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Subsistence-Based Socioeconomic Systems in Alaska: An Introduction

by

Robert J. Wolfe

1984

Alaska Department of Fish and Game

Division of Subsistence



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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly-accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H _A
gram	g			base of natural logarithm	e
hectare	ha			catch per unit effort	CPUE
kilogram	kg			coefficient of variation	CV
kilometer	km	all commonly-accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	common test statistics (F, t, χ^2 , etc.)	
liter	L			confidence interval	CI
meter	m			correlation coefficient (multiple)	R
milliliter	mL	at	@	correlation coefficient (simple)	r
millimeter	mm	compass directions:		covariance	cov
		east	E	degree (angular)	°
		north	N	degrees of freedom	df
		south	S	expected value	E
		west	W	greater than	>
		copyright	©	greater than or equal to	≥
		corporate suffixes:		harvest per unit effort	HPUE
		Company	Co.	less than	<
		Corporation	Corp.	less than or equal to	≤
		Incorporated	Inc.	logarithm (natural)	ln
		Limited	Ltd.	logarithm (base 10)	log
		District of Columbia	D.C.	logarithm (specify base)	log ₂ , etc.
		et alii (and others)	et al.	minute (angular)	'
		et cetera (and so forth)	etc.	not significant	NS
		exempli gratia (for example)	e.g.	null hypothesis	H ₀
		Federal Information Code	FIC	percent	%
		id est (that is)	i.e.	probability	P
		latitude or longitude	lat. or long.	probability of a type I error (rejection of the null hypothesis when true)	α
		monetary symbols (U.S.)	\$, ¢	probability of a type II error (acceptance of the null hypothesis when false)	β
		months (tables and figures)	first three letters (Jan.,...,Dec)	second (angular)	"
		registered trademark	®	standard deviation	SD
		trademark	™	standard error	SE
		United States (adjective)	U.S.	variance	
		United States of America (noun)	USA	population	Var
		U.S.C.	United States Code	sample	var
		U.S. state	two-letter abbreviations (e.g., AK, WA)		
Weights and measures (English)					
cubic feet per second	ft ³ /s				
foot	ft				
gallon	gal				
inch	in				
mile	mi				
nautical mile	nmi				
ounce	oz				
pound	lb				
quart	qt				
yard	yd				
Time and temperature					
day	d				
degrees Celsius	°C				
degrees Fahrenheit	°F				
degrees kelvin	K				
hour	h				
minute	min				
second	s				
Physics and chemistry					
<i>all atomic symbols</i>					
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of) pH					
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				
		Measures (fisheries)			
		fork length	FL		
		mid-eye-to-fork	MEF		
		mid-eye-to-tail-fork	METF		
		standard length	SL		
		total length	TL		

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by

Robert J. Wolfe

Alaska Department of Fish and Game, Division of Subsistence, Juneau

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1984

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SUBSISTENCE-BASED SOCIOECONOMIC SYSTEMS

IN ALASKA: AN INTRODUCTION

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Juneau, Alaska
November 1983
(Revised December 1984)

One of the major research endeavors of the Division of Subsistence of the Alaska Department of Fish and Game is to describe and understand a type of socioeconomic system in Alaska which may be termed a "subsistence-based socioeconomic system." A subsistence-based socioeconomic system is an economy and society where fishing and hunting for local use play important roles. Communities with subsistence-based systems are economically and socially dependent on fishing and hunting for local use. Without access to the natural resource base of fish, game, and plants, the communities could not exist as they do today.

There appear to be several characteristics of a subsistence-based socioeconomic system. Characteristic features include the following: a community-wide seasonal round of subsistence activities; high participation rates in fishing and hunting activities; substantial outputs of fish and game products for local use; a domestic mode of production; extensive non-commercial distribution and exchange networks; traditional systems of land use and occupancy; and a mixed economy combining subsistence and commercial sectors. This paper briefly describes each of these features illustrated with materials drawn from several communities where the Division

of Subsistence has conducted work which are examples of this taxonomic type of socioeconomic system. The locations of these communities are depicted in Figures 1 and 2.

Seasonal Round of Subsistence Activities

The first characteristic of a subsistence-based socioeconomic system in Alaska is the presence of a community-wide seasonal round of fishing and hunting activities. The economic activities of a community follow a yearly cycle, based on the seasonal appearance of fish and game resources. The seasonal round of production activities is complex and differs in detail between communities, as illustrated in Figures 3 and 4 which depict seasonal rounds for two areas -- communities along the Yukon River delta, and the community of Tyonek along Upper Cook Inlet. The seasonal round is a regular pattern, although fluctuations appear in it from year to year depending upon the availability of resources, weather conditions, and other factors.

Participation

A second characteristic of a subsistence-based socioeconomic system is high participation in fishing and hunting activities within the community. Figures 5 and 6 show participation rates in selected subsistence activities by households in Nondalton near Lake Clark, and in Tyonek. Figure 5 shows that between 60-75 percent of Nondalton households harvested sockeye each year during a three years' study period. Between 50-60 percent harvested whitefish, while 60-70 percent harvested caribou. Figure 6 shows participation rates in descending order in Tyonek during 1978-82. As will be described below, households which did not harvest certain resources typically receive products through distribution and exchange networks.

Outputs

A third characteristic of subsistence-based systems is that production outputs of fish and game are substantial. Figure 7 shows food outputs for six communities near the Yukon River delta and for Nondalton, in pounds dressed weight per household per year, in 1980. The sample of 88 Yukon Delta area households interviewed in 1981 on average produced 4,600 pounds of fish and game, or about 780 pounds per household member. These are substantial outputs, reflecting the high dependencies of these communities on fish and game. The economic base of these communities is "food extractive" in nature. This contrasts with the economic bases of other Alaska communities such as trade, government services, finance, defense, and manufacturing.

There is as yet little information documenting trends in subsistence outputs. What little information exists for Yukon Delta communities suggests there has been no radical decreases or increases in output in recent years. Figure 8 depicts harvest trends in subsistence salmon caught along the lower Yukon River, for which there is fairly uniform information for about 20 years. It demonstrates that king harvests fluctuate from year to year primarily due to run strength and catch conditions, and that five-year averages seem to be increasing slightly. Five-year averages of chum harvests seem to show a decline over time, attributable in part to the decreased use dog teams in the area.

Domestic Mode of Production

A fourth important characteristic of subsistence-based systems is that fishing and hunting activities primarily occur within kinship units. Figure 9 illustrates a fishing group at Alakanuk, composed of two households

allied for the purpose of taking salmon. The triangles are men, the circles women, and the vertical lines are birth and descent relationships. In this work group, the father and son-in-law fished and the mother and married daughter processed the catch by air-drying and smoking, a relatively labor-intensive processing method. The production group pooled labor and capital, and the proceeds were commonly held by the two households in a food cache at the parental household. Figure 10 shows that kinship based production groups can be considerably more complex. This group is composed of six households from two villages, using five tents and three smokehouses.

In subsistence-based economies, the major economic firms are these domestic groups. Production capital, labor, and community use-areas are controlled or accessed by these kinship groups. Production levels are determined by the needs of the family group, which are typically at levels below production capacity. This contrasts markedly with the social organization of production in industrial-capital economies where production primarily occurs in firms separate from the family, and production is directed toward market sale and accumulated profit.

Distribution and Exchange Networks

A fifth characteristic of subsistence-based socioeconomic systems is the presence of extensive non-commercial distribution and exchange networks. Fish and game are shared, distributed, and exchanged in non-commercial transactions in large quantities. Figures 11 and 12 illustrate the distribution of a moose taken by hunters in Chuathbaluk on the middle Kuskokwim River and Tyonek, respectively. The Chuathbaluk hunter's moose was divided among five households; the Tyonek hunter's moose was used by eight households. Consequently, even though a household may not directly

participate in the harvesting and processing of a resource, the household may use the resources taken by someone else.

Traditional Systems of Land Use and Occupancy

A sixth characteristic of a subsistence-based socioeconomic system is the presence of traditional systems of land use and occupancy. The locations of fishing and hunting activities by residents of a community are influenced by systems of non-codified customary laws defining rights of access. Trap lines, fish camps, set net sites, big game areas, and other areas are recognized as the use areas of particular kinship groups and communities. The Division of Subsistence is beginning to map some of these use areas, and to document some of the customary laws regulating use. Figure 13 depicts the locations fishcamps along the lower Yukon River. It illustrates that camps tend to cluster according to the resident's village of origin. Figure 14 depicts the areas used for fishing and hunting by the community of Tyonek. The systems of land use represent a sociopolitical organization of fishing and hunting whereby access to resources is defined and control exerted.

Mixed Economy

A final characteristic of subsistence-based economies is that food production for subsistence use is mixed with commercial and wage employment in the community. The economy is "mixed" because the communities have subsistence and commercial sectors. In the Yukon Delta area, money is gained through the commercial sale of fish and furs, wage employment, and cottage crafts. Incomes are relatively low, as commercial harvests are finite and wage-paying jobs are few, highly seasonal, low-paying, and part-time.

Figures 14 and 15 depict monetary incomes for three Lower Yukon communities and for Tyonek. Typically, communities with subsistence-based economies cannot function solely on monetary earnings. Consequently, money is invested in the equipment for fishing and hunting for subsistence uses, the most reliable sector of the economy.

There are complex interrelationships between type of commercial or wage employment and resource use. In many communities, the commercial sector and subsistence sector are mutually supportive. Money gained through the commercial sale of fish, wage employment, trapping, and crafts is invested in a way which supports success in the subsistence sector. Research in the Division of Subsistence continues to explore the interaction of monetary and subsistence activities in these mixed economies.

Summary

To summarize, a "subsistence-based socioeconomic system" seems to be a type of socioeconomic system in the State. It is a food extractive economic system and has several identifying characteristics of resource use. Subsistence-based socioeconomic systems are characterized by a complex seasonal round, high participation rates, high production outputs, a domestic mode of production, extensive non-market distribution and exchange networks, traditional systems of land use and occupancy, and mutually supportive subsistence and commercial-wage sectors.

Clearly, in certain communities, fishing and hunting for local use are important components of the social life and economy. In these communities, the community's economy and society are organized around fishing and hunting for subsistence uses. Understanding the form and functioning of this type of Alaskan socioeconomic system is one of the major directives of the Division of Subsistence.

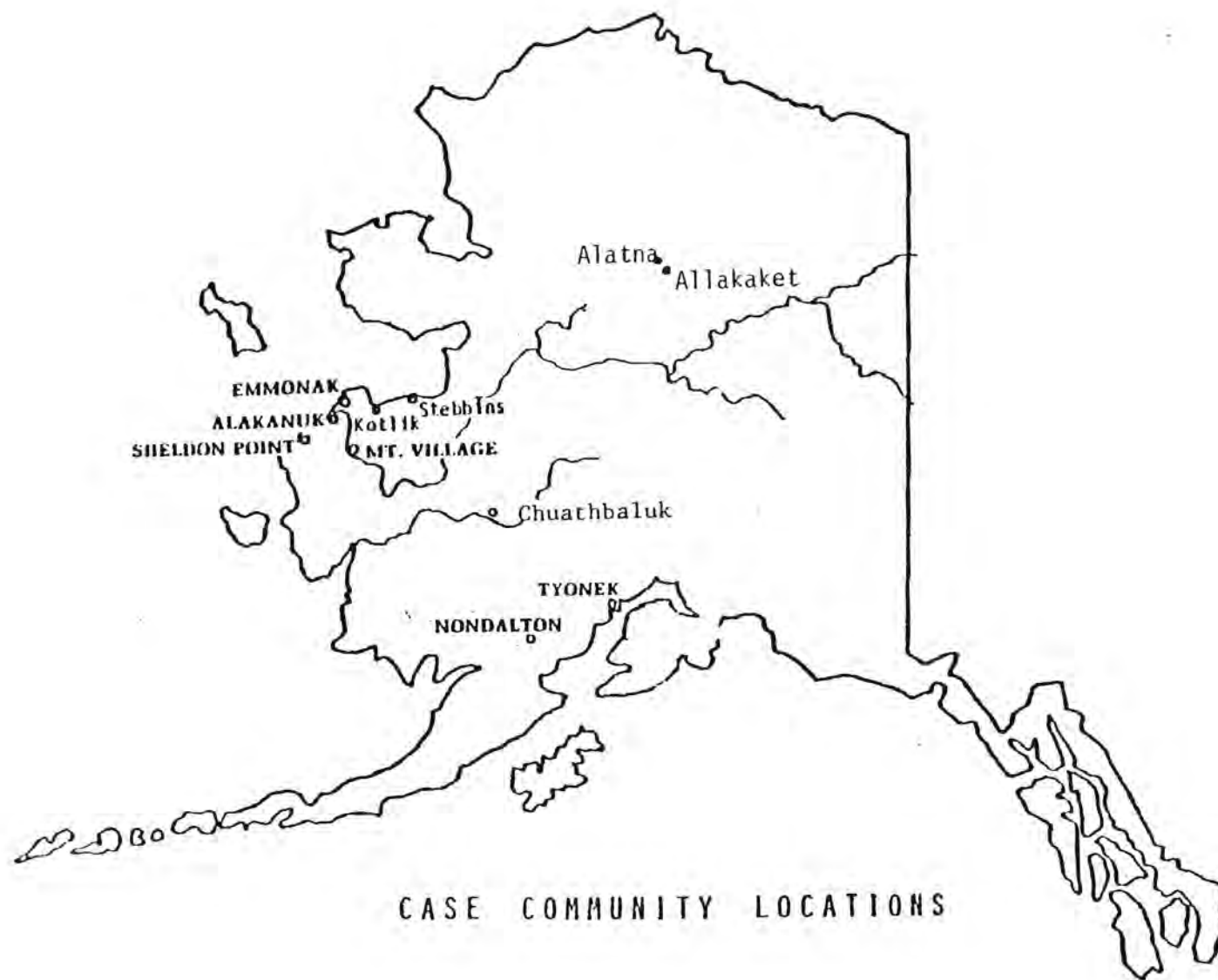


Figure 1

CASE COMMUNITY LOCATIONS

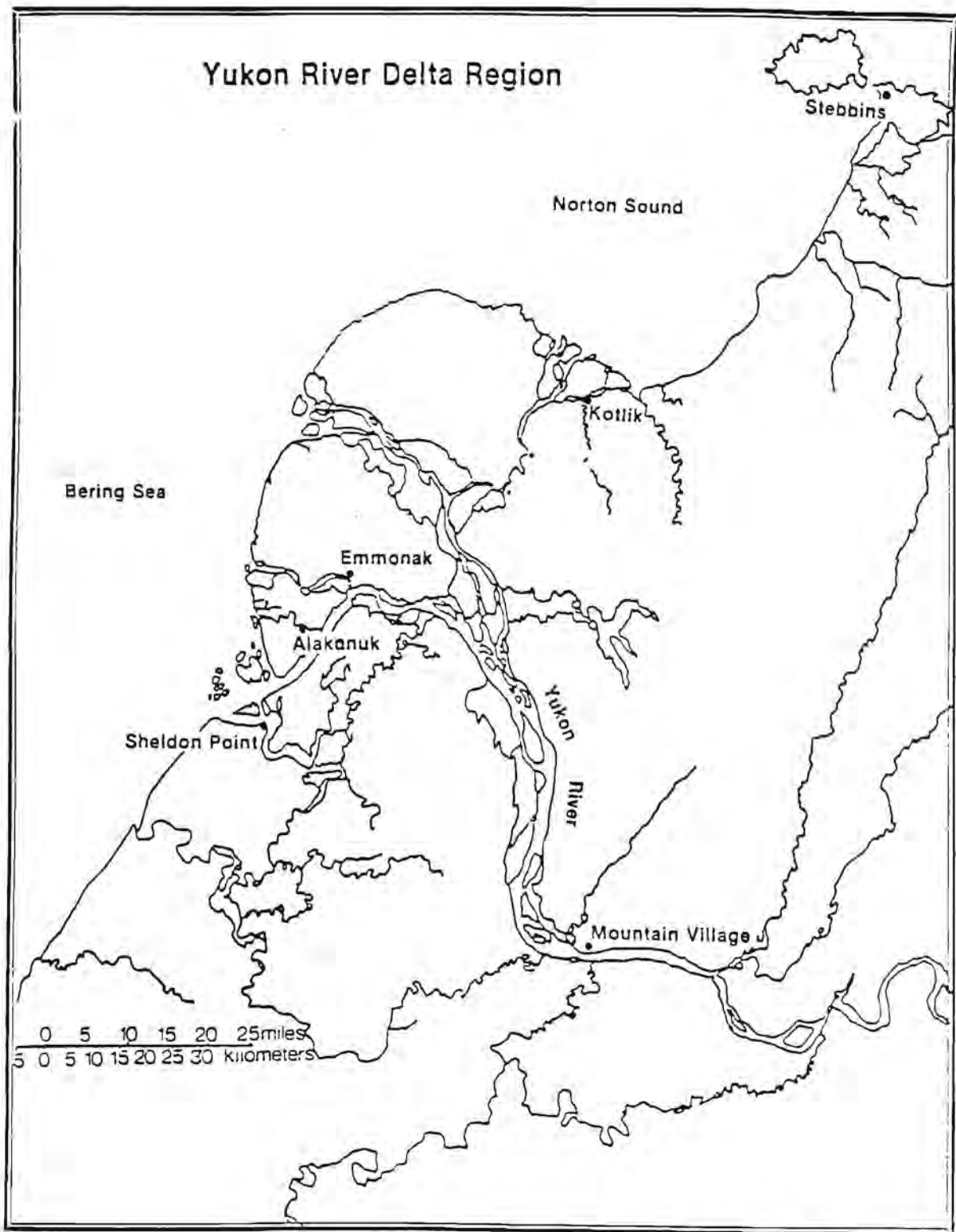


Figure 2

From Robert J. Wolfe (1984) Commercial Fishing in the Hunting-Gathering Economy of a Yukon River Yup'ik Society. Etudes/Inuit/Studies.

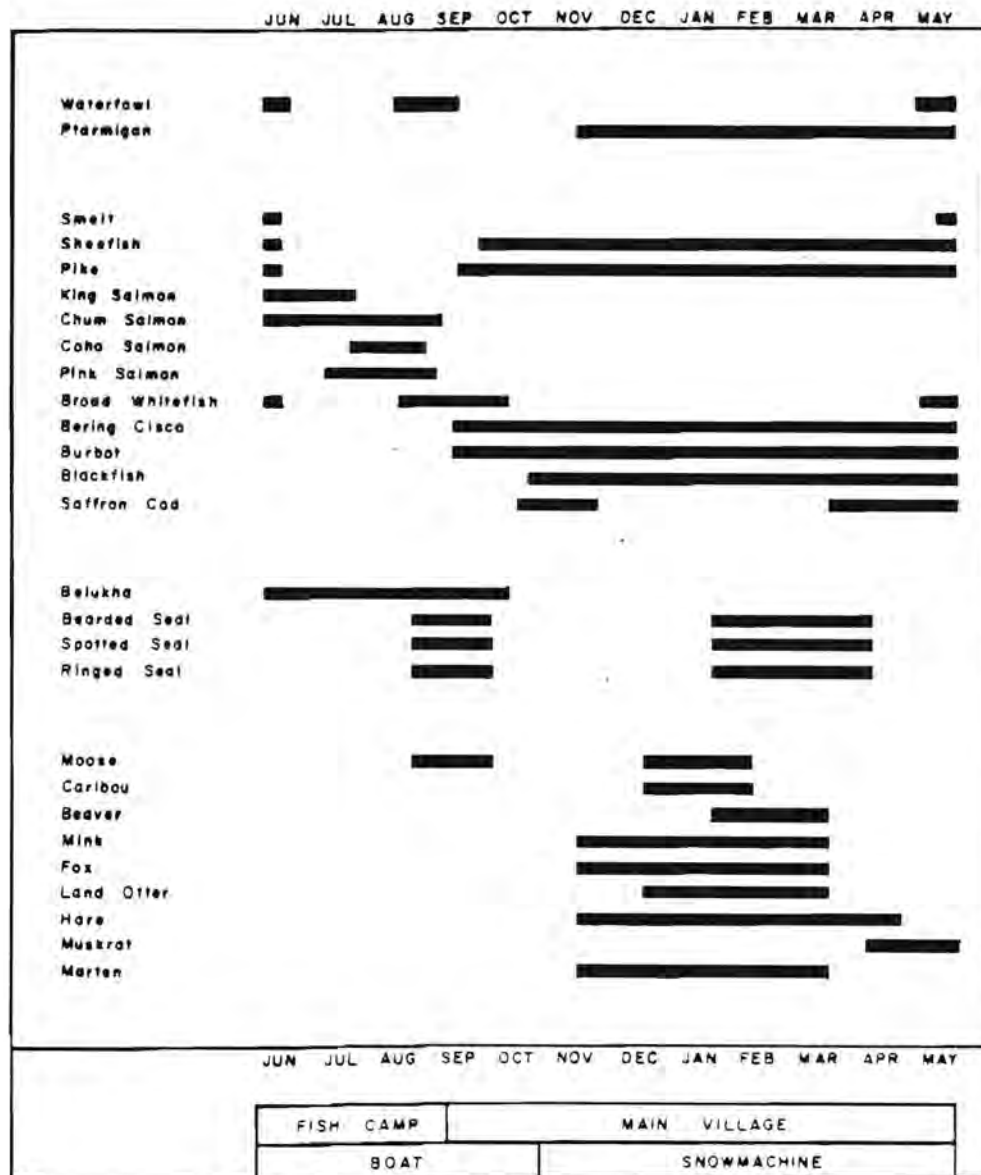
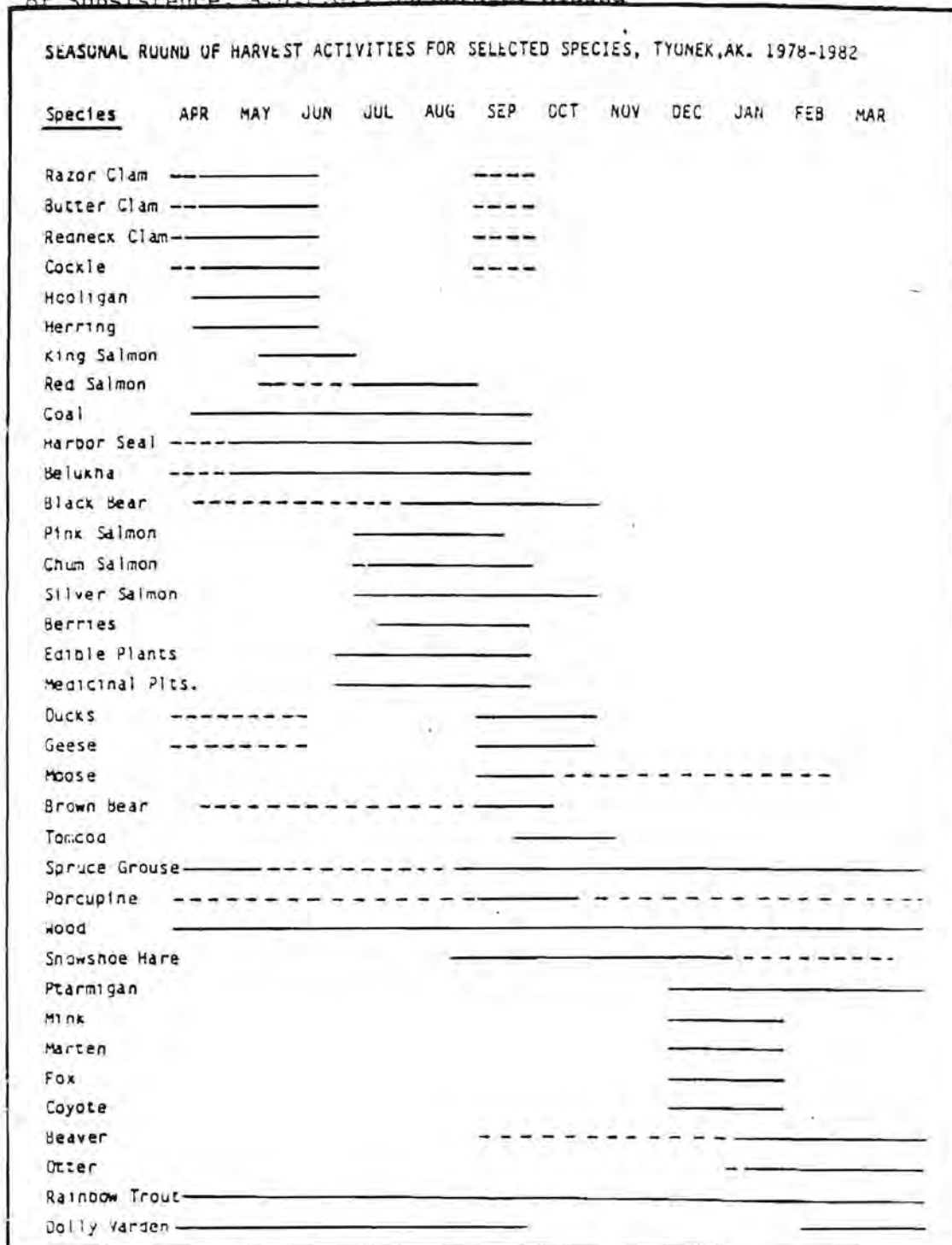


Fig. 4. Seasonal Round of Subsistence Harvests, Lower Yukon River, 1981

From James A. Fall, Daniel J. Foster, and Ronald T. Stanek (1983)
 The Use of Moose and Other Wild Resources in the Tyonek and Upper
 Yentna Areas: A Background Report. Technical Paper No.74, Division
 of Subsistence, A.D.F.G., Anchorage, Alaska



Key: _____ Usual period of harvest effort; ----- Occasional period of harvest effort

Figure 3. Seasonal round of harvest activities by Tyonek residents (Foster 1982b:34)

Figure 4

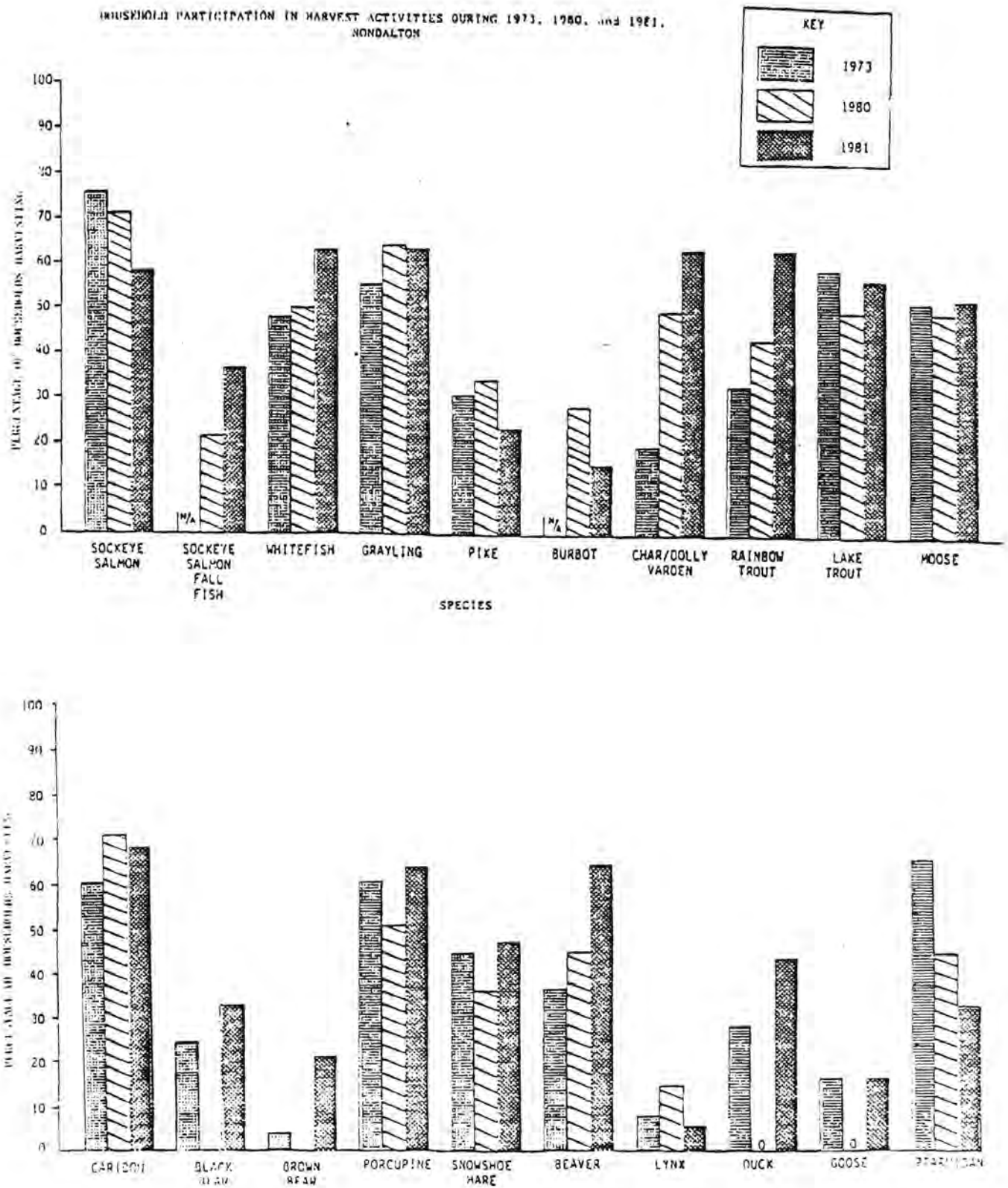


Figure 12. Household Participation in Harvest Activities During 1973, 1980, and 1981, Nondalton

From Steven R. Behnke (1982) Wildlife Utilization and the Economy of Nondalton. Technical Report No.47, Division of Subsistence, A.D.F.G., Dillingham, Alaska.

From James A. Fall, Danieal J. Foster, Ronald T. Stanek
(1983) The Use of Moose and Other Wild Resources in the
Tyonek and Upper Yenitna Areas: a Background Report.
Technical Paper 74, Division of Subsistence, A.D.F.G.
Anchorage, Alaska.

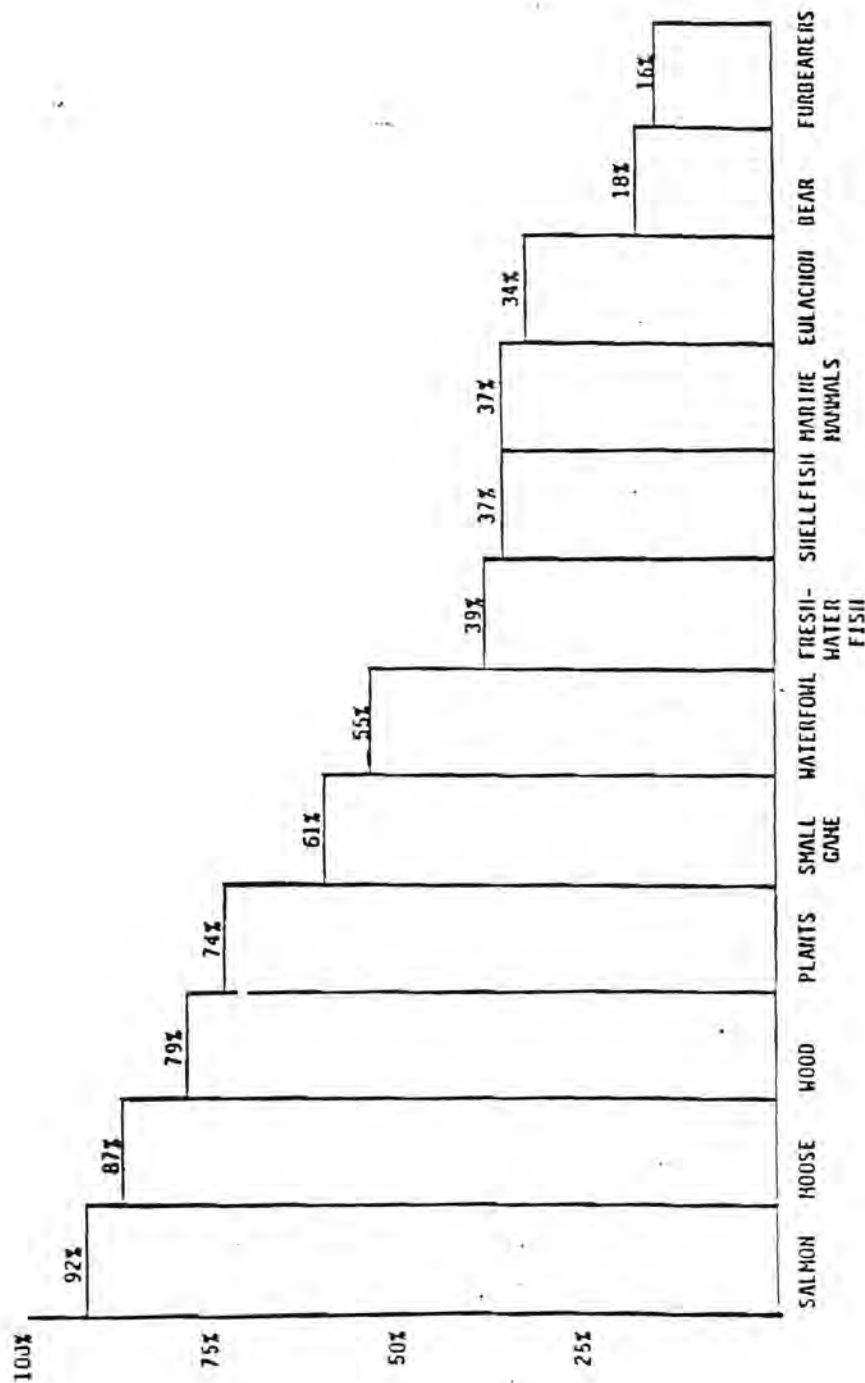


Figure 38. Tyonek Household Participation in the Harvest of Wild Resources, 1978-1982. N=38.

From Robert J. Wolfe (1983)
Resource Diversification and Coastal-
Riverine Habitats: The Economy of the
Yukon Delta Eskimo. Draft report,
Etudes/Inuit/Studies, November 1984

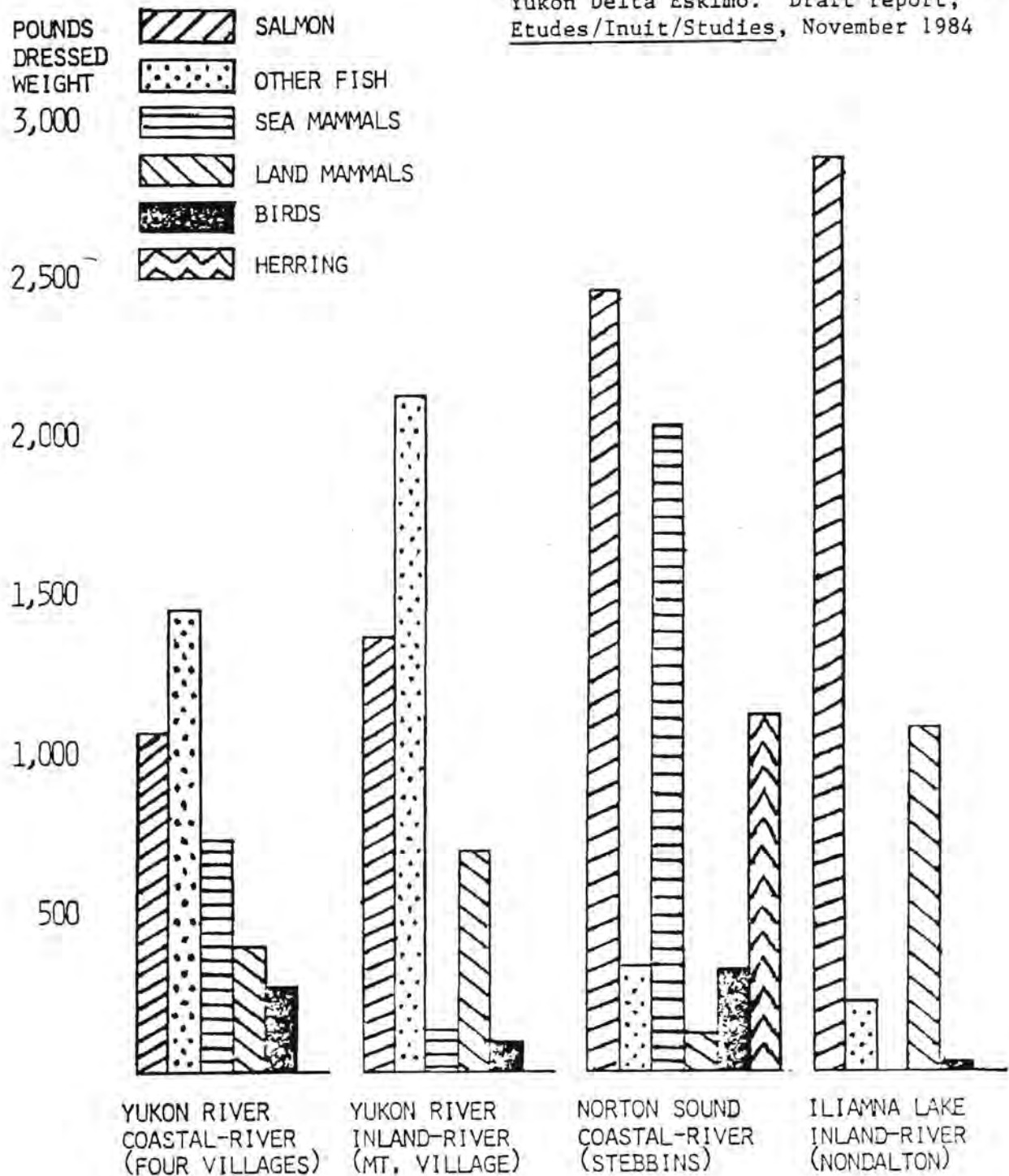


FIGURE 4. MEAN HOUSEHOLD HARVESTS IN POUNDS DRESSED WEIGHT DURING 1980,
BY COMMUNITY

From Robert J. Wolfe (1984) Commercial Fishing in the Hunting-Gathering Economy of a Yukon River Yup'ik Society. Etudes/Inuit/Studies

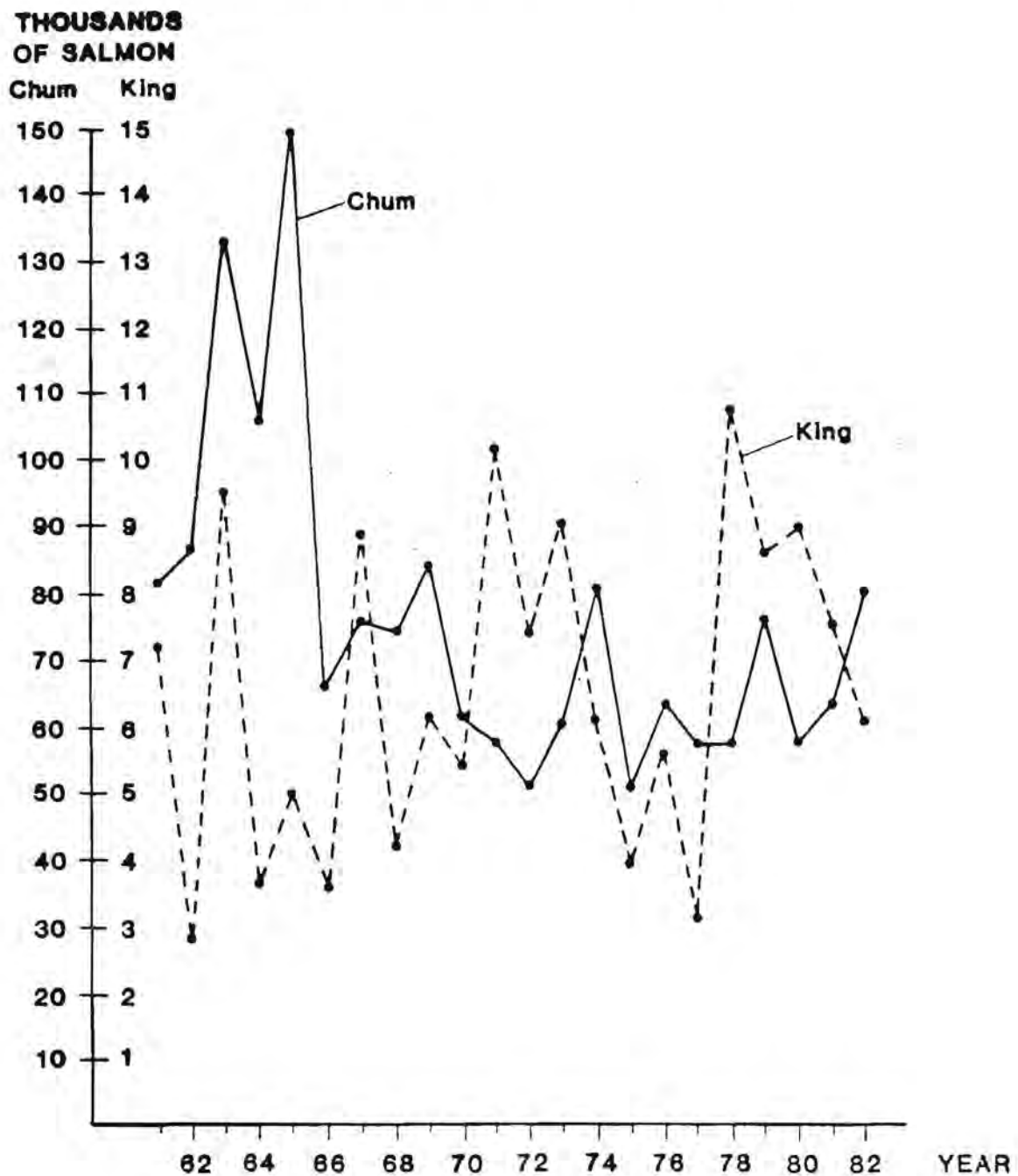


Fig. 6. Subsistence Salmon Catches, Lower Yukon River, 1961-1981

From Robert J. Wolfe (1981) Norton Sound/Yukon Delta Sociocultural Systems Baseline Analysis. Technical Paper No. 59, Division of Subsistence, A.D.F.G., Juneau, Alaska.

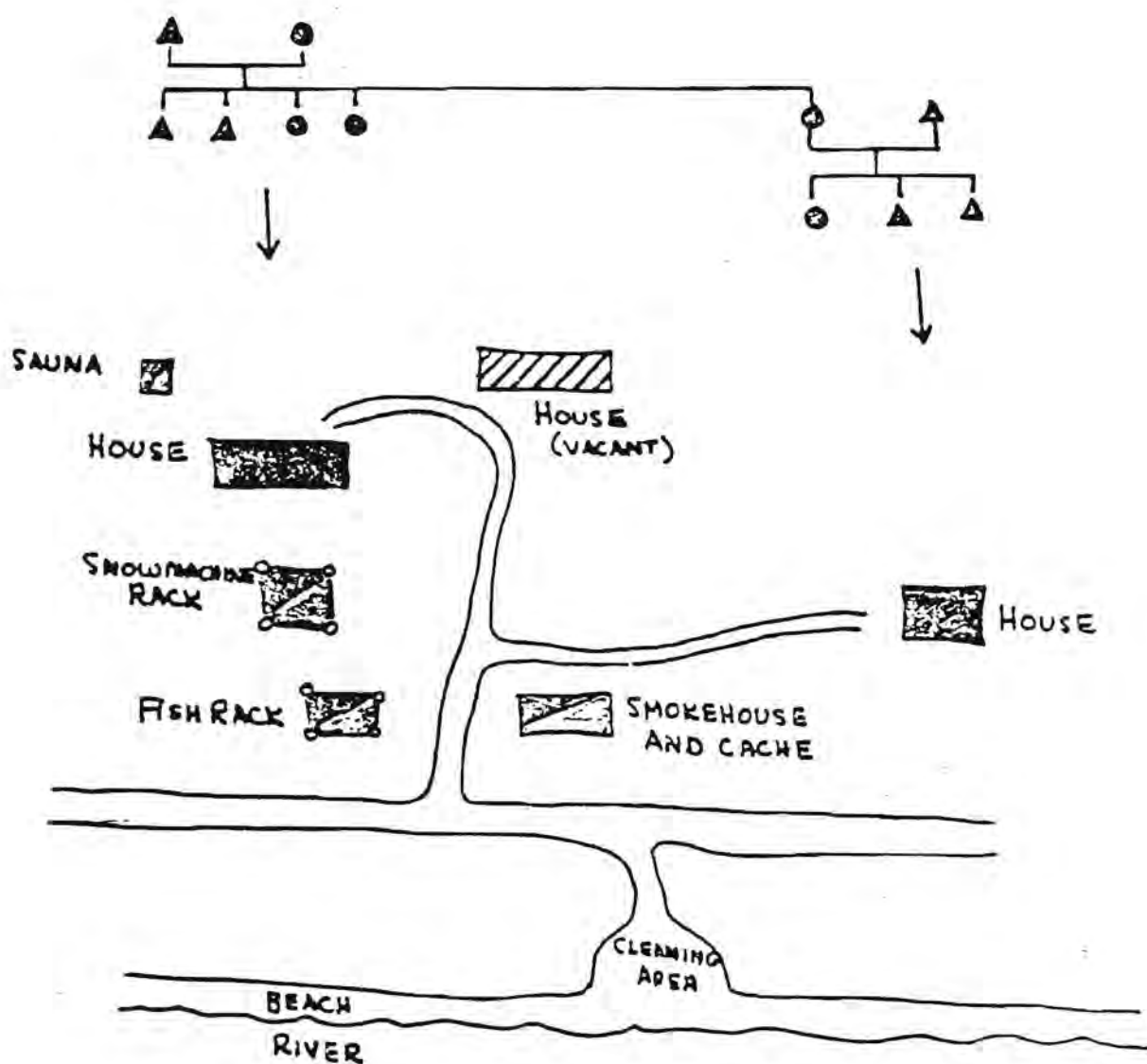


FIGURE 3. EXTENDED FAMILY COOPERATIVE GROUP AT A WINTER VILLAGE

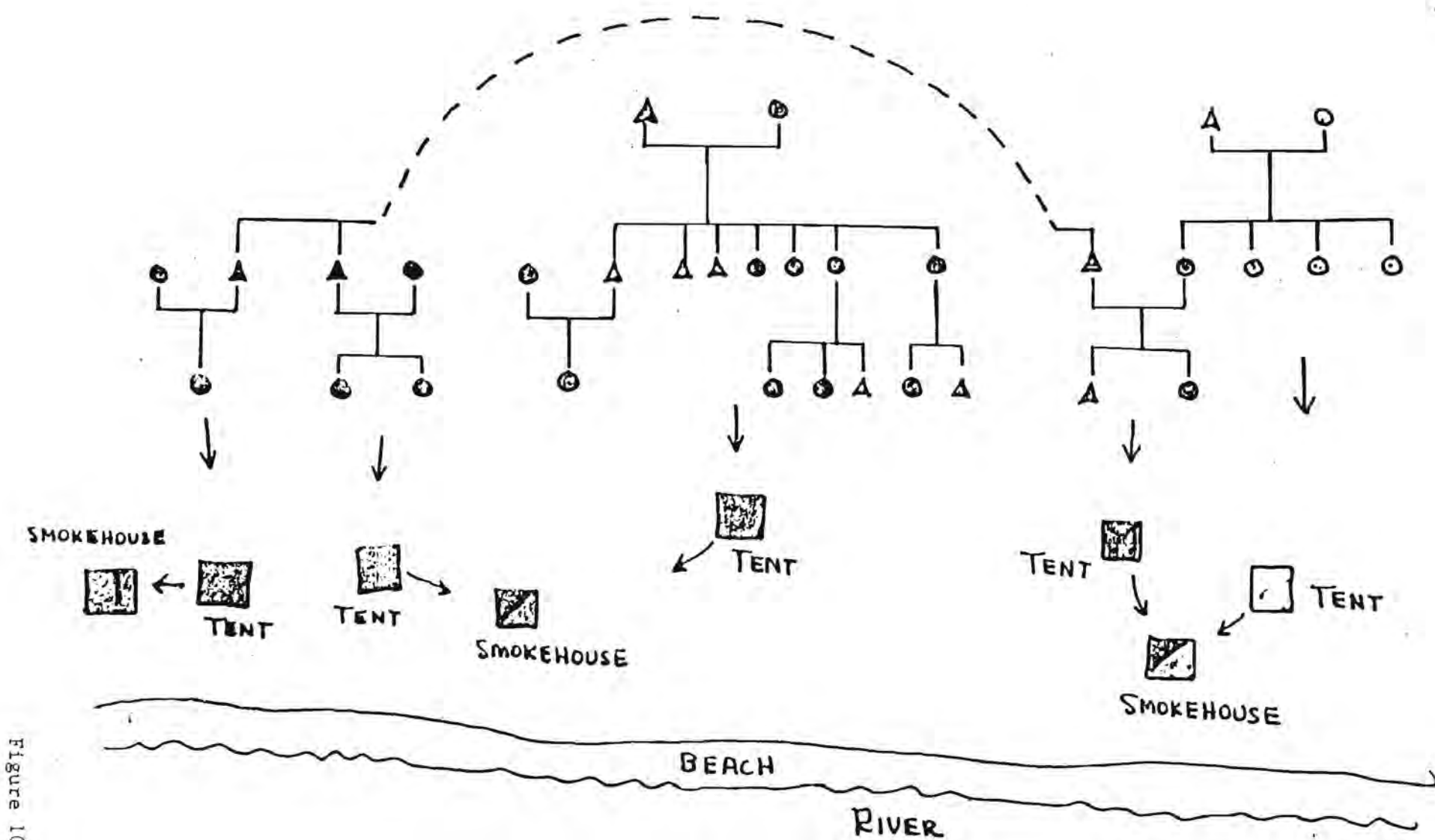


Figure 10

FIGURE 4. COOPERATIVE GROUP AT A FISHCAMP BASED ON KINSHIP AND PRINCIPLES OF ALLIANCE

From Robert J. Wolfe (1981) Norton Sound/Yukon Delta Sociocultural Systems Baseline Analysis. Technical Paper No.59, Division of Subsistence, A.D.F.C., Juneau, Alaska

From Susan Charnley (1983) Moose Hunting in Two Central Kuskokwim Communities: Chuathbaluk and Sleetmute. Technical Paper No. 76, Division of Subsistence, A.D.F.G., Bethel, Alaska

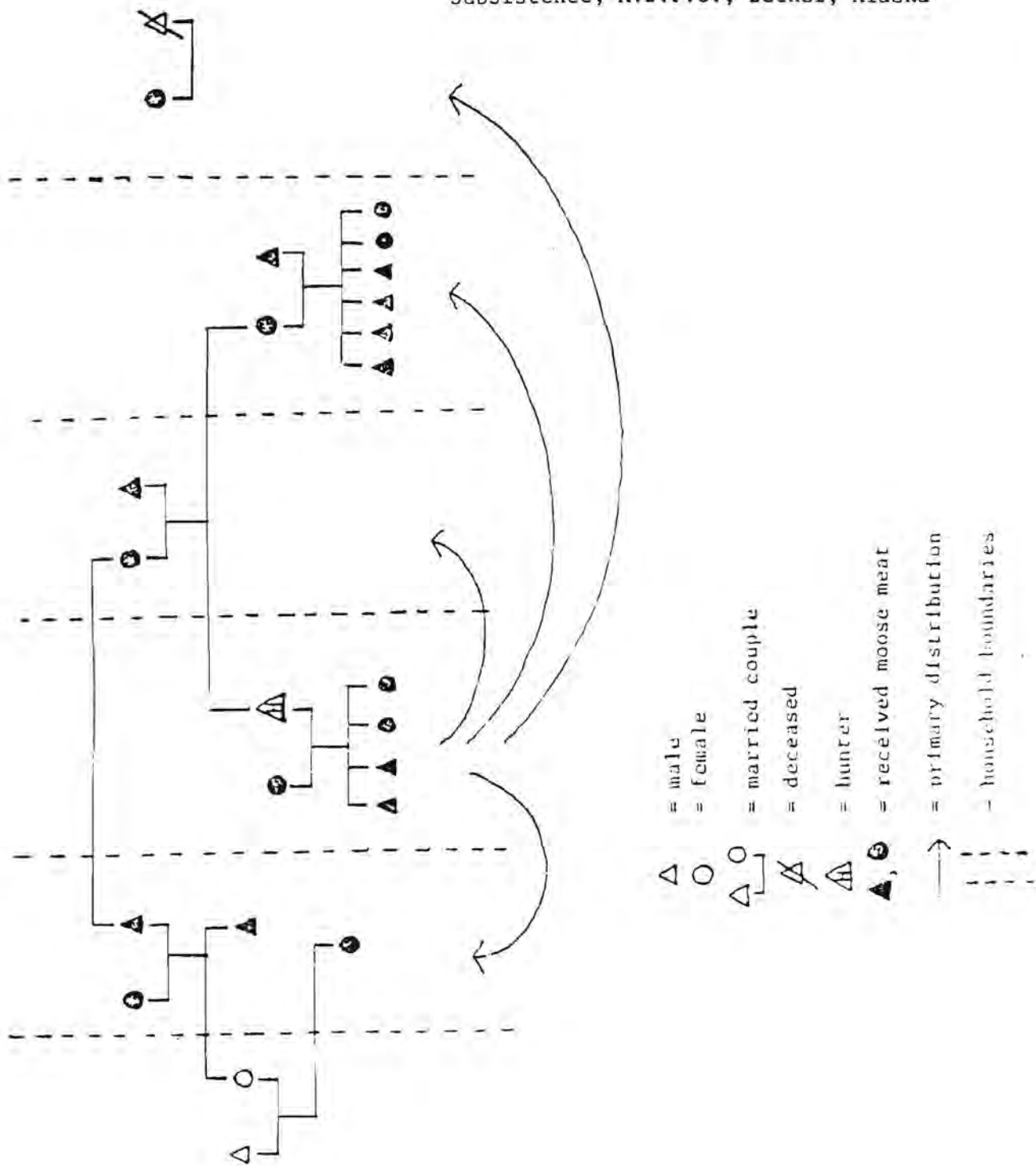


Fig. 9. Distribution of moose meat by a Chuathbaluk hunter.

From James A. Fall, Daniel J. Foster,
and Ronald T. Stanek (1983) The Use of
Moose and Other Wild Resources in the Tyonek
and Upper Yentna Areas. Technical Paper No.74,
Division of Subsistence, A.D.F.G., Anchorage.

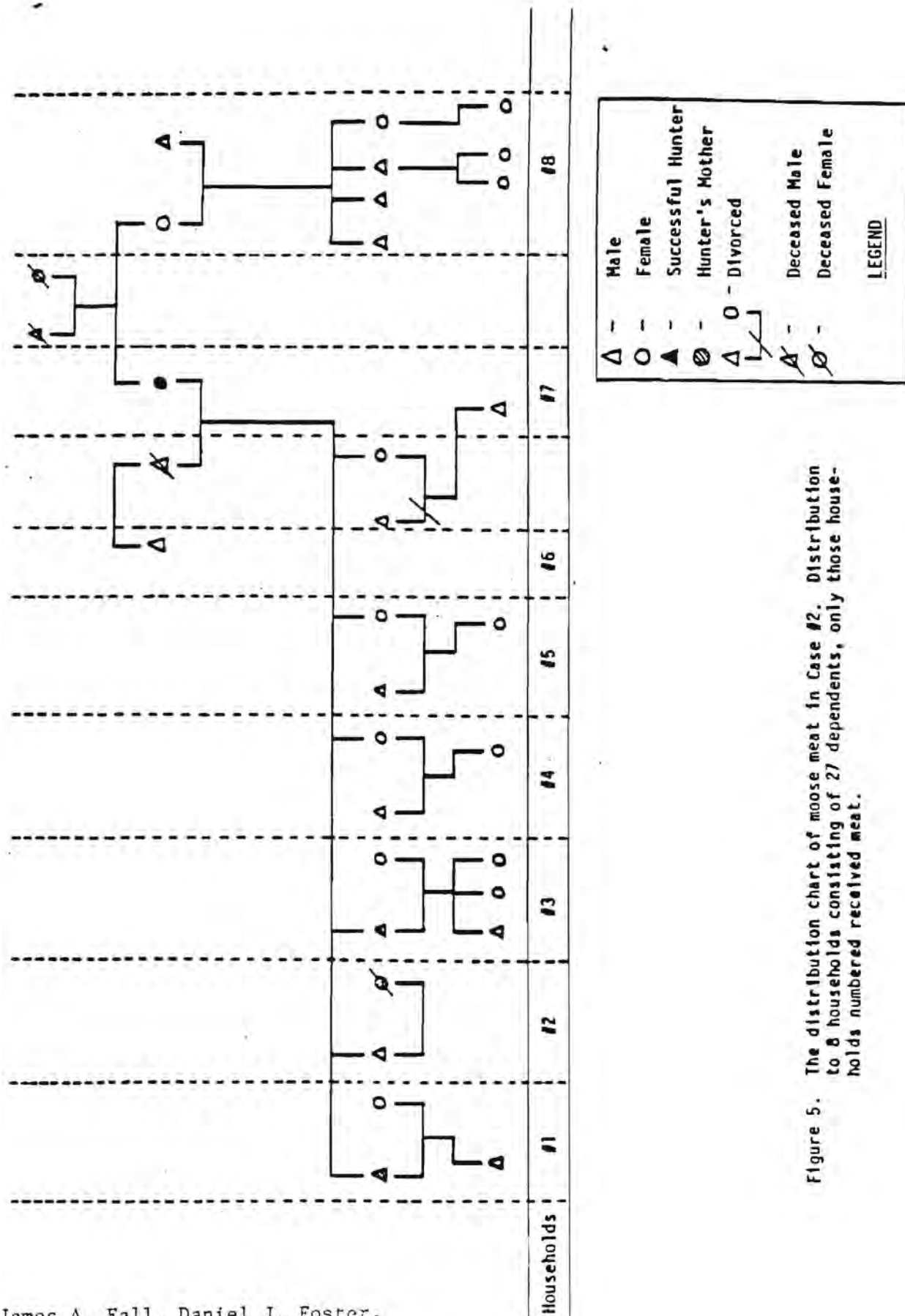


Figure 5. The distribution chart of moose meat in Case #2. Distribution to 8 households consisting of 27 dependents, only those households numbered received meat.

From Steve Behnke (1982) Wildlife Utilization and the Economy of Nondalton.
Subsistence Division, Alaska Department of Fish and Game, Anchorage.

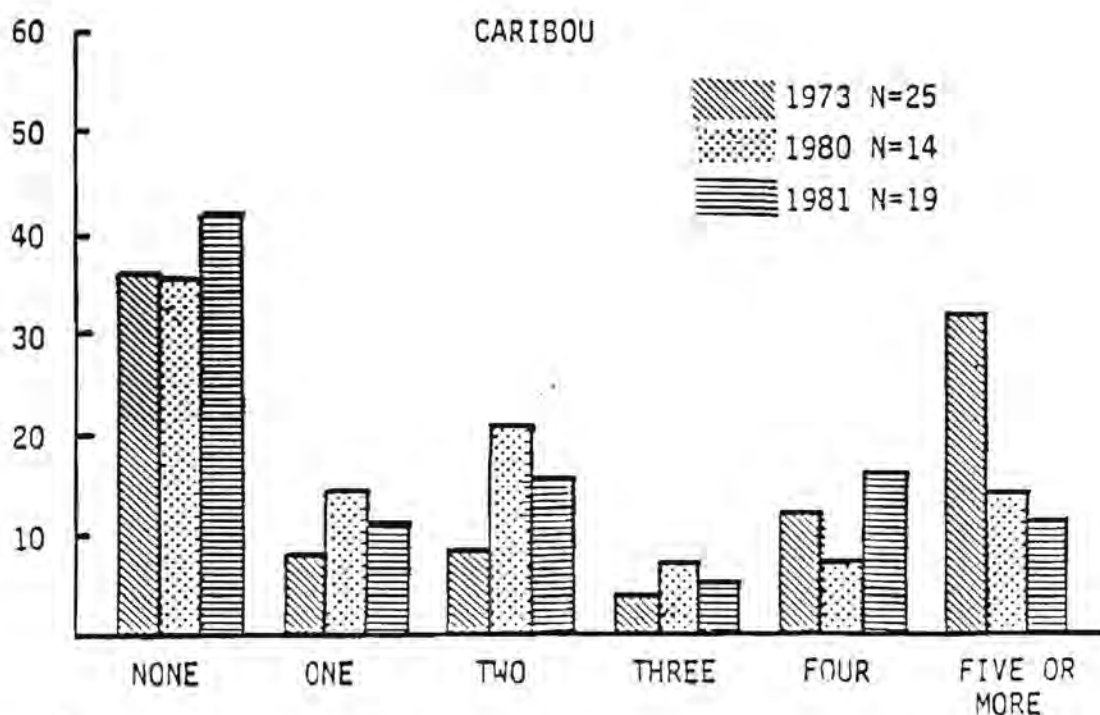
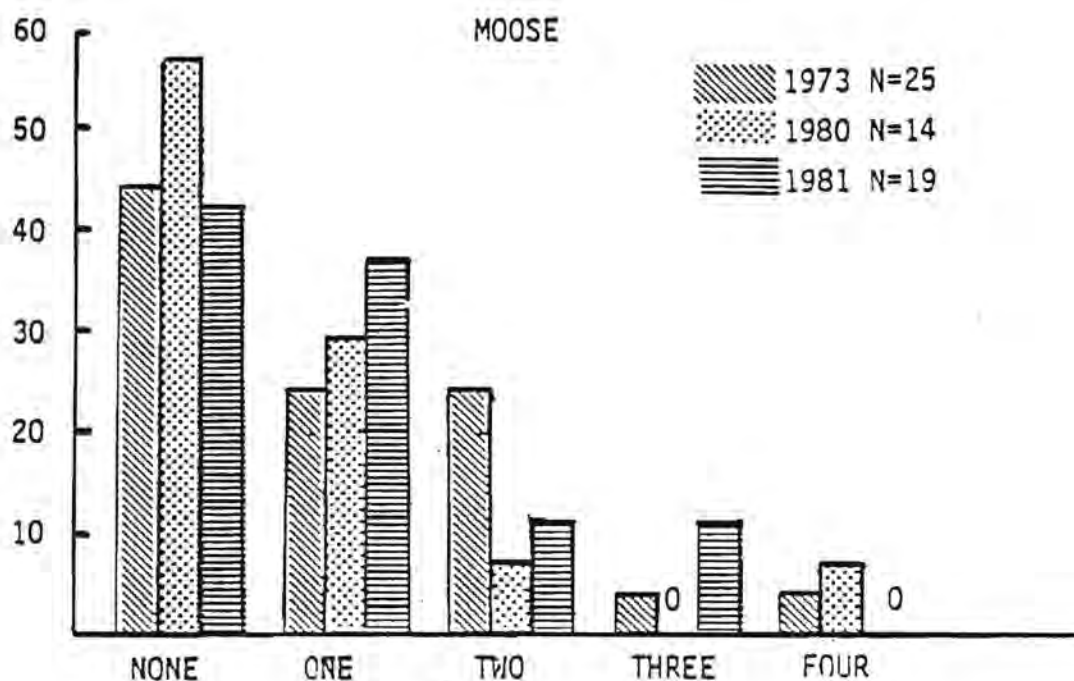


Figure 8. Percentage of Nondalton Households Harvesting Moose and Caribou

- From Robert J. Wolfe (1981) Norton Sound/
Yukon Delta Sociocultural Systems Baseline
Analysis. Technical Paper 59, Division of
Subsistence, Juneau.

NORTON SOUND

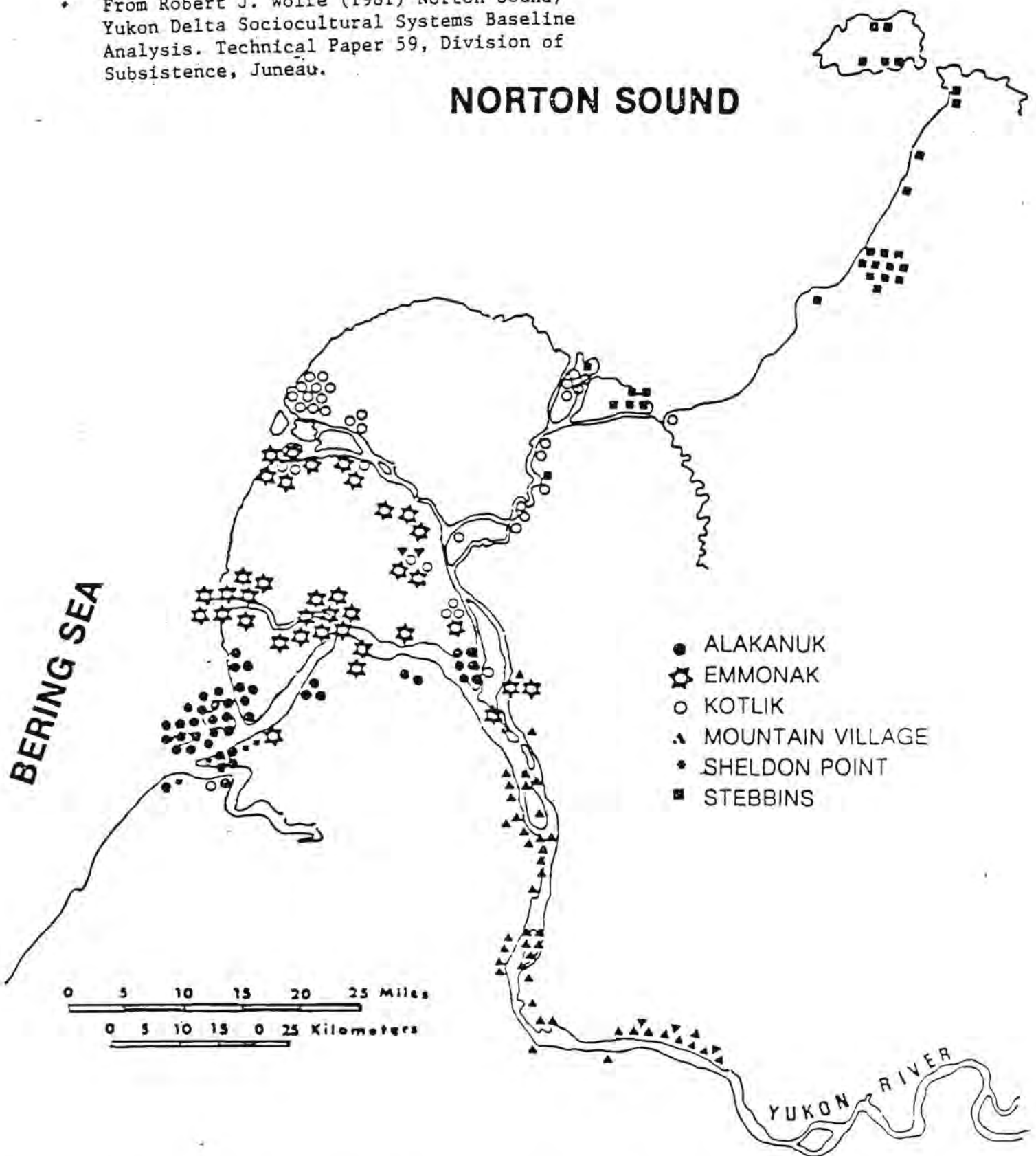


Figure 4: Approximate locations of summer fishcamps of households from Alakanuk, Emmonak, Kotlik, Mountain Village, Sheldon Point, and Stebbins during 1981

From James T. Fall, Daniel J. Foster, and Ronald T. Stanek
 (1983) The Use of Moose and Other Wild Resources in the Tyonek
 and Upper Yentna Areas: A Background Report. Technical Paper NO. 74,
 Division of Subsistence, A.D.F.G., Anchorage, Alaska

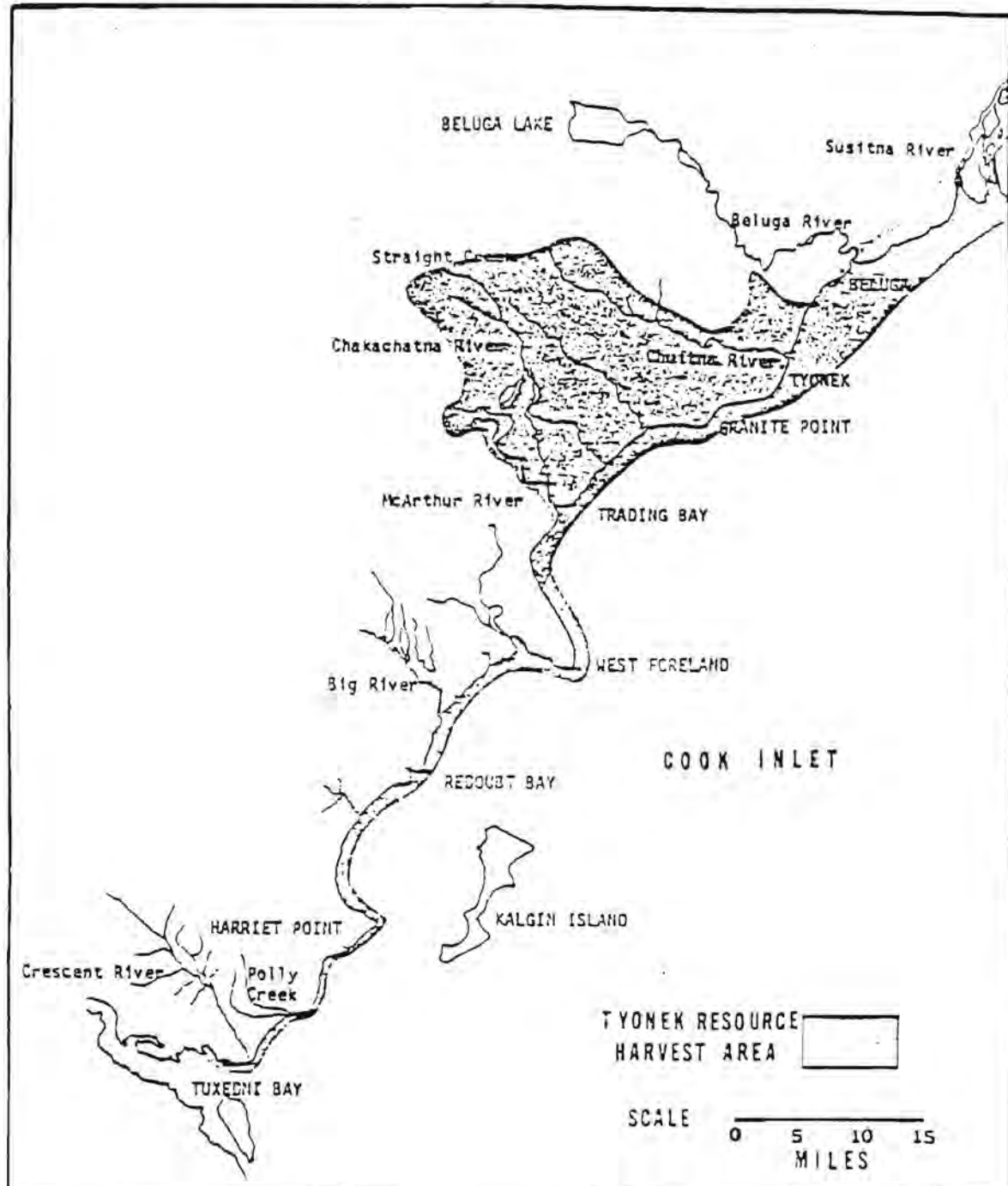


Figure 2. Geographic area of resource harvest used by Tyonek residents 1978 to 1982

Figure 14

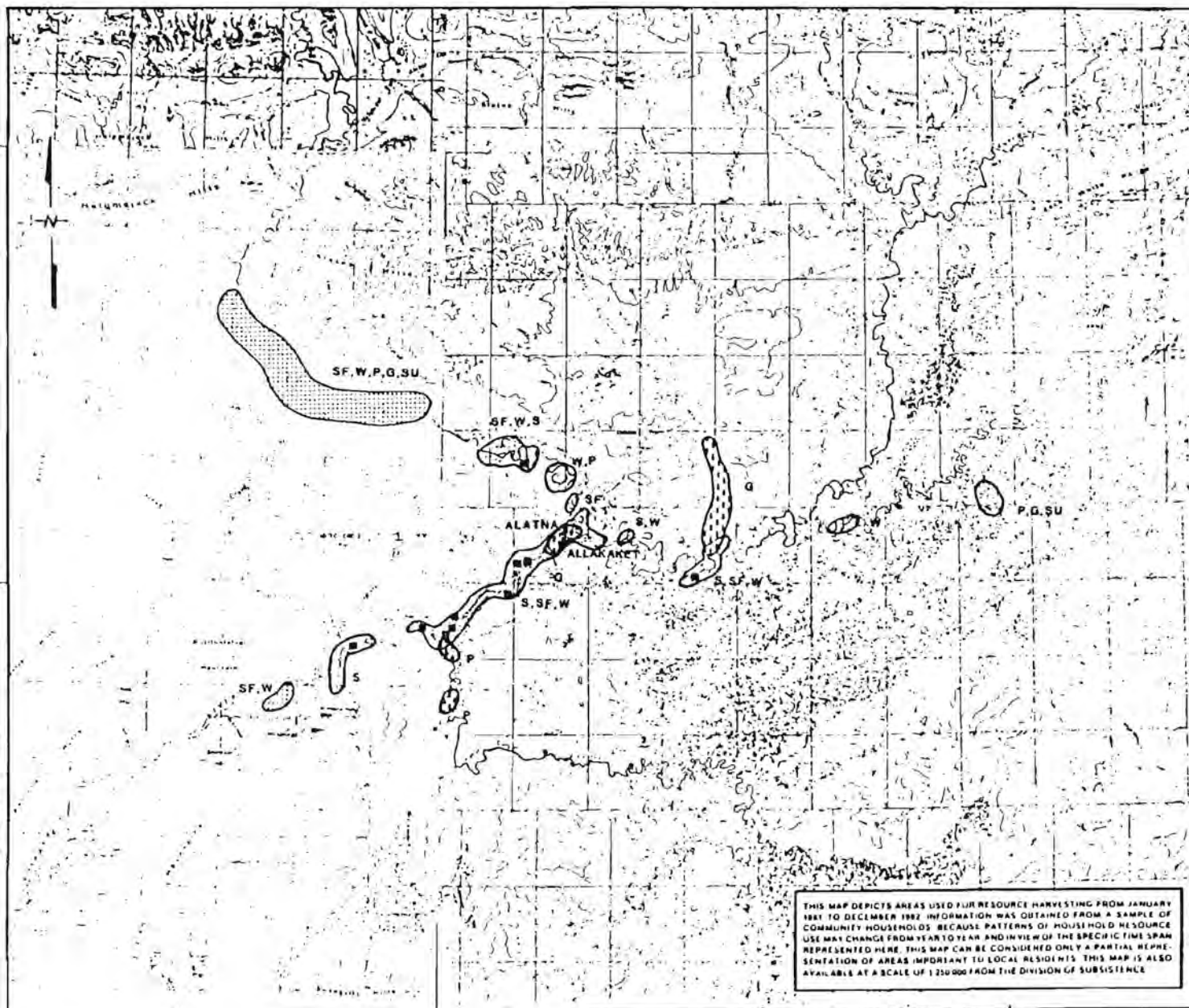


FIG. AREAS USED FOR FISHING BY RESIDENTS OF ALLAKAKET AND ALATNA, JANUARY 1981 - DECEMBER 1982.

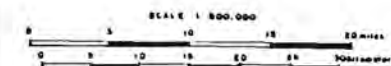
- FISH CAMP
- ▨ SEINE NET AREA
- SET NET AREA
- ▤ HOOK AND LINE AREA

G-GRAYLING SU-SUCKERS
P-PIKE T-TROUT
SF-SHEEFISH W-WHITEFISH
S-SALMON

INFORMATION COLLECTED FOR 34 HOUSEHOLDS BY JIM MARCOTTE, HOMER TOBOK AND ART WILLIAMS, SR. IN JULY 1983.

SEE "CONTEMPORARY RESOURCE USE PATTERNS IN THE UPPER KOTYUK REGION" BY JAMES R. MARCOTTE AND TERRY L. HAYLES DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 83 FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM USGS HUGHES AND BETTLES 1:250,000 QUADS



LOCATION INDEX	
SURVEY	WILDMAN
FAIR	
HUGHES	BETTLES
HELISITAN	TANANA



ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1984

THIS MAP DEPICTS AREAS USED FOR RESOURCE HARVESTING FROM JANUARY 1981 TO DECEMBER 1982. INFORMATION WAS OBTAINED FROM A SAMPLE OF COMMUNITY HOUSEHOLDS. BECAUSE PATTERNS OF HOUSEHOLD RESOURCE USE MAY CHANGE FROM YEAR TO YEAR AND IN VIEW OF THE SPECIFIC TIME SPAN REPRESENTED HERE, THIS MAP CAN BE CONSIDERED ONLY A PARTIAL REPRESENTATION OF AREAS IMPORTANT TO LOCAL RESIDENTS. THIS MAP IS ALSO AVAILABLE AT A SCALE OF 1:250,000 FROM THE DIVISION OF SUBSISTENCE.

FIGURE 148

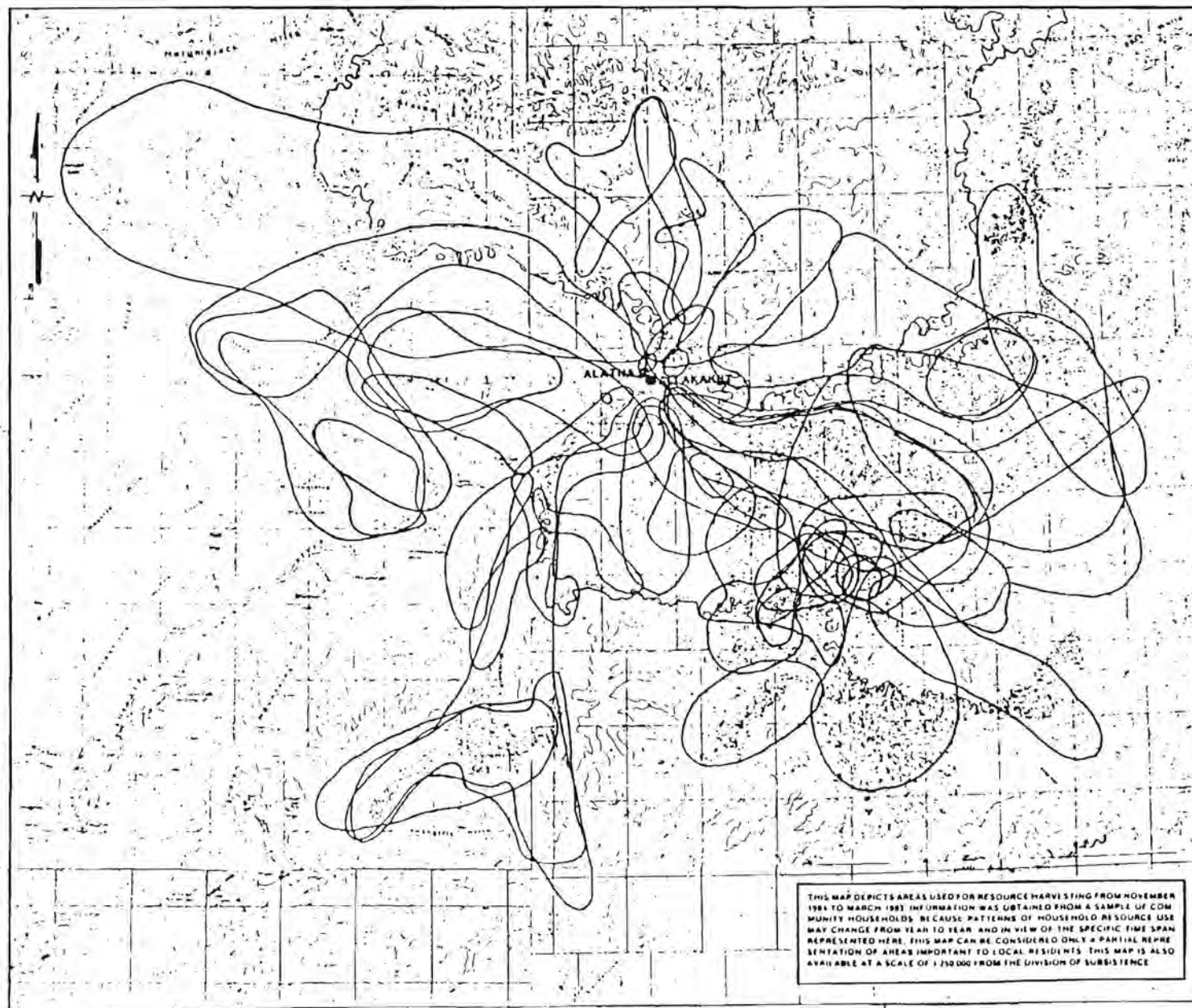


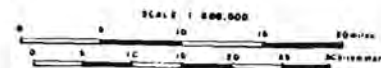
FIG. AREAS USED FOR FURBEARER TRAPPING BY RESIDENTS OF ALLAKAKET AND ALATNA, NOVEMBER 1981 - MARCH 1983.

○ TRAPPING AREAS USED BY COMMUNITY HOUSEHOLDS. (TRAPLINES ARE LOCATED WITHIN THESE AREAS.)

INFORMATION COLLECTED FOR 30 HOUSEHOLDS BY JIM MARCOTTE, HOMER TORUK, AND ART WILLIAMS, SR. IN JULY, 1983.

SEE CONTEMPORARY RESOURCE USE PATTERNS IN THE UPPER KOTUKUK REGION BY JAMES R. MARCOTTE AND TERRY L. HAYNE'S DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 93 FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM USGS HUGHES AND BETTLES 1:250,000 QUADS.



LOCATION INDEX

SURVEY PASS	WISDOM
HOMER	BETTLES
DELFINA	TANANA



ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF SUBSISTENCE

1984

THIS MAP DEPICTS AREAS USED FOR RESOURCE HARVESTING FROM NOVEMBER 1981 TO MARCH 1983. INFORMATION WAS OBTAINED FROM A SAMPLE OF COMMUNITY HOUSEHOLDS. BECAUSE PATTERNS OF HOUSEHOLD RESOURCE USE MAY CHANGE FROM YEAR TO YEAR AND IN VIEW OF THE SPECIFIC TIME SPAN REPRESENTED HERE, THIS MAP CAN BE CONSIDERED ONLY A PARTIAL REPRESENTATION OF AREAS IMPORTANT TO LOCAL RESIDENTS. THIS MAP IS ALSO AVAILABLE AT A SCALE OF 1:250,000 FROM THE DIVISION OF SUBSISTENCE.

FIGURE 14C

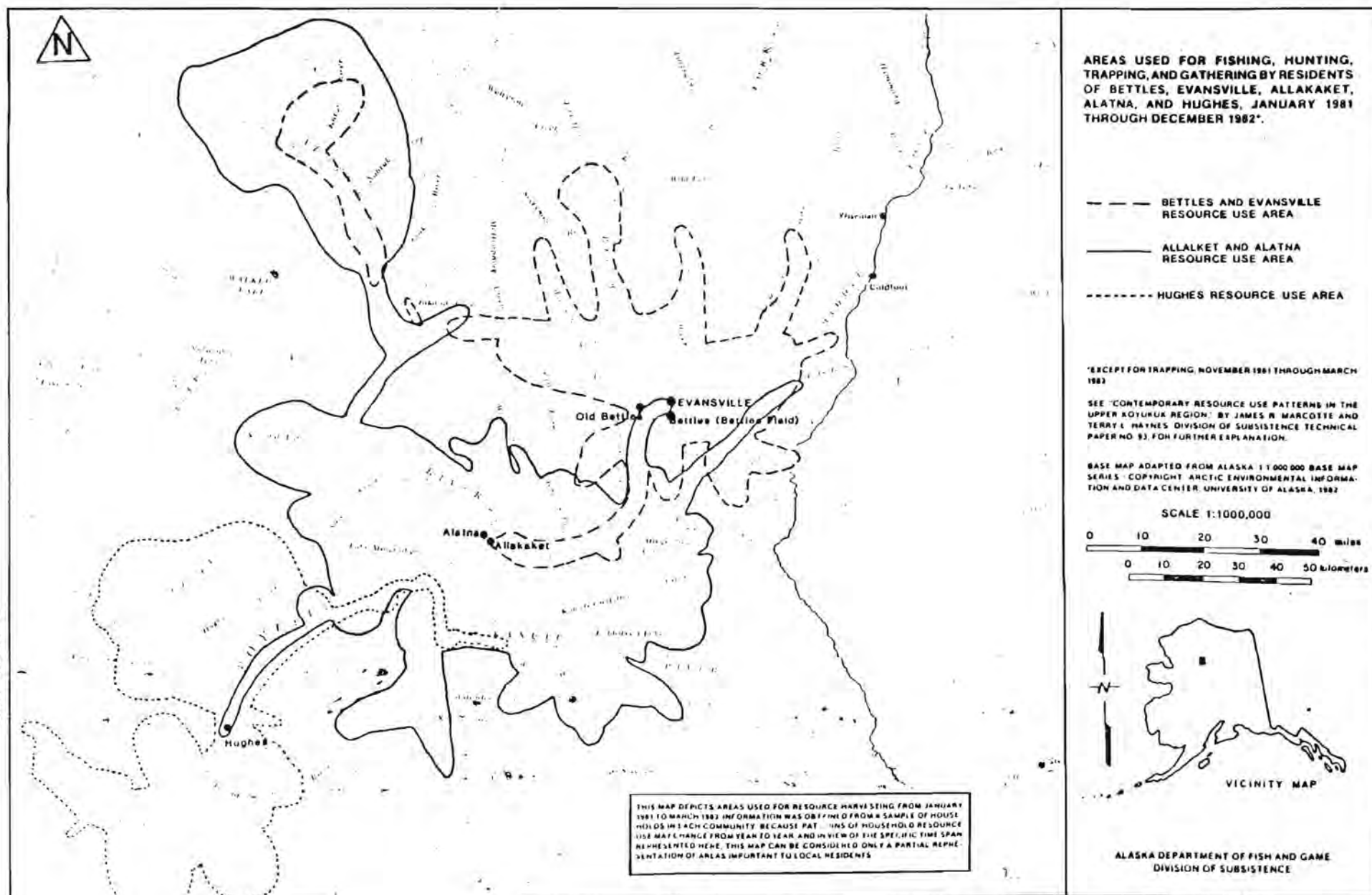


TABLE 5. MEAN SUBSISTENCE HARVESTS BY MAJOR INCOME SOURCE*

Household's Major Income Sources	Mean Household Size	Mean Household Income	Mean Subsistence Harvest per Household	Mean Subsistence Harvest per Household Member
Wage Employment and Commercial Fishing (n=49)	6.1	\$23,362	5,274 lbs.	870 lbs.
Wage Employment Only (n=10)	4.4	19,025	4,608	1,047
Commercial Fishing Only (n=18)	6.3	16,926	3,920	624
Transfer Payments (n=11)	6.3	6,468	2,741	435

*From a sample of 88 households for the period June 1980 through May 1981

(Data from the communities of Alakanuk, Emmonak, Kotlik, Sheldon Point, Mountain Village, and Stebbins in the Yukon River Delta vicinity.)

From Robert J. Wolfe (1984) Commercial Fishing in the Hunting-Gathering Economy of a Yukon River Yup'ik Society. Draft submitted to Etudes/Inuit/Studies.

From Robert J. Wolfe (1983) The Lower Yukon River Delta: Resource Uses in Six Small Communities of Western Alaska. In R.J. Wolfe and L.J. Elianna (comp) Resource Use and Socioeconomic Systems: Case Studies of Fishing and Hunting in Alaskan Communities. Technical Paper No. 61, Division of Subsistence, A.D.F.G., Juneau.

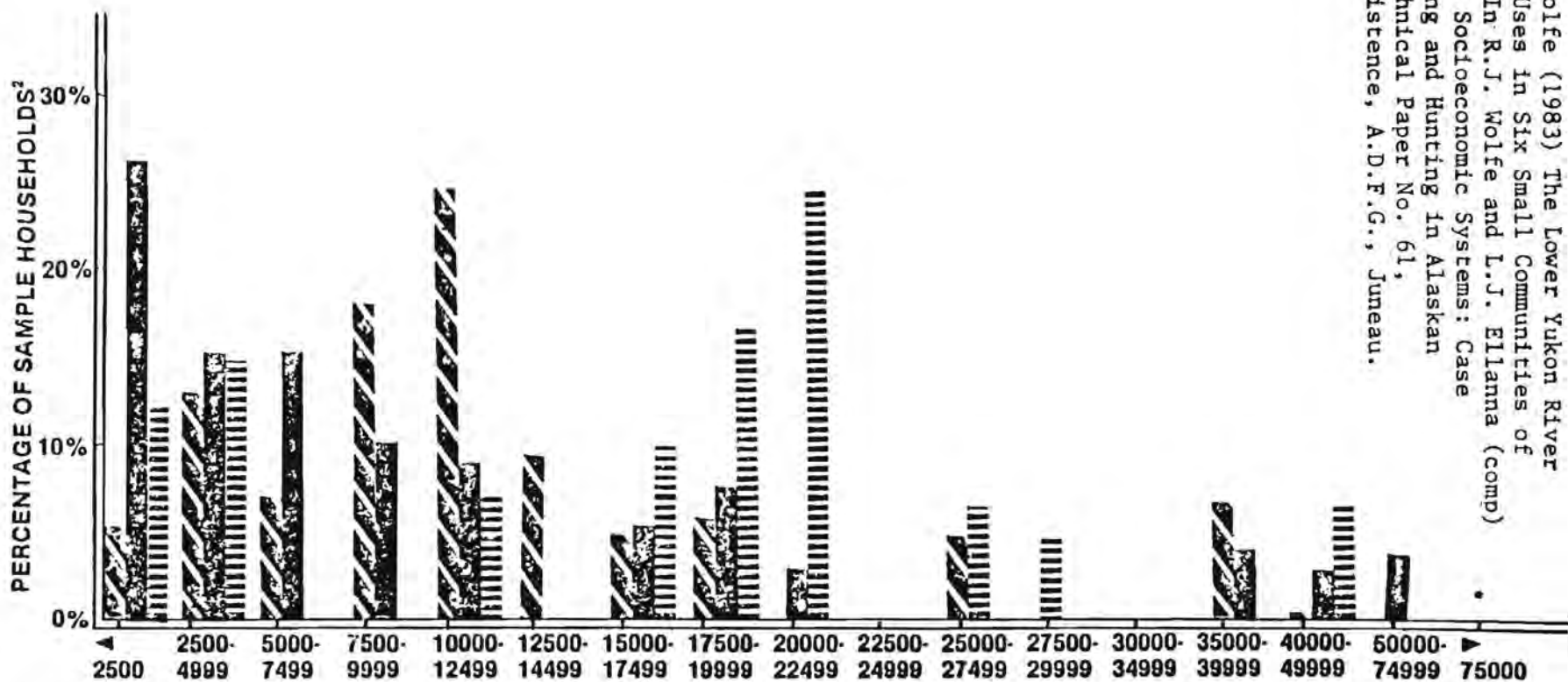


Figure : Household Income (Dollars) — 1979, Alakanuk , Emmonak , Kotlik 

1 U.S. Bureau of the Census, 1980 Census of Population and Housing, Summary Tape File 3

²Alakanuk N = 105; Emmonak N = 132; Kotlik N = 62

* no data available

From James A. Fall (1983) Tyonek. Resource Uses in a Small Non-Road Connected Community of the Kenai Peninsula Borough. In R.J. Wolfe and L.J. Ellanna (comp) Resource Use and Socioeconomic Systems: Case Studies of Fishing and Hunting in Alaskan Communities. Technical Report No.61, Division of Subsistence, A.D.F.G., Juneau.

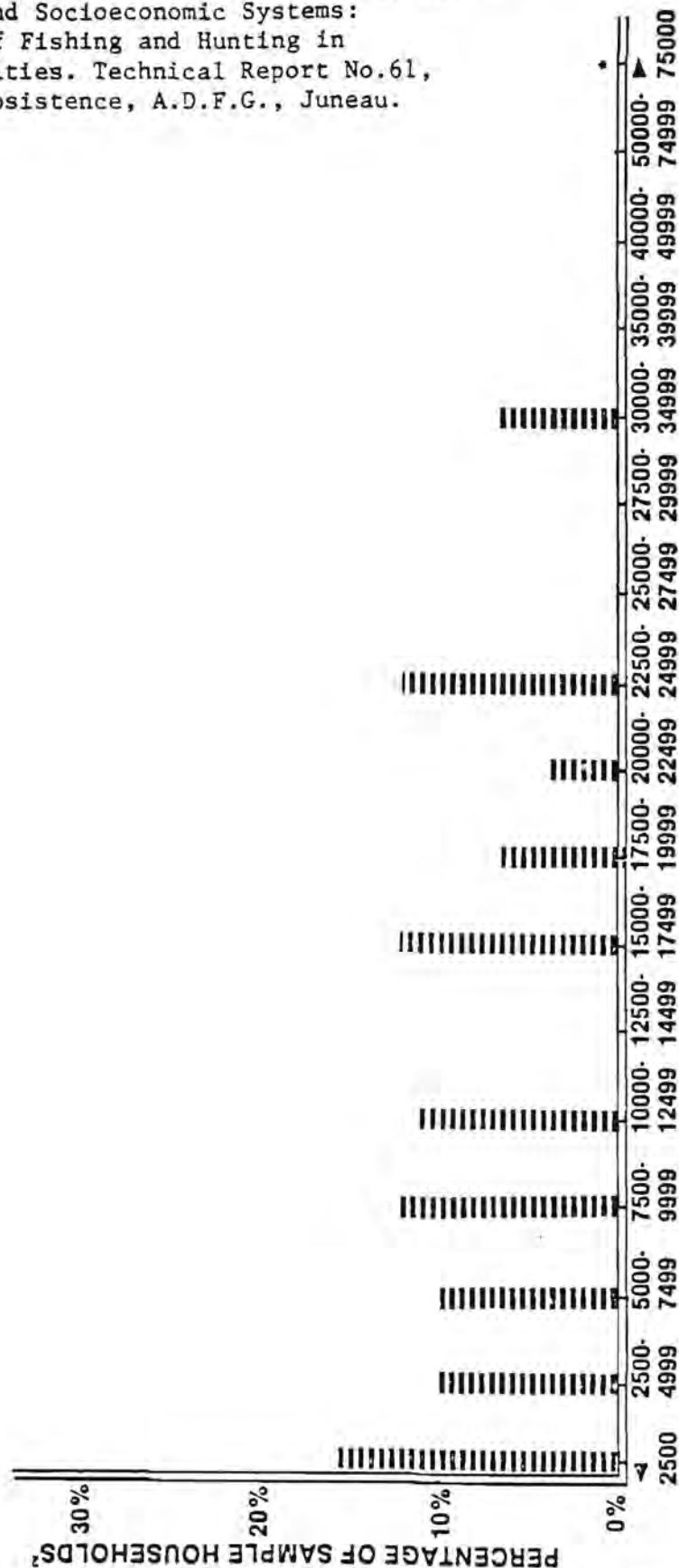


Figure : Household Income (Dollars) — 1979, Tyonek¹