are often caused or influenced by spiritual forces. Detailed explanations are provided for the origin of natural entities and for the causation of natural occurrences (which seldom, if ever, take place purely by chance). Furthermore, man's behavior toward nature and its resources is governed by a large number of supernaturally derived rules which ensure both his well being and that of his surroundings.

These concepts are completely logical and consistent, but their premises differ from those familiar in western society. Of course, both are outgrowths of a particular cultural milieu. Western conceptualization envisions the universe as a system whose functioning can be explained on a purely rationalistic and scientific basis. Thus, the natural and supernatural worlds are clearly separated, and environmental events are caused by ongoing evolutionary and ecological processes or are purely chance occurrences. Finally, man's behavior toward nature or its resources is regulated primarily by practical rather than religious considerations. In short, members of the two cultures, Western and Koyukon, learn to perceive very different environmental realities.

It is important to emphasize that the concepts and beliefs detailed below are a living aspect of present-day Koyukon culture. They are not gathered from the recollections of elders, but from the actual behavior and ideology of adults who are presently the active providers in Koyukuk River communities.

The Koyukon are very open and instructive regarding their religious traditions, which they accept on an equal basis with adopted Christian beliefs. This is a marked contrast to many other Alaskan Native peoples, who are extremely reluctant to discuss traditional religion or to reveal the practices they still follow. In most cases, Christianization has either caused abandonment of the old religion or has driven it underground where it is carefully hidden from the eyes of outsiders. The Inupiat Eskimos are, I believe, a probable example of the latter.

The authors are very fortunate that the Koyukon people have given us an opportunity to describe this aspect of their lives, because without it, we cannot hope to fully understand the nature of subsistence. It allows all of us to see that subsistence extends beyond the purely economic realm—and beyond serving as the foundation of a rural Alaska lifestyle. Indeed, subsistence is a pervasive element in the entire cultural system, conditioning even the ways that people conceptualize the world around them.

The following pages will provide a general description of Koyukon environmental concepts and ideology and will illustrate some of the

ways in which they govern human behavior. The discussion begins with considerations of empirical knowlege and environmental aesthetics, two aspects of perception that are very familiar in Western culture. But subsequent topics are more distinctively Koyukon. They include a summary of Koyukon origin stories, perceptions of man and nature that derive from them the diverse manifestations of nature's spirit powers and the ways in which such powers are utilized by man.

Empirical Knowledge

As mentioned above, the success and survival of a hunting-gathering people is founded primarily upon knowledge. This is the hunter's most vital attribute and his most effective tool. Certainly, the more a person knows about his environment, the better equipped he is to draw sustenance from it. The Koyukon then, over the long span of generations, have amassed a very large and impressive body of empirical knowlege about their natural surroundings.

It is difficult to communicate in summary fashion exactly how detailed this knowledge is. Surely the expert hunter (which here means hunter, trapper, fisherman, gatherer, and traveler—male or female) possesses a body of knowledge equal in depth to that of a qualified professional in any scientific or technical field. A sizeable volume could be written about each major game species, for example, by simply recording the hunters' data on all facets of its natural history. Older Koyukon people have spent a lifetime acquiring traditional knowledge of the environment and augmenting it with the learning of personal experience and observation. They, in turn, devote considerable time to discussing this knowledge and passing it along to others. The following examples illustrate very briefly empirical knowledge, its acquisition, and its uses.

Trappers are incredibly skilled at recognizing animal tracks and making use of the information they yield. During the course of winter, they become familiar with individual animals by repeatedly

encountering their tracks and studying the personality revealed in them. A man spoke of red foxes that are so afraid of man that they will jump over his trails rather than walk across them. These animals are almost impossible to catch. He said that one such fox crossed his trail repeatedly at the same spot. So he studied its track until he knew the animal well, and then devised a way to suspend a snare from a long pole where it could hang well off the trail and away from all footprints. In this way he caught the wary fox when it leaped over his trail, and in the process he developed a special trapping method.

The Koyukon have greatly elaborated their knowledge of bears, which in some past times were the only big game animal available to them. Their fund of information on bear denning is especially remarkable. This knowlege is used to locate dens by recognizing subtle clues, to learn if dens are occupied and by what sort of animal, and to succeed in taking these animals when they are found.

Expert hunters are able to find dens by detecting bear tracks in the frozen moss beneath as much as 2 feet of undisturbed snow, and by spotting miniscule disturbances, such as incongruous bits of grass or cracked twigs. If a den is located (and this may require days of searching), there are equally sophisticated means of investigating its occupant and eventually making a kill. Careful studies are made of the den and its surroundings, but sometimes the hunter must enter an inhabited den to accomplish his task. By putting his head just inside a den's entrance and listening carefully, he may hear the bear licking its chops or breathing, or he may detect its heartbeat growing steadily louder and faster. In the latter case, he knows that he has found a young animal, its pounding heart registering fear. Older bears do not react this way because they are unafraid. Knowing that young animals are more likely to flee a den after disturbance, hunters keep a close watch on the entrance until the hunt is over.

Further illustrations of empirical knowledge are found in other sections of this book—in the discussions of subsistence techniques and women's activities. It is important to emphasize that this approach to understanding is highly developed among the Koyukon, and that it coexists with the non-empirical dimensions to be detailed

below. Both are considered essential for success in the subsistence endeavor.

Environmental Aesthetics

The aesthetic impulse lies somewhere outside, or between, practical knowledge and religious concepts. The Koyukon perceive their environment not only as a source of life and spiritual power, but also as a world of beauty. The beauty of the land and of living things is appreciated in the abstract, much as it is in our own culture. This is of some special interest, given the vast differences in our relationships to the land.

The neighboring Kobuk Eskimos differ from the Koyukon in perceiving beauty as a function of abundance and the quest for food. In that case, the aesthetic impulse derives from fulfillment of practical concerns, from goodness and wealth, rather than from natural artistry. The Koyukon share this appreciation of life and livelihood, but their attachment to the land includes a further dimension.

Koyukuk villagers frequently comment that a day or a scene is particularly beautiful. They are attentive to fleeting moments of beauty—fine evening ligl a snow-covered lake, mountains starkly outlined against the sky, or tranquil reflections on still water. In their language, words such as *nizoonh* (pretty) or *hutaadla'o* (beautiful) are used to communicate these feelings. Such expressions are heard among the most elderly people as well as the young, indicating that they are a part of traditional culture. Huslia's oldest residents, for example, often commented on the beauty of lands in the upper Koyukuk region which was their home in earlier years.

These emotions were somewhat tempered in the past for two reasons. First, people were much concerned with the business of practical existence and often could not afford the luxury of refined aestheticism. Second, although people did pause to appreciate beauty in the landscape, they might avoid speaking of it. At that time, to

talk about the size or majesty of a mountain while looking at it was considered disrespectful. A child doing this would be told, "Don't talk; your mouth is small."

In other words, this was "talking big," disrespecting the need to be humble before something so large and powerful. Once away from the scene, however, people would describe its magnificance in great detail.

Animals are appreciated in much the same way, especially certain species which are uniquely elegant or lovely. A notable example is the common loon which is remarkable for its exquisite voice and plumage. Sometimes a loon's skin is dried with head and beak intact, then stuffed with dry grass and kept so that people can admire it.

The loon's eerie cries and wailings, often heard echoing between forested lakeshores, are even more appreciated than its appearance. Seeking inspiration for their own Koyukon songs, people may sit and listen to the loon's cry. "When a loon calls on a lake," one saying goes, "it is the greatest song that can be heard by man."

In the spring of 1976, a woman stood by the shore of *Binkkookk'a* Lake, at Huslia, singing "spring songs" to a pair of loons swimming in the distance. Shortly, they came toward her, to within 50 yards, and cried out in return. Many people talked of this event afterward, having been affected profoundly by its beauty.

People hunt the loon sometimes,
but me,
I don't like to kill it.
I like to listen to it
all I can
and pick up the words it knows.

From the Time of *Kk'adonts'idnee*

The religious dimensions of nature are discussed in this section, beginning with a description of the basic ideology, the body of knowledge which corresponds to Biblical truths for Christianity. In

this case, however, the truths are preserved not in writing, but in a voluminous array of memorized Koyukon lore.

As the Koyukon reckon it, history is ordered on four temporal planes. The first is *kk'odeehu*, a time within about 20 years; the second is *neełlot dona*, a time within the lifespan of today's adults; the third is *yoogha dona*, a time extending back to the before the birth or during the childhood of the grandparents of today's adults; and finally there is *kk'adonts'idnee*, a time so distant that no one can explain or understand how long ago it really was.

But however remote *kk'adonts'idnee* might be, the events of that time are recounted accurately and in great detail through a prodigious number of stories. These stories comprise an oral history of the Koyukon people and their environment, beginning in an age before the present order of existence became established. During this age, "the animals were human." That is, they could speak the Koyukon language; they lived in a society akin to that of man, and they sometimes assumed human form. These animal and plant beings were of the same species that are found in the Koyukon country today. *Kk'adonts'idnee* stories describe this world and its transfiguration into modern form. Often they are so lengthy that a single narrative may require many evenings, even several weeks, for a complete telling.

The stories are, first of all, an accounting of origins. They are a Koyukon version of Genesis, or perhaps of Darwin. Woven into the plots of many stories are innumerable sub-plots or asides, which often describe the origins of natural entities. These stories are in no way regarded as simple entertainment or folklore—they are fact, pure and simple.

The scope of *kk'adonts'idnee* stories range form the minute to the cosmological. To begin with the latter, they explain that the aurora borealis came from the spirit of a hunter who lived in those remote times, and who was burned up in a fire. When a brilliant aurora fills the sky, it is this man's spirit, shooting his arrows through the heavens. Power from this spirit was utilized previously by Koyukon shamans. Nearer to earth, the stories explain how weather

phenomena were similarly derived. Thunderstorms, for example, are the transformed embodiment of a former human spirit. For this reason, they are sentient and can be influenced or turned away by people who know the proper actions.

The form of the earth itself is also given some accounting in these stories. Thus, a hill near Huslia is called *Yitkuhtl'aala'*, "Giant's Firemakers." At this place, a giant man lost his firemaking rocks, and one of them remains as a hill.

A central figure in this ancient world was the Raven (it is unclear, perhaps irrelevant, if there was one Raven or many), who was its creator and who engineered many of its metamorphoses,

> When Raven first created the earth, the rivers ran both ways, upstream on one side and downstream on the other. But this made life too easy for the humans, who could always travel with the current. So Raven made the rivers flow only one way, and this is how they remain until today.

Plants are much less important in the stories than are the animals, but they do appear. All of the trees originated from women who were told a terrible, sad tale. When one woman heard the tale she cried and pinched her skin, which made it very rough. Then she was transformed into a spruce tree, and her bark remained pinched and rough. Another woman cried and slit her skin when the tale was told, and she became the balsam poplar with its deeply cut bark. And the woman who became the alder pinched her skin until she bled. This is why the alder's bark can be used to make red dye.

Among the animals, there are hundreds of stories explaining aspects of appearance and behavior for all orders of creation. For example, when the burbot (ling cod) was "human," he decided to take leave of the land and become a water animal. So he started down the bank, taking a piece of bear fat with him. But the other animal-humans wanted him to stay and tried to hold him back, stretching him all out of shape in the process. This is why burbot have such a long, stretched-out body, and why their liver is rich and oily like the bear fat their ancestor carried to the water so long ago.

A particularly fine story explains the song and plumage of the white-crowned sparrow:

> Long ago, in the old story times, a starving man tried to walk to his distant spring camp, at a place called *Ts'eetee tł'ot.* This man wore a band of dentalium shells, as was the fashion of his time. But before he made it to the camp, he fell and died. Then he was transformed into a white-crowned sparrow, and thus incarnated he flew on to the camp. When he arrived, he sang a lamenting song, *Donee sik'its'eeteetł'ot,* which means, "Here is *Ts'eeteetł'ot,* but it's too late now."
>
> Today, the white-crowned sparrow bears dentalium shell markings on its head, and still repeats this same plaintive song.

At the end of *kk'adonts'idnee,* a great catastrophe occurred. All the earth was covered by a great flood, and under Raven's supervision two individuals of each species were put aboard a raft. These animals and plants survived, but when the flood ended they could no longer behave like people. All of the humans were killed in this flood, but Raven recreated man in his present form. Since that time, the world has remained as we experience it today.

Kk'adonts'idnee stories function to provide the Koyukon with a foundation for understanding the natural world and man's proper relationship to it. Whenever people discuss the plants, animals, or physical environment, they make frequent reference to the stories. Here they find explanations for the full range of natural phenomena, down to the smallest details. To illustrate this point, there is a story explaining the existence of a small notch in the scapula bone of snowshoe hares. This originated when the hare was attacked by the hawk owl, which was so small that it only made a small wound in its victim's shoulder. Koyukuk people often cite the presence of this little notch as strong evidence that the *kk'adonts'idnee* episodes actually took place.

The stories serve a second and extremely important function for the Koyukon. Events in many narratives show that certain behavior toward natural entities can have disastrous consequences, and these are interpreted as guidelines for humans to follow today. Thus, they provide an extensive compilation of prescribed and prohibited interactions between man and his environment. The narratives serve as a medium for instructing the young in this code of behavior, and they

are considered an infallible source of guidance. "Nobody made it up, these things we're supposed to do. It came from the stories; it's just like out of the Bible."

The most important concept here is the taboo (*hutlaanee*), which prohibits certain kinds of behavior toward nature or resources from nature. Hundreds of taboos exist, and a person who violates them will bring misfortune to himself and, possibly, to his family. Such punishments include bad luck in subsistence activities, clumsiness, illness, accidents, or early death.

> A dog salmon woman was scraping skins at night with her upper jaw, and while she was doing this she was killed. This is why it is taboo today for a woman to scrape skins at night.

In Koyukuk River villages, it is a rare day when someone is not heard saying, "*Hutlaanee*!" ("It's taboo!"). These pervasive regulations are discussed again later in this chapter.

Personalities in Nature

Koyukon stories often portray the animal-humans as having distinctive personalities, and this strongly influences the way that contemporary species are perceived. Often these personalities can only be known through the stories because they are not visibly manifested in the animals' behavior. People have strong positive or negative attitudes toward various species as derived from their portrayal in the stories.

The sucker fish, for example, was a great thief in old story times. Curiously shaped bones in its head are remnants of items that he stole, such as moose antlers, combs, and duck's feet. Because of his activities, the sucker is badly regarded. One man even said that he could never bring himself to eat this fish, knowing what it had been and fearing that it would make him a thief too. "Even in springtime, sometimes we run short of food. But if we catch a sucker in the net, I just can't eat him."

People are often characterized by reference to animal personalities. In fact, the lower Koyukon people (Yukon River villages) inquire about an individual by asking, "*Gin ggaagga nilaanh?,* What animal is he?" (Jette n.d.).

Someone who steals may be described as "just like a sucker fish." When a person talks arrogantly, promises a lot but accomplishes little, or gets ahead by trickery, he is said to be "just like a raven."

Despite the raven's role as creator, he is portrayed in the stories as a lazy trickster, who usually finds a way to get ahead by the efforts of others. People have a kind of jocular respect for ravens, often mocking their personality but nevertheless regarding their spirit power with awe.

Wolves, on the other hand, are respected in a serious way and are considered a quasi-relative of man. According to an old story, a wolf once lived among humans and helped them in their hunts. Since then, wolves sometimes assist hunters by driving animals toward them. When people occasionally find game that has been left by wolves, they appropriate it—knowing that it was intended for them.

It is interesting that relatedness among animals seems to be measured not by physical resemblances but by social standards. In this way, black bears and porcupines are cousins. This is revealed by an old story and manifested today in their occasional co-occupation of a den. When relatedness is not mentioned in the stories, it may be revealed through tendencies to associate to "get along." Muskrats and beaver often live close together and eat some identical foods, and so they are considered relatives. Wolves and dogs cannot get along—in fact loose dogs are likely to be killed if they encounter wolves—which shows that they are not related. Some relatedness is revealed only by the stories, however. Mink, for example, are nephews to the ravens.

So, a natural order exists for the Koyukon, but its structure and foundation are entirely different from our own. As far as the author could learn, there is no concept of phylogeny or of biological interrelatedness, nor of course is one needed. Its equivalent has been provided in another way.

Man's Place in the Natural Order

> When Raven created man, he first used rock for the raw material, and men never died. But this was too easy, so he recreated man, using dust instead. In this way, men became mortal, as they remain today.

The question remains, how does man fit into the world of nature and the scheme of living things?

In the Koyukon system, men and animals are clearly and qualitatively separated, but the distinction is far less sharply drawn than among ouselves. Only humans possess a soul (*bʉnkk'ʉbidza'*) which is quite different from the spirits of animals; and the human soul alone enjoys immortality in a special place after death.

But aside from this distinction, the Koyukon seem to conceptualize men and animals as very similar beings. This similarity derives not from the animal nature of man, so much as the human nature of animals. It was seen earlier that today's animals were formerly members of an essentially human society, and that transmutations between human and animal form were common.

Animals are also understood to possess emotions, to have personalities, and to regularly communicate among themselves and understand what people say to them. People have also seen what they considered to be shamanistic behavior and observance of taboos by animals. The actual behavior is less important, from our standpoint, than the willingness to attribute what would be considered uniquely human practices to animals. Finally, some animals (bear and wolverine) are given funeral rites to placate their spirits, much as is done for humans but on a smaller scale.

The relatively fine distinction between men and animals is further subdued by recognition of a human-animal that occupies the wildlands and remains almost totally removed from society. This is *nik'inla'eena,* "the sneaker," called "woodsman" in English.

Woodsmen are as real as any other creature in the Koyukon environment, but they are extremely shy and quick to vanish when people come near. They are said to be humans who have become wild either after resorting to cannibalism during starvation or after committing murder. Woodsmen are both male and female, resemble people in size and appearance, but are covered with fur.

For the most part these beings lead a solitary existence, but they do approach remote camps and habitations, and they are considered quite frightening. The only serious danger that they pose is toward small children, whom they are likely to steal for their own if the chance arises. Actual disappearances of children in remote places have been attributed to these beings. Other than this hazard, woodsmen are regarded mostly as a nuisance. They often steal fish and meat from drying racks at summer fish camps, especially near certain well-known haunts. People usually are willing to stay in such places, unless some especially frightful encounters happen there. A number of areas along the Koyukuk River are avoided for this reason.

Woodsmen take special delight in harrassing people, which they do by whistling, throwing sticks, rustling the brush, or emitting evil laughter nearby. Most adult Koyukuk people have experienced these things, but the author knows of none who actually saw a woodsman. Their tracks are rarely encountered, because they apparently avoid muddy or sandy places, and during the snow season they hibernate in secluded dens. Tracks that have been reported are longer than a man's foot, about the same width, and have the great toe set apart from the rest.

Countless stories are told about woodsmen and encounters with them. These creatures are a normal part of the environment as it is perceived by Koyukuk villagers. Woodsmen are especially interesting as a bridge across the narrow gap between men and animals, or between the worlds of man and nature.

Nature Spirits and their Treatment

"There's always something in the air that watches us."

Spirits of Natural Entities

Koyukon stories describe and explain rules for proper conduct toward nature. But punishment for offenses against these rules is given by powerful spirits that are part of the living, present-day world. All animals, some plants, and some inanimate things have spirits, vaguely conceptualized beings that protect the welfare of their material counterparts. They are particularly watchful for irreverent, insulting, or wasteful behavior toward living things. The spirits are not offended by the killing of animals, but insist that these beings (or their remains) be treated with the deference that is owed to the sources of human life.

Some animal species have very powerful spirits called *biyeega' hoolaanh,* which are easily provoked and capable of severe retribution. These dangerous spirits can bring serious harm to offenders by taking away their luck in hunting or trapping, or by causing illness, disability, even death. Animals possessed of such spirits include brown and black bears, wolverines, lynx, wolves, and otters. Similarly powerful but less vengeful spirits are associated with beaver and marmots. The remaining mammals, birds, fish, plants, and inanimate things have less powerful spirits that are not directly spoken of in Koyukon. Although these spirits are very real and can punish anyone who offends them, people insist that no term is used to refer to them. The Koyukon do not believe that each species is collectively overseen by a single attendant spirit. Rather, each animal has its own spirit, as the Christian belief that each person has a soul. When an animal is mistreated, its individual spirit is affronted, but all members of that species may become difficult to catch as a result.

In addition to these individual spirits, traditional Koyukon idealogy may include a single spirit of pre-eminent power. Sullivan

(1942:19) found that the Nulato Koyukon conceive of a "Supreme Being" that watches carefully over their food quest and punishes those who mistreat their catches of fish or game. If offended, this being causes sickness or starvation, much as the powerful animal spirits do:

> In the Ten'a [Koyukon] mind. . .the Supreme Being is the "Giver of Food" and the "Avenger of Waste," and it seems that their deep concern with food has influenced them to emphasize these attributes of their Great Spirit. While they have not built up an elaborate series of observances around their Supreme Being, yet in this one matter we find a belief which is deeply embedded in their consciousness and which regularly manifests itself in their food getting activities. It reflects the important position which the Ten'a assign to the search for food, and it stamps their food quest with a definitely religious aspect (Sullivan 1942:20).

Koyukuk people today do not speak of this Supreme Being. Perhaps it was never a strongly developed concept, or it may have been absorbed by the Christian idea of God. But the associated idealogy described above is definitely espoused and adhered to. Certainly, modern Koyukon adults approach their environment from a fundamentally religious point of view.

Proper treatment of natural spirits involves literally hundreds of rules and taboos. Indeed, there is some special observance for most natural entities of significance to the Koyukon. The following discussion of these regulations draws illustrative examples from three major categories: (1) the treatment of living organisms; (2) the treatment of organisms, or parts of organisms, which are no longer alive; and (3) the treatment of non-living entities or objects.

The Treatment of Living Organisms

There are some general rules that apply to all, or nearly all, species of animals. People should never point at animals, for example, because it shows disrespect, "like pointing or staring at a stranger."

They must also speak carefully about most animals, and especially avoid boastful talk about hunting and trapping exploits. A man who

said that he would trap many beaver suddenly found himself unable to catch them; and another man who bragged about bear hunting was later injured seriously in an attack.

The Koyukon are generally prohibited from keeping wild animals as pets, except for species which are perceived as having personality traits valued in humans. Persons who associate closely with live animals acquire their characteristics, for better or worse. Thus, a child who raises a red fox will become mischievous, but raising a hawk owl will help to foster cleanliness and a skill at hunting. Pets are usually avoided, however, because captive animals are likely to suffer, and as a consequence their captor will be struck by illness or bad hunting luck. Taking animals away, for zoo captivity or even catching them for tagged releases, can result in general scarcity of the species involved. For this reason, Koyukuk people oppose game research in their area if it involves the live capture of animals:

> We have respect for the animals. We don't keep them in cages or torture them, because we know the background of animals from *kk'adoots'idnee*. We know that the animal has a spirit—it used to be human—and we know all the things that it did. It's not just an animal; it's lots more than that.

Following from this, the Koyukon espouse an ethic of humane treatment. Every effort is made to kill without causing suffering and to avoid losing wounded animals. A starving moose, mired in deep snow near Huslia, was fed daily until it regained strength and left the area. Once a man found a female bear with cubs, driven from their den by ground water and hopelessly starving in deep snow; he ended their suffering, then dismembered their unusable carcasses lest he offend their spirits by killing without at least symbolic utilization.

Somewhat related to this practice are the rules for the treatment of live animals caught in traps. One man advised that a trapped animal should always be addressed by saying, "My animal, I hope that more of you will come my way."

After this, it is quickly dispatched. Coming upon a wolf or wolverine in another person's trap, the finder must kill the animal and hang it up, to prevent escape or damage. But before shooting it,

he says, "You are not my animal, but I have to kill you. I am trying to help you."

He does this to show respect and to bring luck upon himself. The owner of the trap must learn who killed the animal for him and make a small payment. Otherwise someone in his family will suffer illness. Incidentally, trapped wolverines must never be killed with a club, because it is too slow. One man who did this said that he never caught a wolverine again.

If a raven gets into someone's trap there is potential danger. A Hughes man said that three of his dogs once grabbed a trapped raven and tore it apart before he could save its life. All three of the dogs froze to death soon afterward, but he was spared any vengeance. When he released another raven from his trap, he told it repeatedly that the trap was for other animals and it should have stayed away. The bird flew off unharmed, and he was rewarded with very good trapping luck in that place.

Bears have so much spiritual power that every word spoken about them is chosen carefully. Women are prohibited from even mentioning their names, referring instead to "black thing" (black bear) and "big animal" (brown bear). If a brown bear hunt is imminent, men will discuss it only briefly and with the use of circumlocutions, always well away from women and young people. During the fall bear season, those who follow tradition will limit their contact with women and avoid talking about bears.

The Treatment of Killed Game

An obstreperous young man once jokingly stuffed debris into the opened jaws of a dried pike head that was nailed on a cabin door to ward off bad spirits. His companions were horrified that he would open himself this way to retribution from the animal's spirit. "When you do something like that—when you don't shown respect for animals—it's just like making fun of the Bible."

Rules for the treatment of killed game are even more numerous than for live animals. So again, only a small sampling is given here.

When fur animals (such as mink, beaver, or wolf) are brought inside the house for skinning, their names should not be mentioned, nothing should be burned lest the smell offend their spirit, metallic noises should be avoided, and the carcass should always be kept inside overnight. "I had bad luck with fox this year," one man said. "Come to think of it, I was using power tools while I had a fox in the house. Guess that's why. When you get bad luck like this, you just have to let it wear off. There's nothing else you can do."

Some other rules for proper behavior toward animals can be exemplified by listing a few of the regulations for the treatment of bears. There are rules for proper butchering: a bear's eyes are always removed and the eyeballs slit so that it will not see if the hunter errs in following any taboos; rules for the proper care of the meat: dogs must never eat bear meat because it is disrespectful and because it would make the dogs mean; and rules governing who eats the animal or parts of it: bear brains are never eaten, because it would cause a person to anger easily. Women cannot eat from the front quarters of black bear, and are completely forbidden to eat brown bear meat.

There are also rules for the disposing of unusable portions: edible parts of all animals must be used, to begin with, because waste is profoundly disrespectful. Bear bones should be burned or hung in a tree out in the woods. There are rules for using hides: bear skins should never be stepped on or over by women and are often disposed of in the woods to prevent all female contact. Another set of rules pertain to a "bear party" which is similar to a funeral and must be held by men, outside the village, whenever these animals are taken. Bear meat should be safely cached for several days or weeks so that it is fully and completely dead before being brought to a settlement (living things die slowly, not at the moment when normal life processes stop). Killed bears should never be dragged over the ground, or pulled from dens with snowmachines.

Spirit vengeance can be severe. For relatively minor offenses, bears become aloof or somehow invisible to the hunter. One man did not kill a single bear for 12 years following an infraction, another hunted unsuccessfully for 20 years. Still another man who kicked a bear neck

across the floor and spoke badly of the animal was mauled to death soon afterward.

Further mention should be made of the multitudinous regulations limiting the use of animals for food. For example, young girls cannot eat burbot eggs, lest their children have heavy legs. Only old people who hunt no longer can eat red-necked grebe, because it is clumsy on land; a young person who ate this bird would be slow and clumsy or would produce children with these highly undesirable characteristics. Meat from the pelvis of a beaver is taboo for women because the animal has difficult parturition. Young men avoid eating muskrat tail, lest they become shaky and therefore unable to shoot well. It is not clear how effects such as these are produced and whether animal spirits are involved. The multitude of food taboos are generally respected, however, as an important means of protecting health and well being.

It is important to reiterate that the rules and ceremonial treatments listed here represent only a sample. Such observances exist for virtually all species of importance to the Koyukon. Further illustrations can be found in chapter 9 regarding female taboos, and in chapters 3 and 4 regarding hunted and trapped animals.

Spiritual Nature of the Physical Environment

The earth and sky are personified and imbued with spirits, much in the way of living things. Humans, for example, can interact with forces of the atmosphere. If someone boasts that storms or cold cannot stop him from doing something, the weather will "take care of him good." It will humble him with its power, because "it knows."

The earth and its landforms are also possessed of a consciousness. A man explains that when frozen lakes crack loudly during the fall, they are asking for snow to cover and insulate them. "When my father told me about this, he said that everything has life in it. My old man always used to tell us that."

Just before the river ice breaks up in spring, people gather on the bank to offer prayers. They thank it for giving them a surface for

winter travel and ask that it harm no one as it disintegrates and rafts downstream.

In Koyukon tradition, berry plants are regarded as having special power because they are nurtured directly from the earth. This power is dangerous in the evening, and so people never pick berries during that time. "People are careful about things that grow close to the ground, because the earth is so great."

The earth is the source of a pre-eminent spiritual power called *sinh taala* in the Koyukon language. This is the foundation of the medicine power formerly utilized by shamans, and because of it the earth must be accorded utmost respect. One person who was cured years ago by medicine power still avoids digging in the earth, following instructions given by his attending shaman.

Adherence to Traditional Religion

The preceding description may give an impression of uniformity in belief and practice among the Koyukon, but of course this is not the case here nor in any human society. The Koyukon take a highly individualized approach to all aspects of life, and religion (both traditional and Christian) is no exception. Of course, differences between generations in an era of culture change further exaggerate this tendency.

Most adult Koyukon accept a uniform basic ideology and conceptualization of nature—the environment is sentient and filled with spirit powers which should be treated correctly or they will bring misfortune upon offenders. Many of the taboos are widely observed as well, but there are notable variations. A woman who follows the taboos very carefully said that her grandfather, a powerful shaman, was very lax in this regard and did not even require that she heed the female proscriptions. People who are equally strong believers in the ideology may respect quite different sets of taboos, or may differ markedly in actual practice of their own beliefs. Sinners, after all, are often believers nonetheless. The Koyukon are true relativists who will say of another's practices, "That's just his way."

Taboos are often tested individually to see if they must be followed, although this is usually limited to the less spiritually powerful animals. Six men who were bear hunting together decided to test the taboo on eating a certain part of the bear's stomach. Elders warned that if young men ate this organ their moccasins would be slippery as they trekked through the woods in search of dens. Three young men ate the tabooed part, and three abstained. Next day the three violators had a terrible time, slipping and falling repeatedly, while the others had no trouble at all. Seeing that the taboo was right, they carefully followed it thereafter.

There is a feeling among believers that faithful practice will result in a long, healthy life. Explaining this attitude, a villager pointed out two very active and fit elderly women who were always very strict about following taboos. They were compared to several younger women who often ignored important taboos, and who suffered from declining health and vigor. Furthermore, the children of regular violators are likely to be shiftless, lazy, and incapable of properly supporting a family.

Were the restrictive taboos followed during times of starvation? Naturally people ate what was necessary to survive regardless of even the strongest taboos. But this gave no reprieve from the consequences. One man who gave prohibited cuts of bear meat to women and children in his family alleviated their hunger, but he never took another bear in his lifetime.

Variation in adherence to religious structures also results from acculturation. Koyukuk adults are making a difficult adjustment to the frequent unwillingness of their children to accept many elements of traditional beliefs and practices. On the one hand, they feel that the non-believers will not be punished, "Everybody is different, you know. Some don't follow any *huttanee*, and they don't get bad luck from it. But like me, I always believe it, and if I don't treat animals right something bad will happen."

But these adults are sadly aware of growing problems in their villages, problems which focus primarily on the mental health and the well-being of the young. They wonder aloud if the decline of traditional beliefs and morality toward nature might be at fault.

The Manifestations of Luck

The entity that most vitally conjoins man with the spirits of nature is luck. For the Koyukon, luck is a nearly tangible essence, an aura or condition that is "with" a person under certain circumstances or for particular purposes. Luck may be held permanently, or it may be fleeting and elusive. It is the fundamental ingredient for success; and regardless of a person's skill or experience, he is destined to fail if his luck is gone.

The source of luck is not clearly explained by the Koyukon, but it seems that most or all people are born with it. The difficulty with luck is not so much in getting it as in keeping it. Luck is sustained by treating natural entities properly, that is, by adhering strictly to the rules for conduct toward nature. Violation will cause luck to be withdrawn by the action of the offended spirit. When someone has luck, it means that some hazily comprehended force creates it. "If a person has good luck, catches game, it is because something created the world, and that is helping him to get what he needs."

The way of expressing luck in the hunt is to say *bak'ʉhnaatltonh*. This means literally, "something took care of him."

Luck, or its absence, is specific to particular animals. Thus, a man reported that he had always been lucky in hunting bears until he inadvertently offended one by treating it improperly. Then his luck was gone for many years, and he never took a single bear during that time. If he hunted with other men, they always found the animals while he got nothing. He could only wait until the effect of his transgression wore off, which finally happened several years ago. Since regaining his luck, he has killed one or more bears each season.

This concept could be exemplified almost endlessly, because it applies in some way to every aspect of the Koyukon environment. Each person is possessed (or dispossessed) of luck for all of the entities that he or she interacts with.

> Marten is a funny animal. If a man has luck with them, they just run right into his traps. But if he's got no luck, he won't even catch one. They might walk by his sets, even fool with them, but no way he'll get any. You take mink or some of

those others, even a guy with no luck will catch one or two sometimes. But not marten.

Luck can be transferred to others, but it is like money. The one who gives it up may be left with nothing. When beaver snaring was legalized years ago, it was very hard for young men to learn how to do it. Old men knew, but they would not reveal the methods, because when someone tells another how to make a trapping set his luck will go along with the knowledge. Similarly, a man should never wear another's mittens because he will either take the other person's luck or give away his own.

Implements such as sleds, fishnets, rifles, or snowshoes are also infused with luck. A man lamented to me the troubles he had with one of his rifles, saying that it would shoot a bear coming out of a den, at point blank range, but it only made a wound despite his high caliber rating. Another gun had to be used to make the kill. None of these problems were caused by malfunctioning, he explained, the gun was simply "out of luck." He said that he suspected a young woman had stepped over it, rendering it useless.

Luck serves to bind people to their code of proper behavior toward the natural world. Success in living on the land involves far more than a mastery of technical skills; it requires maintaining a tricky balance between man and the conscious forces of his environment.

Signs from the Spirits of Nature

A part of the extraordinary power of nature spirits is their ability to know or determine future events. This understanding is sometimes revealed through the behavior of animals or other entities in nature and, in this way, becomes accessible to the watchful eyes of man. The Koyukon live in an environment that is full of signs directed toward them by omniscient spirits.

Rare or unusual events in nature are generally regarded as signs, often foretelling bad fortune. It is ominous, for example, to hear a raven calling in the night. Illustrating the power of this sign, a Huslia

woman said that she heard it only once in her life, and two weeks later her brother-in-law suddenly died. Similarly, a red squirrel chattering in the darkness forebodes ill to the listener. Caution requires that people even avoid speaking the name of this animal at night lest they bring misfortune upon themselves. "A bunch of us were camped out one fall, and we heard a squirrel at night, right beside the tent. One guy said, 'What are you fellas worried about? That's for me.' The next summer that man died by drowning."

It is also ominous to find an animal that has died under strange or bizarre circumstances. The woman who found an owl dead in the entangling meshes of her set fishnet suffered the loss of her daughter that same year. Another woman discovered a dead ptarmigan hanging by a single toe from a willow branch. Her grandfather, a shaman, warned that this was a powerfully taboo event. Death came to her newborn baby the following spring.

The great horned owl (*nigoodzagha*) is especially regarded as a giver of signs which may presage the coming of good or bad fortune. In fact, one of the owl's Koyukon names is *nodneeya,* "tells you things." When its voice entones, "*K'itoh hon'. . .K'itoh hon',* You will eat. . .You will eat," the hunter can expect good luck. If its call is a low, almost grunting, "Mmmm. . .Mmmm," cloudy and stormy weather will arrive soon. Koyukon people generally fear the sound of an owl's calling, lest it should say, "You will cry soon." Hearing this call, one may expect the death of a near relative. Indeed, the owl may even speak clearly the name of the person who will pass away.

If a hawk owl catches up to the hunter and flies over from behind, he will have good luck. But if a hawk owl flies across a hunter's trail or wings its way toward him as he travels, it is a sign of bad luck. "I really hate to see one of those things do that. When it does, I still go out, thinking I can beat him! But I never did yet. He's always right."

Signs may also come from non-living entities within the environment. A heavy fall of frost crystals from a gloomy and dour winter sky means that a "body is lying out there someplace."

When this happened in November of 1975, the old people warned of its meaning. Not long afterward they found a man on his remote trapline, frozen to death.

Propitiating the Spirits

Although the Koyukon are helpless to change the signs given them through nature, they do have means of influencing events by utilizing the same spirit powers that give the signs. One way of doing this is through "prayers" to natural entities. The precipitating frost crystals that are a death sign, for instance, are also a forewarning of intense cold that makes travel difficult and causes the game to become inactive. In former years, this could mean hardship for the people. Therefore, they scattered ashes around their meat caches and on trails leading from the settlement, with prayers that bad spirits would leave them alone and that their food would become as abundant as the grains of ash. In this way, people hoped to negate the cold weather sign and avoid the difficulties that it could predict.

Koyukon adults still regularly make "prayers" to certain animals in an effort to assure good fortune for themselves. When the birds are migrating southward in the fall, people speak to them, saying, "I hope you will return again, and we will all be here to see you."

This is a request that both the birds and people will live until the following spring.

Prayers are directed especially to ravens, because they have a powerful spirit that often acts in beneficient ways toward man. "It's just like talking to God, that's why we talk to the raven. He created the world. We don't talk to any other bird the same way."

When a raven flies over and roosts nearby, people may call out to it, *"Tseek'aat* (Old Grandfather), bring us good luck!" Or they might say, *"Tseek'aat,* I wish everything would come our way easy!"

A raven in flight will occasionally tuck one wing and roll partially over in the sky, as if it is dropping a loaded pack from its back. Seeing this maneuver, a person shouts, *"Tseek'at,* be my packsack!"

In this way, the contents of the raven's figurative pack might be given to the caller. Koyukon people also know that ravens may sometimes help them to find game by flying toward it and calling, *"Gaagga. . .Gaagga* (Animal. . .Animal)."

The raven's spirit may also answer prayers of a more urgent nature. When a Huslia woman became very ill and was being carried

home in a sled, a raven followed along overhead for several miles. During this time she prayed to it, asking its help for herself and her family. "If somebody gets sick and then comes out of it, another person in the family might die in their place. So I asked the raven to help them in case I lived."

That woman survived and the rest of her family was spared any illness.

Living things, or parts of them, may also be used as religious objects, again to secure the power of their abiding spirits. Spruce trees are a notable example because they are regarded as spiritually powerful and benevolent. Thus, a person crossing either of two large lakes east of Huslia (*Honoo'odin* or *Hodo'odin*) for the first time should carry the top of a spruce sapling along. This will nullify the dangerous power that exists there. Shamans used spruce boughs to brush sick persons and remove illness from them. Hunters and travelers prefer to camp beneath a towering spruce with outstretched boughs, because the trees gives them spiritual and physical protection, "They always say that the tree will take care of you."

Pieces of dried fish skin or bone are also used to protect against spiritual danger, to prevent a person from losing his spirit when confronted by some harmful power. A small bit of dried fish may be nailed up inside the home to safeguard its occupants. During funerals, children traditionally carried bits of dried or fresh fish, especially vertebrae from the tail portion, to prevent danger from the dead person's lingering spirit. Often a strip of dried fish skin is still fastened into the webbing of newly made snowshoes to protect the user against dangerous supernatural encounters out in the wilds.

The Koyukon place extremely high value on two rarely seen animals which are powerful sources of good luck. These are the yellow-shafted flicker and the least weasel. Either of these animals may be seen only a few times in someone's life, and the fortunate person may succeed in killing one or two. Having killed the animal, he or she will dry the skin (leaving the skull intact) and keep it as a powerful amulet. These are among the most treasured items that one can ever possess.

By understanding the manifestations of spirit powers in nature, the Koyukon are able to foresee and manipulate the course of events. They can help to ensure good fortune and abundance (or at least avoid the opposite), and they can prepare themselves for preordained happenings that lie ahead. Beyond this insight, they can in some cases directly influence the environment in benenficial ways.

One such method, which apparently survives only among the older people, is the use of caribou hunting songs. These songs, which are manifestations of the caribou spirit, usually "come to someone" as he awakens before a hunt. They indicate that caribou are nearby or that someone's behavior has offended their spirit. The songs are remembered over the years; by singing them, a hunter can harness spiritual powers to bring caribou easily within range of his weapons.

Even the physical environment can be affected by proper human intervention. Early spring thaws, for example, can be ended by burning a spruce tree. Peeling the bark from a live birch in winter (which leaves the tree naked and exposed to the chill) can cause intense cold. To avoid this occurrence, the tree should be cut, brought inside for stripping and then buried under the snow to protect it.

Thunderstorms, which are the embodiment of a former human spirit, can also be influenced in a number of ways. Pinching a female dog so that it squeals will frighten a storm away. So, too, will waving a paddle with a red circle painted on it, pointing toward the west, and shouting, "Go out to the coast, where people will enjoy having you!"

Harnessing the Powers of Nature

Koyukon perceptions of nature are strongly influenced by a cultural tradition that is probably no longer actualized or, at best, exists only in remnant form. This is the tradition of shamanism, by which nature spirits are directly controlled for human advantage. Although active shamanism is apparently seldomly, if ever, practiced today, most adult Koyukon have seen and experienced it many times

in their lives. In fact, medicine power has been used to cure many illnesses that they feel would otherwise have killed them. Today the old medicine people are vanishing without passing their skills along, but the underlying beliefs and perceptions remain very much intact.

Koyukon shamans did not have power themselves, but knew how to use the spirit powers that surrounded them in nature. This allowed them to accomplish good or evil, as their individual propensities might dictate. Each man and woman who became a shaman had special associations with an array of familiar spirits. One man "called for" Wood Frog, Birch Woman, Raven, and Northern Lights (among others) when he made medicines. In this way, the shaman had access to supernatural powers and could profoundly influence the course of human and natural events.

Aside from using spirit power to cure (or cause) illness, shamans often manipulated the environment for their own or their clients' benefit. Before caribou hunting, they made medicine to bring animals to the hunters or to advise men on their chances for success. When the shaman made medicine, his spirit helpers communicated with a protective spirit of the caribou and in this way helped toward a successful hunt (Sullivan 1942:79-80).

Shamans also caused an abundance of resources in certain localities, usually at the expense of other areas. Spirits of animals were attracted by shamanistic manipulations, then kept in "houses" within the desired region, to assure a steady supply of game. Great battles of power were waged among them for the control of spirit houses, and those who were successful created local abundances that remain noticeable today.

When shamans were active, they sometimes sent their spirit animals to the villages or dwellings of persons they would harm. On the rare occasions when animals, such as mink, were seen in a settlement, it was presumed to be a shaman's work. Such an animal would never be killed, because this would cause grave danger to the one who killed it. Thus, it was always a bad sign to see a creature of the wildlands in a settlement, because it indicated potential danger from medicine power.

According to an old shaman, now gone, "all of the medicine people in Alaska" worked their power together in World War I, trying to help the U.S. toward victory. In so doing, they moved their locus of power, the *sinh taala*, far away from their homeland into the European battlefields. But then they lacked sufficient power to bring it all back, and it became somewhat diffused. After that time, the shamans' medicine powers began to wane.

The older Koyukuk people, who always have a watchful eye on their surroundings, say that the loss of medicine people has disrupted the balance of natural things. In former times, the animals nearly always avoided the proximity of man, because since the end of *kk'adonts'idnee* they have lived apart from human society. Only as dangerous emmisaries of the shamans did they lurk among the dwellings of man. But today the older order is changing, and the animals are penetrating man's sector of the world. Moose are seen in or near the village, fox tracks encroach upon the limits of settlements, and mink sometimes dash between houses in the night. Most distressing of all, ravens have begun scavenging within villages. According to Huslia people, ravens never stayed around the town this way until two or three years ago. They were not bothered or shot at, but preferred to find their food out in the surrounding country.

One woman voiced her troubled thoughts concerning the ravens that now live so close to the houses. They seem like orphans, she said, living as helpless tramps in a place where they do not belong, apparently unconcerned with their self respect. This is happening, she feels, because since the shamans have gone, people are not using the raven's spirit power. The spirits are now adrift and helpless, like waifs, lacking function and somehow unable to properly oversee the welfare of their living counterparts.

People should be using this power, she surmised, and thus keep the world in its ageless balance. The strange behavior of ravens, which are most powerful among animals, surely indicates that this balance has gone awry. Medicine people were essential links in the patterns of nature—they helped to keep the world in proper order. If ravens came near a settlement in times past, the shamans told them to fly

away and live out on the land where they belonged. But today no one has the power to maintain and reinforce this proper arrangement among living things.

> When I was in the city I saw a raven sitting on a streetlight pole. It looked all oily and messed up, just like it didn't take care of itself at all. I was upset about this, so I looked around to see if anybody could hear me. Then I just talked to it like my grandfather did. I said I wished it would go out where it could life off scraps from hunted animals; then it wouldn't be so poor and helpless.

The Koyukon people envision the necessity for mutual fostering between man and environment. Man needs the land to survive, but the land needs man as well. Nature's spiritual being, which so powerfully affects its ability to support the life of man, depends upon continued use and supplication by its human occupants. Neither the Koyukon people nor the Koyukon environment can exist without the other.

Summing Up

The preceding discussions showed that, for the Koyukon, all events affecting man are either caused by human actions or can be influenced by proper human intervention. Failure to observe prescribed behavior toward nature will always result in some bad fortune, while proper behavior helps to assure good luck and health. The concept of random or chance events has little relevancy. If a game species becomes scarce, people either recognize a causative event (such as violation of a taboo) or assume that such an event took place. If someone "runs out of luck" for a particular species, again the cause is seen in that person's behavior toward the species in question.

This conceptualization of nature dramatically influences the Koyukuk people's behavior toward their environment, binding them

to the multitude of rules and prescriptions that tradition has established. While this has a limiting effect on them, it also releases them from the caprices of an unconcerned and impersonal environment that affects people according to its own random or uncontrollable actions. In other words, this conceptualization limits people, but also grants them power to influence their own fortunes in ways that enhance their chances for success or survival. The environment is like a second society in which the people live, governed by elaborate rules of behavior and etiquette, capable of rewarding those who adhere strictly to these rules and severely punishing those who do not.

These perceptions derive from, and accentuate, the extreme intimacy between the Koyukon people and their surroundings. Their mode of living has brought them incredibly close to nature, as ours has taken us away from it. Underlying this daily interaction with the environment is the need to subsist by procuring resources that are often elusive and difficult to obtain. For the Koyukon, life has always been fraught with insecurity in a land that could bless with abundance or curse with scarcity.

Confronted with uncertainties, and depending so heavily upon the beneficence of the land, the Koyukon have come to rely upon their knowledge of the supernatural to help assure their lives and livelihood. They have learned to see the environment as a conscious, sensate, personified entity, suffused with spiritual powers, capable of propitiation through observance of prescribed behaviors. The spirits of nature are vital, living parts of the land as it exists for the Koyukuk people.

Koyukon subsistence is therefore both an economic pursuit and a vehicle for religious belief and practice. Indeed, the two realms are completely inseparable. Despite a century of culture change, this still holds true for nearly all adult Koyukuk villagers. It is manifested in vastly different manners and degrees, as the individualization of belief has become intensified over the past decades. But it is a living reality, and it is the ideological foundation of subsistence for all Koyukuk villagers. If we are to understand anything of the way that

the modern Koyukon relate to their environment and utilize its resources, we must begin with an appreciation of these concepts.

> A man from the upper Koyukuk told of a tragedy that befell him last year. When he arrived at his summer camp, he found that a wolverine had crawled into his smokehouse and died. This is a powerfully ominous event, a terrible sign of bad luck. The man was completely shocked and dismayed at the discovery.
>
> He immediately took the animal away, to a spot far from any trail, and there he burned it with an offering of food. He was careful to do this in an isolated place, because the area would be dangerous thereafter. Then he left his camp and set himself up elsewhere for the summer, following the advice of older people who gave him consultations.
>
> "I felt so bad about it that I just stayed with my family all summer. I really wanted to get a job like I always do, but I couldn't leave them after that happened. Oh, it just hurt my feelings so bad! It really broke my heart."

Chapter 13
CONTINUITY AND CHANGE IN SUBSISTENCE LIVING

White men arrived in the land of the Koyukon and Nunamiut about a century ago, precipitating an era of change in Native culture and lifestyle. Today's elders have experienced most of the transition from a purely traditional existence to the modern blending of Native and Euro-American patterns. The changes have been profound—permanent villages replaced nomadic camps, rifles supplanted bows and arrows, snowmachines out-performed dog teams, and cloth superseded hide as the principal clothing material. Modern village households contain radios, washing machines, wood stoves, magazines, canned foods, and whatever else can be had from local stores or mail order catalogues.

Along with the changes, however, there has been continuity. This is shown in abundant detail by the descriptions of subsistence activities, techniques, and ideologies in earlier chapters. Koyukon and Nunamiut adults are still fundamentally immersed in their traditional cultures. They speak Native languages, adhere to Native concepts of the world, perpetuate Native value systems and social patterns, live on Native foods, and sustain the Native subsistence lifestyle. Their cultures have not been replaced; rather, they have mixed with another. The process is analogous to combining sand and rocks—the resultant blend has a new look and consistency, but its components remain quite distinct.

Subsistence is very much a part of this intermingling, with its elements of continuity and change. The following discussions will consider subsistence from this point of view, examining its present

status with reference to economics, technology, population, and acculturative factors.

The Importance of Subsistence Resources

Villages in the Gates of the Arctic region are supported primarily by resources from the land. Subsistence foods provide the "main course" for at least two meals per day in most households, and (on the Koyukuk) wood is almost exclusively the source of home heat. Dependence on local foods varies between households, according to preference, income, and traditional versus "progressive" orientation. Diets also vary from year to year, depending on resource availability and wage opportunities.

From an overall perspective, however, resources from the land are the dominant economic factor in village life. Most families would face extreme hardship if these resources became scarce or unavailable. Very few could earn a sufficient wage locally to support themselves on imported foods, and so government support would be their only option. Aside from this consideration, psychological dependencies and cultural associations further intensify the villagers' commitment to local foods (see chapter 11 for a full discussion). Subsistence is overwhelmingly the foundation of village life in this region today.

Besides hunting and fishing, subsistence includes trapping of animals for their hides and meat. Furs are utilized extensively for local manufacture of clothing, although imported fabrics have replaced hide as the primary material. Boots, gloves, mittens, parkas, hats, and trim made from trapped game comprise an important element in Native dress. Preference for fur in certain kinds of clothing derives from its practical qualities, appearance, and value as ethnic identification. Hides and hide manufacturing also provide a source of income, which is obtainable without taking people away from the land or requiring protracted separation from their families. In this region, earnings of 5,000 dollars or more are possible during the winter season (at 1970s fur price levels).

Trapping is also a source of food. Muskrats and beaver, in particular, are highly valued for meat as well as for fur. Depending on the overall resource picture, they may rank as minor secondary foods or as important primary food sources. Thus, the proceeds of trapping contribute to the subsistence economy, while also providing a source of cash which helps in maintaining ties to the land rather than undermining them.

Wood is another important resource in the modern subsistence economy. Koyukuk village homes are mostly built from locally obtained logs and are nearly all heated with firewood. At these latitudes, heat is as important as food, and indeed survival here is more immediately dependent on heat than on food. Koyukon values emphasize the importance of firewood, rewarding with prestige those who maintain large piles of split wood and always keep their homes well heated.

Koyukuk people have long been confronted with the choice between wood and oil heat. Generally, they feel that although fuel oil is convenient, it is far too costly, considering the abundant supplies of firewood available for only the effort of cutting, hauling, and splitting it. This view is presently reinforced by news of fuel shortages affecting parts of the United States. Similar comparisons and conclusions are made with reference to local versus imported building materials, although government housing programs and private advertising campaigns by prefabricated home dealers are beginning to affect this opinion.

The overall importance of subsistence resources is extremely difficult to measure. Each village consumes the equivalent of a million dollars or more in meat, fish, and plant produce each year. This produce would have to come from elsewhere if not from the land. Inflated prices and transportation problems in rural Alaska would make such replacement extremely difficult and costly. In addition, the high nutritional value of subsistence foods would not be equalled, nor would the cultural-psychological value be sustained (Yupiktak Bista 1974:11-12, 16-17).

It is reasonable to say, therefore, that the subsistence economic base of these villages cannot presently be replaced. Tables 6, 7 and 8

present subsistence harvest figures compiled in 1973 for villages in the Gates of the Arctic region (Patterson 1974).

The use of the statistics in the harvest tables must be tempered by two considerations. First, they were gathered by village representatives who had little training and whose data could not be checked for accuracy. The figures reproduced here appear to be quite reliable, although Koyukuk village waterfowl and fish catches seem too low. Huslia data were not presented, on the other hand, because they were obviously inflated and inaccurate.

The second drawback of such data is its inevitable confinement to a very short period of time. Since most of the resources in this area are subject to drastic population changes, surveys would have to cover several decades in order to give an accurate picture of resource

TABLE 6. MAMMAL HARVESTS IN 1973

Resource	Number of Animals Harvested			
	Anaktuvuk Pass	Alatna & Allakaket	Bettles & Evansville	Hughes
Bear (black)	-	20	5	17
Bear (brown)	5	10	-	2
Beaver	-	300	43	82
Caribou	1,000	300	50	218
Fox (arctic)	100	-	-	-
Fox (red)	-	20	5	14
Hare (arctic)	30	-	-	-
Hare (snowshoe)	-	200	100	157
Lynx	-	20	12	2
Marten	-	150	100	123
Mink	-	100	6	32
Moose	5	48	25	22
Muskrat	-	400	20	59
Otter (land or river)	-	10	-	16
Porcupine	2	15	10	15
Sheep (Dall)	15	10	5	-
Squirrel (ground)	200	-	-	-
Weasel	-	10	-	-
Wolverine	15	6	2	2
Wolf	75	5	10	10

TABLE 7. WATERFOWL AND FISH HARVESTS IN 1973

Resource	Number of Animals Harvested			
	Anaktuvuk Pass	Alatna & Allakaket	Bettles & Evansville	Hughes
Ducks	-	4,000	20	360
Geese	10	300	20	200
Grouse	-	150	10	60
Ptarmigan	500	500	100	260
Grayling	1,000	1,000	200	1,880
Pike	-	500	50	315
Salmon (chum)	-	12,000	-	6,800
Salmon (king)	-	300	-	101
Salmon (silver)	-	600	-	-
Sheefish	-	1,600	-	820
Sucker	-	400	100	-
Trout (lake)	500	-	-	-
Whitefish	500	24,000	50	6,500

TABLE 8. VEGETATION HARVESTS IN 1973

Resource	Number Harvested		
	Alatna & Allakaket	Bettles & Evansville	Hughes
Blueberries	200 lbs.	500 lbs.	276 lbs.
Cloudberries	100 lbs.	-	100 lbs.
Cranberries	550 lbs.	250 lbs.	240 lbs.
Wood (for construction)	500 logs	-	800 logs
Wood (for fuel)	300 cords	50 cords	118 cords

usage. Land use or harvest quota policies based on short term surveys would be extremely difficult to justify in many cases. (See chapter 10 for a complete discussion of resource population changes.) By the time these tables are read, the local resource pattern will have undergone major changes. These figures must be used only to document the overall fact of subsistence and not be used as a reliable long-term quantitative measurement.

Wage Earning and Subsistence

There is no question that village economies today are based on monetary exchange as well as subsistence. Exposure to the benefits of western technology has generated a whole new constellation of "needs" which can only be satisfied by the acquisition of cash. To some extent, the villagers have acquired these needs on their own—by traveling to cities, for example. But they have also arisen from values taught in the schools and missions, from government assistance programs, and from commercial advertisements received in the mail or over the radio.

Wage earning allows the fulfillment of new desires for practical as well as luxury items. In some ways, this enhances subsistence living by making it less time consuming and exhausting. After all, under the best of conditions, this way of life requires great outputs of physical effort. But in other ways, wage earning detracts from subsistence by taking people away from the land.

It is very difficult to earn wages in a village. Jobs are limited to a few positions such as school maintenance man, teacher's aid, postmaster, and storekeeper. People who are committed to subsistence usually shy away from these jobs because hunting, trapping, fishing, and gathering require a full-time effort for maximum success. Seasonal employment is therefore preferred by many people; but this is often undependable and it takes men away from their homes and families.

So people try to reach a balance between subsistence activities and wage earning, just as their needs today are divided between resources from the land and resources which must be bought. There is a general feeling that jobs are always scarce and short term, so one must take whatever becomes available, earn as much as possible, and hope that it is enough to cover one's needs until the next job appears. Jobs are like caribou: they must be taken when they appear, and their products must be stored against projected needs until they come again. Employment, also like animals, may become scarce for a period of years. Building the Alaska pipeline was an ideal example of this transitory work situation.

Village people seem committed to the idea of a mixed economy. They would not give up subsistence because it fulfills basic physical and psychological needs; and they would not give up wage earning because it satisfies other needs more recently acquired but still very important. What they seek is not exclusively one or the other, but both.

This conflicts with a common notion that villagers are in the process of giving up one economy for another. Ultimately this may, in fact, take place. But the modern Natives have a different goal in mind. They seek a viable blending of the two systems—a subsistence and cash economy—and at the present time it is a workable reality.

Killing With Kindness, Government Money

The story is told of an old Eskimo man who each year awaited arrival of the supply boats from Outside. When the first men came ashore, he was certain to ask, "*Gavamana suli iñuavaa?*, Is Government still alive?" Certainly he had cause to be concerned that someone as generous and benevolent as *Gavamana* should not die.

In every sense of the word, government has remained very much alive in rural Alaska. Its presence, measured primarily in dollars and cents, is felt more strongly each year. The outpouring of funds comes in the form of programs, most of them predicated on the concept of village "poverty," most of them unsolicited by the people themselves (but routinely welcomed when they come, for who among us will refuse a handout), and many of them based upon misguided concepts of need.

Programs come from all levels of government, and from the broadest spectrum of agencies. These include, for example, housing programs, state welfare, food stamps, B.I.A. welfare, aid to dependent children, diverse educational programs, job corps, church programs, occupational training programs, various special poverty programs, and other support of this type. Hardly a day passes when

some government people are not in a village for one reason or another, to the point where their presence is scarcely noticed today and their words are seldom listened to. I once jokingly asked one such agency person if he was going to be involved with the forthcoming "Program Program," and he responded with a barrage of serious questions about it.

Each of these programs does, in fact, help some people who have serious needs and cannot otherwise satisfy them. But most also give large sums of money to persons or communities where there is no genuine need. Often people are told by someone that they should request or accept these funds. Very frequently the purpose of this assistance could be fulfilled by personal initiative, with the consequent reward of having done something for one's self. Of equal importance is the fact that most of these programs do not originate from village people themselves in response to their own perceptions of need. Rather, they are developed by people remote from the rural areas who are often unaware of village conditions and needs and who do not recognize the people's own capacity to deal with their problems. All too frequently programs deal with "needs" that do not even exist.

An illustration of this policy has been the encouragement of residents of some interior Alaska villages to participate in government housing programs. These programs supply frame dwellings made entirely from imported materials, generally (in the recipients' opinions) unsuited to the environment and very expensive to build. This is an area of abundant timber ideally suited for building highly adapted homes which people are expert in constructing and long accustomed to using. Here is a program which discourages the self-sufficient utilization of readily available subsistence resources. Incidentally, such a program in a Kobuk River community also required that people burn fuel oil rather than wood to heat their new homes.

A village in which one author of this report lived was strongly encouraged to enter the Food Stamp program. The people refused at first, explaining that doing so would take away their own initiative to

harvest food or earn the money to buy it. But they were approached again, and they finally decided to participate. Some people benefitted from the program, no doubt, but its overall effect was exactly what the villagers predicted when they first refused it.

Alaskan Natives have survived over the span of millennia because of their outstanding ability to respond to challenges through personal initiative and independence. Their lessons were hard learned; the penalty for ineptitude or indolence could be starvation. Most Native people take justifiable pride in the skill and self-sufficiency that comes to them as a cultural tradition.

But over the past decade or so these qualities have been eroded as a growing tide of "easy money" has flooded the rural communities. This unsolicited wealth is granted with the best of intentions and is received gratefully by people who rarely understand its origin or perceive its ultimate effects. But these effects are becoming clear today as the need for self-reliance slowly diminishes in Alaskan villages. Gradually, the people are becoming more and more dependent upon government money, are losing their sense of motivation and their pride, and are moving toward an acceptance of the notion that they live in "poverty" despite their ability to harvest a living from the land and earn a wage when it is needed.

Some government money is legitimately beneficial in Alaskan villages, as it is in modern communities everywhere. Rural people should not be expected to do without health care, education, communication, and other fundamental services that all Americans desire. But too much money, given unselectively and without comprehension of its long range effects, is beginning to dissolve traditions worthy of preservation. Native people are being drawn toward a "welfare" dependency; and at the same time they are being criticized for accepting the assistance while still desiring special access to resources of the land.

The following suggestions are made:

1) Government money should be available for communities who specifically request and carefully justify it. These funds should not be granted promiscuously.

2) Government programs should emphasize earned income and self-sufficiency, allowing "welfare" payments only in cases of real need.
3) Programs should recognize the cultural and psychological importance of subsistence activities. Thus, assistance with purchase of hunting, trapping, or fishing equipment should be given strong preference over the provision of food, food stamps, or unearned income.
4) Access to traditional subsistence lands is a corollary to the above and will soon become a government prerogative in certain areas. This will be an important new component in the government's choice of encouraging or discouraging self-sufficiency and the maintenance of tradition in Native Alaska.

Subsistence Technology

The most welcomed and desired changes that have come to Koyukon and Nunamiut villagers are technological items that have proven useful in subsistence activities. Of these, the rifle is undoubtedly first in importance and earliest to have been accepted. Another early introduction was the cotton (and later, nylon) fishnet, which replaced former types made from willow bark.

When Native people began settling in villages (which occurred because of establishment of schools and missions), their need for mobility was greatly intensified. Teams of 2 or 3 dogs grew to 12 or more, and in this way hunters could range widely enough to procure resources at long distances from their villages. Later, motorized boats similarly increased their mobility during the summer months. Most recently snowmachines have gained preference over dog teams for winter travel.

Rifles, fishnets, large dog teams, and motor boats have never been seriously questioned as legitimate tools for subsistence, but snowmachines are often regarded with less benevolence. Many peo-

ple are aesthetically offended by these machines and feel that their efficiency disqualifies them for use in subsistence—they are "not fair." Subsisters are less concerned with these problems than with their desire to locate and haul game or run their traplines in the minimum span of time. This allows them to spend shorter periods away from home while still procuring the same resources.

Use of advanced technology is normally a one-way process. After we have a more effective tool, we want to keep it. Thus, Americans would never conceive of giving up their automobiles for horses, and probably would not have done so 50 years ago. In fact, they even steadfastly refuse to slow them down to the 55-mile-per-hour speed limit. Subsistence hunter-trappers would react similarly to the idea of giving up snowmachines. It would be far more feasible to regulate the legitimate uses of these machines than to simply ban them and suggest reverting to exclusive use of dog teams.

In any case, modern subsistence hunters do not appear to be wasting their resources as a result of new technology. The amount of game taken to feed a given number of people today is not greater than in the past. With the addition of imported foods, in fact, it is surely less. Similarly, the use of modern technology does not negate the fact of subsistence. Methods of patterns of subsistence have changed, but the purpose remains the same.

Population and Subsistence

The myth that Alaska is a rich land of abundant game is fading quickly today, as the state's growing population faces ecological realities. These northern environments have always been relatively unproductive, and only their pristine qualities made them rich in contrast to the depleted game populations elsewhere. Today the number of game animals is declining in Alaska too, as the number of people increases and as natural population cycles run their course. This poses a serious problem for all Alaskans, but most critically for those who pursue subsistence.

Village Populations

Villages are generally increasing in size throughout Alaska, including those in the Gates of the Arctic region. But while the overall population is growing, the number of people living on subsistence is probably increasing at a significantly lower rate, if at all. This is a result of two factors: first, emigration from villages to larger towns or urban centers is a stabilizing factor; and second, even in the villages, increased access to cash sources is taking some residents away from reliance upon natural resources.

The overall interrelationship between village demography and subsistence harvests should be the subject of a special study. Furthermore, villagers should consider this a matter for their own attention:

> To protect its subsistence resources in the future, each village will have to determine how much hunting and fishing can be done right around the village. Then each village will have to find ways to either limit the number of people who live in the village or the number of people who will hunt and fish.
>
> (Yupiktak Bista 1974:66)

The nature of this problem will differ from area to area. In the lower Kuskokwim, for example, settlements are densely spaced. But in the Gates of the Arctic region they are very widely dispersed. Of course resource productivity differs as well, and so the land's capacity to support subsistence populations varies regionally. Further complicating the situation is the dynamic nature of the resource base itself. An area may be highly productive today, but far less so in 5 or 10 years, or vice versa. At the present time, village populations in the Gates of the Arctic region can be supported by their traditional lands, and there is probably very little growth in the number of people living on subsistence resources here.

There is, however, a population problem in this and many other areas of rural Alaska. Dramatic growth in the state's overall population, largely due to construction of the Alaska oil pipeline, has caused considerable intensification of hunting pressure on game

resources. Every year more urban residents travel into remote areas to hunt big game such as moose, caribou, and bear.

Outside Hunters

"Outside hunters," as they are called, have been active along the Koyukuk for about 5 or 6 years. Before this time, a few people always came into the area, but the visitors were scarce enough to cause little concern among local residents. Then their numbers began to increase. Each fall now, people see more float planes flying low along the river, more boats coming up from the Yukon, and more hunting camps set up on the banks of the Koyukuk.

In recent years, moose numbers have declined near the urban centers of interior and southcentral Alaska, along all of the state's highways, and along the major river courses accessible from these highways. As a result, Alaskan and non-Alaskan hunters have been forced to go farther and farther afield to find their meat or trophy animals. Pressure from Outside hunters spread toward the Koyukuk region via the Yukon River. When moose became more difficult to find along the Yukon, non-Native hunters "discovered" the Koyukuk, and now they have converged on the area from afar. At the same time, Native residents from Yukon River villages (Galena, Koyukuk, and Nulato) have begun traveling up the Koyukuk River on their fall hunts. This was seldom necessary in previous years, but moose have simply become too difficult to find along the Yukon.

It is not hard to understand why these changes are occurring. While moose have declined markedly elsewhere, the Koyukuk herd has experienced only a minor natural reduction. The area residents want to protect this healthy situation, and they are therefore deeply distressed by the invasion of Outside hunters, regardless of their place of origin. Native hunters should remain in their own areas, they feel, and non-Natives should either hunt away from subsistence areas or exercise their option to purchase meat in the stores. They point out

that fly-in hunters must spend as much to obtain moose meat as they would for an equivalent amount of beef.

Village people have no viable alternative to their staple subsistence foods. Animals killed and taken away by outsiders subtract from the local person's opportunity to fill his larder, and he can rarely afford to buy meat from a store. Koyukuk people recall a time, just 30 to 40 years ago, when moose were unknown in their region. For this reason, they are careful not to assume that the present favorable conditions are permanent, and they are most attentive to any changes that might affect this important resource. Old timers talk of hunting for weeks to find a single moose, and none wish to see this happen again.

Koyukuk people therefore express strong antagonism toward Outside hunters, and this feeling has led to some efforts to limit access to their area. Huslia residents, for example, have requested that military personnel from Galena, on the Yukon, hunt outside the village's normal subsistence area. They have also sent village representatives to Galena to discourage outsiders from flying up the Koyukuk in search of moose, and they have verbally confronted or refused assistance to those who have come into the region to hunt.

In regional meetings of Koyukon people, village delegates are unanimous and outspoken about the fact that pressure on game by Outside hunters is the highest priority problem facing their communities today. They have learned that although state law provides for the establishment of subsistence zones with special regulations, such zones can be set up only when it is proven that game populations are presently endangered. Villagers cannot limit Outside competition for resources until these resources have been seriously damaged, and so there is no legal means of protecting moose while the population remains healthy.

The Koyukuk people feel that their relationship to game animals and subsistence resources differs fundamentally from that of the non-subsistence users of the same resources. The difference resolves itself into three major factors. First, these resources serve as the basis of the Koyukon economy and livelihood. Income from wages is not

sufficient in this area to allow purchase of staple foods for providers and their families. Urban Alaskans, they feel, do not share this dependence. Second, the villagers are Indians and Eskimos whose entire culture and world view is founded upon the subsistence lifeway and the intimacy with the environment that it entails. Third, the Koyukon feel a special attachment to their established hunting territory, and a favored right to its use and protection. Their ancestors hunted here, and it is their inheritance to continue living on this land as did those who preceded them. "For us, this land is the supermarket; for them it's the playground."

Presently, there is no solution in sight to the problem of competition for game within traditional subsistence areas, and as Alaska's population grows, the problem will continue to intensify. In some parts of the state, changes in land status through the establishment of national parks, monuments, and wildlife refuges will further complicate the situation. Where subsistence activities are permitted in conformance with tradition, competition for game will perhaps be minimized or eliminated. This might reduce tension in areas surrounding the withdrawals by separating those hunters who would be in competition. If subsistence activities are precluded in these withdrawals, greatly increased competition will result, as all resource users are forced into areas that remain open to them.

Acculturation and Subsistence

> I see everybody trying to be like white people, but I don't see them getting any whiter.

The very old man who spoke these words was thinking about the young generation of Koyukon Indians who have been educated in white man's schools but have not "made it" into the white man's world. He seemed to wonder if that was not a futile gesture, if the young people might be more contented following the lifeway of their parents in the villages today.

Young and Old

There is, in fact, a substantial "generation gap" between most Native adults and their children. The older people have grown up in a strongly traditional environment, isolated from extensive contacts with the Outside, basically contented with their blend of Native and non-Native ways of living. But the young are different. Their parents felt that education was the key to getting along in the modern world, and so they had their children taught in school rather than educating them at home. In addition, most of the young people left their villages to attend high school in other parts of the state or country. As a result, the younger generation learned far less of the Native ways than their parents had.

But, as the old man said, they did not become "white" in the process. Nor, however, did they remain completely "Native." They are somewhere in that uncomfortable zone between the two cultures, and they must choose whether to commit themselves to the traditional or non-traditional options that are open to them. At this time, some have chosen jobs and moved to larger towns, and some have decided to remain in the villages. It is the latter that concern us—will they live by subsistence or attempt to pursue a cash livelihood? At this point, most who remain in the villages have opted for a balance but are less oriented toward subsistence than their elders. They are not as skilled nor as perseverant as their parents, but they are capable of procuring fish and game to support themselves.

In Koyukuk villages, some school-age children and youths are surprisingly involved with outdoor, subsistence-related activities. They drive snowmachines and dog teams, sometimes ranging widely around their villages. They often cut and haul wood, hunt and snare small game, and set traps for fur animals. New high schools in the villages give the older children a chance to spend these important years at home, where opportunities to learn subsistence skills are available.

Most young adults who have chosen to live in their home villages are engaged in basic subsistence activities, though none as intensively or skillfully as their elders. In many cases, they do not care to leave

the village and express strong sentiments toward supporting themselves partially from the land. They are, however, far less familiar with their cultural traditions and more oriented toward the modern way of life. But some are becoming active in subsistence as they reach adulthood, especially when they marry and start families. "We been hunting since we were kids, not like these boys now. But I see some of them change. They start hunting when they get to be a certain age."

Many older Koyukon people express concern about the welfare of the younger generation. They are not particularly worried about the acquisition of subsistence skills, which comes through effort and practice. Rather, they are uneasy about the supporting idealogy, noting that young people often violate taboos, thereby mistreating the animals and possibly offending them. Some young people do obey certain rules, either because of a quasi-belief or because doing otherwise is upsetting to their elders. Thus, the religious practices are perpetuated, but without a solid ideological foundation.

Older villagers are of two minds about the violation of taboos by the young. Some feel that disbelievers are simply not punished for offenses—in other words, ignorance excuses. But others blame increases in social disorder and psychological unrest among the young on their irreligious behavior. "Just like if I try to fly an airplane without ever learning how to do it right," one old man explained, "Eventually I'll crash on account of it."

Koyukon villages differ in the extent to which traditional ideology is followed. The upriver villages—Hughes and (especially) Allakaket—tend to be more conservative than Huslia and (most probably) the Yukon communities. This does not, however, correlate with differences in the intensity of subsistence pursuits.

A Bicultural Tradition

A striking quality of Koyukon adults is their thorough and comfortable biculturality, their ability to attain fluency in white culture

without markedly diminishing the vitality of their own Indian traditions. Most, for example, are faithful Christians; but as we have seen, many are also equally committed to the Koyukon religion. "Christianity works for all people everywhere on earth, including us. But the Indian way works for us too, so I've got to have both."

Clearly, the adult generation has not perceived culture contact as requiring that one pattern be chosen at the expense of another. There is a Native way and white man's way, and both can coexist comfortably. Older people speak often about the value and importance of Indian traditions and insist that they need not abandon their old ways just because they also accept new ones.

Besides their adaptation to present-day influences, the Koyukon people have a powerful interest in, and attachment to, the past. Highest status is accorded to the oldest villagers, those who can retell the treasured stories and pass along traditional knowledge of land and animals. It is not surprising, then, that Huslia people reacted strongly against a proposal for an "old folks' home" in distant Tanana. The young spoke first and most loudly against it, saying that old people are the source of knowledge, and that they are well cared for at home.

So the Koyukon are a thoroughly bicultural people, moving into the modern age but carrying their traditions along with them. It remains to be seen whether the young will continue this pattern. But for the present, the Koyukuk communities have blended their culture remarkably well with that of the late-coming whites. In the process, they have solidly maintained much of their Athabaskan culture and identity.

The Irreversibility of Change?

There is a general tendency to assume that culture change is a one-way process, that after a traditional element or institution is lost, it cannot be revived. But a recent pattern of events on the Koyukuk shows that this is not entirely correct.

Until the early 1960s, Koyukuk villagers spent most of their summers living in fishing camps scattered widely along the river. These camps were used primarily to catch the year's supply of fish for dog food. But when snowmachines were introduced, the people quickly gave up their dog teams, and this drastically reduced their need for fish. Now they could catch enough fish for themselves by simply maintaining nets close to the villages, so they abandoned their summer camps and spent the summers at home. An important part of the subsistence pattern was thus abandoned.

Then, in the 1970s, people began using dog teams again, building them up from the handful of animals that had been maintained over the years. Some developed teams for racing, some for working (after becoming disillusioned with unreliable and expensive machines), and some for both work and recreation. When this happened, a few people began re-establishing fish camps. Then more followed suit, until today this important institution is fully integrated into the annual subsistence pattern once again.

Interestingly, some people who have not built up large dog teams, and could therefore easily fish from the village, have also returned to summer camps. An older couple, for example, who had not put up a fishing camp for 20 years, now moves out with their entire family each summer. The motive in these cases is simple preference for the tradition of outdoor living and the easy access to the resources it affords. People have tried the new but longed for the old, and so their tents stand again atop the riverbanks each summer.

Valuation of Subsistence

If the villagers had a choice today between continuing with subsistence and adopting a viable cash economy, which would they select? What is the attitude toward subsistence and the commitment to the lifestyle it entails?

Our studies among the Athabaskans and Eskimos clearly indicate a commitment to subsistence. This is partly because of a need for

Native foods, partly because of a desire to continue an accustomed lifestyle, and partly because of cultural and personal associations with living from the land.

Koyukon culture, for example, ties people closely to a life on the land. The prime avenue to satisfaction and prestige is through providing resources from the environment. This is the deepest and most pervasive theme of life. It is manifested to some extent in an emphasis on developing the pragmatic skills of hunting and survival. It is also revealed in the elaborate religious observances that bring luck in subsistence pursuits, that make hunters quick and agile, and which ensure against alienating the game. This theme is expressed finally in ideal concepts of personality, which emphasize hard work, foresight, striving toward security, and the sharing of food.

> In praise of a man who recently died, people said that his wood pile was the largest in his village and that his family never went short of meat. He was a good provider, and this, together with his kindness toward others, made him prominent among the people.

Hunting, trapping, and fishing are continually on people's minds, and they are constant topics of conversation. Whenever someone goes hunting or trapping, his experiences and observations are recounted afterward in great detail. Even when people take airplane trips between communities, their eyes are constantly searching for signs of game and watching the conditions of land or water. Once I asked a man how he enjoyed his flight from Hughes to Huslia. He replied that it was good—no caribou tracks, but otter sign was abundant in certain areas, and many lakes had frozen overflow which would make for easy travel.

Concern with subsistence is, of course, a matter of great practical importance, but there is more. The Koyukon manifest a profound love for living close to the land, an aesthetic attachment of the deepest sort. Men speak with fondness and excitement about their past travels, their years on the trapline, and their hunting exploits.

Once, in early winter, a man explained to me that he could not feel good during that season if he was not out running his trapline, "I trap because I was raised with it." He added, "It's all I know to do this time of year."

People often express their love of being in the outdoors, living in remote camps, traveling over the broad expanses of land, setting out their traplines, and experiencing the abundant years for each kind of animal. These things are spoken of with the deepest kind of feeling, but also without overlooking the hardships. It is regarded as a most pleasurable away of life.

The adult Koyukon value subsistence not only as a "profession" that constitutes their life work, not only as a source of food that they feel they need, but also as a means of finding satisfaction and ultimate pleasure. Nearing death, a revered old man said, "I know that my time is near, though I cannot tell exactly when it will come. But I have had a good life. I have camped many times beneath spruce trees, roasting grouse over my campfire. So there is no reason to pray that I might live on much longer."

Chapter 14
THE LEGACY OF THE LAND, A POINT OF VIEW

> Wilderness: A tract of land or a region, as a forest or a wide barren plain, uncultivated or uninhabited by human beings: an empty or pathless area of region.
> (from Webster's Third New International Dictionary 1966)

To most of us, the vast stretches of forest, tundra, and mountain lands in Alaska constitute a wilderness in the most absolute sense of the word. In our minds, this land is wilderness because it is undisturbed, pristine, lacking in obvious signs of human activity. To us, undisturbed land is unoccupied or unused land. But in fact, most of Alaska is not a wilderness, nor has it been for thousands of years.

Much of Alaska's apparently untrodden forest and tundra land is thoroughly known by people whose entire lives and cultural ancestry is intimately associated with it. The lakes, hills, river bends, sloughs, and other features are named and imbued with personal or cultural associations. Indeed, to the Native inhabitants, these lands are no more an unknown wilderness than are the streets of a city to its residents.

The fact that we identify Alaska's remote country as wilderness derives from our inability to conceive of occupying and utilizing land without altering or completely eliminating its natural state. But the Indians and Eskimos have been living this way for thousands of years. Certainly, then, theirs has been a successful participation as members of an ecosystem. In a world of environmental degradation, this represents an exemplary form of human adaptation, fostering a healthy coexistence of man and ecosystem. Certainly, we have been incapable of utilizing our lands so well.

The impact of Alaska's Native inhabitants on the land cannot be seen, except for scattered moldering campsites and the widely dispersed village clearings. But man's occupancy has left another kind of imprint, one that exists only in the mind, in the traditions that inseparably unite the people and the environment from which they came. Our studies of Koyukon Athabaskans illustrate this fact with special clarity.

In an earlier chapter (chapter 12), we saw that for the Koyukon the environment is both a natural and a supernatural entity. It has a consciousness; it is sensate and personified; it is filled with spiritual powers associated with its living and non-living entities. Man's interactions with the environment are governed by a moral code, rather than by simple pragmatic concerns. This code includes the prohibition of waste, a conservation ethic, and a prescribed, respectful behavior toward natural things. An associated ideology includes the use of subsistence foods in religious contexts, as a vehicle for communion with the dead and as a means of placating the spirits of certain animals.

Through their daily hunting, trapping, fishing, and gathering activities, the Koyukon Indians sustain an essential contact with the natural-supernatural world. They assure both their physical and spiritual well being, and (according to their ideology) they maintain a proper balance within the environment itself. At the same time, the Koyukon perpetuate the traditions that make the Natives what they are, and that also make the land around them what it is. Although we cannot see and feel these dimensions of the environment, they are a powerfully real element in its natural history.

To illustrate this impact of the mind, consider the cultural and personal associations between the Koyukon Indians and specific kinds of places which are found throughout their land. Some of these associations are personal, founded in the realm of human events and activities. Traveling across the land, each Koyukon person sees hundreds of places which elicit meanings from the past. The author once accompanied a Huslia man to a distant trapline cabin. The trail wound through snowclad thickets along a tributary of the Koyukuk River. At one point he abruptly stopped and pointed into a small

clearing beside the trail. Small mounds in the snow revealed the outline of some tumbled cabin walls. "That's where I was born," he said, and he told me of the people who had lived in the cabin during the years before it was abandoned. We stood quietly for a moment, and then continued on our way. Surely the land in this area had very different meanings for my companion than it did for me.

Other associations are both personal and supernatural. About 15 miles upriver from Huslia is the site of Cutoff, an abandoned village formerly inhabited by many of the older Huslia residents.

> We took a trip to Cutoff today with the dogs. The old village is almost unidentifiable now, except for a few downfallen remnants of cabins. The place elicits thoughts of all that happened there, as related by stories so often told by Huslia people—the daily and yearly activities of village life, the excitement of holiday dances, courtships and marriages, seances by medicine people, and those lingering deaths from tuberculosis and other mysterious diseases that came after Europeans arrived.
>
> Cutoff is so alive in the minds of Huslia's people today, yet one could easily pass it now without noticing those crumbled remains of cabins and caches. But it is more than just a memory place. It is still inhabited by the spirits of those who lived and died there. And for this reason, it is a place of very real danger, where no one would think of camping or staying until darkness brought these spirits up from the silence of the day.

Human spirits haunt certain places throughout Koyukon country, and they sometimes "bother" people who inadvertently camp near them. Many such places are well known and are avoided whenever possible. If troublesome spirits are heard walking nearby in the darkness, tiny moosehide bootsoles are cut out and burned as an offering for them, because they walk so much. Other places are known to have a rather nebulous but still threatening power. These include, for example, stretches of water that have been cursed by shamans or have acquired spiritual power at some remote time beyond memory. These places are fearful because people are likely to drown in them. Land can be similarly empowered. A mountain

named *Dibaa Dlila*, "Whose Mountain?," is never talked about because a medicine man's spirit resides there, "inside, like a beaver house."

Associations such as these are, of course, invisible. But they imbue the terrain with strong and important meanings for the Koyukon.

Koyukuk people also know the landscape through a profusion of names, many of which are recorded on site maps included with this report. Some of these names are used primarily for location, as we use street signs. Others have special meanings derived from personal or traditional history. Hundreds of bear dens, for example, are known throughout Koyukon country, and many of these have special names. All of the dens that have been known for some time have personal associations, and when hunters stop to check them each fall, they often recall past experiences there. Some of these stories go back even to previous generations, and so the dens have become much more than just hunting places.

Known places on the landscape have innumerable associations with hunting events or animal experiences. As a hunter traverses the country, his recollection of these events not only gives the land meaning but also provides him with useful knowledge for locating game. Some important animal experiences are extra-ordinary as well, and these influence people to avoid certain areas or treat them with special respect. A giant pike, for instance, with strong spiritual power lives in the mouth of a Koyukuk tributary, making this place dangerous at night. In certain lakes, there is said to be a beaver-sized muskrat, the "Muskrat Mother," which creates an unusual abundance of this animal where it lives. The creature is harmless, and its haunts are favored by muskrat hunters.

Endless examples could be cited to illustrate the interchange of meanings between Native people and the land. Suffice it to say that the land is known in its finest details, each place unique unto itself, each place full of its own history. The country is anything but a wilderness; at best it can be called a wildland.

The Koyukon do not leave this land when they die. In traditional belief, which has not been superseded by Christianity, a person follows one of two trails after death. If one lived badly, he takes the

poor trail, the trail of suffering, toward the final after-life place. But if one lived well, he follows the easy trail, without suffering or great hardship. Both the good and the bad will end up in the same pleasant place, but one will make the trip easily and quickly, the other slowly and with much travail.

The trails to the after-life follow the land, either upriver or downriver. The spirits of the dead remain for years near where they resided in life. This is why graveyards are always placed on high ground which protects the body and lingering spirit from being swept away in floods. In the final after-life, the spirits range widely over the land, hunting as they always did before.

APPENDIX

Appendix A

SPECIES NAMED AND UTILIZED BY THE KOYUKON ATHABASKANS

The following list of plant and animal names includes most of the species known or used by the Koyukon Athabaskans in 1976. Some of the species are used infrequently, some have become taboo, but most of them are used for food or other purposes. The utilized species are marked by an asterisk (*) in the left-hand column of common English names. Each common English name is followed by its equivalent Koyukon Athabaskan name and by the Latin scientific term. A comparable list of utilized animals and plants which has been compiled for the Kobuk Eskimos applies in large measure for the Nunamiut (see Anderson, et al.:1977).

MAMMALS

English	Koyukon	Latin
*caribou	*bidziyh*	*Rangifer tarandus*
*moose	*dineega*	*Alces alces*
*Dall sheep	*dibee*	*Ovis dalli*
*black bear	*sis*	*Ursus americanus*
*brown bear	*ghonoya, ghanoya*	*Ursus arctos*
*timber wolf	*teekkona*	*Canis lupus*
*red fox	*nohbaaya*	*Vulpes fulva*
red phase	*dilt~~h~~ugha*	
silver phase	*dilzina*	
cross phase	*daa~~h~~t'ogga*	
*marten	*sooga*	*Martes americana*
*short-tailed weasel	*kkaaghozina*	*Mustela erminea*
*least weasel	*kusga*	*Mustela rixosa*
*mink	*taahgoodza*	*Mustela vison*
*wolverine	*ni~~h~~tsee~~l~~*	*Gulo luscus*
*river otter	*bilaazona*	*Lutra canadensis*
*lynx	*kaazina*	*Lynx canadensis*

MAMMALS (cont.)		
*beaver	*noya'a*	*Castor canadensis*
*muskrat	*bikinaala*	*Ondatra zibethica*
*porcupine	*dikahona*	*Erethizon dorsatum*
red squirrel	*tsaghaldaala*	*Tamiasciurus hudsonicus*
*arctic ground squirrel	*hʉndaggaza*	*Citellus undulatus*
*hoary marmot	*tɬaaggaagga*	*Marmota caligata*
*snowshoe hare	*ggʉh*	*Lepus americanus*
vole (several species)	*deeltsaa'a*	*Clethrionomys; Microtus spp.*
lemming (two species)	*kk'ʉyhk'ideelts'aa'a*	*Lemmus; Synaptomys spp.*
shrew (several species)	*ɬoodolts'iyhdla*	*Sorex spp.*
BIRDS		
*common loon	*dodzina*	*Gavia immer*
yellow-billed loon	*dodibeeya*	*Gavia adamsii*
*arctic loon	*tɬ'idlibaa*	*Gavia arctica*
*red-throated loon	*tokootsaagha*	*Gavia stellata*
*horned grebe	*dzeeyaakk*	*Podiceps auritus*
*red-necked grebe	*tokkaa'a*	*Podiceps grisegena*
whistling swan	*tobaa*	*Olor columbianus*
*white-fronted goose	*k'idot'aagga*	*Anser albifrons*
*Canada goose	*bileelzina*	*Branta canadensis*
*snow goose	*hʉggʉh*	*Chen caerulescens*
*black brant	*k'ideeɬghonodaala*	*Branta bernicla*
*American wigeon	*siseeya*	*Anas americana*
*northern shoveler	*dilolagga*	*Anas clypeata*
*pintail	*k'idzonula*	*Anas acuta*
*mallard	*tɬiɬkkʉghʉyh*	*Anas platyrhynchos*
*green-winged teal	*k'ltsuɬ*	*Anas crecca*
*greater scaup	*tontseedla*	*Aythya marila*
*lesser scaup	*tontseedla*	*Aythya affinis*
*bufflehead	*toodaggona*	*Bucephala albeola*
*common goldeneye	dikeenoya	Bucephala clangula
*Barrow's goldeneye	*dikeenoya*	*Bucephala islandica*
old squaw	*ahaaga, aanhaaga*	*Clangula hyemalis*
*harlequin duck	*taasahʉt'aana*	*Histrionicus histrionicus*
*white-winged scoter	*ts'inh daadlagʉya*	*Melanitta deglandi*
*surf scoter	*dotsa'alaayh*	*Melanitta perspicillata*
*common scoter	*yooɬyeesga*	*Melanitta nigra*
*red-breasted merganser	*tsaghuɬ*	*Mergus serrator*
red-tailed hawk	*yoda*	*Buteo jamaicensis*
golden eagle	*tilila*	*Aquila chrysaetos*
marsh hawk	*kk'olkk'eeya*	*Circus cyaneus*
osprey	*taagidzee'aana*	*Pandion haliaetus*
peregrine falcon	*hʉkeenoya*	*Falco peregrinus*
merlin	*ts'inok'iɬk'oodla*	*Falco columbarius*

BIRDS (cont.)		
gyrfalcon	*bakkaant'ogga*	*Falco rusticolus*
*spruce grouse	*diyh*	*Canachites canadensis*
*ruffed grouse	*tsongguda*	*Bonasa umbellus*
*willow ptarmigan	*dilbagga*	*Lagopus lagopus*
sharp-tailed grouse	*k'ił'uga*	*Pedioecetes phasianellus*
*sandhill crane	*dildoola*	*Grus canadensis*
semipalmated plover	*bilaanhok'idaalk'idee*	*Charadrius semipalmatus*
American golden plover	*bibidisis*	*Pluvialis dominica*
common snipe	*yoleeł*	*Gallinago gallinago*
whimbrel	*tł'eeyhts'ineega*	*Numenius phaeopus*
spotted sandpiper	*dilbeedza*	*Actitis macularia*
*lesser yellowlegs	*dzolnoga*	*Tringa flavipes*
northern phalarope	*tolyidla*	*Phalaropus lobatus*
long-tailed jaeger	*dzonh*	*Stercorarius longicaudus*
herring gull	*baats*	*Larus argentatus*
mew gull	*baats*	*Larus canus*
*Bonaparte's gull	*tłeelzina*	*Larus philadelphia*
*arctic tern	*k'idaggaas*	*Sterna paradisaea*
*great horned owl	*nigoodzagha*	*Bubo virginianus*
*snowy owl	*nokinbaa*	*Nyctea scandiaca*
*hawk owl	*k'itłeedzodza*	*Surnia ulula*
great gray owl	*notdułe*	*Strix nebulosa*
short-eared owl	*kk'oonzaah*	*Asio flammeus*
boreal owl	*atkeeh doldoya*	*Aegolinus funereus*
saw-whet owl	*ts'inok'itłk'oodla'*	*Aegolinus acadicus*
belted kingfisher	*dikitł'aasga*	*Megaceryle alcyon*
*yellow-shafted flicker	*tsinił*	*Colaptes auratus*
northern three-toed woodpecker	*dikiltłaala*	*Picoides tridactylus*
olive-sided flycatcher	*dahts'eeneeya*	*Nuttallornis borealis*
horned lark	*dlił tłeek'a bahoolaanee*	*Eremophila alpestris*
*bank swallow	*łaats anogha*	*Riparia riparia*
gray jay	*zahga*	*Perisoreus canadensis*
common raven	*dotson'*	*Corvus corax*
black-capped chickadee	*k'its'ahałtoona*	*Parus atricapillus*
robin	*dilk'ahoo*	*Turdus migratorius*
varied thrush	*dilł'eeza*	*Ixoreus naevius*
hermit thrush	*gguzaakk*	*Catharus guttata*
Swainson's thrush	*gguzaakk*	*Catharus ustulatus*
gray-cheeked thrush	*gguzaakk*	*Catharus minimus*
Bohemian waxwing	*diltsooga*	*Bombycilla garrulus*
yellow warbler	*kk'osaaghatługha*	*Dendroica petechia*
myrtle warbler	*tłaatsontłida*	*Dendroica coronata*
rusty blackbird	*tsahatłts'eegga*	*Euphagus carolinus*
pine grossbeak	*kaayooda*	*Pinicola enucleator*

	BIRDS (cont.)	
common redpoll	*k'ilodibeeza*	*Carduelis flammea*
white-winged crossbill	*saak'itaatłggatł*	*Loxia leucoptera*
savannah sparrow	*k'itsaan' loy doldoya*	*Passerculus sandwichensis*
slate-colored junco	*k'it'otł'ahga*	*Junco hyemalis*
white-crowned sparrow	*k'itł'inh ts'ahtł'aana*	*Zonotrichia leucophrys*
snow bunting	*hłggłh yoza*	*Plectrophenax nivalis*
	FISH	
*sheefish	*nidlaagha, lidlaagha*	*Stenodus leucichthys*
*least cisco	*tsaabaaya*	*Coregonus sardinella*
*broad whitefish	*taasiza*	*Coregonus nasus*
*Alaska whitefish	*holahga*	*Coregonus nelsoni*
*Dolly Varden	*ggaatł'yeega'*	*Salvelinus malma*
*king salmon	*ggaatł*	*Oncorhynchus tshawytscha*
*silver (coho) salmon	*saanlaagha*	*Oncorhynchus kisutch*
*sockeye salmon	*notłdlaagha*	*Oncorhynchus nerka*
*chum (dog) salmon	*noolaagha*	*Oncorhynchus keta*
*arctic grayling	*tłaghalbaaya*	*Thymallus arcticus*
*Alaska blackfish	*oonyheeyh*	*Dallia pectoralis*
*northern pike	*k'oolkkoya*	*Esox luscius*
*burbot (louche)	*tl'aghas*	*Lota lota*
*longnose sucker	*toonts'oda*	*Catostomus catostomus*
	PLANTS	
*white spruce	*ts'ibaa*	*Picea glauca*
*black spruce	*ts'ibaa t'aal*	*Picea mariana*
*Bebb willow	*kk'ełydliyh*	*Salix bebbiana*
*diamondleaf willow	*kk'uydlits'eela*	*Salix planifolia*
*littletree willow	*k'ełyloo*	*Salix arbusculoides*
*balsam poplar	*t'aghatł*	*Populus balsamifera*
*quaking aspen	*t'aghal kk'ooga*	*Populus tremuloides*
resin birch	*kk'aan dikina*	*Betula glandulosa*
*paper birch	*kk'eey*	*Betula papyrifera*
*American green alder	*kk'as*	*Alnus crispa*
*northern black currant	*dotson' geega*	*Ribes hudsonianum*
*American red currant	*nots'ahtl'oona*	*Ribes triste*
red-osier dogwood	*nik'inla'ee geega*	*Cornus stolonifera*
*crowberry	*deenaatł'aas*	*Empetrum nigrum*
*bearberry	*diniyh*	*Arctostaphylos uva-ursi*
*alpine bearberry	*diniyh*	*Arctostaphylos alpina*
*lowbush cranberry	*dinaatłakk'aza*	*Vaccinium vitis-idaea*
*bog blueberry	*geega*	*Vaccinium uliginosum*
*bog cranberry	*geeznogha'*	*Vaccinium oxycoccos*
*highbush cranberry	*donaaldloya*	*Viburnum edule*

PLANTS (cont.)		
*nagoonberry	*noghɬytl'aakk*	*Rubus arcticus*
*cloudberry	*kkotl*	*Rubus chamaemorus*
*American red raspberry	*dits'intl'aakk*	*Rubus idaeus*
*prickly rose	*hus*	*Rosa acicularis*
*sourdock	*ggoo*ɬ	*Rumex arcticus*
*wild chives	*(?)*	*Allium schoenoprasum*
*grass/sedge	*k'itsaan'*	species unknown
*sphagnum moss	*tɬ'o*ɬ	*Sphagnum sp.*
lake-bottom moss	*taahnaana'*	species unknown
*birch fungus	*adzibaangit*	*Fomes igniarus*
*birch fungus	*kkeeyh anee'enee*	species unknown
birch fungus	*k'ididziyh*	species unknown

Appendix B

MARTEN DEADFALL TRAP CONSTRUCTION DETAILS

The marten deadfall traps seen in figures 13 and 14 in chapter 4 employ two trigger assemblies: "A" and "B." The following figures 48 and 49 illustrate trigger assembly A used in one of the deadfall traps. Figure 50 shows the construction details for trigger assembly B used in the other.

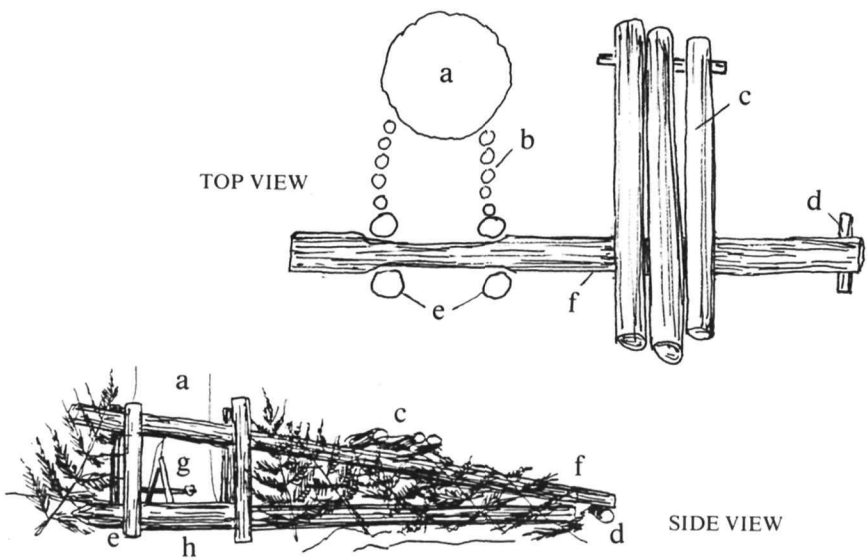
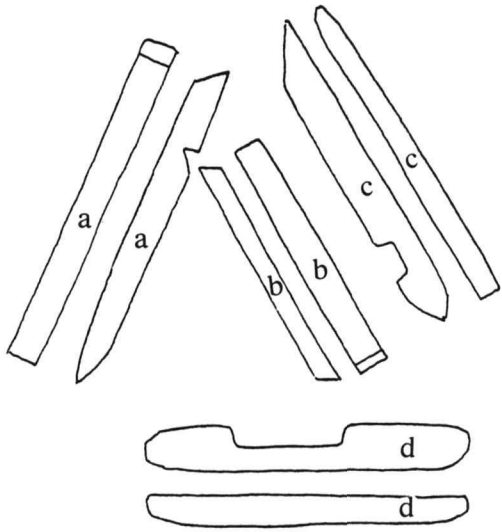
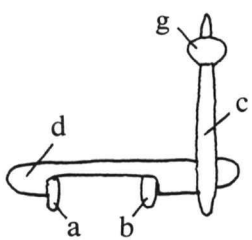


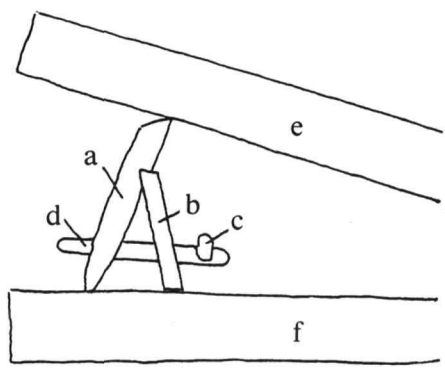
FIGURE 48. MARTEN DEADFALL SET USING TRIGGER ASSEMBLY A: *a*, SPRUCE TREE; *b*, FENCE (6 INCHES HIGH); *c*, WEIGHT LOGS; *d*, HINGE LOG; *e*, FOUR GUIDE POSTS; *f*, TOP OR "KILLER" LOG (6 FEET LONG AND 3 INCHES IN DIAMETER) WHICH IS HEWN FLAT ON EACH SIDE BETWEEN THE GUIDE POSTS TO FACILITATE SLIDING; THE BAITED TRIGGER (*g*) AND BOTTOM LOG (*h*) ARE DIRECTLY BENEATH THE "KILLER" LOG.



TOP AND SIDE VIEWS OF WOODEN TRIGGER SECTIONS

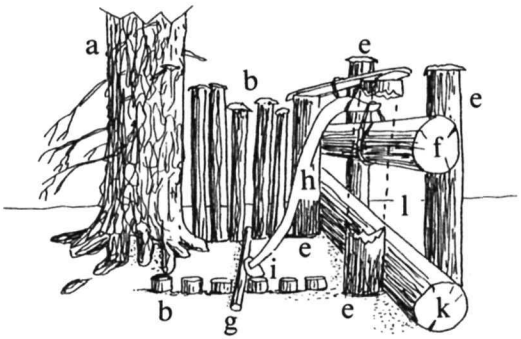


TOP VIEW OF
TRIGGER ASSEMBLY A

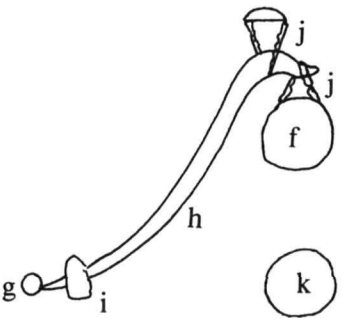


SIDE VIEW OF TRIGGER ASSEMBLY A

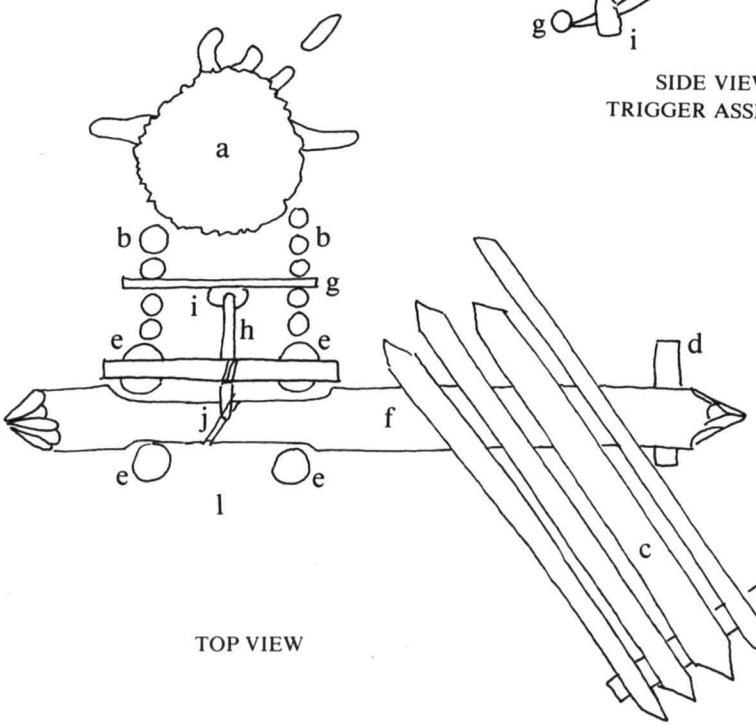
FIGURE 49. TRIGGER ASSEMBLY A: *a, b, c,* and *d,* WOODEN PIECES USED IN THE TRIGGER MECHANISM; *e,* TOP LOG; *f,* BOTTOM LOG; *g,* BAIT.



SIDE VIEW



SIDE VIEW OF
TRIGGER ASSEMBLY B



TOP VIEW

FIGURE 50. MARTEN DEADFALL SET USING TRIGGER ASSEMBLY B: *a*, SPRUCE TREE; *b*, FENCE; *c*, WEIGHT LOGS; *d*, HINGE LOG; *e*, FOUR GUIDE POSTS; *f*, TOP OR "KILLER" LOG; *g*, BAIT POLE; *h*, CROOKED ALDER; *i*, BAIT; *j*, DIAMOND WILLOW LASHING; *k*, BOTTOM LOG; *l*, ENTRY.

Appendix C

KOYUKON CLOTHING PATTERNS

This section includes patterns and instructions for making several Athabaskan articles of clothing: fur mittens and socks, canvas boots, and eight-skin caribou legging boots. The patterns for cutting the skins are reproduced here on a small scale and they must be enlarged to the appropriate size for actual use.

Fur Mittens

The pattern for Koyukon fur mittens is one of several variations on a style of mitten made large enough to fit loosely over one or two pairs of cloth gloves. (Tightly fitting mittens or gloves cause the hands to become cold too easily.) The mittens are attached to a braided yarn "harness" that fits around the neck. Thus, when they must be removed for working with the hands, the harnessed mitts are twisted together so they hang behind the back, out of the way but safe from loss.

To make the mittens, first make your own patterns by enlarging those in figures 51 and 52, then cut the number of pieces needed for each mitten part. Construction of the mittens is outlined in steps 1 through 6.

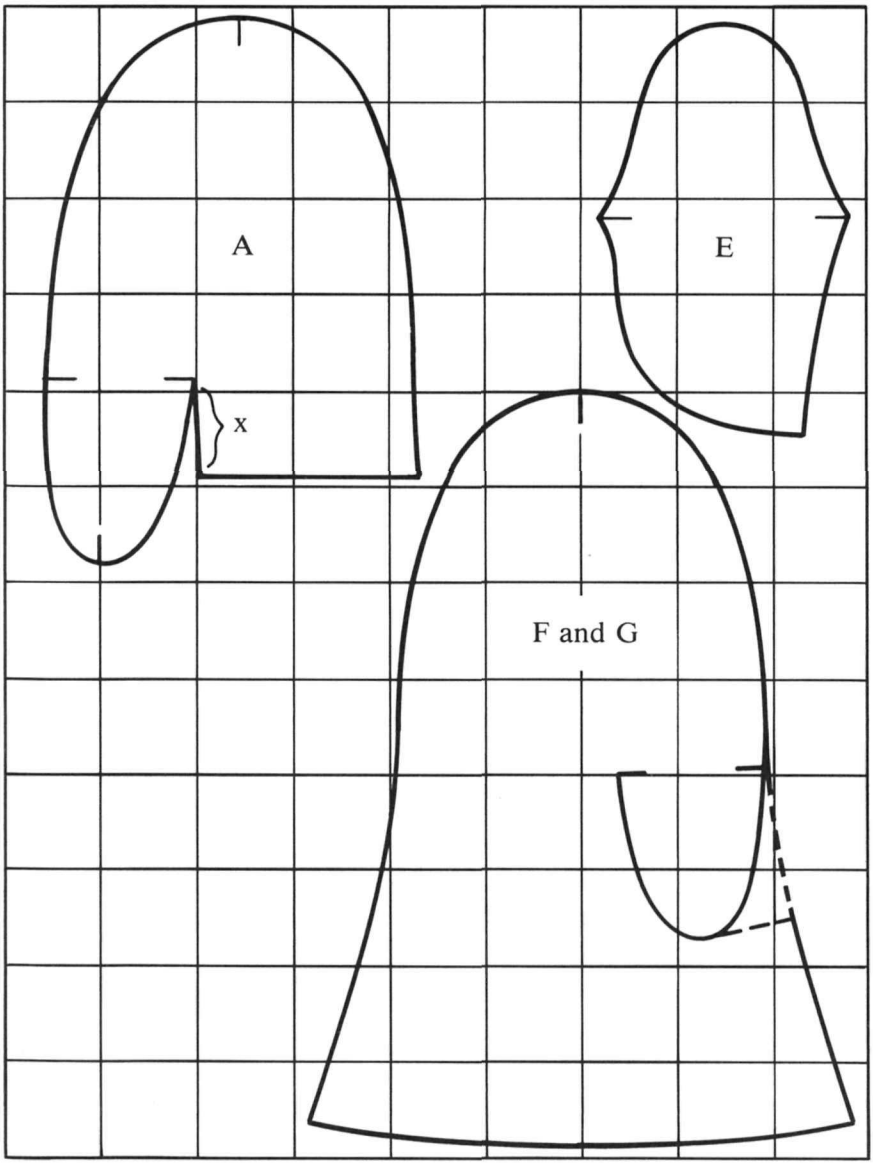


FIGURE 51. PATTERN PIECES FOR FUR MITTENS; *A,* MOOSEHIDE PALM AND THUMB; *E,* THUMB LINING; *F,* PALM AND THUMB LINING; *G,* LINING FOR BACK OF MITT (CUT WITHOUT THUMB, USING DASHED LINE); ENLARGE TO SIZE, CUT ONE FROM EACH PATTERN PIECE, THEN TURN PATTERN OVER AND CUT ANOTHER ONE.

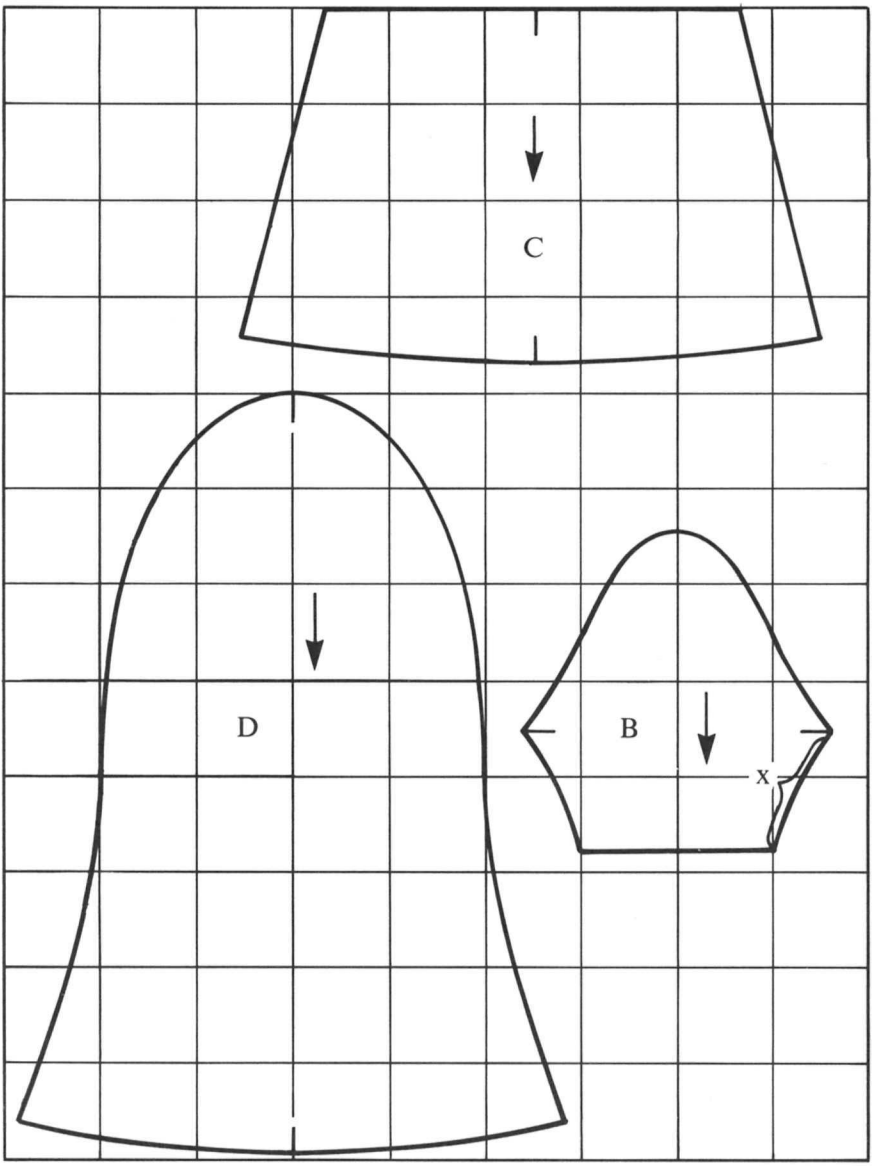
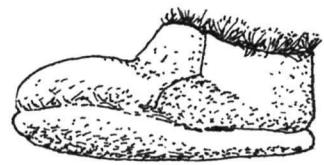


FIGURE 52. PATTERN PIECES FOR FUR MITTENS: *B,* MITT THUMB, *C,* CUFF; *D,* BACK; ENLARGE PIECES AND CUT TWO OF EACH, THE ARROWS INDICATE DIRECTION OF "FLOW" OF FUR.

1) The mitt thumb (piece B) is sewn to the moosehide hand-piece thumb (piece A), tacking the two thumbs together at the top center lines marked on them (remember to sew pattern pieces together from the wrong side). The line marked at one side of the mitt thumb must fit at the inside corner of the moosehide thumb. The moosehide thumb is folded back, then the side section of piece A marked "x" is sewn to the lower side of piece B marked "x." The outer edges of pieces A and B are sewn together from the thumb tops to the sides marked by a line. Piece B is larger than the thumb of piece A and so it must be gathered as necessary, after being tacked in place at the top and sides, so that it will fit correctly. If desired, a strip of colored felt, cut with pinking shears and placed in the seam with the sheared edge on the outside of the mitten, can be used in the seam to protect the stitches and add a decorative touch. The felt strip is inserted as the seams are sewn together.
2) The above completed piece is sewn to the fur mitten cuff (piece C), tacking the narrower top of piece C to the lower edge of pieces A and B.
3) The above completed under-half of the mitten is sewn to the mitten back (piece D). They are tacked together where marked at the top center and also at the center of each side so that they fit together evenly. A ¼-inch-wide strip of colored felt (as described in step 1), or a strip of tanned caribou hide, is used in the seam where the moosehide is being sewn to the fur. This hides and strengthens the stitches.
4) The mitten lining thumb (piece E) is sewn to the mitten lining (piece F) at the thumb. They are tacked together at top center first, then at the sides where marked (piece F thumb must first be folded back before they are tacked together). Gathering must be done if necessary. The lower curved edge of piece E is sewn to the matching curved edge of piece F.

5) The completed under-half of the lining is sewn to the mitten lining piece G (without thumb). They are tacked first at the top center and along the sides so they will fit correctly and so the bottom edge will be even. The completed lining is then placed inside the fur mitten and sewn in place at the inside edge of the cuff.
6) A 2-inch wide strip of colorful cotton trim, or beaded moose or caribou hide, can be added across the top of the mitten at the wrist. It can be tacked to the side seams when finished or placed in the seams when sewing step number 3 above.

Fur Socks
Tuł



Fur socks or *tuł* are worn with the fur inside. The warmest type are made from caribou hide tanned with the fur left on it as for caribou leggings.

To construct a fur sock, cut pattern pieces enlarged from those in figures 53 and 54. Follow steps 1 and 2 to complete this footwear.

1) The top is formed by sewing the front (piece A) to the back (piece B) along the side edges marked "1" and "2."
2) The top is then tacked to the sole (piece C) at the toe, heel, and sides where marked and gathered where necessary to fit.

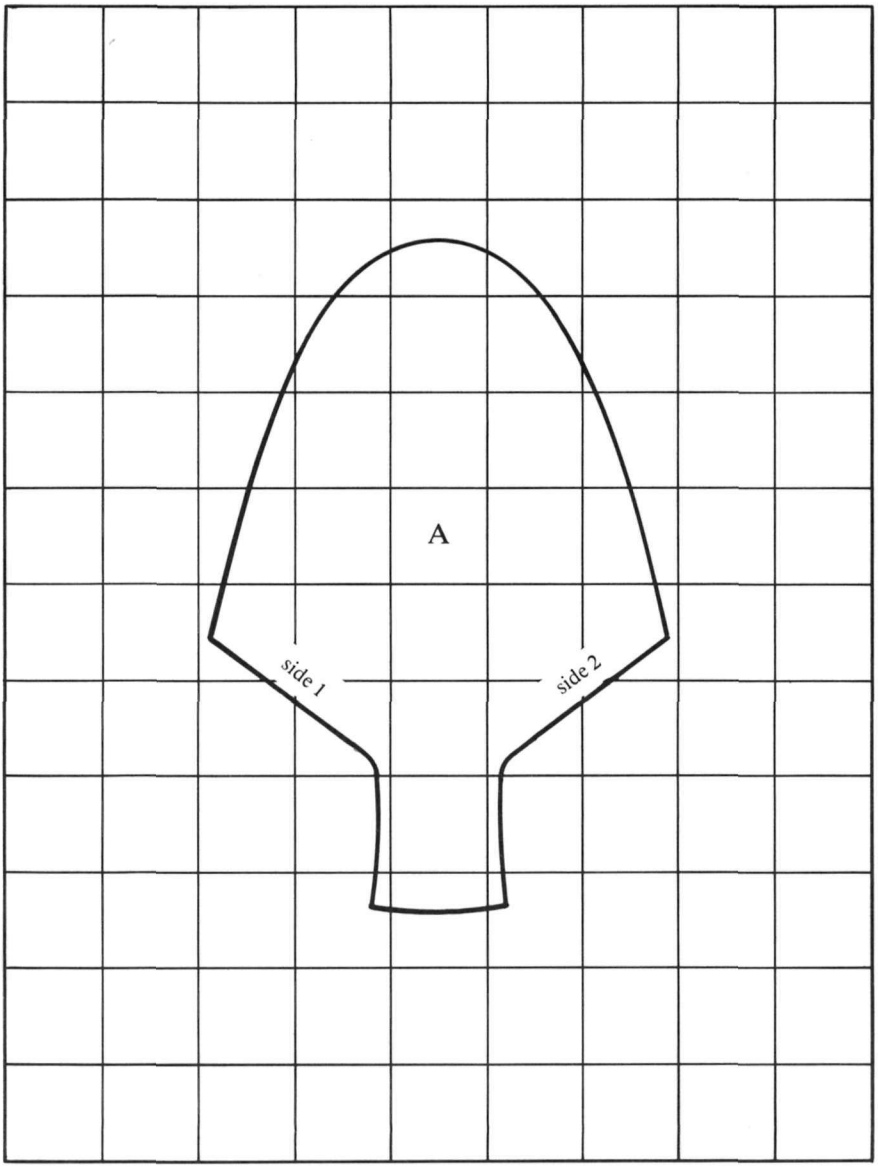


FIGURE 53. PATTERN PIECE FOR FUR SOCKS: *A*, FRONT; ENLARGE TO SIZE AND CUT TWO PIECES.

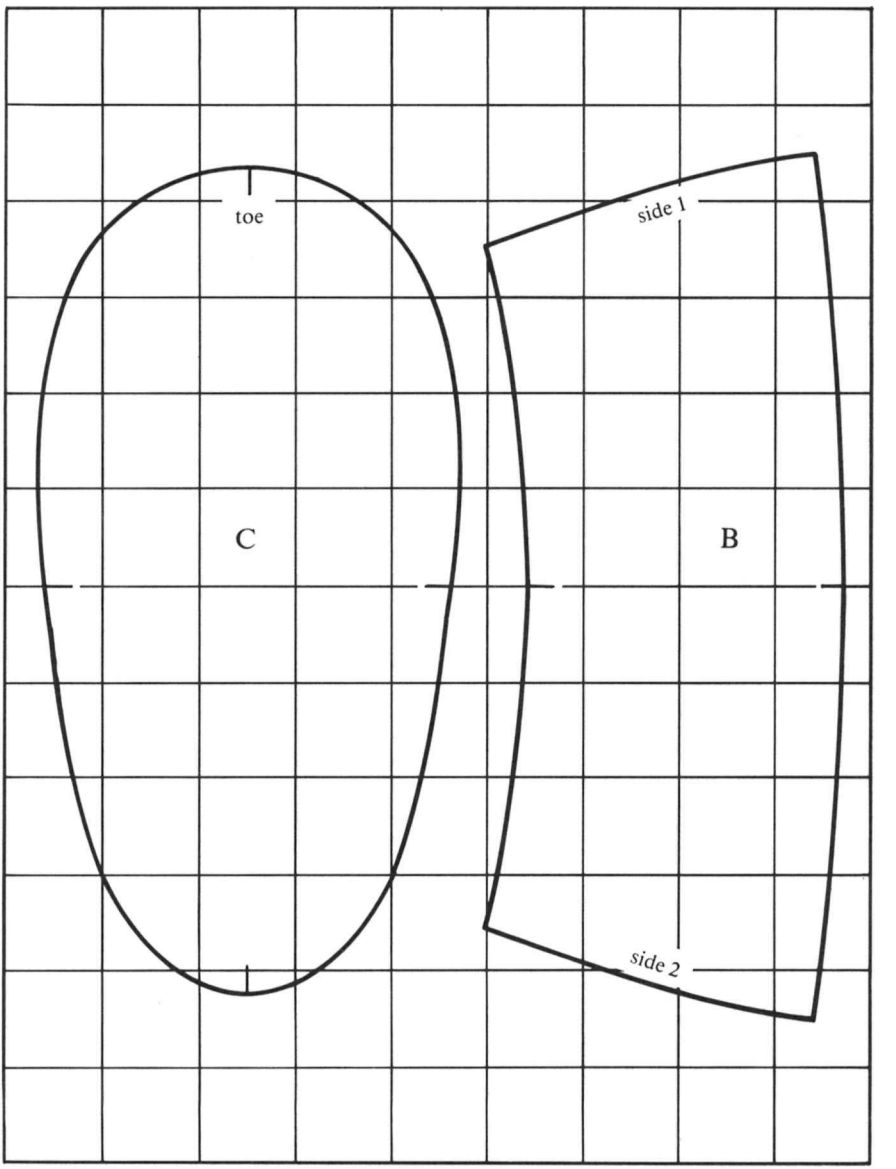


FIGURE 54. PATTERN PIECES FOR FUR SOCKS: *B,* BACK; *C,* SOLE; ENLARGE TO SIZE AND CUT TWO OF EACH.

Canvas Boots

The canvas boots, as well as the caribou-legging boots, must be altered to fit different foot sizes. The width of the boots at the ankle is an important measurement; all the socks a person will be using in the winter are worn, and the foot is measured over the top of the ankle all the way around the back of the heel. The calf measurement must also be taken while wearing socks, long underwear, and pants, so that the boots can fit comfortably over all of them. The soles are measured by wearing winter layers of socks and adding 1½ inches to the front and an inch to the sides and back. Felt or fur insoles are placed inside all boots for extra warmth and to make the soles last longer. It is always better to make winter boots too large rather than too tight, because tightness always causes the feet, as it does the hands, to become cold quickly.

Enlarge the patterns in figures 55, 56, and 57 to cut the pieces needed to sew the canvas boots.

1) If these boots are being lined with material (from old wool pants, a blanket, or quilted nylon, for instance) for extra warmth and strength, lining piece A is sewn to canvas boot piece A and lining piece B to canvas boot piece B. Then the entire piece A is sewn to the entire piece B at sides "1" and "2."
2) The completed canvas boot upper is sewn to the narrow moosehide strip, tacked first at the center front where marked. When the moosehide strip has been sewn all along the bottom edge of the canvas upper, the ends of the strip meet and are cut and sewn together.
3) The completed canvas boot with moosehide strip is sewn to the moosehide sole, using a ¼-inch-wide piece of tanned caribou

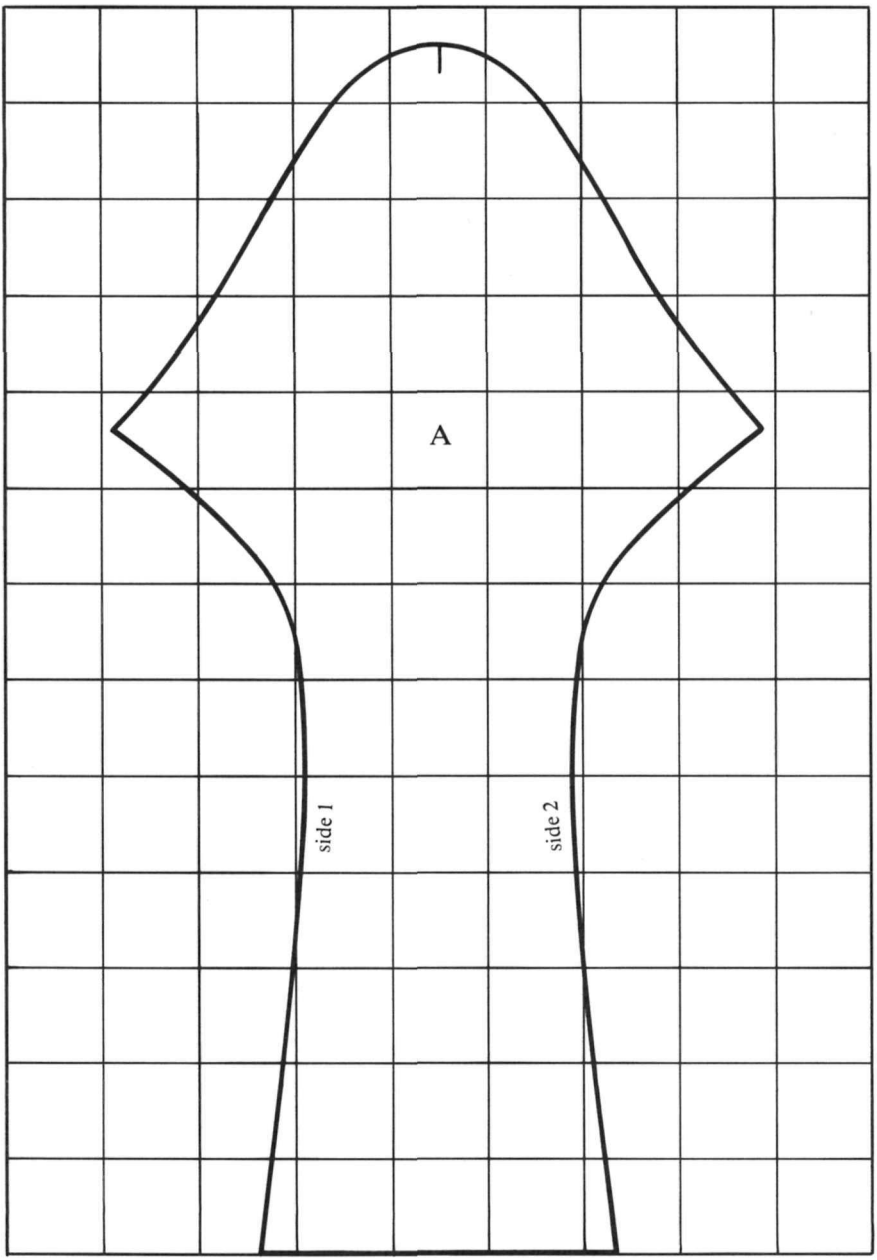


FIGURE 55. PATTERN PIECE FOR CANVAS BOOTS: *A*, FRONT UPPER: ENLARGE PATTERN TO SIZE AND CUT TWO PIECES (THE SAME PATTERN CAN BE USED FOR THE LINING).

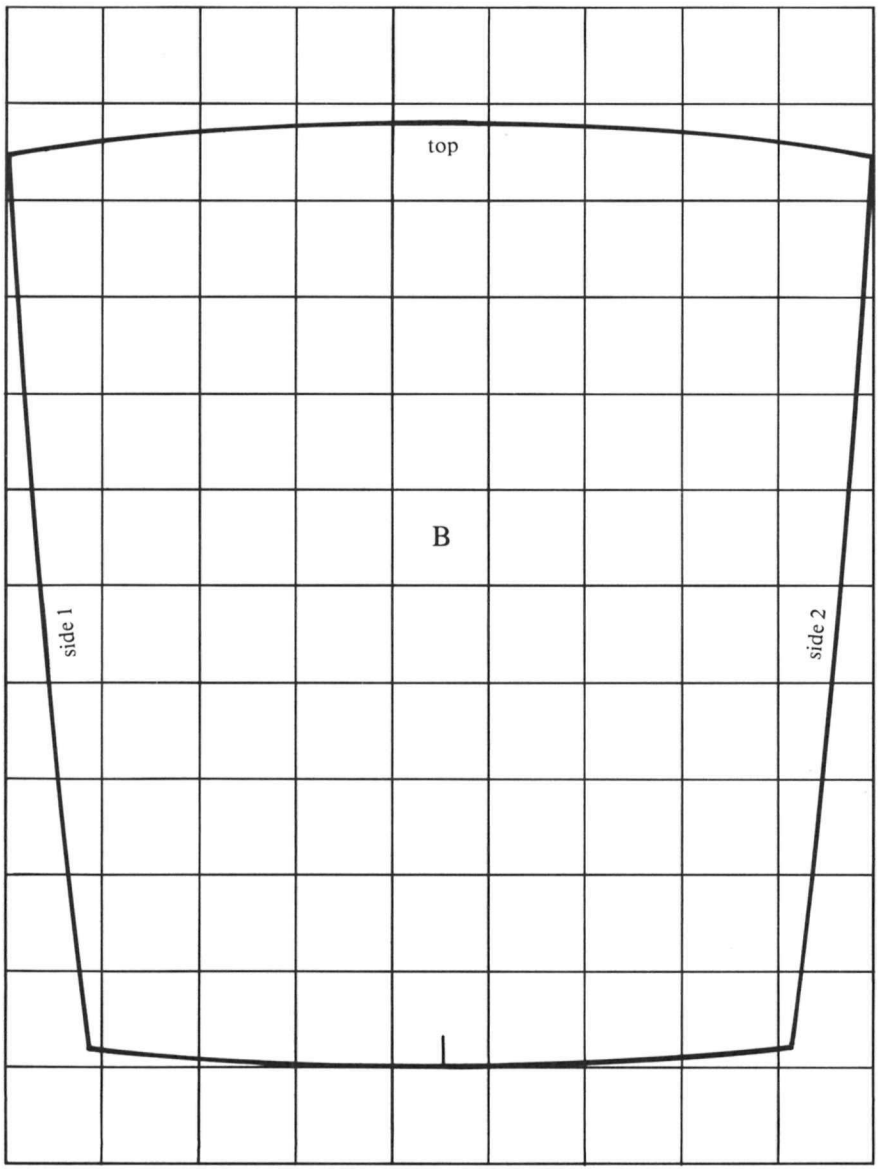


FIGURE 56. PATTERN PIECE FOR CANVAS BOOTS: *B*, BACK UPPER (FOR AN 18-INCH HIGH BOOT); ENLARGE PATTERN AND CUT TWO PIECES (THE SAME PATTERN CAN BE USED FOR THE LINING).

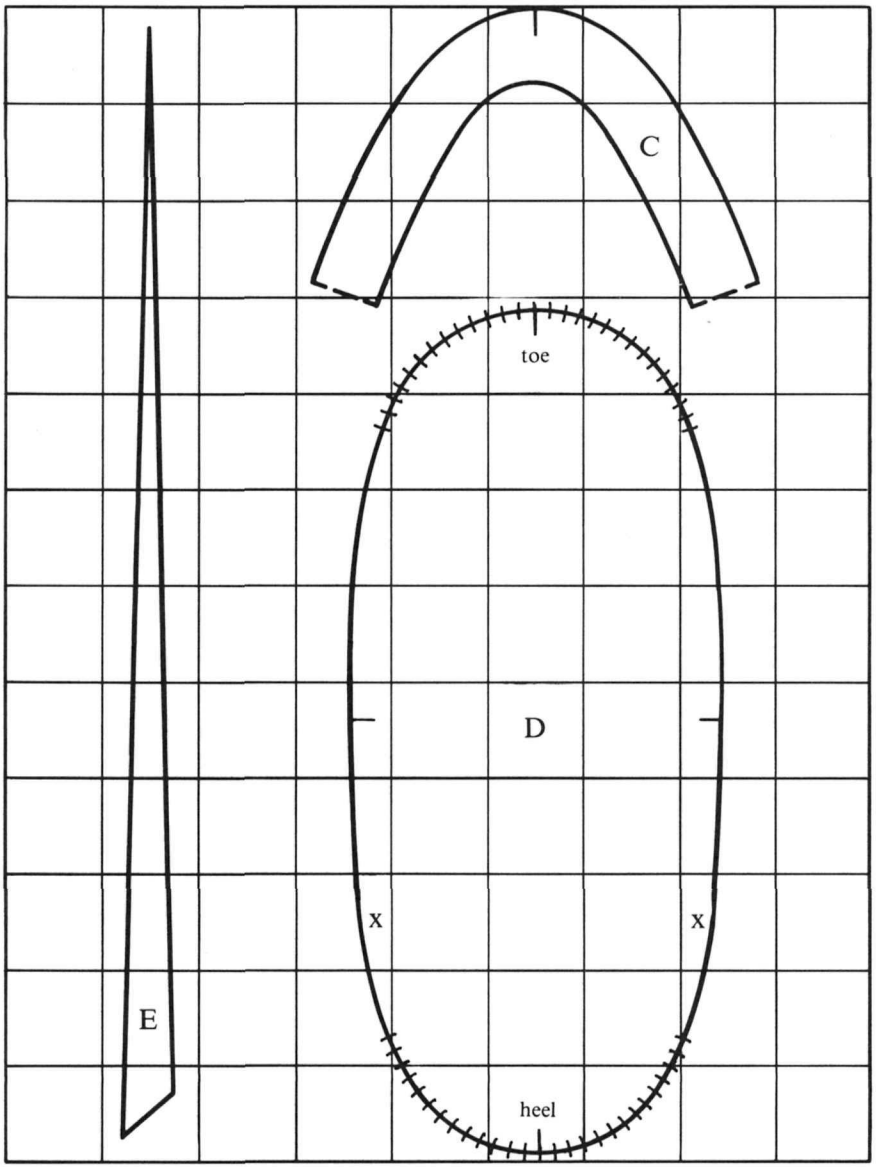


FIGURE 57. PATTERN PIECES FOR CANVAS BOOTS *C,* MOOSEHIDE STRIP (CUT TWO, ADDING 11 INCHES TO EACH SIDE); *E,* TIE (CUT FOUR 24-INCH STRIPS, SHAPED LIKE THE DRAWING, FROM MOOSE OR CARIBOU HIDE); *D,* SOLE (CUT TWO FROM MOOSE HIDE, GATHER AT HEEL AND TOE, ADD TIES AT *x*).

hide in the seam to protect the stitches. The upper part is tacked to the sole at the center of the toe, heel, and sides as marked. Then the sole is gathered as necessary at the front and back where marked, so it will fit evenly to the upper part. The gathering is done by taking long stitches through the inside part of the sole only, not all the way through the hide, and pulling the thread to make the gathering (after the sole has been sewn on, the gathering is removed). Boot ties of tanned caribou, moose, or sealskin are placed in the seam on each side, about halfway between the middle of the boot side and the middle of the heel. The wide end of each tie is placed in the seam, making sure to put it in so that the tie angles back toward the ankle and is on the outside when the boot is turned right side out. The sole is then attached by sewing through the moosehide sole, caribou seam strip, and upper moosehide strip with each stitch, not forgetting to sew also through the boot ties when they are added.

4) The boots are turned right side out, and the caribou seam strip is trimmed if necessary. A thin strip of beaver or other fur can be added to decorate the top of the boots, if desired. A 4- to 6-inch-wide strip of material (corduroy or denim) or tanned caribou hide is folded in half and sewn along the tops. The boot drawstrings are placed inside this material. The material or hide is doubled so that the fold is on the top, and the two even bottom edges are sewn to the top of the boots along the inside edge—beginning at the center of the back of the boot and continuing around the top. The back seams of the material or hide are sewn together from the outside, making sure to sew through only the outer layer of material so that the drawstrings can go through it.
5) Boot drawstrings are made of braided yarn or thin strips of tanned moose or caribou hide. A slit about ½ inch wide is cut through the outer layer of material only, on each side of the seam at the back. The eges of the holes must be sewn like buttonholes so they will not unravel. The drawstrings are put through the tops by attaching one end to a safety pin and working it through the boot.

Eight-skin Caribou Legging Boots

Caribou legging boots are the warmest and strongest winter boots made by the Koyukon. The eight tanned leg skins should be fairly well matched for color. Four front leg skins and four back leg skins are needed. There should be extra skins in case the back skins are not wide enough at the ankle; the small pieces needed can be cut from the extra leg skins, matching the color and flow of fur. The front leg skins are used for the front and back of the boots, and the back leg skins are used for the sides of the boots.

The pattern pieces in figures 58 and 59 can be enlarged to use for cutting the skins.

1) The small extra pieces are fitted to the side skins and sewn in place, if necessary, so that the leg skin is wide enough for the pattern.
2) The toe side of one side (piece C) is tacked to one side of the front (piece A) in at least 10 places so it fits evenly. They are then sewn together.
3) The straight edge of piece C is then tacked to one side of the back (piece B) as above and sewn.
4) The other side of the back (piece B) is tacked to the second side (piece C) along its straight edge and sewn.
5) The toe side of the second side (piece C) is tacked to the remaining side of the front (piece A) and sewn together.
6) For sewing the completed caribou legging boot upper to the moosehide strip and sole, inserting boot ties, and adding boot tops and drawstrings, follow canvas boot construction directions in steps 2 through 5.

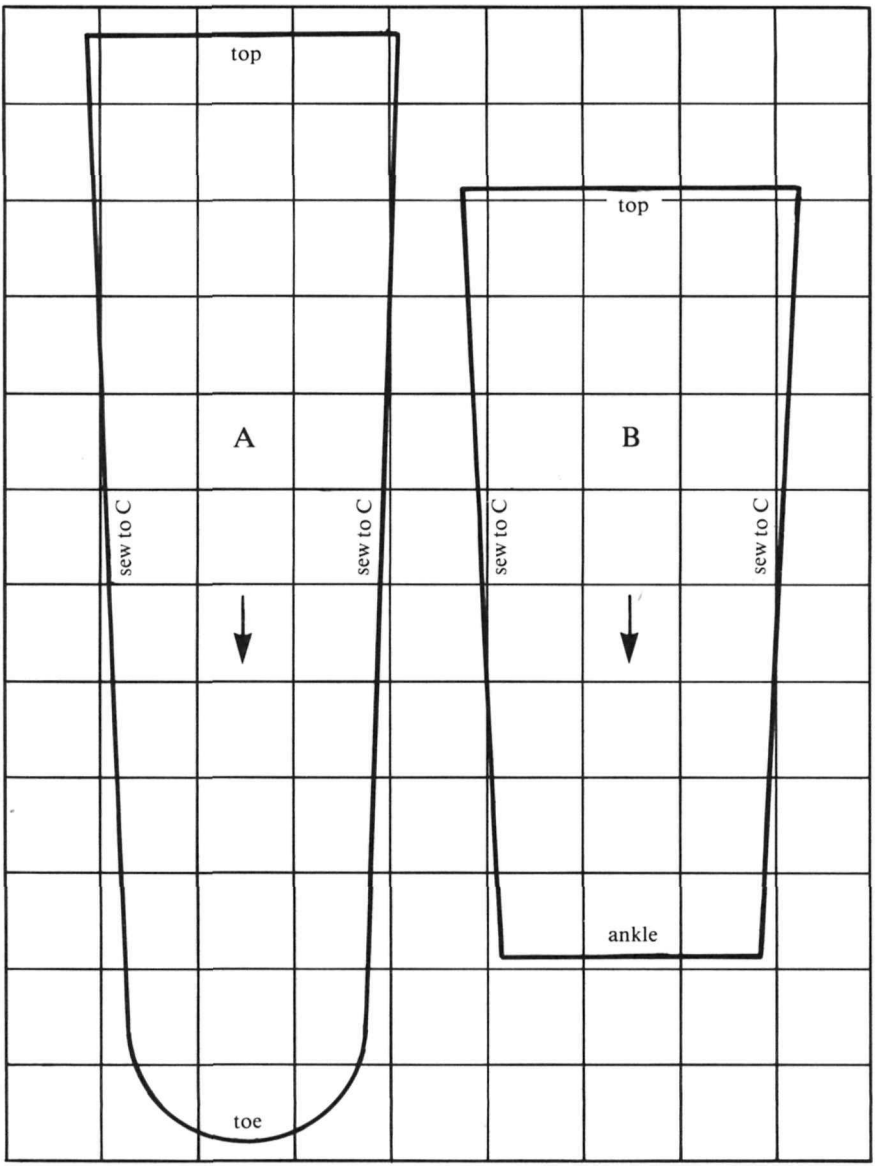


FIGURE 58. PATTERN PIECES FOR CARIBOU LEGGING BOOTS: *A,* FRONT (FOR 10-1/2-INCH-HIGH BOOTS, MORE CAN BE ADDED TO HEIGHT IF DESIRED; CUT TWO FROM FRONT LEG SKINS); *B,* BACK (CUT TWO); THE ARROW INDICATES DIRECTION OF "FLOW" OF FUR; FOR MOOSEHIDE STRIP, SOLES, AND TIES, SEE CANVAS BOOT PATTERNS.

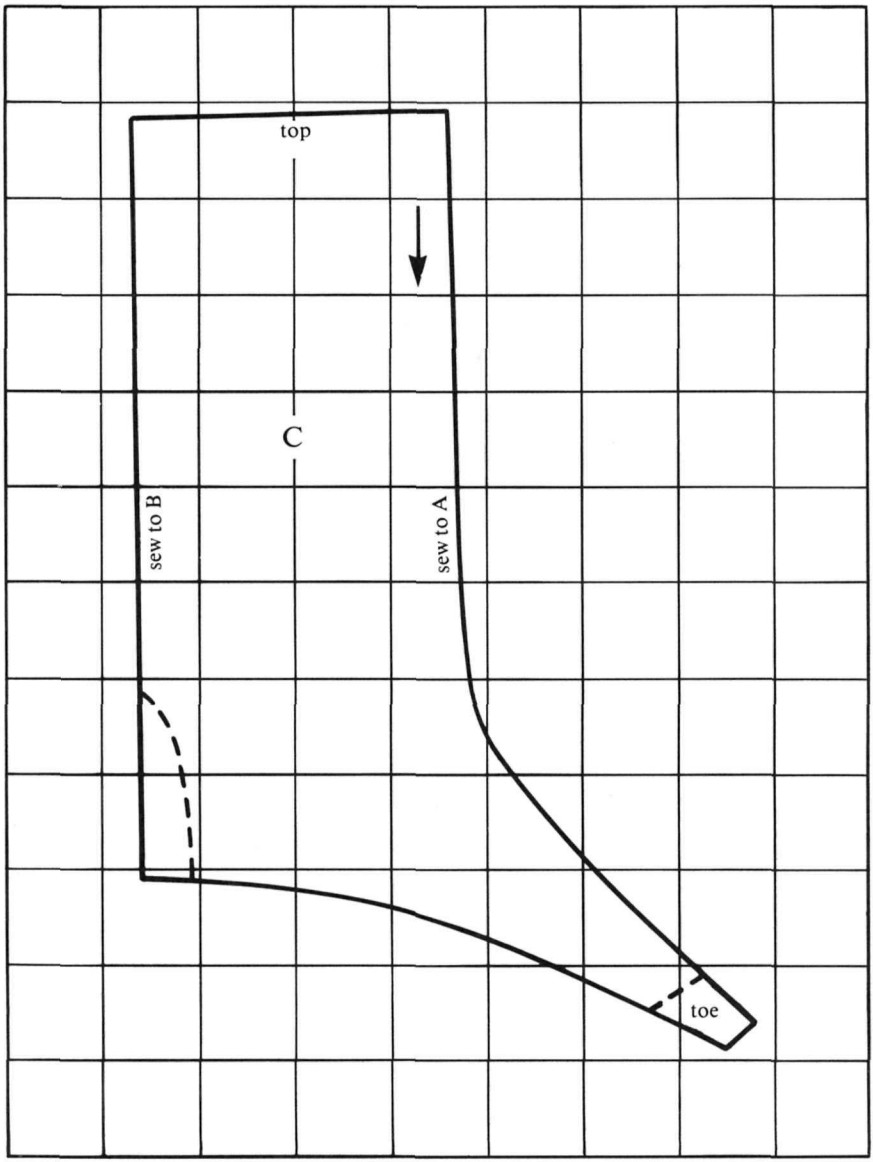


FIGURE 59. PATTERN PIECE FOR CARIBOU LEGGING BOOTS: *C*, SIDE; CUT TWO FROM BACK LEG SKINS, TURN PATTERN OVER AND CUT TWO MORE; ARROW INDICATES DIRECTION OF "FLOW" OF FUR; IT MAY BE NECESSARY TO CUT EXTRA PIECES TO FIT HEEL AND TOE SECTIONS (SEE DASHED LINES) IF LEG SKINS ARE NOT WIDE OR LONG ENOUGH.

Appendix D
NATIVE FOOD PREPARATION

The following instructions for Koyukon methods used to prepare Native foods demonstrate some of the skills village women must acquire. Besides including meat, fish, and fat recipes, this section has directions for plucking and drying waterfowl and hints for cutting and drying fish. The instructions conclude fittingly with a traditional recipe for "Indian ice cream."

Meat Recipes

Beaver Tail

The tail of a beaver is scorched over a campfire until the skin loosens, then the skin is removed. The tail is then boiled and eaten after cooling. Beaver tail is considered a delicacy because it consists of rich, fatty cartilage.

Traditional Koyukon belief held that the hunter must reserve the tip of the tail for himself. If he gave it away, he would caues the death of his mother (Jette 1911:608).

Moose Nose

Moose nose is the same type of delicacy as beaver tail. It is boiled with the skin on, then the skin is removed before eating. It can also be dried.

Whole Beaver

An old style of cooking beaver while out at camp is to remove the viscera through a small incision in the animal's lower abdomen then pour water into this cavity. The beaver is then put, head down, on a stick which leans over the campfire. The water inside the cavity boils and aids in the cooking.

Snowshoe Hare

To cook a snowshoe hare, the skin is removed but the organs are left intact; the whole rabbit is cooked on a stick over the campfire. This improves the flavor of the meat and makes it ". . .stay with people longer; otherwise you get hungry again quick."

Moosehead Soup

To make moosehead soup, the head of a moose is skinned and the brains are removed and saved for tanning hides. The glands are removed and discarded. The whole head is then boiled until the meat is tender.

When it has been allowed to cool, all the meat and fat is cut off, including the fat behind the eyeballs (which are discarded), the tongue and mouth tissue, and the upper lips. (It is taboo to eat the lower lips because it would cause people to move too slowly.) These muscles and tissues are difficult to find and remove properly, therefore considerable knowledge is required to prepare this dish.

All of the meat and fat is chopped into small bits and boiled with macaroni or rice into a rich and delicious soup. This dish takes many hours to prepare, and it is considered a delicacy to be served mainly at potlatches. It is taboo, however, for pregnant women to eat moosehead soup because it would cause sores on their neck that would look like the moose's neck skin.

Roasted Moose Head

To roast a moose or caribou head, the entire head is skinned. It is then suspended from a stick and roasted over a campfire for six hours.

Moose Head Cheese

To make moose "head cheese," the entire head is skinned and then boiled until the meat and tissues fall off easily. The glands, eyeballs, and lower lips are discarded, then the rest of the meat and fat are mixed together with the brains and put into bread pans. It is baked in the oven until solid; it is then sliced for eating.

Dry Meat

Before there were freezers in the villages, muskrats, ducks, and geese killed in the spring and any other meat acquired during spring and summer had to be dried. Today people continue to dry meat that is left in their caches at the time of the first spring thaw. This supply of dry meat is to last for the year and to make room in their caches for the fish and meat they will harvest in the coming months.

To prepare meat for drying, it is removed from the bones of moose, caribou, beaver, and other animal carcasses and cut in long thin strips about an inch wide and ½ to 1 inch thick. If the strips are cut too thin, the meat will become too dry. Koyukuk people like it thick enough so the meat retains some moisture in the center.

The strips of meat are either sprinkled with salt over the entire surface or dipped in a brine solution. Then they are hung on poles in the smokehouse over a smudge fire of dry willow or poplar wood. Strips of fat, tongues, and whole rib cages are also hung to dry. Some meat is only half-dried and then put in the freezer. Meat takes a week or more to dry fully.

Plucking and Drying Waterfowl

The person who plucks a duck or goose wears an apron and places the bird in his or her lap with its feathers pointing away. A bowl of water is put nearby for wetting the fingers, which makes it easier to get a grip on the feathers and down. The feathers are pulled out first by grabbing handfuls and giving them a quick jerk back toward oneself—opposite to the direction in which they grow. All the feathers are removed except for those on the parts to be discarded—the head and the section beyond the bend of the wings. Then the down is removed, again with wetted fingers. If the bird is to be frozen, its viscera are left inside because this prevents the meat from drying out; but if it is to be dried, the viscera are removed.

To prepare a dried waterfowl, the bird is plucked and cleaned and then:

1) The meat is removed from each side of the breast bone from the head end down to the tail end, as shown with dotted lines in

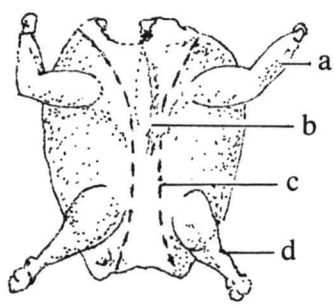


FIGURE 60. WATERFOWL TO BE CUT FOR DRYING: *a,* WING; *b,* BREAST BONE; *c,* CUTTING LINE ON EACH SIDE OF THE BREAST BONE; *d,* LEG.

figure 60. The meat is cut from the bone at a slight angle out toward the wings and legs, leaving a little meat on the breast bone. After cutting down to the first joint of the wing, the joint

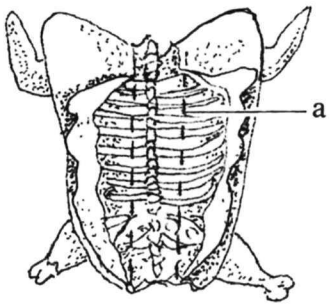


FIGURE 61. CUTTING A WATERFOWL FOR DRYING: CUT ALONG DASHED LINE (*a*) TO FREE BREAST BONE FROM RIBS: DO NOT SEVER COMPLETELY AT THE TAIL END.

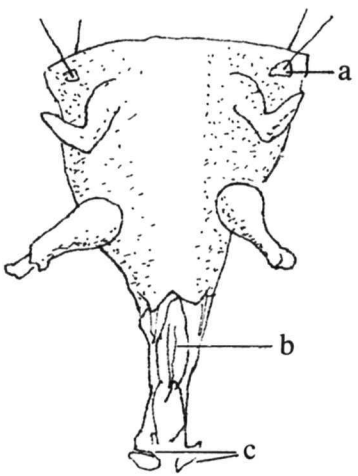


FIGURE 62. WATERFOWL CUT AND READY TO BE HUNG FOR DRYING: *a,* HOLES FOR HANGING; *b,* BREAST BONE; *c,* CORACOID BONES; BACKBONE AND RIBS ARE LOCATED ON REVERSE SIDE.

is cut to sever the wing from the breast. The breast meat is cut almost down to the skin on both sides, making sure not to cut through the skin and sever the piece of meat. The pieces of meat are then folded away from the bones (figure 61).

2) The coracoid bones (the first bones attached to the head end of the breast bone, on each side of the breast bone) are cut free of the breast meat at their two ends, but they are left attached to the breast bone at their bases.
3) The ribs are freed from the breast bone on both sides by cutting through them as illustrated by the dotted lines. The ribs are completely severed from the breast bone at the head end, but they are left attached at the tail end by not cutting through the rest of the meat.
4) The separated breast bone, with coracoid bones attached at one end, is bent back toward the legs so it lays flat. A hole is poked in each side of the breast meat next to the wings, string is placed through each hole, and the meat is then hung outdoors by the string to dry (figure 62).

Fat Recipes

Moose Grease

Strips of moose fat are cut up and "fried" to render grease which is then stored. Fat is also obtained by pulverizing moose joints, boiling them, and then scooping the grease from the top of the water. Moose grease is used as cooking oil, for storing berries, and for making Indian ice cream.

Bear Grease

Strips of bear fat are heated as the moose fat above, and the resultant grease is poured into jars. Bear grease becomes semi-hard and is commonly used as a "condiment" into which pieces of meat or fish are dipped.

Grease Stored in Snowshoe Hare Skin

To prepare a hare skin for storing oil, the skin is removed from the carcass by "casing out," then it is turned so the fur is on the outside. The leg and neck openings are tied firmly, but the posterior is left open.

Seal oil, fish oil, bear grease, or moose grease can be poured into the opening which is then tied shut. About two quarts of oil can be stored in a rabbit skin.

Bear Fat Sausage

Only old men and women are allowed to eat bear fat sausage. The bear stomach is cleaned and turned inside out and then filled with mesentery fat. The ends are tied and it is roasted over a campfire.

Salmon Head Oil

This traditional recipe for salmon head oil requires that several salmon heads be strung together and tied to a stick which is then sunk in the river to submerge the heads. They are left like this for two weeks then removed and boiled; the oil is skimmed off the top and stored.

Fish oil could also be burned in the traditional Koyukon lamp which was a stone "dish" filled with oil with a wick of dried white moss (Sullivan 1942:30).

Pike Stomach Filled with Fish Grease

A pike stomach is dried on both sides, then blown up and tied at one end. The fish grease is obtained by frying or boiling fish viscera and scooping up the oil. The dried stomach is then filled with fish oil and the opening is tied securely.

Fish Recipes

Dried Salmon Eggs

Eggs are removed from the body cavities of salmon and hung over a pole to dry in the sun for a day. They are placed in the shade of the smokehouse to complete drying.

Storage of Fish Eggs

Traditionally, fish eggs were placed in birchbark baskets and stored in underground pits dug into slopes. The partially decomposed eggs were considered a delicacy (Loyens 1966:42).

Salmon Air Bladder Filled with Fish Eggs

An air bladder is filled with salmon eggs and dried outdoors in the sun for one day. The drying is completed in a shaded place like a smokehouse for another week, so it will not "cook" in the sun and rot. After it is dried, it is eaten like sausage.

Pike Liver

Pike liver is known to be "good for kids." It is either roasted on a stick over a campfire as soon as the fish is gutted or it can be dried.

Boiled or Roasted Dry Fish

Pieces of cut-up dried fish are boiled or roasted until tender. When people are roasting dry fish over a fire, they chart its course from the Yukon River up the Koyukuk River; they say, "Now it's coming up the Yukon, now it's at the mouth of the Kateel River. . .," continuing until it arrives where they are located. It is believed that saying this will make the fish nice and oily.

Roasted Half-dry Fish

Pieces of half-dried fish are roasted over a campfire or in the oven until tender.

Fish Soup

Fish are cut into steaks and boiled with water, onion, potatoes, or rice.

Blackfish Broth

When mother's milk or canned milk was not available for babies, the broth from boiled blackfish was used in place of milk. Many newborn babies whose mothers died in childbirth were nurtured with this broth.

Roasted Whole Fish

To roast a whole fish, the fish is not gutted. A pointed stick is inserted into the tail end and pushed along the ribs and backbone, stopping just where the head begins—it must not go through the head. The side of the fish with the backbone and most of the meat is

roasted over the fire first so that when the fish is turned over, the backbone will support the other side as it is roasting. If the stick is inserted incorrectly or if it is put all the way through the head, the fish will slip off the stick during cooking.

Hints for Cutting and Drying Fish

A large, sharp semilunar woman's knife or *tłaabaas* (*ulu* in Eskimo), or a large butcher knife, is used to cut fish. Koyukon women prefer to cut fish on a table while they are standing. The table top is often covered with a slab of spruce bark, which helps to keep the fish from sliding around too much. A rectangular frame of upright poles attached by cross poles, with a series of smaller poles 1½ to 2 inches in diameter laid across the frame, is constructed in the summer as a drying rack. The poles should be straight—if they are too fat or crooked, the fish will slip off. Spruce or willow poles are best; birch is not used because it is too slippery. It is easier to cut fish that has been left overnight first. Fish are scaled for human consumption but not if they are to be eaten by dogs.

Cutting Whitefish or Pike for Drying

1) The pelvic fins are removed first to aid the drying (figure 63).
2) The head is removed in four steps: a cut is made on each side of the head just behind the gills and then back toward the head; the third cut is made under the head and just behind the lower jaw; the fourth cut is made on top of the head, just above the gills, with a hard press of the knife to severe the head. It is either discarded or saved for the "dog pot."
3) The flesh is sliced off each side of the backbone, one side at a time, beginning the cut about half an inch from the center of the fish's back and cutting from the head down toward the tail. The flesh is cut off just over the ribs and backbone all the way down

the side of the fish until the guts are exposed. The guts are removed and then the other side of the fish is cut the same way. In this way, all the flesh is removed in one big slab from the backbone.

4) The backbone is folded out from the slab of flesh. Where the backbone joins the tail, a cut must be made part way through the bone to loosen it so that it is easy to hang. This is done with a firm press of the fish knife, being careful not to sever the backbone from the tail.
5) Crosswise slices are made in the flesh, about 1 inch apart for whitefish and 3 inches apart for pike which dries faster. The slices are made by angling the cuts toward the head end of the fish, cutting just down to the skin but not through it.
6) The fish is rinsed and hung by the tail (flesh side out) to dry on the fish rack pole. Fish are alternated as they are hung (the first one is hung with the backbone facing you, the next one with the scored flesh facing you. This creates maximum room on the drying rack.

Cutting Chum Salmon to Dry for Dogs

When large numbers of salmon are being cut, each salmon is secured to the fish table by pressing its tail down over the pointed end of a nail that has been pounded up through the bottom of the table. The back of the fish is away from the cutter, and its head is to his or her left. It is easier to use a large butcher knife for cutting "dog fish."

1) The dorsal fin is removed first to aid in stretching and drying the fish. If this first cut reveals that the fish is dark pink, the fish is very rich and oily and it is saved to be cut differently as "eating fish" for people.
2) The last inch at the end of the nose is removed (see figure 65).
3) The butcher knife is stuck into the flesh at the tail end, with the blade flat and its sharp edge facing toward the head. The knife

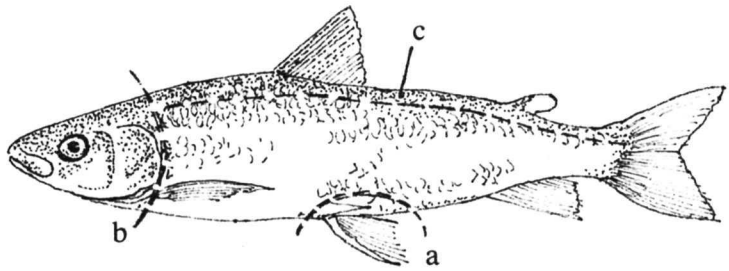


FIGURE 63. CUTTING A WHITEFISH OR PIKE FOR DRYING: *a*, REMOVE PELVIC FIN; *b*, CUT OFF HEAD; *c*, REMOVE FLESH FROM BACKBONE AND RIBS ON EACH SIDE.

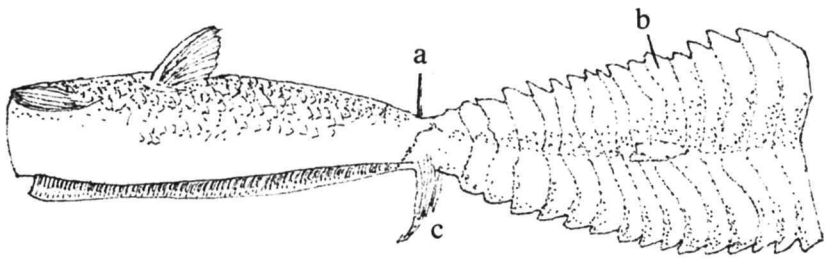


FIGURE 64. WHITEFISH OR PIKE CUT FOR DRYING: *a*, BACKBONE IS FOLDED OUT FROM SLAB OF FLESH; *b*, FLESH IS SLICED BY ANGLING KNIFE TOWARD THE HEAD; *c*, THE FISH IS RINSED AND HUNG BY THE TAIL TO DRY.

enters the flesh at the belly just ahead of the tail, is pushed through the flesh just above the backbone, and comes out the back just ahead of the tail. The flesh is removed by slicing it off just above the backbone for the entire length of the fish—from the tail all the way to the head.

4) This separated slab of flesh, attached at the tail, is folded back over to the right so the flesh is exposed. The guts are removed and the gills are trimmed off.
5) Pressing the knife firmly, the backbone only is severed from the tail. Then the knife is placed just under the backbone with the

blade flat and facing toward the head. The knife cuts just under the backbone, from the tail to the head, then the severed backbone is discarded.

6) Two lengthwise slices about 6 inches long are made just behind the lower jaw (the first few inches of the cut go all the way through the skin, the last few inches go just to the skin, but not through it). The second cut is about 2 inches behind this one and goes just down to the skin. These cuts aid in the stretching and drying.
7) Crosswise slices about 2 inches apart are then made. These cuts are made just down to the skin, not through it, all along the slab of flesh. The slices are angled toward the head of the fish.
8) The second slab of flesh at the right is rotated around to the left by its tail, and steps 6 and 7 are followed with it. The fish is then hung by the tail to dry, flesh side out.

Cutting Chum or Silver Salmon for "Eating Fish" Method I

1) The head is removed as for whitefish and pike.
2) The dorsal fin is removed and the fish is scaled (see figure 66).
3) A slice is made along the center of the belly from the head to the tail. When the cut reaches the anal fin, it divides into two cuts, one on each side of the fin. The viscera and anal fin are then removed and the fish is rinsed.
4) This step is similar to removing the flesh from whitefish and pike, but it is done from the belly side of the fish rather than from its back. Beginning on one side of the belly cut, about ½ inch of flesh is removed from the backbone and ribs. A lengthwise slice is made along the belly, beginning just above where the ribs end, and the flesh is removed up to the back, but not severed. This same cut is then made from the other side of the belly. This forms one big slab of ½-inch thick flesh, and leaves about 1½ inches of flesh on each side of the backbone.

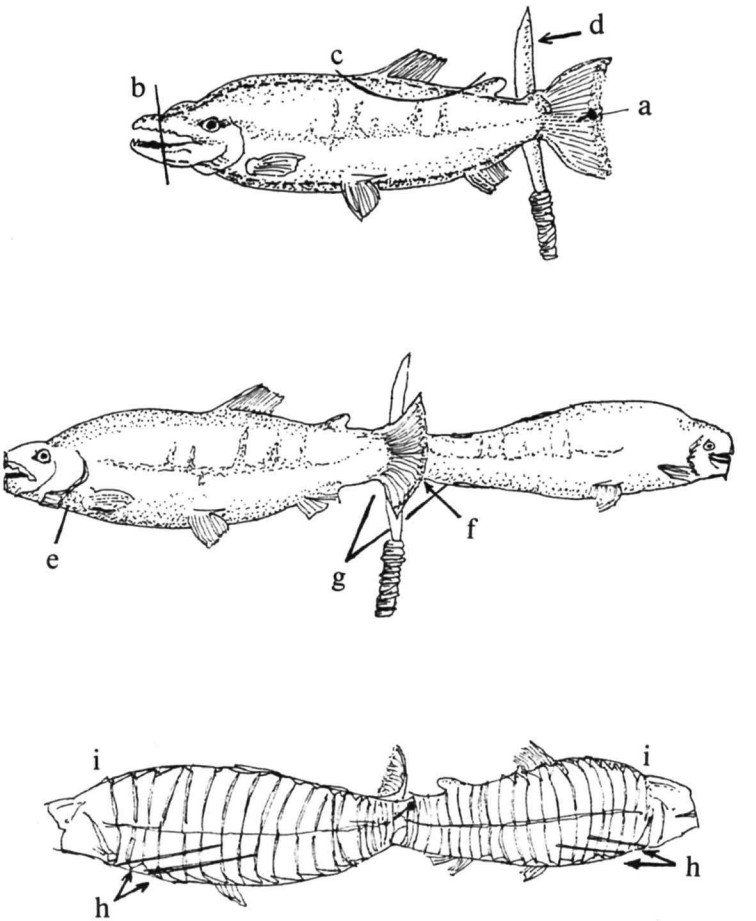


FIGURE 65. CUTTING A CHUM (DOG) SALMON TO DRY (FOR DOGS): *a,* NAIL HAMMERED THROUGH TAIL; *b,* SLICE OFF NOSE; *c,* REMOVE DORSAL FIN; *d,* CUT WITH KNIFE ALONG DASHED LINES FROM TAIL TO HEAD; *e,* TRIM GILLS AND REMOVE GUTS; *f,* SEVER BACKBONE AT TAIL END; *g,* FOLD OTHER SIDE OF FISH TO THE LEFT AND TRIM GILLS AND REMOVE GUTS; *h,* MAKE TWO 6-INCH LENGTHWISE SLICES ON EACH HALF: AND MAKE CROSSWISE SLICES EVERY 2 INCHES, BEGINNING AT *i.*

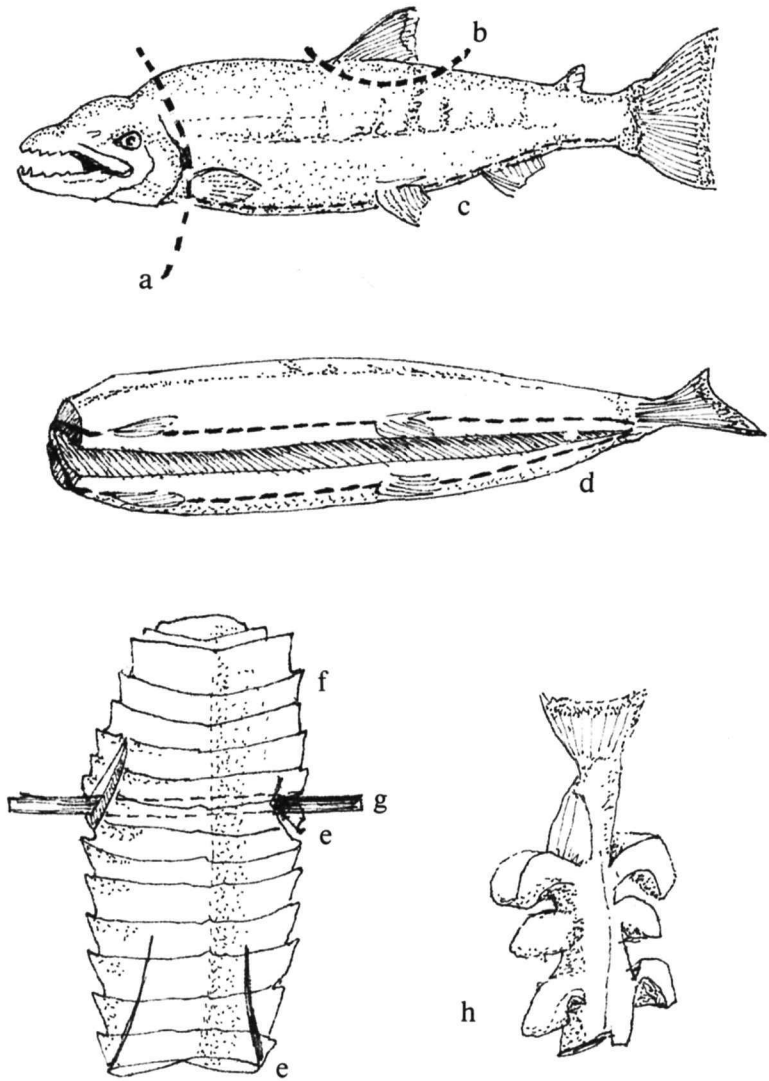


FIGURE 66. CUTTING A CHUM OR SILVER SALMON TO DRY FOR "EATING FISH" (METHOD I): *a,* REMOVE HEAD; *b,* REMOVE DORSAL FIN; *c,* SLICE DOWN BELLY AND REMOVE GUTS; *d,* REMOVE 1/2-INCH-THICK PIECE OF FLESH FROM EACH SIDE OF BACKBONE ALONG DASHED LINES; *e,* MAKE LENGTHWISE CUTS AT PELVIC AND PECTORAL FINS; *f,* MAKE CUTS CROSSWISE EVERY 2 INCHES, ANGLING CUTS TOWARD THE HEAD END; *g,* INSERT BIRCH STICK; *h,* SLICE THE FLESH REMAINING ON EACH SIDE OF THE BACKBONE.

5) On the ½-inch slab of flesh removed from the backbone, two lengthwise cuts 6 inches long are made on each side, just inside the pelvic fins. The cuts are made all the way through the skin for the first few inches and just to the skin for the rest of the way. Similar cuts are made just down to the skin on each side next to the pectoral fins.
6) Crosswise cuts are made all the way along the flesh about 2 inches apart, just down to the skin and angling toward the head. The flesh is then stretched in both directions.
7) Dry birch or spruce sticks, about ¼ inch in diameter and as long as the widest section of flesh at the pelvic fins, must be prepared. A stick is placed across the top of the flesh, with its ends stuck into the flesh on each side next to the pelvic fins. This keeps the flesh stretched out to aid in the drying.
8) About three or four slices are made in the flesh remaining on each side of the backbone. The slices should be about 3 to 4 inches apart and angled towards the head. The fish is hung by its tail to dry, meat side out.

Cutting Dog, Silver, or King Salmon for "Eating Fish" Method II

1) The head and dorsal fin are removed, and the fish is scaled, gutted and rinsed as in method I.
2) The flesh is removed from each side of the backbone as for whitefish and pike, step 3.
3) The entire backbone and ribs are cut off where the backbone joins the tail and are discarded.
4) Two 6-inch lengthwise slices are made on each side of the flesh at the pelvic and pectoral fins as described in method I, step 5.
5) Crosswise slices one inch apart are made on both slabs of flesh, cutting just down to the skin and angling the cuts towards the head end. The fish is then hung by its tail to dry, meat side out (figure 67).

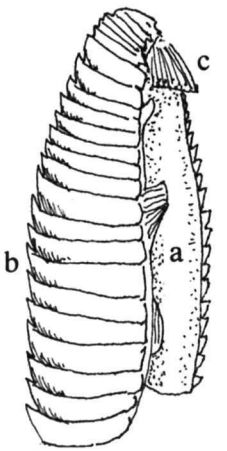


FIGURE 67. DOG, SILVER, OR KING SALMON CUT FOR DRYING (METHOD II): *a,* SKIN; *b,* FLESH; *c,* TAIL.

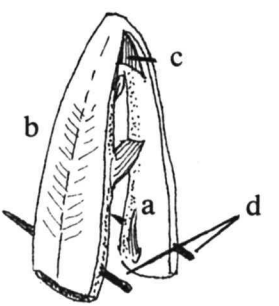


FIGURE 68. SMALL WHITEFISH CUT FOR DRYING: *a,* SKIN; *b,* FLESH; *c,* TAIL; *d,* BIRCH STICKS PLACED INSIDE FLESH.

Cutting Small Whitefish to Dry for "Eating Fish"

1) Steps 1, 2 and 3 above are followed, using 8- to 12-inch whitefish.
2) Each fish is placed in a brine solution for two minutes. There is no need to slice the flesh because they are so small.
3) The fish is hung to dry by its tail. Dry birch or spruce sticks about ¼ inch in diameter are placed inside the flesh on each slab, several inches from the head end. This prevents the fish from curling up as it dries (figure 68).

Drying Time for Fish

Smudge fires of dry willow or poplar wood are kept under the fish racks to repel flies. Fish are dried outdoors for five to seven days, weather permitting, with the flesh side out until a crust is formed. They are then turned over daily. The crust helps to prevent flies from laying eggs on the fish; however, sometimes they do, and all the eggs must be picked off or the fish will be ruined.

After a week in the sun, the fish are placed in an enclosed smokehouse for another week or more of drying and smoking. A smudge fire of dry poplar is kept under them to add the characteristic smoked flavor and to aid in drying. When done, 40 to 50 fish are bundled together and stored in the cache.

Indian Ice Cream

A 10- to 20-pound whitefish or sheefish is needed for "Indian ice cream." After the head and entrails are removed, the fish is scaled and rinsed and sliced into three equal-sized pieces which are boiled until the flesh is soft and done. The skin is then removed and all the

bones are removed from one small piece of fish at a time. When all the bones have been taken out, one handful of fish at a time is squeezed tightly until all the liquid is drained out of it into a separate container. After the liquid has been squeezed from all of the fish flesh, fistfuls of fish are rolled around in the hands and flaked into a bowl. Any other bones that appear are discarded.

About 2 cups of sugar, 2 to 3 cups of blueberries, cranberries or raisins, and a can of evaporated milk are set aside. About ½ to ¾ cup of moose grease is melted. While it is still hot, several handfuls of the flaked fish are thrown in and whipped into the fat with one hand. Metal is not used for mixing because warmth from the hand helps to make this ice cream fluffy.

A little more fish is added and the hand whipping continues. After adding about 2 more tablespoons of moose grease (or lard if the flavor of moose grease is too strong), there is more whipping by hand.

Fish and sugar are added alternately, until all the sugar is used. Drops of evaporated milk are added for moisture as one is whipping. The ice cream is whipped fast so the grease will not cool and thicken and so it will be light and airy.

The final step is to add berries and/or raisins, add more sugar or milk to taste, if desired, and to continue whipping with the hand until everything is mixed together. Traditional Indian ice cream used only fish, fat, and berries, with the fish juice added for moisture. The mixture is extremely popular today among the Koyukuk villagers. Although some people will make it for a treat at anytime, it is most commonly served at potlatches.

People in a house where the ice cream is being made must remain very quiet and still so that the ice cream will turn out fluffy; jumping and noisiness cause it to become heavy. When an old man or woman makes Indian ice cream, young boys or girls will lick the ice cream from the person's hand when he or she is done so that they can acquire that person's good luck in skills such as hunting or sewing.

Appendix E

RESOURCES USED BY THE KOYUKON

This compilation of Koyukon Athabaskan uses of the plants and animals indigenous to their area lists the species in groups and describes them briefly. For the major species used, the descriptions are more detailed to demonstrate the thoroughness of Koyukon game utilization. Comparable information which applies closely for the Nunamiut can be found in Anderson et al.

Mammals

Moose and Caribou

Head (*K'itlee'*)

The head is one of the best parts of a moose. Nearly all tissues and meat are eaten except for the glands (*kkuth*) which are never used from any animal. Head meat is very rich and is usually cut from the skull for cooking "moosehead soup" or "head cheese." Sometimes an entire head is suspended over a campfire and roasted—a great delicacy!

Nose (*K'intsiyh*)

The nose is boiled, roasted in a campfire, or dried and then soaked and boiled for eating.

Eyes (*K'inogha'*)

Eyeballs are not eaten, but the surrounding tissues and fat are boiled and eaten. The fat is also dried or eaten raw.

Ears (*K'idzagha'*)

The cartilage at the base of the ears is boiled or roasted for eating.

Tongue (*K'itɬoola'*)

The tongue is eaten after boiling, roasting, or drying.

Lower Jaw (*K'iyaatɬ'ina'*)

The entire jaw is boiled, then the meat and tissues are eaten. Marrow from inside the jawbone is also eaten. The lower jaw is tabooed for all except old men.

Lips (*K'idobaana'*) and Mouth Tissues

The lips and mouth tissues are cooked and eaten, but the lower lips are tabooed for all except old men. Tabooed parts are never included in preparations such as moosehead soup.

Head Muscles (Face Muscles, *K'inaakoodla'*)

The head muscles are cooked and eaten.

Brain (*K'itɬeetaaggadla'*)

The brain is used in the preparation of "head cheese" and for tanning hides.

Neck (*Bakk'uɬ*)

All meat from the neck is eaten except that from the first joint (*k'its'anotɬeek'itnol'olee*) which is only permitted for old people beyond child-bearing age. Like most taboos on food, this one is imposed to prevent undesirable characteristics in the user or the

user's children. Often (as in this case) the penalty for use of tabooed foods is slowness or clumsiness.

Shoulder Blade (*Baggokina'*)

The shoulder meat is cooked or dried, and the moose's scapula can be dried and used for a moose call.

Foreleg (*K'itɬ'eela'*)

The upper leg muscles (*k'itɬ'eela'*) and lower leg muscles (*k'itɬ'eeɬookk'a'*) are cooked or dried. The marrow (*k'iyagha'*) is eaten raw or cooked. Joints of the leg bones may be pulverized and boiled to obtain grease. The lower foreleg bones (*k'idzotina'*) are fashioned into scrapers for removing fat from animal skins.

Foot (*Bakaa'*)

Fore and hind feet are boiled and the tissues are eaten. This food is tabooed for all except old people.

Hoof (*Bakkaalagguna'*)

The hooves and dew claws (*bakkatutɬ*) are not utilized today.

Backbone

The backbone meat (*tɬaahnilaana'*) is cooked or dried and is considered very high in quality. This is especially true for the anterior meat (*baghona'*) along the high shoulder vertebrae. The bones (*k'inina'*) are not used, but the spinal cord (*k'ininyhaagha'*) is removed from cooked vertebrae and eaten. The sinew (*tɬ'aah*) is removed, dried, and used for sewing. Back sinew is considered the best for sewing and (formerly) for making snares.

Pelvis (Bone with Meat, *Bakk'ɬya'*; Bone Alone, *Bakk'ɬyhtɬ'ina'*)

The meat from the pelvis is highly esteemed, and it is prepared by cooking or drying.

Tail (*K'ikaala', K'ikaa'*)

The tail is cooked and eaten, but it is tabooed for all except old people.

Hind Leg (*K'ilidla'*)

The upper leg muscles (*baghuɬ*) are extremely valuable as food, and the lower leg muscles (*bughdolookk'a*) are less preferred because they are too sinewy. The foot sinew (*bakkaaltɬ'aagga'*) can be used for sewing, but it is not used often. The bones may be pulverized and boiled for grease, and the marrow is removed for eating.

Ribs (Bones and Meat, *Bakkokk'a'*; Meat outside Ribs, *Bakkokkɬ'in'*)

The ribs are considered one of the best parts of moose or caribou. All rib meat is either dried or cooked, often for special occasions.

Brisket (*K'its'iyeetl'ina'*)

The brisket is excellent meat; it is prepared by boiling.

Belly Meat (*K'itsokkliɬ*)

Belly meat is dried or boiled for a long period before eating. It is considered very good meat.

Lungs (*K'idzaaloodla'*)

The lungs are sometimes cut into thin strips and boiled with meat, but they are primarily used for (cooked) dog food. The trachea (*k'iloɬ*) is given only to dogs.

Liver (*K'ikol'ona*)

The liver is cooked and eaten.

Omasum (*K'idee'ona'*)

This organ, often called "The Book," is boiled and eaten.

Large Stomach (*K'ibił*)

The large stomach is not eaten, but it may be filled with blood from the kill, frozen, then chopped up for dog food.

Intestines (*K'its'eega'*)

The upper (large) intestine is not used except for dog food. When the lower intestine has much fat, it may be turned inside out and boiled with the fat inside, then eaten like sausage. The fat is also eaten raw or used in cooking.

Kidneys (*Baggoldzeeda*)

The kidneys are fried or roasted for eating (if they are not from a rutting bull).

Heart (*K'idzaaya'*)

The heart is cooked or dried, but is tabooed for children or young people. The membrane surrounding the heart (*k'idzonoth*) is dried then used for an all-purpose bag to store things in.

Blood (*K'ilkkona*)

The blood was traditionally cooked and eaten or boiled with meat; it is used for dog food today.

Udder (*K'ituga'*)

Milk from the udder was formerly used as food.

Fat

Body fat (*bakk'ah*) and mesentary fat (*binoot*) is a highly prized food; it is eaten dried or cooked, usually with meat. Grease (*baghaa'*) is rendered from fat by frying or boiling and is eaten with meat. The cooked fat that remains is also eaten. "Indian ice cream" is a great delicacy prepared from moose grease and other ingredients (see appendix D for recipe).

Antlers (*K'idaa'*)

The antlers are made into awls, platters, spoons, knife handles, other tool handles, and a variety of miscellaneous objects.

Hide (*K'ilił*)

Moosehide is almost as important as the meat. Koyukon women continue to tan their own hides and use them for sewing a multitude of items. Moose skin with the fur intact is used for mattresses, the hair alone is mixed with waterfowl feathers for mattress stuffing, and rawhide from moose skin is used for sled and snowshoe lashings. Meat sliced from the hide when it is cleaned for tanning (*k'agooth*) is cooked for eating.

Caribou hide is a very important clothing material. The leg skins are especially important today for making warm winter footgear. Entire hides are used for camp mattresses. Caribou rawhide is used for fine snowshoe lashings and other general purposes. Botfly larvae from caribou skins were eaten formerly.

Black Bear and Brown Bear

Basic anatomical terms are the same for all animals, and so only a few specialized terms are listed below. Uses of black and brown bears are essentially identical, except that brown bear meat is completely tabooed for use by women.

Head

The head is roasted on a stick or boiled; this cooking is always done in the woods to avoid tabooed contact with women. After cooking, the face muscles, cartilage at the base of the ears, and fat behind the eyeballs are eaten. The lower jaw and tongue are tabooed for all except old men. The brain is tabooed completely, and the teeth are not used.

Neck

The meat is a delicacy, and it is reserved for use at "bear parties." Neck meat is tabooed for women, and meat from the first joint behind the head is completely tabooed.

Foreleg and Shoulder

All of the foreleg and shoulder meat is eaten, but it is tabooed for women. This and other bear meat is prepared by drying, roasting, or boiling.

Bones

Bear bones are not used, and the marrow is not eaten.

Feet

The feet are esteemed food, often roasted over a fire at the men's bear parties. The forepaws are tabooed for eating by women who are not elderly; hind paws are also tabooed for young men. The claws (*k'inlogguna*) are usually discarded to ensure against their being dropped "just anywhere" and offending the animal's spirit. Today, they are sometimes made into necklaces for sale to "outsiders," however.

Backbone

The backbone meat is always reserved for bear parties, and it is tabooed for women. The sinew from the bear's back and legs is not used.

Pelvis and Hind Legs

All of the pelvis and hind leg meat is eaten, and the highly esteemed pelvis meat is usually saved for distribution at potlatches.

Tail

The tail can be eaten only by old women.

Ribs

The first three ribs are reserved for men at the bear parties; old people, however, can eat them at home. The rest of the ribs are theoretically eaten only by men, but today most women eat them too. Rib meat is a delicacy and often saved for potlatches. The brisket is also eaten, as is the belly meat; but the diaphragm is considered inedible.

Small Organs

The lungs, windpipe, and liver are considered inedible. Kidneys are eaten only by women, and the heart can be eaten by any adults (but it is tabooed to young people). Bear blood is not used. The *k'itaala'* (a foot-long organ between the stomach and liver) is eaten, but only by older people.

Stomach

Bear stomach is prepared by turning it inside out, filling it with fat-laced mesentary (*k'ikooya'*), tying the openings shut, and then roasted whole over a fire. The resultant "sausage" is eaten only by older men and women.

Small Stomach (*K'ikadlo Lodzida*)

The small stomach is a small, fatty "bag" situated like the omasum of a moose. After boiling or roasting, only old men are allowed to eat it.

Intestines

The first 3 or 4 feet of the intestines are discarded, and the rest is turned inside-out so the fat is inside, then it is placed on a fire to roast. The result is a sausage-like delicacy. Only hibernating bears are used this way, because their intestines are empty.

Fat

Back, body, organ, and mesentary fat are highly valued. They are cooked in a big pot to render grease; the solidified grease is eaten with meat. Bear grease was burned formerly in a shallow bowl to provide light.

Hide

Hides were formerly used by men only for mattresses, mittens, parka ruffs, and dog harnesses. Hides are seldom brought home today, because of the danger of offensive contact with young women who might disregard the avoidance taboo.

Wolf

Hide

Wolf hide is used locally for sewing parkas, mittens, winter boots, and parka ruffs. Like all fur animal hides, it is also sold to commercial interests.

Meat

The meat is never used today, but it was eaten formerly.

Red Fox

Hide

Fox hides are used locally for making parkas, clothing trim, and children's parka ruffs.

Meat

The meat of the red fox used to be eaten during times of shortage.

Marten

Hide

The hide is used for making the characteristic Koyukon men's hats and for clothing trim.

Meat

The meat was formerly eaten during times of shortage.

Short-tailed Weasel

Hide

The hide is used for clothing trim.

Meat

The meat is not used.

Least Weasel

Hide

The hide is dried with skull intact and kept as a powerful amulet.

Meat

The meat is not used.

Mink

Hide

The hide is used for making mittens, women's hats, clothing trim, and (formerly) summer pants.

Meat

The meat is eaten occasionally, more often in former times.

"Castor" (*K'its'eela*)

Castor is used for mink and weasel trapping bait.

Wolverine

Hide

The hide is used only for men's parkas and boot trim and for the trim and inner ruff on men's or women's parkas.

Meat

During starvation times, the Yukon River Koyukon were known to eat wolverine meat (Sullivan 1942:100).

River Otter

Hide

The hide is used for making men's boots, mittens, parka and boot trim, and (formerly) summer pants. It is tabooed for women to wear river otter hide.

Meat

The meat was formerly well regarded as food, but it was tabooed for consumption by women.

Lynx

Hide

Used for making men's parkas, mittens, and caps, lynx hide is taboo for women and children to wear.

Meat

The meat is highly regarded as food, but it is strictly tabooed for women.

Beaver

Hide

Beaver hide is used for making parkas, mittens, caps, and clothing trim.

Meat

The meat is considered rich and delicious. Beavers are taken as much for the meat as for the hide.

Tail

Beaver tail is considered a delicacy.

Feet

The hind feet are boiled and eaten, although they are supposed to be avoided by all except old people. The fore feet are not used.

Organs

Only the liver and kidneys are eaten, but the remainder of the viscera provide a very rich dog food. The castor is often used as trapping bait.

Muskrat

Hide

The hide is used for making parkas, mitten lining, clothing trim, and (formerly) summer pants.

Meat and Organs

The meat of the muskrat is highly esteemed. The liver, head, feet, and tail (tabooed for young men) are also eaten. The remaining parts are used as dog food. Muskrat "castor" is used as an ointment to heal sores.

Porcupine

The meat of the porcupine is highly regarded as food, but the head and organs are discarded. Quills were used traditionally in decorative sewing.

Red Squirrel

Hide

The hide was used previously for making parkas, mitten linings, and pants.

Meat

Although it was apparently eaten in former times, some people say the meat is tabooed for use as food.

Arctic Ground Squirrel

Hide

The hide can be used for making parkas, mittens, and hats, but it is rarely available.

Meat

The meat is eaten when available.

Hoary Marmot

Hide

The hide can be used to make parkas, pants, hats, and socks.

Meat and Fat

Both the meat and the fat are excellent food, but the fat is so rich that only small amounts are eaten. The fat can be rendered to make a clear oil that is used like seal oil.

Snowshoe Hare

Hide

The hide of the snowshoe hare is used for making socks, mitten liners, and clothing trim. It was formerly cut into strips and woven to make blankets and clothing.

Meat and Organs

The meat, heart, head, lungs, liver, and intestines are eaten.

Lemming

An unidentified species of lemming (*minomintłogga*) is used as an amulet after drying its skin with the skull intact.

Birds

Loons, Grebes, and Mergansers

Meat and Organs

The meat from loons, grebes, and mergansers is eaten, but the head, feet, and viscera are not utilized. Only old people eat common loon, arctic loon, red-throated loon, and red-necked grebe, because the clumsiness of these birds on land would be contagious for young people, adults, and unborn children.

Skin

The skin, with feathers, is sometimes used to make cushion covers. Dried and stuffed common loon, arctic loon, and male red-throated merganser skins are sometimes kept as objects of beauty. Yellow-billed loons are rarely seen, but they become good luck amulets for the few who take them.

Geese and Ducks

The following uses apply to all geese and ducks:

Meat

All of the meat is eaten, except the distal portion of goose wings. Various preparations consist of boiling the meat as a thin soup or stew, roasting it, or drying it to be boiled later. The use of all species is unrestricted by taboo, except the heavy-bodied oldsquaw which is tabooed for young people. (For a list of utilized species, see appendix A.)

Organs

The gizzard, stomach, intestines, liver, head, and feet are cooked and eaten. Pintail ovaries should be eaten by young girls, because the duck lays its eggs easily and eating this organ will cause easy parturition.

Eggs

Unhatched eggs were formerly cooked and eaten, but they are rarely gathered today. Eggs from inside female ducks were also eaten, but they were tabooed for young people because they would cause clumsiness.

Feathers and Skins

The feathers are used for stuffing quilts, mattresses, pillows, parkas, and socks. Dried wings are used for brooms. Common goldeneye and harlequin duck skins may be stuffed and kept for decorative purposes.

Grouse and Ptarmigan

Ruffed grouse, spruce grouse, and willow ptarmigan are all utilized in essentially the same way, and they are unrestricted by food taboos. People eat the meat, head, heart, gizzard (raw or cooked), and intestines (either cooked or raw with fecal pellets inside). The feathers may be used for stuffing pillows or quilts, but using ptarmigan

feathers is taboo because they could cause one's hair to become gray early.

Sandhill Crane

All the sandhill crane meat is eaten, without taboos; but the viscera, head, and feet are not utilized. Skin from the legs was formerly used as reinforcing strips in clothing seams.

Shorebirds

Lesser yellowlegs are eaten, often boiled with waterfowl or roasted on a stick; they are good for children because the bird's cleanliness will be transferred to them. Spotted sandpipers and semipalmated plovers were formerly eaten, but they are rarely (if ever) used today.

Gulls and Terns

The meat and eggs of the Bonaparte's gull and arctic tern are, and may have been formerly, eaten—but only by old people. Use by young people or adults would cause clumsiness or may cause their children to be clumsy. Mew gulls and herring gulls are universally tabooed because of the possibility of clumsiness, but old people can eat their eggs.

Owls

The meat of the great horned owl, great gray owl (rarely seen), hawk owl, and snowy owl is boiled or roasted for eating. All except the hawl owl are considered clumsy, so they are used only by old people. Owls are not often taken, but their meat is highly regarded.

Yellow-shafted Flicker

The yellow-shafted flicker is rarely seen, but it is shot when possible so that its skin can be kept as a powerful amulet.

Songbirds and Swallows

No songbird is regularly used today, but the pine grosbeak, varied thrush, gray-checked thrush, Swainson's thrush, and robin continue to be boiled and eaten. Eggs of these and other migratory birds are also eaten, but those of resident birds are never disturbed because of taboos. Swallows (probably only bank swallows) are occasionally caught by hand at their burrows and roasted on sticks. They taste excellent and should be eaten by young girls to make them (or their children) pretty.

Fish

Sheefish

The meat, skin, eggs and liver of the sheefish are eaten. The stomach, head, gills, air bladder, and testes are only used as dog food. Preparation of the edible parts is by boiling, frying, roasting, or drying.

Whitefish and Grayling

The broad whitefish, Alaska whitefish, least cisco, round whitefish (from the upper Koyukuk only), and grayling are all utilized in essentially the same way.

Meat

Whitefish and grayling are eaten boiled, raw-frozen, fried, roasted, and dried. The meat is used for making "Indian ice cream."

Skin

The skin is eaten with the cooked fish.

Organs

The eggs, head (cheeks and eyes), and "round stomach" (*ɬookk'a dzeeda'* found only in grayling, broad whitefish, and Alaska whitefish) are eaten. The stomachs are not eaten but many are boiled or fried together to render grease to be used with other foods. The gills and testes are not used.

Salmon

Meat

Salmon is eaten boiled, roasted, fried, baked, and dried.

Skin

The skin is eaten with cooked fish; or, after the dried meat is eaten, the skin is roasted on a stick. Silver and king salmon skin was formerly used for making waterproof parkas, pants, and boots (Sullivan 1942:32) or for a children's vest that gave protection from harmful spirits (the species used is unknown). Pieces of dried skin are still used for such protection.

Eggs

Cooked or dried for eating, the eggs were also used for dog food and trapping bait.

Organs

Only the heart is eaten. All other organs are discarded or used for dog food. The air bladder was formerly stuffed with fish eggs, dried, and eaten like sausage.

Head

The eyes, cheeks, and jaw meat are eaten. Eyes from dried salmon heads are considered a treat, especially by children. Dried salmon heads are also heated to render oil that is used to cure skin sores.

Tail

Dried tails may be carried by children to protect them from dangerous spirits.

Alaska Blackfish

The meat, head (eyes and cheeks), eggs, and liver of the Alaska blackfish are eaten.

Northern Pike

The meat, head, liver, eggs, intestines, and air bladder of the northern pike are generally eaten. The belly meat and the liver are considered the best parts. Several methods of preparation include boiling, frying, roasting, and drying. Pike stomach was used traditionally for storing fish grease. The skin, gills, and testes are not used. Pike jawbones were formerly made into moosehide-encased bracelets which were worn by boys to make them good hunters (because pike catch prey easily). Dried pike heads were nailed on doors of remote cabins to protect against dangerous spirits.

Burbot (Louche)

The meat, head, eggs, and liver (the best part) of the burbot are cooked and eaten. The bulky eggs are tabooed for young people, lest their children have large, clumsy legs. Burbot stomach, intestines, and testes are not eaten.

Longnose Sucker

The meat, head (the best part), and liver of the longnose sucker are cooked and eaten. The air bladder and viscera fat are eaten raw (unfrozen). The eggs, testes, and other organs are not eaten.

Wood Frog

The wood frog is never eaten or harmed, but a live frog is sometimes placed atop someone's head for several minutes to cure a headache.

Vegetation

White Spruce

Wood

Dry spruce wood (*doditsits*), half-dry wood (*dil'aakk*), and live "green wood" (*ɬaanh*) are the principal sources of firewood used in most Koyukuk households. White spruce logs are also the major

material for most homes in this region. Lumber from split or rip-sawed spruce is used in making houses, boats, sleds, canoes, caches, tent frames, and countless other items. Rotten spruce wood (*kk'itodeeɬu*) is pulverized and mixed with rotten willow for smoking hides.

Boughs (*Aɬ*)

Spruce boughs are used for covering tent floors in camps and as insulative bedding for dogs. Dried, needle-less boughs (*k'itloo'*) provide excellent tinder for starting campfires.

Spruce Tops (*Ts'ibaa Tłee'*)

The tops are cut from small trees and carried for spiritual protection in certain places. They were used previously in shamanistic activities.

Needles (*Aɬbagga*)

The needles are boiled in water, and the resulting infusion is drunk to cure kidney problems or to obtain spirit power from the spruce. This may also be applied to heal dry skin or sores.

Bark (*K'ilot'oodza'*)

The bark is peeled from green trees to make camp floors, roofs, and tops for fish-cutting tables.

Roots

Small, supple roots (*hɯyh*) are used for lashing birchbark baskets; and large, woody roots (*k'aggaadla'*) are carved into spoons and bowls.

Pitch (*Dzaah*)

Soft, clear sap is put on sores as a disinfectant. Hard, yellowish pitch is chewed like gum. Both types can be used for waterproofing boat seams, or they can be mixed with fat to make "varnish." Pitch

was formerly burned in shamanistic curing sessions, yielding spiritual power from the spruce.

Black Spruce

Black spruce is an important source of firewood where burned stands are near villages. The trees are often used when strong, slender poles are needed—in fish racks and tent frames, for example, and for a variety of other purposes.

Willow

Wood

The larger willows are burned as firewood (especially in camps), hide and meat smoking, insect smudges, and outdoor dog food cooking. Willow poles are used for making fish racks and for other miscellaneous purposes. "Diamond willow" (Bebb willow) is used in decorative woodwork such as canes and lamp stands.

Branches

Supple branches of the diamondleaf willow are used in making birchbark basket rims. Withes are also used for making fish stringers, fish traps, and spreaders to hold drying fish open. Small shoots and stems of the littletree willow are peeled and scraped for sweet, edible sap.

Leaves

Young leaves of the littletree willow are eaten.

Bark

Willow bark (mostly from littletree willow) was used in the past for making rope and fishnets; it may still be used for lashing blackfish traps.

Balsam Poplar

Wood

Balsam poplar is an excellent firewood for camps because it does not throw sparks. It is also good for smoking meat and fish. Use for home heating is minimal because it burns too slowly and leaves too much ash.

Bark

Poplar bark is used for making fishnet floaters and may have been peeled in slabs for smokehouse floors and walls. The bark is also burned as a mosquito smudge.

Buds

Pitchy buds are boiled with spruce needles (or with highbush cranberries and rose hips) to make medicine for healing sores.

Quaking Aspen

Uses of the quaking aspen are the same as those of the balsam poplar. It is an excellent material for smoking meat and fish.

Paper Birch

Wood

An important firewood for home use, paper birch is preferred over spruce but it is less abundant. Rotten birch is occasionally burned to smoke meat or fish, but it may cause an undesirable flavor. Straight-grained birch is ripped or split to make lumber, especially for sled and snowshoe making.

Roots and Burls

The roots and burls are carved into spoons and bowls.

Bark

Birchbark is fashioned into baskets for local use or sale, and was used formerly in canoe making. Overlapping slabs of bark are sometimes used as a water-proof layer on dirt-covered roofs. Birchbark is also an excellent fire starter.

American Green Alder

Wood

Used commonly as a firewood in camps, American green alder is used rarely inside houses. Long ago, before steel axes and saws were introduced, alder and willow were the main firewood. An excellent wood for smoking meat and fish, alder is also used in some sled construction.

Bark

The bark is used on occasion to make red dye.

Berries

Thirteen berry-producing species are utilized by the Koyukon.

Northern Black Currant

Eaten formerly, the northern black currant is largely avoided due to its traditional association with the raven.

American Red Currant

The American red currant is eaten raw, usually when and where it is found.

Crowberry

Eaten when it is found in mountain areas, the crowberry is said to be helpful in relieving thirst.

Bearberry

Two species of bearberry are used. The berries are stored in moose fat or grease, and they are always mixed with fish, meat, or oil before eating.

Lowbush Cranberry

Lowbush cranberries are gathered in large quantities and eaten raw or used as an ingredient for "Indian ice cream." The berries were formerly crushed and spread on sled runners to make them slippery on the abrasive snows brought by winter west winds.

Bog Blueberry

The bog blueberry is the most extensively utilized berry; it is eaten raw and is used in making "Indian ice cream."

Bog Cranberry

The bog cranberry is eaten raw, usually when and where it is found.

Highbush Cranberry

Highbush cranberries are eaten where and whenever they are found, and the stems of the plant are used for making birchbark basket rims.

Nagoonberry

Highly esteemed, the nagoonberry is eaten raw when found.

Cloudberry

Cloudberries are considered very good eating, they are gathered whenever they are found.

Prickly Rose

The fruits of the prickly rose (rose hips) are eaten raw.

Sourdock

Early summer sourdock shoots are boiled and eaten.

Wild Chives

Wild chives are eaten raw, either alone or mixed with fish.

Grass or Sedge

Today, grass is used mainly for insulative bedding under sled dogs. It was formerly put inside boots for warmth, and it was also burned during shamanistic activites.

Moss

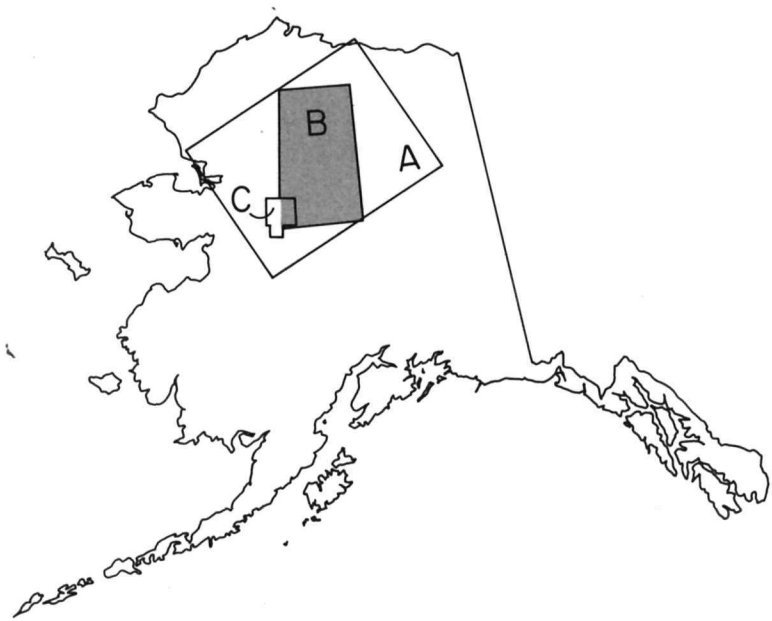
Sphagnum moss is used for log cabin chinking. Sphagnum and "lake bottom moss" insulate older cabin roofs, and they were formerly used for baby diapers.

Birch Fungus

A small, black type of fungus (*k'ididziyh*) that grows on live birch was used with flints for starting fires. A larger, denser fungus with a white underside (*kk'eeyh anee'onee*) grows on dead, rotting birch. It is regularly burned to repel mosquitos and gnats from camps or house areas, and it is said to keep bears away from campsites. A large, soft fungus with very white sides (*adzibaangit*) grows on dead birch. It is occasionally used as a pincushion.

Appendix F

SUBSISTENCE USE AREA



■ Cabin Site
Ⱥ Cache Site
△ Camp Site
⌓ Lookout Site
†† Fish Camp
✱ Firewood
⊟ House Logs
⚿ Timber

Direction Of River Travel
I Limit For Boat Travel

+++ FootTravel
•••• Trap Line
--- Winter Trail

(B) Bear Harvest
(C) Caribou Harvest
(Ca) Past Caribou Harvest Area
(Mr) Marmot Hunting
(M) Moose Harvest
(Sh) Sheep Harvest
(Wl) Waterfowl Hunting
(Wf) Wolf Harvest
(Wv) Wolverine Harvest

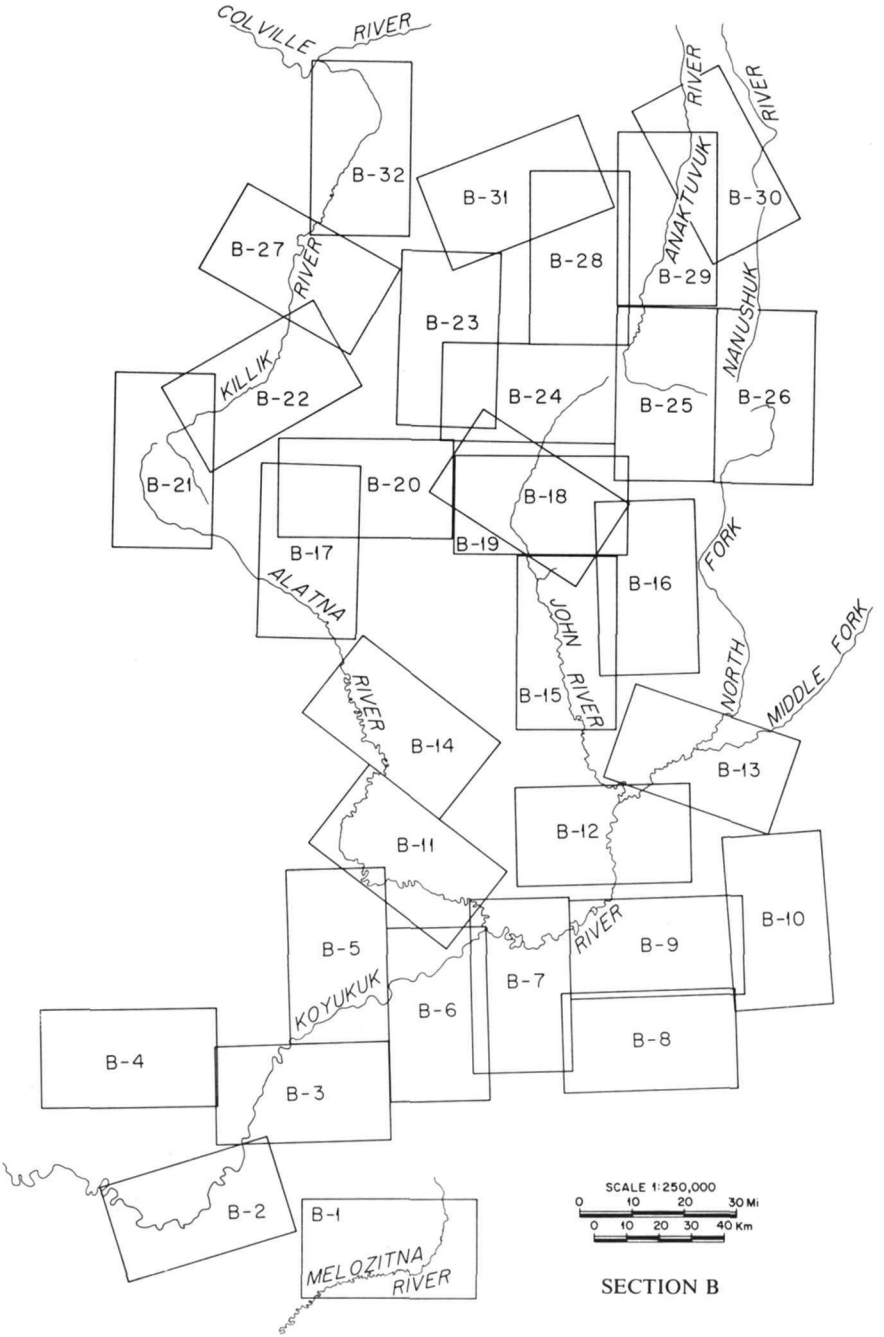
(Bv) Beaver Trapping
(F) Fox Trapping
(L) Lynx Trapping

Ss Summer Net Site
Ws Winter Net Site
Sn Summer Netting
Wn Winter Netting

[F] Fall Fish Trap
[Ls] Late Summer Fish Trap
[W] Winter Fish Trap

G Grayling Hooking
P Pike Hooking
Pn Pike Netting
S Salmon Fishing
◡ Seining
T Trout Hooking

By Berry Picking
Bb Bearberry Picking
Cy Cranberry Picking
Po Eskimo Potato Harvest
Rb Rhubarb Picking
Sy Salmonberry Picking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KILLIK RIVER
ANAKTUVUK RIVER
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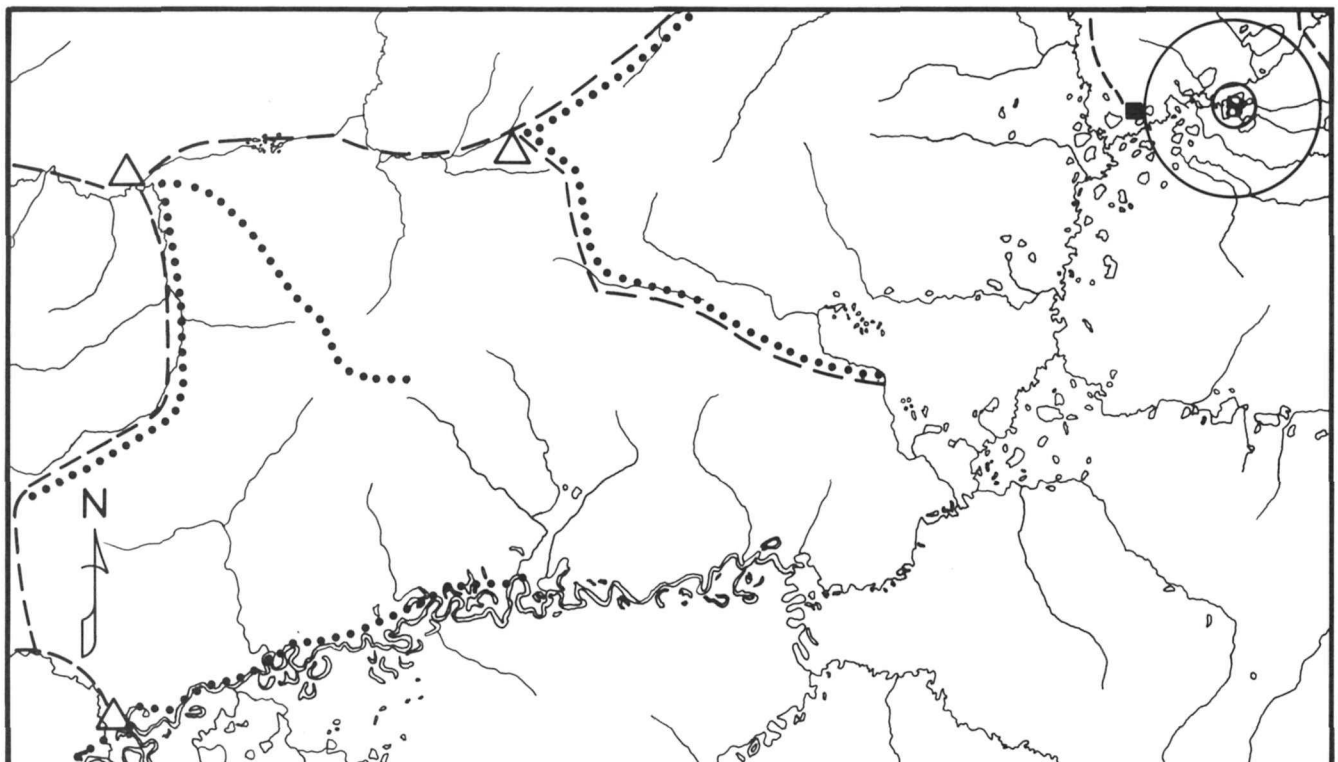

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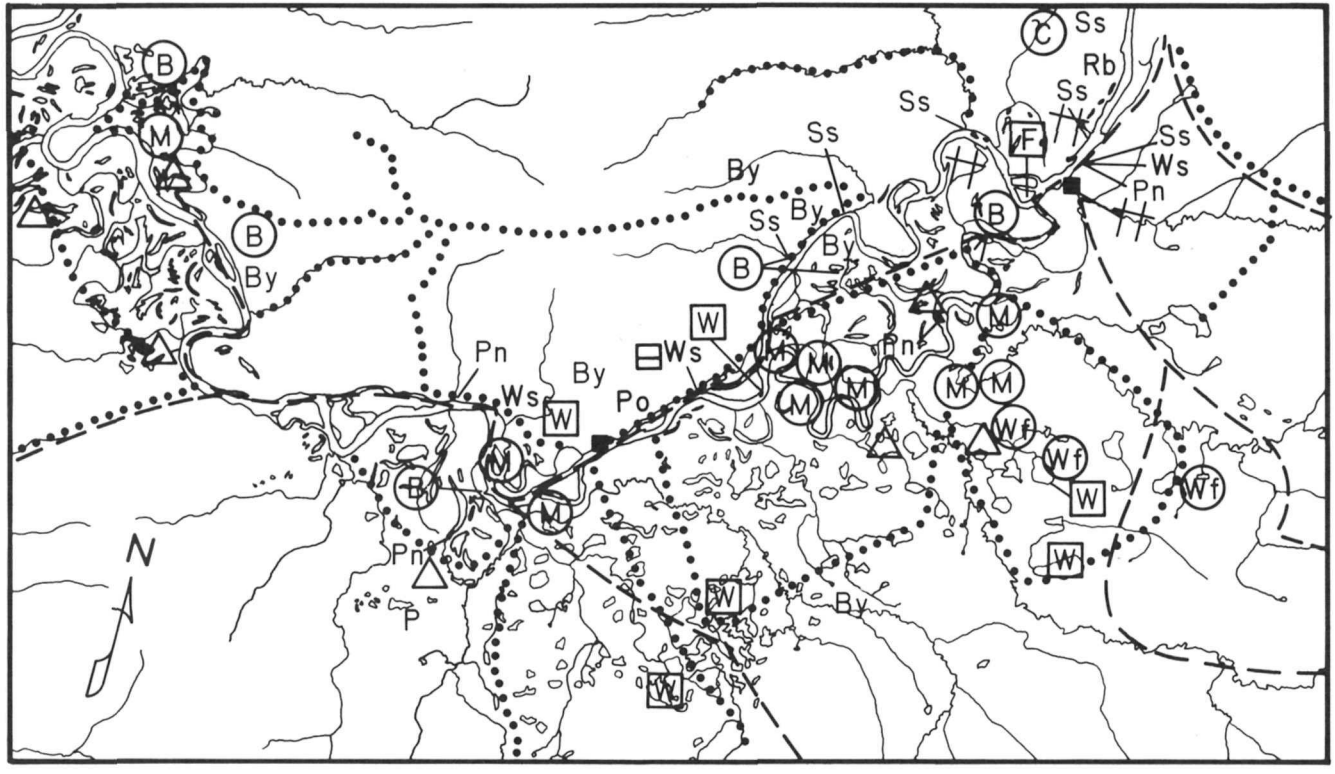
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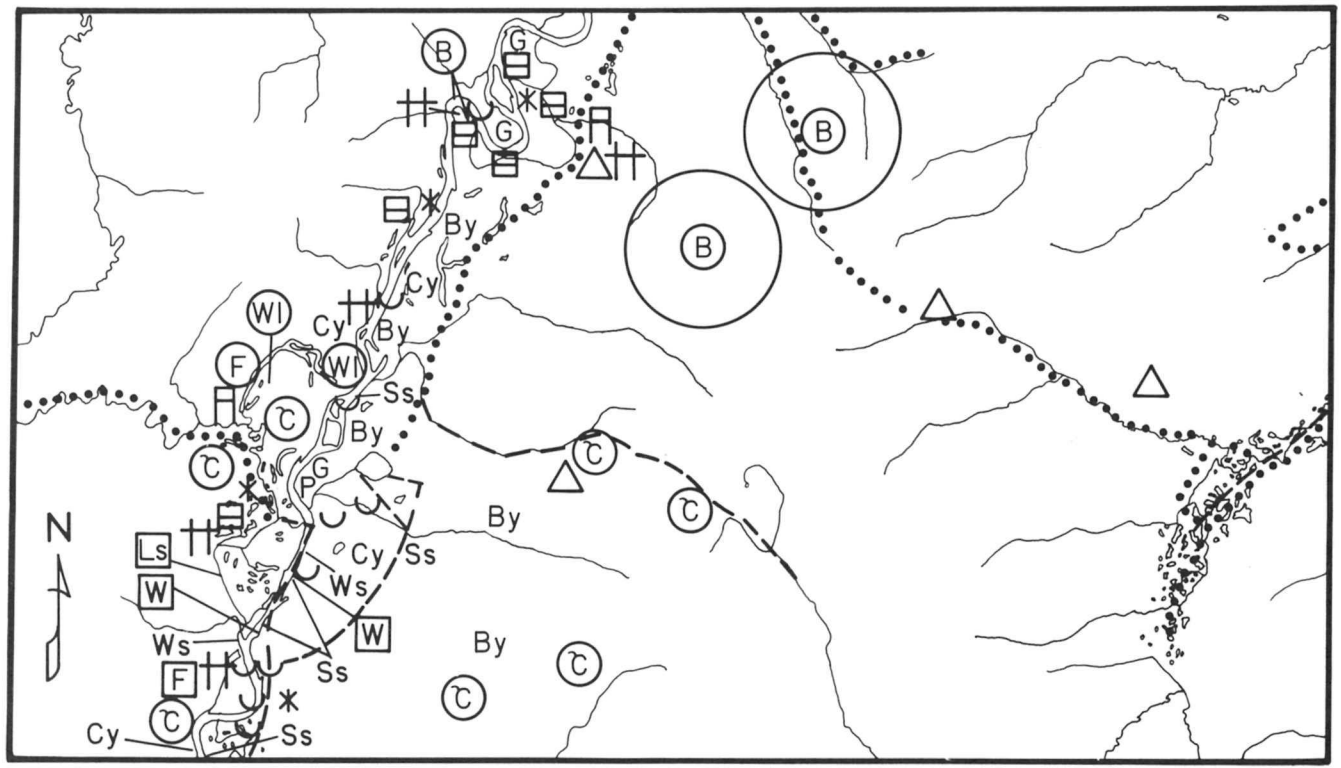
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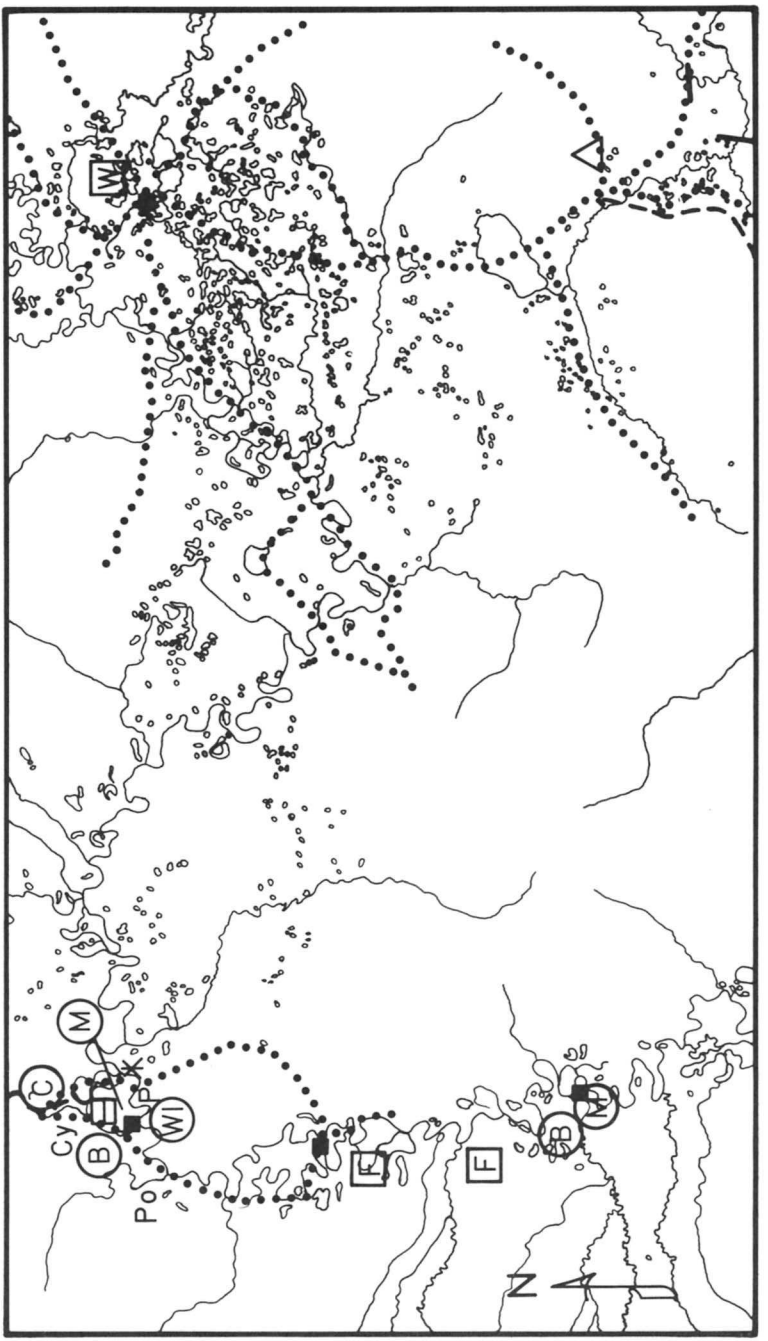

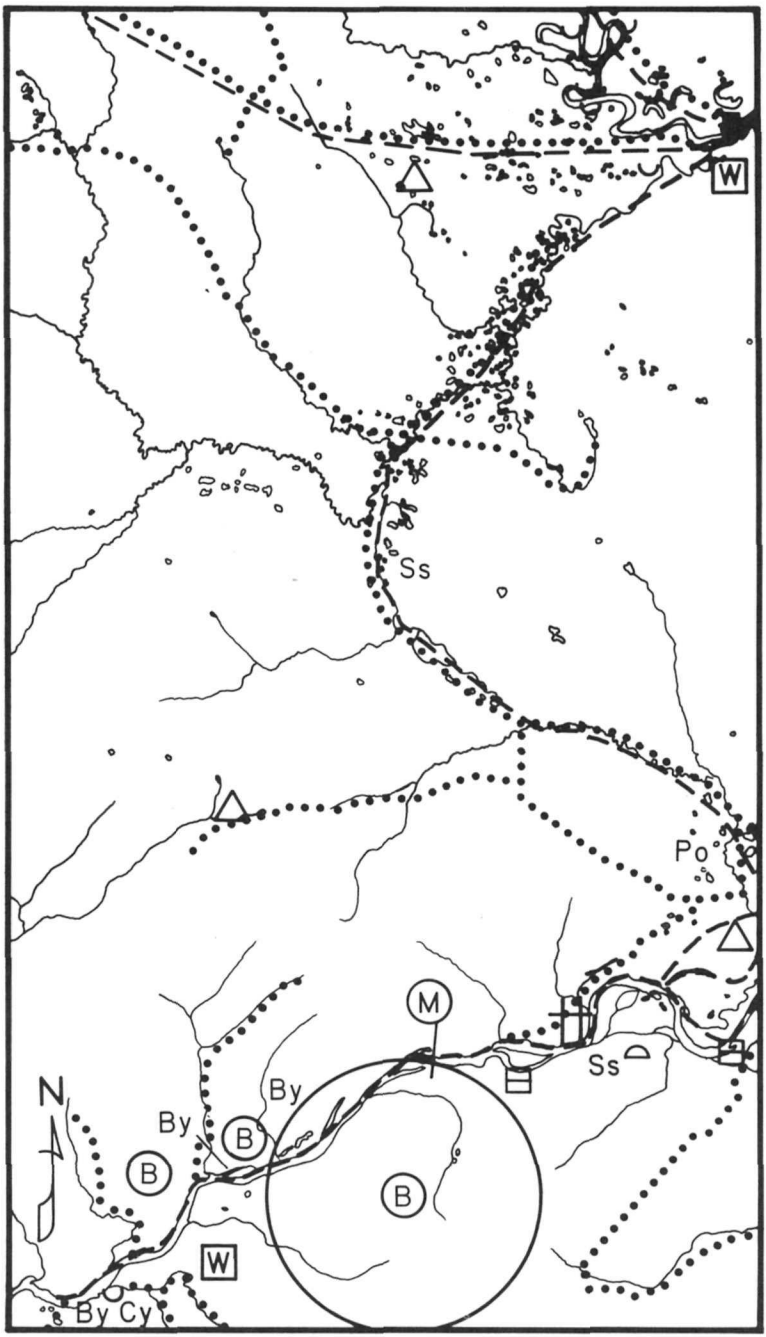

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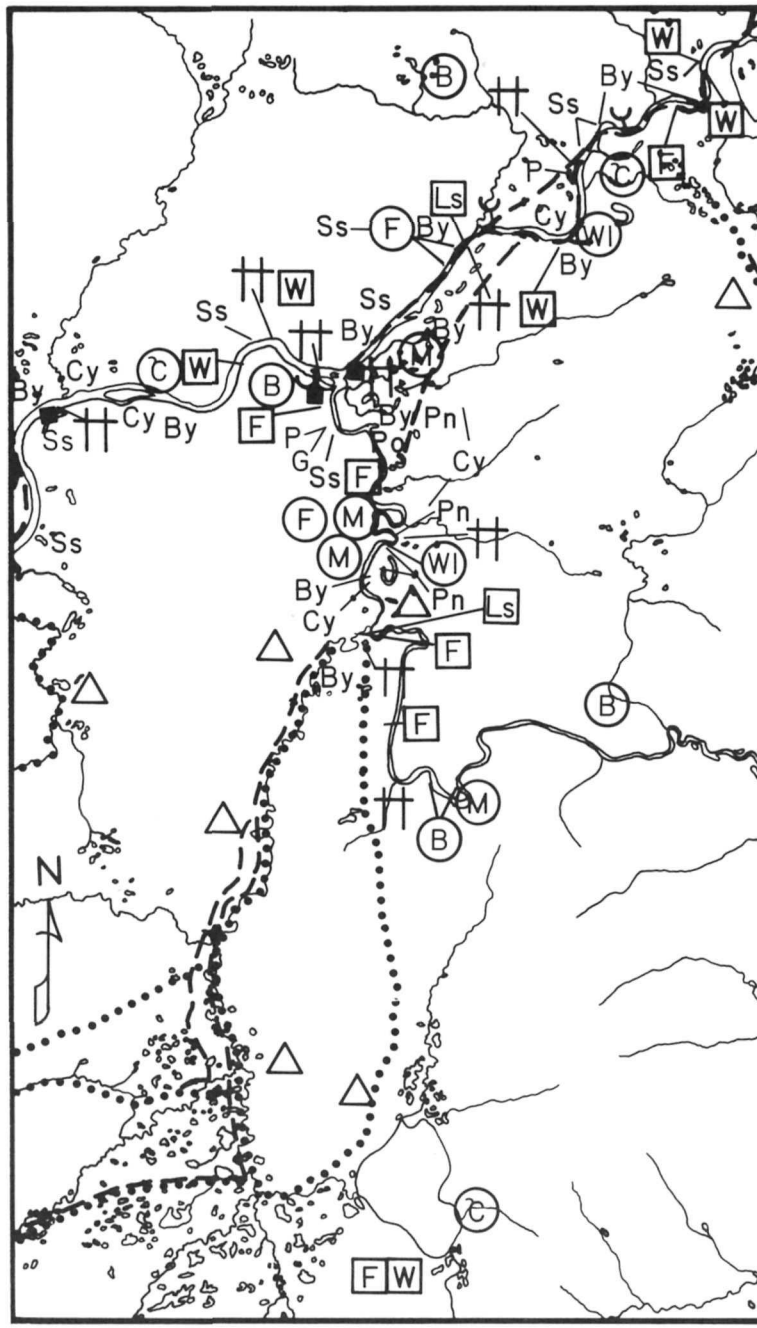
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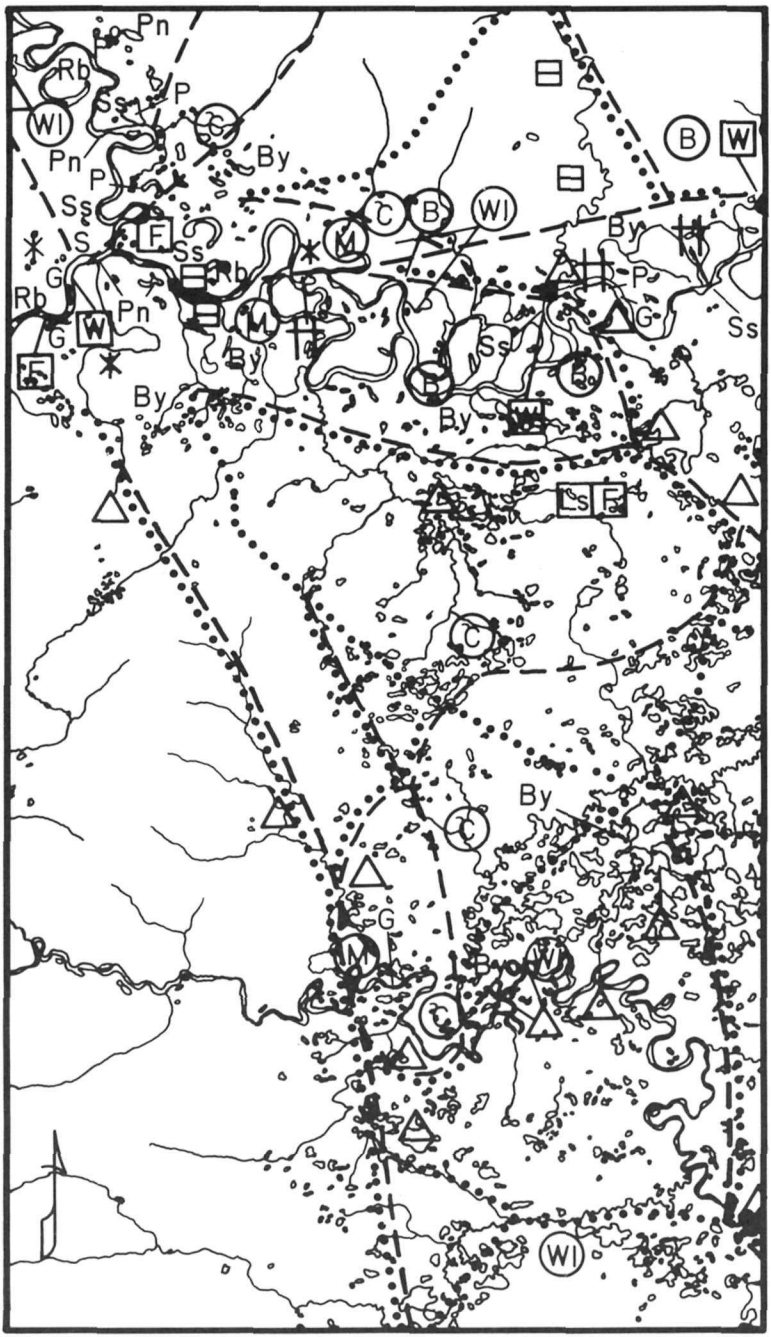

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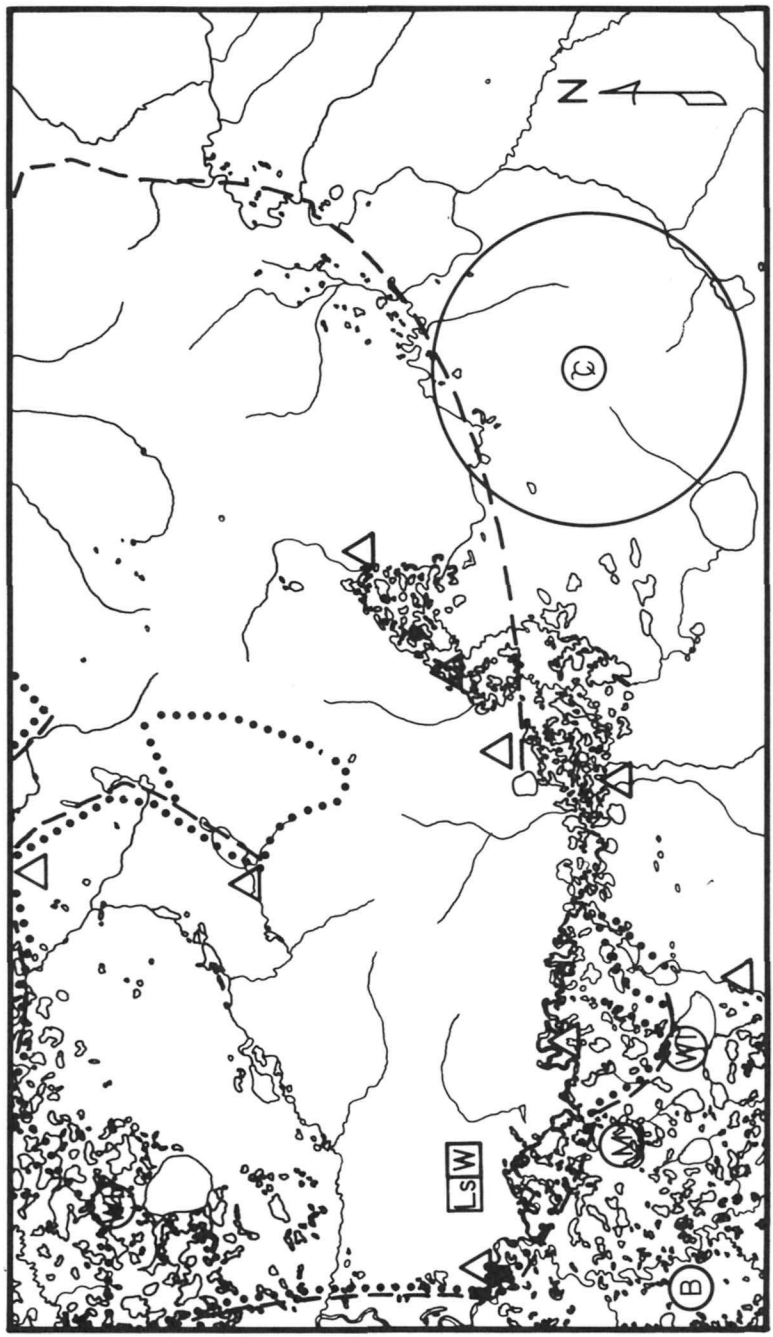

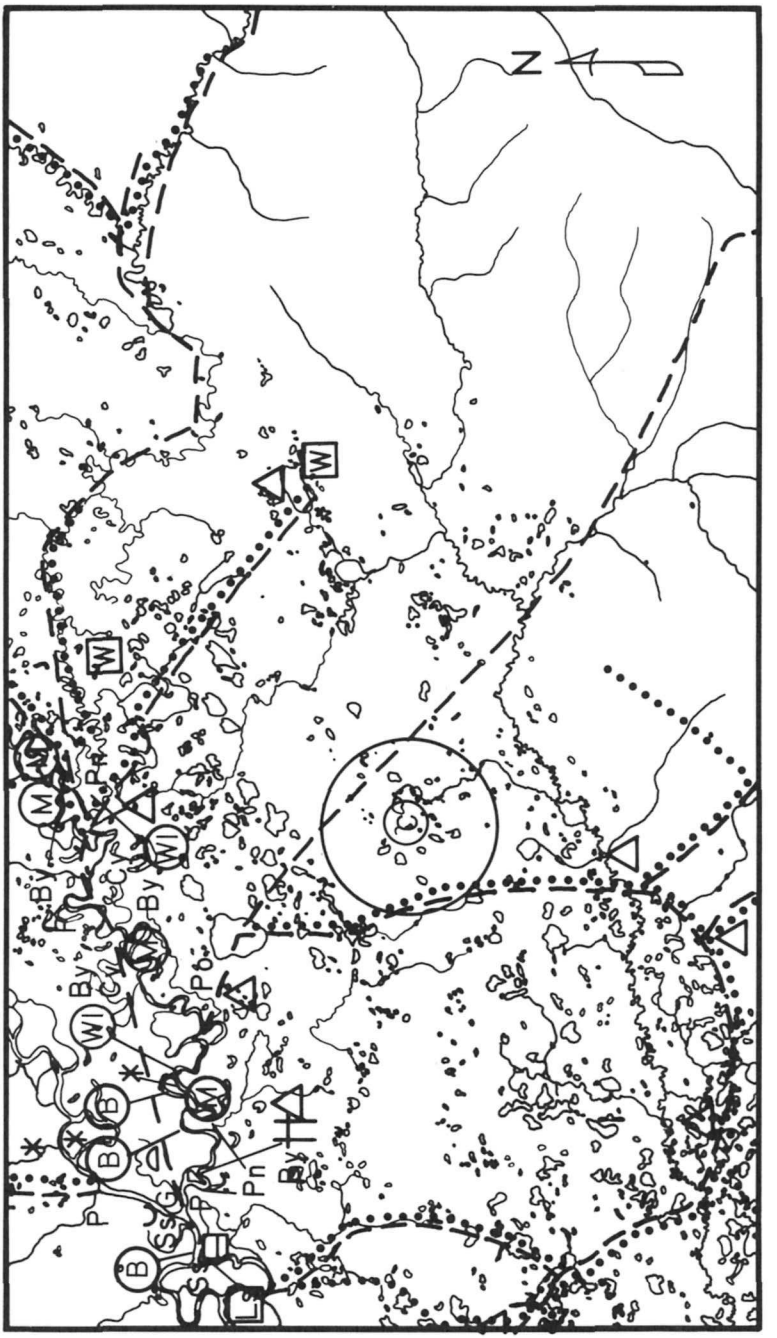

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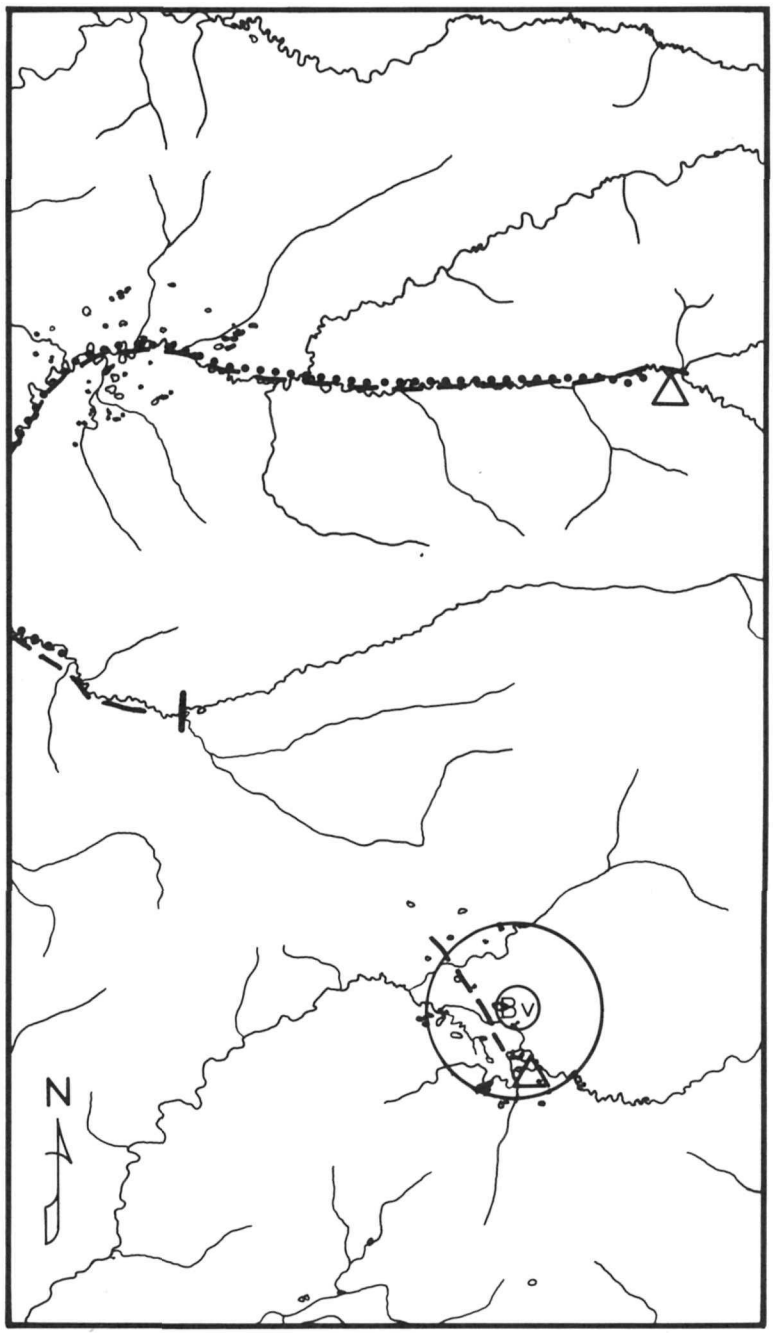

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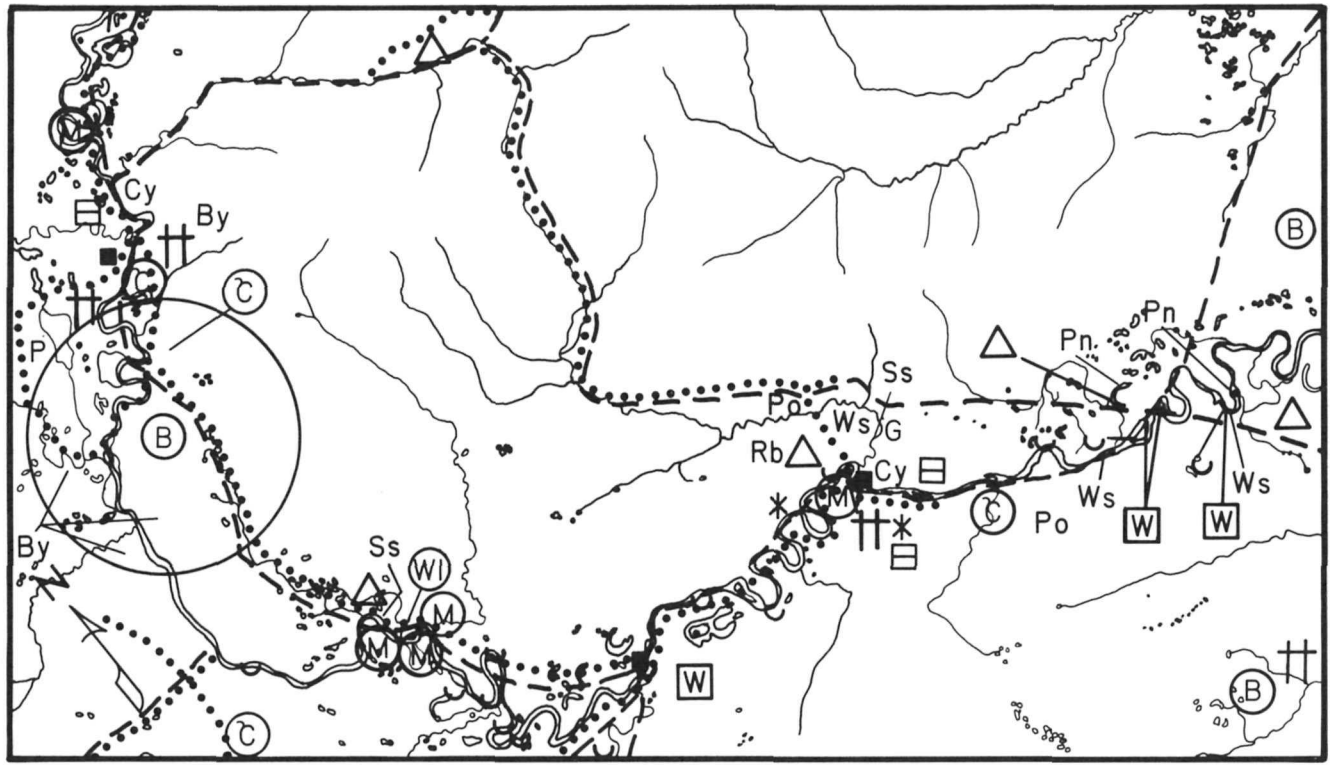

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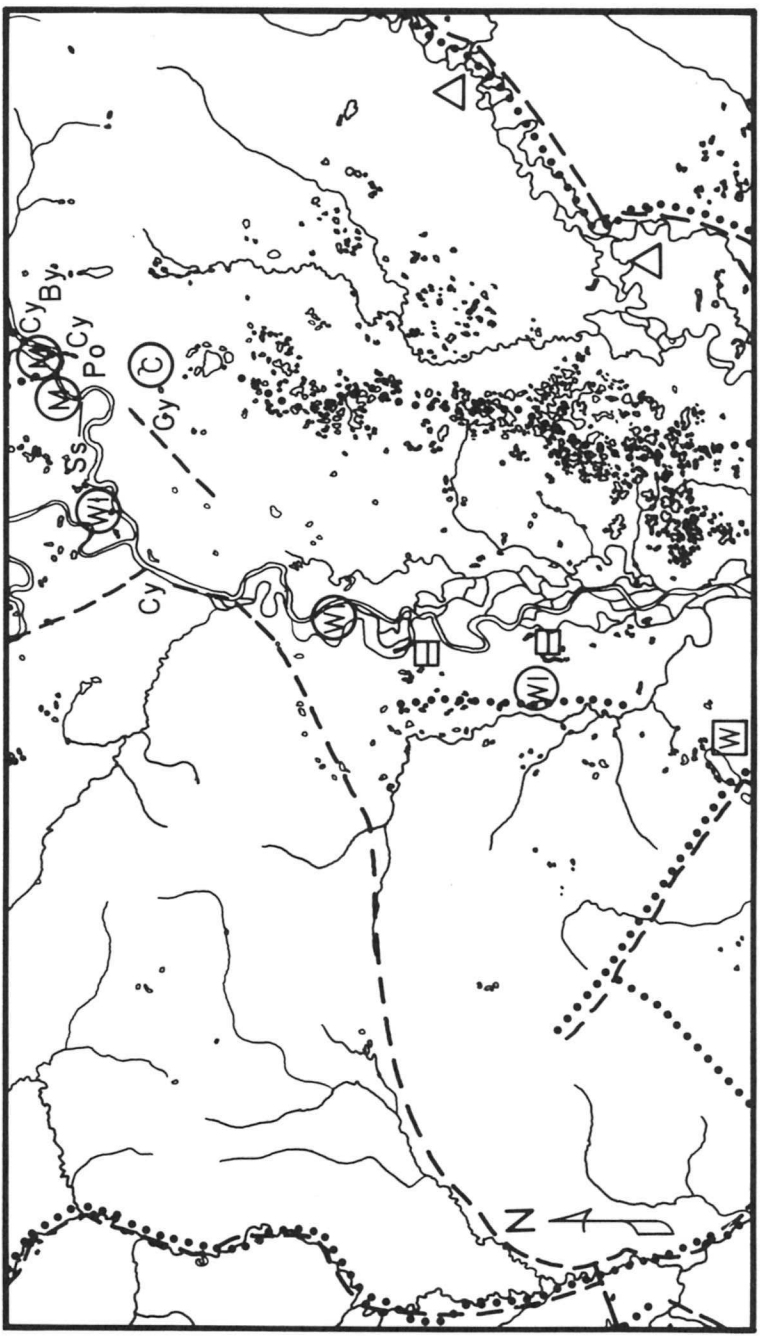

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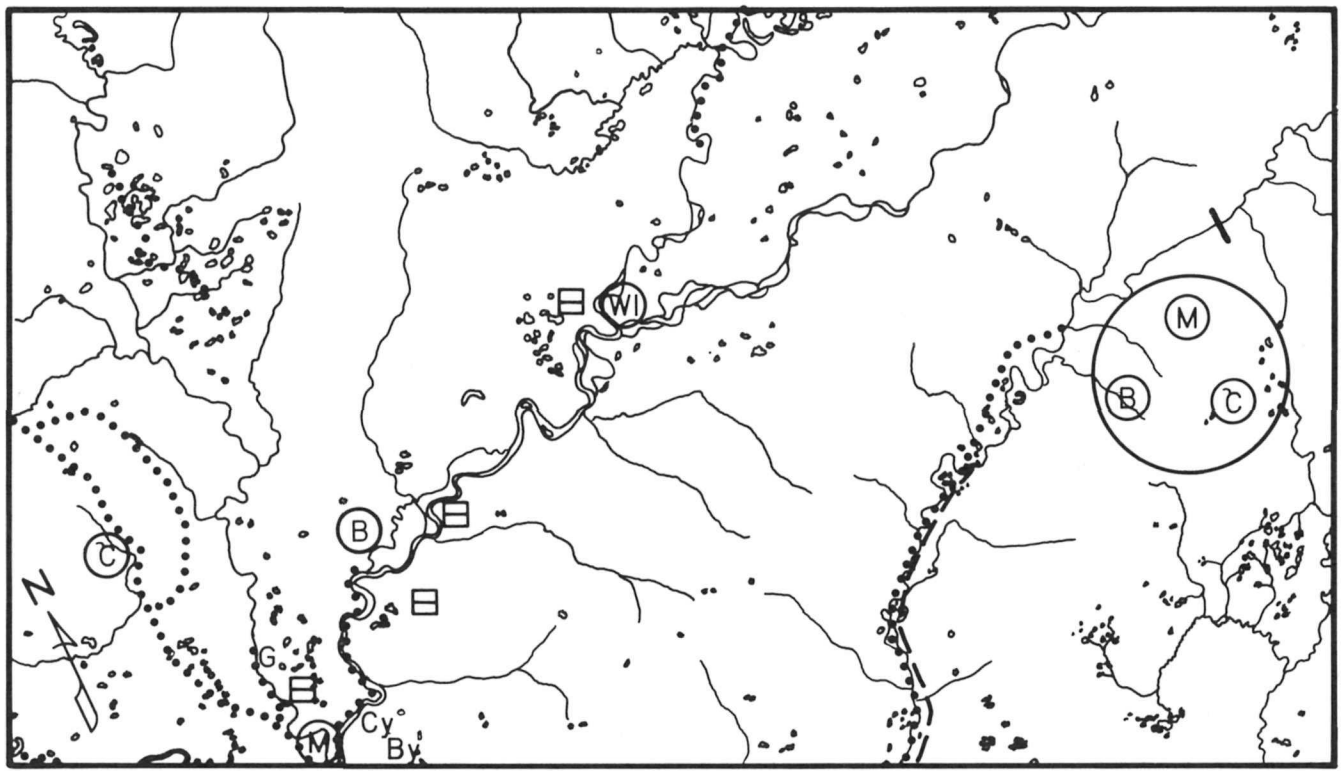

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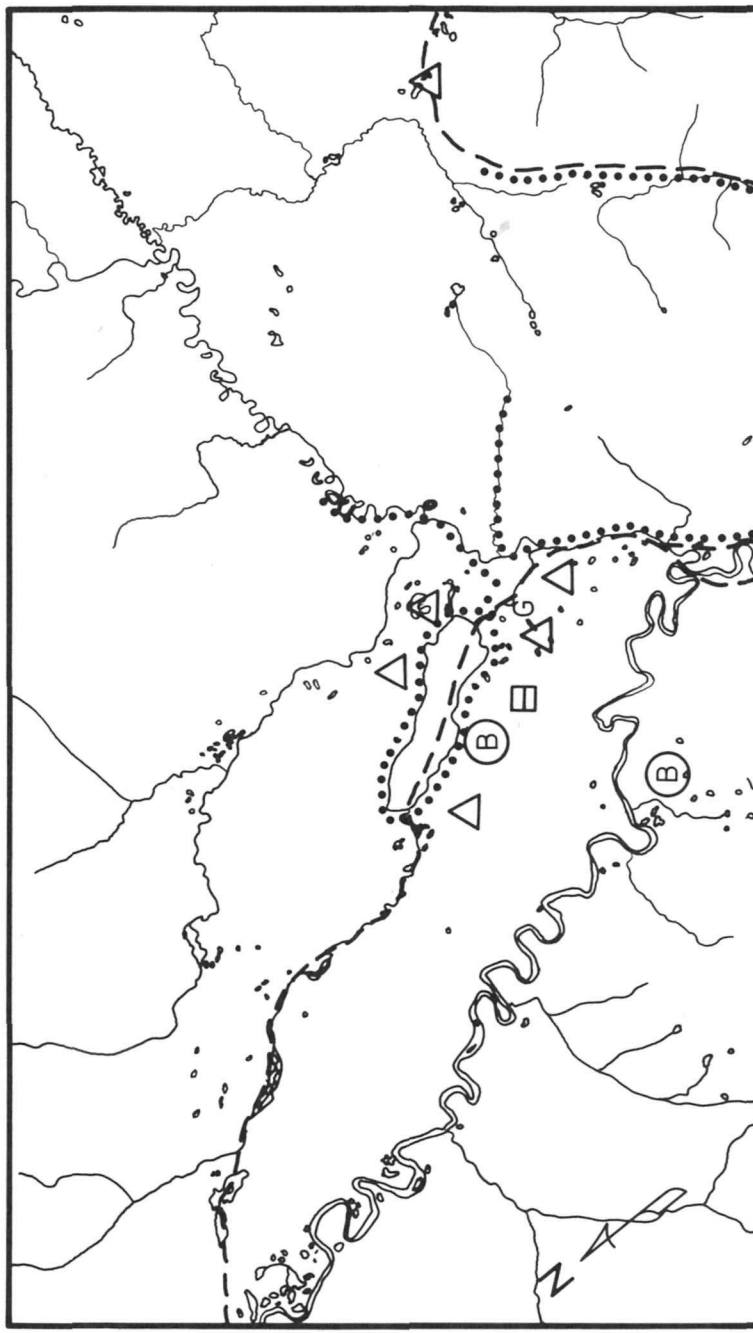

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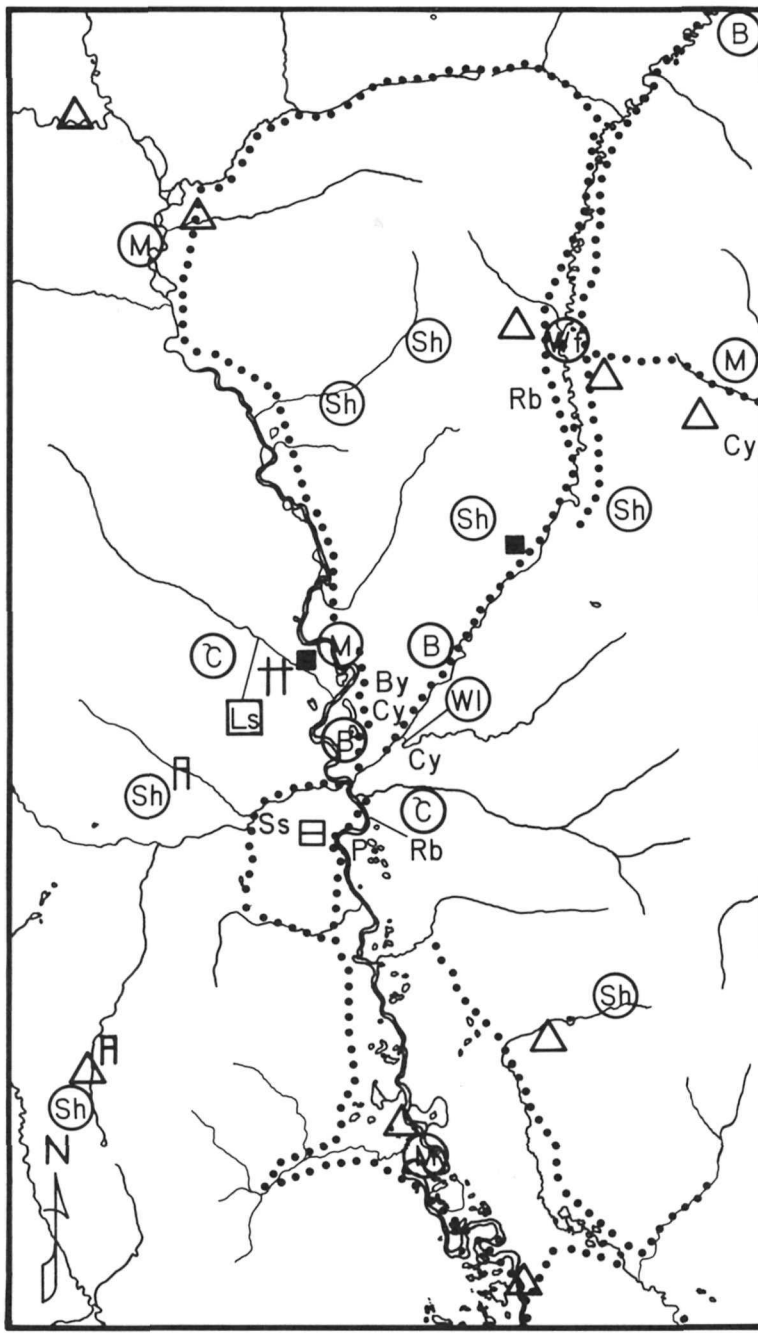

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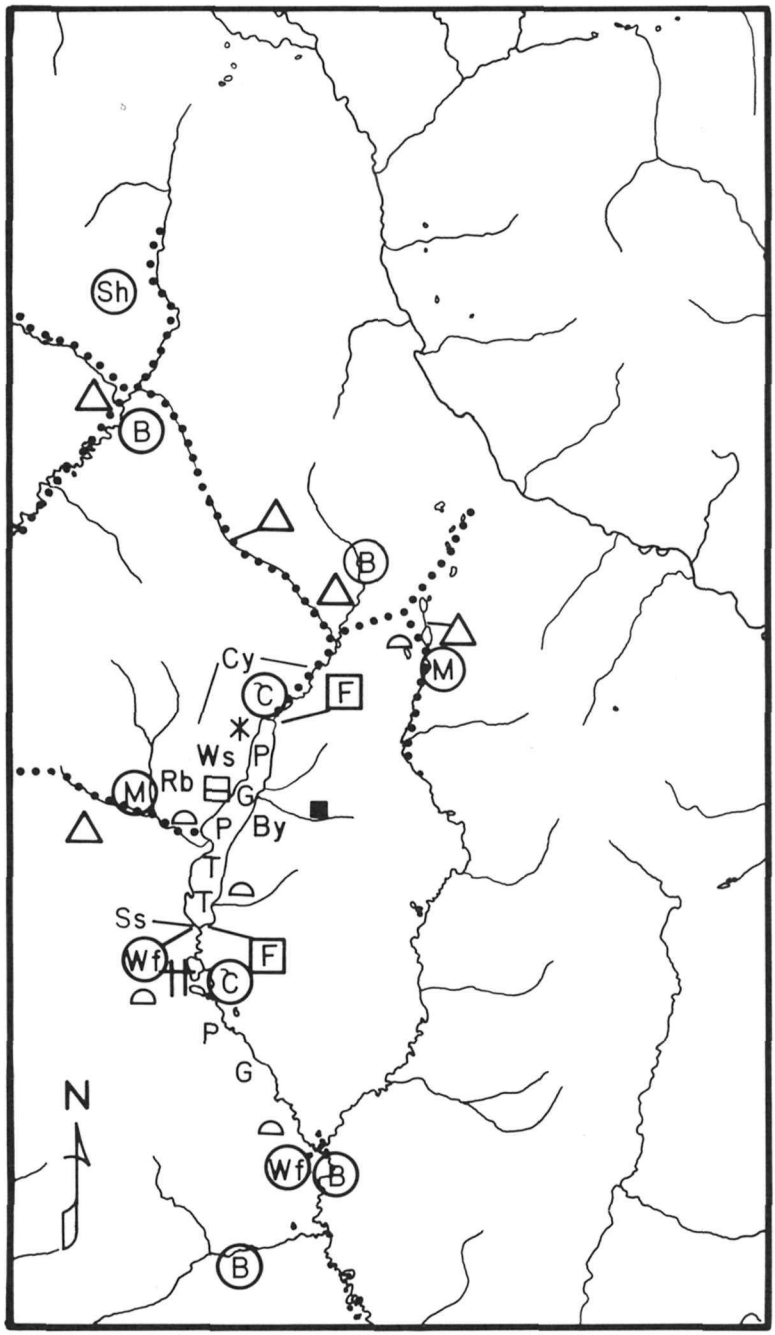

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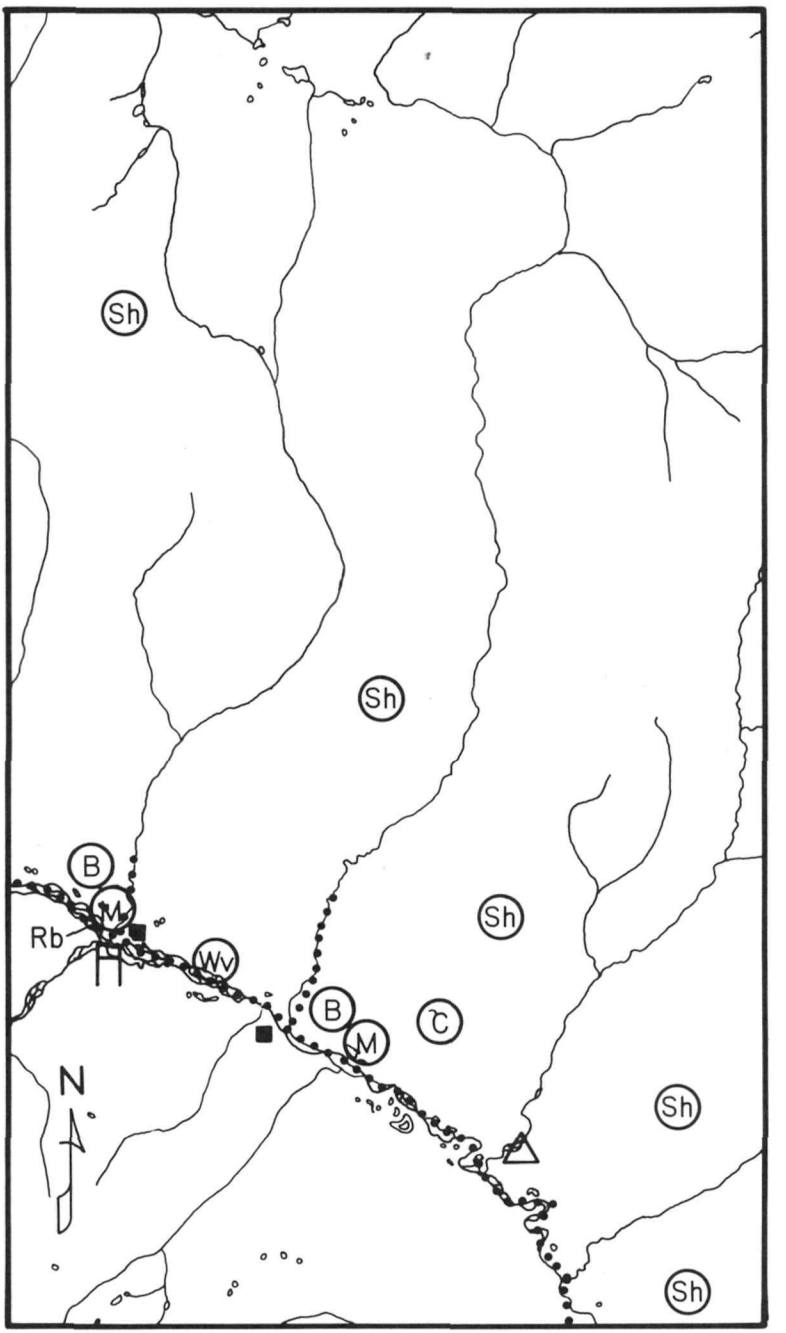

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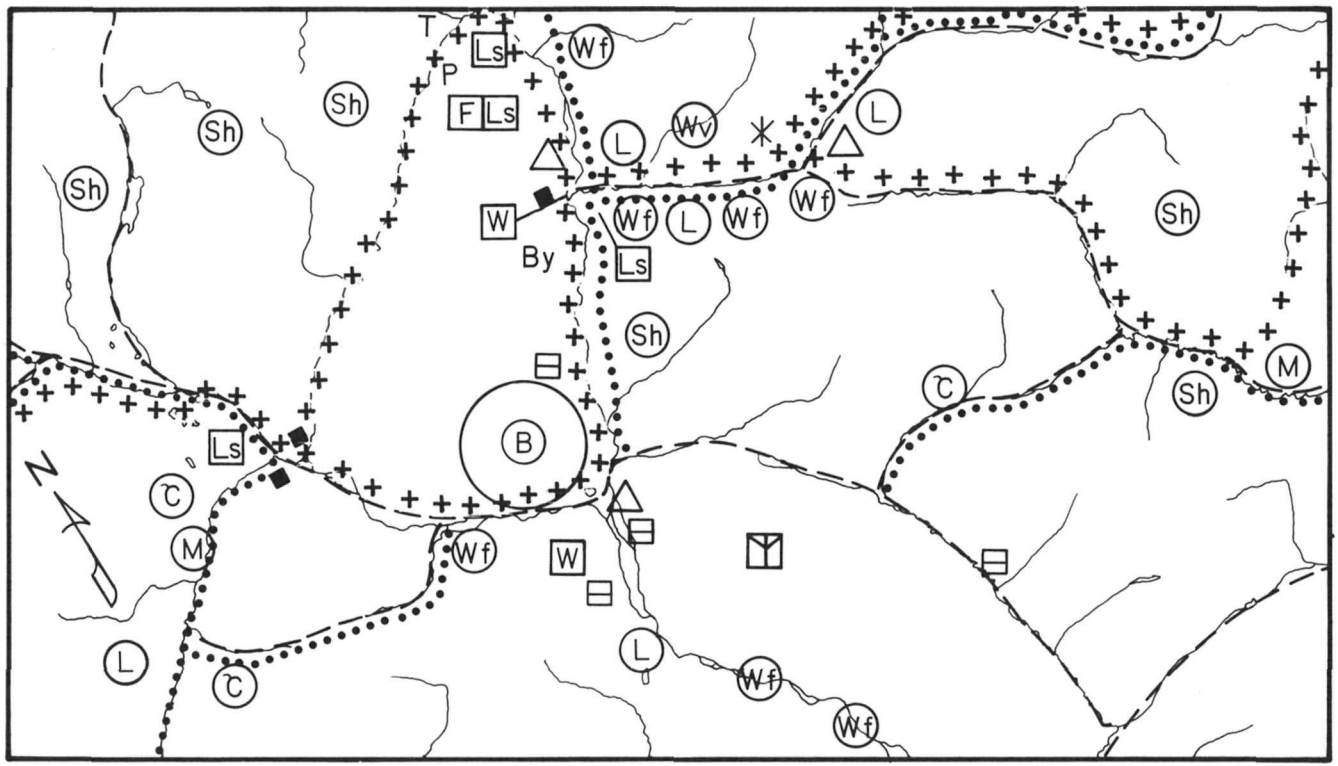
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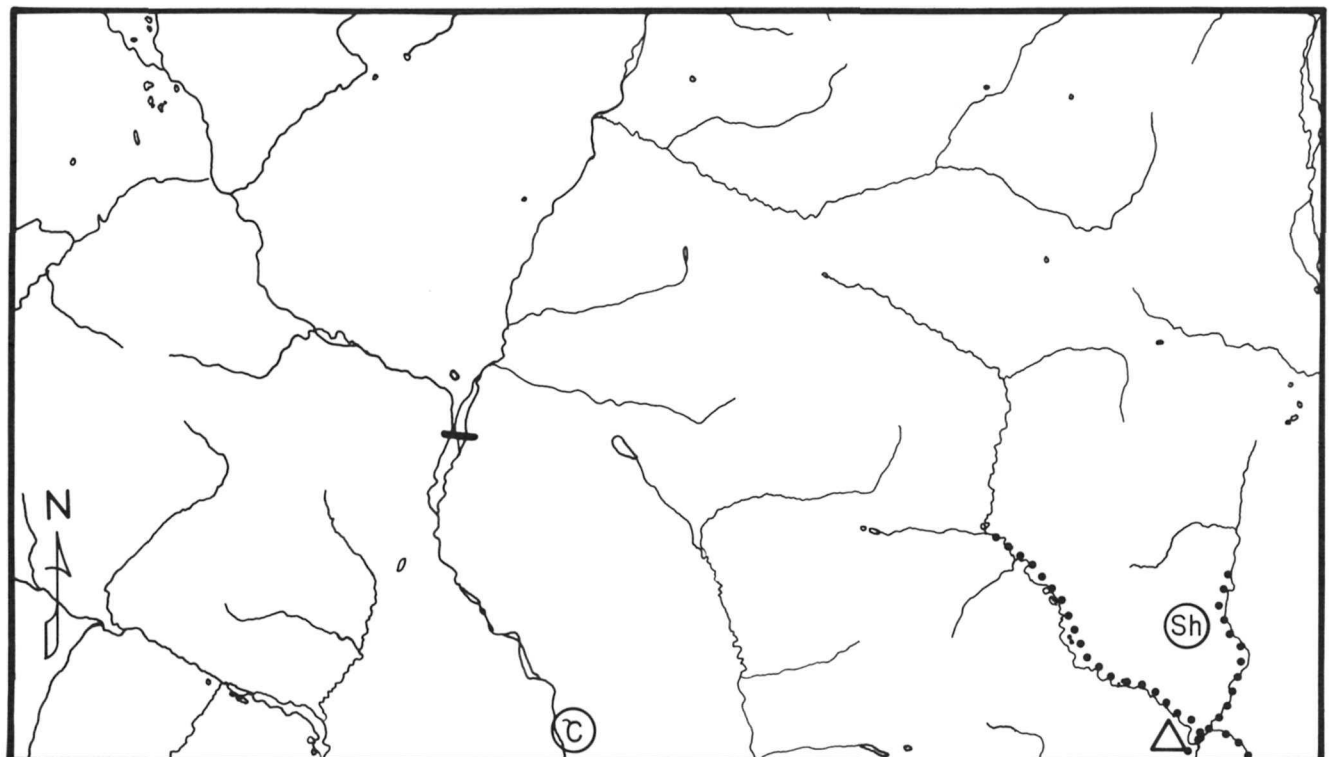

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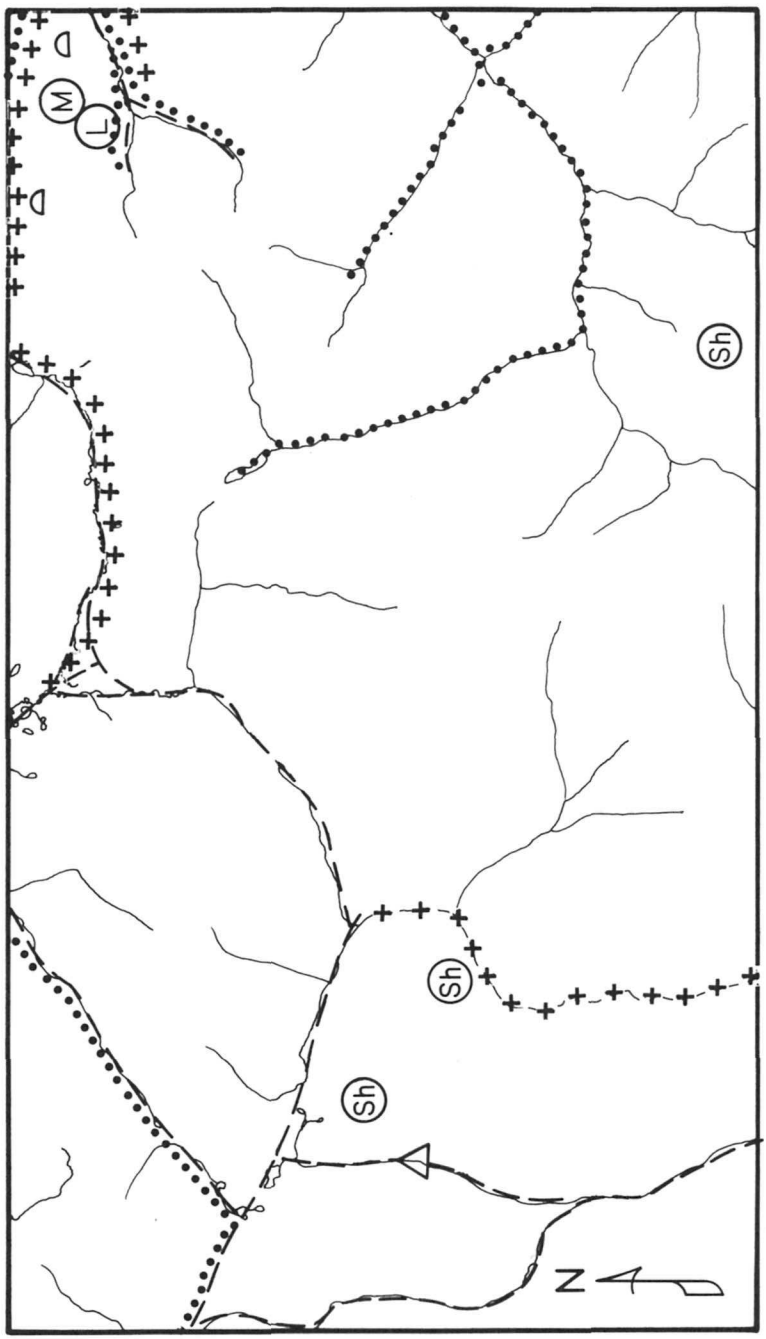
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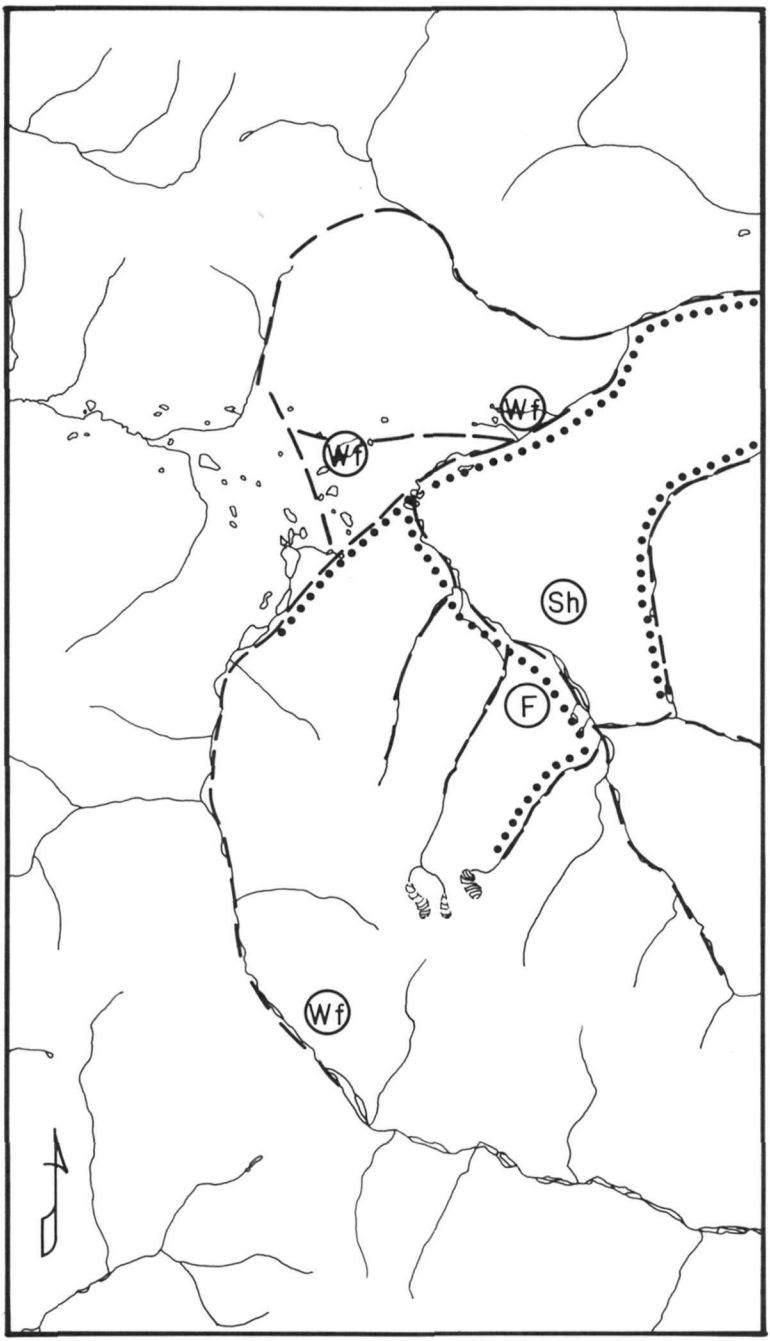

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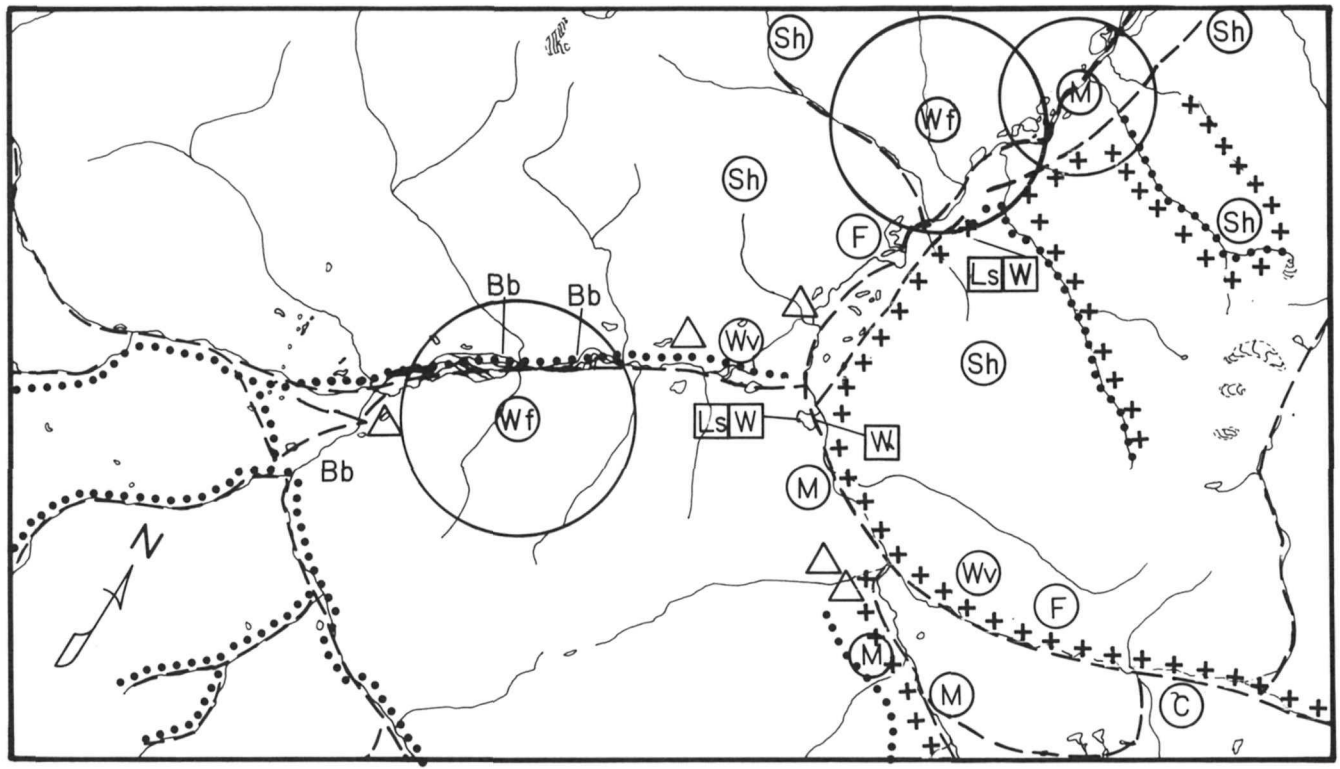
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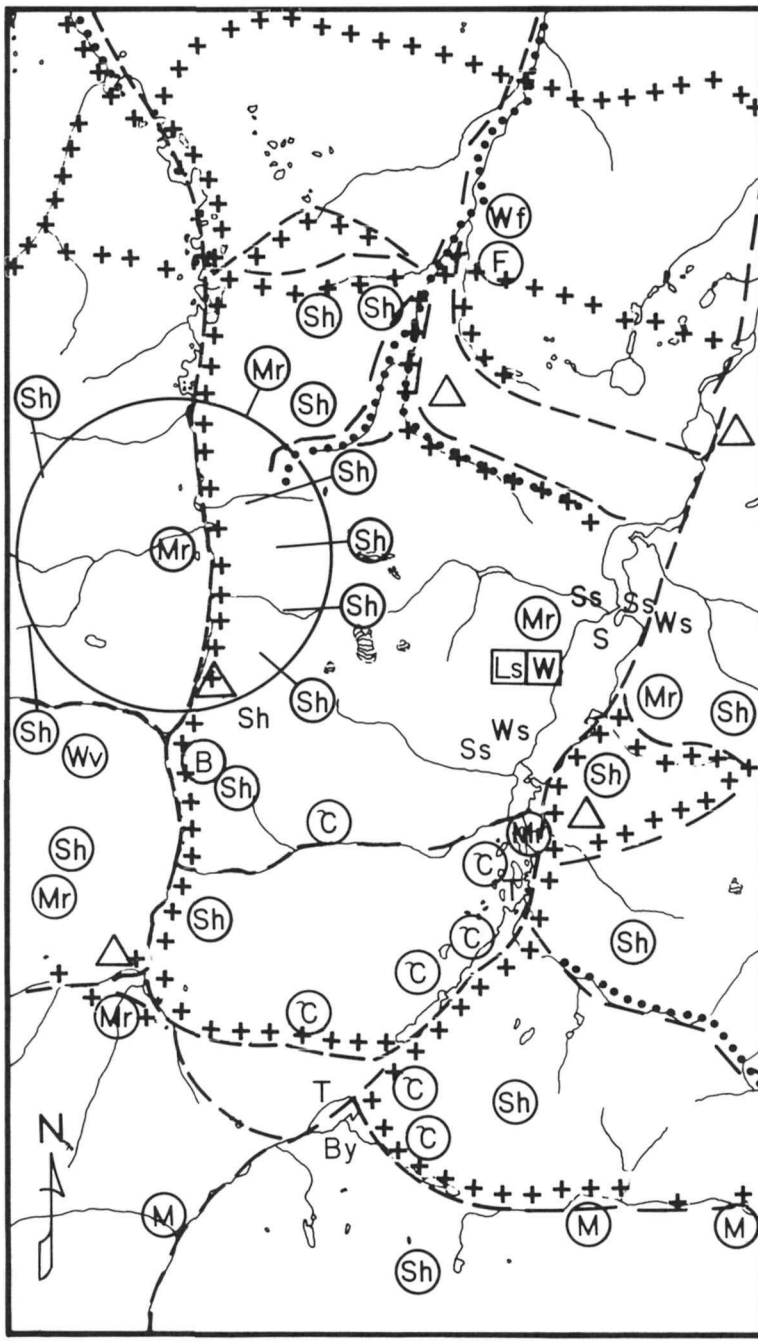

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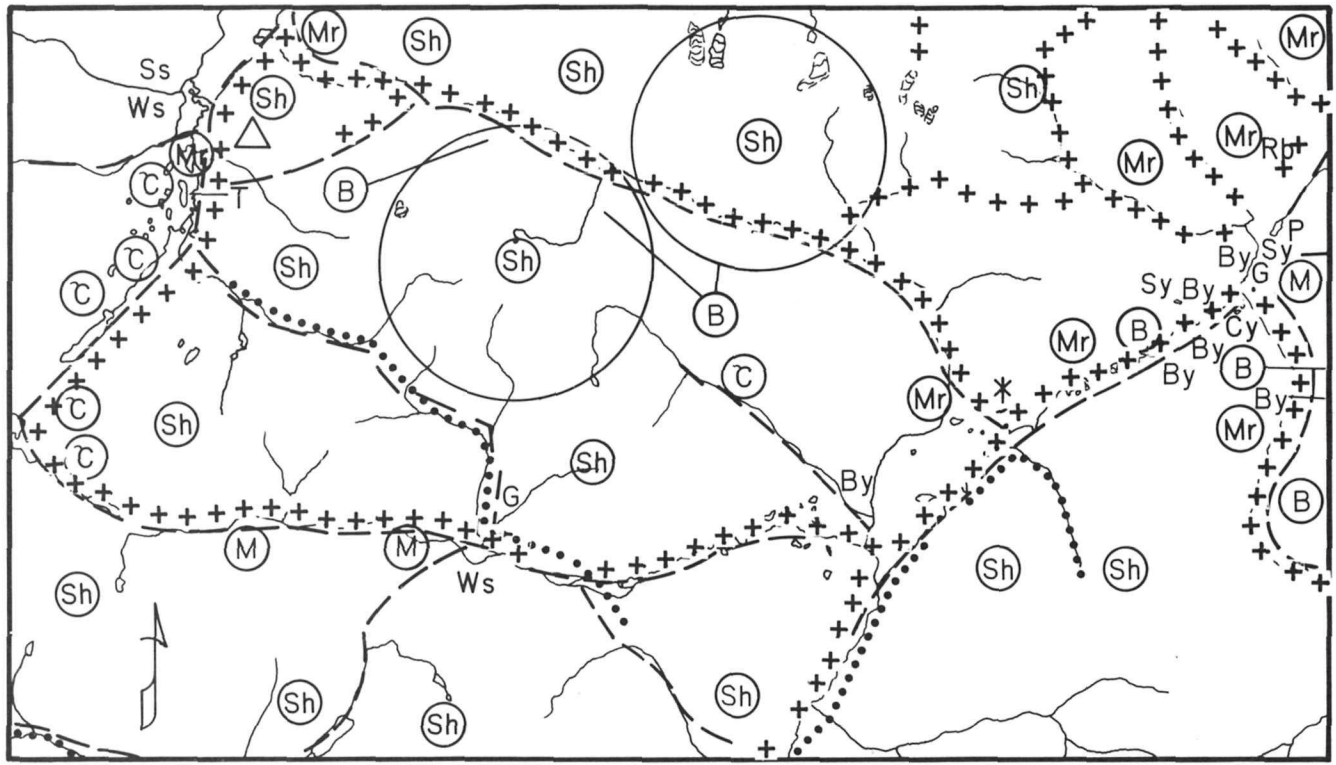
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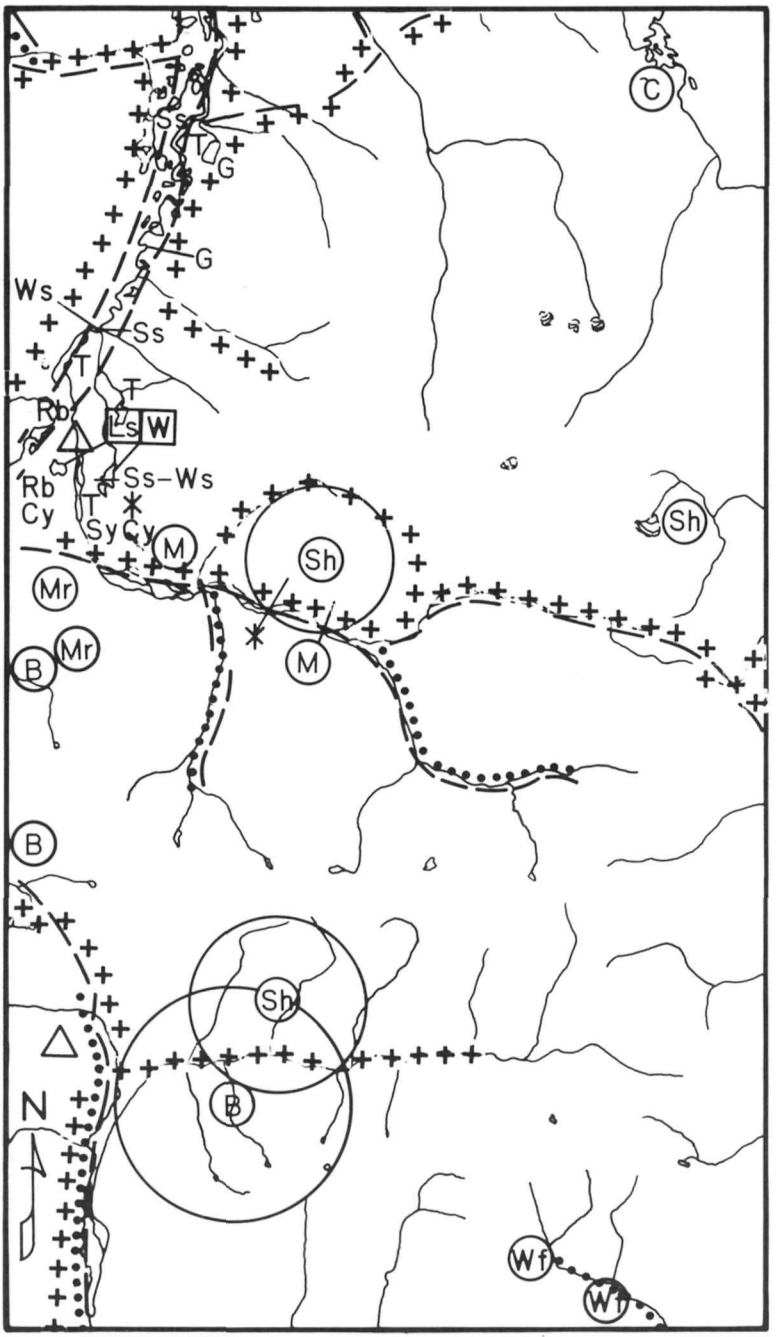
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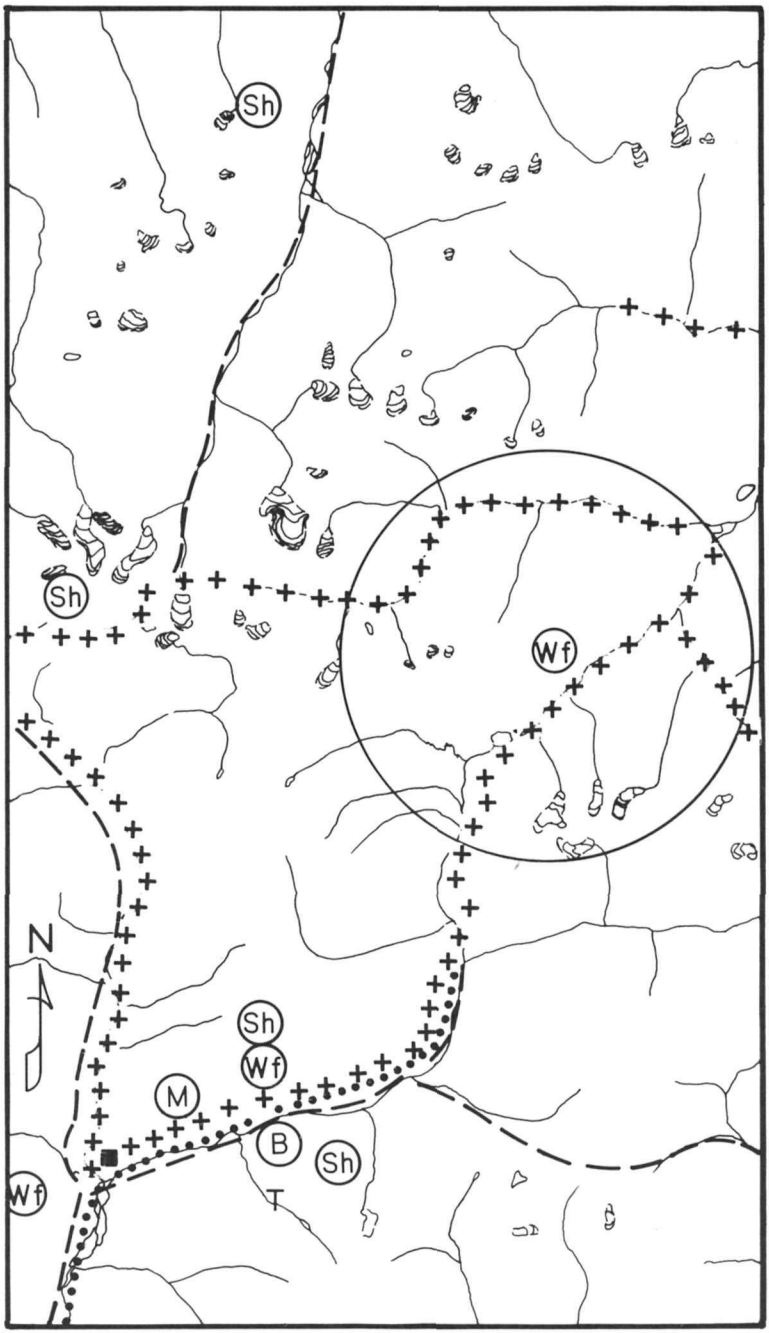
SECTION B-25



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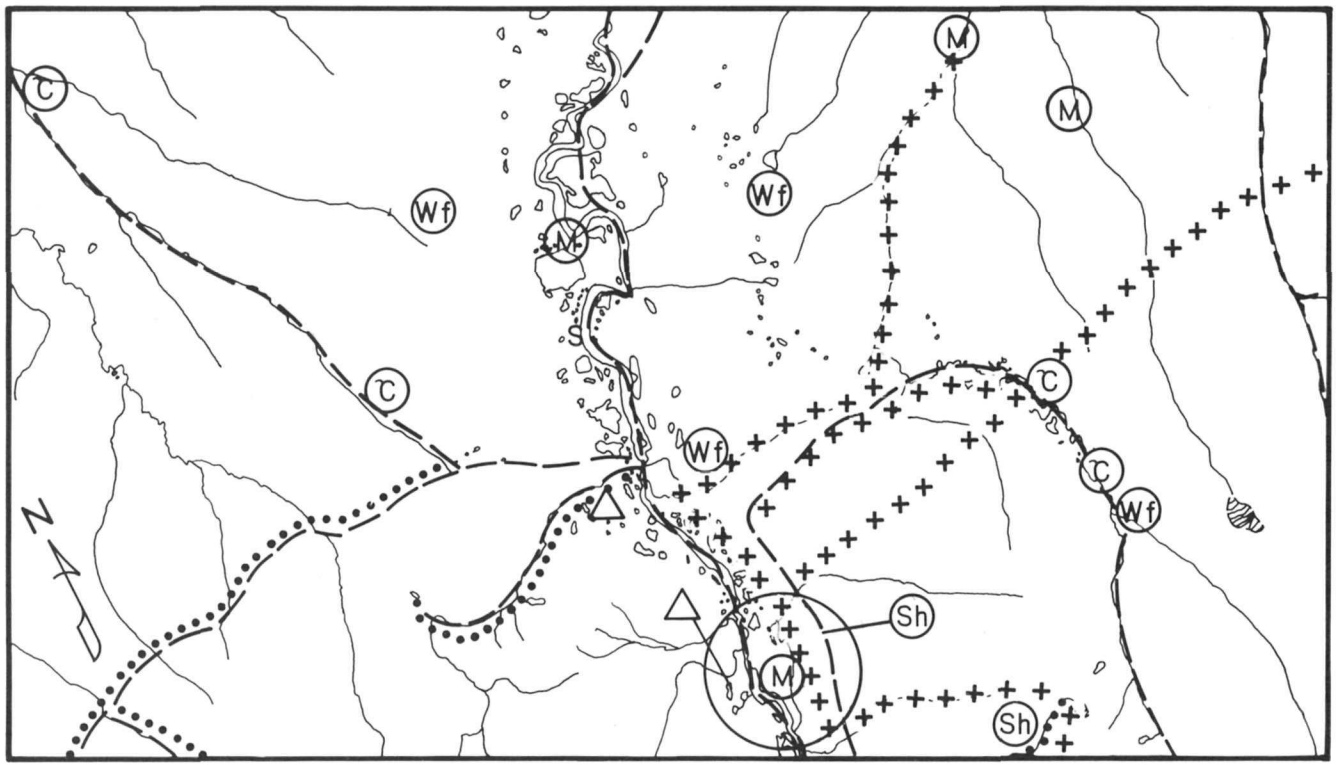

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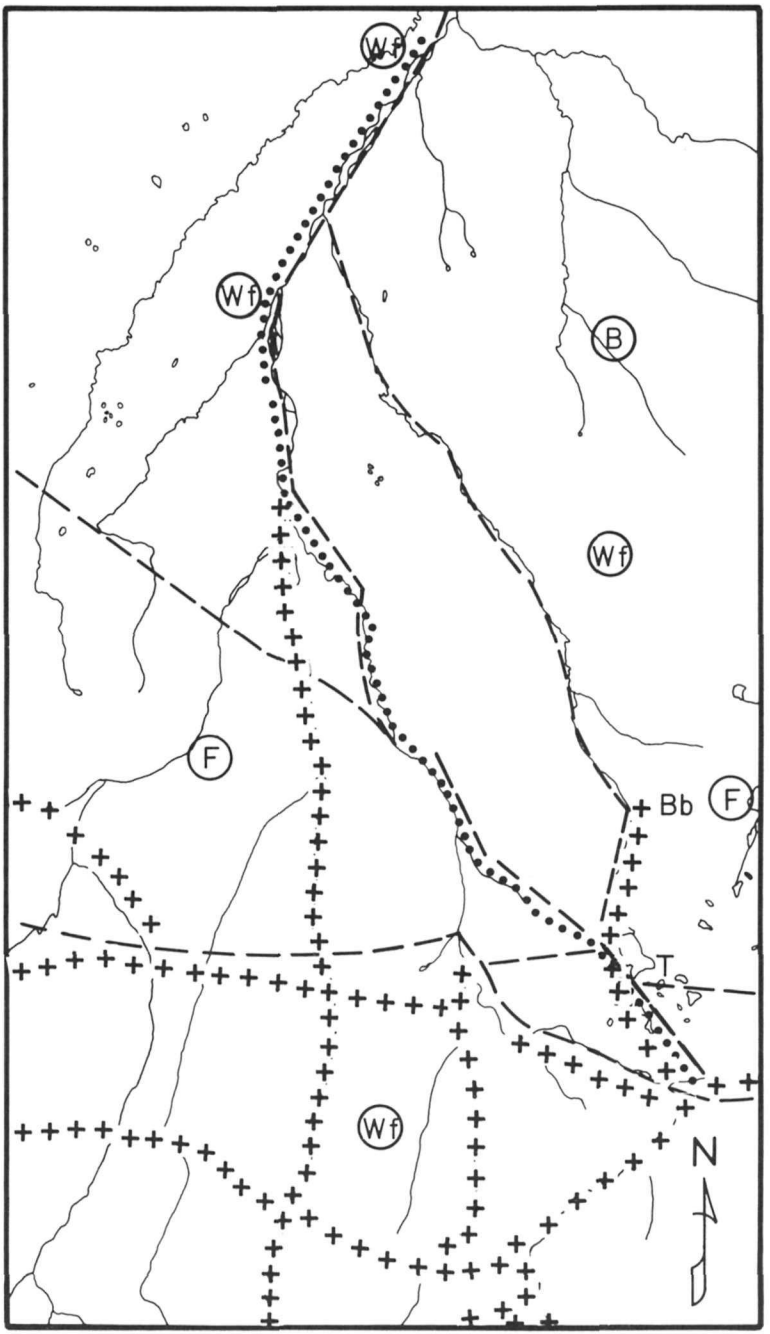

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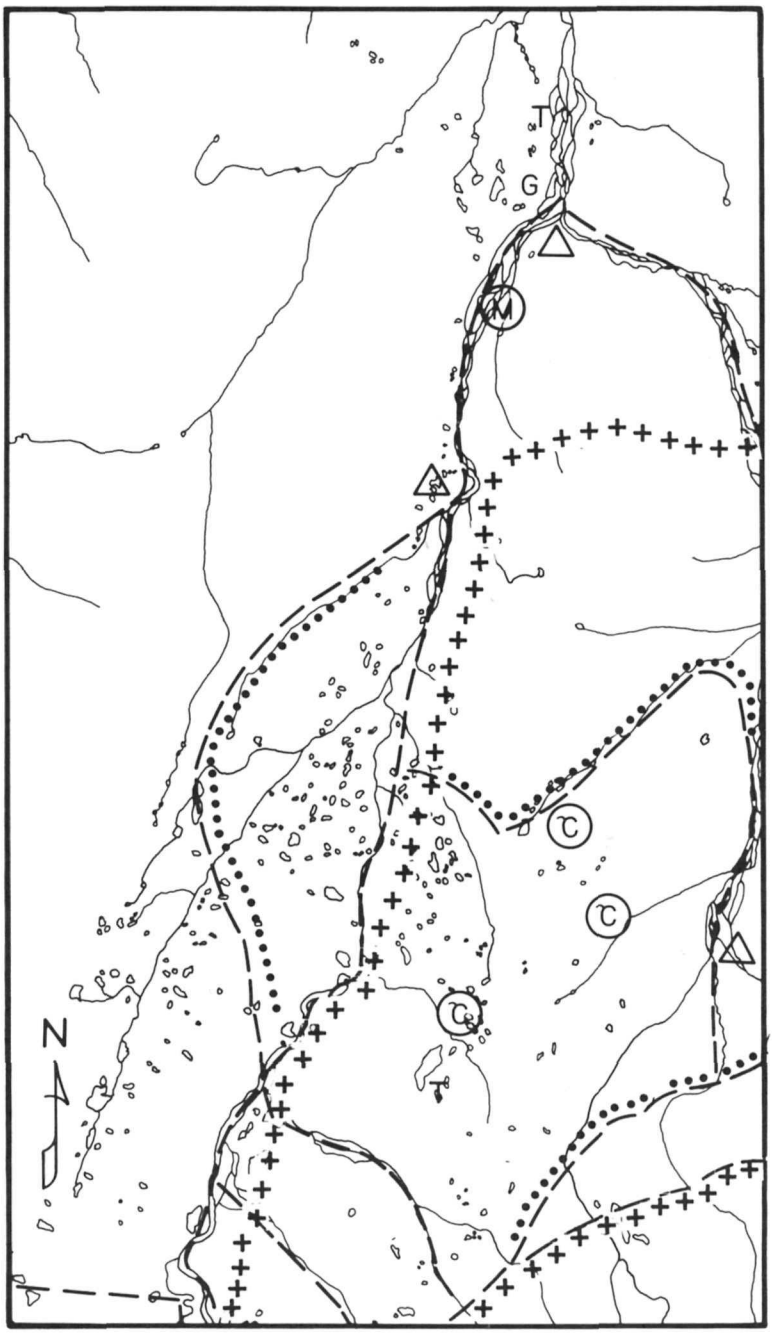

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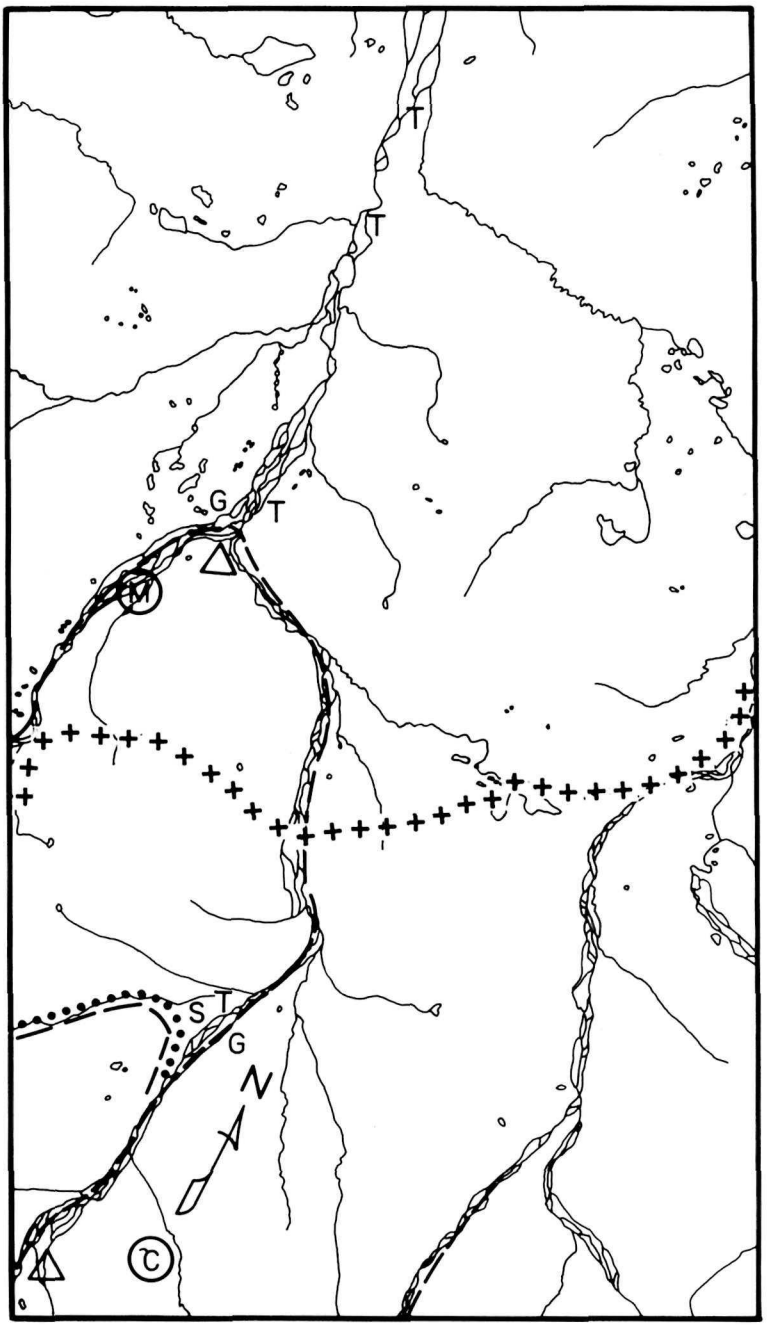

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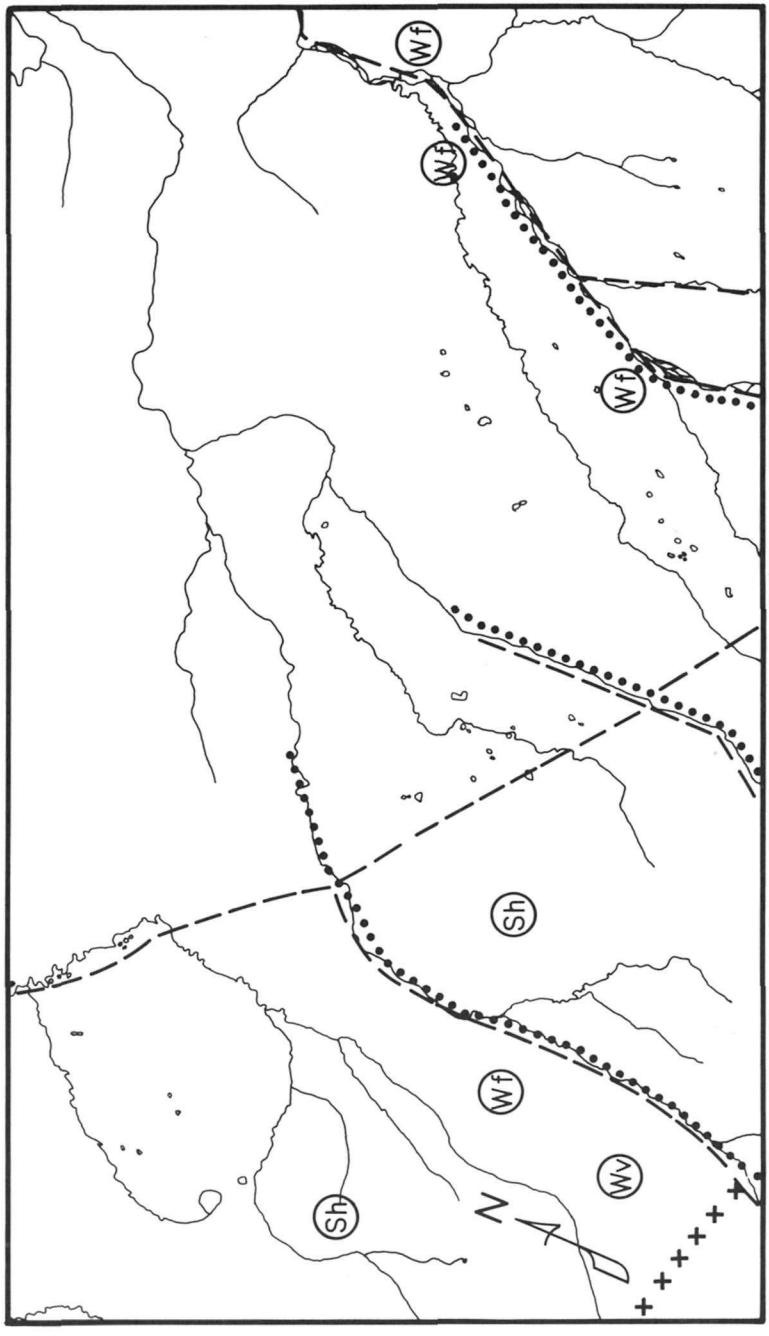
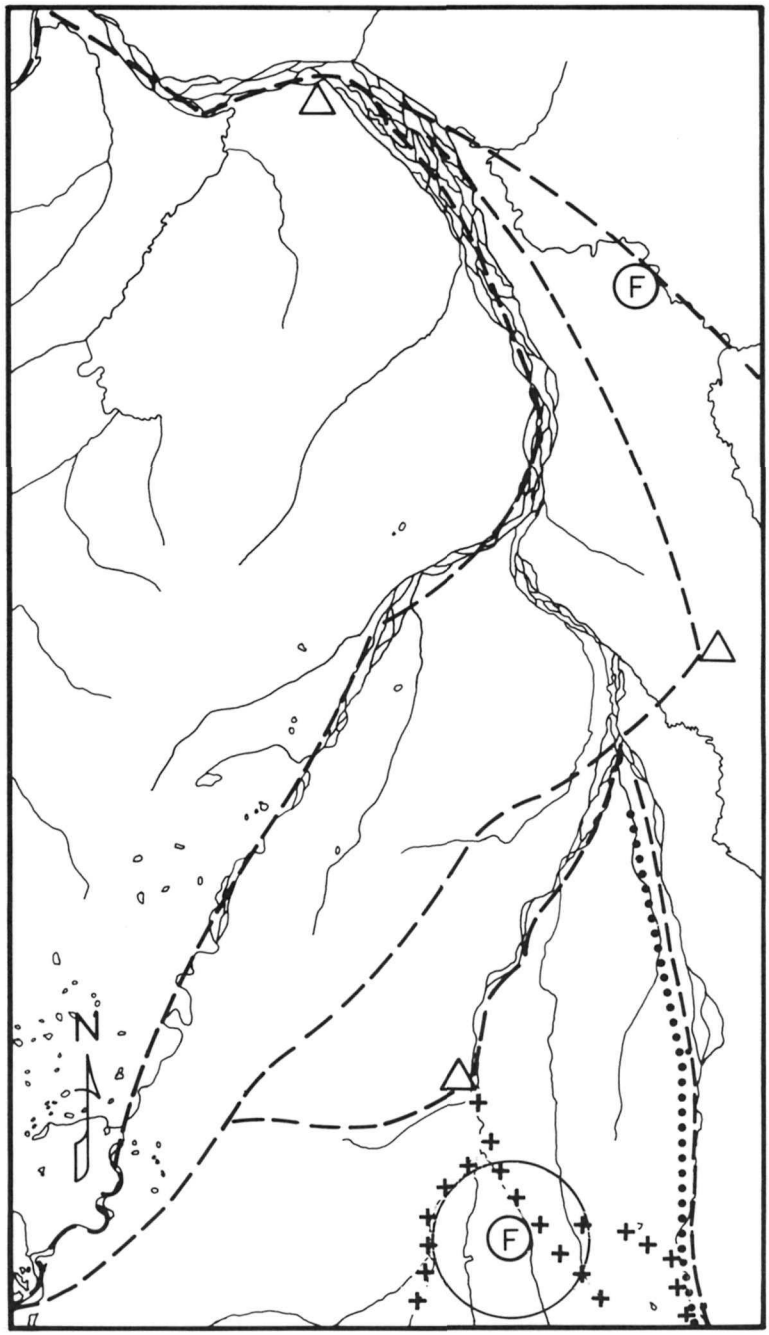
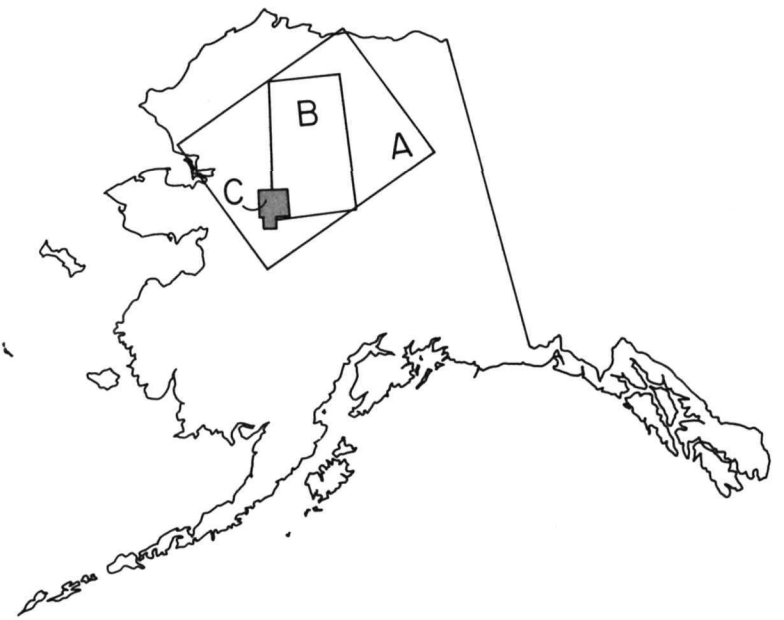


SECTION B-31



SECTION B-32

Appendix G
SITE LOCATIONS AND PLACE NAMES



Symbols Used in Place Name List

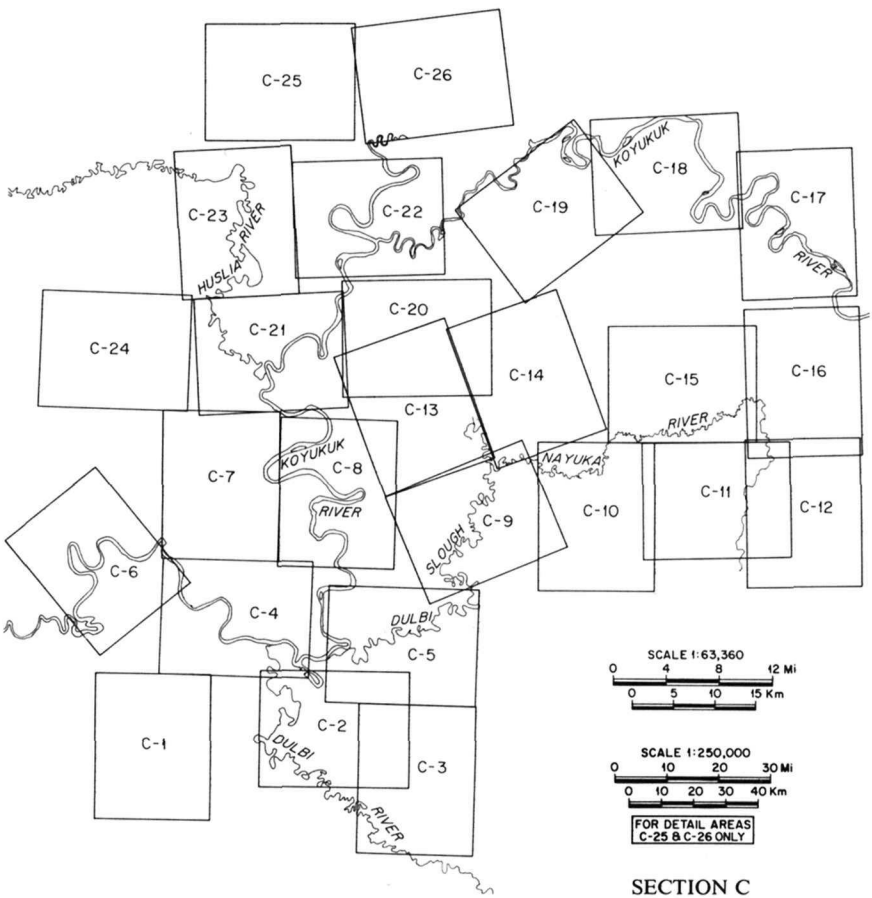
* Koyukon word unavailable

** Translation unavailable

*** Site information unavailable

(...) Information or comments added by Koyukon speaker

[...] Information or comments added by researcher or translator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NAYUKA
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DULBI
DULBI
RIVER
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FOR DETAIL AREAS
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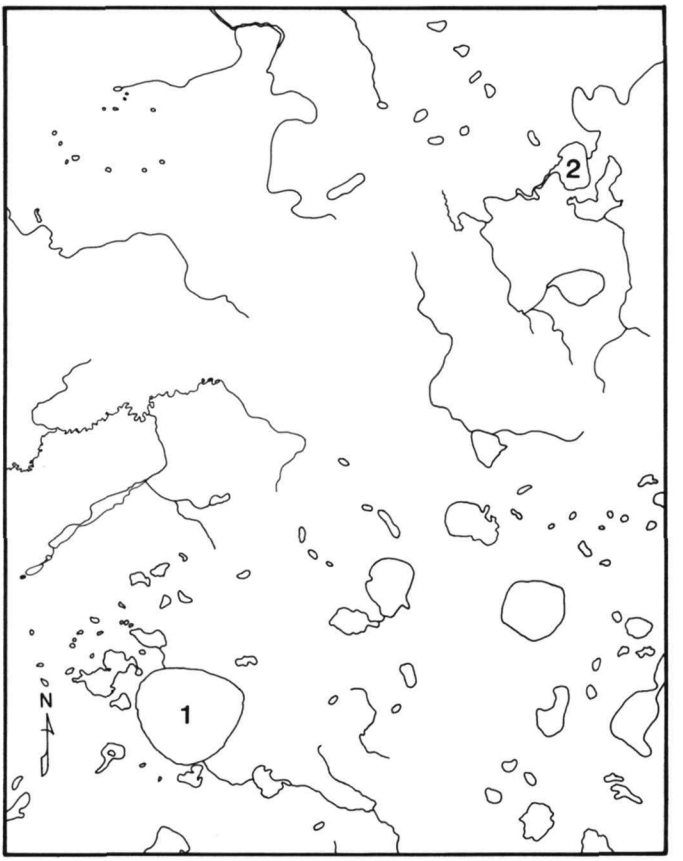
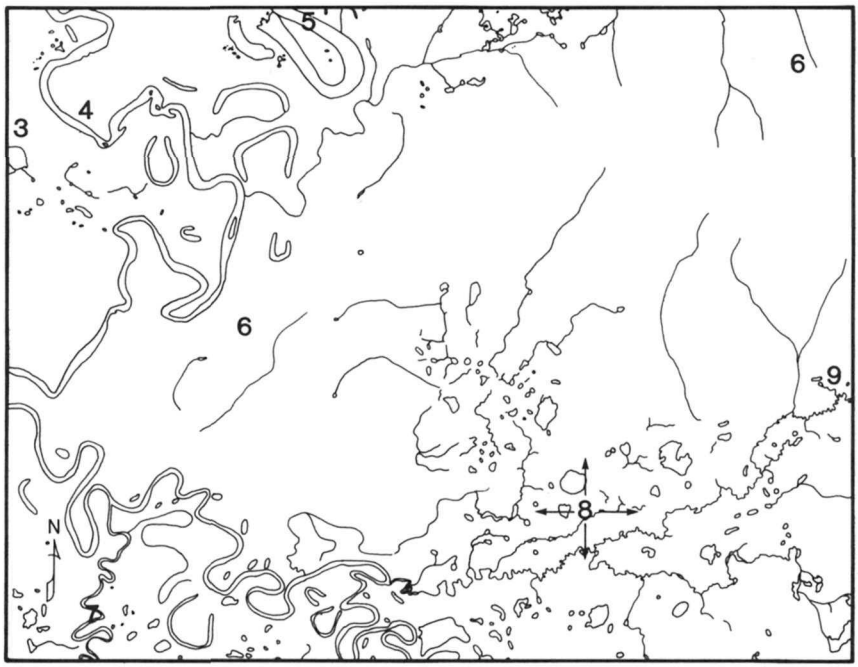
SECTION C



SECTION C-1

Section C-1

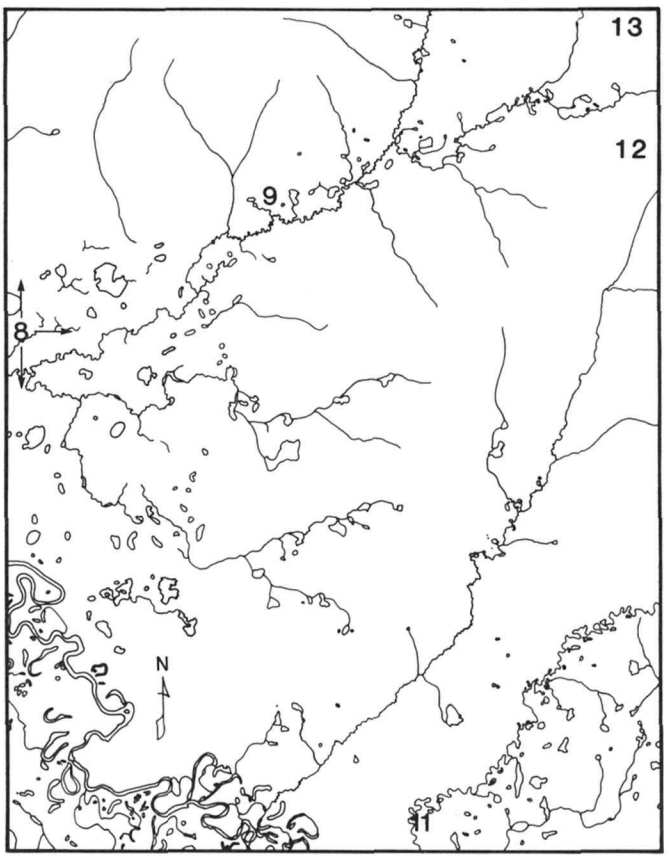
Map No.	Koyukon Site Name	Translation or Description
1	*Bit+Zinh Yeet*	Undercut bank with caribou moss
2	*H+tseekk'a+t'ot*	Head of *H+tseekk'a+t'ot*



SECTION C-2

Section C-2

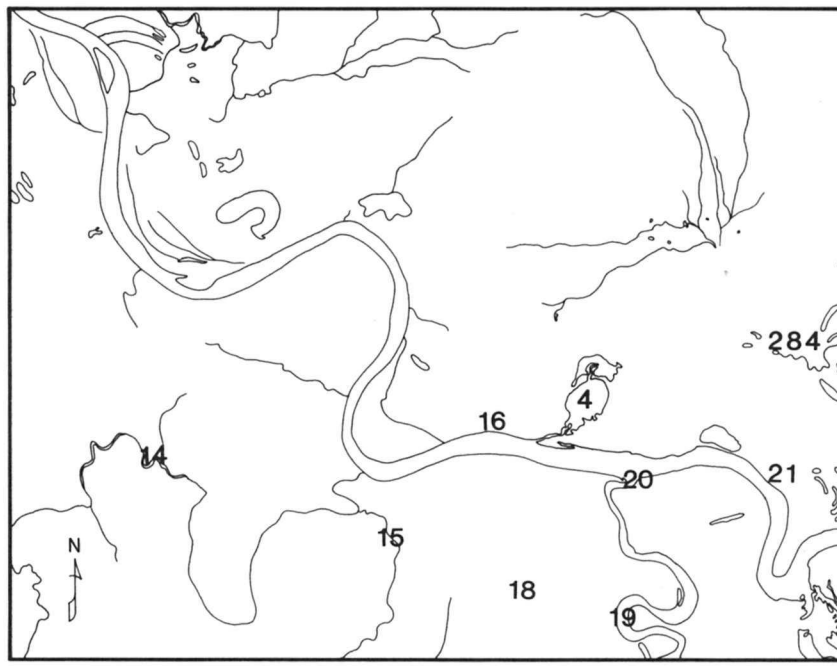
Map No.	Koyukon Site Name	Translation or Description
3	*Tiyh Ghano*	Lake behind the hill
4	*Dolbaatno'*	Gosling River
5	*K'its'a Hugh Notohoonee'onh Dinh*	Place where river changes its course (about 2½ miles from *Kk'otaakkaakk'*)
6	*Kk'ots'aghoteel Loyit*	Point of where we carry bow and arrow
7	*Hulkkaghtno'*	Creek from *Hulkkagh'ayila'*
8	*Hobinhzagheeltonh Dinh*	Lots of lakes
9	*Homin Zagheelton Dinh*	Place of lots of lakes



SECTION C-3

Section C-3

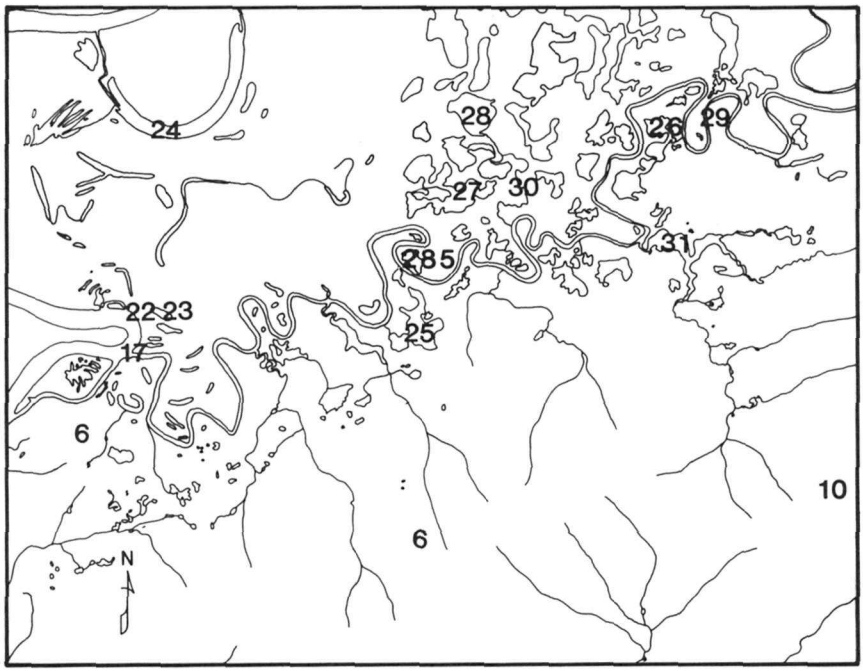
Map No.	Koyukon Site Name	Translation or Description
8	*Hobinhzagheeɬonh Dinh*	Lots of lakes
9	*Homin Zagheeɬton Dinh*	Place of lots of lakes
11	*K'ikaakk' oyghotna*	A split tail river, maybe
12	*Ggɯhnoots'iɬ*	Rabbit Mountain
13	*K'ahɯghnoogh Ggɯhnoots'iɬ*	Upper *Ggɯhnoots'iɬ*



SECTION C-4

Section C-4

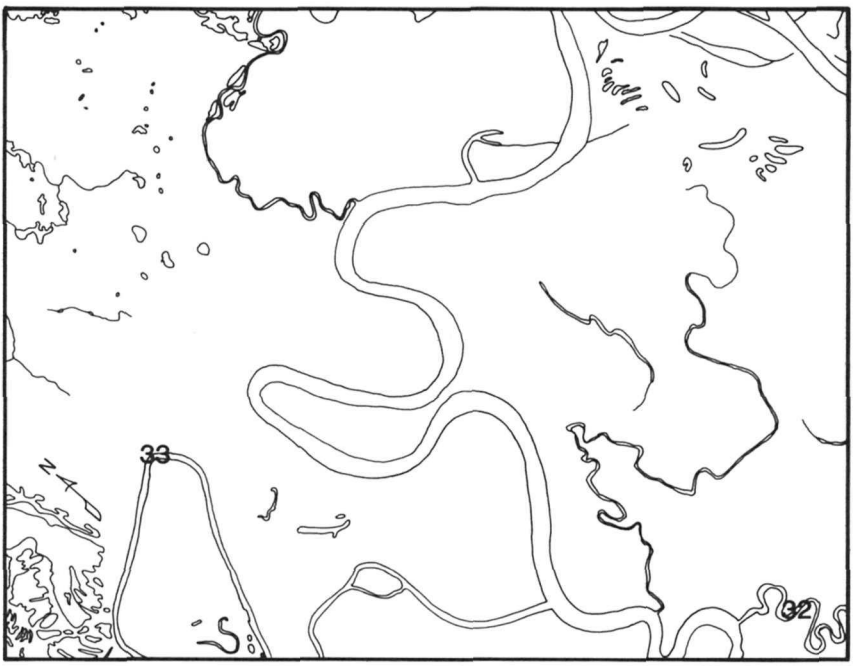
Map No.	Koyukon Site Name	Translation or Description
4	*Dolbaatno'*	Gosling River
14	*To'eeleeyh Dinh*	(big long slough a mile and a half below *Dits'eedza T'oh*)
15	*Neegidzahno'*	Neegidzah River
16	*Dits'eedza T'oh*	Under *D'its'eedza T'oh* (Old Peter Cleaver used to have his upper cabin there)
18	*Notogholteeł Dinh*	Place where big body of water is carried around (It's about 3 miles up.)
19	*Tin Hugida'*	Big trail (about 7 or 8 miles up Dulbi River)
20	*Dolbaakkaakk'at*	Mouth of Gosling River
21	*Dohdoł'eeł Tin Ghunh*	At the bones of *Dohdoł'eeł* (Old Sam Dobin used to have a store there long ago)
284	*Hozaagh K'uhulaayh Dinh*	Place where hooking things out takes place (They used to net fish there long ago.)



SECTION C-5

Section C-5

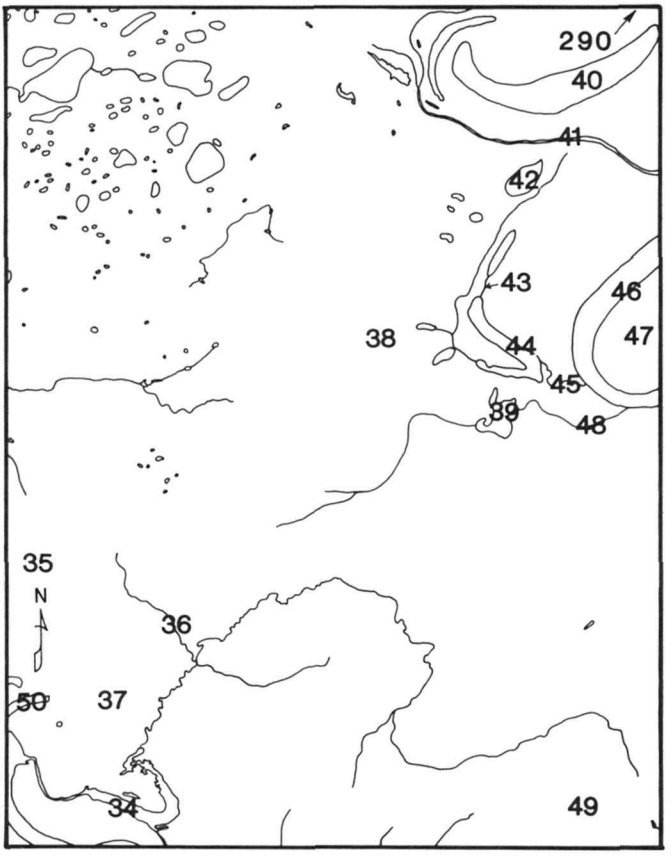
Map No.	Koyukon Site Name	Translation or Description
6	*Kk'ots'aghoteel Loyit*	Point where we carry bow and arrow
10	*Atlokkaayah*	Spruce bough village
17	*Kk'otaatkkaakk'at*	Mouth of Dulbi Slough
22	*Hatlaaga Tots'eeteeyit*	Put boats in water where he doesn't talk
23	*T'aghat Dol'onh Dinh*	Clump of cotton trees place
24	*Notol'o Dinh*	Place where water goes around (*Htugh hoodonhda doda'tu*, below *Htugh Hoodonh Dinh)*
25	*K'ootl'aan k'iminkk'a*	*K'ootl'aan*'s, Alexandra's Lake
26	*Nokk Yeet*	Mud Lake
27	*Tlaats Donookkaagha*	Around the foot of sand _____**
28	*K'itteeltl'in Dol'onh Dinh*	Place where a skull is hanging
29	*Ts'ibaa Dol'onh Dinh*	A clump of spruce trees (English name: Jack Spruce Hill)
30	*Ts'ibaa Noogha*	Spruce Creek
31	*Tots'inaayh Dinh*	Place where we customarily move up the bank
285	*K'ahughdoogh K'ootl'aan K'iminkk'a*	Lower *K'ootl'aan K'iminkk'a*



SECTION C-6

Section C-6

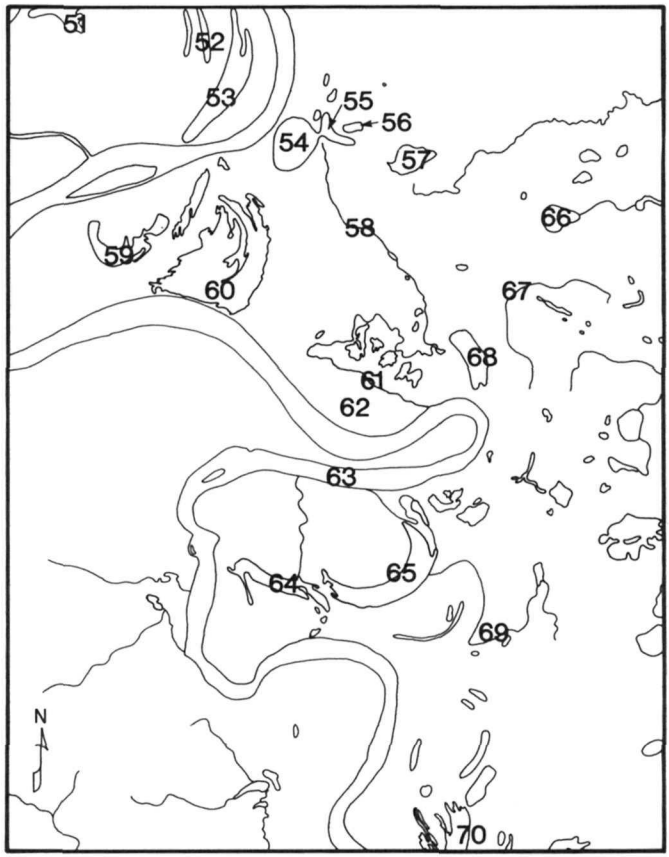
Map No.	Koyukon Site Name	Translation or Description
32	*K'ozokkaak'at*	The mouth of the creek that people travel on
33	*	



SECTION C-7

Section C-7

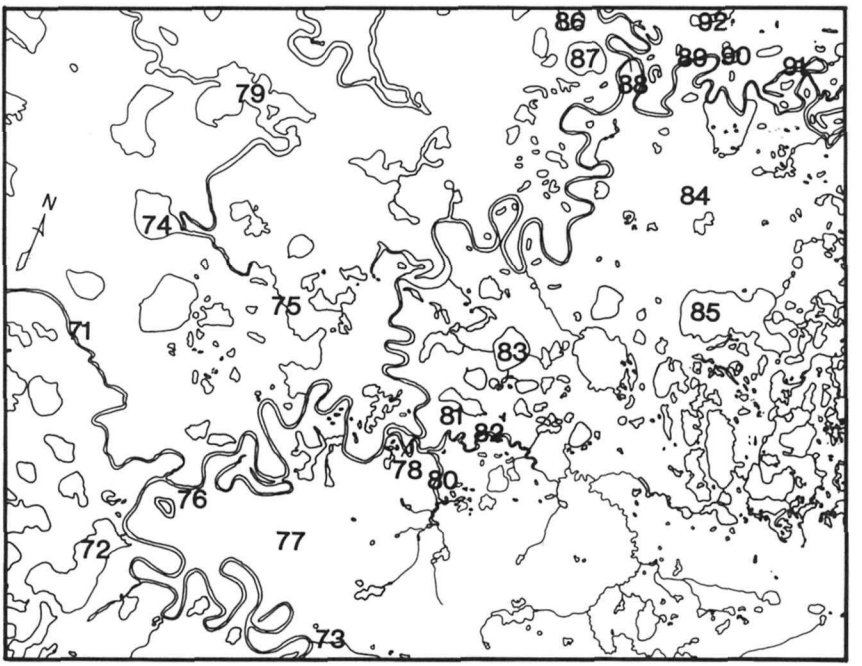
Map No.	Koyukon Site Name	Translation or Description
34	*Ukk'a Notol'o Dinh*	Place where eddy goes around
35	*Bits'ugh Tinyee*	It has trail between it and whatever
36	*Dilggeet'ɬ Dinh*	Place where it glaciers
37	*Dits'eedza'*	Rough skin
38	*Tiyh Loyit*	Point of hill
39	*Tiyh T'ogh Notodaal'o Dinh*	Place where there's water along under the hill
40	*Hulyakk'a Noo' Kkokk'a*	Lake beside *Hulyak'atna* island
41	*Noonagga*	Slough behind island
42	*Taadeeɬlot Dinh*	Deep water place
43	*Ts'eet'o Gheel Da Hugh Hudaadonh Dinh*	Where water runs through between two lakes
44	***	
45	***	
46	*Ts'eet'o Gheelinh Da Kkokk'a*	Stretch of fast current place
47	*Ts'eet'o Gheel Da Nooyeeɬ*	*Ts'eet'o Da,* island
48	*Biziyh Nidah Hu*	Around where otter streak
49	*Ts'eeydla'*	Jack spruce hill
50	*Dits'eedza' T'oh*	Lake under *Dits'eedza*



SECTION C-8

Section C-8

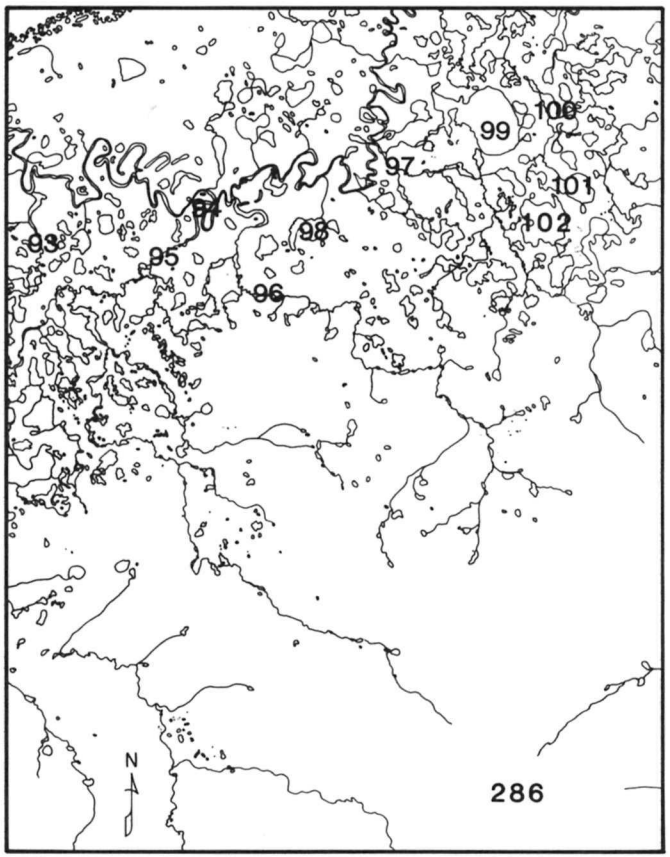
Map No.	Koyukon Site Name	Translation or Description
51	*Nitseel Haal Daalonh Dinh*	Place of wolverine deadfall trap
52	*K'itsaan' Kkokk'a*	Lake of Huslia River island
53	*Dinaagul Kk'aa Toghee'o Dinh*	Water extended into the empty place of our cooking stick
54	*Toneets Ts'ibaa La'onh Dinh*	Spruce island in middle of lake
55	*Tiyh Keeya*	Head of hill
56	*Tiyh Yee Minkk'at*	Lake in hill
57	*Bin Kookk'a*	Lake _____**
58	*Bin Lookk'una*	Lake fish creek
59	*Noyee Binkk'a*	Lake in the island
60	*Tl'uh Kkokk'a*	Lake of short-bladed grass
61	*Dagho K'aghaloyh Hu*	Around where something hangs here and there, every now and then
62	*Daghok'aghaloyh Da Nooyeet*	Island of *Daghok'aghaloyh Hu*
63	*Łookk'a Ts'ilyaan Da Kkokk'a*	Stretch of *Łookk'a Ts'ilyaan Dinh*
64	*Nohloonh Tl'ok Taahlidlo Dinh*	Place where sunglasses are in the water
65	*Łookk'a Ts'ilyaan Dinh*	Fat whitefish place
66	*Kk'eeyh Tsits Yeet*	Dry birch lake
67	*Dalodzoy Dol'onh Hu*	Around where a clump of spruce cones is sitting up in a tree
68	*Dagho K'aghaloyh Dinh*	[Possibly] a gravel place
69	*Haatoghee'o Hu*	Around where water runs into fish lake
70	*Hugh Hoodon Dinh*	Place where water runs through between two lakes



SECTION C-9

Section C-9

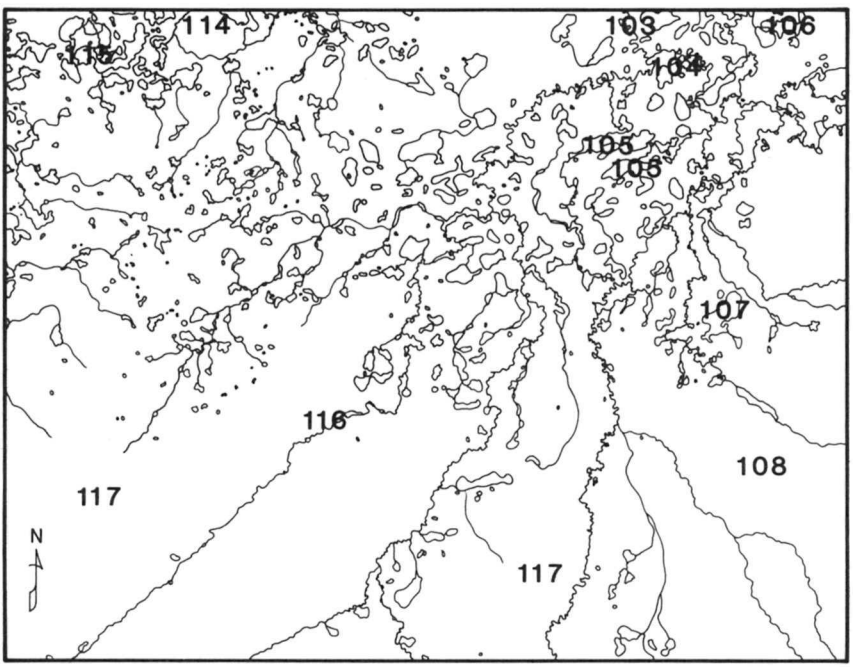
Map No.	Koyukon Site Name	Translation or Description
71	*Kk'eeyh Noo Loyit*	End of birch island (*donootit taaldlinh hu,* around where water runs over the island)
72	*Neeghudzin Dinh*	Where _____** come together
73	*	Below Mike Sleigh, oh, I don't know how many miles, they call *tsaghaldaal tsookk'-adlit* squirrel creek
74	*Binkk'a Hukuh k'uhdots'ina*	Lake below the big lake
75	*Kk'una Hukuh*	Big slough
76	*Kk'ots'aghoteel Loy*	Point of *Kk'ots'aghoteel*
77	*Kk'ots'aghoteel Tiya*	We carry bow and arrow hill
78	*Ts'iton Dizinh Dokkaakk'at*	Mouth of the slough from black hill
79	*Binkk'a Hukuh*	Big lake
80	*Kk'ots'aghoteel Kk'atna*	Outlet of *Kk'ots'aghoteel*
81	*Ts'itonzinh Dinh*	Black Hill
82	*Ts'iton Dizinh Hu*	Drainage from Black Hill
83	*Tobaan Nokk'eeyh Daadliyo Dinh*	Birch hills around the lake place
84	*Gguh Tl'itl'o Tiya*	The nape of the rabbit neck hill
85	*Gguh Tl'itl'o Kkokk'a*	Lake of *Gguh Tl'itl'o Tiya*
86	*Ts'ibaa Donooyh Ghu Kkokk'a*	Lake in front of *Ts'ibaa Donooyh*
87	*Hudaalggaat Dinh*	Place where it was cut away so the water will run out and they'll catch fish in the spring
88	*Nitaagheedilinh Dinh*	Where waters run into each other
89	*Naan' Yakk'a*	Under *Naan'*
90	*Tl'odoggu Dohdaal'onh Dinh*	Place where lake sits on the bank
91	*Kkokk'a Todaghee'o Dinh*	Kind of long lake
92	*Kkokk'a Todaghee'o Dinh*	Long lake



SECTION C-10

Section C-10

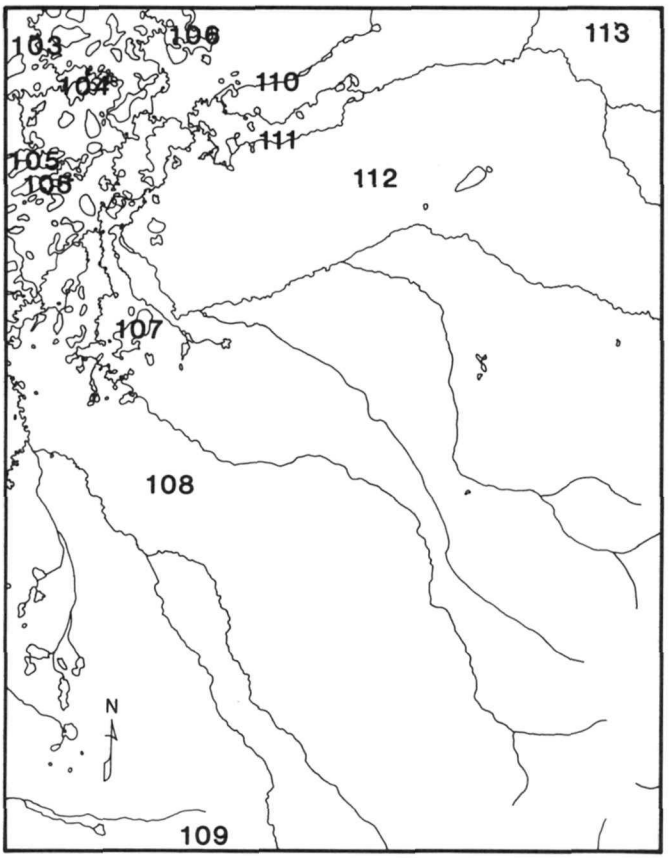
Map No.	Koyukon Site Name	Translation or Description
93	*Ggʉh Tɬ'iɬt'o Hʉkk'ɑɬna*	Slough from *Ggʉh Tɬ'iɬt'o*
94	*Ts'eekuh Ts'aghoyh Dinh*	Place where customarily make boats
95	*Ts'eekuh Ts'aghoyh Hu*	Slough ot *Ts'eekuh Ts'aghoyh Dinh*
96	*K'ʉhtaaneets Ts'eekuh Ts'aghoyh Dinh*	Middle *Ts'eekuh Ts'aghoyh Dinh*
97	*K'ahʉgh Noogh Ts'eekuh Ts'aghoyh Hu*	Upper *Ts'eekuh Ts'aghoyh Hu*
98	*Ts'eekuh Ts'aghoyh Da Kkokk'a*	Lake of all the *Ts'eekuh Ts'aghoyh Hu*
99	*K'itsaan' Yee Hʉkuh*	Lake with lots of grass around it
100	*Naan' Nakkokk'a*	Lake close to *Naan' Yakk'a*
101	*Naan' Nakkokk'a K'ʉhtaaneets*	Middle *Naan' Nakkokk'a*
102	*K'ʉhdʉhts'in Naan' Nakkokk'a*	Upper *Naan' Nakkokk'a*
286	*Siɬ Yaan'*	Jack spruce only [hill]



SECTION C-11

Section C-11

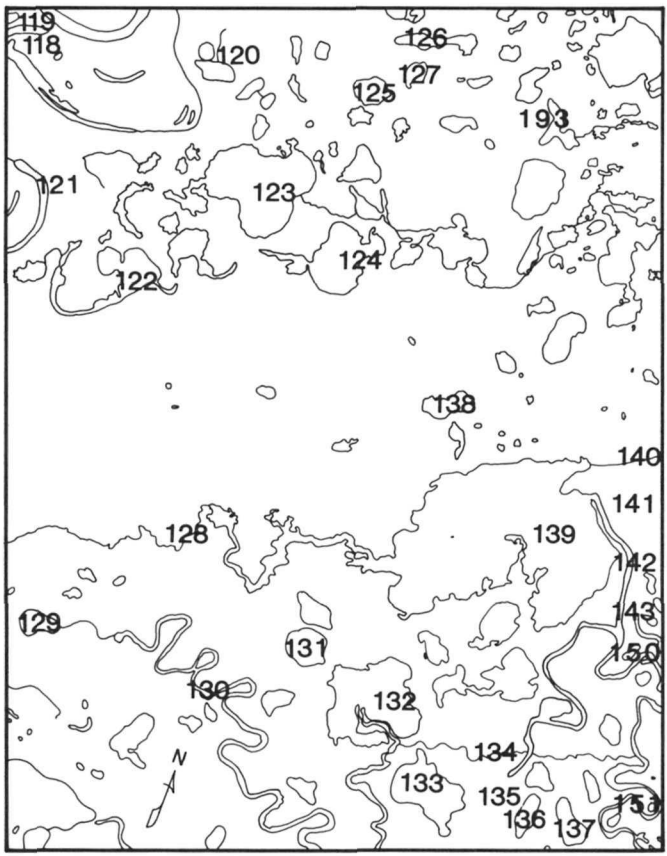
Map No.	Koyukon Site Name	Translation or Description
103	*Tin Looɬeetna*	Creek with lots of overhanging ice [ice is left behind on the bank in winter when the level of the water drops.]
104	*Kk'ɬy K'udla Yee*	Lake with willows
105	*Niɬ'ohɬdinlitaanh Da Kkokk'a*	Lake back to back
106	*Neenok'idilah K'uhduhts'in Kkokk'a*	Upper *Neenok'idilah Dinh*
107	*Tɬ'olda Yee*	Lake with lots of lake moss
108	*Dagga Nok'inaalzoos Tiya*	Hill of *Dagga Nok'inaalzoos*
114	*Biɬ Zinh Yeet*	Undercut bank with caribou moss
115	*K'it'oɬ'on Da'oyh Da Kkokk'a*	Fish trap funnel place
116	*K'ahɬghdoogh Tin Looɬeetna*	Lower *Tin Looɬeetna*
117	*Ts'ahagha Nolggul*	Hill sticks out



SECTION C-12

Section C-12

Map No.	Koyukon Site Name	Translation or Description
103	*Tin Loo⁀eetna*	Creek with lots of overhanging ice [ice is left behind on the bank in winter when the level of the water drops.]
104	*Kk'ʉy K'udla Yee*	Lake with willows
105	*Ni⁀'ohudinlitaanh Da Kkokk'a*	Lake back to back
106	*Neenok'idilah K'uhduhts'in Kkokk'a*	Upper *Neenok'idilah Dinh*
107	*T⁀'olda Yee*	Lake with lots of lake moss
108	*Dagga Nok'inaalzoos Tiya*	Hill of *Dagga Nok'inaalzoos*
109	*Ghanoy Ghaadlineega'*	Brown bear den
110	*K'ahʉghnoogh Sahna Hʉkuh*	Upper *Sahna Hʉkuh*
111	*K'ahʉghdoogh Sahna Hʉkuh*	Lower *Sahna Hʉkuh*
112	*Tiyh Ghano Tiya*	Hill around the corner
113	*T⁀aadza'ʉyh*	Rock outcrop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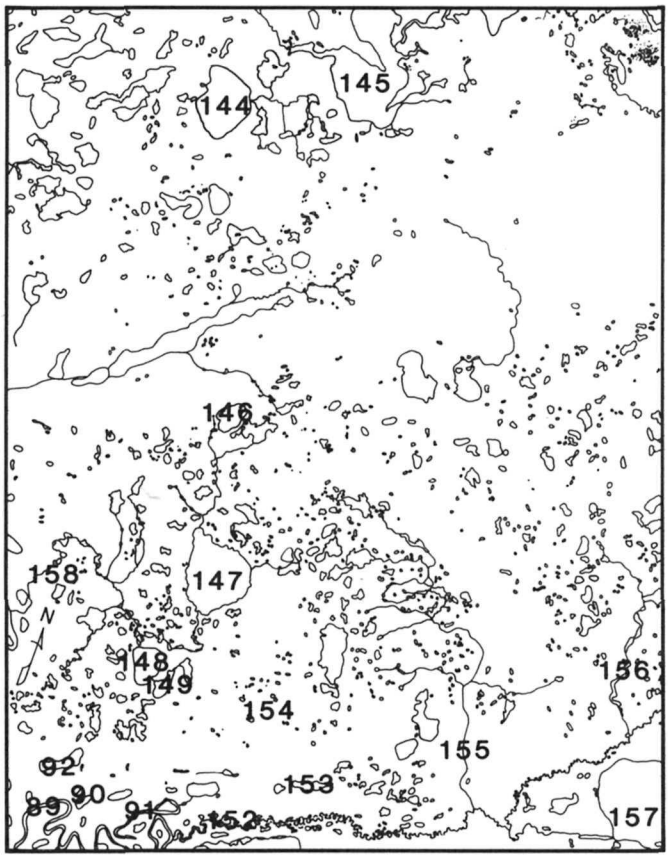
SECTION C-13

Section C-13

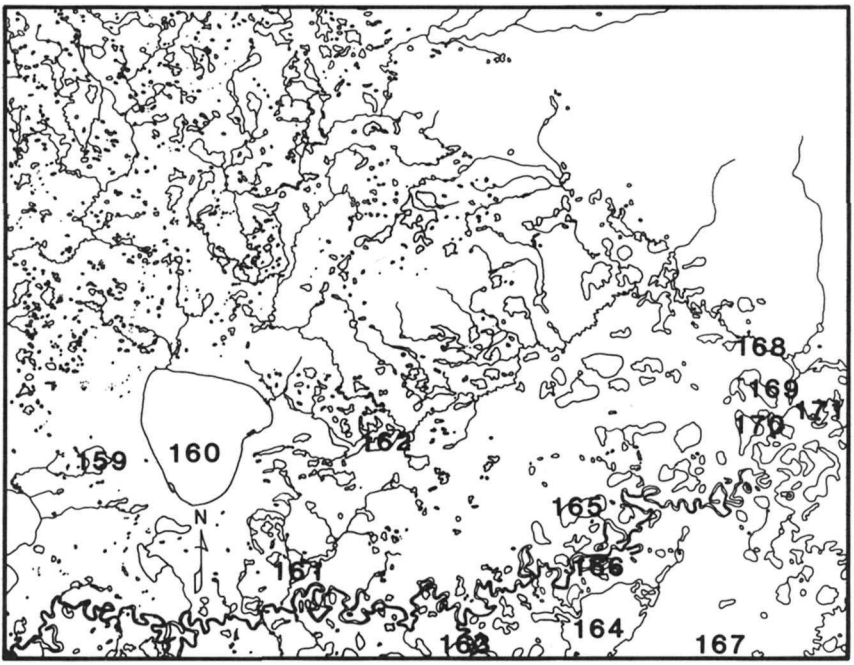
Map No.	Koyukon Site Name	Translation or Description
118	*Hokkoh*	Corner of lake or something
119	*Hugh Toditaal'o Hu*	Lake on the side of long lake
120	*Tiyh Ghu Toneeɬo Dinh*	Place where slough goes through between two hills
121	*Nidaaloda Kkokk'a*	Long lake
122	*Yoodaggu Notok'idinaazakk Dinh*	Horseshoe lake with shallow water
123	*Tots'itdon Da Kkokk'a*	At the stretch of_____**
124	*Toneets Ts'ibaa La'onh Dinh*	Place where there's jack spruce island in the middle
125	*Totsidza Yeet*	In where water broke up land
126	*Kk'eey Tsits Yee*	In the dry birch lake
127	*Saakkaay Naalnonh Dinh*	Place where children died
128	*Nogheelinh Hu*	Around where water runs down [rapids]
129	*Kk'eeyh Tsits Yeet*	Dry birch lake
130	*Donootiɬ Taaldlinh Hu*	Water running over the island
131	*Toonoon Ghunh*	At the water filled things (blackfish with stomach full of water)
132	*Notozahtɬ Dinh*	Lake shaped like a hook
133	*Notozahtɬ K'uhdots'in Kkokk'a*	Lower *Notozahtl Dinh*
134	***	
135	*Yoonɬ Yoodot*	Way out downriver place (cabin, south of *Tsotlyeet*)
136	*Ts'ibaa Donooyh*	Jack spruce hill
137	*Ts'ibaa Donooyh Ghu Kkokk'a*	Lake in front of *Ts'ibaa Donooyh*
138	*Dodzin Nohkk'aa*	Loon lookout
139	*Kk'otaal Kkokk'a*	Lake at the head of Dulbi Slough
140	*Tiyh Ghano*	Around the corner of a hill (creek)
141	*Tiyh Ghano Tiya'*	Hill around corner of *Tiyh Ghano*
142	*Kk'otaalna*	Slough from *Kk'otaal Kkokk'a*
143	*Notozahtl Da Hukk'alna*	Slough from *Notozahtl Dinh*
150	*K'its'izeeyh Da Hudokkaakk'at*	Mouth of *K'its'izeeyh Hu*
151	*Tsoɬyeet*	Wild carrot/potato lake



SECTION C-14

Section C-14

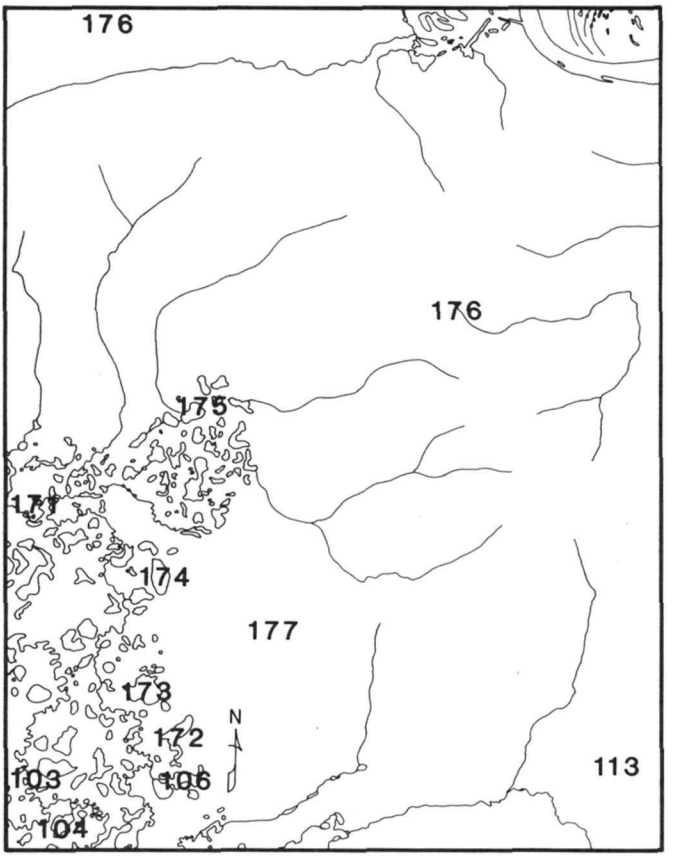
Map No.	Koyukon Site Name	Translation or Description
89	*Naan' Yakk'a*	Under *Naan'*
90	*Tɬ'odoggu Dohdaal'onh Dinh*	Place where lake sits on the bank
91	*Kkokk'a Todaghee'o Dinh*	Kind of a long lake
92	*Kkokk'a Todaghee'o Dinh*	Long lake
144	*Hozaagh Kk'uhulaayh Dinh*	Place where hooking things out takes place (They used to net fish there long ago.)
145	*Nododil Ghunh*	At the place of things going around the corner (fish resting and swimming around on their way)
146	*Dozinh Kk'aa*	Empty place of shiny black _____**
147	*Hutleekeey Dinh*	Place above all the others (lake above all the other lakes)
148	*K'its'izeeyh Da Kkokk'a*	The stretch of lakeshore where bear is customarily caught in its den
149	*K'its'izeeyh Da Hudots'in Kkookk'a*	Lake below *K'its'izeeyh Dinh*
152	*Hudagheelina*	Creek into another creek
153	*Tiyh Yee Minkk'a*	Lake in the hill
154	*Tɬ'uh Kkokk'a Hugho Nee'oyee*	Lake pointing to another lake called *Tl'uh Kkokk'a*
155	*Tɬ'uh Kkokk'a*	Shortbladed grass lake
156	*Hudaagheelina'*	Creek runs into bigger creek
157	*Hudo Dinh*	The mouth of the place
158	*K'its'izeeyh Hu*	Area where bear is customarily caught in the den



SECTION C-15

Section C-15

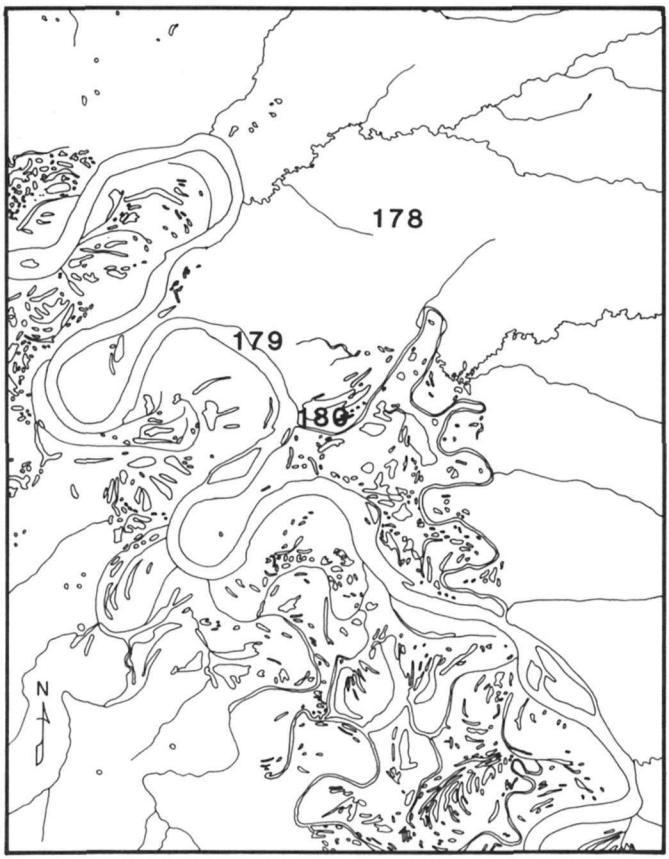
Map No.	Koyukon Site Name	Translation or Description
159	*Hudotakk'u Dinh*	Lake between two big lakes
160	*Hunoo Dinh*	Upper big lake
161	*Hontin Kkokk'a*	[Possibly] the lake on the main trail
162	*Hagho Ts'inkdil Dinh*	Where we make it to the lake carrying our canoes
163	*K'itsaan' Yee Huyoza*	Small grass lake with grass around it
164	*Tilaay Binkk'a*	Lake where fish start running (or) lake where fish run into the lake outlet
165	*Too Noon Ghunh*	Blackfish with stomach full of water
166	*Yoodaggu Notol'o Dinh*	Horseshoe lake
167	*Tilaay Binkk'a Tiya*	Hill behind *Tilaay Binkk'a*
168	*Sis Dlil T'ogha*	Under *Sis Dlil*
169	*K'ahughnoogh Hanoloolaatlghaanh Dinh*	Upper *Hanoloolaatlghaanh* where they wait for the ice to thaw
170	*K'ahughdoogh Hanoloolaatlghaanh Dinh*	Lower *Hanoloolaatlghaanh Dinh*
171	*Too K'ok'its'ilaayh Da Huk'ana*	Creek of *Too K'ok'its'ilaayh Dinh*



SECTION C-16

Section C-16

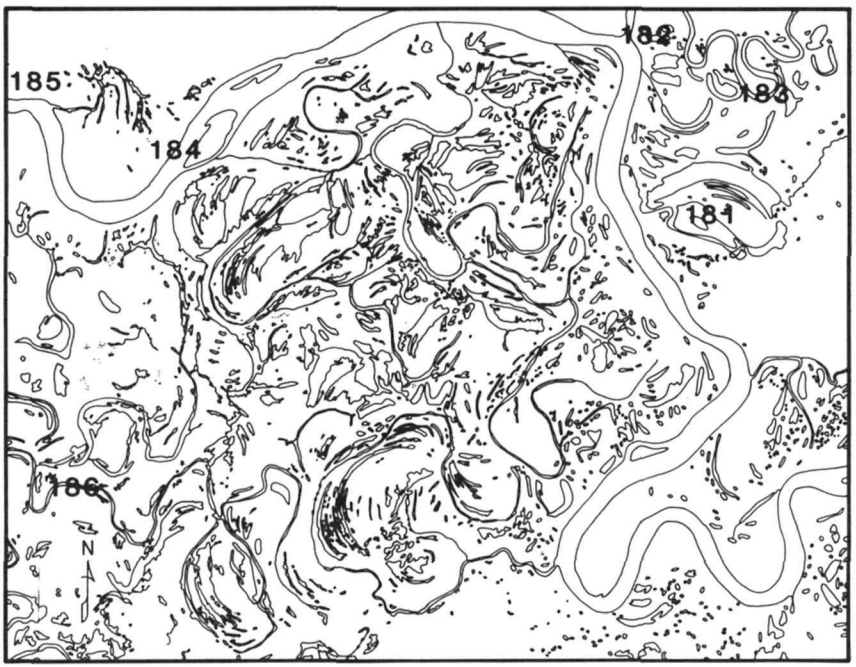
Map No.	Koyukon Site Name	Translation or Description
103	*Tin Loo⁄eetna*	Creek with lots of overhanging ice [Ice is left behind on the bank in winter when the level of the water drops.]
104	*Kk'ą y K'udla Yee*	Lake with willows
106	*Neenok'idilah K'ąhdą⁄ls'in Kkokk'a*	Upper *Neenok'idilah Dinh*
113	*T⁄aadza'uyh*	Rock outcrop
171	*Too K'ok'its'ilaay Da Hą k'a⁄na*	Creek of *Too K'ok'its'ilaayh Dinh*
172	*Neenok'idilah Da Kkokk'a*	Spring where fish stay still to catch other fishes
173	*Taakk'aa⁄t'on Kkokk'a*	*Taakk'aalt'on* lake
174	*Taakk'aa⁄t'on K'ahą ghnaan*	Upper *Taakk'aa⁄t'on Kkokk'a*
175	*Too K'ok'its'ilaayh Da Kkokk'a*	Lake where we start carrying canoes over the mountain from _____**
176	*Sis Dlila*	Black bear mountain
177	*Taakk'aa⁄don*	Mountain by itself



SECTION C-17

Section C-17

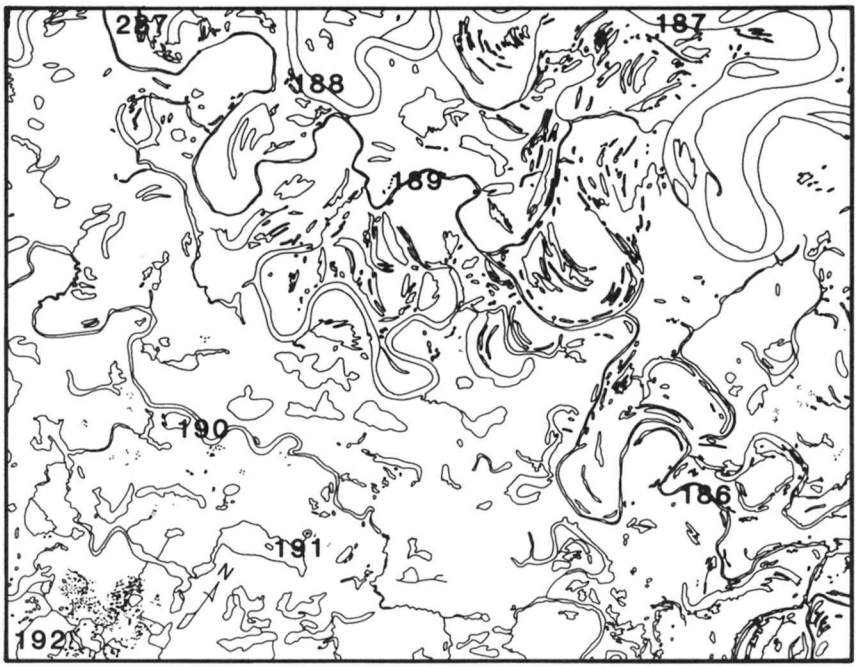
Map No.	Koyukon Site Name	Translation or Description
178	*Diniyh T'oh*	Bearberry place
179	*Diniyh T'oh Kkokk'a*	Stretch of *Diniyh T'oh*
180	*Diniyh T'oh Hɬak'aɬna*	*Diniyh T'oh* slough



SECTION C-18

Section C-18

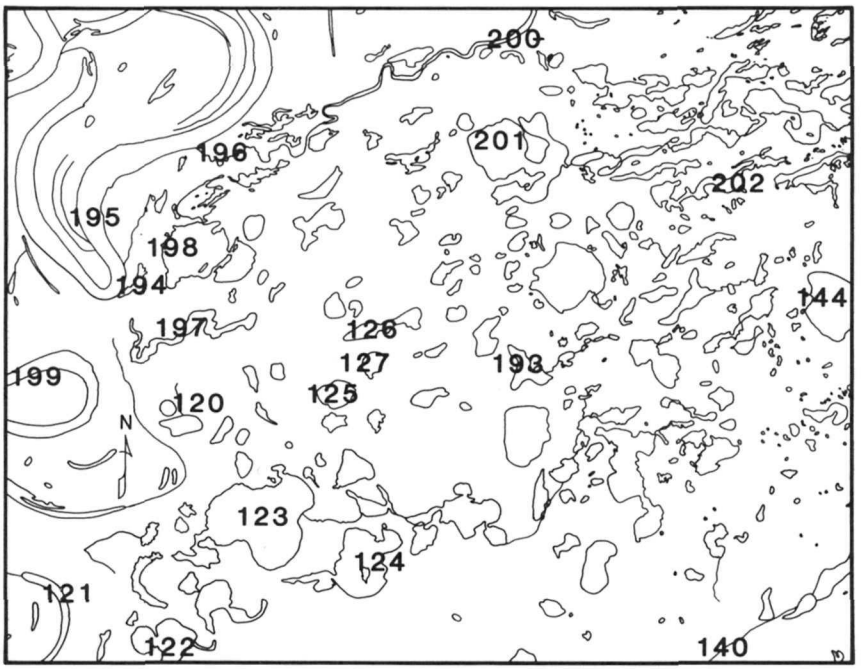
Map No.	Koyukon Site Name	Translation or Description
181	*Taasiz Ghɑ Kkokk'a*	Lake of big whitefish
182	*Hɑgaadzaakkaakk'at*	Mouth of *Hɑgaadzaatna'*
183	*Hɑgaadzaatna*	River running towards *Hɑlghaatna*
184	*Nonts'idnaay Dinh*	Place where we customarily move across the river
185	*Dotson' Da'oyh Dinh*	Place where raven customarily puts up a nest



SECTION C-19

Section C-19

Map No.	Koyukon Site Name	Translation or Description
186	*Dagga Nok'inaalyeez Hu*	Around where one paddles all night
187	*Neeɬts'aadodlinh'a*	The stretch where the river splits
188	*Nʉghɬa*	Short cut (or) side channel in river
189	*Tɬ'oɬdodiloy Hʉkk'aɬna*	Creek of *Tɬ'oɬdodiloyit'*
190	*Noyaagheelinh Hu*	Swift water creek
191	*Kk'eeyh Yeet*	In birch lake
192	*Toonoon Ghʉnh*	At the water filled things (blackfish with stomach full of water)
287	*Tɬ'oɬdodiloyit*	Point where there is moss hanging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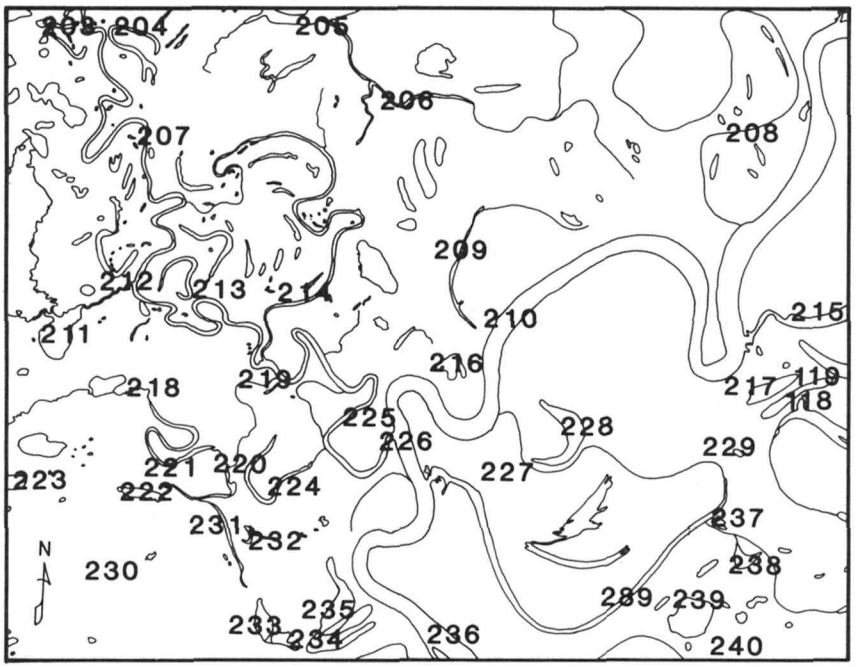
SECTION C-20

Section C-20

Map No.	Koyukon Site Name	Translation or Description
120	*Tiyh Ghu Toneeł'o Dinh*	Place where slough goes through between two hills
121	*Nidaaloda Kkokk'a*	Long lake
122	*Yoodaggu Notok'idinaazakk Dinh*	Horseshoe lake with shallow water
123	*Tots'itdon Da Kkokk'a*	At the stretch of_____**
124	*Toneets Ts'ibaa La'onh Dinh*	Place where there's jack spruce island in the middle
125	*Totsidza Yeet*	In where water broke up land
126	*Kk'eey Tsits Yee*	In the dry birch lake
127	*Saakkaay Naalnonh Dinh*	Place where children died
140	*Tiyh Ghano*	Around the corner of a hill (creek)
144	*Hozaagh Kk'uhulaayh Dinh*	Place where hooking things out takes place (They used to net fish there long ago.)
193	*Neents'eekuh Ts'ilyaayh Dinh*	Place where we leave boats customarily
194	*K'itheetlt'in Dol'onh Dinh*	Place where the skull of something is hanging
195	*Hugh Hooneetlaakk Dinh*	Place where river carved through
196	*Loyhna*	Sandy slough
197	*Taasiz Ghunh*	Whitefish lake
198	*Ts'oo Yakk'a*	Under *Ts'oo*
199	*Toyinaalyeez Dinh*	Place where the river cut through
200	*Loyhna*	Gravel river
201	*Notozahtł'Dinh*	Place where water is winding
202	*Kk'osaaldlinh Dinh*	Where the water is running all over the place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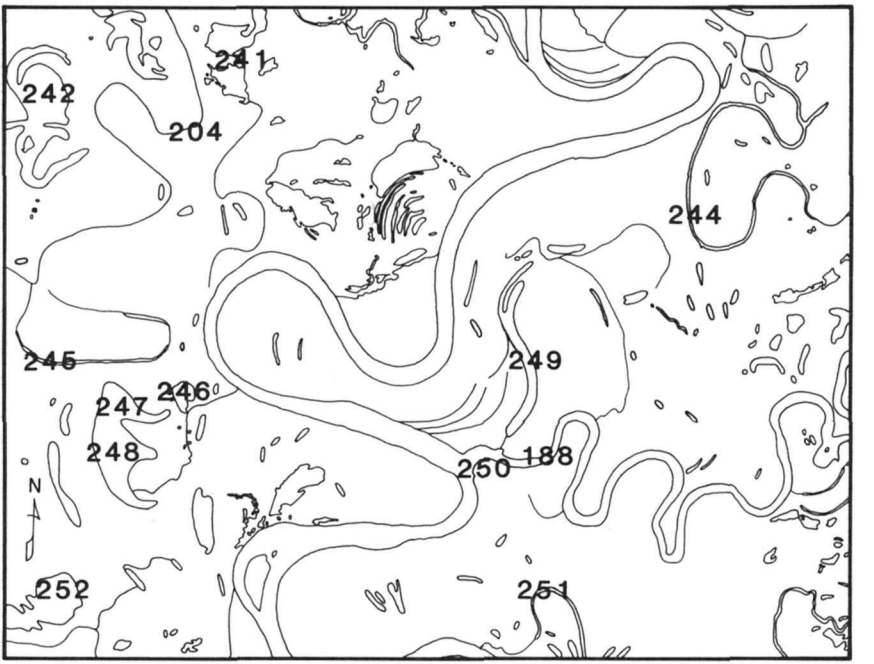
SECTION C-21

Section C-21

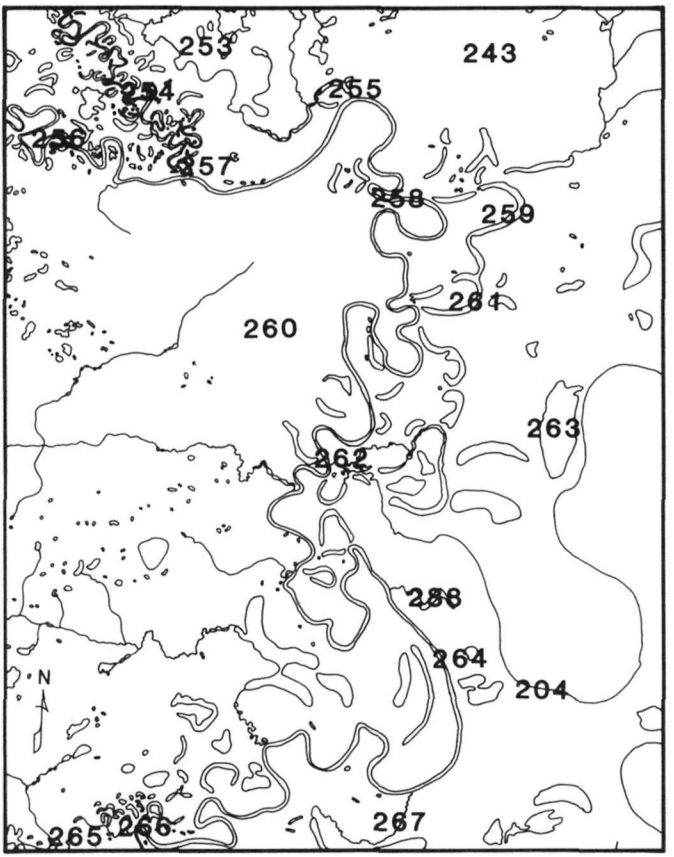
Map No.	Koyukon Site Name	Translation or Description
118	*Hokkoh*	Corner of lake or something
119	*Hugh Toditaal'o Hu*	Lake on the side of long lake
203	*Tsook'aal Kkaagha*	At grandmother's feet
204	*Duhk'idzaay Dinh*	A lake that's shaped like a heart
205	*Duh Ooto Doltonh Da Kkokk'a*	Lane of *Duh Ooto Doltonh Dinh*
206	*Duh Ooto Doltonh Hu*	Around where a clay plot is hanging
207	*Hulyakk'atna*	River with steep banks
208	*Honts'idnaayh Hu*	Where you move around
209	*Dilbagga Ts'oolneek Hu*	Where someone grabbed a ptarmigan
210	*Dilbagga Ts'oolneek Da Kkokk'a*	Long stretch of *Dilbagga Ts'oolneek Hu*
211	*Hunggada Kkokk'a*	Big lake behind the hill
212	*Hunggadinh*	Slough from *Hunggada Kkokk'a*
213	*Tit Kk'aatl'ona*	Where flat comes out to the river
214	*Noono*	Slough around island
215	*Toyinaalyeez Dinh*	Place where the river cut through
216	*Honts'idnaay Dinh*	Where we move up the bank
217	*Todobaak'itl'o Dinh*	A place where something has a beak sticking out into the water
218	*Tiyh Ghu Toneel'o Dinh*	Place where slough goes between two hills
219	*Hudotakku Dinh*	Slough between two sloughs
220	*Neelts'aghun Totl'o Dinh*	Where slough branches off in different directions
221	*Tlaadogga*	Top of hill
222	*Kk'aaziyh Ghun Totl'o Dinh*	Lake beside the slough
223	*Too Dits'itl'eeyh Da Kkokk'a*	Where they reach the lake from the slough
224	*Hudo' Dinh*	The mouth of the place
225	*Tl'otl deekk'on Da Kkokk'a*	Lake where mass caught fire
226	*Hulyakk'a Kkaakk'at*	Mouth of *Hulyakk'atna'*
227	*Nok'idaanee'o Da kkokk'a*	Lake of log jam
228	*Tiyh Yee Minkk'a*	Lake in hill
229	*Kitl Kk'aatiyit*	Place of molting ducks
230	*Dzonyitidilah Dinh*	Blackfish lake
231	*Neenots'eekuhts'ilyaayh Dinh*	Place where we leave our boats
232	*Tinh Needzit*	Lake in the middle of the flat
233	*Nin' Tit Tleetaaltonh Hu*	Trail over land
234	*Too Daaltl'its Dinh*	Black water place
235	*Ts'eeyh Tin Kkokk'a*	Canoe trail
236	*Hulyakknoo' Kkokka'*	Lake of Huslia River island
237	*Dodo Yootleet*	Lake that is downriver from somewhere
238	*Kk'uy Nuggut*	Lake behind willows
239	*Binkookk'a*	**
240	*Ts'aatiyhdinaadakk'onh Dinh*	Place where forest fire burned the hill out to the river



SECTION C-22

Section C-22

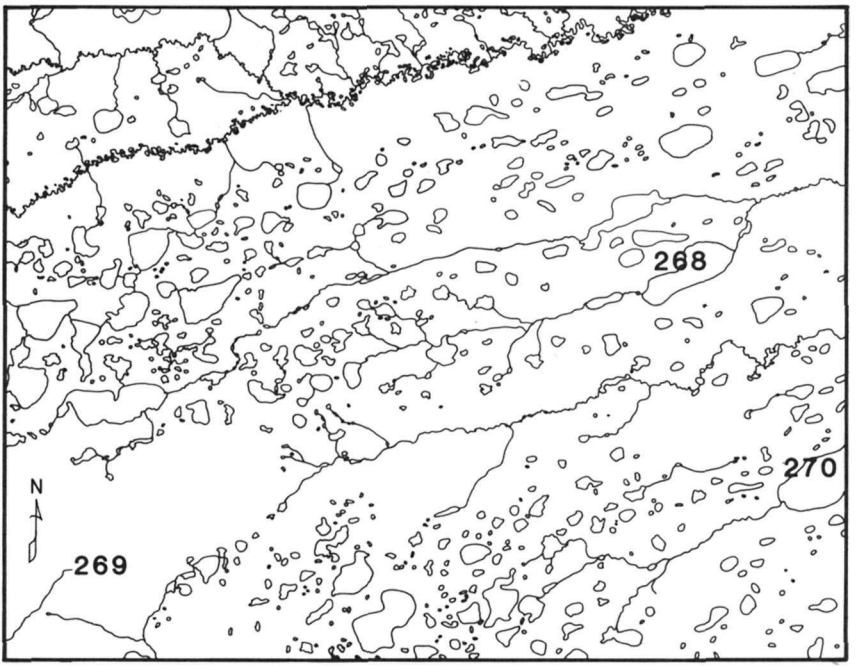
Map No.	Koyukon Site Name	Translation or Description
188	*Nughutla*	Short cut (or) side channel in river
204	*Ts'eekuh Zeetna*	Where one can go a long way in a boat
241	*	Kobuk Lake
242	*Bidziyh Kkunaahaanh Dinh*	Caribou lying all over the place
244	*Nikiltonh Dinh*	Place _____**
245	*Donts'iggadlit*	[Possibly] a gulch down from some place
246	*Liyilyee*	In blueberry bushes
247	*Totsidza Yeet*	Where the water broke up the land
248	*Tokkaa' Daa'athaanh Dinh*	Place where a red-necked grebe is hanging
249	*Binaahkkaadla Ghunh*	At the one that has a bag-like hill next to it
250	*Nihaaghadeelinh Dinh*	Place where current meets
252	*Ts'aahooneela Dinh*	Cut through from lake
252	*Ts'ibaa Yee Kkokk'a*	Spruce lake



SECTION C-23

Section C-23

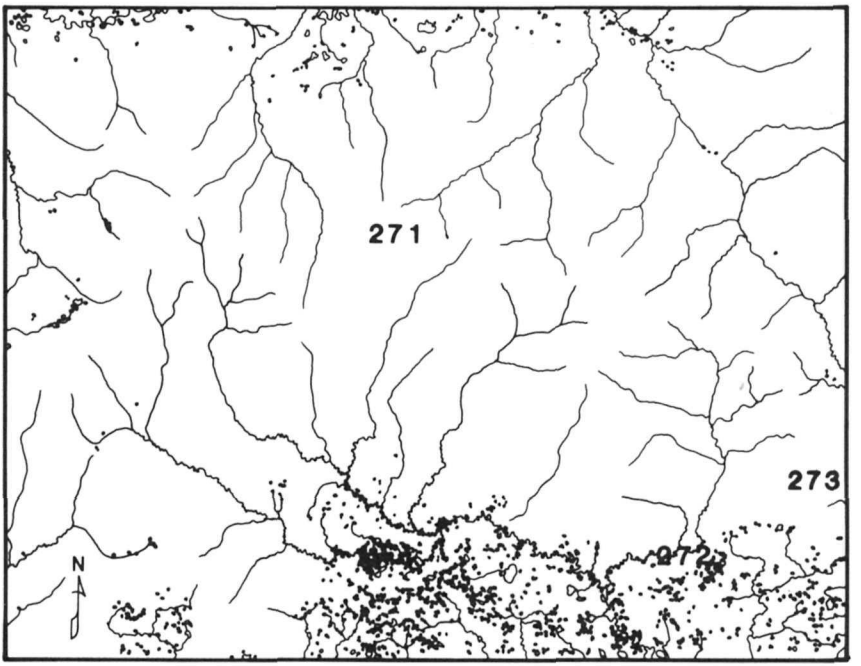
Map No.	Koyukon Site Name	Translation or Description
204	*Ts'eekuh Zeetna*	Where one can go a long way in a boat
243	*Taaɬdzaaydlila'*	**
253	*Aɬ Daaldlo Da Kinkkokk'a*	Flat of *Aɬ Daaldlo Dinh*
254	*Taaɬdzaatna*	*Taaɬdzaat* river
255	*Aɬ Daaldlo Dinh*	Place where spruce boughs are sitting
256	*Hɬyakk'atna*	River with steep banks
257	*Taaɬdzaakkaakk'at*	Mouth of *Taaɬdzaatna*
258	*Totiɬ K'its'ik'aayh Dinh*	Place where we shoot arrows over the hill
259	*Kk'eeyh Tsits Yee Kkokk'a*	Lake with lots of rotten birch
260	*Taaɬdzaay Dlila'*	_____**heart mountain
261	*Ɬokk'a Nitiɬɬik Da Kkokk'a*	Lake where fish jump
262	*Ts'eekuh Zeekaak'at*	Mouth of *Ts'eekuhzeetna*
263	*Hɬɬeekeey Da Kkokk'a*	Lake at the head of all the lakes
264	*Hooɬgeet Dinh*	[Possibly] a place where the hill sticks out crookedly
265	*Nolaaytna*	*Nolaay* river
266	*Nolaay Kkaakk'at*	Mouth of *Nolaaytna*
267	*Dɬh Ooɬo Doltonh Da Hɬkk'atna*	Slough from *Dɬh Ooɬo Doltonh Dinh*
288	*Hooɬgeet Da Kkokk'a*	Lake of *Hooɬgeet Dinh*



SECTION C-24

Section C-24

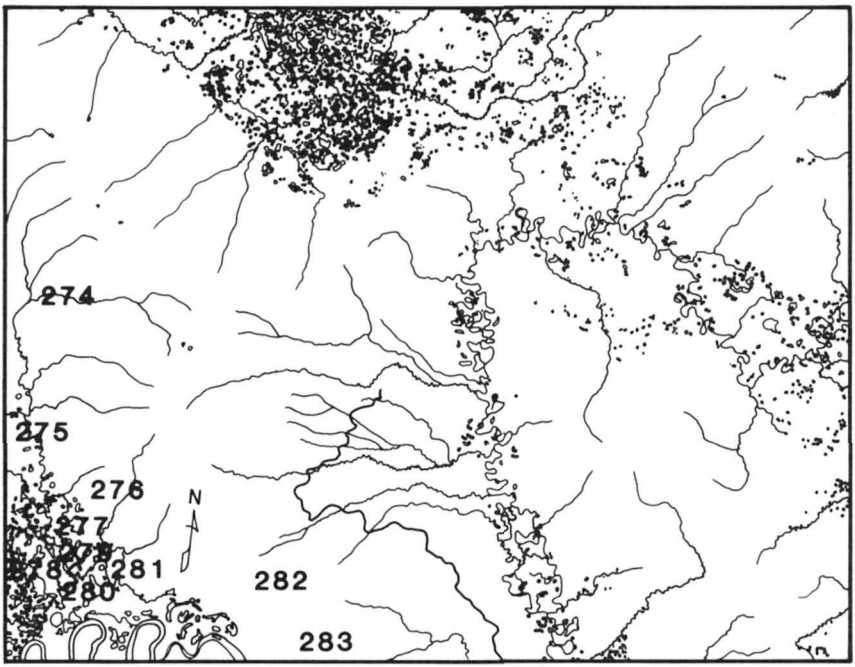
Map No.	Koyukon Site Name	Translation or Description
268	*Dotson' Kkokk'a Gheeyo Dinh*	Place where Raven walked through the lake
269	*Biyee Dinaadikin Daahonee*	The island in which a coffin sits
270	*Taasiz Ghɨɨ Kkokk'a*	Lake of big whitefish



SECTION C-25

Section C-25

Map No.	Koyukon Site Name	Translation or Description
271	*Dibaa Dlila*	Whose mountain
272	*Yokk' oteetna*	**
273	*Taagha Taal'oyee*	Ridge running through water



SECTION C-26

Section C-26

Map No.	Koyukon Site Name	Translation or Description
274	*Tłaayoz Tł'o*	Upriver end of small rock
275	*Dałghdlitna*	Creek running off the mountain
276	*Tsoł Nuł*	Wild carrot
277	*S'iłT'oh*	Under the mountain
278	*Totił No'eedileeyh Dinh*	Place where water runs over land occasionally
279	*Ts'ibaa Nitotł'o Dinh*	Place where water is in among spruce trees
280	*Oonyeeyh Tilah Dinh*	Place where blackfish start running
281	*Tsoł Binkk'a*	Wild carrot lake
282	*Toghałtaal'ayee*	Ridge along the river
283	*Nohkk'aa*	Lookout place (from which to watch for animals)

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After reading about his people in **Tracks in the Wildland,** a Koyukon gentleman said, "Now you know all our secrets. . . ."

He had read Occasional Paper No. 9, the original monograph issued by the Anthropology and Historic Preservation section of the Cooperative Park Studies Unit, University of Alaska, Fairbanks. He and others living in the area, land use planners, government officials, and visitors have wanted more copies of "Tracks" than we could print. Thus, we offer the book you now hold in your hand.

Under the guidance of Zorro Bradley, chief of the Unit, and with support from the National Park Service, the authors lived with the inhabitants of the Koyukuk River area in 1976-77. **Richard K. Nelson, Kathleen H. Mautner,** and **G. Ray Bane** participated in the subsistence way of life found in the Central Brooks Range to study local land use prior to the establishment of Gates of the Arctic National Park. Their observations clearly show their respect for and personal involvement with the country and its people.

This new edition retains the material found in the original monograph: the in-depth description and discussion of traditional Koyukon Athabaskan and Nunamiut Eskimo lifeways and the changes subsequent to White contact. It also includes the large "how-to" sections, the maps and resource lists illustrating the intimate ties of the people to their land, and most of Timothy Sczawinski's pen-and-ink drawings—with new ones created especially for this book.