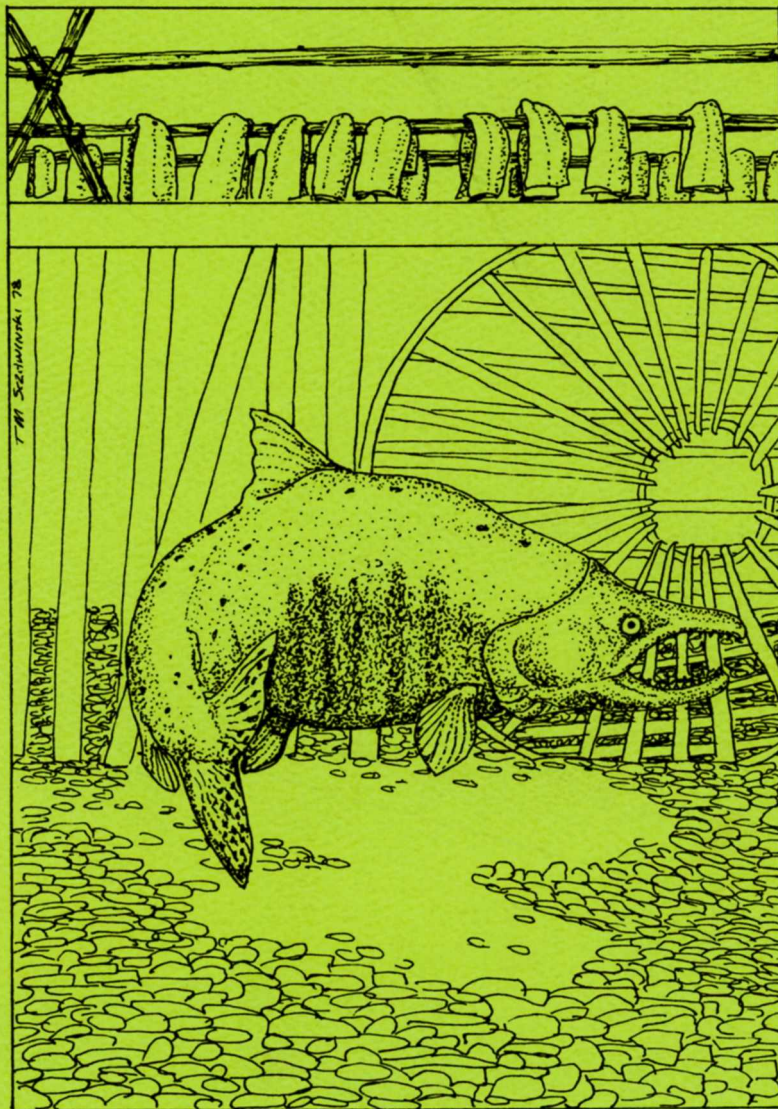


**Resource Use and Subsistence
in the Vicinity of the Proposed
Lake Clark National Park, Alaska
and
Additions to Katmai National Monument**

Steven R. Behnke



**Anthropology and Historic Preservation
Cooperative Park Studies Unit
University of Alaska
Fairbanks, Alaska**

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RESIDENT RESOURCE USE IN
THE VICINITY OF THE PROPOSED
LAKE CLARK NATIONAL PARK, ALASKA

I. INTRODUCTION: THE COUNTRY AND RESOURCES

The proposed Lake Clark National Park-Preserve occupies an area which includes the north end of the Aleutian Range, and south end of the Alaska Range in South central Alaska. Much of the area proposed for inclusion in this park is mountainous, covered with glaciers, and too rugged and inhospitable for permanent human occupation. But man has managed to occupy and use the foothills, valleys, lakes and rivers of the proposal as well as the Cook Inlet coast, for thousands of years.

The purpose of this report is to describe the use of land and resources by residents of the Lake Clark proposal area. A wide variety of fish, game and other local resources are harvested by the approximately 230 residents of Nondalton and Lake Clark, and many of their harvest activities occur within the National Park and Preserve proposals. These activities are important to people who live in the area, for there are few year-round employment opportunities. While most wage income is seasonal, local fish and game resources provide employment and food throughout the year. Local resources also have considerable social and cultural significance to most residents.

The author; employed by the University of Alaska, conducted a preliminary survey of land and resource utilization in the Lake Clark area from November, 1976 to February, 1977. Additional field work was conducted during spring, 1977, and further information has been gathered during the author's two years of residence in the Lake Clark Area.

I gratefully acknowledge the assistance and generosity of all the people of Lake Clark and Nondalton, while retaining responsibility for any incorrect statements or misinterpretations made in this report. Special thanks to the Bill Trefon family in Nondalton, to Chuck and Sara Hornberger on Lake Clark, and to my wife, Linda, who put up with nine moves in as many months. The orthography for Tanaina words used in the report is taken from Tenenbaum (1975), while that for place names is from Kari (1977, unpublished), included in an appendix to the report.

National Park Proposals

The southern portion of the Alaska Range, near the base of the Alaska Peninsula, is a diverse and scenic area of mountains, glaciers, coast, rivers, and large mountain lakes, including fifty-mile long Lake Clark. Since the 1960's a number of proposals have been made for the creation of a National Park in the Lake Clark area, and while there are differences in acreages and areas proposed, at least a core area is likely to be managed by the National Park Service.

This core includes the mountains and glacially-formed lakes of a large area at the junction of the Alaska and Aleutian ranges, encompassing the headwaters of four major drainage systems. Short streams flow east out of the rugged mountains into Cook Inlet, which forms the eastern boundary of the core. The northern edge of the proposals includes the upper tributaries of the Stony and Chakachamna Rivers, the former draining west to the Kuskokwim River, and the latter east to Cook Inlet. A number of beautiful glacially-formed lakes in the western foothills of the Alaska Range drain into the Stony and Mulchatna rivers. Lake Clark, the largest of these lakes, lies in a long fault valley which creates a major pass through the Alaska Range; it drains southwest into Iliamna Lake.

The general study area for this survey was defined by the Department of the Interior's 1974 Environmental Impact Statement for the proposed Lake Clark National Park (see map). More recent proposals have subsequently been taken into consideration, including Secretary Andrus' recommendations on D-2 lands shown on map 1. The western half of this proposal, encompassing the area from Stony River south to Lake Clark, down to Nondalton, over the Mulchatna River and back to the Stony River, includes the traditional territory of the subgroup of Tanaina Athabaskans whose descendents live in Lime Village and Nondalton. Most of this area has been utilized for subsistence purposes by the residents of these communities, and this area of traditional use has also helped define the research area.

In general, it can be stated that much of the park proposal, particularly the rugged mountainous portions, is not utilized today for resource harvest by local residents. The residents of two communities, Port Alsworth, on Lake Clark, and Nondalton, on Six-Mile Lake, as well as several scattered families within the proposal, do make considerable use of other portions of the proposal, however.

The Country and Resources

The proposed area includes a diversity of terrain and habitat. Rugged mountains, rolling upland tundra, deep cold glacial lakes and rivers, slow, and warmer drainages, scrub spruce, recently vegetated burns, and mature spruce/birch forests are all represented in the area. Most of the region has a climate transitional between the coastal and interior; weather is subject to major seasonal and annual fluctuations.

The diversity of terrain, habitat and climate support a wide variety of wildlife and other resources; Table 1-1 provides a list of the resources

TABLE 1-1

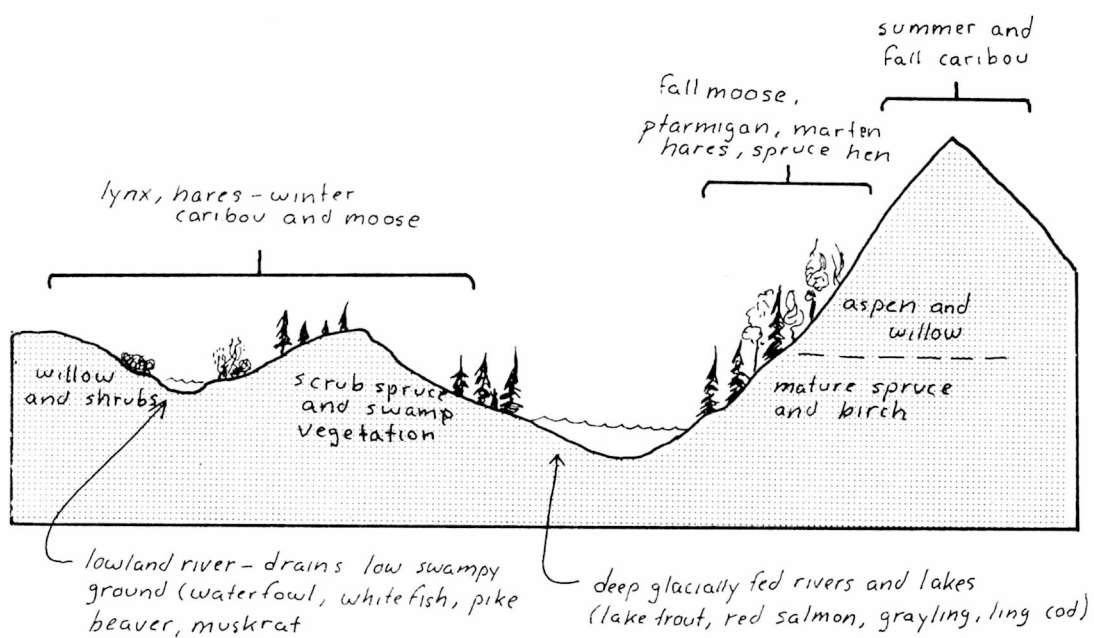
SPECIES UTILIZED BY RESIDENTS OF THE NONDALTON-LAKE CLARK ARFA

<u>English Names</u>	<u>Scientific Names</u>	<u>Nondalton Dena'ina Names*</u>
<u>Mammals</u>		
moose	Alces alces	K'uhda'i
caribou	Rangifer granti	vejex
brown bear	Ursus arctos	ghenuy, shesh
black bear	Ursus americanus	yeghdishla, gadishla
dall sheep	Ovis dalli	nudyi
lynx	Lynx Canadensis	kazhna
wolverine	Gulo gulo	idashla, dghusha
wolf	Canis lupus	riqin
red fox	Vulpes fulva	q'anlcha
cross fox		chavadushga
silver fox		k't'esha
mink	Mustela vison	tak'sch'a
short-tailed weasel	Mustela erminea	kaghuljena
least weasel	Mustela rixosa	yukina
marten	Martes americana	k'chughuxa
river otter	Lutra canadensis	aggeya
muskrat	Ondatra zebethicus	tu-chuda
beaver	Castor canadensis	chu
porcupine	Erithizon dorsatum	nini
ground squirrel	Citellus parryi	qunsha
hoary marmot	Marmota marmota	k'qusheya
red squirrel	Tamiasciurus hudsonicus	ts'ela
varying hare	Lepus americanus	hvaya
arctic hare	Lepus othus	ggeh kegh
<u>Fish</u>		
red salmon	Oncorhynchus nerka	k'q'uya
silver salmon	Oncorhynchus kisutch	nusdlaghi +
pink salmon (humpy)	Oncorhynchus gorbushca	alima, quighuna +
dog samon (chum)	oncorhynchus keta	nulay +
king salmon	onchorhynchus tshawytscha	Liq'a ka'a+
rainbow	Salmo gaidneri	tuni
dolly varden	Salvelinus sp.	qak'elay, liq'a k'qe
arctic char	Salvelinus sp.	vat
lake trout	Salvelinus namaycush	zhuk'udghuzha
grayling	Thymallus arcticus	ch'dat'an
humpback whitefish		telay
whitefish		hulehga'
candlefish (round whitefish)		hesten
pike	Esox lucius	ghelguts'i
ling cod	Lota lota	ch'unya
longnose sucker	Catostomus catostomus	duch'ehdi

*From Tenenbaum 1975, Tanaina Noun Dictionary
 +Occur in Mulchatna and Stony River drainages

<u>English Names</u>	<u>Scientific Names</u>	<u>Nondalton Dena'ina Names</u>
<u>Birds</u>		
Canada goose	<i>Branta canadensis</i>	ventl'uqench'ela
brant	<i>Branta nigricans</i>	chulvin vi'a
white-fronted goose	<i>Anser albifrons</i>	dalvay
snow goose	<i>Chen hyperborea</i>	ch'iluzhena
mallard	<i>Anas platyrhynchos</i>	chadat'l'ech'i
pintail	<i>Anas acuta</i>	chendghinlggesh
gadwall	<i>Anas strepera</i>	sheshinya
shoveler	<i>Spatula clypeata</i>	veduzhizha dghiltali
green winged teal	<i>Anas carolinensis</i>	hulchiza
greater scaup	<i>Aythya marila</i>	jija veq'ilq'eli
common goldeneye	<i>Bucephala clangula</i>	ts'iq'unya
bufflehead	<i>Bucephala albeola</i>	suknatsighat
harlequin duck	<i>Histrionicus histrionicus</i>	tusget'ay
oldsquaw	<i>Clangula hyemalis</i>	ahhanva
common scoter	<i>Gidemia nigra</i>	jijalt'esha
common merganser	<i>Mergus serrator</i>	cheghesh
whistling swan	<i>Olor columbianus</i>	tava
sandhill crane	<i>Grus canadensis</i>	ndał
spruce grouse	<i>Canachites canadensis</i>	ełdyin
ruffed grouse	<i>Bonasa umbellus</i>	k'dełnini
willow ptarmigan	<i>Lagopus lagopus</i>	q'ach'ema
rock ptarmigan	<i>Lagopus mutus</i>	jełq'ach'ema
white-tailed ptarmigan		qatsin qat
<u>Plants</u>		
white spruce	<i>Picea glauca</i>	ch'vala
black spruce	<i>Picea mariana</i>	ch'vach'etl'a
birch	<i>Betula papyrifera</i>	q'itsay
common juniper	<i>Juniperus communis</i>	shint'una
american green alder	<i>Alnus crispa</i>	qenq'eya
willow	<i>salix sp.</i>	ch'etl'
cottonwood	<i>Populus balsamifera</i>	eseni
aspen	<i>Populus tremuloides</i>	t'eghes
bog blueberry	<i>Vaccinium uliginosum</i>	gigagheli
highbush blueberry	<i>V. ovaliflorum</i>	gigantsa
lowbush cranberry	<i>V. vitis-idaea</i>	k'inghildi, heygega
nagoonberry	<i>Rubus arcticus</i>	nughuya giga
raspberry	<i>Rubus idaeus</i>	k'engutl'kegh
salmonberry	<i>Rubus chamaemorus</i>	k'enqutl'
bearberry	<i>Arctostaphylos alpina</i>	gizha naga
black currant	<i>Ribes hudsonianum</i>	ggaga giga
red currant	<i>Ribes triste</i>	jeghdenghultl'ila
wild rose	<i>Rosa acicularis</i>	hesh
Indian potato	<i>Hedysarum alpinum</i>	k'tl'ila
wild rice	<i>Frutillaria camschatcensis</i>	qinazdli
fireweed	<i>Epilobium angustifolium</i>	ch'deshitleq'a
wild onion	<i>Allium schoenoprasum</i>	hdenłghik'i
wild rhubarb	<i>Rumex sp.</i>	kashi
wood fern	<i>Dryopteris austriaca</i>	uh
labrador tea	<i>Ledum decumbens</i>	k'luq'ey

*Reported from Mulchatna and Stony River drainages by Nondalton residents as well as from Crescent Lake by Nacine and Young (1978,222).



Idealized Lake Clark area terrain and habitat types

exploited by the residents of the area. Different resource associations are found in different terrain and habitat types. Since much subsistence related travel is by boat or snowmobile, the lakes, rivers and open country where travel is easiest are particularly important for resource harvest. The knowledge of seasonal distributions and movements of wildlife are critical to the resource user.

II. THE RESOURCE USERS

The fish and wildlife resources of the Lake Clark study area are utilized for a variety of purposes by people from throughout Alaska, and indeed, the world. Although the area is not as well-known for its populations of trophy fish, moose, brown bear and caribou as is the nearby Alaska Peninsula, it is a large diverse area which has not been as heavily hunted as that more popular region. The past ten or fifteen years have brought increasing numbers of urban Alaskans, as well as sportsmen from the continental United States and Europe to the area, particularly for hunting and fishing. Observation and photography of wildlife, as well as fishing, hunting and trapping, are important uses to residents, as well as non-residents of the region.

Users can be grouped by a number of common, albeit informal criteria, including their places of residence, economic situations, cultural orientations and purposes of harvest. Users come to feel that they have moral rights to resources based on past use, in addition to the rights in state and federal law which they all share. Individuals and groups come to have strong territorial and proprietary feelings about areas and resources they utilize.

The residents of the Lake Clark region for example, have strong attachments to place and wildlife based upon past and current use. Many of them have grown up in the area, and wildlife has been an important part of making a living, as well as a major component of their ways of life. Even recently arrived residents quickly develop a sense of possessiveness about the land and resources.

In a similar way, Kenai and Anchorage residents who fly into the Lake Clark region to fish, hunt or trap feel that they have rights to resources. Some have cabins within the region; some have been coming to the area for many years and feel strongly about this personal tradition. Although most of them have employment outside the region which supplies most of their living, they feel that the moose or caribou they take in the proposal area are both economically and symbolically significant.

Sportsmen who have begun to hunt or fish the region more recently, or to whom the area is one of a number of alternative hunting areas, are more likely to feel that all land should be open to everyone. Sport hunters and fishermen come to the region from Alaskan cities and from outside the state to take part in their chosen sport. A number of guides and air services, most of them based outside the region, bring sportsmen into the Lake Clark area.

Area residents frequently resent "outsiders" who come into the region to harvest wildlife. The use of local resources by area residents for their own consumption is how most of these people define "subsistence," and this is how this controversial word is used throughout this report. Many of the hunters from outside the region who are mainly interested in taking meat back to town for their own use would probably agree with this use of the term, although they would disagree with regional residence as a

criteria; this usage is similar to the State of Alaska's position on subsistence. Other people, including "sport" hunters and fishermen, are more interested in the resources in terms of recreation than food, and many of them would deny that such a thing as "subsistence" use exists at all.

Residents of the Proposal

The people of two communities, Port Alsworth and Nondalton, as well as several individuals and families in other locations within the area, are of most concern in any discussion of subsistence resource use in the Lake Clark region. These are the people who live year-round in the area, who have the strongest emotional, cultural, and economic ties to the area and its resources and who make the most consistent and comprehensive use of them.

Port Alsworth, a post office at Hardenburg Bay on the southwestern shore of Lake Clark, is a loci for a small population along the lakeshore near the bay and the mouth of Tanakan River. During the winter of 1976-77, the population was approximately 25, although the winter population varies from year to year. In summer the population increases greatly as summer residents arrive, lodges open, and Tanalian Bible Camp is held.

There is a privately owned airstrip at Port Alsworth, and a post office with mail services three times a week from Iliamna. Weather observations are made, and RCA maintains a bush telephone there.

Several other people live at more isolated locations around the shores of Lake Clark and elsewhere within the park proposals. A Tanaina family lives across the lake from Port Alsworth, and a couple of miles up the beach from them a young man takes care of a lodge and traps during the winter. Several miles further up Lake Clark another young man lives year-round, taking care of a large log home and lodge. Other cabins in the area are used

on weekends, or during the summer.

One man operates a lodge on Fishtrap Lake, north of Lake Clark, and he lives there much of the year, trapping with an airplane in the winter. Another man lives much of the time at Twin Lakes, although during the period of field work he was not in residence there. Two or three people were living along the Cook Inlet coast in the Chinitna Bay-Iniskin Bay area, where they trap in the winter. They were not visited. Frequently people from outside the region spend a few months or a winter at locations within the proposal, trapping or just "living."

Just outside the 1974 park proposal, within the area of ecological concern, a family lives at the mouth of the Chulitna River. Another family built a cabin on the shore of Lake Clark near the mouth of Portage Bay in the summer of 1976 and spent the winter there.

Most of the people living around Lake Clark are Caucasian, with the exception of one Tanaina family, although some of the families are of mixed ancestry. Most of the white residents have arrived relatively recently; only a small core, two or three families, have consistently lived in the area for more than ten years. A number of the other people began living in the area seasonally during the late 1960's and early 1970's and have since established there permanently. About half the people have moved to the area in the last one to four years. Some of the seasonal residents owning cabins in the area hope eventually to move there permanently and there are presently several homes and cabins being constructed at Port Alsworth and around Lake Clark.

The Tanaina Athapaskan people of Nondalton comprise the single largest group of resource users in the area near the park proposal. The village of Nondalton is located on the northwest shore of Six-Mile Lake, near

its outlet into the Newhalen River. Six-Mile Lake is connected by a narrow channel to Lake Clark. Red salmon ascend the Newhalen River and the village of Nondalton developed near long established fish camps at the outlet of the lake.

Nondalton has a population of about 200 people, of whom about 90% are of Tanaina Athapaskan ancestry. The small white population is composed of teachers, missionaries, and a few men married to Tanaina women.

Despite the village's proximity to Anchorage, which is only 180 air miles away, Nondalton is surprisingly isolated from the modern urban world. Unlike most rural Alaskan villages, there are no telephone connections and no public electricity. An air taxi in Iliamna delivers mail three times a week, and provides connections to flights to Anchorage, but wind, fog, and snow can close the area to air traffic for days at a time. There are two stores in the village but their prices are often double those in Anchorage. Transportation costs are high for freight and passengers; a round-trip to Anchorage costs about \$120.00.

There is a cultural, as well as physical isolation. Most of the older people continue to speak Tanaina among themselves, but most younger people do not understand the language. Most Nondalton Tanaina are Russian Orthodox, and there is a strong undercurrent of older belief. People are uncommunicative with strangers who come into the village, and sometimes suspicious of them, so misunderstandings and hostility arise in dealings with outsiders. The village has a reputation for being rough and having a lot of alcohol related problems.

Nondalton people travel frequently to Anchorage and Bristol Bay for visiting, shopping, and seasonal jobs, but overall they have a more restricted physical and social mobility than white residents of Lake Clark do. Many

of the people of Lake Clark and Port Alsworth own aircraft and fly to gain access to local natural resources as well as outside resources such as supplies and jobs in Anchorage or other areas.

Neighboring Communities

Several other nearby communities are involved in the affairs of the Lake Clark proposal area. Iliamna is a small community of about 70 year-round residents on the north shore of Iliamna Lake. It is a transportation and service center for the Iliamna Lake area, including Lake Clark, since it has scheduled airline connections with Anchorage and is served by barge from Cook Inlet and Bristol Bay. It is a well known sport-fishing and guided hunting center. Most of the residents of Iliamna are white, and most are employed by government, or in transportation, lodging, and guiding services.

About four miles from Iliamna, at the mouth of the Newhalen River, is the village of Newhalen with a population of about 90. It is largely "Aleut," or Yupik Eskimo, although there are also whites and Tanaina living there. A road connects the village with Iliamna and the airfield, and a school is shared by the two communities.

The "portage" road, about ten miles of dirt and gravel, connects Iliamna and Newhalen with the "landing" on the upper Newhalen River some eight miles below Nondalton. The road bypasses the rapids in the Newhalen, and is utilized for hauling fuel and supplies from the bargehead or airport at Iliamna to the navigable upper part of the river, where they can be hauled by boat to Nondalton or up into Lake Clark. It is also utilized by hunters and fishermen.

The subsistence activities of Newhalen people take them up along

the Newhalen River towards Roadhouse Mountain, or across the river toward Talarik Creek and Koktuli River, but generally not into the Lake Clark study area. A few people from Iliamna utilize the Lake Clark and Mulchatna areas for hunting, fishing, trapping, and recreation; several have cabins in these areas. Most of them own aircraft with which they gain seasonal access to these areas. A number of individuals from other communities follow similar patterns of use. Utilization by most of these people is considered to be different from that of subsistence use by residents of the area, having more of a recreational and commercial component. A few individuals from nearby communities who use portions of the study area for trapping or moose or caribou hunting could be considered subsistence users. People from Iliamna Lake, for example, have long trapped in the Mulchatna drainage, while people from the Nushagak River travel by boat up the Mulchatna into the proposal area to hunt caribou and moose.

Pedro Bay, at the northeastern end of Iliamna Lake, is a small mixed white and Tanaina community of about 40 people. Most of its residents fish in Bristol Bay or go out to temporary jobs in the summer. The Tanaina in Pedro Bay are closely related to the people of Nondalton and have utilized some of the same trapping and hunting areas in the past, in the Chekok, Pile, and Mulchatna drainages. Today few if any of the subsistence activities of Pedro Bay people occur within or close to the proposal.

Lime Village is a small, extremely isolated Tanaina village of about 40 people on the upper Stony River. Its residents are closely related to the people of Nondalton, the people of Lime Village have utilized the western portion of the Lake Clark proposal, including the upper Stony River, Telaquana Lake, Whitefish Lake and upper Mulchatna areas, for hunting, trapping, and fishing.

Lime Village has only received regular mail service in the last two or three years and in this same period a school has been started. Most travel out of the village is via McGrath and people look in that direction and towards Anchorage for temporary summer work. Hunting and fishing supply much of the meat utilized by villagers and trapping is important for a few families. Several families have dogteams, and summer salmon fishing is an important activity for supplying dog food. Most of the subsistence activities of Lime Village people today take place 30 or 40 miles west of the northern portion of the Lake Clark park proposal, although they occasionally occur closer in the Whitefish Lake, upper Mulchatna area.

Most of the residents of Lake Clark and other locations within the park proposal, and most of the people of Nondalton, benefit from resources harvested within portions of the park and preserve proposals. Lake Clark and its shoreline is utilized by members of at least 25 of the 30 households in Nondalton at one time or another. This makes a total of about 240 local residents who benefit from use of the proposal, although not all of them harvest resources in the area with the same frequency, or are dependent on the proposal to the same degree. For example, many Nondalton families only get into the proposal area a few times a year, or only every other year.

The degrees of dependence of these people upon resources harvested from the proposal varies from very little to moderate. Today no one is totally dependent upon the proposal's resources for the necessities of life, since all have some form of cash income and certain alternative harvest areas.

III. HISTORY OF SETTLEMENT AND SUBSISTENCE

The basic adaptive problems for any group of people who live by hunting, fishing or gathering are the development of harvest and storage techniques, and the scheduling, in time and location, of their harvest activities. These problems are particularly severe in the arctic and sub-arctic with their low solar energy income, and relatively short history of ecosystem development since glacial retreats. These regions are characteristically short food chains, small biomass per area, major fluctuations in game populations and migration of many species over large areas annually.

Several major prey species utilized by the people of the Lake Clark proposal area including caribou, waterfowl, salmon, and other fish species, spend only part of the year in the region, and migrate between different habitats during the year. Often game species are available only for a short period of time, or only in localized areas to human predators. Game laws and regulations place further constraints upon human access to, and use of, wildlife resources.

Any group of people which depend on these resources must have not only an understanding of the natural history of each species, and of local geography, but also the ability to be in the right place at the right time to harvest them. They must also have flexibility which allows them to change as the resource base changes.

This section gives a brief historical perspective on settlement and subsistence patterns in the Lake Clark region. This historical view provides a background for understanding change, and approximates the experience and perceptions of residents of the area from whom this information comes. The past, present, and future are not separated in people's lives and values,

and a picture of contemporary resource utilization would be static and incomplete without some conception of what had gone before.

Early Settlement

The prehistory of the Lake Clark/Stony River/Mulchatna region is almost totally unknown. A small number of prehistoric sites have recently been discovered in the upper Stony River and Mulchatna drainages (Smith and Shields, 1977), but the few artifacts recovered tell us little or nothing about dates of occupation or cultural affiliations. It appears likely that the region has had at least intermittent human use for several thousand years.

By the time the Russians began to acquire knowledge of the region, however, in the late 1700's and early 1800's, portions of it at least were occupied by the people who have come to be known in anthropological literature as the Tanaina. The best known early Tanaina settlement in the region is qizhjeh, or Kijik, on the northwestern shore of Lake Clark, which has been in existence at least since 1818, judging from a Russian map of Korsakovskii's journey inland to the upper Mulchatna (Federova, 1973). Kijik may have also been the place where the priest Juvenal was killed in 1796 (Townsend, 1965: 36-53)

While Vanstone and Townsend (1970) excavations at the site of Kijik found no evidence of occupation earlier than the mid or late 1800's they suggest that the village was occupied since around 1800. Recently discovered housepits in the vicinity of the Kijik River indicate that the general area was occupied earlier, probably at least by the late 1700's. The Tanaina name qizhjeh apparently refers to a settlement area, rather than a particular site, and there may be other scattered housepits such as the one behind Chulitna Lodge, about three miles from Kijik which predate

or are contemporaneous, with the Kijik site. A visitor to the Kijik village in 1898, for example, noted that a woman walked in from a house five or six miles away (Banks, 1949:29).

Other settlement areas of the Tanaina in the region in the 1800's included qeghnilen (Canyon Village), k'h'dichen (the modern site of Lime Village) and other locations on the Stony River; chqul-chistnu, near Telaquana Lake; and hq'ak'elyashtnu (Grayling Creek), and other locations on the Mulchatna River. Little is recorded in either ethnographic or archaeological literature about these places, but a few older people in Lime Village and Nondalton mention them as old sites.

Aboriginal Subsistence

Each settlement area of the Tanaina in the Lake Clark-Stony River region had particular resource combinations, but general patterns of subsistence were probably similar over the entire region. Salmon were important to the Tanaina, as they were to most northern Athabaskans (Osgood, 1937:26), but large game hunting, particularly of caribou, has apparently played an important role as well. Other large-game species, including sheep, brown bear and black bear, have also been important to the people of Lake Clark. Townsend (1965:192) was told by a Pedro Bay informant that an old chief had told him in 1906 that when the Tanaina first came to Iliamna Lake they were primarily land hunters, and relied heavily on moose. Since there were no moose in the Iliamna area, they began to depend on salmon.

Red salmon are the only salmon species to ascend the Newhalen River into Lake Clark in numbers. Long ago they were speared along the banks of the river, as they occasionally were until the 1930's or 1940's by Nondalton people, and they were taken in fishtraps (taz'in). Seines, made

of rawhide, or of lashed roots, may have been used as well. Fish traps were probably the most important means of harvesting large numbers of salmon, and they were important for taking other fish species as well.

The fishtrap could be shaped in a long tube, made of split spruce, or alder poles lashed to birch hoops, or might simply be a large box with sides made of poles and no top. It was usually set in small, shallow streams or in sloughs off main rivers, and was usually used in conjunction with a fish weir to funnel fish into the trap. The sides or leads of the weir, called taztin or talyagi, were constructed of poles lashed to form A-frames sticking up out of the water, and connected with other poles. It was set in a "V" across the stream, with the point of the "V" upstream. The sides, filled with brush and poles to keep fish from going through, guided them into the fishtrap at the point of the "V." Salmon were taken out of the trap through an opening on the top with a dip net (tach'nil'ey) woven with roots and attached to a long pole (Osgood, *ibid*; Wrangell, 1970:12).

Fishtraps were utilized in the outlets of many streams of the region. Fishtrap, Lachbuna, Twin Lakes, Telaquana, Whitefish, and Tazimina Lakes are all reported to have had fishtraps, as are many other streams in the Mulchatna and Stony drainages. The Tanaina name for Tazimina (taz'in vena) means fishtrap lake.

The Mulchatna and Stony rivers have runs of king, chum, humpbacked and silver as well as red salmon. Rainbow trout, char, whitefish, pike, and lake trout were also taken in fishtraps at different seasons.

During the summer, while putting up dried fish in much the manner in which it is still done, the Lake Clark-Interior Tanaina probably lived in large pole-framed structures covered with bark similar to the Upper Inlet summer houses described by Osgood (1937:62). These may have been

similar in shape and size to the smokehouses (chagenq'a) currently in use near Nondalton. Smaller temporary dwellings covered with bark were also constructed. After canvas became available, people began making tents with it, which became standard summer dwellings, although bark shelters continued to be occasionally used until the 1940's by Stony River people.

Dried fish were stored in above ground caches (deh'i), or sometimes underground in pits lined with logs (chuten). A favorite food, chuquilin, was salmon buried in a hole in the ground until it fermented. Fish heads and salmon were probably also stored in holes in the ground for dogfood.

It was common for the Tanaina to walk into the hills and mountains away from Lake Clark and other fishing areas in summer and fall to look for large game. Dogs were used to pack equipment, such as sheets of birch bark for shelter, to help hunt, and to pack meat back out.

Summer trails (shanten) crisscrossed the region, and people could walk from the Kijik vicinity into the mountains to the north, northeast and northwest. Bear, sheep, caribou and moose were hunted along these, and there were lakes and streams where salmon and other fish could be trapped, speared, or hooked. Many people tell stories about epic walks over these trails. One man is said to have walked from the Stony River to Kijik in October in three days, via the "upper" or so-called "Telaquana" trail.

The caribou of the Mulchatna herd have fluctuated greatly in numbers over the years, as other caribou herds in Alaska have, and this has probably had considerable impact on the culture history of the region. In times of abundant caribou, people probably moved into the region, while in times of scarcity they have been forced to move elsewhere or use alternative resources.

Before the introduction of firearms, individuals could hunt caribou with bow and arrow in country with shelter for stalking them, but it is likely that in this region, like other Athabaskan areas, caribou drives and snares were more important means of hunting. It is likely that caribou fences were constructed by lashing poles between trees or pole tripods, forming long barriers across the countryside, which would have occasional openings with snares set to entangle caribou passing through them. The fences could also lead into "corrals" or bodies of water where hunters could lance them.

While no Nondalton informants remember the use of caribou fences, nearby Athapaskan groups in the Susitna and upper Kuskokwim areas are known to have used them and the remains of old fences in western drainages of the Alaska Range just north of the Lake Clark/Stony River region have been reported.

Nondalton people do remember the use of snares for both moose and caribou. A number of place names in the region hint at the use of caribou snares and fences including Vilqutnu "caribou snare creek" near Long Lake, and Caribou Snare Creek near Lime Village. The Tanaina name for Turquoise Lake (Vandaztun Vena - "Caribou hair lake"), may refer to the practice of spearing caribou in the water. Another area mentioned for this kind of hunting is the "caribou lakes" on the upper Koksetna River.

The meat of caribou, sheep, and other game killed in the interior during the summer were usually dried in the air, with a small smudge underneath to keep flies away. It was stored in an elevated cache to protect it from scavengers until it could be retrieved later during the winter. Caches built for this purpose were scattered across the country according to Nondalton informants who trapped in these areas in later years.

Groups of women would walk into the mountains in the fall to pick berries and hunt ground squirrels. They snared the squirrels or dug them out of their burrows with a bone-pointed digging tool. Ground squirrels were valued as food, especially for their fat in fall, and skins were used for parkas. The hair was removed to make undergarments and children's clothing. The skins were also important in interregional trade. Copper Mountain, near Currant River, is reported to have been one of the areas important for these fall activities.

Vegetation utilized by the Lake Clark Tanaina included qinazdli (*frutillaria camschatcensis*) and k'tl'ila (*hedysarum alpinum*) among other plants. Large quantities of berries were also harvested, including cranberries, blueberries, salmonberries, blackberries and others. Containers made of birchbark were used to store such things as mixtures of blueberries, salmonberries, and mashed fish roe, sealed with a layer of tallow. Spruce was of major significance, both for shelter and firewood. Old-timers report finding the rotten stumps of trees cut with stone axes "gnawed all around like beavers do" in Mulchatna drainages in the 1940's.

After the salmon turned red in September or October, hiliq'a or "fall" fish were harvested and prepared in a variety of ways. Many Tanaina preferred to spear these fish, which required considerable skill, but allowed the selection of favored fish, such as the broad, bright-backed males or egg-laden females. Each type was best when taken at a particular time, and when prepared in a particular way. Dried fall salmon were a favorite food for many older people because they had less fat, a milder taste, and were easier to digest.

Fish spears, tuqesi, had a long shaft of spruce and a detachable bone

or antler point with one to three barbs on one side, connected to the shaft by a line. Nondalton people say barbs were only on one side because if put on both sides they would split the fish. The point was made long, so that as it wore down from being struck against the bottom it could be resharpened and reused. These continued to be used by a few old men around Lake Clark until the 1940's and many Nondalton residents have seen them being made and used.

An important fall activity which was closely integrated with the use of fall salmon for food was hunting brown bear. Their thick layer of fat was sought as a supplement to the lean fall salmon; brown bear substituted in this area for the sea mammals used on Cook Inlet. The fat was also used with other foods, including berries.

One method utilized by Lake Clark and Kijik Tanaina inhabitants for hunting grizzlies was to lie in wait at night beside paths used by the bear near salmon spawning areas along the Kijik River and at the head of Kijik Lake. When a bear approached, hunters crouching alongside the trail would rise with a spear and impale the bear. The head of Little Lake Clark and of Telaquana Lake provided areas where this kind of hunting could be conducted as well.

Other methods of hunting brown bear included paddling a canoe silently along the shore of a lake at night and listening for the movement of a bear. Kijik Lake and Little Lake Clark, with their steep mountain shores and game trails close to the water, were major areas for this method of hunting.

Another specialized method of brown bear hunting mentioned by a Nondalton man was for a hunter to go up on a mountain where a brown bear was digging after ground squirrels. He would try to get above the bear,

and then roll a small rock down past it. The bear, thinking the rock was a squirrel, would rush downhill after it and the hunter would then slip into the bear's excavation and lay down. When the bear returned and saw the hunter, it would rise up on its hind legs "plenty surprised" and the hunter would thrust his spear into its chest.

Bear gut was utilized for making waterproof coats, vak'izhegi, and for making sacks, dinughelyi, used for storing fish heads, eggs, fins, and tails which were allowed to ferment. Bear gut was also used for windows and for food bags. Osgood (1937:107) notes that all Tanaina made bags or pouches of bear intestines and describes methods of preparing and sewing them.

Guns were eagerly sought by the Tanaina, particularly for caribou, moose, and sheep hunting, where they greatly increased the individual's killing range. By the 1840's the Tanaina of the Stony River had a few firearms and were involved in trading guns and powder between Cook Inlet and the Kuskokwim River (Zagoskin, 247, 268-269). It is certain that the relatives of Stony River people in the Mulchatna and Lake Clark areas would have acquired some guns by this time as well. Gunpowder and lead were expensive and hard to get. Nondalton people relate stories of hunters waiting to line up two caribou or of waiting for game to get in front of a hill so they could dig the lead out and reuse it after shooting the animal. Most people considered the percussion guns unreliable for killing brown bear and short, stout spears were in common use into the early 1900's for bear protection.

Trapping was extremely important to the Tanaina of the Interior by the early 1800's since they desired an increasing variety of goods which could be acquired only through trade. Late fall, early winter, and spring

were major trapping times, and a variety of deadfalls were used by the Tanaina to take furbearers. Few steel traps were available until the latter half of the 19th century, and even then many people continued to make heavy use of deadfalls and snares. These were of much the same form as those used by other northern Athabaskans (see illustrations in Osgood, 1937:92-98).

Beaver was an extremely important fur species and also an important food. Much of the Lake Clark area, and the Chulitna, Mulchatna, Hoholitna, and Stony drainages provided good beaver habitat. A variety of methods were used for harvesting beaver, including deadfalls on trails where beaver were cutting in the fall, and shooting them in the rivers in the spring.

In other regions, Tanaina took beaver by breaking into their houses in the spring or fall, and hooking the animals out with a gaff (Osgood, 1937:35), and this may have been done by the people of this area as well. This method is said to have been introduced by the Russians on the Kenai Peninsula and on the Nushagak River in the late 1700's (Zagoskin, 1967: 221), and nearly wiped out beaver populations in areas where it was heavily used.

Trade

Spring was a time for long journeys and trading, since long days and crusted snow made travel good. The people of Lake Clark, Mulchatna, and Stony River were apparently involved in an extensive network of trade by the 1800's. Before the arrival of the Russians in Cook Inlet, trade was probably carried out between Tanaina and neighboring Eskimo groups, the Interior people providing moose and caribou skins, ground squirrel and wolverine hides, and goods made of birchbark and sheep horn. Coastal

products included sea mammal's fat, and products made of them, such as kayaks. Like other areas of Alaska, this trade may have been as important socially for extending kinship ties and alliances, as it was economically.

Tanaina from the Lake Clark region travelled to Cook Inlet by way of Lake Clark Pass to trade for Russian goods from Kenai, and later Tyonek. The arrival of Indians from "Elamna" (either Iliamna or Lake Clark) is recorded in the journal of the Tyonek trading station during March and April, 1877, for example (Alaska Commercial Company records, University of Alaska Archives). A Lake Clark chief was reported to have travelled to the Knik post on Knik arm to trade as well (Porter, 1893:94).

The Lake Clark Pass route was difficult because it crossed an active glacier, which protrudes into the valley near the summit of the pass. A story about trips through Lake Clark Pass is known to many Nondalton people:

Sometime, maybe almost 100 years ago, the Kijik people were crossing the glacier in Lake Clark Pass on their way to Tyonek to trade. A baby girl was in a bark cradle on a sled, and the sled tipped into a big crack in the glacier, and she dropped into it. It was dark, but people could hear her crying way down there, and her father unlashed the other sleds and tied the lines together. The people lowered him down into the crack, and when he reached the baby he didn't have anything to stand on because she had landed on just a little ledge partway down. He couldn't see bottom. He picked her up and the people pulled them both back up. One of the baby's hands was frozen by the time they got her up, and she lost the fingers on it.

One of the Nondalton men who told the story said that as a boy he had seen her when she was old, and she could cut salmon quickly, even without fingers on one hand.

Telaquana Pass was also utilized as a trading route between the Stony River-Upper Mulchatna country and Cook Inlet. Sometimes boats were utilized on Chakachamna Lake if moose or caribou were killed along the way to provide skins for covering boats.

Another route important to Lake Clark people for travel, trading, and visiting went from Lake Clark to Old Iliamna at the mouth of the Iliamna River. This route started up the Tanalian River, near the present site of Port Alsworth, and then up the first valley to the south. At Tazimina Lakes, routes diverged; one going south to Chekok, and the other up to the head of Tazimina Lakes and downriver to Pile Bay on Iliamna Lake. A large party of Kijik people travelling to Old Iliamna for a potlatch were killed by an avalanche in one of the mountain passes, according to one local story.

Another route to Cook Inlet which is reported to have been utilized by the Lake Clark Tanaina led from the head of Little Lake Clark up a valley to the south through the Chigmit Mountains and down into Turedni Bay.

Change at the Turn of the Century

The late 1800's and early 1900's brought major changes in settlement and subsistence patterns in the region. In 1880 the "Mulchatna villages" were reported to have a population of 180 (Petroff, 1884), but famine, possibly the result of declining caribou numbers, and an epidemic which decimated the population, apparently caused their abandonment by the 1890's. Little is known of these people or their settlements, although residents of Nondalton have ancestors who came from the Mulchatna. Housepits or villages are believed to exist at several locations on the Mulchatna River.

The village of Chqul-chishtnu, near Telaquana Lake, was also abandoned around the turn of the century, and the people who lived there moved to Lime Village and to Kijik. There was a major population movement from the Interior to Kijik and Lake Clark around 1900, again possibly because of disease and starvation.

Prospectors had begun entering the region by the 1890's and they probably introduced new diseases, especially in the isolated Mulchatna and Stony River populations. Many Kijik people are said to have died in an epidemic in 1889, and a prospector visiting the village in the summer, 1898, observed that many people were ill with tuberculosis and that many had recently died of smallpox. He noted that there was "an extensive cemetary with many new graves" (Banks, 1949:28). Tanaina began to move away, to escape both disease and ghosts, and this marked the end of the Kijik settlement.

People from Stony River, Kijik, and other places settled at many locations around Lake Clark in the early 1900's, and numerous old cabin remains around the lake attest to this change in settlement patterns. There were five or six houses along the shore west of Kijik River, two or three houses at Tanalian Point, on the opposite side of the lake, several houses at Miller Creek, and several on Chulitna Bay. In 1902 a number of people moved to a location on Six-Mile Lake, near traditional fishing camps at the head of the Newhalen River; this place came to be known as Nondalton, and later, when people moved further down the lake, as Old Village.

Many of the houses and elevated caches at Kijik, built of split and hewn logs, with dovetailed corners, were dismantled between 1902 and 1909 and hauled down the lake to old Nondalton. Only a few houses and the church were left standing.

By the early 1900's several prospectors were working in the general Lake Clark area, particularly at Portage Creek on Lake Clark, and on the Mulchatna River. Although no major strikes were made, in 1903 it was reported that a prospector could make \$4.00-\$5.00 a day on the placers at Bonanza Creek on the Mulchatna (Brooks, 1904:48). There were 16 men in the

area in 1909, six of whom were planning to winter (Katz, 1917:201-202). In 1914 five or six people were reported wintering on Big Bonanza Creek (Smith, 1917:38).

A few prospectors poled boats up the Nushagak and the Mulchatna to haul supplies into the Bonanza Hills area, but most of them entered the region by way of Iliamna and Six-Mile Lake, and then across toward the upper part of the Mulchatna (Smith, 1917:38). Some Nondalton people were hired as packers across the Newhalen portage, and as guides and packers into the Mulchatna placers.

Around 1901 exploration began for a railroad line from Iliamna Bay on the Cook Inlet, toward Aniak on the Kuskokwim, via the Six-Mile Lake, Nondalton area. A route was selected and plats filed in 1912, but little actual work was accomplished (Smith, 1917:16).

It is possible that this increasing activity in the Iliamna area, combined with the attraction of the early fish run at the outlet of Six-Mile Lake made the Nondalton location attractive to people of the area after the epidemics in Kijik. Sometime before 1914 a store was opened in Old Nondalton (Smith, 1917:38), which was apparently operated by Hans Severson, who also opened a store in New Iliamna. That area began to replace Old Iliamna as the trading center for the Lake Iliamna drainage in the 1920's.

A number of families continued to live in Lime Village on the Stony River, although over the years more and more of them moved to Old Nondalton. This migration continued, a few individuals or families at a time, into the 1950's, leaving only a handful of people in Lime Village.

A few of the Lime Village people whose parents moved to Nondalton by about 1930 said that the main reasons they moved were to be nearer the stores. It is not certain when Nondalton people began taking part in the fishing industry in Bristol Bay, but some informants said that some people

from the Iliamna area were going down to work in canneries by about 1905. They said that people from Nondalton were participating in cannery work by about 1912 or 1915, but that people were not involved in fishing until the 1920's or 1930's.

In 1918-1919, the people of the area were hit by an influenza epidemic which again killed many people. Salmon runs in Lake Clark have been affected by over-fishing in Bristol Bay for several years by this time, and the summer of 1919 was the worst of several bad years. During these years a number of Lake Clark people returned to the Telaquana and Stony River areas to attempt to put up salmon.

Again, in 1925 there was an almost total failure of the salmon in the Lake Clark area, and very few fish were seen by Bureau of Fisheries personnel. They reported that there were two families in and near the mouth of the Kijik River on the first of September, and that about 40 bundles (1600 fish) had been dried there. Another 24 bundles (960 fish) had been dried at Tazimina (BBHS xerox, 154-155). They also reported that the Natives of the region had killed about half their sled dogs.

There were so few salmon in this and the following years that many Nondalton people stopped going to fish camps at Kijik and on the Newhalen River (Bristol Bay Historical Society, xerox, n.d.), and it is possible that many of them may have temporarily migrated out of the area, or at least remained dispersed, since the 1929 U.S. census reports only 24 residents for Nondalton.

In the late 1920's salmon runs increased again in the Newhalen River and fish camps were reestablished there and at Kijik. In 1927 some 848 bundles (34,820 fish) were dried at Six-Mile Lake and Lake Clark (BBHS xerox, 168-170).

There was still considerable mobility during the 1920's and 1930's. Families would stay in one location for a winter or several years, then move elsewhere. In the winter families would be spread out around the shores of Lake Clark, in the Telaquana Lake, Stony River, and Mulchatna areas, as well as at old Nondalton village.

At least one family continued to live near the Kijik site until the 1930's, while others used the area seasonally for putting up fall-fish, or for trapping in the winter. Houses at Tanalian Point were regularly occupied until the late 1930's, and the area continued to be periodically inhabited after that. Other locations around Lake Clark mentioned earlier continued to be inhabited-Chulitna Bay, Dice Bay, Miller Creek, and Tommy's Creek, among others. These were utilized mainly during fall and winter as trapping headquarters, and in the summer families would go to fish camps at the head of the Newhalen River, in order to put up early salmon. Later in the summer people would return to these sites to put up later salmon and "fall-fish."

Modern Nondalton

About 1938 a few people began to build houses at a location on the shore of Six-Mile Lake about two miles southwest of Old Nondalton. The old site was on a steep hill which was said to stay frozen until late in the spring, and to have too much water running through it when it did begin to thaw. Another problem with the site appears to have been the mud flats extending out in front of the village. Some people say that this bay had originally been deeper, but that it silted-in during the thirty years that Old Nondalton was occupied.

It is possible therefore that the move may have been associated with the increasing use of heavier wooden skiffs, and of boat engines. These

boats needed deeper water. Another reason cited for moving was the depletion of firewood in the vicinity of the village.

By about 1940 more people were moving, and a number of houses and caches were moved to the site of New Nondalton. A few of these are still standing. People continued to utilize the old village site for gardens until the 1960's. The site is called "the old village" today.

Throughout the whole occupation of Six-Mile Lake, the Nondalton people have used the upper part of the Newhalen River for salmon fishing. A series of fishcamps, with large smokehouses, tent-frames, caches for the dried fish, and a few small cabins, are scattered along the head of the river and for several miles downstream.

White Settlement in the Region

As noted earlier, the first white men to live in the region for extended periods of time arrived in the late 1890's and early 1900's and two or three of these married into Denaina families. Some of these continued to live in the general Kijik/upper Lake Clark area.

Other prospectors and trappers settled in the Lake Clark area during the early 1900's, and a few men lived near Tanalian Point and near Portage Creek from about 1907 on. When Capps (1931:137) was in the area in the late 1920's, there was one man living at the approximate location of Miller Creek.

Whites continued to arrive in small numbers through the 1930's and 1940's. In the early 1930's a sawmill was set up near Tanalian Point, and lumber was sawed for use in placer mining, for houses, and for boats, and then towed the furnished lumber to Nondalton. The lake was logged for large spruce in the following years and the signs of logging are evident almost everywhere around the middle portion of the lake, although much

less evident further up toward the head of Lake Clark.

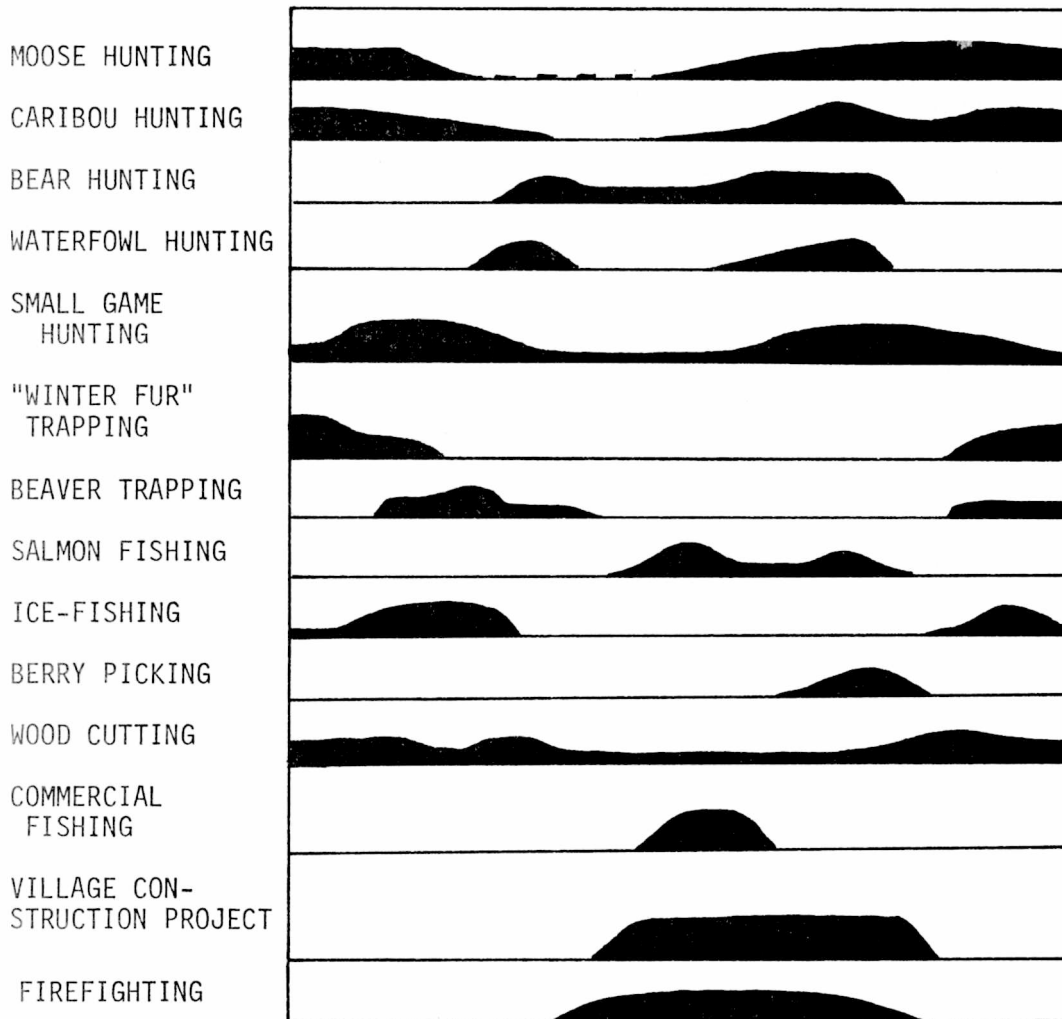
From the 1930's on, whites lived around the Tanalian and Port Alsworth area, at the mouth of the Chulitna River, and in the Portage Creek area, where gold placers were worked. Most of these men trapped in the winter, and either prospected or mined in the summer or went to Bristol Bay to fish commercially. They utilized the same resources as did the Tanaina, putting up salmon for their own uses and for dog food, particularly at Tanalian Beach, and at Kijik. They utilized moose, caribou, and sheep for food, and probably competed to some extent with the Denaena for fur animals, although this was apparently a period of decreasing use by the Denaena of the upper part of Lake Clark.

Two families of people who lived at Lake Clark in the 1930's continue to live on Lake Clark, while the descendants of several others continue to use the lake seasonally. Other people purchased property from those who left, while still others filed on homesites and homesteads in the area from the 1940's to the 1960's, mainly from Bristol Bay communities. Today, several of these people operate lodges, work seasonally elsewhere, and take fish, game, and fur bearers.

IV. THE CONTEMPORARY ANNUAL CYCLE IN NONDALTON AND LAKE CLARK

In the past the seasonal organization of livelihood activities in the Lake Clark area closely reflected the constraints and opportunities created by local ecological systems. The arrival of salmon triggered a whole series of activities associated with the harvest, preparation, and storage of this important resource, for example. Human settlement patterns reflected the seasonal movements and habits of wildlife species. Natural

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events such as freeze-up, break-up, and weather and snow conditions were critical factors in travel and access to different resources.

These things continue to be important to people living in the Lake Clark area. People still have to wait for a break in the wind in order to cross the lake, or for freeze-up or snowfall so they can haul in wood. The seasonal movements of game are major topics of conversation and concern. The same ecological conditions continue to affect people, but a host of additional constraints and opportunities are presented by modern American economy and society. New technology, ranging from ATV's to CB radios, give the same environmental conditions different meaning and impact. A CB radio enables someone about to set out on a long boat trip to find out from someone at the other end how the wind is there, saving him the trouble of having to find out on his own and perhaps having to turn back.

Alternative social and economic activities originating in the larger society, ranging from alcohol, to jobs, and education, in addition to natural factors influencing patterns of resource activities. The policies and laws of government have become increasingly important components of this expanded environment. The contemporary annual cycles of residents of the proposal area, described briefly below, are the outcomes of individual allocations of time and energy between the different opportunities and limitations they perceive in the natural and social environment. Thus they are extremely dynamic, subject to change and modification both as external conditions change, and as individuals' perceptions of their environment change. Table 4-1 summarizes the time of important annual activities in the Nondalton/Lake Clark area.

Spring

The people of Nondalton look forward to the season of increasing daylight and warmth after the short, cold days of winter. During February and March the weather in the Lake Clark region often remains cold, with stretches of clear weather and long sunny days. The snow often gets a crust, refreezing after thaws, making ideal conditions for travel. People begin to spend more time outside as the days lengthen and warm.

Trappers begin to turn from "winter fur" to beaver when beaver season opens in February. The season lasts until mid-March in this area and many Nondalton people attempt to do some beaver trapping. At least 15 participated actively in the 1977 season, while others assisted or took small numbers of beaver. Beaver trapping is combined with lynx trapping by some people since lynx season continues through March. Trips to check beaver sets are combined with caribou, moose, and small game hunting as well.

In the past it was common for Nondalton people to make long trips by dog team, 50-100 miles, to trap beaver. Several men and sometimes their families, would camp in a good beaver locality for two or three weeks at a time. Today most people go out by snowmachine and return the same day, although a few make camp for a few days or a week at a time. People without the time or reliable snowmachines for long distance trapping trap in areas near the village. Young men and older men and women go out to set snares at unexploited lodges. Beaver trapping occurs as much for the meat as for the hides, which bring low prices at present.

Spring is a time of renewed fishing activity and small game hunting. As the days become longer and warmer, increasing numbers of people spend more time fishing. Grayling and whitefish are taken by jigging through the ice, while ling-cod and lake trout are caught on set hooks. Rainbow trout

are also taken through the ice, and in open water as ice disappears around the mouth of the Tazimina River and the upper Newhalen River. Snowshoe and Arctic hares appear with warm weather in April and are easily hunted along the creeks and in other brushy areas.

By the middle or latter part of April waterfowl begin to arrive in the region. There is usually still snow on the ground but rivers, creeks, and some tundra ponds have begun to open. Large numbers of returning waterfowl concentrate in these few open places. Residents have traditionally hunted waterfowl in the spring, travelling to good areas to hunt and perhaps camp for a few days. Large numbers of ducks and geese have traditionally been taken, as well as a few swans.

A small number of people continue to follow traditional patterns by going to spring camp to put up fish for dogfood and to hunt muskrat. Muskrat hunting was a common spring activity until the 1960's, but today only a few are taken, and the main activity is fishing for pike, lake trout and suckers. A few waterfowl and an occasional beaver are taken for food as well.

Black bear, which have begun to come out of hibernation in April, as well as moose and caribou, are occasionally taken during the spring. In late spring, when the snow and ice on land melts, there is usually a period of little travel, since snowmachines cannot be used and the ice on the main lakes prevents boat travel. There may still be snow in the mountains, and snowmachines can be used in those areas after the snow is gone at lower elevations.

Summer

Summer is the season of open water, beginning in May and June. Some lakes and rivers in the region lose their ice in April and boats may be pulled across the ice on Six-Mile Lake in front of Nondalton to gain access to areas of open water by the mouth of the Tazimina River and the head of Newhalen River. By early or mid-May the ice goes out on Six-Mile Lake and people begin to travel by boat.

The ice goes out in May or early June on Lake Clark, opening a huge area to access by anyone with a boat, outboard and fuel. Lake Clark and Nondalton people begin to travel on the lake and the Chulitna River, hunting and fishing. Pike and whitefish are sought for human and dog consumption. Many people camp in favorable locations during early summer to fish with nets, or to hook huge pike. Lake Clark residents fish for grayling, lake trout, and other species both with hook and line and nets.

The meat of waterfowl and fish is particularly welcome changes in the diet at this time of year. Boat trips are also long anticipated social occasions and a chance for Nondalton families to get out of the village after the winter.

Heavy use of the waterways occurs through the summer. The lakes and rivers of the area become highways for hunting, fishing, visiting, and recreation purposes. Supplies and fuel are hauled by boat from the Newhalen landing to Nondalton or up to Lake Clark.

The basic subsistence activity during summer is fishing. Red salmon arrive in Six-Mile Lake in June, and Nondalton people put up most of their fish during late June and July. The fish do not reach middle Lake Clark until late June or early July, so fishing begins later there. Other species of fish are taken by hook and line for recreation and to add variety to the diet.

Women and children in Nondalton are often left to do much of the salmon fishing, since many men leave the village during the summer to take temporary jobs. If construction jobs are available in the village they prefer to take these; the short summer season is the time when most of the income for the year is earned in Nondalton.

Fire season sometimes begins as early as late April or May and may continue throughout the summer into September or October. Nondalton people are experienced and available firefighters, and are among the first villagers hired as firefighters each year by the Bureau of Land Management. In bad fire years as many as four crews of Nondalton people, including many women, go out firefighting.

A few Nondalton and Lake Clark men regularly go commercial fishing in Bristol Bay in early or mid-June, returning after the main red salmon run is finished in mid-July. This pattern had declined in the last few years as many Nondalton men were unable to qualify for limited entry permits after a number of bad fishing years.

There have been increasing opportunities for summer employment in the area in the last few years, such as the recently completed water and sewer project in Nondalton. This has enabled Nondalton men to stay in the village. It also allows them to utilize the Six-Mile Lake and Lake Clark areas more frequently during the summer, although the need to be back in time for work is a constraint on such use.

Most Lake Clark residents, and a few Nondalton families, plant gardens during the summer. A wide variety of garden crops are grown, and potatoes, turnips, and cabbage are winter staples. A few Lake Clark families grow a major part of the vegetable foods they require annually, canning, pickling, and storing them in root cellars. Goats and chickens are kept by one Port Alsworth family, and they supply milk and eggs much of the year.

Logs for cabin construction are cut in late spring or early summer near the waterways, and then towed to building locations behind boats. Many areas near Nondalton have been logged over for spruce for cabins and firewood, and long distances must be travelled to obtain them. Many areas around the shores of Lake Clark have also been logged. A small amount of edible plants and roots are gathered in the summer by Nondalton women.

Several Tanaina who have left the area to live in Anchorage or Bristol Bay communities return to Lake Clark and Nondalton in the summer to visit, to eat fresh salmon, and to put up native foods to take back to town with them. Some of them have allotments where they camp, or they stay with friends and relatives. They smoke, dry, and salt fish, pick berries, and occasionally get a caribou, bear, or moose, or share one taken by someone else. When they fly back to town they take bundles and boxes of fish and other country produce. Some of them hope to move back to the area someday.

Fall

Fall is a time of transition; temperatures drop, weather becomes unsettled, and many species of game migrate and move. The wind begins to blow more frequently by late August, particularly from the northeast, making water travel on Lake Clark difficult and often disrupting transportation.

The salmon begin to turn red in late August, and during the fall many Nondalton people travel up into Lake Clark to put up "fall fish" for themselves and their dogs. Black bear and berries are sought as the latter become ripe, and each family knows of good locations for different species of berries. While travelling by boat a watch is kept for bear, moose, or other game along the shore and mountainsides of the lake. Caribou are occasionally taken when they appear near the lake, and a few are killed

by hunters walking up into the mountains.

Most Lake Clark and Nondalton residents attempt to get moose and caribou during the fall, although those without electricity wait until cold weather sets in, often after the hunting season closes, in order to be able to keep the meat. The use of aircraft makes moose and caribou hunting most efficient, since residents must compete with large numbers of guided and unguided airborne sport-hunters from outside the region. Residents of the area fly in on their own or in chartered aircraft, into good moose and caribou hunting areas north of Lake Clark. Some camp for a few days or a week, hunting and picking berries, before being flown back out with their meat.

There are about seven lodges in the Nondalton/Lake Clark area, as well as others in the Iliamna area, which operate in the area during summer and fall. Two of these lodges, catering more to sport fishermen than hunters, are owned and operated by Lake Clark residents.

A few Nondalton men have been employed by lodges as guides and packers. In the last two or three years two of the hunting lodges near Nondalton have begun bringing in meat killed by their hunters for use by local people, a practice encouraged by the village council, which felt too much meat was being abandoned and wasted. These policies have provided some employment, as well as meat, to Nondalton people during hunting season from late August to October.

Water fowl are hunted in the fall, but do not arrive in the large numbers found in the spring. They are hunted by moose-hunters along the Chulitna River, or during trips for combined hunting, fishing and berrypicking. A few ducks are shot near Nondalton and Port Alsworth.

Local residents occasionally hunt sheep during August in the mountains around upper Lake Clark and Little Lake Clark. These areas are extremely rugged and few sport hunters utilize them. Pressure on sheep has increased considerably throughout Alaska, and rough air strips are gradually being developed in rugged areas which have generally been considered inaccessible by guides and sport hunters.

A few Nondalton families move to camps on Lake Clark in late summer and fall, taking their dogs with them, to hunt and to put up fish for dogfood. While salmon are dried for the winter's supply, the scraps are fed to dogs. This pattern was common in the past, as evidenced by the large number of fish racks and campsites scattered around the shores of Lake Clark, but has declined as dogteams have decreased in importance.

In October, when salmon congregate in bays and the mouths of spawning streams, people with dogs seine them up for dogfood. The bright red males are also utilized by humans. These trips are occasionally combined with brown bear hunting in the Kijik area.

Winter

Winters in the Lake Clark area are more moderate than those of nearby interior locations, but more severe than those of the coast. There is considerable variation, both within the season and from year to year, in temperature and precipitation. In some years there are deep snowfalls, in others, little snow; in a few years temperatures have reached -50° but they are generally much milder. At higher elevations, and further from the coast, temperatures are lower; the large lakes moderate the temperature in their immediate vicinity somewhat until they freeze over. The Lake Clark area is subject to periodic warm east winds during the winter,

which sometimes melt snow and ice. This environmental variability affects resource use in many ways.

The rivers and small lakes of the area usually freeze around mid-October and Six-Mile Lake and sheltered bays on Lake Clark may freeze soon afterward. The main body of Lake Clark usually freezes during December or January, although in some years it has not frozen at all.

Boating activity slows down with the advent of cold weather, although warm weather can revive the use of boats. During the unusually warm winter of 1976-77, trappers were still using boats on Lake Clark until the end of December.

When the ice is thick enough to support a person, fishing begins through the ice. Grayling, whitefish, lake trout, and ling-cod are taken, mainly by middle-aged or older women and by children. These supply an important food to some families, and also supplement other types of dogfood.

Small-game hunting, for spruce grouse, ptarmigan, and hares, is a common activity in the winter. Older people and children in Nondalton do considerable fishing and hunting near the village. Early winter is a time for repairing and building sleighs for use behind snowmachines and dogs.

Trapping begins in the Nondalton/Lake Clark area in November. If there is little snow, travel may be restricted to areas closer to home; when travel conditions allow, traplines are extended. Trips to set and check traps are combined with hunting, and moose, caribou, and small game are taken. A variety of furbearers are available in the

Lake Clark area, but trapping effort depends on individual orientation and motivation; upon fur prices, which fluctuate considerably; upon travel conditions; and upon resource availability.

In the last few years moose hunting season has been open in the Nondalton area during December, for both bulls and cows in 1976, but only for bulls in 1977. Moose or caribou are usually taken whenever encountered by local residents.

Wood gathering is one of the most important subsistence activities in the area during fall and winter, and one in which almost all households participate. Spruce is the most commonly used fuel in Nondalton, but most Lake Clark residents utilize birch whenever possible. Several of the Lake Clark families cut wood a year ahead and let it dry in a woodshed. Wood is used by many Lake Clark families for cooking as well as heating.

Trapping activity slows down during the coldest weather and during January, particularly since Nondalton residents observe Russian Christmas and New Year during the second and third weeks of January. This is a time of intense social activity, with celebrations and visiting between Russian Orthodox villages in the Lake Iliamna area. Snowmachine trips are made to Iliamna and Newhalen, and airplanes are chartered to and from Pedro Bay, Igiugig, and Kokhonak. People attempt to stock up on fish, moose and caribou to feed visitors at this time.

Trapping activity picks up again in February, and caribou are hunted in conjunction with trapping, long trips sometimes being made by snow-machine into the Chulitna drainage. Lengthening days in February signal the beginning of spring and beaver trapping, changes anticipated and enjoyed by residents of the region.

V. PATTERNS OF RESOURCE HARVEST AND USE IN THE LAKE CLARK-NONDALTON AREA

The preceeding chapter has briefly described the temporal organization of the resource harvest and other economic activities of residents of the Lake Clark-Nondalton area. This section rounds out this general picture by describing the methods and means utilized to harvest local resources, the spatial extent of subsistence activities, and the uses made of the various resources by the people of this area.

One of the major determinants of contemporary resource harvest activities are the means of transportation utilized to gain access to resources. Transportation figures importantly in all phases of subsistence, including its economic, cultural, social, and ecological dimensions.

Travel and Transportation

Among Nondalton Tanaina there seems to be a fundamental cultural orientation toward the rivers and waterways in travel. Names of places and directions of travel are frequently conceived of in terms of the rivers and lakes. The waterways have long been travel routes, both in the open-water and frozen-water seasons, both for Tanaina and White.

A number of travel routes are utilized to gain access to harvest areas around Lake Clark, in the Chulitna Valley, and elsewhere. Some of these are historic routes which are seldom used for subsistence purposes today, since dog travel has decreased, but snowmachines are now used on some of them. Cross-country trails in the winter tend to follow open country, swamps, creeks and lakes as much as possible, and where necessary brush and trees are cleared. Blazes on trees often mark portions of trails through thick woods, while long use has worn vegetation in some

open areas. Map 1 shows some of the major routes of travel utilized by dog teams, snowmobiles and boats in the Lake Clark region.

Three modes of transportation are most important in terms of distance covered for resource harvesting activities in the area today. These include the snowmachine, outboard engine powered boat, and airplane. Dog teams played an extremely important role in subsistence activities in the region until about ten years ago, and they continue to play a significant role for a small number of people.

Walking, of course, remains important, since some walking is necessary with almost all phases of subsistence. It is particularly important for trapping, hunting, and gathering near inhabited areas, and for stalking and packing game.

All-terrain vehicles (ATVs), except for snowmobiles, are not used to a great extent in the region, although a few small tracked vehicles and tractors are owned by residents of Nondalton and Lake Clark. These are used for subsistence related activities such as hauling firewood, and for hauling other supplies, but seldom for cross-country travel or hunting. Little three-wheeled motorcycles are owned by a few families in Nondalton and Port Alsworth, but they are mainly used near inhabited areas. They do provide some transportation for nearby trapping, small-game hunting, and fishing.

Snowmobiles

Snowmobiles were first brought to Nondalton and Lake Clark in the early 1960's and since that time major changes have occurred in winter activities. Almost every family in Nondalton has at least one snowmobile of some kind, in various stages of repair and usefulness. The amount of income received by a family seems to be a major determinant of the number

and age of the snowmobiles it owns. A wide variety of makes and models are represented. About two thirds of the families on Lake Clark have snowmobiles.

The snowmobile is used for almost every winter activity, from visiting, hauling mail or supplies home, and playing tag on the ice, to hauling wood, trapping, and pulling boats across the ice to reach open water. The snowmobile is a fast and convenient means for getting out into resource areas during the season of snow-covered ground and frozen water.

The snowmobile is of most use when the ground is covered with enough, but not too much, snow, and when creeks, swamps and lakes have thick enough ice that they become avenues of travel rather than barriers. In the Lake Clark and Nondalton areas these conditions are not quite as reliably met throughout the winter as they are in more northerly and interior locations; freeze-up varies considerably from year to year and east winds bring thaws which quickly melt much snow and sometimes ice. Lake Clark usually does not freeze until December or January, and in some years is not safe for snowmobile travel until even later.

Numerous trails fan out into the country from Nondalton, Port Alsworth, and other inhabited places; these are used for trapping, small game hunting, and wood-hauling. Further from the village there are a number of main routes leading into favored resource areas which are used by snowmobilers. Map 1 shows the most significant of these trails. In open country, swamps, above brushline, or on rivers or lakes, trails are not necessary, and the traveller can go anywhere.

Besides the constraints imposed by the natural environment upon the use of the snowmobile for gaining access to resources, there are limitations imposed by the economics of snowmobile ownership and operation.

Most machines are purchased in Anchorage or Iliamna and cost between \$1,000 and \$2,000. Under hard use and limited maintenance a snowmachine seldom lasts more than two or three years. Operation of the machine requires gas, oil, and a variety of spare parts, all of which are relatively expensive in this area. By the time it reaches Nondalton or Lake Clark gasoline costs from \$1.25 to \$1.75 per gallon.

If a Nondalton man doesn't have enough cash to buy a new snowmobile for the winter he may have to use an older, less reliable machine. This limits his winter activities to areas closer to the village since he can't depend on his snowmobile to get him back home. Most longer trips are made by groups of men and machines for safety and companionship. Considerable income is required to purchase and operate a snowmobile for efficient winter hunting and trapping.

Trips are seldom made beyond a thirty-mile radius of the village by snowmobile, although people occasionally go farther by hauling gas on a sled behind the machine. Deep soft snow, or rough brushy terrain particularly limit the load-hauling capability of the snowmobile.

Nondalton people frequently pull a sleigh, constructed like the ones they use with dog teams, behind the snowmobile. These are used to haul trapping and hunting equipment, extra fuel, and fish or meat. They are used around the village for hauling water, trash, and light loads of firewood.

The Tanaina did not use dog teams in their current form until the early 1900's when they probably began to copy the sleds, harnesses and teams of whites who began to move into the country. The parents and grandparents of older Nondalton Tanaina only had a few dogs, and these were used mainly for packing and hunting. Small crude sleds were pulled

by a few dogs, assisted by men and women on snowshoes, but the dogs weren't taught to obey voice signals, and a person usually led them.

The modern sleigh in Nondalton is from 7 to 10 feet long, with three or four stanchions. Small two or three stanchion sleighs are constructed for dog racing, or for pulling behind snowmobiles. Runners are shod either with steel or plastic strips. Traditionally the sleighs were lashed with rawhide, but most sleighs built in nondalton today are lashed with nylon cord. Few Nondalton people have developed elaborate means of connecting sleighs behind snowmobiles, and they usually jury-rig a lashed pole to connect the two.

For wood hauling, small "bobsleds", with runners shaped from 2"X 6" or 2"X 8" planks, and with 2"X 4" crosspieces are built. So are tobaggans about six or eight feet long, with 2"X 6" sides, flattened oil drums for the bottom. These are loaded with lengths of wood and pulled behind a snowmachine.

Dog Teams

About half the families in Nondalton have at least small dog teams and some eight teams are used on a semi-regular basis. There are about 200 dogs in the village in 1977, down from the 300 dogs kept by Nondalton people in the 1960's. The main use of dogs in Nondalton today is for racing, generally in local races held in the spring in neighboring villages. Occasional use is made of a few teams for trapping and recreation. Around Lake Clark there are three dogteams, all of which are used for some trapping and other subsistence activities. Two of the families with dog teams have no snowmobiles.

Dog teams have the major advantage that they can be fed on salmon

and other local fish, rather than consuming costly imported fuel. This requires several weeks of hard work during the summer. Dogs are not nearly as convenient or fast as snowmobiles, nor can they haul loads as large as a snowmobile is able to.

People in Nondalton continue to keep dogs partly because dog racing is popular and prestigious, partly because dogs have been part of their way of life so long, and perhaps partly because they feel that one of these days they may need some dogs again. Occasionally dog teams are used more intensively for subsistence purposes. In 1976-77 a Nondalton family used a snowmachine and dog team for trapping west of the village. At other times families utilize dogs for trapping in more distant areas, such as the Chilikadrotna drainage, having the dogs and feed flown in.

Boats

Various types of outboard-engine powered boats are the most significant means of transportation for summer resource harvesting purposes in the Nondalton-Lake Clark area. Sometime in the early 1900's Nondalton people began to build wooden skiffs patterned after those of whites who came into the region, and today there are a number of large wooden skiffs in use, usually twenty or twenty-two feet long. Some people have acquired fiberglass boats, both in skiff and cruiser patterns, and today aluminum skiffs, 14-18' in length, are becoming increasingly popular.

Several common make of outboards are used, 20-35 h.p. being popular sizes, although larger motors, 50 h.p. or larger, are preferred on the wooden skiffs. Like snowmachines, outboards are used hard and often get little maintenance, and therefore frequently do not last long. They are expensive, running from \$700 up to \$1,500 or more. They also consume

large amounts of oil and gas. Boats are expensive as well, with aluminum boats 16' in length costing about \$1000. Until five or ten years ago wooden skiffs were built out of local spruce, but in more recent years plywood has been used. Aluminum boats, although more expensive, and not nearly as sturdy, are light, fast, and can be pulled up out of the water easily, an important consideration on the exposed beaches of Lake Clark.

Traditional Tanaina watercraft included typical Athapaskan birchbark canoes, which were used up until fifty years ago in remote areas such as Lime Village. Large moosehide boats and hide-covered "bydarkis," two or three holed kayaks obtained or copied from Eskimo and Aleut neighbors, were also utilized. A canvas covered canoe was modeled after the traditional birchbark form for use in spring muskrat and beaver hunting thirty or forty years ago, and continued to be used until recently.

The lakes and rivers make a large area accessible to Nondalton and Lake Clark residents. The upper portion of the Newhalen River, Six-mile Lake, Lake Clark, Little Lake Clark, and the Chulitna River all connect and provide boat access to hundreds of square miles of country.

Aircraft

The first airplane flew through the Lake Clark region in 1929, and since that time aircraft have greatly increased in importance to residents of the region. Residents of Lake Clark have owned aircraft since the early 1940's. Today two residents of Nondalton and seven residents of Lake Clark, own aircraft. Most of these are small, two or four passenger models on wheels, although several are equipped with floats in summer.

Two of the Lake Clark residents use their airplanes commercially, primarily during the summer for hauling fishing guests or hunters.

The rest use aircraft for personal transportation, to get into Iliamna or Anchorage to shop and visit, to haul supplies back out to the Lake Clark area, and to hunt and fish.

Many of the people who have cabins in the area which they use for recreation also own aircraft and use them for access to the region. Other aircraft owners, from both nearby communities such as Iliamna, and more distant ones such as Anchorage and Kenai, fly into the area for fishing, moose hunting, or sheep hunting and trapping.

Aircraft are used in resource harvesting activities for providing access to distant and remote areas, for locating game, and for hauling hunters, equipment, and game. Under state law, hunters are not allowed to take most species of big game the same day they have been airborne, although this law is difficult to enforce. A few people track wolves and wolverine from the air, then attempt to land near enough to shoot the animal, or (illegally) shoot the animal from the air, usually with a shotgun. One part-time resident of the proposed area is reputed to be an experienced and successful aerial wolf hunter, while others come to the area from Kenai or Anchorage.

Many of the residents of the proposal are fairly conservative in using their aircraft for hunting and trapping, feeling that they represent too much money to be used lightly. Most use them to take moose or caribou once or twice during the year, and for recreational flying, but try to stay out of tight spots which might cause damage to their aircraft. It is generally the pilot from outside the area who uses his aircraft to take game illegally, and there are many hunting related aircraft accidents in the proposal each year by such pilots.

Some of the people who own aircraft consider themselves to be subsistence users, since much of their food and heating fuel comes from the local area.

The airplane is viewed as a tool little different from the snowmachine, which helps make their way of life in the Lake Clark area possible.

The economics of aircraft use vary considerably from individual to individual. Many of the aircraft used by local people are older ones, built in the 1940's, and purchased when prices were much less than they are at present for these same models. Many were purchased for \$3,000 to \$5,000. Smaller models use only four or five gallons of fuel per hour, getting 18 or 20 miles per gallon, and are two or three times as efficient in fuel consumption as outboards and snowmachines. Most local people do their own maintenance work, frequently using parts salvaged from wrecked aircraft for repairs. Few local pilots insure their aircraft.

People who do not own aircraft utilize commercial flights to Iliamna and Anchorage, and many also charter aircraft or fly with friends to harvest resources. With increasing competition for moose and caribou from sport-hunters, local residents have begun to fly into more remote areas to get meat for themselves, sometimes camping for a week or so in a good location. Trappers, too, often utilize aircraft to gain access to more remote areas, and this is important to Nondalton trappers when poor snow conditions limit the use of snowmachines.

Hunting, Fishing, and Gathering

The comings and goings of subsistence users are often quiet and unnoticed by the casual visitor. Subsistence activities blend in with social and recreational activities, and these are frequently integrated with one another to make efficient use of time and energy. For this reason they are difficult to separate analytically, since a caribou hunting trip, for example, may be combined with moose hunting, small game hunting, and trapping. For convenience however, the following account is divided on

a species-by-species basis. Map 1 provides more details of the geographic dimensions of harvest activities.

Moose: Moose are one of the most sought after wildlife species for food in the Lake Clark region. They are a large animal, and one can provide a large percentage of the meat requirements for a small family for a winter. They are distributed over much of the study area, except in the highest, most rugged mountains, but their distribution at any given time can be extremely localized.

Moose have been an important resource only since about the 1930's when they began to appear in numbers in the Lake Clark area. Most moose have been taken during the fall: the main method utilized by the people of Nondalton for hunting them has been to take boats up around Lake Clark, or up the Chulitna River, and to watch for moose along the shore. Often several days or a week would be devoted to travelling, camping at night, and watching for moose in early morning or late evening. A number of locations are noted as particularly good areas for moose hunting during the fall. Several bays in lower Lake Clark, including Matt Fay Bay, and Portage (Snowshoe) Bay, are likely locations for spotting moose, as are the mouths of tributaries emptying into the lake, including the Kijik, Currant, Big (Tlikaklila) and Chokotonk Rivers, and numerous smaller creeks. "Camelback" an area of rocky knolls near Tommy Creek, provides vantage points for hunters to watch several small ponds where moose come to feed. Sometimes boats are taken up the Big (Tlikaklila) River to the Otter Lake vicinity in search of moose.

The Chulitna River is another major moose hunting locale. Nondalton and Lake Clark people take boats up the Chulitna throughout the open-water season for a variety of activities and moose are killed when spotted along the river. In the fall a major method of hunting is to drift back downriver

with the outboard shut off, particularly in the evening, hoping to surprise a moose coming out to the river. There are two locations along the river where high rocks provide good views of river, sloughs, and surrounding country, and people use these promontories to sit and watch for moose.

The legal fall season for moose (Sept. 10 - Oct. 10, in 1976) has been made progressively shorter and over the last few years only bulls could be taken. This works against local residents and subsistence users in a number of ways. The bulls are going into rut by the middle of September, and people feel their meat begins to get poor. There are still flies in September, and cold weather for keeping meat cannot be counted on until mid-October; since most residents do not have freezers meat cannot be preserved until this time. Weather is often unstable in the Lake Clark area during late August and September, with much wind and frequent rain. The wind often makes boat travel on Lake Clark an uncertain proposition at this time of year, and people may have to wait for good weather to travel. The shortening of the season makes it more and more difficult to find a long enough stretch of good weather to go moose hunting around Lake Clark.

After lakes freeze and snow comes people shoot moose when they come across them while travelling by snowmachine. Moose are taken in the winter in areas around Nondalton, on the mountains north of the village, around Six-mile Lake and Lower Lake Clark, and in the Chulitna drainage. Most are located while people are engaged in other activities, such as trapping, wood-hauling, or caribou hunting. Dogs are occasionally used in locating moose.

There is a December moose season in the Lake Clark area, open for either sex in 1976, but only to bulls in 1977. At this time of year the moose are losing their fat, and cows are preferred by some Nondalton people.

Most moose killed by Lake Clark and Nondalton residents are shared among other families. In Nondalton a small number of hunters may take a large percentage of the moose, since they are more active and likely to find them. The Nondalton people have strong feelings against wasting meat, and about using all the parts. This makes them particularly angry with what they call "head-hunters," sportsmen who come to the area to get a trophy and leave much of the meat behind.

Aircraft are used to locate and hunt moose by some residents of Lake Clark, and occasionally by Nondalton people, who fly out with friends, or charter aircraft for the purpose. The use of aircraft makes getting a moose a much more reliable proposition, compared to just stumbling onto one in the short hunting season. It saves considerable time as well as expense for fuel, food, and other hunting supplies.

Caribou: Caribou are also a major large game species harvested in the region. They have probably played a significant role in the culture history of the Lake Clark Tanaina, as it is suggested they have among other Alaskan Athapaskan groups (McKenna, 1969, p.97), and they continue to be an important resource to the people of Nondalton and Lake Clark.

The caribou hunted by residents of the area are part of the so-called Mulchatna herd, which ranges a large region bounded roughly by the Swift River and Alaska Range on the north and Nushagak River on the west, Lake Iliamna on the south, and the Alaska Range on the east. There are no hard and fast boundaries however, and caribou go beyond the defined area. The history of the herd's population, distribution, and migration patterns is not well documented, and it is one of the lesser known herds in Alaska. The population was estimated at about 3,000 animals in the mid 1960's; a 1974 census counted a minimum of 14,000 animals (Ak. Dept. of Fish and Game, 1976, p.86).

BUTCHERING PARTS AND SOME USES MADE OF MOOSE AND CARIBOU PARTS

<u>Butchering Part</u>	<u>Tanaina Name</u>	<u>Uses</u>
Heart	k'kuz'in'	cooked on stick when camping; fried in pan; boiled
Kidney	k'jech'a	fried; boiled
Liver	k'ezet'	
Moose stomach	k'chundiyes	contents cleaned out of main pouch, then coagulated blood scooped up from body cavity and placed in pouch. This was used for dogfood plain, or cooked with other dogfood in winter; had high food value.
Small pouch	k'chilaqa jijegha	small sack near stomach. Could be pegged with a stick and formed into kettle for boiling water and cooking meat in.
Moose "book"	k'di'in	organ with folds near stomach; washed and eaten raw
Ribs	k'kaq'a	boiled; roasted; opened up and dried for transporting
Brisket	k'yits'ena	boiled
Neck	k'q'es	boiled
Front quarter	k'gguna	boiled; fried; meat dried; bones boiled for marrow
Hind quarter	k'qakena	boiled; meat dried; sinews saved
Nose	k'enchix	boiled until tender, then skin peeled off and sliced for eating
Tongue	k'tsila	boiled and treated as nose
Lower backbone	k'yina	boiled; stewed
Sirloin	k'q'iliha	cooked on stick over fire; steaks fried
Tenderloin	k'yints'aq'a	steaks fried; sinew saved for sewing thread

<u>Butchering Part</u>	<u>Tanaina Name</u>	<u>Uses</u>
Moose hump	k'vakeslaha	a choice part; boiled
Head		stewed; boiled and cooled for "head cheese"
Hoof		boiled, cooled and eaten
Hide		hair removed and used as "rawhide"; for webbing in snowshoes and lashing on sleighs. Softened and smoke tanned for leather

The Bonanza Hills-Upper Chilikadrotna-Upper Mulchatna area is a major calving ground for the Mulchatna herd. There seem to be sub-populations of the herd which stay in the area between the Chulitna Valley and the Upper Koktuli and Talarik Creek drainages. These caribou are among those hunted by the people of Nondalton. There do not normally seem to be long migrations of large numbers of caribou in this area, although large concentrations do occur in the spring. Throughout much of the year caribou of the Mulchatna herd are scattered in small bands.

During the summer, caribou generally stay far back in the country north of Lake Clark, and residents do not particularly seek them. A few caribou move into the hills and mountains close to the lake in the summer however, and they can frequently be seen on ridge tops and mountain sides on the north side of the lake. Caribou season opens August 10, and people sometimes walk up into the mountains in the Kijik Lake area, or Portage Creek area, to hunt them at this time of year, although brush and rugged terrain limit this practice. In fall 1976 a few caribou were taken in this way by Nondalton people.

A few caribou wander down into the lower country in late summer or fall and are taken by people travelling by boat on Lake Clark or the Chulitna River. Long trips are sometimes made up the Chulitna River past Nikabuna Lakes looking for caribou or moose. In August the bulls are particularly fat, and their meat is preferred, but after the rut begins cows are preferred. In late summer 1976, caribou were killed on Chulitna Bay on Lake Clark, and in Snowshoe Bay.

Later in the fall the caribou generally move back away from the shores of Lake Clark and are seldom taken by boat hunters. Moose have largely provided a substitute for caribou in the fall since they have been

more frequently available. More people have begun chartering aircraft to take them back into the "Caribou Lakes" (Upper Koksetna River) or Bonanza Hills to hunt caribou in the fall.

Most Lake Clark residents who hunt caribou in the fall fly into areas north of Lake Clark, landing on lakes or on bare ridges. Hunters spend the night in camp, then hunt the next day, often returning home with meat that night.

When lakes and creeks freeze, and snow falls, making travel less rough, Nondalton hunters use snowmachines to travel to the Long Lake vicinity in the Chulitna drainage. In recent years small bands of caribou have been available in the Chulitna Valley throughout the winter and into the spring. When the wind blows from the south or southeast, Nondalton people go out over the mountain trail behind the village, or around the Hinmore Cache trail to the Chulitna Valley, expecting to find caribou closer to the village, since they say the caribou tend to travel into a steady wind. Caribou are also sought in the Upper Talarik and Upper Koktuli drainages. If they cannot be found closer to the village and travel conditions are good hunters may travel in to the Mulchatna drainage in the Tutna Lake area in search of caribou.

When caribou tracks are spotted by a hunter in winter they are usually followed. When the animals are located the hunter attempts to drive his snowmachine close enough for a shot. Caribou are frequently spooked by snowmachines, however, even at long distances, and in rough, partially forested areas it is often hard to get close enough. If several snowmachines are travelling together one may attempt to swing around to head the caribou toward the waiting hunters. If caribou run into a patch of timber hunters may try to circle around it and wait in an open area for the animals to come out on the other side.

Almost every portion of the caribou is utilized for food, and caribou hides are valued as sleeping pads and sleigh covers. Low mukluks are made with caribou leg skins, and a few women in Nondalton continue to use caribou sinew for thread in sewing fur articles of clothing. Like moose, caribou are shared among the people of the village, although probably not to the same extent as moose. Old women and men are sometimes given small choice parts of the animal as gifts.

Small Game: Although large animals such as caribou and moose are more spectacular and more prestigious, small game are important as well to the people of Nondalton and Lake Clark. Small game supply significant amounts of food for some families at certain times. Included in these species are the snowshoe hare, Arctic hare, ptarmigan, spruce grouse, and porcupine. Ground squirrels are sometimes taken as well.

Small game are usually either harvested near places of residence, often by boys or young men, or in the course of other activities, when small game is happened upon. Snowshoe hare are hunted on the hillside behind Nondalton, where the bottoms of little creeks filled with alder and willow brush provide good cover. The large Arctic hares are found in the open mountain and tundra country. Snowshoe hares are also hunted near the homes of Port Alsworth residents.

Ptarmigan are occasionally found in large numbers near Nondalton, and are killed with .22's and shotguns. In January and February large flocks move down out of the mountains to the shore of Six-mile Lake and are found in areas of small brush near the mouth of the Tazimina River, and the outlet of Six-mile Lake. Few ptarmigan appear near residences on Lake Clark.

The forests around Lake Clark support large numbers of spruce grouse, however, and they are frequently utilized for food. When snow comes grouse often move out to the lake shore where the wind exposes sources of gravel. They are shot in the Kijik vicinity and near Port Alsworth. Nondalton people travelling or camping take small numbers from various locations around Lake Clark in summer and fall.

Many porcupines are found in some areas around Six-mile Lake and Lake Clark and residents frequently utilize them for food. They are usually harvested incidentally to other activities. They are either scorched in a fire to remove the quills, or skinned.

Ground squirrels were commonly hunted or snared in the past by Tanaina women on certain mountains around Nondalton and Lake Clark, for skins for parkas, and for food. They are occasionally taken today by shooting them with .22's; one woman digs them up in the fall with a mattock in the traditional manner; "just like brown bear does" she says. She uses the skins to make women's mittens.

Waterfowl: A wide variety of waterfowl pass through the Lake Clark-Nondalton area. Table 1-1 includes a list of the waterfowl species known and utilized by local residents.

Ducks and geese are actively sought during the short periods during which they are available to local people. Nondalton people hunt them on the Upper Newhalen River, in Chulitna Bay, in the Chulitna flats, and at ponds along the Chulitna River. In the spring waterfowl begin to arrive from the south near the end of April, and concentrate in a few open ponds and creeks along the Chulitna drainage. Bearpaw Bay, (Turner's Bay) near the mouth of the Chulitna, is a particularly important stopping point in the spring.

The Tanaina have traditionally hunted waterfowl in the spring. Today they travel by snowmachine to the Upper Chulitna, occasionally camping for several days in good hunting locations and walking from camp in the early morning or evening to hunt. A few people bring back a sledload of ducks and geese, but most only get five or ten geese. Swans were commonly hunted in the past, but few are taken today. Some people think they are tough, but the meat, and particularly the liver is relished by older people. Waterfowl provide a welcome change from winter activities and diets.

Waterfowl do not concentrate so heavily in this area in the fall, and geese are seldom seen at this time of year. Ducks are hunted in the Chulitna flats by Nondalton and Lake Clark residents. A few Lake Clark residents fly down to the Alaska Peninsula in the fall to hunt waterfowl.

Fishing

Salmon: Red salmon are one of the major subsistence species harvested in the proposal area. They are the only salmon species to ascend the Newhalen River, where they arrive early in June. They slowly move up into Six-mile Lake through June, and arrive in the middle Lake Clark area by late June or early July.

The people of Nondalton look forward to the first fresh salmon of the season, and a few gill nets are set out down the Newhalen River in early June. Good runs do not arrive until mid or late June, however, and this is when serious fishing begins. People try to put up fish early in the season, by late June or early July, because the fish are in the best condition, and because weather is usually better for drying fish than later in the summer.

The salmon are still bright silver and their flesh is rich red when they first arrive in Six-mile Lake and Lake Clark. They are taken for immediate use, and for salting and drying for human use. A few Nondalton people and most Lake Clark families, can fresh salmon. A small number are frozen, since people enjoy them fresh, but this method of preservation is limited since few people have freezers.

A number of long-used fishcamps are located on both sides of the outlet of Six-mile Lake, and along the upper five miles of the Newhalen River. Each camp consists of a number of structures, including large weathered smokehouses (chagenq'a) built of spruce poles, old planks, and other scrap materials with tiers of poles inside from which cut salmon are hung to dry. Other structures include tent-frames, small, weathered cabins, pole racks, and caches. Each camp also has rough tables where fish are cut, and small pens made of poles or chicken wire for keeping fish in the water until they can be cut. A traditional method for keeping fish from slipping on the table while they are being cut is to use strips of spruce bark. One Tanaina woman living on Lake Clark says that people laugh at her old ways, "but fish don't slip, no matter how thick the slime gets," when spruce bark is used.

Most people try to put up their "eating fish," dried fish for their own use, right away in the summer. People use gill nets, with one end fastened to shore, and put them out early in the season down the Newhalen River, where they travel by boat to check them. Later they move them closer to the fishcamps. At the height of the run, people sometimes make seine sets, using two boats.

"Eating fish" are cut by slicing fillets from each side of the fish which are left connected by the tail. They are cut carefully, since

hacking the fish would leave places for flies to lay eggs. The fish is then soaked in a strong brine for twenty minutes to an hour, rinsed off, and hung outside on a rack to begin drying. The skin side of the fish is hung out first, then the fish is turned so the flesh side is out. When a coat begins to form on the flesh, the fish are placed in the smokehouse. Some people prefer to let the fish stay in water overnight after they have been cut; they say this makes the eating fish softer after they have dried. Birch, cottonwood, or driftwood of these species, is kept smoldering under the fish in cut down 50 gallon drums to provide smoke, both to provide flavor and discourage flies.

Today, most Nondalton families put up from three to six bundles (40 fish per bundle) of dried fish for their own use. Dried fish is a favorite food for lunch or with tea and pilot bread when visitors come, and it often runs out early. A few families put up considerably more eating fish than others, and depend upon it more throughout the winter.

The main fishing effort, once the more modest requirements for eating fish are met, is devoted to putting up dried fish for dogfood. In the past, when every family had working teams for trapping, this was a critical activity, since a family with 7-9 dogs needed to put up at least 50 bundles, or 2,000 fish, for the winter. Today, with fewer working dogs, fewer fish are put up, although some families do put up 20 or 30 bundles.

"Dog" fish are cut in generally the same way as "eating" fish, but with less care. After the backbone is removed, several slices are usually made through the sides to enable faster drying. They are hung directly on the drying racks after being cut. A skillful worker can cut upwards of 5 bundles in a day.

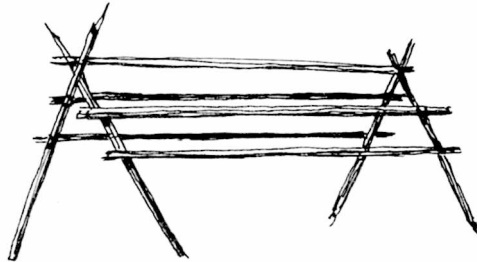
The backbone, ribs and connected flesh left after "eating" and "dog" fish are cut are tied together in pairs, usually by children, and hung over drying racks. These are used as dogfood after they dry. There is a lot of work to be done. Fish heads and scraps are cooked in large pots for the dogs, which are often tied near the fishcamp, and wood must be hauled for the smokehouse and for cooking fires. Nets have to be picked, fish hauled, and hours spent cutting the fish.

Until the late 1960's every family in Nondalton moved down to fishcamp, often only a quarter of a mile from their house in the village. Since then many families have commuted from home in the village to fishcamp by boat every day. Others continue the practice of staying in camp. A bad fire year, such as summer, 1977, when large numbers of men and women were hired to fight fires, may disrupt salmon fishing considerably since many people were gone from the village.

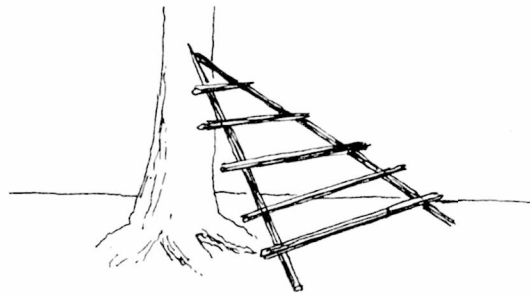
Both "eating" fish and "dog" fish may stay in the smokehouse from two weeks to a month, and then they may be taken down, flattened out, and bundled or stacked neatly in a cache. Some people carefully cut the tails off to pack them more neatly and efficiently. "Dog" fish and bones may be left to hang in the smokehouse until used.

People say it is best to have at least two caches, one for dry goods, and another for dried fish. Some have two in the village, and a third in fishcamp, where dried "dog" fish and fishbones are stored until they are needed in the village.

Nondalton families often put up a barrel or two of salt-fish (suluna). Fillets of salmon are washed, then placed in layers, with salt between, in a wooden barrel or plastic garbage can. They are carefully covered and left until needed; they must be soaked in water for a few days and then they can be cooked like fresh fish. A number of Nondalton families also put up salmon in glass jars by pressure canning.



"bone" racks at fishcamp



temporary fish rack for use in camp



Rack where fish are allowed to hang
before going into the smokehouse

In the fall, after the salmon run passes Nondalton, one traditional pattern since the early 1900's has been to go to camps up around Lake Clark. Here people hunt, pick berries, and catch "fall fish," salmon which are turning red. These fish are cooked fresh, but mainly are split as described for eating fish and hung to dry in the cool fall air. The flesh of these fish, called nudelvay, does not have the rich fat of fish taken earlier in the summer, and many people prefer it because it is easier to digest. Another traditional method of preparing fall fish is to hang them by their heads, without gutting them, to dry and eventually freeze. These fish (dunultani) are eaten both by humans and dogs. Still another old method is to take females with eggs, cut off the heads, and fillet them, leaving the backbone, guts, and eggs connected. The eggs are eaten before fully dry. Nudelvay are often eaten with some kind of fat, preferably the fat (k'dilkidi) from the brown bear.

A number of locations around Lake Clark are camping spots utilized for taking "fall fish." Several old camps are located near the mouth of the Kijik River, and this area continues to be used. Two or three camps are currently used on Chulitna Bay, and others are located along the shores of lower Lake Clark, at Zachar Creek, near Flat Island, and elsewhere. These can be recognized by the fishracks, tent-frames, and small rough steambaths found at them.

"Trouts" and other fish: "Trouts" or shagela, is the general term used in Nondalton for the freshwater species found in the Six-mile Lake-Lake Clark system, including rainbow trout, grayling, lake trout, char, and dolly varden. These species are all caught with fishing rods, or by jigging through the ice. A few people use trout nets near the village. These species are all used for human food, and occasionally grayling may be fed to dogs.

NONDALTON AND LAKE CLARK SUBSISTENCE
SALMON CATCHES - 1963-1976

Nondalton

	Total	Famillies Fishing		Dogs
1963	7,400-25,000	34		200-300
1964	9,200-35,000	34		250+
1966	45,800			
1967	29,600			
1968	33,700			
1969	44,000	33		257
1970	42,900			
1971	22,100			
1972	24,100			
1973	8,500	#permits issued, #returned		
1974	29,509	17	15	
1975	48,704	28	9	
1976	20,480	27	10	210

Port Alsworth - Lake Clark

	Total*	#permits issued, #returned		Dogs
1974	1,426	10	10	
1975	2,078	11	10	
1976	5,532	19	15	20**sled dogs

*Estimates made from village surveys by Alaska Department of Fish and Game, 1963-1969; detailed count made in 1969; 1970-1976 estimates are interpolations made by Alaska Department of Fish and Game from information on permits returned by subsistence users.

**Counts made in early winter, 1976

Whitefish and "candlefish" are generally caught through the ice by jigging, although nets are also used for them. Ling-cod and lake trout are taken on set hooks baited with meat or grayling parts. All of these form important additions to the diet throughout the year. Spring time especially brings people out onto the ice near Nondalton to fish through holes chopped with axes and ice chisels. The mouths of several small creeks near the village are good locations for fishing.

People also fish when travelling up around Lake Clark, and the residents of the lake take fish to eat. There are a number of good grayling spots off the mouths of tributaries coming into Lake Clark; these can be easily fished out as sport-fishing guides making intensive use of a few small areas have found. Residents of the area fish for char in Kijik Lake and occasionally in Kontrashibuna Lake. Trails lead from the shores of Lake Clark to these nearby lakes.

Suckers and lake trout are commonly taken in salmon nets at certain locations around Lake Clark, while in Chulitna Bay large pike are taken as well. Suckers may be cooked and fed to dogs during the summer, while the others are cut and dried like salmon.

People camping at Chulitna Bay in the spring catch large numbers of pike, suckers and lake trout to feed dogs; any extra are cut and hung to dry. After the ice in Lake Clark breaks up Nondalton people travel up the Chulitna River to the Long Lake area to fish for large pike and the large whitefish (telay) found in Long Lake. Pike can be taken with lures, but nets are also used, and these take both whitefish and pike. Pike are also occasionally taken by people in the bay at Port Alsworth.

Bears: Black bear are hunted by residents of Nondalton and Lake Clark in much the same way as other big game species during the fall. Hunters travel by boat watching the lake shores and the mountain sides away from the lake. Black bear often feed on the slopes of the mountains where there are many berries. Hunters take bear almost everywhere around Lake Clark up the lower Big (Tlikaklila) River, and up the Chulitna River.

The mountains on the southeastern side of Lake Clark, in the Flat Island area, are good black bear habitat, and people combine blueberry picking with moose and bear hunting here in the fall. Other areas noted for black bear include the mountain sides along Little Lake Clark and the mouth of Currant River.

In the spring, black bear are taken near Nondalton or in the Chulitna Valley when located. The meat is preferred early in the spring, soon after the bears come out of hibernation.

Grizzlies or brown bear are wide-ranging animals and are usually harvested by Nondalton people when they come across them in the course of other activities, particularly when travelling by boat. They are killed along the Newhalen River occasionally, for example, or around the shores of Lake Clark. There are numerous grizzly trails and bear trees all around the shores of the lake. The head of Lake Clark, and of Little Lake Clark are likely areas to spot grizzlies. A traditional means of hunting, described in the section on the history of subsistence, is for hunters to wait by bear trails at night near fishponds in the Kijik area.

At times in the past, when moose and caribou were scarce, grizzlies comprised a major food resource in the Lake Clark area. Many stories remain of these times. Nondalton men enjoy telling stories about hunting grizzly and considerable prestige is attached to hunting them. One Nondalton

informant related that hunting bears at night "is one of the best kinds of hunting; You have to pick a good place to hide along the trail, otherwise the bear will spook. You can't disturb the grass or brush, and the wind has to be just right." Almost every fall a few Nondalton men hunt for bear in the Kijik area. The fat is eaten with nudelvay, dried fall fish.

Sheep: Like grizzlies, dall sheep are not a major subsistence resource today, but were in the not so distant past. Sheep have been fairly numerous in the rugged mountains around the northeastern end of Lake Clark, and north in the Alaska Range, and some of the ancestors of Nondalton people were noted sheep hunters.

A number of locations are noted as important sheep hunting areas. A creek flowing out of the ridge between the Tlikakila and Chokotonk rivers for example is called Nudyi Qelah in the Nondalton Tanaina language meaning "a place where sheep are taken." The canyon on the southeast side of Little Lake Clark, just past the Tlikakila River delta, is locally called Sheep Canyon, and Nondalton and Lake Clark residents hike up into it in search of sheep.

Other noted sheep hunting areas are at the head of Kontrashibuna Lake, and on the north side of Twin Lakes. There were camps near both places and caches nearby where sheep shot in the fall could be stored until snow fell and they could be picked up by dogteam. Sheep were occasionally hunted in the Twin Lakes area in the winter as well.

Trapping: In the past trapping was the dominant winter economic activity for people of Lake Clark and Nondalton. Today, however, the people

of Nondalton and Lake Clark who trap must be considered subsistence, rather than commercial trappers, in the sense that trapping provides a small amount of supplemental income, rather than being of major economic importance.

Many Nondalton men have trapped all over the study region, from Lake Clark north to the Stony River, west to the Hoholitna River, and along the Mulchatna River. The Tazimina Lakes and Chulitna River have also been major trapping grounds. This huge area was exploited particularly for beaver, but marten, fox, and other species have been important as well.

Today most Nondalton and Lake Clark trappers operate from home rather than from trapping camps, although a number of Nondalton men occasionally use cabins on Lake Clark. Most run lines which can be checked in one day by snowmachine. Sometimes trappers will travel into a more distant area, either by snowmachine or airplane, and spend anywhere from a few days to a month camping there and trapping.

A variety of furbearers are sought by Nondalton and Lake Clark trappers including mink, fox, lynx, beaver, otter, muskrat, marten, wolf, and wolverine. Little effort has been devoted to muskrat in recent years because prices are so low. Wolf and wolverine are usually taken incidentally to other kinds of activities and they are probably shot more often than trapped. Only a few of each of these species are normally taken by Nondalton and Lake Clark people.

The season for most of these species opens November 10, and fairly intensive trapping begins in easily accessible areas at that time. Sets are made for fox, lynx, and marten along the mountain behind Nondalton and for fox, mink, and otter down the Newhalen River where boats can sometimes be used early in the winter. Lake Clark residents make sets for lynx and fox near their homes.

When snow conditions improve for snowmachine travel, Nondalton men extend their efforts around the northern end of Hoknede Mountain and into the Chulitna valley, particularly for fox and lynx. Trips to check traps in these areas are combined with moose, caribou and small game hunting. Camps are sometimes made in the Long Lake area or along the Chulitna River and several days or a week may be spent trapping out of these. Other trappers make sets on Lake Clark, in Chulitna Bay, near Kijik and Miller Creek, and elsewhere. Boats can sometimes be used until December for trapping around Lake Clark and in the mild winter of 1976-1977 they were used until January.

A few Nondalton trappers charter aircraft to take them to the Chulitna, Mulchatna, or Chilikadrotna drainages to spend a few weeks trapping. Many Nondalton men know these areas well from having travelled across them by dogteam.

Beaver season in the Nondalton/Lake Clark area opens about the first of February and lasts until mid-March. Beaver trapping is a significant spring activity for several Nondalton men who attempt to take their limits of 20 beaver each season. Many other people look forward to the season as an excuse to get outdoors in the lengthening spring days, and even those with jobs go out after work or on weekends to trap beaver. Beaver have increased in number throughout the Lake Clark/Nondalton area and large populations of beaver near the village have encouraged many people to go out and trap. One man and his son trap with a snowmachine and dog team west from Nondalton toward Groundhog Mountain; others go over the mountain into Chulitna Valley. Snares and Conibear traps are utilized by beaver trappers. In some areas, lynx and beaver trapping are combined since the lynx season remains open through March.

Muskrat hunting and trapping was a major spring activity in the past and a few families occasionally camp near the Chulitna River in the spring to shoot rats. Most people do not consider it worth the effort, since prices for hides have been so low. One Lake Clark family takes muskrats for their own use.

Most furs are sold, but a few are kept by local people for their own use, as decorations, or for making handicrafts. A few women make mukluks, mitts, parkas, and hats, using moose, caribou, ground squirrel, muskrat, and beaver skins. The meat of lynx and beaver is relished by many Nondalton people and beaver are sometimes snared or shot out of season for their meat.

People living around Lake Clark trap in the Port Alsworth and Nanaliam River areas, around the mouth of the Chulitna River, and in the Kijik area. Occasionally people from other areas come to spend time during the winter trapping in the region, on Lake Clark or to the north, often with airplanes.

Vegetation

Spruce and birch trees are major resources to the people of Lake Clark and Nondalton. Not only are many of the homes of people in the area built with local spruce, but almost all of them are heated exclusively with wood. A few Nondalton households do utilize fuel oil for heat, but this reliance varies from year to year with family income and all are able to fall back on wood. One Nondalton man estimates that it costs him about \$1,000.00 for fuel oil to heat his home for the winter based on the cost of fuel off the barge in Iliamna. He hauled it over the portage road himself and the figure does not include the cost of transporting the drums by boat from the Newhalen Landing to Nondalton. Fuel delivered to Nondalton

costs about \$74.00 per 55 gallon drum in 1976.

Spruce is the fuel most heavily used by Nondalton people. The vicinity of Nondalton has been heavily cut over for more than a mile in each direction and wood must be hauled long distances by snowmachine. Trails radiate out from the village into forests along the mountain front for this purpose. Wood is hauled in basket sleighs or on small sledges. Some birch is used, but little is available nearby.

Lake Clark families tend to use more birch for heat, since it burns hotter and longer than spruce. They also use some cottonwood. Most of them have woodsheds and try to stay a year ahead so that wood can dry before being used.

Dry wood puts out more heat and cuts down on creosote problems. Small birch are more plentiful around Port Alsworth than around Nondalton but residents still haul it fairly long distances. Numerous wood roads radiate out from inhabited areas and tractors, small tracked ATV's and snowmachines are used to haul in wood. Most Lake Clark families attempt to haul in a good wood supply late in the fall after the ground freezes, but before there is much snow or cold weather. Several of them cut wood into stove-sized lengths with "Swede saws," while others use chainsaws or "buzz" saws. Most Lake Clark families also cook with wood which requires large quantities of dry spruce and birch.

Almost all families in Nondalton and a few on Lake Clark have steambaths (n'li) which are used several times a week. These also require quantities of wood to heat. Friends and neighbors often share steambaths and these are occasions for visiting. Steambaths are also located at frequently used camps. Another form of vegetation associated with steambaths is the switch (vinik) used by Nondalton Tanaina to slap the body to help draw

perspiration. These are made of bunches of the twigs and leaves of dwarf birch or mountain ash.

Wood to be burned in smokehouses to help dry salmon, especially birch, cottonwood, and alder, is gathered in the summer and often transported by boat to the fishcamp. Driftwood is also used for smoking fish.

The best stands of spruce logs for cabins or lumber-making are found along the Chulitna River, around the shores of upper Lake Clark and up its tributary streams. The shores of lower Lake Clark and Six-mile Lake are forested mainly with scrubby black spruce growth and brush. Sawmills have been operated in the Port Alsworth area since the 1930's and many of the houses and boats of Nondalton and Lake Clark people are constructed from lumber cut from trees around the shores of Lake Clark. The stumps of these trees can be found almost everywhere around the shores of the lake, particularly from the Chulitna Bay area up the lake to past Portage Creek.

Areas where logs have been cut in recent years include the Currant River, Portage Creek, Kijik, Tanalian River and Chulitna vicinities. Closer to Nondalton they are taken from along the Newhalen River.

Sleighs for use behind dogs and snowmachines are constructed by Nondalton people mainly from local birch. A smooth-barked, straight-grained tree is selected to be ripped into runners, stanchions, slats, and other parts of the sled. It has become increasingly difficult to find good sleigh birch in the area near Nondalton, and birch is sometimes brought long distances from locations around Lake Clark or up the Chulitna River. The Tanalian, Kijik, and Currant River deltas supply some birch for sled construction

Snowshoes are constructed by a few Nondalton men out of local birch; it is also difficult to find good, clear straight-grained birch for these.

Nondalton people feel they are lighter and give better "lift" on snow than commercial snowshoes. Light nylon cord is substituted today for the traditional rawhide webbing.

Birch and spruce had a variety of other traditional uses in making tools and equipment. Spruce wood was used for the frames of canoes and for weapons. Spruce bark continues to serve as a non-slippery surface for cutting fish on, as described in the section on salmon fishing. The name for a large community house used in the past, nichit, is also the name for birch bark; these semi-subterranean dwellings were apparently covered with birchbark. Birchbark was also used for covering canoes and temporary shelters.

A variety of plant species have been used by the Tanaina for food. Berries in particular, are harvested by both Nondalton and Lake Clark residents beginning about August. Certain locations are important for harvesting different types of berries; the upper part of Lake Clark, in the Currant River and Kijik areas, for example, provides spots where raspberries and currants can be found in quantity. Other berry-picking places include areas around Port Alsworth and the Tanalian River, the lower Chulitna River, Flat Island, and on the mountain behind Nondalton. Sometimes families make long trips in search of certain varieties, or hunting and berry-picking are combined in a long boat trip. Most berry-picking is done closer to the village or place of residence, however.

Berries are eaten raw, made into jams and jellies, or stored dry. "Indian ice cream" (nivagi, or agudaq) is a favorite Nondalton use of fresh blueberries and crowberries. It is made by whipping lard, sugar, and berries together. In the past bear grease was used, but Crisco or a similar product is used today.

Other plants used by the Tanaina and other residents include the young tender tips of fireweed, and fiddlehead ferns. In spring the sweet inner layer of birch bark is chewed like gum, and was used as a starvation food in the past. *Hedysarum alpinum* (k'tl'ila, wild turnip), and *Heracleum lanatum* (ggis, wild celery) are eaten, as are a number of other plants. A moss has been used for diapers for babies, and a variety of medicinal plants are known to the Tanaina.

Most Lake Clark families, and a few Nondalton people, plant gardens in the summer. These supply all of the potatoes, and many of the other vegetables used by a number of families. Early white settlers, at Tanalian Point and elsewhere around Lake Clark, introduced gardening in the early 1900's, and many Tanaina had gardens when they lived around Lake Clark from the 1920's to the 1940's. Most of the old house remains from this period have root cellars which were used for the storage of potatoes, turnips, rutabaga, and carrots.

These root crops continue to be important, as do cabbage, lettuce, peas, squash, strawberries, raspberries, and rhubarb. Tomatoes and cucumbers are grown by a number of families in greenhouses. The gardens of four or five Lake Clark families produce large percentages of the vegetables they use. Several Nondalton families plant small gardens at their camps up Six-mile Lake and Lake Clark, where they seem to do better than they do in the village, probably because children and dogs cannot reach them.

VI. ENVIRONMENTAL DYNAMICS AND EFFECTS UPON RESOURCE USE

The natural environment of the Lake Clark region has rhythmic and non-rhythmic fluctuations which affect resource use in many ways.

The region is active geologically, with live volcanoes along its southeastern side which occasionally shower the area with ash. Many of the older residents have seen changes occur in the physical geography of the area within their lifetime, including shifts in stream-courses, changes in lake levels, and a variety of vegetational changes.

They have also noticed glacial changes, particularly in the glaciers which until recently met near the summit of Lake Clark Pass, but which have retreated in the last few years, leaving an open area between them.

The climate of the region is transitional between the continental climate of the interior, and coastal climates. Weather is subject to considerable variation from day to day, and from year to year. In some years portions of the region get high snowfalls, while in others they get very little. Temperatures can drop quite low under the influence of interior highs; -50°F has been recorded. Some winters see very little cold weather however, perhaps only -10° . Temperatures can change very quickly also; local residents recall instances of the temperature rising from -40° to $+40^{\circ}$ in the space of six or seven hours in an east wind. East winds on Lake Clark frequently bring thawing spells in mid-winter, and often blow snow off exposed areas.

These variations in temperature and snow conditions can drastically affect transportation and access to resources by snowmachine, while rapid weather changes affect both snow and water travel. Winds can come up quickly on Lake Clark, for instance, and the long fetch exposed to a north-east wind throws up large waves in a short time.

Weather can also have a great deal of impact on game populations. The southern limit of Dall sheep in the Alaska Range, a limit believed to be related to snow depth, is in the Lake Clark area, and variations in snowfall may have a heavy impact on sheep populations. Numbers of sheep were reportedly high around the northeastern end of Lake Clark early in the century (Smith, 1917:p.39), but may have decreased in the severe winters of the 1930's and 1940's. They are believed to have risen again in the 1950's until a severe winter in 1969-70 reduced their numbers somewhat (Alaska Dept. of Fish and Game 1976, 100). Residents of the area believe sheep numbers have declined again in recent years. Snow depths affect caribou and moose distribution and numbers as do other weather conditions.

Other species in the Lake Clark area appear to undergo cyclic variations in population size as they do in the rest of the boreal forest. The snowshoe hare cycle affects other species, although in the diverse habitat around Lake Clark lynx and fox populations may not be quite as closely linked to hares as they are in the Alaska interior.

All of the major resources utilized by the Tanaina for food have varied drastically in historic times, and this has had considerable impact on resource use and settlement patterns in the Lake Clark area. Such variations probably had an even greater impact on the aboriginal Tanaina. A geological party passing through the Nondalton-Lake Clark region in 1914 has left a few observations on game conditions early in the century. They noted that for an area so remote there was surprisingly little game. Caribou and bear were the only large game species seen, and the few caribou seen were mainly in the middle Koksetna River basin. They recorded that the natives of Nondalton told them that caribou were

at one time much more numerous, and they cited the large number of deeply worn game trails, largely overgrown in 1914, as evidence for this (Smith, 1917:39).

Black bear meat was obtained by the expedition from the people of Nondalton, who said that it formed an important part of their diet. They said that it was becoming increasingly difficult to obtain, however (Ibid:39). Most moose sign seen by the expedition were much farther to the north, in the Mulchatna and Kuskokwin drainages (Ibid:39).

Caribou populations in the region apparently remained low until the 1960's, when the Mulchatna herd was estimated to number about 3000 animals. By 1974, however, it has increased to over 14,000 animals. This made a great deal of difference to the people of Nondalton, who had to travel into the Chilikadrotan country or farther to find caribou in the 1940's. In the 1970's caribou have been available in the Chulitna drainage and close to the shores of Lake Clark.

Moose, too, were apparently rare around the shores of Lake Clark until the 1930's, although they were found in the upper Mulchatna and Stony River country. They became quite numerous in the Lake Clark-Chulitna-Nondalton area by the 1950's, but since the early 1970's there has been a decline in their numbers which local residents attribute to increasing sport hunting pressure. Some residents also say there have been behavioral changes; that the moose stay farther away from the waterways in the fall than they used to. They hypothesize that this is a result of increased hunting pressure and air traffic along the lake and river systems.

The history of fluctuations in game populations is only vaguely known for the Lake Clark area. Residents of the area were able to give the broad outlines of historic changes, but these are of course liable

to problems of interpretation, not only of quantity (how many is a "lot of caribou", or "fewer moose than today", etc.), but also of time, since few people have a very exact memory of when these changes occur. Detailed and drawn-out conversations with people, relating their seasonal activities, locations, and events of personal importance, such as births in the family, could provide much more information about historical changes in game populations and environment than this study had time for.

Several of the fur species, including lynx, fox, muskrat, and beaver are subject to fluctuations in population, and this has affected, and been affected by, trapping activities.

Lynx populations vary in a general ten or eleven year cycle along with snowshoe hares, and they also seem to move into and out of areas in response to unknown conditions.

Nondalton people say that fox, wolf, and wolverine are fairly closely associated with the caribou herds, and that their distribution and populations are affected by caribou distribution and abundance.

Market forces also have considerable impact on furbearers, particularly the beaver, which remain in one location and can be easily trapped out of local areas. When prices are high people take more beaver, and in areas close to the village they may become scarce. Beaver seem to be extremely numerous in the Nondalton and Lake Clark area at present, and new houses are even found on little creeks close to Nondalton where people say they have never seen beaver before. Numerous areas around Lake Clark also have an abundance of beaver.

Salmon runs fluctuate in size in the Lake Clark system, and are affected both by natural cycles and by catches on the high seas and in Bristol Bay. For the most part Nondalton people are able to get the fish they need even in years of small runs by increasing their effort. Occasionally

in the past however, even with increased fishing, they were unable to get all of the salmon they needed for dogfood. In these years they substituted with pike and whitefish from the Chulitna, or by taking larger numbers of spawned salmon in the Kijik area. From about 1919 to 1926 or 1927 were extremely poor salmon years in the Lake Clark and other Kvichak drainages, apparently due to overfishing in the new Bristol Bay fishery. There were a number of years when salmon almost totally failed.

Rainbow trout in the Tazimina system, which flows into Six-mile Lake just across from the village of Nondalton, are another example of man-caused fluctuations in resource populations. Nondalton people long netted rainbows at the mouth of the Tazimina River, and caught them through the ice or in open water during the spring as well. In the 1950's a lodge was built just up the lake from the village, and the trophy rainbow of the Tazimina were a major attraction. Sport fishermen utilized the area from early spring through fall. Apparently the additional pressure on the resource, particularly during the spawning period, was enough to almost wipe out the rainbow population. Restrictions on spring fishing were instituted, and today the population is just beginning to recover.

People who utilize wildlife resources for food have only a few options when resources they depend upon become scarce in the areas they normally harvest them. One is to increase their geographical area of subsistence activities to utilize different resources or to substitute other activities such as wage employment. The Nondalton Tanaina have done all these things in history of their occupation of the Lake Clark region,

and some of their adaptations are noted in the chapter on subsistence history.

The Nondalton Tanaina consider their subsistence territory to include all of the upper Newhalen-Six-mile Lake area, Lake Clark, the country north of Lake Clark to Telaquana Lake, the upper half of the Mulchatna drainage and the Chulitna Valley. This is the area they have traditionally occupied, largely to the exclusion of other groups, and over which they have hunted and trapped. This large area has been needed by the small Tanaina population in the past to give them room to find resources they have needed, particularly in times of resource fluctuations; They continue to feel a strong relationship to this country.

VII. THE SIGNIFICANCE OF SUBSISTENCE

The importance of wildlife and timber resources, and the activities associated with their use to the people of Nondalton and Lake Clark, is obvious to those who know them, but difficult to express clearly to those who do not. "Subsistence" is a controversial word in Alaska today, and connotes very different things to different people. It has become part of a complex and increasingly emotional and political question.

It is obvious that resource use has changed in the Lake Clark region, just as it has throughout the state, as aboriginal peoples were contacted by newcomers with new ideas, values and technology. Although this process of change, outlined briefly in Section III, has not been thoroughly documented for the Lake Clark region, patterns of settlement and livelihood have changed considerably in the past fifty years, and they continue to change.

Regardless of such changes, however, the use of local wildlife

and other resources continues to have considerable importance to the people of the area. Indications of this are seen in the fact that people continue to live in the area, despite the increasing costs of transportation and imported goods, and in the ways in which Nondalton and Lake Clark people live.

Economic Importance

The contemporary way of life in Nondalton and around Lake Clark, like that in many other rural areas of Alaska, is based on the integration of three economic components; earned income, unearned income, and subsistence, or, as it has been expressed elsewhere, "wages, welfare, and wildlife." Few opportunities for year-round employment exist in the region, while good-paying full-time jobs such as teaching are often filled by people from outside the region, since they require skills which few Nondalton people possess. Within Nondalton there are a core of jobs, including school janitor, teaching aide, school cook, postmaster, store clerk, and health aide. One Tanaina woman is a certified teacher and is employed by the school. Various projects funded by government agencies, such as school construction, sewer and water installation, and community building construction, have provided wages for a short period of time for a number of people. Trapping, which is closely tied to the subsistence sector, provides a small amount of income seasonally as well, as do handicrafts.

Other opportunities for wage employment exist only away from home, and most people travel outside the region for temporary jobs. These include cannery work, commercial fishing, fire-fighting, and construction projects such as the Alaska pipeline. Most of these jobs are available only during the three or four summer months.

There is a great degree of variability from year to year in the sources and amounts of income residents earn. During some summers there are few fires, and no firefighters are hired; in other years there are poor salmon runs in Bristol Bay and few people are hired by the canneries, or commercial fishermen barely make expenses. Similarly, the construction industry in Alaska goes through cycles of "boom and bust" in which many high-paying jobs are available in some years, and in others there are few jobs.

The residents of Lake Clark are also associated with the sport-fishing and lodging industry, earning fairly reliable, but small incomes. Members of four Port Alsworth families receive income from the school which was started there in winter 1976-77. There is also income from the post-office, weather observations, and aircraft repairs. Like jobs in Nondalton, these are all part-time, and provide only part of the income people need to live in the area.

Several sources of unearned income are utilized by some of the people of Nondalton. If a person works long enough during the summer to qualify, he can draw unemployment compensation for much of the winter. State and federal welfare agencies provide support for those in need. This support is based on income and family circumstances, and varies from year to year. In most recent years only about five families in Nondalton have depended heavily on welfare. Social security and other old age income is important to families with older members. Food stamps are also available and used. In addition to these sources, there are a number of subsidies, such as medical care, transportation for medical services, and a variety of education and training programs, which are available to Nondalton residents. Some of the Lake Clark people may benefit from

unemployment compensation at times, and older residents draw on Social Security, but none of them utilize other welfare sources.

Prices for food and other goods are relatively high in Nondalton and Lake Clark. Most goods are delivered by air, although some fuel and lumber is transported via the "portage" road from Iliamna, where they are delivered by barge or large aircraft. Food ordered by individuals, or by the stores in Nondalton, must first be delivered to Iliamna, then transported to Nondalton or Port Alsworth by air charter. This raises the cost of goods considerably, as do mark-ups in the two stores in Nondalton. Meat and fresh fruit prices are often double or more what they are in Anchorage.

While goods and services are far more expensive in the Lake Clark region than in Anchorage, employment is far less reliable, and incomes generally much less. In 1973, for example, more than 80% of the families in Nondalton reported incomes of less than \$10,000.00 while 50% reported incomes of less than \$5,000.00 (Gasbarro, unpublished data).

The use of local natural resources is the third critical component of the modern subsistence economy. The harvest of local resources is frequently the only sector which provides employment opportunities throughout the year. Harvesting fish and wildlife fills the months until wage employment can again be obtained. Fuel and some kind of food can be harvested throughout the year in the local region. Conversely, wage employment provides income necessary for pursuing subsistence activities.

Hunting and fishing contribute an important part of many families' diets. The researcher estimates that a majority of the families in Nondalton obtain more than half of the fish and meat they eat from the land and waters of the surrounding area. A few families, in certain months or in

particular years, are even more dependent upon local game for food. A few Nondalton residents seldom purchase any meat or fish at all.

Some Lake Clark residents are equally dependent upon local resources. Moose, caribou and fish supply much of the meat that many of them use, while almost all are dependent upon locally harvested wood for warmth and cooking. Several families grow gardens which supply all of the potatoes and many of the other vegetables they utilize.

Depending on the costs assigned to the various resources harvested and grown by residents in the area, the replacement value of the subsistence products harvested by many families would be in the order of thousands of dollars. For many families the values of these products would approach the total value of other forms of income. This can be illustrated by the example of a Nondalton family of seven which earned about \$8000.00 in 1976. They burned wood for heat, at a replacement value in terms of fuel oil of over \$1,000.00 a year. They harvested a moose, two caribou, and a variety of small game in 1976, which, if valued per pound at the going rates for meat in Nondalton stores, would be conservatively worth \$3,000.00.

The value of the salmon and other fish they harvested is more difficult to estimate since neither fish nor dogfood are sold in the Nondalton stores. They have six dogs and at a conservative \$60.00 per month to feed them commercial dogfood, the use of fish is worth \$720.00 for the year. Fish for their own consumption, particularly smoked and canned salmon, if valued at Anchorage prices, would be worth well more than \$2.50 per pound. Their catch of about 120 eating fish would be worth at least \$9000.00 at this replacement value. If their trapping income of \$700.00 is subtracted from the earned income, and added to the "subsistence" side of the ledger, the value of the country produced harvested

by the family would equal \$6,320, almost as much as the total earned income. This does not include other products, including berries, items of clothing using furs, and sleighs and other items constructed of local materials.

More than this, a considerable portion of the \$8,000 income was expended on items related to subsistence activities. A new outboard engine was purchased by the family in 1976 for almost \$1,000 and at least \$500 worth of fuel and oil were used by snowmachines and outboard engines. Other related expenditures included traps, ammunition, and snowmobile parts. These examples help indicate the economic significance of resource harvest activities, although of course there is much variation from year to year and between families.

Harvest Levels

Another way of expressing the significance of the subsistence sector is to quantify the harvest of resources. Table 7-1 represents average annual harvests of certain resources by residents of Nondalton and Lake Clark.

These average annual harvests are estimated from information provided by residents, by observations made during the researchers residence in the area, and from 1973 harvest estimates collected in a household survey made by the University of Alaska (Gasbarro and Utermohle, 1974, unpublished data). These estimates are given as a range, both to indicate the variations which occur from year to year, and to avoid misplaced concreteness. Most of these resources are harvested from the area of ecological concern defined by the Department of the Interior's 1974 proposal for the Lake Clark region, although many are also taken within

the park proposal. Section V of this report describes the areas most important for the harvest of particular species.

The amount of game, fish and materials harvested by residents of the proposal region varies greatly from year to year, depending on such factors as resource availability, personal and family situation and needs, game regulations and enforcement, weather, and accessibility. Harvests within any given geographic area are likely to vary even more, depending upon the availability of resources in alternative areas, and upon travel and access conditions.

It should be kept in mind that estimates of resource harvests based on individual reminiscence are not extremely accurate. Often people do not know how many of each species they have harvested in a given period of time, or they may distrust the motives of the questioner and give him what they think the legal bag limit is. Occasionally individuals claim to have taken more game than they actually have, boastfully, while at the same time underrepresenting harvests of other species which have less prestige attached to their harvest. For these reasons, even the most detailed and intensive survey of household harvests would be subject to considerable error. The researcher was advised by the Nondalton village council not to make such a household survey.

Dependence upon Local Resources

The concept of "dependence" upon, or "need" for, subsistence resources is intuitively obvious, but difficult to base analysis upon. An incredible number of variables are involved in determining why people's use of resources, and their requirements for resources vary.

TABLE 7-1

HARVESTS OF MAJOR SPECIES IN THE LAKE CLARK NATIONAL PARK
PROPOSAL AND AREA OF ECOLOGICAL CONCERN

SPECIES	Estimated Annual Averages 1966-1976	
Moose	25 -	30*
Caribou	75 -	125
Black Bear	10 -	12*
Grizzly	1 -	3*
Sheep	0 -	3*
Hares	200 -	300
Porcupine	100 -	125*
Ptarmigan	500 -	600
Spruce Hen	100 -	150
Beaver	58 -	200*
Muskrat	10 -	50
Land Otter	10 -	20
Mink	10 -	50
Marten	5 -	50
Wolverine	2 -	5
Wolf	1 -	3
Fox	50 -	200*
Lynx	5 -	30*
Ground Squirrel	5 -	15
Ducks	100 -	200
Geese	40 -	50
Salmon	8,000 -	30,000*
Whitefish	800 -	1,000
Pike	300 -	400
Grayling	1,500 -	2,000
Char	50 -	100
Rainbow	150 -	200
Lake Trout	500 -	750

*Significant harvests within park proposal

There is no one in the Lake Clark area today who is totally dependent on local resources for his livelihood. But nearly all residents supplement their other sources of income by harvesting resources for their own consumption in the form of building materials, fuel, and food.

There is great variation in harvest and use of resources among the residents of the park area. Some people harvest a great number and variety of resources, while others harvest only a few of a much smaller number of species. This is not necessarily an indication of the importance which the resources they harvest have to them however, since a person who is well-off economically or has an airplane, may have the opportunity to harvest a large variety of species, while the person who harvests only a few resources may have critical need of the few he gets.

There is great variation through time as well, in the use of resources. In some years, because of the variable and unreliable nature of the regional economy, the resources a family harvests may have much more economic importance than they do in other years when income is greater.

In addition to variability in income, family size and composition, types of employment, cultural heritage, and attitudes, among other factors, influence the use of, and dependence upon, local resources.

Generally speaking, for the majority of the people of Nondalton, and for most of those of Lake Clark as well, the use of local resources provides the economic margin which makes it possible to continue living in the area. In terms of replacement value, for example, the use of spruce and birch for construction and firewood is extremely important economically, since the high cost of transporting lumber and store-oil put them almost out of the reach of people living the life-style that many do in this area. Without the use of subsistence resources many

people could not continue to live in the area, or would be able to do so only at a much lower standard of living.

Subsistence and Economic Changes

As noted in Chapter III, many changes have occurred in settlement and subsistence patterns in the Lake Clark area during the past 200 years. The dominant trend has been toward an increasing involvement in the economy of the outside world, first through trapping and the fur-trade, then through cannery work and fishing in Bristol Bay, and then through wage employment. These activities have all enabled people to obtain goods and services from the outside economy which could not be obtained through the subsistence sector. Although the role and meaning of subsistence activities have changed during all these economic and cultural changes, these activities continue to be important.

The major economic trend in recent years has been the increasing dominance of government spending. Construction, maintenance, and programs associated with schools have provided new jobs in Nondalton and Port Alsworth, for example. Water, sewer, and communication projects, and various community programs, have created jobs. Air-taxis and lodges also benefit from government spending since they supply services to support many government projects. The provisions of ANCSA are also starting to be felt in the economy.

These sources of income are coming to replace traditional sources, such as fishing in Bristol Bay, particularly since they occur closer to home and are becoming increasingly dependable and predictable.

Many types of changes in subsistence activities have occurred as the result of economic and social change. People no longer spend long periods of time out in trapping camps in the Chilikadrotna or Mulchatna drainages

as they did twenty and thirty years ago. The harvest of salmon has decreased since there are fewer working dogteams. Areas used for resource harvest and settlement have decreased, while more intensive use is made of smaller areas.

In some respects it can be said that there has been a decline in the relative importance of local resources as alternative activities and sources of food and income have become available. To resident resource users however, relative importance is not the concern; if you need a resource to maintain your way of life, and enable you to live where you do, that resource is important. Its importance can't really be compared unless viable alternatives to it are available.

Indeed, some resources are more important and used more than they were in the past. Moose, for example, were uncommon in the area until thirty or forty years ago, but are now important sources of meat. Firewood has actually increased in value as the cost of stove oil has increased.

Certain individuals and families rely more on local resources, and follow more traditional practices than others and this variation makes generalizations about the effects of economic change upon subsistence practices extremely difficult. And, as mentioned in previous paragraphs, the relative importance of store-bought and locally harvested resources varies seasonally and annually for many families.

There does not appear to be a linear relationship between increasing wage opportunities and decreasing subsistence activities, as common belief would indicate. Some forms of employment or welfare obviously make certain subsistence activities impractical or impossible. A person who is working eight hours a day at a job cannot go off to hunt or cut

firewood during that time. However, he may be able to purchase a snowmachine and fuel which gives him greater mobility for harvest activities during his off-hours and on weekends. Or he may subsidize the subsistence activities of another family member who is not employed.

A few Nondalton people say they have been told they will lose unemployment benefits if they trap. If they cannot combine trapping with hunting they feel there is little point in going out by snowmachine to hunt caribou unless they know the exact location of caribou, since it would cost too much for fuel without the chance of getting fur to help defray expenses. Each subsistence activity, rather than "subsistence" as a whole, is affected by changes in other cultural and economic areas, and it would require much more study to unravel these connections and associations. The nature and characteristics of the alternative forms of employment, rather than the mere fact of their existence, seem to be the important factors in the relationships between wage and subsistence activities.

Viewed historically, the Tanaina have been in a continuous process of adaptation to the western economic systems for hundreds of years. The people of the Lake Clark area continue to integrate wage, welfare, and subsistence activities in much the same way that they integrated trapping, trading and subsistence up until twenty or thirty years ago.

Socio-cultural significance

Resources and harvest activities have more than merely economic value to the people of Lake Clark and Nondalton. Many social relations revolve around resource harvesting activities. Families take boat trips together around Lake Clark or up the Chulitna River together, to hunt,

fish, and camp, for example. Not only do these provide opportunities for many members of the family to participate in activities together, but they also allow families to share activities and reinforce social ties. Women form partnerships during the summer while putting up salmon, sharing the use of boats, nets, and smokehouses. Men may form short-term partnerships for trapping and hunting activities.

Subsistence activities also provide significant opportunities for the employment of people of different ages and skills. Children contribute economically by helping relatives process salmon, by ice-fishing, or fishing with hooks and line. They also bring in wood and help with other chores. Teenagers hunt small game, fish and trap around the village, and help their parents in a variety of activities. Old men and women, past the age of active participation in the wage economy, put up dried salmon and spend hours fishing through the ice. Many of them hunt small game and trap. Old men frequently skin beaver and other fur animals for younger trappers, often in return for meat. These resource-related activities provide important links between individuals, families, and generations. They enable the passing on of traditional skills and knowledge, and help maintain social and cultural ties.

Use of the land and wildlife for subsistence is an important part of the cultural fabric of both Tanaina and "white" ways of life in the Lake Clark area. Much of the history and cultural heritage of the people of Nondalton is related to subsistence activities and lands in the Lake Clark proposal. This is reflected in language, stories, place names, and people's memories of the past. The land around Lake Clark is alive to the Nondalton Tanaina through their hunting and trapping

experiences and through the stories and place names which pass along the accumulated history and environmental knowledge of the Tanaina. It is through present subsistence activities that these things are remembered, reinforced, and passed on to succeeding generations.

The Lake Clark proposal includes a large area which is of particular cultural significance to the people of Nondalton. Most of the adults on Nondalton grew up in it, have relatives buried there, and have continued to make use of the area. Certain sites have combined economic and cultural importance, such as the Kijik area, which is not only the site of a major 19th century Tanaina settlement and graveyard, but also a major area for gathering fall salmon, and for hunting brown bear.

The people of Nondalton feel that trapping and other subsistence oriented activities will continue to be important as young people return to the village from school and pipeline related jobs. "What else will they do here in the village?", is a commonly expressed thought. Nondalton Tanaina view the lands around upper Lake Clark and in the Mulchatna, Chilikadrotna, and Stony River drainages as part of their land, their "hunting ground" as they call it, even though these areas are not heavily used at present. They express the idea that some of these areas are important alternatives when resources become scarce closer to the village. All adults of middle age or older remember when there were no caribou or moose available closer than the Chilikadrotna River and stories of this scarcity have been passed along as part of the traditional knowledge. Nondalton Tanaina say it could happen again.

To white residents of the area, subsistence activities and resources have meanings of their own. The American pioneer heritage and its Alaskan version include a high valuation of hunting and the use of wildlife for food. Among Lake Clark residents there is an element of "back-to-the-land"

thinking, valuing individualism and self-sufficiency. The use of local resources for subsistence fits neatly into these concepts and lifestyles. Some elements of subsistence living, such as methods of putting up smoked fish, have been adopted from natives, while others have come from the whole spectrum of American pioneer heritage.

One factor, often overlooked in discussions of the importance of subsistence and trapping activities, is the role these activities play in providing stability for native individuals in a period of social and economic transition. Even if the needs of people could be met totally by welfare, or seasonal employment, many native people would continue to need something to do, something to make them feel productive and give them pride in themselves. One of the reasons that alcohol has become such a problem in villages like Nondalton seems to be the loss of identity and cultural pride brought about by rapid social and economic change. Trapping, hunting, and fishing are things which may help people retain a sense of personal worth.

VIII. SUBSISTENCE RESOURCE USE AND THE PROPOSED PARK

Trends in Subsistence - Population Change

The population of Nondalton has remained fairly stable over the last ten years, as a high birth rate in the 1960's was balanced by a high rate of outmigration. Over the last five years, the birthrate has declined, and outmigration from Nondalton has apparently slowed as services and opportunities for jobs have increased slightly in the village. It is possible that Nondalton may grow slightly if many of the large population of young people stay in the village and raise families. There are also

a number of families who consider the village "home" living and working elsewhere who could decide to return if economic conditions improve in the village and region.

There are few prospects for long term improvements in Nondalton's economy however. There will be construction projects, such as a new high school, which will provide temporary abundance, as well as a few new jobs in maintenance, but nothing in sight beyond that. The pattern of integrating seasonal wage employment with subsistence activities is likely to continue.

The Lake Clark-Port Alsworth situation is slightly different. It is difficult to speak of trends when such a small population is involved, but certain influences upon population change can be noted. The first is the fact that a family has lived in the area for more than 30 years. Their airstrip, the post office, and school at Port Alsworth, have drawn several families to the area in recent years. These people like the environment, small community, and pace of life on Lake Clark. People have moved to other locations on Lake Clark for similar reasons-- they like the country and the way of life. The opportunity to take wildlife and firewood resources helps make this way of life possible. These values appear to be having an increasing impact on rural settlement in Alaska, and it is likely that areas like Lake Clark will see slow increases in population. Other factors, particularly the lack of available land, and employment opportunities, will hinder such growth. In this respect it is difficult to say what impact the creation of a park may have upon population. It may increase the employment factor, while decreasing opportunities for newcomers to participate in subsistence activities or acquire land. In general, the year-round population of the Lake Clark area is likely to remain low, though it may increase slightly.

Economic Change

Temporary economic improvements, such as construction projects, or more seasonal jobs, may result in improved capability among Nondalton and Lake Clark residents to gain access to local resources. One of the main factors limiting use of the Lake Clark area, for example, is the time and expense of boat and snowmobile travel. Greater income, making possible the purchase of faster boats and outboards, and greater quantities of fuel, may well allow people to make more frequent use of the area. A decrease in the high cost of fuel in Nondalton, presently in the range of \$1.50-\$1.75 per gallon, could have a similar effect.

Without major economic changes in the area, wildlife and other subsistence resources are likely to remain economically significant to most families now using them. These resources constitute an attraction for people to live in the area, while also making life in the area feasible.

Cultural and social factors work toward the continuance of resource harvest activities in the area. Natives and white alike attach value to these resources, not only for the money they save, but also because wildlife provides preferred foods, and because harvest activities are a valued way of life. Social activities often revolve around shared harvest activities.

In general then, it may be speculated that the year-round resident population of the Lake Clark-Nondalton area will remain near its present level or slightly increase for at least the short-term, perhaps five to ten years. Seasonal residents are likely to increase, particularly if more land for cabins becomes available in the area, either through subdivision of native allotments or existing patented land.

Some harvest activities are likely to decline somewhat over this period, while others will probably increase. The importance of large numbers of salmon for dogfood may continue to decline, or the emphasis may continue to shift more toward fall fishing, since this can be done later in the year after people return from summer jobs. If this is the case, areas such as Kijik within the proposal, may see continued or increased use for fall salmon fishing. The use of moose and caribou is likely to continue to increase if local economic conditions improve, since their meat is preferred and more income tends to improve local residents' access to these resources. Trends in trapping will depend on fur prices, which are presently high for some species and are encouraging and expansion of trapping activities and increased trapping effort.

The Significance of the Proposal Area for Subsistence

Chapter V has noted the general areas of resource use, and the activities which occur on lands within the proposed Lake Clark National Park. The proposal area is significant for resource use to local residents of Nondalton and Lake Clark in several respects. First, the area has historically been used by the people of Lime Village and Nondalton, who consider it part of their traditional territory. They recognize that the distribution and abundance of fish and wildlife resources have fluctuated in the past, as have economic conditions, and they consider the western parts of the proposal as important reserves for times when they cannot obtain resources closer to their villages.

Lake Clark and other portions of the proposal are important to Nondalton and Lake Clark residents who trap, hunt, and fish there. Lake Clark is more accessible than areas north of Nondalton. It also has

fairly good populations of lynx, which are presently bringing good prices. Other areas of the proposal are lightly exploited, and therefore provide good trapping and hunting.

Firewood and building materials are harvested from around Lake Clark and are a particularly important resource economically to residents of the lake and to Nondalton people with cabins and camps around the lake. There are few alternatives available, since the best stands of accessible spruce and birch in the region are included in the proposal.

Impacts Upon Park Management

Since the NPS has not yet received mandates from Congress for management of the Lake Clark proposal, it is impossible to know what policies and regulations will be enacted, or what role subsistence resource use will have in the park. Based upon existing conditions, however, some speculations can be made regarding the general impact of subsistence activities upon park management in the Lake Clark area.

One problem with such an assessment must be recognized at the outset, however. Most of the Lake Clark proposals recommend that sport hunting continue to be allowed in at least portions of the area. Since this study has not addressed recreational hunting or resource use by people who are not residents of the general proposal region, very little can be said of the combined impact of "sport" and "subsistence" harvest. At present, for certain species, particularly moose, caribou and sheep, the former exceeds the latter by several-fold in the region.

If legislation enacting a park in the Lake Clark area authorizes "traditional subsistence uses," either with or without a clause limiting these to 1971 levels, a number of uses made by the people of Nondalton

and Lake Clark of the proposal area will probably qualify. The most significant of these in terms of harvest, include moose, black bear and small game hunting, several types of fishing, trapping, berrying, and woodcutting around the shores of Lake Clark. Trapping, some moose and caribou hunting, and other activities incidental to trapping occur throughout a much larger area of the proposal. A few specialized activities, important more for their cultural associations than for their economic significance, also occur in the proposal, including brown bear and sheep hunting.

Each of these types of resource activities have characteristics which are likely to affect aspects of park management; Chapter V contains descriptions of methods and areas of exploitation. Much will depend on the other types of uses which eventually develop in the park, since at present, most use of the area revolves around consumptive use of resources.

The use of firearms, is of course, a necessary part of many harvest activities and there is the potential here for conflict with non-consumptive resource users, as well as questions of safety. Wood-cutting also presents a potential for conflict, since areas around the lakes and rivers, most desirable for recreational uses, are also the areas where local residents cut wood for camping, cabin construction, and for residential heating. In some cases such subsistence uses can have considerable impact upon vegetation. Park planning and regulations including zoning of activities in time and space, could prevent such conflicts. Campgrounds for recreational users, for example, should not be developed in areas important for subsistence purposes. Determining who should qualify for subsistence use of the park, and enforcing such regulations, will be two of the major problems facing the NPS in implementing a subsistence policy. People of the area are not

accustomed to regulation of their activities, and indeed, in some cases pay little attention to existing state and federal regulations dealing with the use of wildlife and timber. These agencies and their representatives have failed to gain the respect of local people. Local people feel that they have little involvement with these agencies and no effective input into decisions made about local affairs; they feel that bureaucrats lack knowledge of, and concern for, local conditions and ways of life.

Both the Tanaina and local white populations are highly individualistic, preferring to deal with situations on their own, rather than through representatives. The Tanaina of Nondalton have no tradition of delegation of authority in dealing with agencies, and although under various regulations, they are compelled to elect various representatives, these people are not really considered by villagers as spokesmen for themselves. Each person speaks for himself. This makes it difficult for government agencies, which are designed to operate through representatives of groups rather than individuals. It should also be recognized that there is often no effective communication chain from representatives back to villagers about external affairs. An agency may contact and inform a village representative, but often that information does not go beyond him to the rest of the villagers. This has caused many problems with government agencies in Nondalton, as well as other villages, in the construction of public facilities, in education, and in Land Claims implementation. Resource harvest activities particularly are the immediate concerns of individuals.

The simpler and more suited to local conditions regulations dealing with subsistence are made, the more successful they are likely to be. Complex and inflexible regulations are likely to create conflicts, both among local people and between local people and the NPS.

Impacts Upon Subsistence

Again, it is impossible to second-guess Congress and the Department of the Interior with respect to mandates and policies concerning subsistence in new national parks. The creation of a park will inevitably have certain impacts upon local resource use however.

One major effect of creating a park is the imposition of a new layer of regulations upon local people. Naturally they will resent this. More important however, certain of their options and alternatives, with both economic and cultural significance, are bound to be reduced. Chapter III on the history of subsistence, and Chapter VI, on resource dynamics, both illustrate the importance of alternative resources and geographic areas to the survival of the Tanaina when environmental circumstances have changed. In the past, wildlife populations were the critical variable, but today government policies and world economic conditions have become increasingly important environmental variables.

As one example, Nondalton people today harvest few caribou within the park proposal itself, since caribou are available closer to the village; in the past a large area of the proposal was utilized for caribou hunting. If, because of the limited contemporary importance of particular areas for caribou hunting, the NPS decides to restrict the taking of caribou in the proposed park, this reduces an alternative formerly available to Nondalton people. If caribou move out of areas where they presently hunt, Nondalton people will have lost the option of hunting them in the park. Other examples could be given of similar situations.

One potential impact of a park upon subsistence has been little addressed. Much of the proposed park is undergoing increasingly heavy utilization by guided and non-guided airborne caribou and moose hunters from

beyond the region, as well as trappers with access by air from other regions. If sport hunting is no longer allowed in the park area, this will tend to concentrate hunters in remaining areas open to hunting with greater impact on local game populations. This will affect subsistence users by increasing hunting and trapping competition in areas around Nondalton and Lake Clark.

New regulations upon use of the land and resources of the proposal area are likely to have the effect of discouraging local people from using them, particularly if they have to deal with complex permits or paperwork. Many subsistence activities are fairly spontaneous, depending upon a variety of circumstances, and many do not lend themselves to long-term planning. If regulations are instituted requiring an individual to apply for permits for certain activities long in advance, or to check-in with NPS personnel, they are likely to discourage certain activities. It would be best from the resource users point of view, if he could qualify on a one time basis for subsistence activities in the area, and then be allowed to go his own way without further paperwork.

Proposed Subsistence Guidelines and the Lake Clark Area

The people of the Lake Clark area combine a variety of commercial and subsistence activities. Without cash income, in fact, local resource harvesting activities could not be carried out as they are today. While it would probably not be accurate to say that subsistence for the people of Nondalton and Lake Clark is the "...pivotal means of well-being without which an unacceptable decline in human welfare would ensue..." (NPS Subsistence Draft, 1976:p.6 of 12), it would be no more correct to state that any other single activity was either. The various components of their economy and lifestyle are interwoven and inseparable.

The modern subsistence lifestyle characteristic of this area is the result of the integration of wages, welfare, and subsistence, or harvest for personal use. It results from choices made by rural residents among the alternatives open to them, choices made not solely in terms of economics, but in terms of a much wider range of cultural and social values.

In the Lake Clark area there is a wide range of economic and lifestyle combinations, ranging from those who do considerable commercial fishing, or are permanently employed, buy all their fuel, and most of their food, through those who are seldom employed, collect welfare, and seldom hunt or trap. In between are those who earn a certain amount of cash at temporary jobs in the summer, trap in the winter, and feed their family and neighbors fish and meat from the land. Because of this variety, emphasis upon "economic need" as criteria for allowing the continuance of resource uses on proposal lands would be likely to cause problems. The potential for dividing people in the area into groups who could, or could not utilize certain resources or areas on the basis of economic criteria seems to be a danger of such a policy.

Residents of Nondalton and Lake Clark buy a wide variety of foods and materials and it would be difficult to decide for every individual whether these, or resources obtained from the land were "the central and consistent supporting sources" (p.9) for his subsistence. In terms of food, for example, it is likely that residents of the area obtain most of their calories from store-bought foods. But it is equally likely that most of the protein obtained by many people comes from locally harvested fish and meat. It is difficult to say which of these would be considered "...supporting sources...".

There is the question too, of whether subsistence regulations could handle the variable and dynamic nature of resource use in the proposal area. The people of Nondalton normally take almost all of their caribou outside the proposal for example, but occasionally in early fall caribou are accessible only within the proposal area. In such a case would they be considered to be dependent upon the proposal area for caribou hunting.

A narrow definition of eligibility would ignore the fact that the economic importance of subsistence resources is difficult, if not impossible, to quantify, and that at any rate, the cultural and social significance of resources and harvest activities may outweigh the economic.

In the Lake Clark case, for example, several major brown bear hunting areas traditionally utilized by Nondalton hunters are included in the proposal. Brown bear do not constitute a "central" source of food for anyone at present, but some people like the fat with their "noodelvi" or dried spawned salmon, a favorite food. Many of the older and middle-aged Nondalton people experienced a time when there were few moose or caribou near Lake Clark, and they were forced to rely upon sheep and brown bear; some of them still like the meat. People say they like to hunt brown bear, and they like to teach young men to hunt them, so that they will know how to do it, and how to use them.

A local method of hunting bear is to wait by a fish spawning pond on a moonlit night for a bear to come along the paths they use for fishing. This practice, carried out in the past with a spear, but today utilizing rifles, still involves not only detailed knowledge of local geography and animal behavior, but also considerable courage. Much prestige is still attached to bear hunting by Nondalton people. Other examples of the relationships between the economic and non-economic importance of subsistence resources and activities could be given.

Under strict enforcement of the draft guidelines, such harvests of brown bear in the park area might be precluded, since it is not a "central and consistent supporting source" of subsistence. The only areas where this type of hunting is done are included in the park proposal, so such a policy might mean the end of this traditional activity.

On the other hand the draft policy's concepts of local residence, and customary and consistent useage seem to be a strong and sufficient means for delimiting who can use the park areas for subsistence purposes. They are much easier to define in practice, and less likely to lead to conflict for local subsistence boards. Combined with a statement of restriction on aircraft access, use of the park for subsistence purposes would effectively be limited to the present subsistence users of Lake Clark and Nondalton, without the complications, ambiguities and potential conflicts of other economic criteria.

LAKE CLARK-MULCHATNA-TELAQUANA PLACENAMES

Compiled by Jim Kari, Alaska Native Language Center, University of Alaska, Fairbanks, with Alec Trefon, Pete Trefon, Harry Balluta, Pete Koktelash, Macy Hobson, Luther Hobson, and Albert Wassillie of Nondalton.

Lake Clark - SE Shore

Nundaltin lakes extend	Six-mile Lake, Nondalton
Vata'esluh Vena	Pickere1 Lakes
K'denez Vena bear tree lake	North Pickere1 Lake
K'denez Dghil'u bear tree mountain	mountain east of Pickere1 Lakes
Taz'in Vena fish trap lake	Tazimina Lake
Unqeghnich'er Taz'in Vena upper fish trap lake	Upper Tazimina Lake
Sataŋ'iy	mountain, N shore of Upper Tazimina Lake
Unqeghnich'en Z'uni upper protrusion	mountain, S shore of Upper Tazimina Lake
Oizhjeh Vena	Lake Clark
K'denez T'uhtaz'iv bear tree beneath sticks out	Chayi Point
Kak'ditl'ix set snares	first creek SE end of Lake Clark
Husuyghiqan Hni'a	Flat Island
Nundalchini remade	two small islands N of Chi point
Lik'aha Ht'udelghish	place opposite Nundalchini
Vashla Vetnughizhlitnu	next creek S of Tanalian River

Lake Clark - SE Shore

Tanilen Vetnu water flows creek	Tanalian River
Qen'ghishi Vena water sloshes back and forth lake	Kontrashibuna Lake
Daggugga (a Yup'ik name)	Takoka Creek
Kazhnatu lynx creek	Kasna Creek
T'k'el'ih animals gather	salt lick on creek, head of Kontrashibuna Lake
Qishdghuch'i holes	mountain 4289' behind Port Alsworth
Tits'tnadzeni steep	Tanalian Mountain
Ts'anani'ghelde'i go packing together	twin hills E of Tommy Creek
Hduti'uk'dghilyasht, Hdu'udilyasht	creek S of Currant Creek
Q'u' Qelaht where whetstones are gathered	place or bay S of Currant Creek
Lik'a Viqach'ghighani we pack dogs up	Copper Mountain
Nuch'tnastnunhtnu we drink again creek	Currant Creek
Ch'kenta'qeyitnu throw spear creek	creek N of Currant Creek
Tsayeh Ka'ahtnu big cliff creek	Creek S into Chokotok River
Chuquhtenghehtnu cache trail creek	Chokotok River
Ts'anani'ghazitnu spawned out fish run	Tommy Creek

Lake Clark - NE Shore

Unhnidi
last one up river

Niʔdink'et'a

Nusuydastggye
white sands

Veghdeq Idaʔtin

Tanivan Qilan
(dog) drowned is

Tanivan Vetnu
drowned creek

Hughelqet'i Ka'a
baldy

Ch'alikel'u Yitughiʔ'u
extends out bay

Ch'alikel'u
extends out

Yusdighuyiq'
point tip

Ch'alitnu
flows out river

Q'nuqilchin Hqilchin

Ges T'el'iht
where hooking is done

Qinghuch'una

Qaʔnigi Tunilentnu
rock flows through creek

K'ijeghi Tsayeh
owl cliff

Ventuh Ninʔyin
mixed vegetation

Hoknede Mountain

clearing at south end of Lake Clark

beach SE of Keyes Point

lake up first creek on NE shore of Lake Clark

place just S of Portage Bay

creek from Tanivan Qilan

rock at tip of Portage Bay

Portage Bay

peninsula of Keyes Point & Cape Shiskin

point N end of Turner Bay

Chulitna River

rock 347' in Chulitna Bay

fishing spot by Q'nuqilchin Hqilchin

mountain at head of Qaʔnigi Tunilentnu

creek N of Q'nuqilchin Hqilchin

bluff 310' N end of Chulitna Bay

next point N of Chulitna Bay

Lake Clark - NE Shore

Tsayeh cliff	bluff opposite Tommy Creek
Ch'aq'ah Tugget corner stabbed	bay by Sophie Austin's
Ch'kendaʔk'et' flats extend down	location 2 mi. S of Kijik
Tuk'eleh spawn up	S creek, Kijik River Delta
Wizhjah	Kijik village
Dghilishla little mountain	mountain S side of Kijik Lake
Ch'ak'daʔtnu (they) walk out creek	Kijik River
K'q'uya Vena red salmon lake	Kijik Lake
Dghiʔdiden Qayeh narrow ones village	location on NE shore of Kijik Lake
Nit'eha flying	mountain on N shore of Kijik Lake
Yuyan Ach'edeʔ sky we go into	pass over Nit'eha Mountain
Vighuzdlen	stream fork below Kijik Lake
Hnitsanghi'iy rock stuck down	point, "Priest Rock" N of Kijik on Lake Clark
Hnitsanghi'iytnu rock stuck down creek	creek N of Kijik
K'unust'in stands apart	Kijik Mountain
Nan Qelah moss is gathered	lower end of Miller Creek
Tunghastggech	point N of Miller Creek
Tits'tnadzeni steep	mountain S of Portage Creek

Lake Clark - NE Shore

Nusdatl'na Qayeh ghost village	location on next creek N of Portage Creek
Yiq'a Qilanhtnu fish is creek	Tlikakila River
Huten Vena trail up lake	Otter Lake
Chixnigh ochre island	by Otter Lake on Tlikakila River
Hutulenska'a flows up big	creek N of Otter Lake into Tlikakila R.
Hutulenshla flows up little	creek N of Hutulenska'a
Hqaynust'in	hill 305' at Little Lake Clark
Tayanq' Ch'angatnalyiy	ridge between Tlikakila and Chokotonik rivers
Nudyi Qelah sheep are taken	creek in midst of Tayanq' Ch'angatnalyiy to N
Yiq'aqilanhtnu Tl'ughu fish are river headwaters	Lake Clark Pass

On or near trail from Kijik to Lake Telaquana

Veghdeq Dghilenshla up from it flows little	springs off E side of Kijik Mountain
Veghdeq Dghilenka'a up from it flows big	springs off E side of Kijik Mountain
Veghdeq Ida'tin up from it body of water	Miller Creek Lake
Nl'a'i Vena many (birds) swim lake	Lachbuna Lake
Tuvughnaten Tyonek people's trail	creek into Kijik River toward Fishtrap Lake
K'ilghech' gap	valley on trail just S of College Creek
K'dalghektnu scraping noise (of caribou horns)	unnamed creek S of Snipe Lake

On or near trail from Kijik to Lake Telaquana

Nunch'qeꞓchixtnu we dam across creek	Little Mulchatna River
Nunch'qeꞓchix Vena we dam across lake	Fishtrap Lake
Yudun Dghil'u down river mountain	mountains N of College Creek <u>and</u> N of Fishtrap Lake
K'kiyiq' Hnighi'iy point struck down	mountain E of Snipe Lake
K'adaꞓa Vena	Snipe Lake
K'na'a K'elahi	mountain S side of Twin Lakes
Niꞓqidlin Vena flow together lakes	Twin Lakes
Sataꞓ'iy	mountain N side of Twin Lakes
Ts'ezdlen	creek into upper Twin Lake from N
K'aka'a	mountain 3332' "Twin"
Qayantda nicely cleared	mountain behind K'aka'a
Vandaztunhtnu caribou hair creek	creek out of Turquoise Lake
Vandaztun Vena caribou hair lake	Turquoise Lake
Qaꞓnigi Akenlchix	Leaning Rock at base of Q'eteni
Q'eteni trail on it	long ridge at base of Telaquana Mt.
K'indiz'i sticks up	mountain 3993' "trail"
Nduk'eyux animal goes in	Telaquana Mt.
Ch'quꞓch'ishtnu baby willows creek	Trail Creek, old village site

On or near trail from Kijik to Lake Telaquana

Dilahvena (fish) swim into lake	Telaquana Lake
Tuken water flat	southernmost bay on Telaquana Lake
Venq'atl' lake head	head of Telaquana Lake
Qenchix Ch'tinghanuha nose touches side	hill on SE end of Telaquana Lake
Tunghastggech	bay on N side of Telaquana Lake
K'itudghi'u water goes in	bay on N side of Telaquana Lake
Nhtnashjeya layered hills	ridge on NE end of Telaquana Lake
Hden'ghik'i Veq' T'el'ih onions on it gathered	point N of old village on Telaquana Lake
Ch'azhiya	ridge N of Telaquana Lake
Dilahvena Vetnu swim into lake river	Telaquana River
Shehtl'unu upper side stream	creek into Telaquana River that flows from direction of Mulchatna
<u>Chulitna River drainage</u>	
Ch'alitnu flows out river	Chulitna River
Kenquq' Tazdlenitnu flat flows river	first creek into Chulitna from mouth
Hulehga Tahvi'q'a whitefish net hole	slough on N branch of Chulitna 1-2 miles from mouth
Huk'esdlik'itnu snared creek	second creek into Chulitna from N
Nunendastggat foot holes poked out	creek below Huk'esdlik'i
Huk'esdlik'i snared	mountain at head of Huk'esdlik'itnu

On or near trail from Kijik to Lake Telaquana

Venshla Vugh little lake shore	small alke N of Huk'esdlik'i and E of Kijik Lake
Nach'ghighun	next creek W of Huk'esdlik'itnu
Kaʔja Dilen swallows flow	bluff on Chulitna E of Koksetna River
Q'uk'tsatnu	Koksetna River or Caribou Creek
Viyka'atnu big surprise creek	creek into Koksetna R. E of Mesa Mt.
Ch'dat'antnu grayling creek	Black Creek
Qinghuyi Vena	Long Lake
Qinghuyi Dghil'u	mountain N of Long Lake
Qaʔnigi Vetnu Den'uhi rocks creek are	Rock Lake
Ghenuy Jech'a Q'elchini caribou kidney made like	hill 1018' off Rock Creek
Viʔqutnu caribou snare creek	creek E of Long Lake
Qiyhi Dghil'u K'qusheya Dghil'u whistler mountain	Groundhog Mountain
Antone K'etnua Antone's Creek	creek from S before Nikabuna Lake
Nikugh Vena, Nikegh Vena island big lake	Nikabuna Lake
Nikugh Dghil'u island big mountain	mountain W of Nikabuna Lake
Vahunk'ulgedi	westernmost of Nikabuna Lakes
Nanahaghelqeʔi it goes around us	hill W of Nikabuna Lakes
Veq' Dnagh K'dghasdiy	mountain between Nikughvena Lakes

Mulchatna River Drainage

Valts'atnaq'

Hq'ak'elyashtnu
grayling creek

Shanlzheni
black summer

Shehtnu
side stream

Chaŋchitnu

Chaŋchikaq'

Chaŋchi Dghil'u

Nakida Vena, Nagida Vena

Nakida Dghil'u

Vighunch'titnashi
we travel on it

Ch'vaq'da Dghiŋen
hill flows through

K'etnu Tuvughniy
river beach the one

Veq' ŷighitsa'i
on it dogs bark

Q'eytsay Diŋ'iy
birch extend

K'eltsaŋi
stone axe

Tsila K'idghutnu
tongue ?-creek

Yuzheghnitnu

Mulchatna River

"Moose Creek" S of Springway Creek

mountain E side of Mulchatna, S of
Nikadavena Creek

Springway Creek

Chilchitna River

old camp at mouth of Chilchitna River

mountain at head of Chilchitna

Tutna Lake

Mesa Mountain

mountain W of Tutna Lake

Dummy Creek

hill 1398' "Chat", E side of Mulchatna River

ridge 2387' W side of Mulchatna

hill 2008' by Weasel Creek

hill 1927' opposite Pete Koktelash's cabin

Chilikadrotna River

Ptarmigan Creek

Mulchatna River Drainage

Tich'eqantnu
lodge creek

Bonanza Creek

Tich'eqan
lodge

hill 2438' up Bonanza Creek

Qanquhtnu

McKinley Creek

Nitali
flat one

Halfway Mountain

Chatnashtl'ech'i
black rock

W end of Halfway Mountain

Henesdi
nearby one

northernmost Bonanza Hill, 3950'

Suyquq'
sand flat

flat N of Henesdi

Ts'enesquq'
frozen overflow flat

flat NW of Henesdi

Tl'uhdalzhegh
upper flow together

Summit Creek

Yihvena
whitefish lake

Whitefish Lake

Tleghtitnu
grease water river

Hoholitna River

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RESOURCE USE AND SUBSISTENCE
IN THE VICINITY OF PROPOSED ADDITIONS
TO KATMAI NATIONAL MONUMENT

INTRODUCTION

This survey provides information on resource harvest activities, particularly those related to the question of subsistence resource use, in the vicinity of proposed additions to Katmai National Monument, in the Central Alaska Peninsula. It is the result of a contract between the University of Alaska and the National Park Service to provide the NPS with information on subsistence on the D-2 lands in Alaska. The survey was conducted in a short period of time with fairly limited objectives, and cannot hope to portray either the complete picture of resource use in this area, or its economic, cultural, and political ramifications. Hopefully, it will give the reader some appreciation for local resource use and its meaning to the people of the region around Katmai.

Field work for this survey was conducted in the communities of the Katmai region between February and April, 1977. Due to the large number of villages potentially affected by the Katmai addition, only short periods of time, from one to three weeks, were spent in each place. In each community the researcher was able to stay with families who participated in resource harvest activities, and was immensely aided by their information and introductions to other people. More than sixty interviews and innumerable other conversations were held with residents of the six communities visited.

I am grateful for the hospitality and generous assistance of a great many people in these communities. Special thanks to the Paul Boskoffsky family in Egegik, to the Angasans in South Naknek, to Mike and Susie Tollefsen in King Salmon, to the Danny O'Hara family and Mike Shapsinkov in Naknek and to Nick Wassillie in Igiugig.

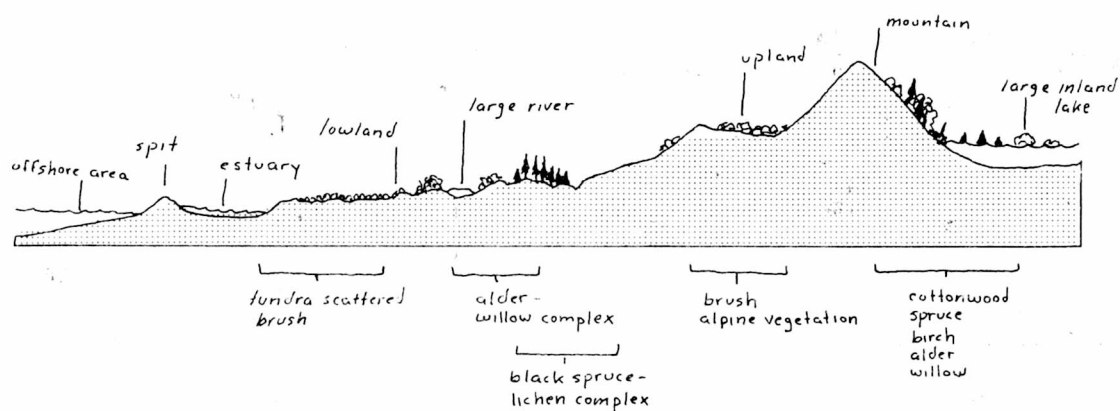
I. THE PROPOSAL AND THE RESOURCES

The areas adjoining the existing Katmai National Monument contain scenic mountains, valleys, lakes, streams and coastline, as well as important wildlife habitat. The upper portions of several of the present Monument's watersheds lie outside the Monument in some of these areas. For these reasons, it has been proposed that lands around the Monument be added to it, and the area designated as a National Park.

This survey utilized the proposal outline in the Department of Interior's 1974 Environmental Impact Statement for the Katmai area as a starting point in assessing local resource use. This proposal would add 2,054,000 acres of adjacent lands to the existing Monument on the north, east and south (see Map 1).

Seven communities lie in proximity to the proposed additions; preliminary fieldwork determined that residents of all seven of these communities made some use of these addition lands for wildlife harvest. The area is also used for hunting and fishing by other Alaskans as well as non-residents.

The Alaska Peninsula is a rich environment, with a diversity of habitats which support a wide range of wildlife species. Large populations of anadromous and fresh-water fish are found in the waters of Bristol Bay and the North Pacific, and the productive rivers and lakes of the region, which in turn support species such as brown bear, mink, otter and a variety of sea mammals. Productive estuary systems and coastal lowlands support millions of migrating, breeding, and wintering waterfowl while tundra and brush communities, together with spruce-lichen forests, provide habitat for relatively large populations of moose and caribou on the



Diversity of Habitats of the Katmai Region

Peninsula. The following paragraphs briefly describe the resource populations of most significance to man on the Alaska Peninsula and some of the characteristics which affect their use. Much of this information is abstracted from Alaska Department of Fish and Game, 1976, Alaska Wildlife Management Proposals for Southwestern Alaska.

Fish

All five species of Pacific salmon spawn in the central Alaska Peninsula, while a wide variety of other salt-and fresh-water species are also found there. Large tributaries draining the central Peninsula are most important for these, including the Alagnak, Naknek, and Egegik systems. Large glacially-formed lakes such as Kulik, Nonvianuk, Brooks, Naknek, and Becherof are important salmon-spawning areas and support lake trout, grayling, rainbow trout, char, whitefish, and burbot. Slower lowland streams and tundra lakes support pike, whitefish, burbot, and numerous other species.

Salmon runs are subject to natural and man-caused fluctuations, including four and five-year cycles of abundance, and fluctuations caused by weather or over-harvest by man. These affect other species of fish as well. A few species, such as rainbow trout, have been affected by overfishing in the Naknek River.

Moose

Moose apparently began to populate the Alaska Peninsula from the North about 1900, and occupied all suitable habitat by the early 1950's. During the 1960's their populations in the central Peninsula peaked and began to drop, declining one-half to one-third in that time. This decline

is believed to be related to habitat deficiencies, particularly scarcity of critical browse in winter months, which weakens moose, and may result in poor calf survival. Predation by wolf and brown bear are believed to have additional impacts on calf survival. Hunting and natural mortality have further reduced the adult populations.

The Alaska Peninsula habitat types of most importance to moose include stream bottoms and other brushy areas, where willow are available. High snowfall pushes moose down out of higher elevations in the winter.

Caribou

The largest of the three caribou herds on the Alaska Peninsula ranges in an area from King Salmon on the north, to Port Moller on the south. This herd numbered about 13,000 animals in 1975. A peak in the caribou population of this area apparently occurred before the turn of the century, while another high was reported in the early 1940's when the population was estimated at about 20,000. A drastic decline followed this high, and in the late 1940's, the population was estimated at about 2,000 animals. Since that time, there has been steady growth.

The traditional pattern of migration for this herd has been south in late winter and spring to the vicinity of calving grounds in the flats near Port Moller, then north again in the fall past Ugashik and Egegik toward heavily-used spruce-lichen wintering areas between Becherof Lake and the Naknek River. As the population has increased, there has been increasing use of the foothills of the Aleutian Range.

Brown Bear

A high density population of brown bear presently occurs in the central

Alaska Peninsula. Movements of bears occur between this area and drainages to the south and north, and across the Aleutian Range to Pacific drainages. Productivity is high, and there have been increasing numbers of bears around canneries and communities in the area. Populations seem to be greatest in the lowlands where food, particularly salmon and plant species, are most abundant.

Furbearers

A great diversity of furbearer habitat occurs in the region and almost all Alaskan fur species are present. Beaver, fox, mink, otter, wolf, and wolverine populations are relatively high. Lynx are near the southern limit of their distribution and do not reach high densities.

Like other areas, the abundance of many furbearer species are subject to fluctuations, particularly in those dependent on a few or just single dominant prey species. Lynx fluctuate with snowshoe rabbit populations, while fox populations appear to be dependent upon densities of small rodents and snowshoe hares. Beaver populations are controlled by local food supply and since they are tied to lodges and dams, can be relatively easily wiped out in local areas. They continue to be fairly abundant over the study area, however.

II. THE RESOURCE USERS

Local Communities

Seven communities are located around the periphery of the proposed additions to Katmai Monument. They can be roughly lumped into three categories on the basis of size, economic base, and "lifestyle". At the

"urban" extreme are King Salmon and Naknek, connected by fifteen miles of road. King Salmon is the site of a large airport and Air Force installation and is connected to the rest of the urban world by daily jet flights to Anchorage, as well as by radio and telephone. It has such urban amenities as electricity, bars, restaurants, and television. It has a civilian population of about 250, mostly Caucasian, employed in permanent, good-paying jobs related to government activities and services. Many of them are relatively transient, living in government housing and transferring to other places after a year or two in King Salmon. About 500 military personnel are stationed in King Salmon.

Naknek, with a permanent population of about 350, is the site of several salmon canneries. It has come to function as a transportation and service center for the immediate region because of its access to the airport at King Salmon. Many of its residents also find employment there. With a mixed population of whites, Eskimos and Aleuts, the community shares many urban services with King Salmon, including electricity, telephones, stores, police, and fire protection.

At the "village" extreme are the small communities of Levelock, on the Kvichak River, with a population of about 75; Igiugig, at the head of the Kvichak River, on Iliamna Lake, with about 40; and Kakhonak, on Iliamna Lake, with about 100 people. These places are characterized by largely Native populations, little employment, few services, and poor communications and transportation connections with the outside world. Many of their residents travel down to Bristol Bay to fish commercial during salmon season, but few of them own large boats or are as prosperous as many Naknek, South Naknek, and Egegik fishermen are. The harvest of fish and wildlife helps meet the food needs of their families and is an

important part of their adaptation to the fluctuations of the commercial fishing and wage labor economy.

In between the "urban" and "village" extremes lie South Naknek and Egegik, each with mixed white-Native populations of about 150 people. They have more frequent plane service and it is easier and cheaper to get goods delivered from Anchorage than it is in the smaller places. Canneries are located in both South Naknek and Egegik, and these places have had a much more active involvement with the commercial fishing and cannery economy than have the villages up the Kvichak River. While there are more jobs available because of the canneries than in the small places, there are fewer full-time and good-paying jobs than in the urban areas. Subsistence and trapping activities are important to a smaller percentage of the residents in these villages than in the smaller communities, but the opportunity to get moose, caribou, fish, and other resources for the winter's meat supply is important to many families.

While there are these broad differences between "urban" and "village" ways of life, there are individuals in the urban areas who live more like village residents. There are also a few individuals in the villages who have the skills, experience, outlook and employment which give them the characteristics of those involved in the urban way of life.

Other Alaskan Users of the Region's Resources

People from other communities in the Bristol Bay area, as well as from Anchorage and other Alaskan communities, come to the central Alaska Peninsula to fish and hunt. Some of these are people who primarily desire caribou or moose meat, including those from distant Bristol Bay villages who charter aircraft to the area in order to take caribou. Others are primarily interested in recreation or in obtaining trophies. The areas

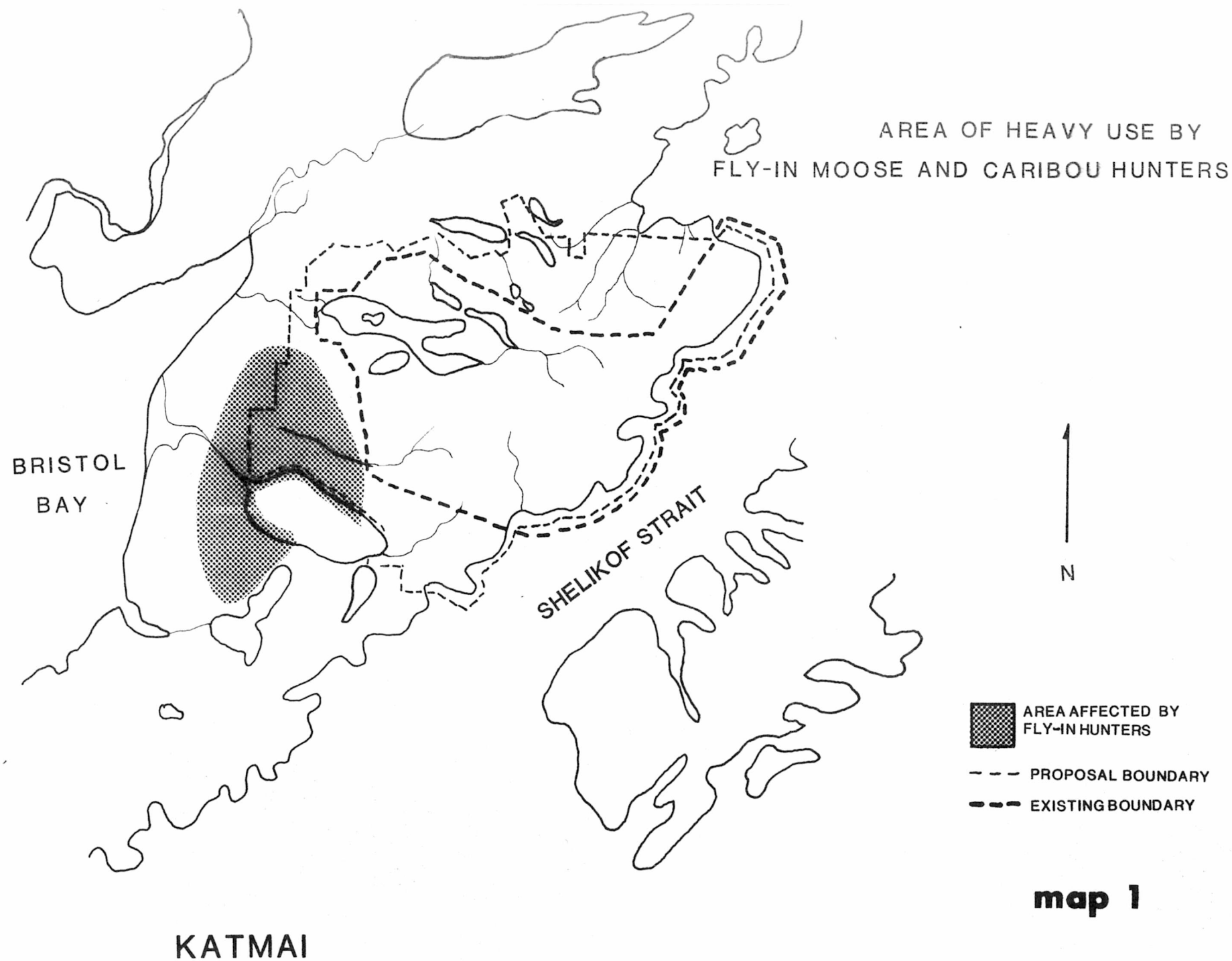
closest to Katmai are not very significant for this harvest, but considerable caribou hunting occurs in the flat country between the Naknek River and the Egegik River, portions of which are included in the 1974 proposed addition.

Before the early 1970's, most non-local hunting was done by guided non-residents, but since that time increasing human populations in Alaska and competition for dwindling wildlife resources near urban centers in the state have drawn hunters to the Alaska Peninsula. This area is the most accessible of the better moose, caribou, and brown bear hunting areas in the state.

Non-Resident Resource Users

Hunters come to the Alaska Peninsula for trophy moose, caribou, brown bear, and fish from throughout the world. A majority of the big-game guides in the Alaska Peninsula utilize the central Peninsula area, from King Salmon south to Port Moller, for moose and caribou hunts. Substantial harvests of moose and caribou by guided non-residents occur in and near the proposed addition, in the upper King Salmon River, Blue Mountain, and Kejulik River vicinities.

Aircraft are important in both resident and non-resident hunts. Almost all access by recreational moose and caribou hunters is by aircraft in this area. Aircraft can be landed on lakes, river bars, "blow-outs" in the tundra, or on ridgetops. Several areas in and near the proposed addition are of significance to air-borne hunters because good landing areas exist in areas where game is frequently available, particularly on river bars along the King Salmon River which drains into Egegik, and in blow-outs and ridgetops near Blue Mountain, just north of Becherof Lake.



A discussion of non-resident hunters should also include mention of the military personnel at King Salmon, since many of these are not Alaskan residents. Many military people hunt and fish in areas around King Salmon and in the past they have had a major impact on game resources in the immediate area, particularly upon rainbow trout. Many also harvest moose and caribou when they have the opportunity.

Some Naknek and King Salmon residents feel that much game is wasted by military personnel who shoot game because they feel it is an "Alaskan" thing to do, but then do not know how to care for the meat. They cite examples of soldiers dragging moose in to the base behind trucks and horror stories of quantities of freezer-damaged meat being thrown out in the dump in the spring.

Population and Socioeconomic Trends in the Central Alaska Peninsula

The general Bristol Bay region including the area around Katmai Monument, has increased in population during the last twenty years. The rate of population growth dropped sharply between 1960 and 1970, however, as in this period, the Native birth rate for the region dropped from 4.12% to 2.13% (Kresge et. al., 1974, p.2-7).

During the same time, there was a net out-migration estimated at more than 400 people for the non-White or Native, sector of population. By contrast, two-thirds of the growth in the civilian population was due to migration into the region by Whites (Ibid, p.2-7).

Although there is no reliable recent population data available, the net out-migration of Natives has apparently slowed during the 1970's due to improvements in the economies and services in the villages. The larger communities, such as Naknek and King Salmon, continue to increase in

population at a greater rate than the smaller places, and this trend seems likely to accelerate in the future, as capital and government funds funnel into larger places at a greater rate than into the smaller ones.

Smaller villages, on the other hand, have declined, or remained stable in population in the region around Katmai National Monument. Barring major economic developments nearby, villages such as Iguigig, Levelock, Kakhonak, and Egegik seem likely to remain at existing levels or to increase slowly in population. There are many former residents of these villages now living elsewhere however who could decide to return, so that any economic improvements in these villages could result in large rates of growth relative to the present small populations.

Commercial fishing and associated cannery employment have been the major economic bases of the communities around the Katmai proposal since the early 1900's, and have resulted in highly seasonal patterns of employment in the area. During the summer, thousands of jobs are created by commercial fishing, canneries and services, and thousands of workers must be brought into the region to fill them. Local residents are able to find employment during the short summer fishing season, but at its conclusion, the temporary workers leave, and many of the residents drop out of the labor market for the winter. Unemployment compensation, welfare, and subsistence activities become important to many families.

Government activities, at local, state, and federal levels, have become increasingly important in the economy of the villages of the region during the 1960's and 1970's. The establishment of schools in all communities provides new jobs, as do services such as health

TABLE 1

POPULATION CHANGE IN THE COMMUNITIES
AROUND THE KATMAI PROPOSAL

	1929	1939	1950	1960	1970	1976 (estimated)
Kakhonak	*	*	39	57	88	95
Igiugig	*	*	*	*	36	40
Levelock	*	*	76	88	98	85
Naknek	173	152	174	249	318	350
King Salmon			*	227	202	250
	(Air Force Base)			322	403	500
South Naknek	*	*	*	142	154	150
Egegik	86	125	119	150	153	150

* No data in U.S. Census

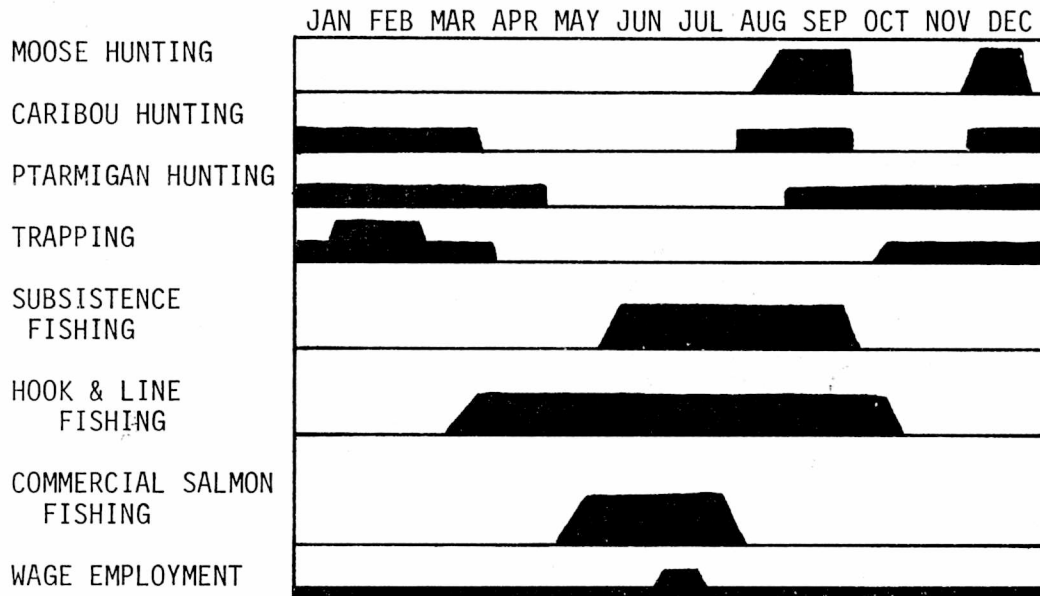
aids, road and runway maintenance, and powerplant operation. Temporary jobs are created each summer in many villages by federally funded community projects, such as the construction of community halls, or by the construction of schools, water systems, or sewage systems. For the Bristol Bay region as a whole, direct government employment increased from 25% of the total employment (excluding commercial fishing) in 1961, to 42% in 1972. During the same period, the significance of manufacturing employment (mainly cannery work) declined, shrinking from 58% of the total employment in 1961, to 34% in 1972 (Kresge et. al., 1974, Table 3-3).

Government related employment and services have made life in the villages more secure, and possibly more attractive to people who might otherwise move. State and federal agencies seem committed to continuing and increasing such services, so this trend is likely to continue. In many ways, this employment provides an alternative to traditional means of earning income such as cannery work and trapping. Like them, however, it is frequently seasonal or short term, and cannot be fully relied upon.

III. METHODS AND AREAS OF RESOURCE HARVEST

The harvest of renewable resources contributes to the larders of many of the residents of the region around the Katmai proposal. Since salmon have been a traditional basis for life in the region, and because boats have been a major means of transportation, many harvest activities have taken place along the waterways. The major drainages--the Kvichak, Alagnak, Naknek, Egegik, and Ugashik river systems--have been particularly important.

GENERALIZED ANNUAL CYCLE OF ACTIVITIES IN
COMMUNITIES OF THE KATMAI PROPOSAL REGION



Moose, caribou, waterfowl, ptarmigan, rabbits, grayling, pike, lake trout, rainbow trout, char, smelt, whitefish, and the five species of salmon are among the major resources harvested by residents of this region for food. Spruce hens, porcupines, firewood, numerous plants and berries, salt-water fish, and seven species of fur-bearers are also harvested. Sea mammals have not been of major significance, although seals and beluga are occasionally utilized by residents of Egegik, South Naknek, and Levelock. Brown bear are also occasionally taken for subsistence purposes, primarily for the fat, which is eaten with fall-dried salmon, by residents of the Kvichak villages.

Because airplanes are so widely used by residents of the area in harvesting wildlife resources, the zones of wildlife harvest are actually much larger than those indicated in Map , which represents the areas most heavily used by residents of the different villages, rather than their total areas of use. Social relations also contribute to overlapping areas of resource use, since people with relatives in other villages often hunt or trap with them. Despite this overlap, enough cultural, economic, and geographic differences exist between villages in the region that it is useful to divide the description of resource harvest into three community groups.

Travel and Transportation

A wide variety of transportation methods are utilized for harvesting wildlife resources on the Alaska Peninsula. The area has highly variable weather conditions, which affect transportation in many ways. Thaws are possible throughout the winter, and there are major fluctuations in snow and ice conditions. Periods of high winds are common, and thick fogs often obscure coastal areas.

Variable winter conditions and the increasing use of aircraft, jeeps, and ATV's caused the use of dog teams to decline in this area much earlier than in other parts of the state. Few people around Naknek or South Naknek were using dogs after the 1940's, although a number continue to be used in the Kvichak villages, mainly for racing.

Jeeps and other four-wheel drive vehicles have been important for resource activities to the people of Naknek, South Naknek, and King Salmon since the 1940's when the base at King Salmon was constructed. Rough cross-country trails developed, particularly in the morainal country around the western end of Naknek Lake, both from military activities and from hunters and fishermen driving four-wheel rigs into the area. Well-drained areas, such as ridges, could easily be followed by these vehicles. The military also pushed rough cat trails and roads out from King Salmon into the surrounding country which were later used by hunters, trappers, and fishermen. One of the most used of these is the trail up King Salmon Creek into areas proposed for addition to Katmai Monument. This area is particularly heavily used by jeeps, and even two-wheel drive automobiles, after freeze-up until snow depth makes their use impossible. Tracked vehicles and snowmobiles are then used. Jeeps, "four-by's", and other vehicles are also used along the beaches and on frozen rivers.

All terrain vehicles (ATV's) of various kinds are owned by a number of residents. These range from old surplus tracked "weasels", which have been in use for twenty or thirty years, to newer models of tracked and wheeled ATV's, such as "Rangers", "Coots", and so forth. Some residents have also purchased new Honda "dunebuggy" rigs. Honda three-wheelers are extremely popular in all the communities of the area and they are used for visiting, recreation, and hunting, fishing, and trapping. They

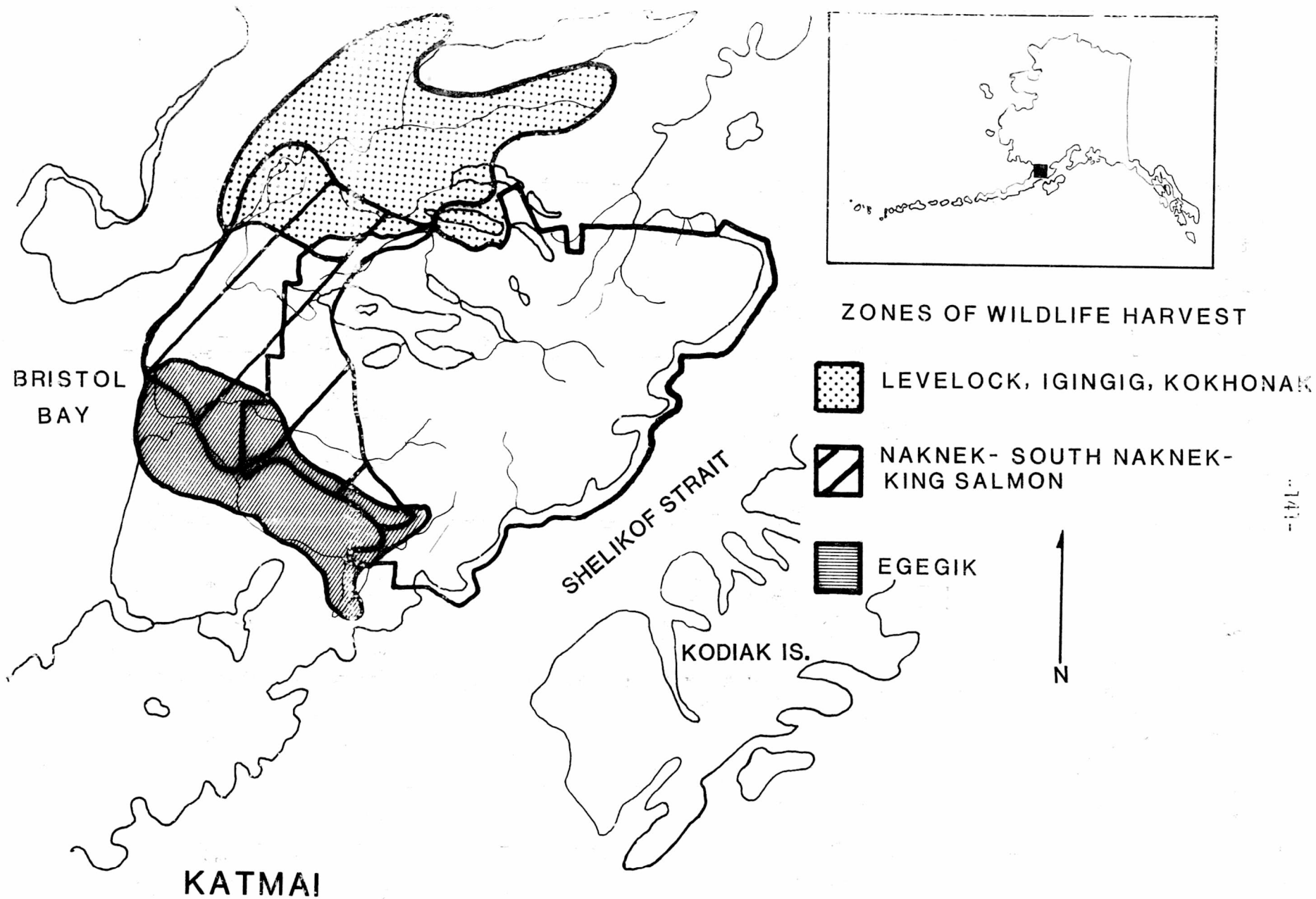
can traverse a variety of terrain, although they are not of much use in rough tundra and deep snow. They are especially good on old cat trails, beaches, and on frozen lakes and rivers when there is not too much snow.

Few snowmobiles are owned by residents of the Naknek River communities and Egegik, while in the Kvichak and Iliamna Lake communities almost every family has a snowmachine. Conditions are frequently poor for snowmachines in the southern part of the study area, where thaws and wind often sweep the terrain free of snow, leaving rough tundra and brush. Almost everyone in the Naknek River communities has a truck or other automobile and these and ATV's are often more useful than snowmachines would be. A few trappers and other people in these communities do own snowmobiles.

In the Kvichak area, there is considerably more snow in the winter, and people are more oriented toward winter subsistence activities than they are in the larger communities. Snowmobiles are used for hunting caribou, moose, and small game, as well as for trapping and getting to good fishing spots. Snowmobile trails connect Kokhonek, Igiugig, and Levelock and go from Levelock to Naknek. They also go up Branch (Alagnak) River.

The first airplanes came to Bristol Bay in the early 1920's and rapidly increased in importance to the people of the region. A number of Naknek and South Naknek men learned to fly in the 1940's, and brought small aircraft on wheels into the country for the first time. Airstrips were developed at South Naknek and Naknek by them.

These small planes increased individuals' mobility and were used for visiting other communities, bringing in supplies, travelling out to trapping camps, hunting caribou, trailing wolves and wolverine, and shooting



map 2

wolves from the air. Commercial fishermen have used them to spot schools of salmon. Many of these original pilots still live in the communities and continue to fly.

Presently, there are about 30 airplanes owned by residents of the six communities nearest the Katmai proposal, including those owned by air-taxis. Many of these are used by their owners and their friends for hunting, fishing, and trapping in the general region, including portions of the proposal. Some Naknek and South Naknek women even have their husbands fly them to particularly good berry-picking areas. In addition, a variety of aircraft can be chartered from local air-taxis for these purposes. Rates vary from \$50.00 to \$150.00 (or more) per hour, depending upon the type of aircraft, and an hour's flying can put the recreational or subsistence user near almost any combination of resources.

Many of the families in the study area have boats of various kinds, ranging from inboard powered 32' fishing boats, to outboard powered skiffs and flat-bottomed river boats. All of these types are used for fish and wildlife harvests for personal use. Rivers, lakes, and the sea give access to a large area for these purposes. Map 2 identifies many of the waterways navigable by boat and utilized for wildlife harvest by local residents.

THE NAKNEK RIVER COMMUNITY

Harvest Activities and Areas of Use

The people of Naknek, South Naknek, and King Salmon utilize a large area for harvesting resources, particularly since these communities contain most of the people on the Alaska Peninsula and utilize aircraft the most for wildlife harvest. Their residents do not have to go far, however, for some of the best hunting and fishing in the state.

Moose season is open in the general region during the fall, from September 10 to September 30, and in early winter during the month of December (1976 ADF&G regulations). An antlerless moose could be taken in the 1976 December season. Residents of the Naknek River communities take moose in both seasons. Moose hunting is usually conducted in three general areas: near the Naknek River and its tributaries; on the Branch River; or to the south in the upper King Salmon River-Becherof Lake area.

The latter area is accessible only to fly-in hunters and is most important for trophy hunts. In the fall, however, that area is also good for caribou hunting, so hunts for the two species can be combined.

The country around the tributaries of the Naknek River is accessible to several means of transportation and is probably hunted the hardest.

A rough road leads more than 20 miles up King Salmon Creek toward the existing Katmai Monument boundary and is utilized by automobiles and ATV's in the fall and by snowmobiles in the winter season. If little snow is on the ground, the area is easily accessible to trucks and cars in the December season, as was the case in 1976.

In the fall season, boats are used for moose hunting up Smelt Creek and Big Creek on the south side of the Naknek River. Some people say there are few good landing places for wheel or float planes along Big Creek and therefore boat hunters can compete more successfully with the more mobile airplane hunters in this area. It can be ascended for more than 15 miles. Snowmobile, and occasionally four-wheel drive rigs, can also get up Big Creek after freeze-up.

Only a few residents of these communities hunt moose in the Branch (Alagnak) River, and access is mainly by boat or float-equipped aircraft. Several families with ties to Levelock regularly utilize the Branch for

moose hunting. The Branch River is becoming increasingly popular for float trips and hunters are dropped off in Nonvianuk Lake to float downriver with rafts, watching for moose and fishing. Most of these hunters are not local residents.

Caribou are usually hunted by residents of Naknek, King Salmon, and South Naknek in the large general area between the Naknek River on the north and Becherof Lake and the Egegik River on the south. Caribou season in 1976 was open from August 10 to October 15 and from December 1 to March 31 in Unit 9. Three antlered caribou could be taken, providing that only one could be taken from August 10 to October 15. In 1977, the season was open from August 10 to March 31 for four caribou with the same limit in the fall.

A few caribou are taken by hunters using boats on Big Creek or Smelt Creek in the fall, but most fall caribou are taken by hunters with access by aircraft to areas around the King Salmon River and Egegik River. Float planes can land in many lakes in these areas while planes on wheels can use river bars and bare ridges.

After freeze-up, caribou are often available close by on the south side of the Naknek River and can be hunted with snowmachines and even automobiles at times. South Naknek people are sometimes able to take caribou by walking out from the village. Caribou are easily located and hunted during the winter by pilots with aircraft on skis.

Fish are taken by residents of the Naknek River communities along the Naknek River, up many of its tributaries, in Naknek Lake, and in a number of other locations reached mainly by air. Many residents take salmon for their own use in conjunction with commercial fishing and many also take salmon in set nets along the lower Naknek River. A Subsistence permit, obtainable by any Alaskan resident from the Alaska

Department of Fish and Game, allows a person to take a limited number of each species of salmon for personal use.

Salmon are used fresh throughout the summer and are prepared and stored in several ways. Kings are often cut, filleted, soaked in brine, and then slowly smoked to make "strips". Reds and other species are also smoked in a variety of ways. Methods of smoking and preparing salmon have been introduced from a range of different cultures, including local "Aleut", Scandinavian, and other Europeans. Salmon are also canned, frozen, pickled, and salted. Many families eat salmon in a variety of preparations throughout the year.

A few families from Naknek and South Naknek continue traditional patterns by travelling up into Naknek Lake in the fall to get "red" fish, red salmon which are beginning to spawn and have turned bright red. These fish are split and hung on racks to dry in the air. They provide a favorite food to a few Native families and are eaten with seal oil, rendered bear fat, or butter. Small numbers of these fish are taken at lagoons along the upper Naknek River, and a traditional location for fall fishing is at the mouth of Brooks River in Katmai National Monument.

Rainbow trout, and several other species, including grayling, char, burbot, and lake trout are taken in Naknek Lake and along tributaries of the Naknek River, particularly in the fall. Pike and whitefish are also available in certain lakes and creeks. The outlet of Naknek Lake is a popular and heavily used fishing area, since it is connected by road to King Salmon. The military operated recreational fishing camps for many years at the outlet of Naknek Lake and at the falls on the Naknek River, several miles below the outlet, and these have finally closed down only in the last few years. Boats can easily be taken by road to Naknek Lake. They can also be used along the Naknek River and its tributaries, Big Creek and Smelt Creek.

Some ice-fishing is done throughout the winter on the tributaries of the Naknek River, on Naknek Lake, and in smaller lakes in the area. Smelt are particularly sought and trout, grayling, lingcod, char, whitefish, and pike can be taken through the ice. A commercial fishery for whitefish was started in the mid-1960's on Naknek Lake and nets are still occasionally used to take whitefish. Marketing problems stopped the venture, but a few local people continue to talk about reviving it.

Small game are hunted along the road between Naknek, King Salmon, and Naknek Lake, and are also taken incidentally to trapping and other kinds of hunting or fishing activities. Hares and ptarmigan are the main small game hunted, although a few spruce grouse are also taken in wooded areas along King Salmon Creek. Ptarmigan congregate in large flocks in January and February and large numbers are killed at this time of year. Hunters who take large quantities sometimes just freeze the birds whole and they seem to store best this way.

Trapping is important to several families in the Naknek River communities, and many other people trap recreationally. The traditional way of life around much of Bristol Bay over the past fifty or sixty years combined commercial fishing in the summer with trapping in the winter, while fish and game were harvested for food. Some remnants of this pattern continue in the Naknek River communities, but for the most part other forms of employment or unemployment compensation have replaced trapping in importance.

Fox, lynx, mink, otter, wolf, and wolverine are taken during the winter season, both near the communities by part-time trappers, and in more distant areas. Snowmachines give access to Smelt Creek, Big Creek, and King Salmon Creek where a few Naknek and South Naknek men have trapping cabins.

Residents say that beaver populations are quite high locally and there is considerable trapping for them despite relatively low prices. Many people wonder about the impact of large numbers of beaver dams on salmon reproduction. Heavily trapped areas include Paul's Creek, King Salmon Creek, and Big Creek and its tributaries.

A few trappers are transported to distant areas by airplane to spend a few weeks or longer trapping while others run long-distance traplines by air. Trapping areas extend north into Pauls Creek and American Creek and a few trappers from the area utilize Nonvianuk Lake. To the south, aerial traplines extend down to the King Salmon River or beyond.

Other resources used by Naknek River residents include berries and firewood. Berries are picked in many places, but the morainal ridges around the western end of Naknek Lake are favorite spots because abundant patches are accessible by road from Naknek and King Salmon. Picnics and recreational off-road vehicle use are also popular in this area. Blueberries, crowberries, and cranberries are usually abundant on the hills, while salmon berries are found in areas with poorer drainage.

Firewood, mainly spruce, is harvested in the vicinity of cabins and commonly used camping areas along King Salmon Creek, Big Creek, and other areas. Alder is sometimes harvested for use in smoking fish.

Naknek River Residents' Use of the Proposed Addition

Naknek, King Salmon, and South Naknek are the communities closest to the Katmai proposal and residents of the former two have access to the western edge of the area by automobile. A large part of the most accessible hunting areas and those used by the greatest number of people for wildlife harvest near these two communities are included within the proposal.

The area around the outlet of Naknek Lake, some five or six miles from King Salmon, is accessible by road from King Salmon and Naknek and is heavily utilized for fishing; for hunting moose, ptarmigan, and rabbits; and for picking berries. Many local residents combine recreation with the harvest of resources for food in this area.

The drainages of King Salmon Creek and Big Creek, within the proposal, are also heavily utilized by residents harvesting fish and game. A rough four-wheel drive trail follows King Salmon Creek for more than twenty miles from King Salmon and this area is accessible by truck or snowmachine for moose hunting and trapping.

Big Creek is also accessible by snowmachine, and under some conditions by automobile, as well as by boat in the summer. This area is utilized for moose, caribou and small game hunting, as well as fishing and trapping. Boats can ascend it for more than 15 miles. There are a few good landing places for aircraft along it, and therefore, boat hunters can compete with the more mobile aircraft hunters in this area. One Naknek family has trapped in the Headwaters Creek area, just outside the Monument boundary west of Brooks Lake, for more than ten years and derive a substantial part of their income from this activity.

KVICHAK COMMUNITIES

Harvest Activities and Areas of Use

The residents of Levelock, Igiugig, and Kakhonak, are related socially and geographically. They also have relatives over on the Nushagak River, as well as in the Naknek River communities. Frequent visiting and family movements occur between these places and considerable boat, snowmobile and air travel connect them.

Residents of Levelock and Igiugig hunt moose along the Kvichak River and up the Branch (Alagnak) River by boat in the fall. One method of hunting on the Branch River is to drift downriver in the evening, watching for a moose to come out on a riverbank. Moose are taken in the winter and occasionally in the spring by snowmachine travellers, particularly around the villages and in the lower portions of the Alagnak River. Winter moose are frequently taken incidentally to trapping.

During early winter, caribou tend to move south and southwest from the Koktuli and Mulchatna River areas into the country between the Nushagak and Kvichak Rivers and off the western end of Iliamna Lake. In years when they come near the villages, Levelock and Igiugig hunters hunt them by snowmachine. There are a number of well-drained north-south trending ridge systems which people say the caribou tend to follow, and these are often good places to hunt caribou.

During the spring, caribou generally move back north toward the Koktuli River area, although a few small bands tend to stay in the general region between the Nushagak and Kvichak Rivers.

While men are working or fishing commercially in the summer, some elder people and women set gill nets near the village or out at fishcamps to take salmon for family use and dogfood. A few families use fishcamps upriver from Levelock and downriver from Igiugig, as well as on the lower Alagnak River. Salmon are split and smoke-dried, as well as canned, salted and pickled. Some families put up quantities of fish for dogfood. In the fall, people also go to fishcamp to put up salmon from later runs. Trips are made to good fishing spots to take grayling, char, rainbows, and dolly varden with hook and line. Some fishing is done by local residents far up the Alagnak River.

Villagers occasionally ascend the Alagnak River and go up into Nonvianuk and even Kukaklek Lake, pulling boats up through the falls. Fall fish were traditionally harvested at the head of Narrow Cove on Kukaklek Lake and on Kulik Lake.

Ice-fishing is done near Igiugig and Levelock for trout, grayling, and lingcod. Fish are also taken through the ice along the Alagnak River and on Nonvianuk Lake. Trappers have taken large whitefish through the ice on American Creek. Pike are taken in lakes near the Kvichak River.

A number of people from Levelock and Igiugig trap, some remaining near the village, while others run long-distance lines by snowmobile. A few are flown into more remote areas, or have supplies and fuel for snowmobiles flown in. In years when Iliamna Lake is slow in freezing, boats are used early in the winter by Igiugig residents to gain access to trapping areas around the southern shore of Iliamna Lake.

The Alagnak River is recognized as a particularly good area for mink and otter trapping, and traps are also set along its course for fox, lynx, wolf, and wolverine. The river is used as a snowmobile route once it freezes well as are its sloughs and tributaries. It gives access to a large area for hunting and trapping in the winter.

Good prices for fox and lynx in recent years have caused people to travel farther and trap in areas not heavily used a few years ago. Kukalek Lake, Nonvianuk Lake, and American Creek are all areas trapped by a few residents of Levelock, Igiugig, Kakhonak, Naknek, and South Naknek. Traplines from Levelock run up the Alagnak River, along the Kvichak River, and up creeks and tributaries to the Kvichak, as well as into the tundra and lakes west of the village. Igiugig people trap around the western shore of Iliamna Lake, into the Kaskanak Creek area; toward Big Mountain, into the Kukaklek Lake area, and toward the Alagnak River.

Beaver populations are said to be low on the west side of the Kvichak and in other areas close to Levelock and Igiugig. The Kukaklek-Nonvianuk areas are said to have large beaver populations and a number of people from the villages trap beaver in these areas. Although beaver prices are not high, many village residents continue to trap them because they enjoy getting out in the spring, like the meat, and can use the income at that time of year.

Kvichak Villagers' Use of the Proposed Area

The people of Igiugig, Levelock, and Kakhonak make limited use of the addition proposed by the 1974 Environmental Impact Statement since most resources are available closer to their villages. Residents of the first two villages do ascend the Alagnak River by boat and snowmachine, however, and utilize the Area of Ecological Concern, and occasionally the proposal, for moose-hunting. The upper parts of Paul's Creek, King Salmon Creek, and American Creek, within the proposal, are utilized by a few trappers from these villages seeking beaver, lynx, fox, wolf, and wolverine. A number of trapping cabins in this part of the proposal are owned by Levelock, Igiugig, and South Naknek trappers. One man regularly spends winters trapping in the American Creek drainage, while others use that area more sporadically.

EGEGIK

Harvest Activities and Areas of Use

The people of Egegik are primarily commercial fishermen, but commercial fishing is conducted during a short summer period; the harvest of wildlife resources is an important activity for many residents during the rest of the year. The Egegik River, its tributaries, and

Becherof Lake are areas of major significance for these activities although snowmobiles provide winter access to areas away from the waterways.

Moose are occasionally taken by Egegik residents hunting by boat during the fall, mainly up King Salmon River. Other moose-hunting areas include the northwest shore of Becherof Lake near Whaleback Mountain and the eastern end of Becherof Lake. Most Egegik residents take caribou rather than moose, however, since they are relatively abundant, easily hunted, and easily transported. Fish and Game regulations have become increasingly restrictive on moose-hunting in recent years, limiting the fall season to a short period and permitting only bulls with a rack of more than 50" in the area south of the King Salmon River which flows into Egegik Bay.

During September, caribou reach the Egegik River in their annual migration north from their calving areas. Hunters take skiffs or larger boats up the Egegik River about half-way to Becherof Lake. In this area, a series of low ridges followed by the caribou are intersected by the river and caribou can be spotted and killed close to the river. Sometimes a tent or tarp is rigged in the boat and people spend the night upriver.

Caribou is a favorite meat and they are relatively easy to take in this manner. Most families put away a supply of meat for early winter. In the past, caribou meat was dried, salted, or stored in cool pits in the ground, but since many people have freezers, most of it is now frozen. Most people obey state game regulations with regard to limits, although these may be stretched by a man taking caribou on his wife's or children's limits. The limit in 1976 was three caribou. This increased to four in 1977. Caribou meat is often shared between families.

During late fall and early winter, caribou tend to move and feed

between King Salmon River and the Naknek drainage, although they can be found scattered over a much larger area. By the early part of the New Year, there is a southward tendency and many caribou follow the western shore of Becherof Lake south, crossing the Egegik River in the vicinity of the rapids near the outlet of Becherof Lake. Hunters sometimes take snowmobiles up the Egegik River to the rapids area and near the shore of Becherof Lake to hunt caribou. In the warm winter of 1976-77, a few people took boats upriver and killed caribou in the rapids area in late January and early February.

Caribou are also hunted by snowmobile or on foot near the village. Some people say it is easier to hunt on foot because snowmachines spook the animals. Hunting on foot is also said to allow more selectivity, so that males or fatter animals can be picked out. Hunters on foot face considerable competition from snowmobile hunters near the village, however.

Most families keep salmon taken during commercial fishing for their own use during the fishing season and apparently this use is generally not recorded on ADF&G subsistence fishing permits. In 1974, only five permits were returned to the ADF&G by Egegik people and indicated that about 253 reds, 18 kings, and 42 silvers were taken. A survey taken by the University of Alaska that summer, however, showed that over 2,000 salmon were taken for personal use by Egegik residents in 1973 (Gasbarro & Untermohle, 1974, unpublished data).

Reds and silvers are taken for canning and smoking; Kings are often frozen whole or smoked as "strips". Older people recall a variety of traditional methods for preparing and storing salmon. They often combine commercial and subsistence fishing by operating a set net. For these people, fishing combines the opportunity to earn some cash with the chance to feed themselves and their families and to put up food for the winter.

Hook and line fishing is conducted during the fall up the King Salmon River and in the rapids area of the Egegik River where there are several cabins utilized by Egegik people. Grayling, dolly varden, char, and rainbows are also caught through the ice up the King Salmon River, mainly for immediate use, although some are frozen. People fish for smelt along the Egegik River from in front of the village to several miles upriver. These small fish can be caught in large numbers by jigging with a small spoon.

When ducks and geese arrive, trips are made up King Salmon and Egegik Rivers to hunt them. Ducks are particularly sought in the mouths of creeks and sloughs off the main rivers, while geese are found in flats along the Egegik River. Young men and boys often hike out from the village in morning or evening to hunt geese. People say that most geese fly over the Egegik area in the fall, however, and they are not available in the huge numbers found further south on the Peninsula.

Ptarmigan and Arctic hare are hunted throughout the winter, and contribute significantly to the larders of many families. Ptarmigan are found in the willow patches scattered across the rolling tundra behind Egegik and along the rivers. In mid-winter, large flocks occur and many can easily be killed. When large numbers are taken, some are usually stored whole in the freezer or left out in the windbreaks on the fronts of houses for later use.

The main furbearers trapped in the vicinity of Egegik are fox, mink, land otter, and beaver. Wolves, wolverine, and lynx are occasionally taken as well. The innumerable tundra lakes and creeks of the lowlands around Egegik support quantities of small fish and are good mink and otter habitat. There is not a lot of trapping effort by Egegik residents, although this varies

from year to year. Few people regularly trap, however. One man traps each year from a cabin about 15 miles northeast of Egegik on the King Salmon River. He has used the cabin since 1956, and began trapping with his father in the general area before that. He uses a snowmobile to get back and forth to Egegik, but walks his trapline which extends about 10 miles up the King Salmon River from his cabin and 10 miles downriver.

Other significant trapping areas are south of Egegik toward Dago Lake, around the shores of Becharof Lake, and in the Kejulik valley. The Kejulik is noted as being the best trapping area in the region, having good populations of fox, wolf, and wolverine. A number of men have trapped beaver there in the past as well. It has been periodically used during the past 10 years with most access by airplane.

Three or four Egegik men own aircraft and use them to get into good hunting and trapping areas, as well as for transportation to Naknek, King Salmon, and Anchorage. Aircraft are used to fly to the Pacific side of the Peninsula to dig clams on beaches from Katmai Bay south to Wide Bay. People also fly down to the Cinder Creek/Port Heiden area to hunt geese in the fall, often chartering an airplane to take a group.

Egegik Use of the Proposal Area

The people of Egegik harvest most of their subsistence resources outside the 1974 proposal, but certain resources and lands within the proposal are used. People spend considerable time during the fall in the Egegik Rapids area fishing, berry-picking, and caribou hunting. The upper Egegik River, and in some years, the northwestern shore of Becharof Lake, are important for caribou hunting in fall and winter. Moose are also occasionally sought in these areas.

Other areas along the northern and eastern shore of Becharof Lake and in the Kejulik drainage, are occasionally used for subsistence purposes, although not as heavily as in the past. Moose-hunting, fishing, and trapping have been carried out in these areas and several people in Egegik maintain cabins in them which they use mainly in late summer and fall. A number of Egegik people migrated to Egegik from Kanatak, near the southeastern end of Becharof Lake and they retain ties to those areas.

Areas between the Naknek River and Becharof Lake are heavily utilized during the fall and winter for moose and caribou hunting. Most access to this area is by air, both by local villages and outsiders although South Naknek and Egegik people reach the area by snowmachine as well. One trapper near Egegik spends much of the winter up King Salmon River, close to the proposed boundary of the park, and he traps and hunts in and near the proposal in that area.

Residents' Harvest Activities in the Area of Ecological Concern

The Katmai proposal's Area of Ecological Concern encompasses much of the Alagnak drainage, north of the proposal boundary, including Nonvianuk and Kukaklek Lakes. It is within the traditional subsistence area of the residents of Levelock, Alaganak, Igiugig, and Kakhonak, who were dependent on the salmon and big game of the area. By the early 1900's, they were herding reindeer in these areas, a use which lasted until the 1940's.

Today, residents of Levelock, Alaganak, and Igiugig, and their relatives in other communities, make considerable use of the Alagnak River for fishing, trapping, and hunting. They use gill nets for the subsistence harvest of salmon along the lower portion of the river and fish with hook and line along its length for grayling, trout, char, and other species. People

frequently ascend the river to the "forks" where the Nonvianuk River joins the Alagnak and there are a number of cabins which are utilized by travellers along this stretch of river. Occasionally, boats are taken into Nonvianuk or, less often because of the falls, into Kukalek Lake. "Fall" salmon are sometimes taken in these areas and dried.

Moose are hunted along the Alagnak both in fall and winter. People from Levelock say that in the past, when moose were scarce all along the river, they would go up to the forks and then hike into the hills south of the river toward the American Creek drainage where a few moose could be found. Beaver, lynx, mink, otter, fox, wolf, and wolverine are all trapped along the Alagnak, with trappers from Levelock, Igiugig, Naknek, and South Naknek travelling to different portions of it by snowmachines and aircraft. The families living at Alagnak also do considerable trapping in these areas. The Nonvianuk and Kukaklek Lakes area is utilized by trappers from all these communities and from Kakhonak. Some access to this area is by airplane, although people from Igiugig, Kakhonak, and Levelock travel there by snowmachine as well.

IV. "SUBSISTENCE" AND "SUBSISTENCE USERS"

AROUND THE PROPOSED ADDITION TO KATMAI NATIONAL MONUMENT

The region around Katmai National Monument has a heterogenous population with a wide range of incomes, lifestyles, and cultural backgrounds. Members of all groups harvest wildlife resources. Since it is likely that any addition to Katmai Monument will allow "consistent and customary subsistence use" of wildlife and other resources, it will eventually be necessary to distinguish between "subsistence" and other users

in this area. This survey provides information on the general characteristics of the communities and resource users and of the uses made of the proposal area. Any determination of who qualifies as a subsistence user, and who does not, is a purely political problem.

Past and Present: An Historical Perspective

A socio-economic report on Bristol Bay (Kresge, et. al., 1974, p.6-20) summarizes the general status of the economic importance of wildlife harvest in the Bristol Bay region as a whole.

"Hunting and trapping are not as important to the Bristol Bay economy as they were before the development of the commercial salmon fishery. Before the fishery was established, wildlife was the major source of food and clothing; cash was needed only to purchase supplies. After the industry was established, most Bristol Bay Natives began to earn incomes from fishing and no longer completely depended on subsistence activities. However, wildlife still remains an important food source as well as a supplementary source of money income."

The aboriginal patterns of settlement and subsistence in the upper Alaska Peninsula began to be altered first by contact with the Russians and the introduction of the fur trade in the mid-1700's, while the development of commercial fishing and the canning industry at the mouths of major rivers, in the early 1900's made further profound changes.

During the early 1900's, commercial fishing and cannery work in the summer were combined with hunting and fishing for food; trapping became an important part of the way of life in the region, providing a source of income in the winter to supplement earnings from the short fishing season.

During World War II when the base was constructed at King Salmon and other construction projects were started, government employment began to be an important factor in the local economy and its role has continued to increase

in importance. There have been major fluctuations in this, as all other sources of income in the region, however. This heritage of using wildlife to supplement diets and income, particularly in view of the economic fluctuations which have occurred in the past and still occur, is one of the reasons why many local residents feel strongly about subsistence and its role in their way of life.

Lifestyles, Village and Urban

In the section on resource users in the Katmai region, the distinction was made between the larger Naknek River communities and the smaller Kvichak River villages. There are significant differences in patterns of resources use between the villages and the more urban communities and individuals. The traditional life-style of the Bristol Bay region for the past sixty or seventy years has centered around commercial fishing and cannery work in the summer, trapping in the winter and a variety of resource harvest activities which complement and supplement these economic pursuits. This life-style evolved in relation to the availability of highly seasonal commercial fishing opportunities. Trapping and subsistence activities provided fairly constant, if less profitable, employment during the rest of the year.

The increasing role of government, both in employment and welfare, has decreased the importance of these activities for many people. For some people this has simply provided more options in the same basic way of life, rather than drastically altering it. For many people, temporary seasonal jobs, unemployment compensation, and welfare have merely been grafted onto a basic commercial fishing and subsistence way of life. There continues to be uncertainty in the annual returns from commercial fishing, while opportunities for wage employment are also highly seasonal.

and variable from year to year. Therefore, trapping and the harvest of fish and wildlife, together with unemployment compensation and welfare, are important to some individuals since they help reduce economic variability and uncertainty.

This contrasts greatly with what we have called the "urban" way of life in which permanent, full-time employment or a dependable source of income is available. There is considerable government-related employment in King Salmon and Naknek, and the relationship to fish and wildlife resources of the people who hold permanent jobs is considerably different from that of the people living the commercial fishing/subsistence life-style described above. The variability and dependability of income is probably just as important as its dollar value in distinguishing between subsistence and other users. In this respect, commercial fishermen owning their own boats and gear have much more secure positions than those who do not.

Another difference in subsistence resource use is related to population size and the effect of harvest on local game populations. In the urban areas, there is more competition for game and more pressure on nearby lands. Hunters in these areas invest in increasingly sophisticated equipment to gain access to game, including all-terrain vehicles; faster snow machines; larger, faster boats; and aircraft. People with larger, more reliable incomes can afford to pay for better transportation, in effect substituting money for time in locating, harvesting, and retrieving fish and wildlife. In this way, subsistence users are forced either to move, or to acquire income and equipment to compete for game.

In the villages, the reverse is true. More people have more time than money to spend in resource harvest activities and the equipment

they do purchase takes a much larger proportion of their income than it does in the case of the urban hunter. In the village areas, too, except where hunters from outside create too much competition, there is frequently less hunting and fishing pressure and game may be obtained closer to home.

Economics, Rich Folk--Poor Folk

The relationships between economic situation and resource use are not simple or direct and there are little data available for analyzing them. Gasbarro and Utermohle (1975, p.12), report for the Bristol Bay area as a whole that, on a per capita basis, households earning less than \$6,000 annually harvest nearly twice as much meat and fish as those in higher income ranges do. At the individual level however, many high income households harvest just as much, or more, than many lower income households. There does not appear to be any clear differentiation between subsistence and non-subsistence user in terms of income. Although subsistence activities are economically more important to people in the smaller villages and to people with smaller incomes, the use of fish and wildlife is also an important part of the way of life to many people in the urban areas.

Many of the residents of King Salmon and Naknek were drawn to the area by the opportunity to hunt and fish, and they feel that these activities add substantially to the quality of life. Many, even people with high incomes, say that the resources they harvest help compensate for the high cost of living in this area. This makes "subsistence" and fish and game management in general highly emotional subjects to most residents of the area.

Empirically, we can see that families with a combination of low income, income which is seasonal, and large numbers of dependents, have

the most need for local resources. But whether people actually go out and harvest wildlife for their own use depends on a number of other factors, including personal initiative, the possession of equipment and transportation, on having the time and personnel to harvest resources, and on the family and community value system (whether local resources and harvest activities are valued economically, nutritionally, or socially).

It should be recognized that certain types of subsistence activities may be marginal economically. The price of shotgun shells and snowmachine fuel for hunting ptarmigan may make the cost of hunting ptarmigan fairly high, for example. In smaller villages where there are no chickens in the freezer, or other substitutes are extremely expensive, ptarmigan hunting may make economic sense, where in the urban area it may not. People using ptarmigan on a subsistence basis are more likely to take ptarmigan incidentally to other activities, perhaps while returning from fishing or trapping, or they are more likely to go out on foot, as many young men do near the villages. In the "urban" areas ptarmigan hunting may be more important as a recreational pursuit.

Depending on how costs of equipment depreciation and operation are figured and how the value of wild meat is derived, even moose or caribou hunting by snowmachine, boat, or airplane may be marginal. But in any case, even if substitutes are available, fresh moose or ptarmigan are preferred, both for the flavor and the activity. Thus, a non-economic criterion may be most important to the hunter.

Reasons for Harvesting Wildlife/Meat Hunters--Head Hunters

"Subsistence" is not a term widely used by local residents of the Katmai region, but they do distinguish between hunting for meat and hunting for sport or "head hunting". In local usage, the latter category comprises

taking game for trophies and is mainly done by hunters from outside the region or by transients. Most residents consider themselves meat hunters, but they do not distinguish between different groups on the basis of need or income.

Most local people are highly critical of "head" hunting and of those who take moose, caribou, ducks, or fish and then throw much of it away later because it was improperly taken care of or stayed in the freezer too long.

Ethnicity: Natives and Non-Natives

As noted in earlier sections, the population of the Katmai region, and Bristol Bay in general, is a mixture of ethnic and racial groups. The aboriginal populations of the Katmai region included three Eskimo speaking groups, the Kiatagmiut, Aglmiut, and Peninsula Eskimo. Many of the ancestors of these people who live in the Katmai proposal call themselves "Aleut".

There has been a great degree of intermarriage and mixture between ethnic and racial groups in the area historically. This dates back into the 18th and 19th centuries when intermixture occurred between Native peoples and the Russians. Large numbers of Scandinavians and other Europeans came to Bristol Bay to take part in the commercial fishery beginning around the turn of the century and many of these married Native women. Many people who consider themselves "Aleut" or Native have Scandinavian surnames, speak only English, have light-colored skin, and partake in all phases of American culture, as well as harvesting wildlife for food.

On the other hand, many non-Natives have moved into the region, attracted by employment possibilities, lifestyles, or opportunities for

fishing and hunting. A number have married Native women and have adopted the commercial fishing-seasonal employment-trapping-hunting and fishing way of life. Others, those characterized as "urban" in temperament and values in earlier sections, have more permanent, reliable employment and also utilize wildlife, but more as a recreational outlet than as an employment and income alternative and supplement.

In short, there are few basic differences in resource use between ethnic groups in the Katmai region. Subsistence activities are important to many Native people however because they form one of the most significant aspects of their self-identity. They identify themselves, and are identified by others, as Native because of the way they live, including wide use of fish and wildlife resources.

Today there is generally much less reliance on subsistence resources than there was twenty or thirty years ago, but this varies seasonally, annually, and between villages and families. Among many Native families, there is still considerable traditional knowledge about the environment and resources and for them, the whole subsistence realm is more complex and multidimensional than it is for many non-Native families. Although much of this tradition and knowledge is being missed by the younger generation who lack the language and experience in subsistence matters, there seems to be resurgence of interest in their heritage among many young people. Subsistence activities and the land are central to this heritage, along with oral history and language. It is difficult to say what the outcomes of these various trends are likely to be, but many Native residents feel that it is desirable to maintain diversity and choice for future generations.

Trends in Subsistence

Residents of the Katmai area are likely to continue to harvest fish, game, and other resources for personal consumption as long as regulations and resource populations allow. Most of the residents of the area, regardless of income or ethnic affiliation, place a high value on these activities and such cultural values appear to be more important than economic factors in influencing the continued demand for wildlife resources.

An increasing population of humans in the King Salmon-Naknek area has resulted in increasing competition for game in nearby areas which will continue to grow in the future. In the process, people who make considerable use of local resources have had to reduce their consumption and dependence, or extend their harvest activities. The airplane has provided an important means of doing this. If these people are allowed to use the proposal area, it can be expected that there will be increasing harvests as long as resource populations and regulations allow.

While subsistence activities remain economically important to people in the smaller villages, in the larger communities there has been a shift in the significance of hunting and fishing activities. Today, except for a few families, these activities, while supplying much of the meat utilized by many families, are largely a function of choice of lifestyle. They contribute greatly to the quality of life, but cannot be considered essential for the maintenance of life. Most families in the larger communities would be able to purchase meat and fish from the store, and to continue to live where they do, even if they could not harvest wildlife. While the same is true in some respects, even for people who might be considered subsistence users in the smaller villages, more government aid and welfare would be required to replace subsistence resources in their case.

It is likely that this trend, a reduction in the significance of local resources for the necessities of life and an increase in their significance as symbols, or for more intangible values such as "quality of life", will continue in all communities of the area. The economic necessity for subsistence activities will decrease at a much lower rate in the "villages" than it has in King Salmon and Naknek, however.

It is possible that high fur prices may cause the recent increase in trapping activity in areas of the proposal to continue. Trapping is a significant economic activity for people in the smaller villages, as well as for a few people in the larger places. It is also an important recreational activity for a number of people in King Salmon and Naknek.

Hunters and other resource users have increasingly moved toward mechanized means of transportation in the Katami area. Outboard engines have been used on boats for many years, and now jet units on flat-bottomed river boats allow rapid, easy and expensive access along many rivers and creeks. Snowmachines have not become as ubiquitous in this area as they have in many parts of Alaska because of the great variability in snow conditions both throughout the winter and from year to year. They are more important in Levelock and Igiugig, which have more reliable snow conditions. In the urban areas, where people have greater incomes, all-terrain vehicles have become common, and new varieties are constantly being tested. Most villages have increasing numbers of "three wheelers", and these are utilized for subsistence activities throughout the year where conditions allow.

Those who have the most income, and therefore theoretically have the least need of subsistence resources, are most able to purchase easy access to resources through the ownership or charter of specialized vehicles. Regulations controlling means of access to certain areas of the proposal would give lower-income hunters more opportunity to harvest game,

although complete prohibition of aircraft access to the proposal might prevent the dispersal of hunting pressure, focusing it on areas utilized for subsistence by residents in other communities.

It will be particularly difficult to enforce the proposed extensions boundaries against aircraft hunting, since there are few landmarks or natural features defining it. Unless markers visible from the air are placed around it, pilots will not be able to tell whether they are in or near the proposal, particularly on the featureless plain of the western portion between the Naknek and Egegik Rivers, an area heavily used for moose and caribou hunting. Increasing hunting pressure along a poorly defined boundary is likely to pose difficult management and enforcement problems.

Impacts of Subsistence Resource Use upon the Katmai Park Proposal

The aboriginal Eskimo-Aleut residents of the Katmai region relied solely upon the fish and wildlife resources of this area for their livelihood until cannery work became available in the early 1900's. Since then, residents of the region have integrated wage employment, commercial fishing, and subsistence activities. The areas proposed for addition to the Katmai National Monument supported hunting, fishing, and gathering activities for thousands of years without major alterations to habitat or extinction of species.

Since World War II, when the Air Force base at King Salmon was constructed, sport hunting and fishing have increased in the proposal area, and it is impossible to separate the effects of subsistence activities from those of recreational hunting and fishing which occur on the same lands. In general, however, hunting, fishing, gathering and trapping are not

causing any major disturbances to habitat in the area as a whole, nor do they threaten the survival of any species.

The greatest long-term threats appear to be the overharvest of salmon commercially, causing reductions in salmon runs in streams of the area. This decline could affect the ecology of the streams and have impacts on many species. Similar long-term impacts could come from proposed roads and other development.

There are short-term and localized impacts resulting from certain subsistence and recreational resource harvesting activities, however, particularly in the vicinity of population centers. The use of off-road vehicles near King Salmon has caused the destruction of vegetation and created erosion threats in some portions of the proposal, for example.

Beaver populations are liable to overharvest in local areas, and temporary depletion has occurred in the past in portions of the proposal area. Heavy trapping in areas easily accessible to large populations, such as King Salmon Creek, could cause reduction in beaver populations. Generally beaver are able to recognize trapped out areas, however. Other furbearer populations may be temporarily depleted near human population centers.

Moose in areas of the proposal may be liable to overharvest under certain conditions. In the winter of 1976-77, for example, moose concentrated in the King Salmon Creek area from the surrounding region, where they were easily hunted by residents of King Salmon and Naknek. Frozen ground with little snow cover facilitated access by automobiles, and an estimated forty or fifty moose were taken from this valley alone. It is doubtful that the area can sustain harvests of this magnitude, and the ADF&G plans to begin permit and check-in systems for this drainage. (Personal Communication 1976 Jim Faro ADF&G, King Salmon).

ESTIMATES OF RESOURCE HARVESTS BY LOCAL RESIDENTS
IN AREAS* PROPOSED FOR ADDITION TO KATMAI NATIONAL MONUMENT

<u>Species</u>	<u>Annual Range of Harvest</u>
Moose	25-50
Caribou	50-100
Beaver	50-100
Lynx	5-30
Wolf	1-5
Wolverine	1-5
Land Otter	10-30
Mink	10-30
Fox	20-100
Ptarmigan	100-200
Rainbow	50-100
Salmon (mainly reds: some taken inside existing Monument during fall)	50-100

*As Proposed in 1974 Department of Interior
Environmental Impact Statement for Katmai
National Park Proposal

In some areas of the Alaska Peninsula, moose populations have been affected by heavy sport-hunting pressure, resulting in low numbers of bulls per cows, and low calf ratios. In many areas of the proposal, however, there seem to be good moose populations, particularly in areas which are difficult of access.

Rainbow trout populations in the Naknek River have also been over-harvested in the past, and again, like the moose, this appears to be a function of the proximity of a large human population and ease of access to the resource. Many, if not most of the people harvesting trout are taking them for recreational purposes.

Other resources of the proposal area fluctuate so much naturally that it is difficult to identify the impacts of harvest activities. Caribou migrate in and out of the proposal and are presently fairly abundant on the Alaska Peninsula. Like all caribou populations, they seem subject to major natural cyclic fluctuations. A decline in the number of caribou could lead to shifts in resource use among people utilizing caribou for food. This would probably be the case in Egegik, for example, where caribou is a preferred species and moose are little sought for subsistence purposes. If caribou were not available, people would probably attempt to take more moose, causing shifts in hunting and land use patterns including perhaps, heavier use of the north shore of Becherof Lake and the King Salmon River.

The Significance of the Proposal Area for Subsistence

Commercial fishing and government, not subsistence, are the dominant economic facts of life for most people in this region, but the harvest of local renewable resources for personal consumption continues to be

important nonetheless. In the smaller, more remote villages where there are fewer alternatives, and for some individuals in the larger places, subsistence activities have considerable economic significance. To those groups, as well as to many other people, wildlife harvest activities have social and cultural importance.

Most of the subsistence activities of the residents of the smaller villages occur on lands outside the Department of Interior's proposed addition to Katmai. Only two or three of the residents of Kakhonak, for example, make use of the proposal area at all. On the other hand, a large proportion of the harvest activities of the people in the larger, closer communities, King Salmon, Naknek, and South Naknek, take place within the proposal.

The significance of the proposal area to these three communities lies in its proximity, and in the fact that two of the major hunting areas accessible by land and water, King Salmon and Big Creeks, lie within it. There are few alternatives to these areas for moose hunters from King Salmon and Naknek dependent upon boat and automobile access. Hunters using aircraft have access to areas outside the proposal, but in many cases increasing use of these areas puts them into competition with subsistence hunters from other communities. This indirect impact of the proposed addition could affect subsistence hunting in the vicinity of the smaller villages, such as Egegik, Levelock, and Iguigig.

The significance of the proposal for residents of the smaller villages is that certain areas within it are portions of their total resource harvest territory; areas which are utilized for certain species, or during times when particular resources are scarce in areas closer to the village. Portions of the proposal are particularly significant to a small number of trappers from Kakhonak, Igiugig and Levelock, as well as Naknek and

South Naknek, who use these areas for trapping fox, lynx, and beaver.

As noted in an earlier section, most of the harvest activities of the people of Egegik occur outside the proposal area. Again, however, the proposal does contain areas which are significant under certain conditions, or for particular species. The Egegik Rapids area, for example, is used for moose and caribou hunting, as well as for fishing.

Possible alternatives to the subsistence activities conducted by the people of the Katmai region, and to their use of proposal lands, vary between communities and individuals. As noted above, Naknek and King Salmon moose hunters dependent upon land and water transport have few alternatives to the proposal area if they desire to get moose. Most of them probably could get along without the moose if they had to, but at a lower perceived standard of living.

For the trappers from surrounding communities who use the proposal area, the major alternatives are either to stop trapping, or to trap in areas outside the proposal. Trapping is fairly significant economically to a number of people, particularly in poor fishing years; for them, the major alternative is increased welfare. The proposal areas are important because they are more distant from the communities, and have not been heavily trapped, therefore, a serious trapper can do better there. Certain species bringing high prices, such as lynx, are also more abundant within and near the proposal area, particularly in the upper Alagnak drainage and American Creek. A few trappers have large investments in time, experience, traplines, and cabins in the proposal which would be lost if they could not trap in the area. The proposal area is viewed as an important hunting, trapping, gathering, and fishing area by residents of all the communities around it. Naknek and South Naknek residents, in particular, have strong feelings about

the area. There are a few older people in those communities who trapped, hunted and fished for subsistence purposes in the Naknek Lake area before Monument regulations were enforced in the 1940's, and many residents utilized the western end of Naknek Lake for these purposes before the 1969 extension of the Monument forced them out. Many people feel that the Department of the Interior's proposed extension will close off much of the last available hunting and trapping in this region.

Subsistence and Proposed Policy Guidelines

The Katmai proposal area has a complex of communities, socio-economic groups, and life-styles that make it different from many of the other proposed national parks in Alaska. This complexity may cause problems in the implementation of proposed policy guidelines on subsistence, although in general, they appear to have considerable flexibility.

Local definitions of "subsistence" do not coincide to any great degree with those implied in the NPS guideline proposals. The major divergence appears in the role which economic "need" plays in this definition, for the purposes of determining eligibility for continuing use of the Katmai proposal and its resources.

On the face of it, economic necessity provides a good basis for eligibility for use of the proposal's resources. In the communities of the Katmai area, however, such criteria are so potentially divisive socially that one wonders whether they can work. All income groups harvest resources from the proposal for consumptive use, and there are no clear-cut divisions separating subsistence from non-subsistence users; any division for regulatory purposes will have to be arbitrary.

Any definition based on economic need or income also faces the problem

of variability in need from year to year, particularly of commercial fishermen, or those who work temporary jobs. In one year, an individual may make a windfall, while in the next he might make just enough to get by on, so that the real income provided by locally harvested fish and game becomes critical. It seems likely that an extremely complex bureaucracy would be necessary if permits were to be issued annually, depending on income from the previous year. And the applicant might need the resources this year, no matter how much money he made last year, so a just policy would require information on how much money he is making this year.

The selection of qualified members for the proposed Subsistence Councils will be of major importance. The composition of the Council, and the biases, philosophies, experiences and expectations of its members; will be critical factors in the functioning of the Council. In small communities like those around the Katmai proposal, there is a high potential for conflict over such an emotional issue as subsistence, and it might be difficult to find or keep qualified people on such councils.

Under liberal interpretations of subsistence guidelines, if eligibility were based on residence and customary and consistent use rather than need, most people presently hunting and fishing in the area would be able to continue doing so, and there would be little conflict. Under stricter interpretations, it seems likely that a small "privileged" class of resource users would cause hard feelings, conflict, and endless litigation.

The exclusion of aircraft access to the proposal for subsistence purposes, combined with provisions basing eligibility on local residency and past use would accomplish much the same end as would basing eligibility on economic need, without the management and social problems inherent in

the latter. The deletion of the heavily-used King Salmon Creek and Big Creek areas near King Salmon from the proposal, or the creation of a special hunting use category would avoid many problems in the Katmai area.

It should be noted that aircraft have been used for harvesting wildlife resources for more than thirty years in the Katmai area, and that they have been important because of the variable snow and ice conditions, which frequently make winter ground travel difficult. They came early to replace dog teams for access to trapping areas, for example. Some local people argue that aircraft are a more traditional means of transportation than snowmachines or ATV's, which are of much more recent vintage, and that they do less harm to the environment. Aircraft also allow the dispersion of harvest pressures away from areas accessible by road and waterways.

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