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Subsistence and Income in Rural Alaska

by

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and

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Alaska Department of Fish and Game **Division of Subsistence**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

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

all atomic symbols	
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

General

Alaska Administrative Code	AAC
all commonly-accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly-accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures)	first three letters (Jan,...,Dec)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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SUBSISTENCE AND INCOME IN RURAL ALASKA

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A definition of "subsistence" based on household income criteria has the potential of affecting large numbers of households and villages in rural Alaska.[1] This short paper examines potential effects of various income cutoff levels using three geographic areas as case examples: Lower Yukon River, Copper Basin, and Yakutat. The paper supports three major conclusions:

1. Using an income restriction like the federal poverty standard would hurt entire villages, because a sizable portion of a community's subsistence food supply is harvested by households above federal poverty cutoff levels.
2. Any income level would be arbitrary, as nowhere is there an obvious "cutting point" at which households stop fishing and hunting for subsistence which would apply to all villages.

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1. One draft version of the state subsistence bill (Senate CS for CS for House Bill No. 288, Judiciary, 14th Session) specifies as a qualifying criterion for subsistence that a rural resident "present proof that the applicant's annual family gross income for the preceding calendar year was below 130% of the official federal poverty line established by the director of the federal Office of Management and Budget, as revised by the Secretary of Health and Human Services under 42 U.S.C. 9841 and 9902." In 1986, the federal poverty level for a family of one in Alaska was $6,700 with $2,350 for each additional member (Federal Register, February 11, 1986 p. 5105-6). At 130%, cutoff incomes are $8,710 (family of one), $11,765 (family of two), $14,820 (family of three), $17,875 (family of four), and $20,930 (family of five).

3. A definition of subsistence based on income does not fit economic realities in these rural areas, because households need to earn income to purchase equipment in order to fish and hunt for subsistence use.

Case 1. Lower Yukon River (Western Region)

Six villages are included in this first case example: Alakanuk, Emmonak, Kotlik, Mountain Village, Sheldon Point, and Stebbins. The six villages are in the lower Yukon River area. They are primarily Yup'ik Eskimo with a 1980 population of 2,399 people. In 1981, 87 households from the six villages were interviewed about subsistence harvests and incomes, the results of which are summarized in Table 1:

Table 1. Household Harvest and Income, 1981, for Six Lower Yukon River Villages

Mean Household Subsistence Harvest*	Mean Household Income**
4,597 lbs	$19,345

*Pounds edible product harvested June 1980-May 1981.
**Gross household income before deductions.

As shown in Table 1, village households rely greatly on subsistence harvests: the 87 households harvested 404,510 lbs edible weight of subsistence food in 1981, an average of 4,597 lbs per household.

On average, the households earned $19,345 in 1981 before deductions. Figure 1 shows the range of household incomes.

A definition of subsistence based on income does not fit economic realities in rural villages like these. Households at all income levels depended on subsistence fish and game in these villages. Households at all income levels fished and hunted for subsistence. This is shown in Figure 2, which depicts household subsistence harvests by household income (each square is a household). As shown in Figure 2, there were households at all income levels harvesting greater than 2,000 lbs of subsistence fish and game for food. There is no natural breaking point in income beyond which households no longer participated in subsistence fishing and hunting. The reality of rural Alaska economies illustrated by this case is that nearly all households with able-bodied members hunt and fish for their support.

What would be the effects of using an income level (such as federal poverty income cutoffs) to determine eligibility for subsistence fishing and hunting in these six villages? An income restriction like the federal poverty standard would hurt entire villages, because a sizable portion of each community's subsistence food is harvested by households above such a cutoff level. This is shown in Figure 3, which depicts the communities' total subsistence harvests by households at different income levels (a square represents a household). Figure 3, can be used to assess effects at different cutting points.

For example, what if subsistence were defined as harvests by households earning less than $10,000? According

to Figure 3, households earning less than $10,000 harvested only about 20 percent of the communities' subsistence food in 1981. Such a definition would eliminate as subsistence 80 percent of the communities subsistence food supply.

What if subsistence were defined as harvests by households earning less than $20,000? According to Figure 3, households earning less than $20,000 harvested only about 60 percent of the communities' subsistence food in 1981. Such a definition would eliminate as subsistence 40 percent of the communities' food supply. For the sample of households, this amounts to disqualifying about 161,804 lbs of subsistence food, an average of 1,860 lbs food per household. Such arbitrary income criteria would hurt the entire village.

As shown in Figure 3, any income level selected would be arbitrary. Nowhere is there an obvious "cutting point." This is because, as stated before, households at all income levels are producing subsistence foods: there is no observable income level at which subsistence fishing and hunting stops being important for a household. Additional information on subsistence in the lower Yukon River area is published in Wolfe (1979, 1981, 1984).

Case 2. Copper Basin (Southcentral Region)

The Copper Basin in Southcentral Region is the second case illustrating effects on communities of using an income criteria for defining subsistence. In 1983 there were about

3,310 people in 1,057 households living in the Copper Basin. A random sample of 431 households in the Copper River Basin were interviewed in 1983 about wild resource harvests and income, the results of which are summarized in Table 2:

Table 2. Household Harvests and Incomes, 1983, for 431 Copper Basin Households

Mean Household Wild Resource Harvest*	Mean Household Income**
385 lbs	$22,551

*Pounds edible product harvested in 1983.
**Gross household income before deductions.

As shown in Table 2, households in the Copper Basin harvested an average of 385 lbs of fish, game, and other wild resources per household in 1983. This is the equivalent of 151 lbs per person. For comparison, on average Americans consumed about 252 lbs per person of meat, fish, and poultry in 1982. Thus, 60 percent of the U.S. average meat, fish, and poultry consumption was obtained from wild resources by Copper Basin residents. This is a substantial amount of subsistence use.

On average, households earned $22,551 in 1983 before deductions. Figure 4 shows the range of household incomes.

Figure 5 shows household subsistence harvests by household income. As in the Western Region, households at all income levels fished and hunted for subsistence. There is no breaking point which would not arbitrarily discriminate between households using wild resources.

Figure 6 illustrates what portion of the Copper Basin's subsistence food harvest would be affected by a income cutoff level: the Figure depicts the Basin's total subsistence harvests by household income. At a $10,000 cutoff, 70 percent of the Copper Basin's food harvest would be disqualified as subsistence. A $30,000 cutoff would eliminate as subsistence 50 percent of the Copper Basin's food harvest. This is because households at all income levels are producing subsistence foods: yearly household income by itself is an arbitrary mechanism for defining subsistence. Additional information on subsistence in the Copper Basin area is published in Stratton and Georgette (1984), Fall and Stratton (1984), and Stratton (1982a, 1982b, 1983).

Case 3. Yakutat (Southeastern Region)

The community of Yakutat in the Southeastern Region is the third case illustrating effects of using an income criteria for defining subsistence. In 1985 there were about 550 Yakutat residents, about 48 percent Alaska Native. In 1985, 50 households in Yakutat were interviewed about subsistence harvests and incomes, the results which are summarized in Table 3:

Table 3. Household Harvest and Income, 1984, Yakutat

Mean Household Subsistence Harvest*	Mean and Median Household Income**
1,105 lbs	$40-45,000

*Pounds edible product.
**Gross household income before deductions.

As shown in Table 3, Yakutat household relied greatly on subsistence harvests: the random sample of 50 households harvested 55,250 lbs edible weight of subsistence food, an average of 1,105 lbs per household in 1984.

The mean and median household income before deductions was in the $40,000-$45,000 range in 1984. It should be kept in mind that many households fish commercially in Yakutat, and that these household income estimates include a household's gross commercial fish sales before deducting fishing expenses. Household enterprises like commercial fishing complicate the calculation of disposable household income estimates, as is discussed further below. Figure 7 shows the range of household incomes.

As with the other two case examples, a definition of subsistence based on income does not fit economic realities in rural fishing villages like Yakutat. Households at all income levels fished and hunted for food, as shown in Figure 8. There is no obvious breaking point in income beyond which households no longer participated in subsistence fishing and hunting.

Figure 9 illustrates what proportion of Yakutat's subsistence food harvest would be affected at various income cutoff levels: the Figure depicts Yakutat's total subsistence harvest by household income. At a $20,000 cutoff, over 90 percent of Yakutat's resource harvest would

be disqualified as subsistence. That is, households with gross incomes less than $20,000 produced less than 10 percent of the community's wild food supply. At a $40,000 cutoff, about 50 percent of Yakutat's resource harvest would be eliminated as subsistence. This would pose a substantial economic hardship for the community. Additional information on subsistence in Yakutat is published in Mills and Firman (1985).

Discussion

In rural regions like the lower Yukon River area, Copper Basin, and Yakutat, households typically combine subsistence activities with income-generating activities during the year. Monetary income is needed by a household to purchase the equipment used for subsistence fishing and hunting. Money is also needed for purchasing fuel, shelter, clothing, imported food items, and other basics. The most successful families in rural communities are those which are able to combine commercial-wage activities and subsistence fishing and hunting during the year.

It has been found that seasonal commercial fishing (as along the Yukon River and in Yakutat) is an activity especially compatible with subsistence fishing and hunting (cf. Wolfe 1984). It typically is a source of income with flexible, short-term labor requirements, using similar skills, equipment, and work groups used in subsistence activities. Wage jobs which have more inflexible work schedules than commercial fishing commonly are integrated

with subsistence through complementary work roles: some household members work for money while others work in subsistence fishing and hunting, pooling the results of their efforts. Another household strategy is for members to substitute for one another on wage jobs to allow members to hunt and fish. Another practice is fishing and hunting during off-hours, weekends, leaves, and vacations. Village employers commonly allow for more flexible work hours and substitution policies to accomodate subsistence fishing and hunting activities of employees.

Under this kind of mixed subsistence-cash economy, it makes little sense to define subsistence in terms of income criteria. Household whose members hold jobs also participate in subsistence fishing and hunting in the villages.

Because household incomes commonly are invested in equipment used for subsistence fishing and hunting, an income criteria defining subsistence creates a "Catch 22" for households: if a household earns money to buy equipment for subsistence fishing and hunting, it is disqualified, and if a household does not earn money, it qualifies but has no money to obtain and operate subsistence equipment for harvesting. Households with equipment share their subsistence harvests with poorer households without equipment and labor. Cutting out the households with money to own and operate equipment undermines the community's economic security and stability based on these sharing relations.

There is confusion in how to count subsistence equipment in calculating household income, as household assets or expenses? Some welfare standards treat equipment as household assets, which would disqualify households with subsistence equipment from hunting and fishing. If treated as an expense, then a household's yearly gross earned income no longer is an accurate qualifying indicator, for it would need adjusting by a household's investments into subsistence equipment. Complex formulas would have to be applied to deal with the complications of a household's subsistence equipment holdings.

An additional complication is that because income opportunities fluctuate greatly from year to year in rural communities, a household's eligibility would have to be assessed every year. The numbers of qualifying subsistence users probably would change markedly from year to year. During years with a few government funded capital projects in a village, households with workers would be disqualified; years without employment would see a resurgence of qualifying households. Such fluctuations would be induced by the income criteria, not by the real level of subsistence need or number of subsistence users in rural villages, which tend to remain relatively stable from year to year in spite of fluctuations in income opportunities.

Summary

In summary, a definition of subsistence based on income does not fit reality in rural communities of Alaska. These three case examples demonstrate that any income level is likely to be arbitrary. It would be impossible to select a meaningful income level that would equally apply across all communities. The examples also demonstrate that restrictions based on incomes would hurt whole villages, because commonly a sizable portion of a community's subsistence food supply is harvested by households with sufficiently high incomes to allow them to purchase and operate equipment for fishing and hunting. Households with equipment share their subsistence harvests with poorer households without equipment and hunters. Cutting out these households with arbitrary income criteria hurts everyone: the household itself, the poor households dependent on food shared by the productive households, and the entire village whose food supply comes from in large part from these productive households.

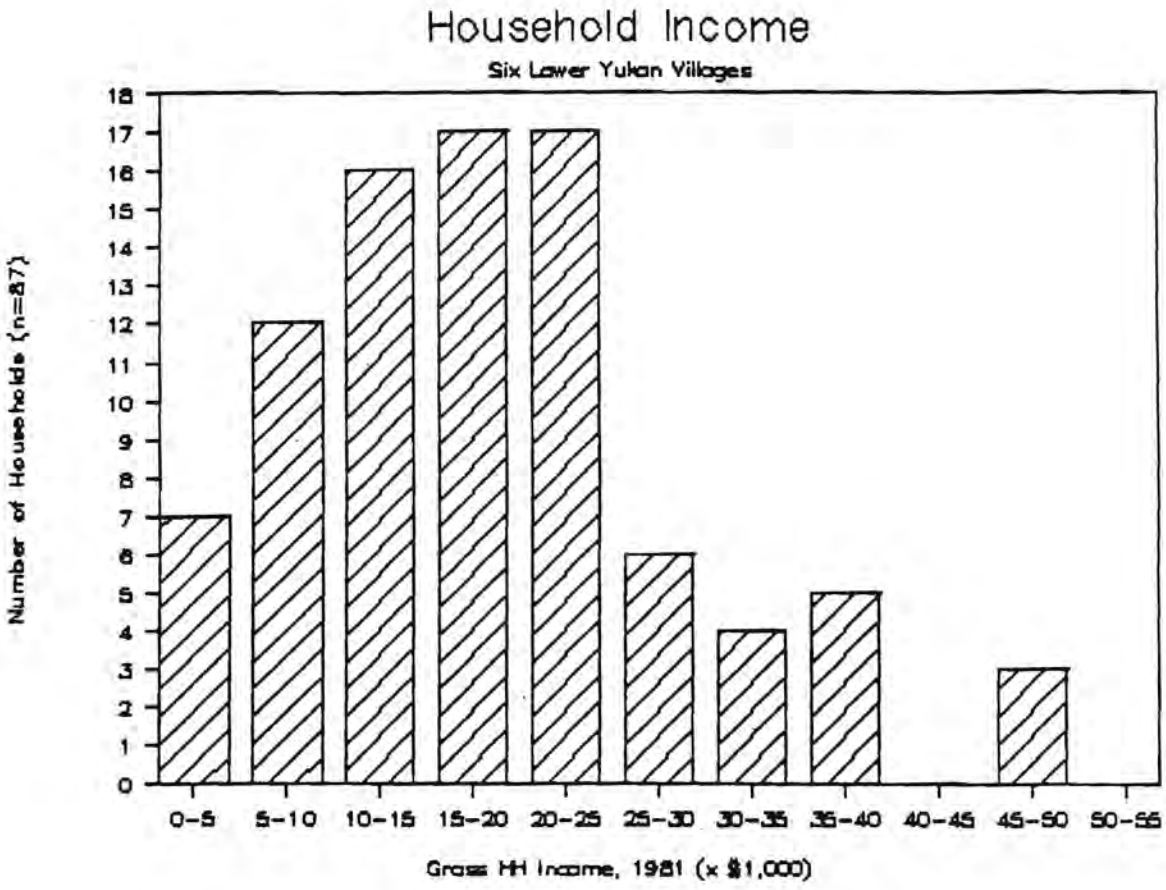

Fig. 1. Gross household income levels before deductions, 1981, for a sample of 87 households in six lower Yukon River area communities. A household's gross commercial fish sales unadjusted for expenses are included in the income estimates.

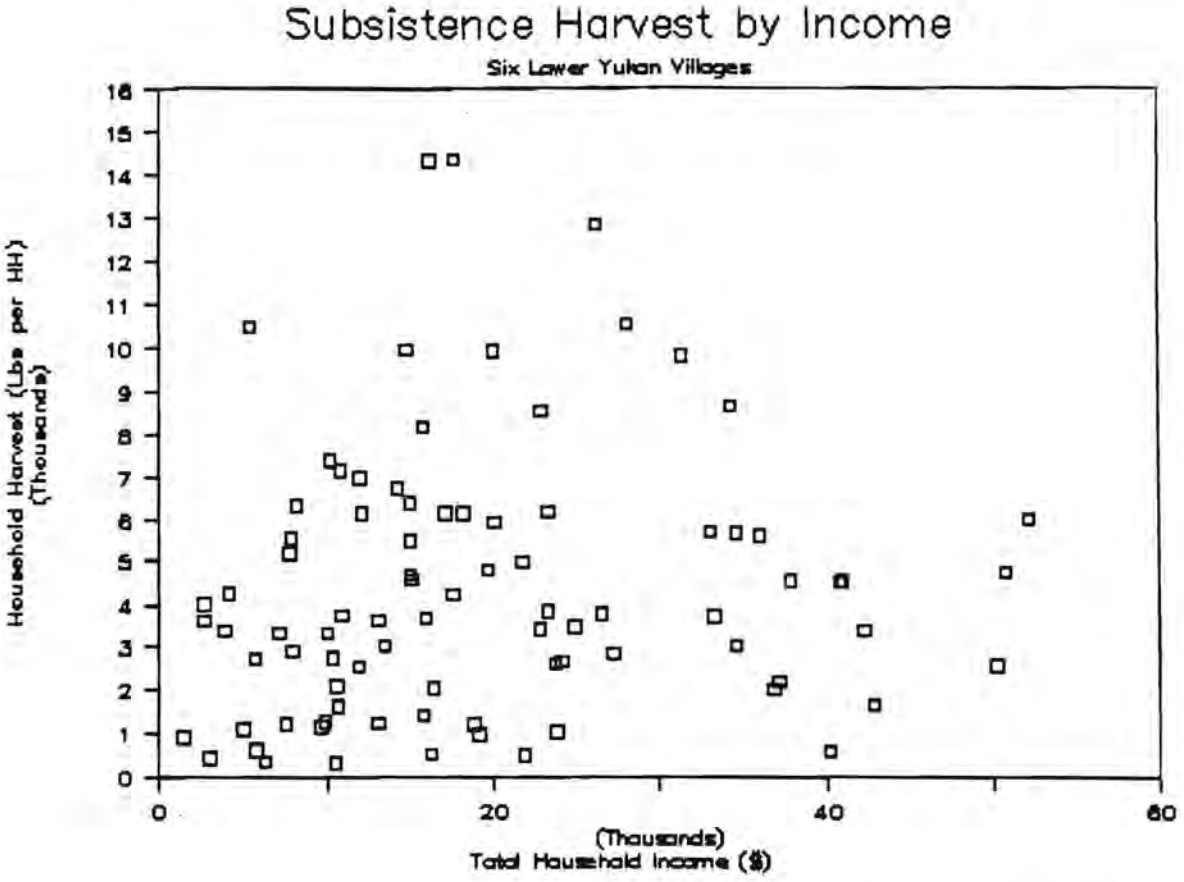

Fig. 2. Household subsistence harvests (pounds edible weight per household) by household gross income, 1981, for a sample of 87 households in six lower Yukon River area communities. Each square represents one household. The figure shows that households at all income levels fished and hunted for food in 1981 in these communities.

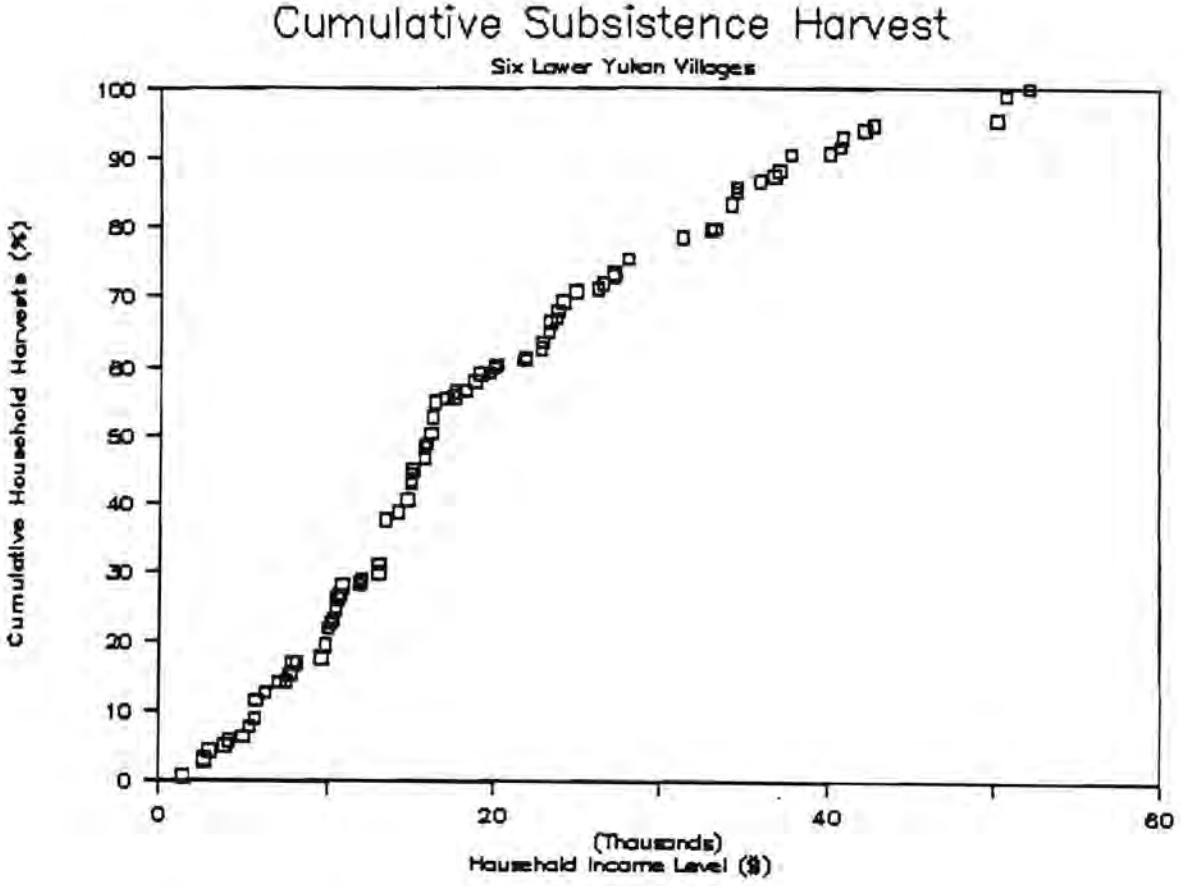

Figure 3. Cumulative subsistence harvests by household income, 1981, for a sample of 87 households in six lower Yukon River area communities. Each square represents a household. The figure shows that households earning less than $10,000 income harvested only about 18 percent of the villages' subsistence food supply. Households earning less than $20,000 income harvested only about 60 percent of the villages' subsistence food supply.

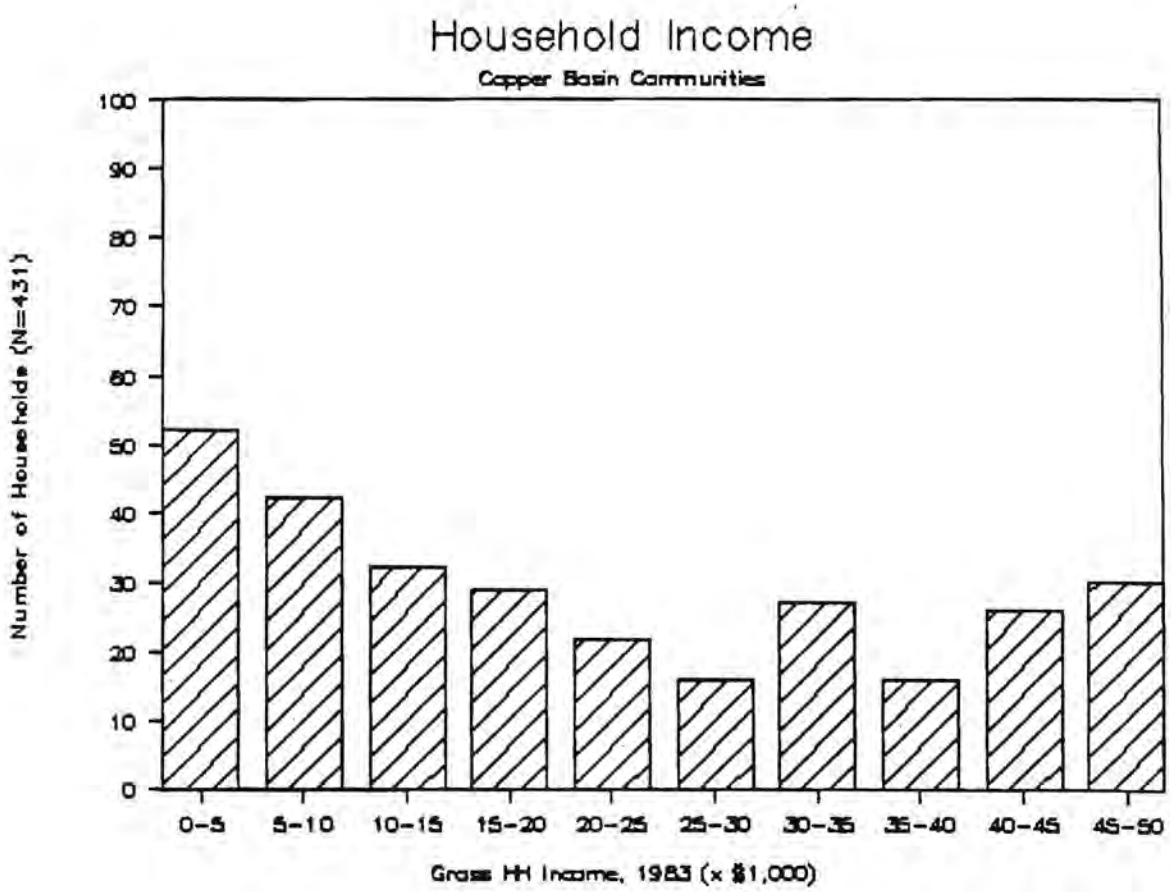

Fig. 4. Gross household income levels before deductions, 1983, for a sample of 431 households in the Copper Basin.

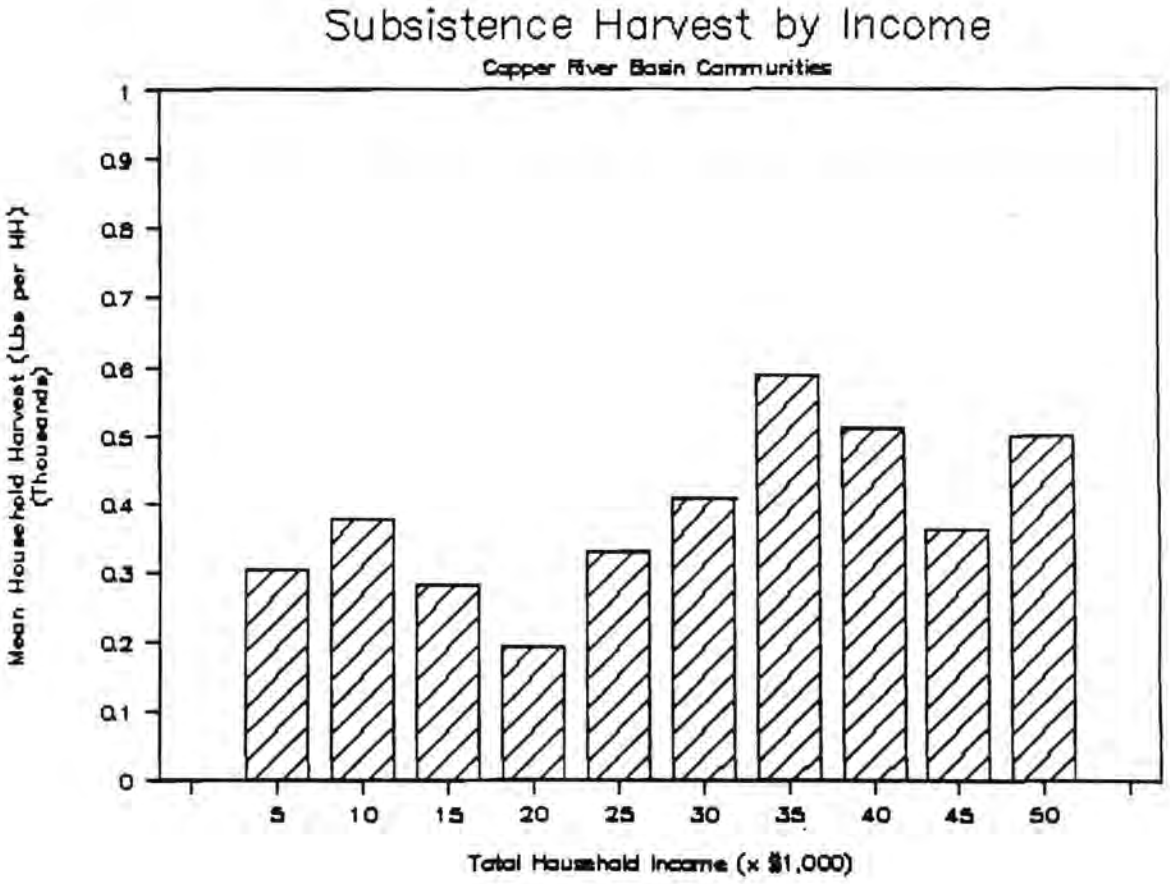

Fig. 5. Household subsistence harvests (pounds edible weight per household) by household gross income, 1983, for a sample of 431 households in the Copper Basin. The figure shows that households at all incomes levels fished and hunted for food in 1983 in the Copper Basin.

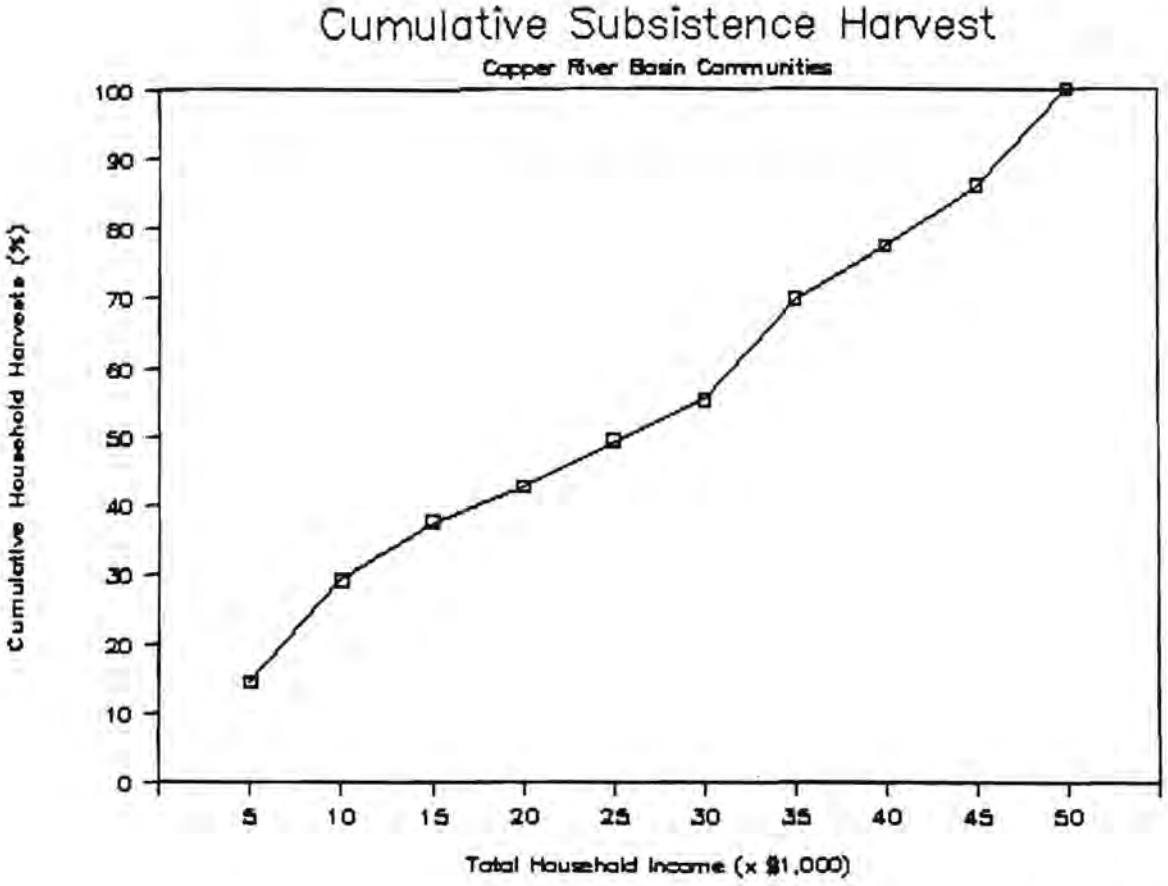

Fig. 6. Cumulative subsistence harvests by household income, 1983, for a sample of 431 households in the Copper Basin. The figure shows that households earning less than $10,000 income harvested only about 30 percent of the Copper Basin's subsistence food supply. Households earning less than $20,000 harvested only about 40 percent of the subsistence food supply.

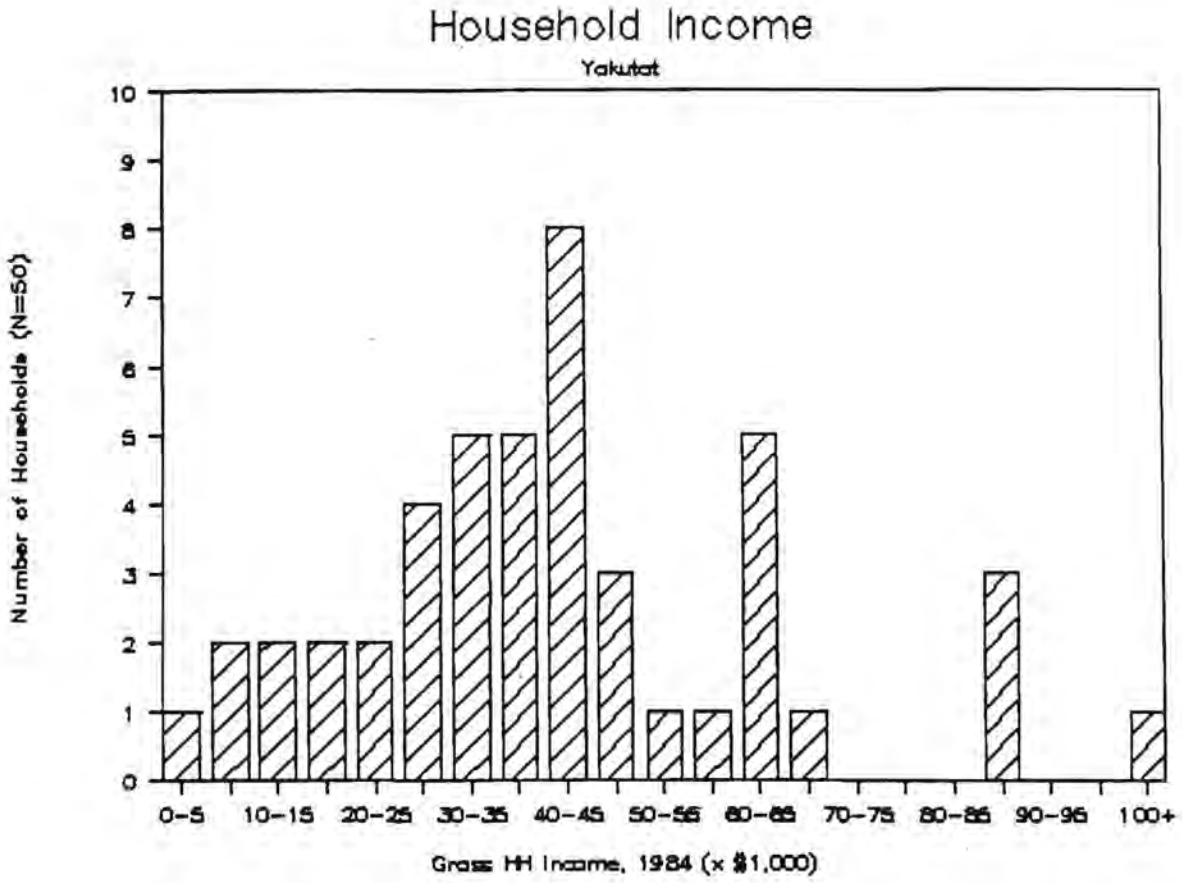

Fig. 7. Gross household income levels before deductions, 1984, for a sample of 50 households in Yakutat. A household's gross commercial fish sales unadjusted for expenses are included in the income estimates.

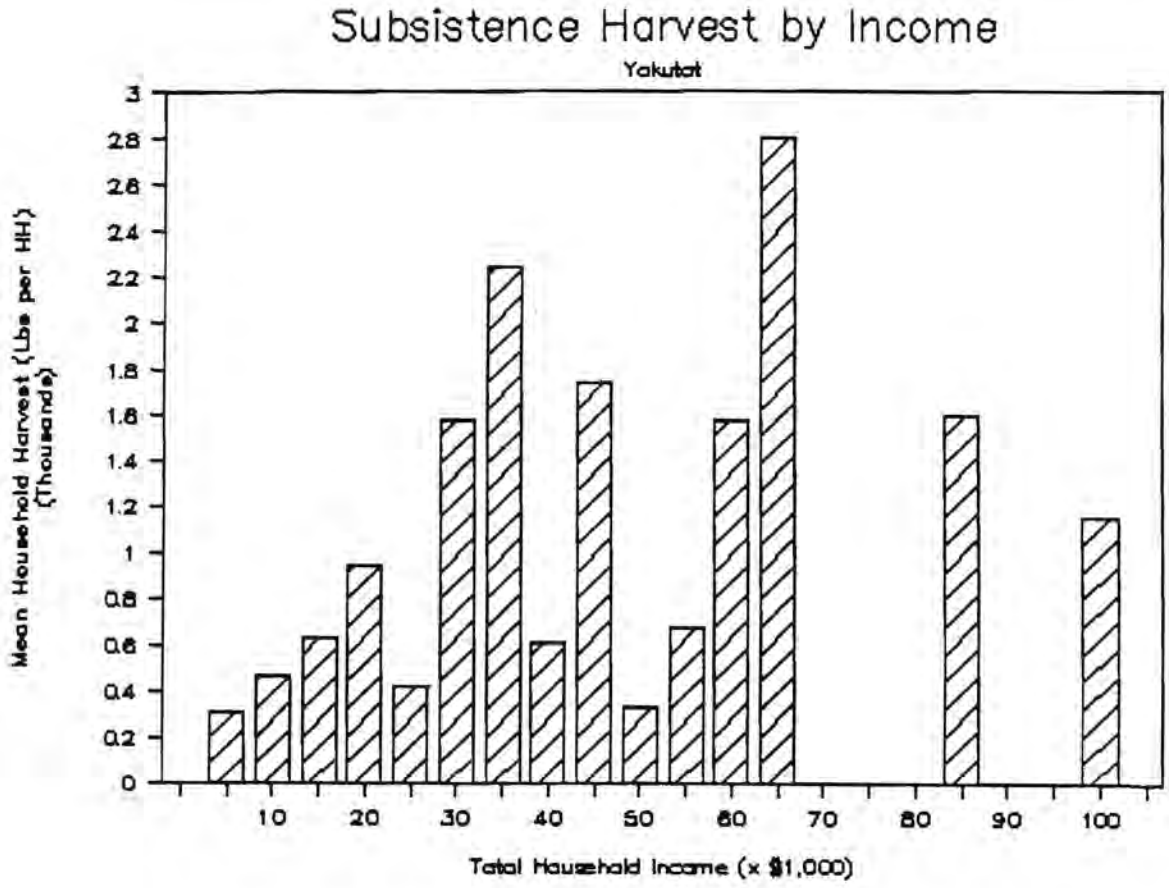

Fig. 8. Household subsistence harvests (pounds edible weight per household) by household gross income, 1984, for a sample of 50 households in Yakutat. The figure shows that households at all income levels fished and hunted for food in 1984 in Yakutat.

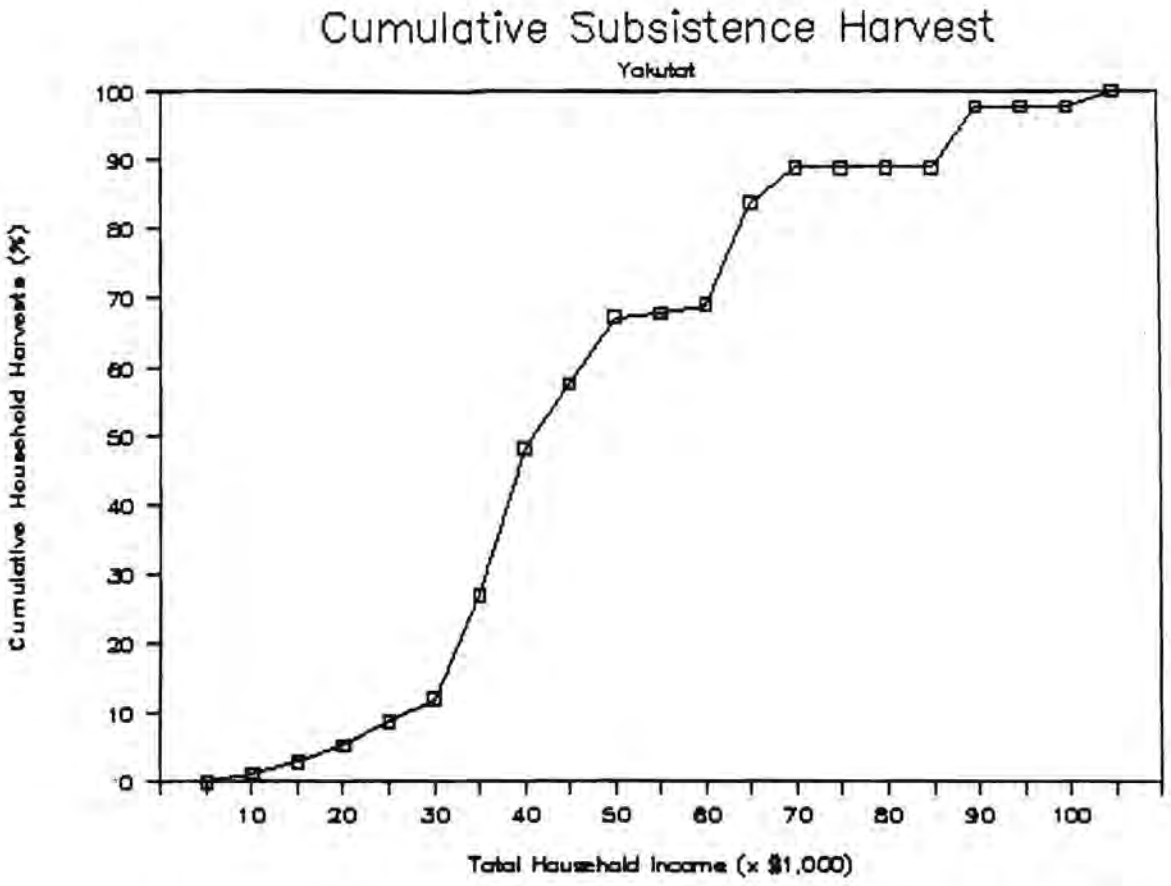

Fig. 9. Cumulative subsistence harvests by household income, 1984, for a sample of 50 households in Yakutat. The figure shows that households earning less than $20,000 gross income harvested only about 7 percent of Yakutat's subsistence food supply in 1984. A household's gross commercial fish sales unadjusted for expenses are included in the household income estimates.

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