Technical Paper No. 505

The Harvest and Use of Wild Resources in Huslia and Koyukuk, Alaska, 2022

by
Jesse Coleman
Cassidy Somerville
Isabelle Tiller
and
Loraine Navarro

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

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the reports by the Division of Subsistence. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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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Jesse Coleman, Cassidy Somerville, Isabelle Tiller, and Loraine Navarro
Alaska Department of Fish and Game Division of Subsistence, Fairbanks

Alaska Department of Fish and Game
Division of Subsistence
1300 College Road
Fairbanks, AK 99701

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The Division of Subsistence Technical Paper Series was established in 1979 and represents the most complete collection of information about customary and traditional uses of fish and wildlife resources in Alaska. The papers cover all regions of the state. Some papers were written in response to specific fish and game management issues. Others provide detailed, basic information on the subsistence uses of particular communities which pertain to a large number of scientific and policy questions.

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Jesse Coleman, Cassidy Somerville, Isabelle Tiller, and Loraine Navarro
Alaska Department of Fish and Game, Division of Subsistence
1300 College Road, Fairbanks, AK 99701-1551 USA

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ABSTRACT

This report summarizes the harvest and use of wild resources in the communities of Huslia and Koyukuk, Alaska, during the study year 2022. Huslia is located on the lower Koyukuk River, and Koyukuk lies at the river's confluence with the Yukon River. This information was gathered in support of the bilateral US-Canada agreement to cooperatively manage transboundary stocks of Pacific salmon, including Yukon River Chinook and fall chum salmon. The communities were chosen because comprehensive harvest and use data for all wild resources were considered out of date (Huslia, last surveyed in 1983) or had not previously been collected (Koyukuk). The objectives of the study were to: 1) quantify the harvest and use of all subsistence resources in each community; 2) document traditional knowledge held by area residents; and 3) document local concerns and comments about wild resources, fish and game management, or other subsistence-related topics. Researchers from the ADF&G Division of Subsistence conducted household survey and ethnographic interviews in Huslia in March 2023 and in Koyukuk in April 2023. The key findings from this study included residents' experience with the subsistence Chinook and chum salmon fishery closures in 2021 and 2022, and the effects of the closures on cultural practices and food security. These closures also significantly shifted the composition of subsistence harvests to other resources such as moose and nonsalmon fish. Respondents linked the declines in salmon to several causes but observed that climate-related changes had affected salmon abundance and migration patterns in addition to several other ecological patterns, including streambank erosion, river ice conditions, wildfire prevalence and severity, and river temperatures.

Key words: Huslia, Koyukuk, subsistence fishing, subsistence hunting, trapping, Koyukuk River, Yukon River, Koyukuk National Wildlife Refuge, Chinook salmon, summer chum salmon, fall chum salmon, moose, berries, vegetation, food security, harvest areas, climate change

1. INTRODUCTION

This report details the harvest and use of wild resources in the communities of Huslia and Koyukuk, Alaska, in 2022 (Figure 1-1). During the study year, the Koyukuk River community of Huslia had an estimated 282 residents (Table 1-1). Koyukuk, located at the confluence of the Koyukuk and Yukon rivers, had an estimated 70 residents in 2022. Alaska Native residents of these communities are of Koyukon Athabascan heritage, many of whom speak Denaakk'e, the traditional language in the region. The communities have long been dependent upon salmon, nonsalmon fish, migratory and upland game birds, moose, and caribou (Table 1-2). These patterns of harvest and use, as this report will explore, are changing in response to increased climatic variability, salmon declines, and competition from outside hunters. The report will also briefly discuss the connections between traditional subsistence activities and well-being, as documented through participant observation during a Healing Gathering held in Huslia in 2023.

Project Background

This study was part of the Yukon Comprehensive Survey program, which is funded by the United States Fish & Wildlife Service (USFWS) as part of their Treaty Implementation fund (grant #F23AP01424). In 2021, the Division of Subsistence received annual funding through a reversible services agreement with the Alaska Department of Fish & Game (ADF&G) Division of Commercial Fisheries—the recipient of the treaty implementation fund—to conduct comprehensive subsistence surveys in Yukon River drainage communities. Division staff identified Yukon River drainage communities that lacked recent subsistence survey data, and in 2022—the first year that funds were made available—the division surveyed Chevak and Hooper Bay for the first time. Prior to the present study, Huslia was last surveyed in 1983, and the community of Koyukuk had never been surveyed.

In 1978, the Alaska legislature passed the state's first subsistence priority law (AS 16.05.258). Alaska's lawmakers recognized the importance of subsistence to the livelihoods of Alaskans and took action to enshrine in law the priority of subsistence uses above all other consumptive uses (Behnke 1996). To support the implementation of the law, the legislature passed a statute that established within ADF&G the Division of Subsistence, also in 1978, and defined its responsibilities (AS 16.05.094). Chief among those is to "compile existing data and conduct studies to gather information, including data from subsistence users, on all aspects of the role of subsistence hunting and fishing in the lives of the residents of the state" (AS 16.05.094(1)). The Division of Subsistence and the subsistence priority law have both undergone many changes since they were first established, but the importance of subsistence to Alaskans has remained unchanged (Magdanz et al. 2016). In the nearly half-century that the division has been conducting subsistence research, over 300 communities have been surveyed about their harvest and use of wild resources.[1] This comprehensive survey effort in Huslia and Koyukuk builds on that research tradition, while also documenting changes to subsistence practices and concerns held by local people.

The comprehensive harvest data that exist for Huslia, collected by the division in 1983, are no longer considered representative of the community's subsistence harvest and use patterns. However, those data may be used as a baseline against which the data collected by this study may be compared. Detailed comparisons will be discussed in later chapters, but a general overview of the 1983 study is provided here. Marcotte (1986) described patterns of wild resource harvest and use among Huslia residents during the period 1981 to 1983. The study was prompted by residents in response to potential road development in the region (Berger et al. 1981). Marcotte spent several months in the community observing hunting, fishing, and gathering practices while conducting household surveys with residents. The surveys documented the amounts of resources harvested, harvest group compositions, methods used for harvest, resource-specific search and harvest areas, and resources received and shared with other households. The study showed that residents of Huslia harvested 1,082 lb per capita of wild resources, which was higher than most communities

1. Alaska Department of Fish and Game, Division of Subsistence. "Community Subsistence Information System: CSIS." Accessed April 26, 2024. https://www.adfg.alaska.gov/sb/CSIS/ (hereinafter cited as CSIS).

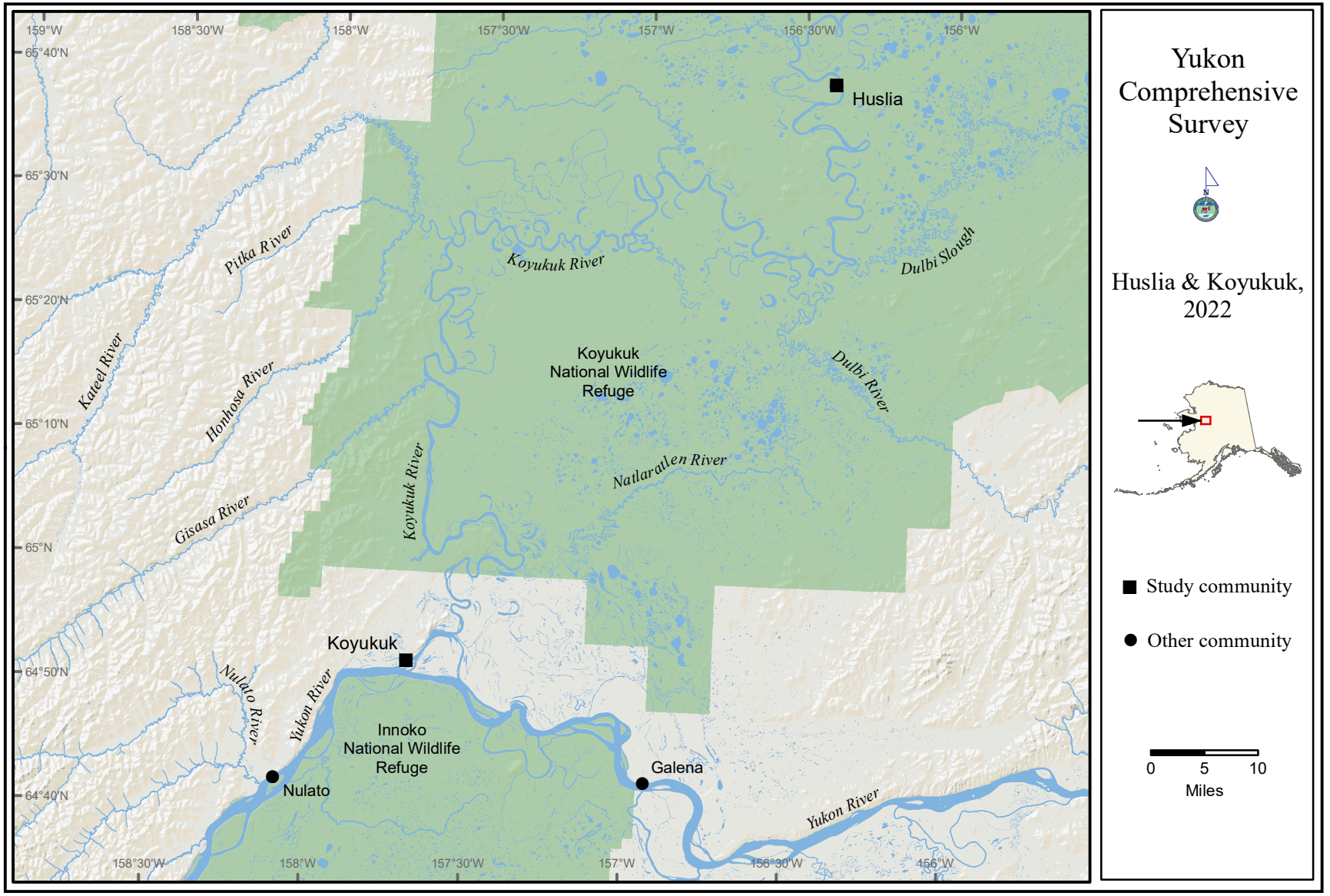


Figure 1-1.–Map of study communities, 2022.

Table 1-1.–Comparison of selected study findings, Huslia and Koyukuk, 2022.

Category	Community	
	Huslia	Koyukuk
Demography		
Population	282.3	69.5
Percentage of population that is Alaska Native	94.3%	96.8%
Percentage of household heads born in Alaska	86.1%	95.3%
Average length of residency of household heads (year)	68.4	45.7
Cash economy		
Average number of months employed	5.9	7.0
Percent of employed adults working year-round	44.3%	64.1%
Percentage of income from sources other than employment	36.5%	34.9%
Average household income[a]	$62,195	$49,509
Per capita income[a]	$18,944	$26,351
Resource harvest and use		
Per capita harvest, pounds usable weight	216.5	156.0
Average household harvest, pounds usable weight	710.7	293.1
Number of resources used by 50% or more households	7.0	2.0
Average number of resources used per household	12.7	6.9
Average number of resources attempted to be harvested per household	7.7	3.5
Average number of resources harvested per household	6.9	2.8
Average number of resources received per household	7.0	4.7
Average number of resources given away per household	5.2	3.2
Percentage of total harvest taken by top 25% ranked households	84.5%	86.1%
Percentage of households that harvested 70% of harvest	13.2%	15.2%
Per capita harvest by lowest ranked 50% of households	6.7	0.4
Percentage of total harvest taken by lowest ranked 50% of harvesting households	1.4%	0.1%
Average number of resources used by lowest ranked 50% of households	9.2	4.3
Average number of resources used by top 25% ranked households	22.1	9.1

Source ADF&G Division of Subsistence household surveys, 2023.

a. Includes income from sources other than employment.

Table 1-2.–Resource harvest and use characteristics, Huslia and Koyukuk, 2022.

Characteristic	Huslia	Koyukuk
Mean number of resources used per household	12.7	6.9
Minimum	1	1
Maximum	42	18
95% confidence interval (±)[a]	12.8%	7.4%
Median	10	6
Mean number of resources attempted to harvest per household	7.7	3.5
Minimum	0	0
Maximum	40	14
95% confidence interval (±)[a]	20.8%	13.1%
Median	4	2
Mean number of resources harvested per household	6.9	2.8
Minimum	0	0
Maximum	39	13
95% confidence interval (±)[a]	22.4%	14.6%
Median	3	1
Mean number of resources received per household	7.0	4.7
Minimum	1	1
Maximum	22	13
95% confidence interval (±)[a]	12.7%	7.5%
Median	6	4
Mean number of resources given away per household	5.2	3.2
Minimum	0	0
Maximum	31	14
95% confidence interval (±)[a]	21.3%	12.3%
Median	3	2
Mean household harvest (lb)	710.7	293.1
Minimum	0.0	0.0
Maximum	8,807.2	3,280.8
Median	88.0	8.0
Total harvest weight (lb)	61,118.4	10,845.9
Community per capita harvest (lb)	216.5	156.0
Percentage using any resource	100.0%	100.0%
Percentage attempting to harvest any resource	88.7%	75.8%
Percentage harvesting any resource	79.2%	63.6%
Percentage receiving any resource	100.0%	100.0%
Percentage giving away any resource	83.0%	78.8%
Number of resources on the survey[b]	105	91

Source ADF&G Division of Subsistence household surveys, 2023.

a. 95% confidence intervals are calculated as a percentage range around the mean.

b. Includes resources printed on the survey and any resource volunteered by one or more households.

at that time. The 1986 report highlighted the importance of salmon, nonsalmon fish, moose, bears, birds, and furbearers to Huslia households during the study period.

In addition to the baseline work in Huslia completed by Marcotte in the 1980s, the division completed several years of surveys to document the harvest, use, and sharing of moose, caribou, wolves, and bears in the middle Yukon River and Koyukuk River communities. At the time, moose populations in the middle Yukon River area and Koyukuk River drainages were highly productive, and moose hunting regulations (e.g., bag limits and seasons) were relatively liberal (Andersen et al. 1998). The division attempted to document subsistence harvests of moose and other big game species through household surveys administered by local research assistants, because the harvest estimates the department derived from registration permits and harvest tickets were found to be biased low (Andersen and Alexander 1992).[2] The results of five years of study, from 1998 to 2003 (except 2001), showed the high degree of harvest and sharing of big game meat within Huslia and between Huslia and other communities, and the direct reliance of most households in the region on primarily moose, followed by caribou and black bear (Brown et al. 2004).

Although comprehensive survey data have never been collected for Koyukuk, the community has participated in other division research in the past. The division partnered with the Tanana Chiefs Conference (TCC) in 2001 to conduct a study on nonsalmon fish—an important but often overshadowed group of resources. In 2004, Andersen et al. published a report on the traditional ecological knowledge and harvest of nonsalmon fishes in the Koyukuk River drainage (Andersen et al. 2004). This study included interviews with five Koyukuk elders, language experts, and productive subsistence providers which yielded detailed information about the value of these nonsalmon fish species to Koyukon people. Interview topics included: when and how to harvest nonsalmon fish using a variety of gear types, Denaakk'e words for different species and life stages of fish, how best to use and prepare fish, and lore and cultural beliefs about each species. The report also described detailed life history information for Alaska blackfish, Arctic grayling, burbot, longnose sucker, northern pike,[3] sheefish, and several species of whitefishes. The findings of this study will be further discussed and compared to the findings of the present study in the following chapters.

Regional Background

The first people to inhabit the middle Yukon River and Koyukuk River were the Koyukon Athabascans, who settled several thousands of years ago. Their language is Denaakk'e, with regional dialect variations along the Yukon and Koyukuk rivers (Jones 2001). The lower dialect is spoken mainly in Kaltag and Nulato, while the central dialect is spoken in Koyukuk, Galena, and Ruby on the Yukon River, as well as the Koyukuk River communities of Huslia, Hughes, and Allakaket. The upper dialect is spoken in Yukon River communities from Stevens Village to Tanana.

The Koyukon people followed a seasonal round to harvest locally available resources. They traded extensively with coastal and Interior Iñupiat and lower Yukon River and coastal Yupiit to acquire goods and foods not locally available. Examples include trade with coastal communities such as Unalakleet for marine mammal products (e.g., seal oil, baleen, meat) or with lower river communities with access to European or Russian goods via trade with whaling or other ships. In exchange, Koyukon people often traded furs or Yukon River salmon. Direct contact with Russian traders in the late 1800s meant engagement in the commercial fur trade. The establishment of a trading post at Nulato introduced Western economic principles and eventually cash into Koyukon culture and economies.

In 1867, the United States purchased Alaska, which included the sovereignty of the First Alaskan people. At that point, Alaska was a U.S. territory, therefore, the federal government managed the regulation of hunting and fishing in the territory until statehood in 1959. During this period, Alaska Native people retained aboriginal hunting and fishing rights on their traditional lands. Statehood shifted the authority to manage fish and wildlife populations from the federal government to the newly formed Alaska state government. In the late 1950s and early 1960s, oil fields were discovered on Alaska's north slope which served as the

2. Harvest reporting for registration permits is mandatory, while reporting for harvest tickets is nonmandatory.
3. Hereinafter referred to as "pike."

impetus for the Alaska Native Claims Settlement Act (ANCSA). This act, passed in 1971, extinguished aboriginal hunting and fishing rights and transferred fee simple title of selected lands to both Alaska Native village and regional corporations.

In Huslia and Koyukuk, village corporations were established to manage the surface rights of the lands surrounding the communities, and the regional Alaska Native corporation, Doyon, Ltd., owns parcels of land surrounding both communities. While small parcels of state land are scattered throughout the Koyukuk River drainage, the majority of lands in the lower Koyukuk River drainage are federal lands and are managed by the Bureau of Land Management (BLM) or the USFWS through the Koyukuk National Wildlife Refuge (KNWR).

The Yukon-Koyukuk Census Area is 145,576 square miles, and extends from the Grayling-Anvik-Shageluk-Holy Cross area up the Yukon River to upstream of Circle and Central, including the entirety of the Koyukuk and Teedriinjik River drainages, and the US portion of the Porcupine River.[4] In the Yukon-Koyukuk Census Area, the total population in 2020 was estimated to be 5,343 residents.[5] The population was 72% Alaska Native/American Indian. The median household income in the area was $43,405, and the unemployment rate was 57%. Communities in the middle Yukon River include Kaltag, Nulato, Koyukuk, Galena, Ruby, and Tanana. Communities in the Koyukuk River drainage include Koyukuk, Huslia, Hughes, Allakaket, Alatna, Bettles, and Evansville.

Seasonal Round

In springtime, when the light returns and daytime temperatures climb above freezing, people in Koyukuk and Huslia begin to spend more time on the land. Trapping begins in November and continues into February and March, depending on the species of furbearer. Muskrat and beaver may be harvested until mid-June, but they are typically not targeted after spring breakup because of difficulties accessing animals and the poor quality of their pelts late in the season. Some hunters target ptarmigan and spruce grouse during early spring, following the traditional belief that the birds are slow and easy to catch because they offer themselves to people who might have run out of food by that point in the year and lacked the strength to hunt (03262023HSL05). People typically hunt for snow geese, Canada geese, and various duck species as they migrate through the area in late April and early May on their way to breeding areas north of the Brooks Range. After the ice thaws on the Yukon and Koyukuk rivers, which happens in mid- to late May, fishers set 3.5- to 4-inch gillnets to catch pike or whitefish in sloughs and lake outlets and use rod and reel to catch pike or grayling. In late May, many households prepare to travel to fish camp by readying boats, gathering equipment, and packing enough consumable supplies to last anywhere from a couple weeks to a month.

Early summer is devoted to preparing for fish camp and harvesting salmon. Starting in mid-June in the middle Yukon River, summer chum salmon migrate along the north bank of the river, while Chinook salmon migrate deeper in the channel, closer to the south side of the river. These differences in migratory patterns require gear types that are effective in different parts of the Yukon and Koyukuk rivers. In the Koyukuk River, most fishers use set gillnets, while in the Yukon River, they have historically used fish wheels, drift gillnets, and set gillnets to harvest salmon. Fish wheels and set gillnets have historically been operated from fish camps because they require a fixed location suited to their particular gear types. Before drift gillnetting became popular in the 1970s, most fishers were typically able to catch only summer chum with fish wheels and a small number of set gillnets. The increased availability of outboard motors meant that fishers could use drift gillnet gear to target Chinook salmon in different areas of the river. Still today, most people do not harvest many Chinook salmon using fish wheels or set gillnets.

Most families from Koyukuk have fish camps along the stretch of the Yukon River between Koyukuk and Galena. Bishop Rock, Bishop Rock Island, and Pilot Mountain are three areas identified by study

4. Alaska Department of Labor and Workforce Development. "Yukon-Koyukuk Census Area." Accessed April 22, 2024. https://live.laborstats.alaska.gov/cen/maps/bor/current/290.pdf
5. U.S. Census Bureau. 2020. "Yukon-Koyukuk Census Area, Alaska." Accessed April 22, 2024. https://data.census.gov/profile/Yukon-Koyukuk_Census_Area,_Alaska?g=050XX00US02290

participants along the Yukon River with numerous fish camps. Families in Huslia have fish camps along the Koyukuk River, from about 40 miles upstream of the community down to the river's confluence with the Yukon River. Some camps are located on tributaries of the Koyukuk River, such as the Huslia River, Hogatza River, and Dulbi Slough. The mainstem Koyukuk River and its tributaries are major summer chum salmon spawning areas, so any fish harvested in these areas are nearly ready to spawn and are likely to be in poor condition for human consumption.

Summer chum salmon, known locally as dog salmon, were historically harvested in large quantities to feed sled dog teams or to be sold commercially. Dog team owners would dry their summer chum salmon and store them in bales of fifty fish, sometimes selling them to local traders for store credit or bartering them for locally available goods (Moncrieff 2007). These practices have diminished with the decrease in the use of dog teams for transportation and racing and with the recent declines in summer chum salmon. Commercial fishing for Chinook and chum salmon—mostly for salmon roe—in the middle Yukon and lower Koyukuk rivers was a common practice from the 1950s until the late 1990s. The roe fishery allowed fishers to sell the roe commercially but retain the flesh for subsistence purposes, whether for dog teams or human consumption. Today, summer chum salmon are harvested for subsistence only and are typically dried or half-dried and frozen. When Chinook salmon are caught, they are processed very carefully and eaten fresh or cut into strips and dried.

When the Chinook and summer chum salmon runs wind down in mid- to late July, fishers take a break from salmon fishing and return to their home community for a few weeks. They often return to fish camp to harvest fall chum salmon, which begins during the first or second week of August in the middle river. Like summer chum salmon, fall chum salmon are bank-oriented during their upstream migration and can be harvested with fish wheels and set gillnets. The Koyukuk River does not have a large run of fall chum salmon, but people from Huslia catch small amounts in the lower Koyukuk River. Fall chum salmon have high oil content and are generally in better condition in the middle river than summer chum salmon. Because of their condition, people typically harvest fall chum salmon for human consumption. Similar to other salmon, fall chum salmon are split and dried in the form of strips or as fillets joined at the tail, with scores in the flesh to encourage drying. Many people smoke their fish for added flavor. Fall chum salmon fishing can often last into late September, as the ice begins to form on the banks of the rivers. Fishers will occasionally harvest coho salmon as they migrate in late summer and early fall, but they are relatively uncommon in the middle Yukon River and Koyukuk River.

The transition period from summer to fall is dedicated to picking berries, gathering firewood, and moose hunting. Many people pick berries near their homes or while at fish camp if berry patches are nearby. Others take dedicated trips overland or by boat to pick berries. Raspberries and high- and low-bush cranberries are plentiful, and blueberries can be found in wet, low-lying areas near ponds and lakes. Many Koyukuk and Huslia families have a "woodyard," which is used for harvesting birch and spruce for firewood. Similar to traplines, these areas are used but not always owned by particular families. Some families harvest wood from their Alaska Native allotments. Most homes in Koyukuk and Huslia are at least partially heated with a wood stove, so firewood is an important resource for offsetting the high costs of home heating fuel. People cut firewood at any time of year, but many take advantage of open water by hauling driftwood via boat or wait until winter to haul wood with a snowmachine and sled.

Given the decline in salmon harvests in the last three years, moose hunting is more important than ever in the lower Koyukuk River and middle Yukon River. State hunts occur in the Koyukuk Controlled Use Area (KCUA) during the fall, from September 1 to 25 with registration and drawing permit options. Moose hunting opportunities are also available for federally qualified users on federal lands (see below for a detailed description of regulations and land status in the region). Most moose hunters travel the Yukon and Koyukuk Rivers by boat, occasionally searching channels and low-lying areas adjacent to the rivers. Some people take dedicated week-long trips to their fish camps and take day trips from camp to look for moose. Others take a rifle and their permit with them when they are traveling by boat to do other things, such as grocery shopping in Galena. This opportunistic form of moose hunting is relatively common in Koyukuk and Huslia and provides an example of cost-effective subsistence practices.

In addition to fall moose hunting, some residents of Koyukuk and Huslia set gillnets in sloughs, small streams, or at lake outlets to harvest nonsalmon fish species such as whitefishes, sheefish, and pike. As described above, nonsalmon fish are harvested year-round but harvest practices differ between seasons. In the fall, nonsalmon gillnets typically have 4-inch or smaller mesh. When the river ice becomes thick enough, people set gillnets or set lines for burbot under the ice and check them daily or every few days. Freeze-up on the Yukon and Koyukuk rivers typically occurs in mid- to late November at Koyukuk, while freeze-up on the Koyukuk at Huslia occurs in late October or early November. Residents often dry nonsalmon fish or freeze them whole, similar to how they would handle salmon. Nonsalmon fish have also long been important for feeding dog teams, especially during shortages of summer chum salmon.

In addition to nonsalmon fishing, falltime is when people hunt for bears. Black and brown bears are often referred to as "big animals" in Koyukon tradition because of the animals' powerful spirit. Only men are allowed to participate in brown or black bear hunts, and women of childbearing age are traditionally prohibited from handling or consuming bear meat or attending gatherings where bear meat is prepared and served (03242023HSL03). In the vicinity of Huslia and Koyukuk, resident hunters may take three black bears annually with no closed season. Residents may harvest one brown bear per year, and the season for brown bears is August 10 through fall, winter, and spring until the following year on June 30.

Trapping has long been and remains a common winter subsistence activity in the Yukon-Koyukuk region. The trapping season begins on November 1 for most furbearers except for beaver, which begins on September 1. However, some trappers must wait for the river to freeze in order to travel safely by snowmachine to their traplines. Residents use the frozen rivers as winter highways to travel between communities and to other locations for hunting, fishing, trapping, or cutting wood. Snares are the preferred method of taking beavers, whereas trappers may use a variety of snares, spring-loaded foot-hold traps, and body-grip traps to harvest wolverine, marten, mink, muskrat, lynx, and wolf. Occasionally, small-caliber rifles are used to hunt furbearers. Traplines are territorial use areas, often close to Native allotments and fish camps, but not necessarily so. When a trapper retires, they may pass their trapline on to relatives or other trappers, but a trapline is never used without permission from the "owner." People may also set traps outside of established traplines but must ensure that they are not encroaching on another trapper's area.

The winter subsistence season is relatively quiet. Aside from trapping, residents may take trips to cut and haul wood, and they may hunt close to the community for ptarmigan or grouse. A few people participate in a winter bull moose hunt near Huslia[6] or a winter any-moose hunt near Koyukuk,[7] primarily if they are unsuccessful in the fall. The Western Arctic Caribou Herd migrates seasonally, and caribou can be harvested near Shungnak, about 100 miles north of Huslia, in March or April. Very rarely, caribou migrate into the Koyukuk River valley close to Huslia. Caribou are generally not targeted by Koyukuk hunters because of the travel distance required to access the herds. When trail conditions permit, some Huslia hunters travel by snowmachine to the Kobuk River valley near Shungnak to hunt for caribou. The area adjoining the Kobuk and Koyukuk valleys has long served as a meeting place for Koyukon and Iñupiaq trading partners to exchange goods, and these trade and barter relationships persist today.

Regulatory Context

Huslia is surrounded by Alaska Native corporation and federal land, the latter consisting of USFWS lands and BLM lands. The USFWS lands are contained within the KNWR. Whereas, Koyukuk is surrounded by Alaska Native corporation lands, and the Innoko National Wildlife Refuge (INWR) is located across the Yukon River from the community as well as on either bank of the Yukon as far upstream as Galena. This patchwork of land status means that the state and federal governments commonly work together to manage fish and wildlife populations in the area. However, there are differences in harvest opportunities on federal lands versus state lands. Huslia is located in Game Management Unit (GMU) 24D, just upstream of its

6. This is a general season, harvest ticket hunt in Game Management Unit 24D for resident hunters; the season dates are December 1–10.
7. RM831 is a registration hunt in Game Management Unit 21D that may be announced; season dates are March 1–15.

border with GMU 21D. Koyukuk is in GMU 21D, which extends from Blackburn Slough on the Yukon River upstream to the community of Ruby, including the Kaiyuh Flats and Kaiyuh Mountains. The KCUA covers a large portion of GMU 24D and the northern portion of GMU 21D. In the KCUA, hunters are not allowed to use aircraft except for commercial flights into and out of the communities. Resident hunters may participate in fall and winter bull moose hunts by registration permit or harvest ticket on state lands in GMU 24D. Across the Yukon River from the community of Koyukuk, in the southern portion of GMU 21D, state residents may harvest one bull moose by registration permit during a late August hunt or a September hunt. Residents of communities in GMU 24 plus Koyukuk and Galena residents may harvest moose on federal lands in the KCUA and federal lands in the remainder of GMU 24D with a state registration permit. Some additional moose hunting opportunities for federally qualified users exist with seasons that may be announced by the appropriate USFWS refuge manager or the BLM office in Fairbanks.

The Board of Game has made a positive customary and traditional use finding for moose in GMUs 21 and 24 (5 AAC 99.025(8)). The amount reasonably necessary for subsistence uses (ANS) for moose in GMU 21 is 600 to 800 moose, and the ANS in GMU 24 is 170 to 270 moose. The board has also made positive intensive management findings for moose in 21D and 24D (5 AAC 92.108). Under the current intensive management program for GMU 21D, the department manages for a population objective of 7,000 to 10,000 moose with a harvest objective of 450 to 1,000 moose (Stout 2018). In GMU 24D, the department manages for a population objective of 5,000 to 6,000 moose with a harvest objective of 225 to 425 moose (Stout 2018). According to the most recent Division of Wildlife Conservation management reports for these units, population and harvest objectives are being met.

Salmon fishing is managed on the Yukon and Koyukuk rivers by the state and the USFWS. Federal waters extend between the communities of Kaltag and Galena on the Yukon River (i.e., those bordered by the INWR), and on the Koyukuk River from about 18 river miles upstream of the confluence with the Yukon River to 24 river miles downstream from the community of Hughes (i.e., those bordered by the KNWR). The Koyukuk River falls under federal jurisdiction again when it enters the Kanuti National Wildlife Refuge upstream of the community of Allakaket.

Closures of the subsistence salmon fishery in 2021 and 2022 occurred in both state and federal waters due to declining runs of chum and Canadian-origin Chinook salmon.[8] The residents of Huslia and Koyukuk are federally qualified users under federal subsistence regulations, so if there was a federal fishery opening during a state fishery closure, Huslia and Koyukuk residents could participate in federal fishery openings in federal public waters of the Yukon River. However, the two governments regularly coordinate on inseason management actions to avoid confusion among subsistence users along the river. During 2021 and 2022, the decline in both Chinook and chum salmon populations led to the enactment of restrictions on subsistence harvest opportunities for all communities. These restrictions limited the use of fishing gear to gillnets—with a 4-inch or smaller mesh size—and "selective" (i.e., nonlethal) gear types, such as dip nets or beach seines. The restriction of gillnets to 4-inch or smaller mesh was intended to limit the incidental harvest of Chinook salmon, as this gear tends to select for smaller species such as chum or pink salmon. Along with the gear restriction, fishers were advised to avoid fishing in areas with Chinook salmon present and that they could be cited for targeting Chinook salmon. The use of selective gear types was meant to allow some salmon harvest opportunity while relieving harvest pressure from the Chinook salmon population.

Study Objectives

The project had the following objectives:

- Document the harvest and use of wild resources by the communities of Huslia and Koyukuk, including:

8. Partial closures of the subsistence salmon fishery on the Yukon have occurred since 2001 in response to declines in Canadian-origin Chinook salmon. For more information, see Brown, C. L., and A. Godduhn. 2015. *Socioeconomic effects of declining salmon runs on the Yukon River*. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 398. https://www.adfg.alaska.gov/techpap/TP398.pdf.

- Household-level participation in the harvest, use, receiving, and giving of wild resources;
- Individual level participation in harvesting and processing activities;
- Assessments of whether the household got enough of a resource during study year, and whether that amount was the same, more, or less than in recent years, including reasons for responses;
- Food insecure conditions experienced and community-level food security status;
- Wage and income information.

- Document traditional knowledge held by residents about the harvest, use, and exchange of wild resources.
- Document local concerns and comments about wild resources, fish and game management, or other topics relevant to subsistence.

Research Methods

Ethical Principles for the Conduct of Research

The project was guided by the research principles outlined in the *Alaska Federation of Natives Guidelines for Research,*[9] the *Principles for Conducting Research in the Arctic* by the U.S. Interagency Arctic Research Policy Committee,[10] and the *Ethical Principles for the Conduct of Research in the North* (ACUNS 2003), as well as the Alaska confidentiality statute (AS 16.05.815). These principles stress community approval of research designs, informed consent, anonymity or confidentiality of study participants, community review of draft study findings, and the provision of study findings to each study community upon completion of the research.

Project Planning and Approvals

The Principal Investigators (PIs) on the project were Subsistence Resource Specialist Jesse Coleman and Northern Region Program Manager Alida Trainor (Table 1-3). Coleman sent letters of interest to tribal council offices in Koyukuk and Huslia via postal mail, and Coleman and Trainor made several phone calls from September to December of 2022 to the tribal administrators in Koyukuk and Huslia, respectively. Trainor secured approval from the Huslia Tribal Council during their regular meeting on February 1, 2023. The Koyukuk Tribal Council (KTC) did not meet during the winter leading up to the project, so Coleman discussed the study on four occasions with KTC's first chief, Leo Lolnitz, who granted permission on March 6, 2023, for the division to conduct the study in Koyukuk.

Systematic Household Surveys

The primary method for collecting subsistence harvest and use information in this project was a systematic household survey. The survey instruments (Appendix A) were adapted from an instrument that was used in a comprehensive survey of the middle Koyukuk River community of Hughes in 2014 (Wilson and Kostick 2016). Denaakk'e names for resources were used when available and were cross-referenced with Jones' Junior Koyukon Dictionary (2001). Minor changes were made to the survey instrument, including language in food security module to clarify that the study period for module and the larger survey was the calendar year. Prior to this change, the food security module asked about "the previous 12 months". No

9. Alaska Federation of Natives. 1993. "Alaska Federation of Natives Guidelines for Research." Alaska Native Knowledge Network. Accessed April 22, 2024. https://www.uaf.edu/ankn/indigenous-knowledge-syst/alaska-federation-of-nati/
10. U.S. Interagency Arctic Research Policy Committee (IARPC). 2018. "Principles for Conducting Research in the Arctic." National Science Foundation, Office of Polar Programs. Accessed April 22, 2024. https://www.nsf.gov/geo/opp/arctic/conduct.jsp

Table 1-3.–Project staff.

Task	Name	Organization
Northern Region Program Manager	Alida Trainor	ADF&G Division of Subsistence
Principal Investigator	Jesse Coleman	ADF&G Division of Subsistence
Administrative Support	Cheryl Park	ADF&G Division of Subsistence
	Tamsen Coursey-Willis	ADF&G Division of Subsistence
	Deanne Lincoln	ADF&G Division of Subsistence
Data Management Lead	David Koster	ADF&G Division of Subsistence
Programmer	David Koster	ADF&G Division of Subsistence
Data Entry	Reve Tomlin	ADF&G Division of Subsistence
	Carrie Hallinan	ADF&G Division of Subsistence
	Halia Valdez	ADF&G Division of Subsistence
	Devin Anderson	ADF&G Division of Subsistence
	Loraine Navarro	ADF&G Division of Subsistence
Data Cleaning/Validation	Loraine Navarro	ADF&G Division of Subsistence
Data Analysis	David Koster	ADF&G Division of Subsistence
	Loraine Navarro	ADF&G Division of Subsistence
	Reve Tomlin	ADF&G Division of Subsistence
Cartography	Gayle Neufeld	ADF&G Division of Subsistence
	Loraine Navarro	ADF&G Division of Subsistence
Editorial Review Lead	Nathanael Hardy	ADF&G Division of Subsistence
	Adam Knight	ADF&G Division of Subsistence
Production Lead	Nathanael Hardy	ADF&G Division of Subsistence
	Adam Knight	ADF&G Division of Subsistence
Field Research Staff	Jesse Coleman	ADF&G Division of Subsistence
	Alida Trainor	ADF&G Division of Subsistence
	Kathleen Roush	ADF&G Division of Subsistence
	Emily Donaldson	ADF&G Division of Subsistence
	Andrew Slear	ADF&G Division of Subsistence
	Cassidy Sommerville	ADF&G Division of Subsistence
Local Research Assistant	Becky Derendoff	Huslia resident
	Vanessa Derendoff	Huslia resident
	Jenna Lestenkoff	Huslia resident
	Precious Lestenkoff	Huslia resident
	Bob Albert	Koyukuk resident
	Donovan Albert	Koyukuk resident
	Jojo Dayton	Koyukuk resident

Source ADF&G Division of Subsistence, 2023.

other substantive changes were made to the survey instrument, and researchers finalized the instrument in March 2023. A key goal was to structure the survey instrument to collect demographic, resource harvest and use, and economic data that are comparable with information collected in other household surveys in the study communities and with data in the Community Subsistence Information System (CSIS).

Prior to fieldwork, the Division of Commercial Fisheries provided household lists and maps of Huslia and Koyukuk to the PIs. These household lists and maps, assembled from Yukon River postseason subsistence salmon surveys conducted in the autumn prior to the present study, served as a starting point for identifying households in each community. These household lists and maps were revised during the first few days of survey implementation (see details below). A census of all households was attempted in both Huslia and Koyukuk, which is the division's sampling approach for communities with fewer than 100 households. Based on initial household lists and maps, there were 77 dwelling units in Huslia and 38 in Koyukuk (Table 1-4). During survey administration, if researchers were initially unsuccessful at contacting a household, two more attempts to survey the household were made on different days and at different times. After a reasonable effort to conduct the survey, if the household could still not be reached, then a "no contact" sampling disposition was applied. A sampling disposition of "surveyed" or "declined to participate" was assigned to the remaining households.

Table 1-4.–Sample achievement, Huslia and Koyukuk, 2022.

	Community	
Sample information	Huslia	Koyukuk
Number of dwelling units	77	38
Survey goal	86	37
Households surveyed	53	33
Households failed to be contacted	18	4
Households declined to be surveyed	15	0
Households moved or occupied by non resident	8	6
New households	17	5
Total households attempted to be surveyed	86	37
Final estimate of permanent households	86	37
Percentage of total households surveyed	61.6%	89.2%
Survey weighting factor	1.62	1.12
Sampled population	174	62
Estimated population	282.3	69.5

Source ADF&G Division of Subsistence household surveys, 2023.

Household Survey Implementation

Huslia

Division of Subsistence staff conducted household surveys in Huslia from March 21–28, 2023. Coleman and Trainor trained three local research assistants (LRAs) on contacting households and scheduling surveys. After the training, the LRAs helped to update maps and household information, such as identifying households that had recently moved away from the community or to a new home in the community, changes in household membership, new residents, and deceased residents. Researchers and LRAs identified a total of 86 households, with 53 households surveyed (62%). A net total of nine additional households were

added to the household list provided by the Division of Commercial Fisheries.[11] Eighteen households could not be contacted (21%) and 15 declined to be surveyed for a refusal rate of 17%.

Surveys were conducted in respondents' homes as well as at the multipurpose building, the tribal council office, and the school in Huslia. The average length of a survey was 40 minutes. During the survey effort, a week-long healing gathering took place at the school and made scheduling surveys more difficult in some cases, but also provided opportunities for researchers to connect with residents, identify ethnographic respondents, and participate in activities including storytelling, crafts, and a potlatch. This gathering will be described in greater detail in the discussion chapter.

Plate 1-1.–Participants of the Healing Gathering enjoying Potlatch. © ADF&G.

Koyukuk

Division staff conducted household surveys in Koyukuk from April 4–8, 2023. Shortly after arriving in the community, Coleman trained three LRAs. After the training, the LRAs assisted division researchers in updating household lists and maps, adding and removing households from the list, and updating household membership. Several households were identified as "seasonally occupied" and were removed from the sampling frame. As mentioned above, researchers attempted a census of the households in Koyukuk, and 33 households (89%) completed surveys (Table 1-4). Zero households declined to be surveyed, but four households could not be contacted during the survey effort. Contacting households was somewhat complicated by the lack of cell phone service in Koyukuk; however, LRAs were able to contact people over the VHF radio or by knocking on doors. Surveys took place in residents' homes, at their place of employment, or the community hall. On average, surveys were completed in 37 minutes (Table 1-5).

Mapping Locations of Subsistence Hunting, Fishing, and Gathering Activities

During household interviews, the researchers asked respondents to indicate the locations of their fishing, hunting, and gathering activities during the study year. Points were generally used to mark harvest locations and polygons were used to indicate harvest effort areas, such as areas searched while hunting moose.

Table 1-5.–Survey length, Huslia and Koyukuk, 2022.

	Survey length (in minutes)		
Community	Average	Minimum	Maximum
Huslia	40.2	14	93
Koyukuk	37.4	13	120

Source ADF&G Division of Subsistence household surveys, 2023.

11. The Division of Commercial Fisheries conducts an annual postseason subsistence salmon harvest survey in a majority of Yukon River communities. The Division of Subsistence requested up-to-date household lists from the prior year's postseason salmon survey effort in Huslia and Koyukuk.

Points were also used to designate harvest effort locations, for instance, when people reported fishing from a riverbank. Lines were drawn to depict when harvesting activity did not occur at a specific point; for example, to depict traplines or courses taken while drift gillnetting.

Researchers documented harvest locations and fishing, hunting, and gathering areas on iPads[12] using the Field Maps application customized for Division of Subsistence data collection needs. The feature—point, polygon, or line—was drawn on a U.S. Geological Survey topographic relief map downloaded on the iPad. Due to the iPad's capabilities, the user was able to zoom in and out to the appropriate scale and document search and harvest activities wherever they occurred in the state of Alaska. Once a feature was accepted, the researcher added attributes that noted the month(s) of use of the area, method of access to the resource, species searched for or harvested, and amount harvested—if successful. In some instances, paper maps were used to document search and harvest locations. These maps were 11x17 inches at scales of 1:100,000 (immediate community area), 1:200,000 (middle Koyukuk River for Huslia, confluence of Koyukuk and Yukon rivers for Koyukuk), and 1:500,000 (middle Yukon and Koyukuk rivers region). Research staff digitized markings from paper maps using the iPad application daily while still in the field.

While in the field, once a survey was complete, researchers conducted a quality control exercise by matching the map data to the survey form to ensure all map data had been documented. Once data collection was complete, the data were uploaded through ArcGIS Online to the ESRI cloud server for storage. Once the data were uploaded, researchers verified that the household data were successfully recorded on the server.

Key Respondent Interviews

While researchers were in the study communities they consulted with tribal governments, community councils, and LRAs to identify key respondents to interview. The purpose of the key respondent interviews was to document locally held traditional knowledge; observations of change; and information on harvesting, processing, and sharing of subsistence resources. In Huslia, some key respondents were chosen based on prior knowledge of active subsistence harvesters as well as residents who were active in regulatory meetings at the state and federal levels. Other key respondents were identified during the course of surveys or interviews with others. Key respondent interviews were semi-structured and directed by an interview protocol designed by ADF&G researchers (Appendix B. The protocol helped to establish the key respondent's experience with subsistence activities and foster a conversation about the key ethnographic topics of interest for this study. Key respondents were informed that, to maintain confidentiality, their names would not be used anywhere except in the transcript of their audio-recorded interview. Transcripts and audio recordings were accessible only by division staff. For interviews that are included in this report, each respondent signed an informed consent agreement that explained how their data were to be used and the measures taken by the division to protect the confidentiality of their names and responses. A copy of the audio recording and a printed transcript of the interview were sent to each respondent. The number of key respondent interviews varied among communities. Researchers conducted eight key respondent interviews with elders, artisans, and active subsistence harvesters in Huslia and seven in Koyukuk.

Data Analysis and Review

Survey Data Entry and Analysis

Subsistence Resource Specialists and Fish and Wildlife Technicians who conducted fieldwork in each community were also responsible for coding survey data (Table 1-3). Coding was double-checked by the community lead researcher while in the field, then checked again by a Research Analyst prior to data entry. Responses were coded following standardized conventions used by the Division of Subsistence to facilitate data entry. Information Management (IM) staff within the Division of Subsistence set up database structures within Microsoft SQL Server at ADF&G in Anchorage to hold the survey data. The database structures included rules, constraints, and referential integrity to ensure that data were entered completely and accurately. Data entry screens built in Microsoft Access were available on a secured internet network.

12. Product names are given because they are established standards for the State of Alaska or for scientific completeness; they do not constitute product endorsement.

Daily incremental backups of the database occurred, and transaction logs were backed up hourly. Full backups of the database occurred twice weekly. This process ensured that no more than one hour of data entry would be lost in the unlikely event of a catastrophic failure. All survey data were entered twice, and each set was compared in order to minimize data entry errors.

Once data were entered and confirmed, information was processed with the use of R statistical software version 4.2.2. Initial processing included the performance of standardized logic checks of the data. Logic checks are often needed in complex data sets where rules, constraints, and referential integrity do not capture all of the possible inconsistencies that may appear. Harvest data collected as numbers of animals, or in gallons or buckets, were converted to pounds usable weight using standard factors (see Appendix C for conversion factors).[13]

Division of Subsistence staff also used R for analyzing the survey information. Analyses included review of raw data frequencies, cross tabulations, table generation, estimation of population parameters, and calculation of confidence intervals for the estimates. Instances of missing information were evaluated to ensure these cases were sporadic, random, and uniformly distributed among all surveys and questions. There was no indication that response bias may be present based on a review of the instances of missing information, and each instance was dealt with on a case-by-case basis according to standardized practices. For data elements where a non-zero mean could be derived, missing data were replaced with the mean of valid responses. In cases where mean values resolved to zero, but a non-zero amount was implied by a missing data code, then a minimal substitution was applied. Division researchers documented all adjustments in R code.

Harvest estimates and responses to all questions, except income and categorical responses, were calculated by using the principle that a sample mean can be used as an unbiased estimator of the population mean (Cochran 1977). For analysis, the sample mean was the arithmetic mean, or average, of households that agreed to participate, and the population was the total number of occupied and eligible households present in the community during the study period. These calculations are standard methods for extrapolating sampled data. As an example, the formula for harvest expansion is:

$$\hat{X} = N\bar{y} \tag{1}$$

$$\bar{y} = \frac{\sum_{i=1}^{n} x_i}{n} \tag{2}$$

where:

N = total number of households in a community,

$\bar{y}$ = the mean harvest (amount of resources or pounds) of returned surveys,

n = the number of returned surveys,

x_i = the reported harvest (amount of resources or pounds) of household i, and

$\hat{X}$ = the total estimated harvest (amount of resources or pounds).

In addition to community estimates, 95% confidence intervals were calculated to evaluate the relative precision of the mean. The confidence interval is depicted either as a percentage or a range of values. Confidence intervals were calculated using raw, unexpanded data. This metric represents a confidence level of 95% that the true population mean falls within the calculated range (Goldsman and Goldsman 2021). A wide confidence interval implies less confidence in the estimate. For interpretation in Koyukuk, a confidence interval range where the lower bound falls below the sum of reported values implies that no statistically significant difference exists between the reported and estimated values, thus the true population value may be represented by the sample. Additionally, a confidence interval where the lower bound falls below zero implies that the estimate does not have a statistically significant difference from zero. For Koyukuk, this

13. For an overview of statewide conversion factors and their sources, see "Resource Conversion Factors," ADF&G Division of Subsistence, CSIS: http://www.adfg.alaska.gov/sb/CSIS/index.cfm?ADFG=main.conversionFactorSelRes

would further show that the reported value is the true value. For Huslia, a smaller sample was achieved, thus interpretation is similar; however, lower confidence bounds below 0 do not represent further evidence that the true value has been captured with the sample. Because the sample was taken from a finite population of households, confidence intervals were calculated using finite population correction as formulated below (Cochran 1977):

$$\mathrm{CI}\%(\pm) = \frac{t_{a/2} \times \frac{s}{\sqrt{n}} \times \sqrt{\frac{N-n}{N-1}}}{\bar{y}} \tag{3}$$

where:

$t_{\frac{a}{2},\mathrm{n}-1}$ = student's two-tailed *t* critical value for a=0.95 and n–1 degrees of freedom,

s = sample standard deviation,

n = the number of returned surveys,

N = total number of households in the community, and

$\bar{y}$ = sample mean.

Estimates for jobs and income were calculated using a Monte Carlo method referred to as bootstrapping (Efron and Tibshirani 1993). This method was used to account for confounding features of the data stemming from the complexity of interrelated variables and random missing elements, as well as small amounts of data. Small populations result in many unique records where it is not possible to identify a mean or median for estimation, so similar records must be used instead. These "similar" records were derived through resampling with replacement. The assumption made was that the jobs and income present in the sample would be reasonably representative of the whole community and therefore uncontacted households would have similar makeup and characteristics.

The bootstrap method resamples surveyed households 1,000 times with all households eligible to be selected during each resample. An estimate was developed for each separate resample using a set of rules regarding missing data. To begin, known annual income amounts were divided by the number of months. Missing income from a job was replaced with the median of jobs having the same standard occupational classification (SOC) code. If no estimate could be obtained, then a median from the same industry was applied. A similar approach was used for missing information about job schedules and months by using the mean rather than the median. Once missing value replacements were made, the mean income was calculated and applied to the community to develop an estimate. For individuals spanning the ages of 16 and 65 who did not provide an employment status, an additional expansion was calculated and applied using the proportion of valid responses for employed adults. Once the estimates were created for each resample, the average of all 1,000 resamples was used as the estimate. This approach was used to estimate the number of jobs, total income, number of employed people, and the number of employed households. Ninety-five percent confidence intervals for income estimates by source were computed by selecting appropriate quantiles from the 1,000 resamples, using an approach adapted from Efron and Tibshirani (1993):

$$l = \sum_{i=1}^{(\hat{\theta}_i - \theta) < 0} 1 \tag{4}$$

$$\bar{\theta} = \frac{\sum_{i=1}^{N} \hat{\theta}_i}{N} \tag{5}$$

$$\hat{z}_0 = \frac{l}{N} \tag{6}$$

$$t_2 = \sum_{i}^{N} (\hat{\theta}_i - \theta)^2 \quad (7)$$

$$t_3 = \sum_{i}^{N} (\hat{\theta}_i - \theta)^3 \quad (8)$$

$$\hat{\alpha} = \frac{t_3}{(6 \times t_2)^{1.5}} \quad (9)$$

$$\alpha_1 = NORMAL\left(\hat{z}_0 + \frac{\hat{z}_0 - 1.96}{(1 - \hat{\alpha} \times (\hat{z}_0 - 1.96)}\right) \quad (10)$$

$$\alpha_2 = NORMAL\left(\hat{z}_0 + \frac{\hat{z}_0 + 1.96}{(1 - \hat{\alpha} \times (\hat{z}_0 + 1.96)}\right) \quad (11)$$

$$CI(-) = \hat{\theta}_{N \times \alpha_1} \quad (12)$$

$$CI(+) = \hat{\theta}_{N \times \alpha_2} \quad (13)$$

where:

$\hat{\theta}_i$ = the ith resample estimate,

Θ = the estimate of the income,

i = index of resamples ordered from smallest to largest estimate,

N = number of resamples taken (at least 1,000),

$CI(-) = \hat{\theta}_{N \times \alpha_2}$ = the estimate at N x a_1 in the sorted list of estimated resamples, and the lower bound of the 95% confidence interval,

$CI(+) = \hat{\theta}_{N \times \alpha_2}$ = the estimate at N x a_2 in the sorted list of estimated resamples, and the upper bound of the 95% confidence interval, and

NORMAL( ) = the normal cumulative distribution function (CDF), which returns a value corresponding to the position of the parameter within the normal distribution.

The corrected final data from the household survey will be added to the Division of Subsistence CSIS. The CSIS is a publicly accessible database maintained by the Division of Subsistence and includes community-level study findings.

Food Security Analysis

A "food security" section of the survey used a modified version of a standard national questionnaire to assess whether or not the household had enough food to eat, whether from subsistence sources or from market sources. The protocol used in this survey was a modified version of the 12-month food security scale questionnaire developed by the U.S. Department of Agriculture (USDA). This questionnaire is administered nationwide each year as part of the annual Current Population Survey (CPS). In 2021, approximately 98,800 U.S. households were interviewed, including 1,203 in Alaska (Coleman-Jensen et al. 2022). From CPS data, the USDA prepares an annual report on food security in the United States.

Food security protocols have been extensively reviewed (Coates 2004; Webb et al. 2006; Wunderlich and Norwood 2006) and have been used around the world, including in northern Burkina Faso (Frongillo and Nanama 2006), Bangladesh (Coates et al. 2006), Bolivia and the Philippines (Melgar-Quinonez et al.

2006), and Brazil (Pérez-Escamilla et al. 2004). Although there have been efforts to develop a universal food security measurement protocol (Swindale and Bilinsky 2006), researchers often modify the protocol slightly to respond to community social, cultural, and economic circumstances, as was done here.

For this study, the food security protocol was modified by the addition of several questions designed to determine whether food insecurities, if any, were related to subsistence foods or store-bought foods. Additionally, the wording of some questions was changed slightly. As in Brazil (Pérez-Escamilla et al. 2004), the USDA term "balanced meals" was difficult to interpret for indigenous Alaska populations, and was replaced with the term "the kinds of food we wanted to eat" to reflect unique dietary and cultural circumstances in rural Alaska. Households agreeing with the statement, "We had enough of the kinds of foods we wanted to eat," were considered food secure and were not asked about increasingly severe instances of food insecurity.

Map Data Entry and Analysis

As discussed above, maps were generated based on data collected using ESRI's ArcGIS Field Maps mobile application installed on iPads or 11x17-inch paper maps. All data were entered on the iPad, whether in the field during interviews or by ADF&G research staff while coding survey data. After all data were uploaded to the ESRI cloud server, data were downloaded and stored on the ADF&G network. After verification that all data had been synched, the data were removed from the ESRI cloud server.

To create community-level maps, spatial data were sorted first by community and then by resource and examined for accuracy. To present study results, household data were aggregated to the community level to protect the confidentiality of individual households. For nonsalmon fish and small land mammals, the data were dissolved to the category level. In this instance, the term "dissolved" refers to an analytical procedure of aggregating data (individual household search and use areas) into a single unit, to represent a composite whole (a search and use area for a community). For birds and bird eggs, data were dissolved into subcategories: ducks and geese and ptarmigans and grouses. For vegetation resources, data were dissolved into berries and greens. For large land mammals, data were dissolved to the species level. Due to confidentiality reasons, data were published only if a minimum of five households were represented. No maps were created to show salmon search and harvest locations reported by Huslia residents or to show small land mammals search and harvest areas used by Koyukuk residents. For confidentiality, bear search and harvest areas were also removed from the map representing large land mammals reported by subsistence users in Koyukuk.

ADF&G staff created search and harvest location maps for each resource category or subcategory, or for individual species, in ArcMap 10.8.1 or higher using a standard template for reports. To ensure confidentiality, the maps produced for the report do not distinguish between overall search areas and specific harvest locations. Maps were reviewed at a community review meeting to ensure accuracy and to identify any data the community would like to keep confidential. Community members did not identify any confidential data in the maps that required revisions to the presentation of data in this report.

Ethnographic Interview Transcription and Analysis

Upon return from fieldwork, digitally recorded interviews were transcribed using Olympus DSS Player Standard Transcription Module and reviewed for accuracy. Interview data were uploaded into Atlas.ti 23, a qualitative data analysis software, and were then coded and analyzed. One researcher coded all interviews for a community. The development of an appropriate coding structure is critical to the analysis, so the PI and project staff worked together to develop this structure prior to text coding (see Andersen et al. 2013). Coding of transcribed interviews was accomplished using a deductive, or *a priori* code list, which was developed and revised during the coding process (i.e., inductive or *post-hoc* coding). The inductive coding process allows the researcher to identify codes based on emergent themes and relationships present in the interview data. Specifically, researchers identified themes of information by identifying and describing linkages between codes and code categories (for example, knowledge about nonsalmon fish as it relates to seasonality of harvest and gear types), as well as more detailed information such as the relationships between harvests and seasonal weather and water levels. Atlas.ti assisted researchers in identifying important

relationships within the data and frequencies or co-occurrences of particular themes or sub-themes that would be challenging to track without the software (Friese 2012).

Population Estimates and Other Demographic Information

As noted above, a goal of the research was to collect demographic information for a sample of year-round households in Huslia and all year-round households in Koyukuk. For this study, "year-round" was defined as being domiciled in the community when the surveys took place and for at least six months during the study year 2022. Because not all households were interviewed, population estimates for each community were calculated by multiplying the average household size of interviewed households by the total number of eligible year-round households, as identified by Division of Subsistence researchers through ground truthing and in consultation with community officials and other knowledgeable respondents.

There may be several reasons for the differences among the population estimates for each community generated from the division's surveys and other demographic data developed by the 2020 federal census and the U.S. Census Bureau's American Community Survey (ACS) and the Alaska Department of Labor and Workforce Development (ADLWD n.d.; U.S. Census Bureau 2021). Sampling of households, timing of surveys, or eligibility criteria for inclusion in the survey may explain differences in the population estimates. As noted above, several Koyukuk households were identified as being seasonal, which was a relative increase compared to previous years.[14]

Community Review Meetings

In July 2024, ADF&G staff mailed packets including a cover letter and draft report copies to the tribal council administrator in each study community for council member review. Packets were delivered on July 15 in Huslia and on July 17 in Koyukuk. No comments were received as of October 1, 2024. ADF&G staff attempted unsuccessfully to contact the Huslia tribal council during their scheduled meeting on June 20, 2024 to present survey results. ADF&G staff made attempts in June, July, and August 2024 but were unable to contact Koyukuk tribal council staff to schedule a meeting and present survey results.

Final Report Organization

This report summarizes the harvest and use patterns of subsistence resources by residents of Huslia and Koyukuk. The report is organized by community, with results specific to Huslia presented in Chapter 2 followed by Koyukuk results in Chapter 3. The order of the chapters is alphabetical and does not have analytical implications. Each chapter includes tables and figures that summarize demographics, employment characteristics, individual participation in harvesting and processing of wild resources, and characteristics of and temporal trends in resource harvests and uses, as well as food security. Each chapter also includes maps of search and harvest areas by resource category aggregated at the community level. The content is consistent in each chapter because the data are based on the survey instrument; however, there are differences among the chapters in terms of documenting historical trends because each community has a different history of subsistence harvesting practices. The report concludes in Chapter 4 with a discussion of the study results in the context of change over time and across neighboring communities and conclusions about the study's key findings.

Appendices to this report include the survey instruments used in each community (Appendix A), the key respondent interview protocol (Appendix B), lists of conversion factors used for calculating edible weight from reported harvests (appendices C and D), and 4-page summaries of the study findings that were mailed to every household in the study communities (appendices E and F).

14. K. Roush, Koyukuk field notes, April 7, 2023.

2. HUSLIA

Community Background

The predominantly Koyukon Athabascan community of Huslia is located within the KNWR, along the lower Koyukuk River.[1] The community is about 290 air miles west of Fairbanks and 170 river miles northwest of Galena. Huslia is not connected to the road system and can only be accessed via boat in the summer, and by plane year-round.

Alaska's continental climate zone, which includes most of Interior Alaska, experiences both hot summers and cold winters (Henning 1983).[1] Huslia's record temperatures range from -65˚ F in the winter to over 90˚ F in the summer. January tends to be the coldest month, and July the hottest (Henning 1983) with average temperatures of 0˚ F and 72˚ F, respectively. The Koyukuk River is frozen for more than 200 days of the year but is generally clear of ice from May through September (Henning 1983).[1] Up to 30 inches of rain typically falls during the summer and early fall, and around 70 inches of snow can fall during the winter months.

The boreal forest surrounding Huslia supports a wide variety of wildlife with moose and beaver being the two of the more important species to subsistence harvesters (Andersen et al. 2004; Marcotte 1986). While beavers have been a fixture in the area since precontact, moose are relatively new and were practically nonexistent prior to 1935. Moose now make up a large portion of the subsistence harvest each year in Huslia. Beaver are also a popular food item, and their fur is commonly used for crafting. In addition to moose and beaver, residents also have access to a variety of freshwater fish species, migratory birds, and other large land mammals.

Before contact with Russian traders in 1843, the Koyukuk River area was inhabited by four matrilineal bands of Koyukon Athabascans (Marcotte 1986; McFayden Clark 1996; McFayden Clark and Clark 1976). These bands were entirely dependent on their subsistence lifestyle to provide whatever they needed for survival. Koyukon Athabascans traded with other groups across northern Alaska to access goods not available in their area (Huntington and Elliott 2002; McFayden Clark and Clark 1976). Evidence of trade networks stretched from the Koyukuk River to the Chuchi Sea. These relationships facilitated the exchange of wild foods and material goods. Marriages and the adoption of children also occurred between trade partners. Interaction with distant communities, whether through trade, marriage or the adoption of children served to reduce historical conflict in the region, strengthen ties, and build trust.

The Koyukon bands moved their camps seasonally depending on the resource availability (Marcotte 1986; McFayden Clark 1996; McFayden Clark and Clark 1976; Nelson 1983). While hunting areas for birds and most large mammals were shared by all; beaver lodges, fishing sites, and bear dens were considered family property. The practice of harvest areas being family property is still in use today regarding trapping locations. The seasonal rotation of small camps continued until the 1920s when sedentary settlements started to form around schools, mining camps, and trading posts (Marcotte 1986). These small settlements were usually temporarily inhabited between stays at seasonal camps. By the 1940s, small settlements started to disappear as more people settled semi-permanently in Allakaket, Hughes, Cutoff, and Koyukuk. Cutoff, now also known as "old town," was prone to seasonal flooding, and in 1951 the residents moved four miles downriver and established Huslia (Barnhardt 1985; Marcotte 1986). After the move downriver the community was able to secure funding to build a school and, in the following years, a post office, airport, and health clinic before the community was later incorporated in 1969 (Huntington and Elliott 2002).[2]

While the contemporary community site is elevated enough above the Koyukuk River floodplain that seasonal flooding is no longer a concern, erosion along the banks of the Koyukuk River has become more

1. Tanana Chiefs Conference, "Huslia," Accessed March 29, 2024, https://www.tananachiefs.org/about/communities/huslia/.
2. Yukon-Koyukuk School District, "About Huslia," Accessed March 29, 2024, https://www.yksd.com/domain/34

of an issue.[3] In 2007, The U.S. Army Corps of Engineers published a report on streambank erosion near Huslia. This assessment found that the community was located on sandy, erosion-prone soil and that 10 to 30 feet of riverbank was eroding yearly. While the community had previously received funds to halt or slow down the erosion, these efforts do not address the larger environmental conditions, such as melting permafrost, ice jams, and flooding, that exacerbate the problem. Due to this, the community of Huslia is now focused more on relocating away from the river than slowing the erosion of the riverbank. In 2014 and 2019, the Huslia village council worked with the Natural Resources Conservation Service (NRCS) to move, relocate, or demolish buildings that were deemed too close to the erosion site.[4] In both years, the NRCS was able to provide 90% of the necessary funds.

To make Huslia more self-sustaining, wood biomass boilers were added to the infrastructure to provide heat to three main community buildings. Residents are hired to harvest locally sourced wood and are trained to operate the heating system. This provides more employment and training opportunities to community members, contributes to the circulation of money within the community, and reduces the dependency on heating oil. Huslia's community members feel strongly about retaining their traditional culture and sharing it with future generations (03252023HSL06; 03242023HSL03; 03242023HSL04; 03232023HSL01; 03232023HSL02; 03252023HSL05).[5] Some community-wide events can help with this retention and sharing.

In 2023, the tribal council, in partnership with the TCC hosted a multi-day healing gathering. The purpose of the gathering was to teach ways to process and heal from historical trauma as well as reconnect with their culture and learn traditional practices such as skin sewing, beading, caribou tufting, drum and spear making, and beaver trapping, among other activities. Additionally, a traditional Inupiaq healer, an acupuncturist, and a massage therapist came to offer their services, free of charge to community members. Community members and guests, including the research team for this project, were invited to join all or some of the activities. Organizers explained that when trying to heal from traumatic events or grief, Koyukon Athabascan culture encourages people to connect. Facilitators helped lead group discussions on intergenerational trauma in Alaska and reminded participants of the strength and sense of well-being that can come from cultural identity and engagement. The three-day event ended with a potlatch where organizers and attendees thanked one another for their hard work and participation and shared how the event affected them. This event is one example of Huslia's leadership, resilience, and dedication to honoring Koyukon values.

Population Estimates and Demographic Information

Expanding for unsurveyed households, 282 residents lived in 86 households in Huslia in 2022, and 94% of the population identified as Alaska Native (Table 2-1; Figure 2-1). The first U.S. Census count in 1960 recorded Huslia's population at 168 residents, which then dropped in the next 10 years to 159 (Figure 2-2). The Alaska Department of Labor (ADL) recorded yearly estimates from 1984 to 2021. These estimates show a steady upward trend. The lowest count since the early census was in 1990 at 198 residents and the highest was in 2013 at 339 residents. Differences between population and demographic estimates from this study, the U.S. Census, and the ADL likely result from variations in the sampling methods, timing of surveys, refusal rates, and definitions of residency.

At the time of this survey, the estimated population was made up of 148 males and 135 females (Table 2-2 Figure 2-3). The average age of Huslia residents was 32; the oldest individual in the community was 83, and the youngest was less than one year old (Table 2-3). Of the 282 individuals living in Huslia during the study year, 42% were 19 years of age or younger (Table 2-2; Figure 2-3). Young adults (ages 20–34) made

3. U.S. Army Corps of Engineers: Alaska District, "Alaska Baseline Erosion Assessment: Erosion Information Paper-Huslia, Alaska," 2007, Accessed March 29, 2024, https://www.poa.usace.army.mil/Portals/34/docs/civilworks/BEA/Huslia_Final%20Report.pdf
4. United States Department of Agriculture, "Huslia, Alaska Natural Resources Conservation Service: Emergency Watershed protection program," Accessed February 20, 2024, https://www.nrcs.usda.gov/sites/default/files/2022-10/Huslia%20EWP%20Success%20Story%20Dec2021.pdf.
5. ADF&G Division of Subsistence household survey comments, 2022.

Plate 2-2.–Riverbank erosion near Huslia. © ADF&G.

Table 2-1.–Population estimates, Huslia, 2020 and 2023.

	U.S. Census (2020)	American Community Survey (2018–2022)		This study (2022)	
		Estimate	Range[a]	Estimate	Range[b]
Total population					
Households	104	84	69 – 99	86	–
Population	304	275	234 – 316	282.3	256 – 309
Alaska Native					
Population	290	270	229 – 311	266.1	240 – 292
Percentage	95.4%	98.2%	94 – 101	94.3%	85.% – 103.5%

Sources U.S. Census Bureau (2021) for 2020 estimate; U.S. Census Bureau for American Community Survey (ACS) 2022 estimate (5-year average); and ADF&G Division of Subsistence household surveys, 2022, for 2023 estimate.

Note Division of Subsistence household surveys eligibility requirements differ from those used by the U.S. Census Bureau.

Note U.S. Census Bureau publishes population estimates rounded to 0 digits of decimal precision, the Division of Subsistence publishes 1 digit of decimal precision.

a. ACS data range is the reported margin of error.

b. No range of households is estimated for division surveys.

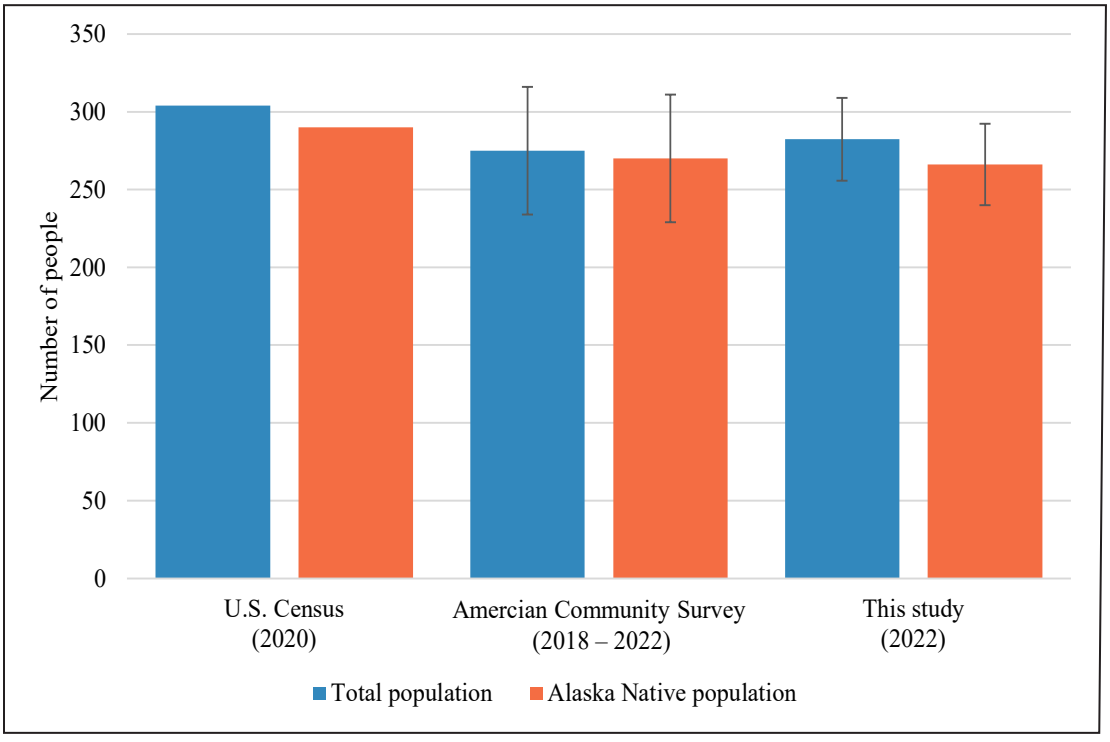


Figure 2-1.–Alaska Native and overall population estimates, Huslia, 2020 and 2023.

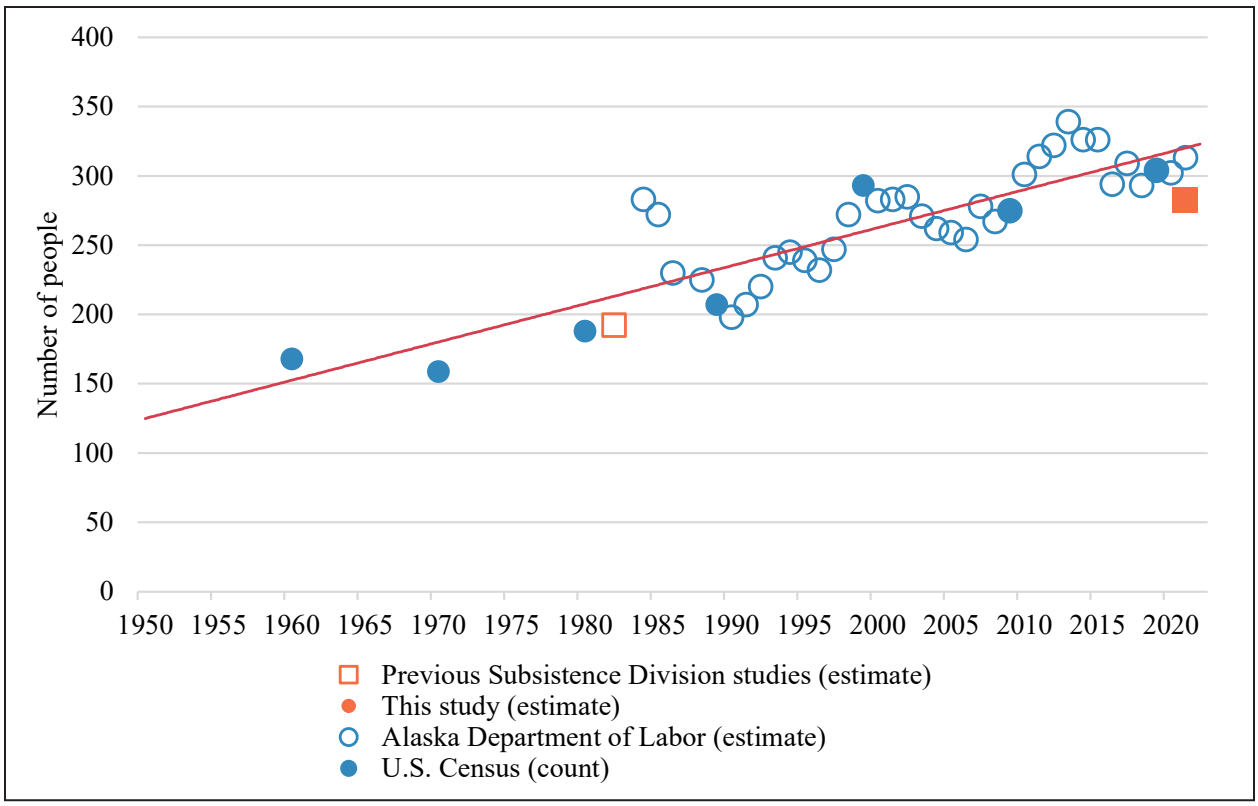


Figure 2-2.–Historical population estimates, Huslia, 1950–2022.

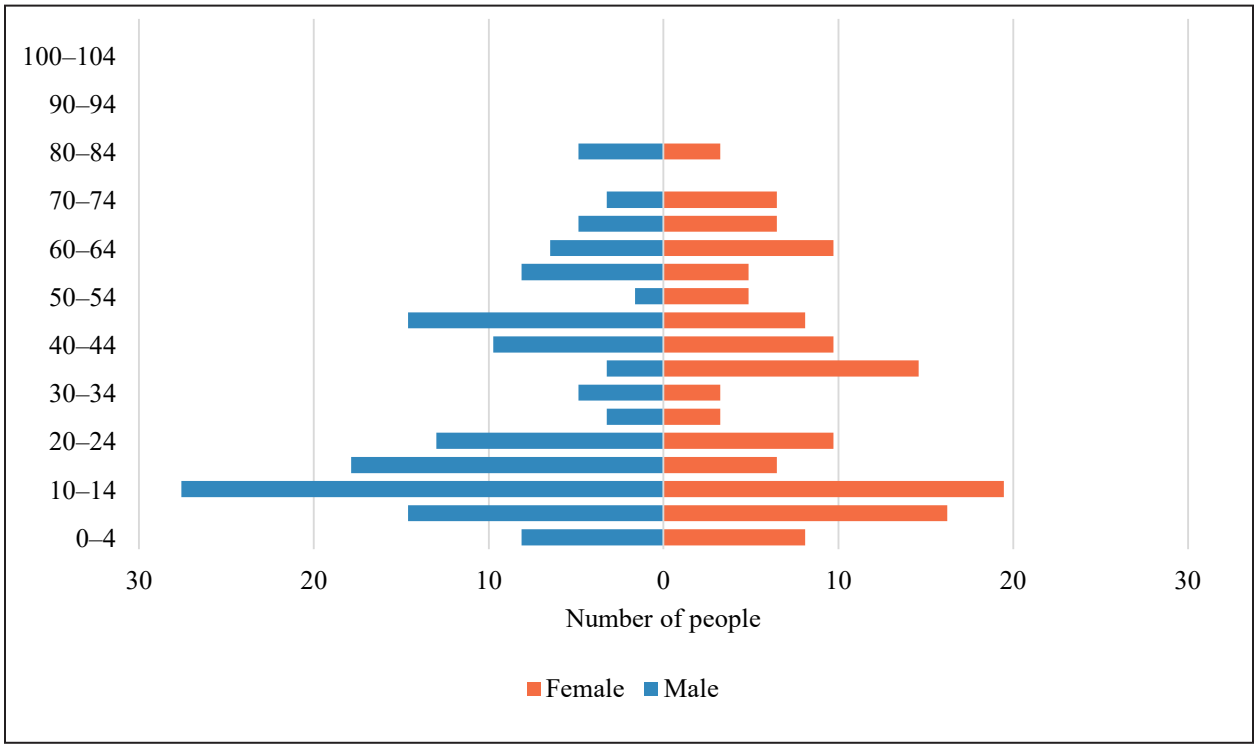


Figure 2-3.–Population profile, Huslia, 2022.

Table 2-2.–Population Age Profile, Huslia, 2022.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	8.1	5.5%	5.5%	8.1	6.0%	6.0%	16.2	5.7%	5.7%
5–9	14.6	9.9%	15.4%	16.2	12.0%	18.1%	30.8	10.9%	16.7%
10–14	27.6	18.7%	34.1%	19.5	14.5%	32.5%	47.1	16.7%	33.3%
15–19	17.8	12.1%	46.2%	6.5	4.8%	37.3%	24.3	8.6%	42.0%
20–24	13.0	8.8%	54.9%	9.7	7.2%	44.6%	22.7	8.0%	50.0%
25–29	3.2	2.2%	57.1%	3.2	2.4%	47.0%	6.5	2.3%	52.3%
30–34	4.9	3.3%	60.4%	3.2	2.4%	49.4%	8.1	2.9%	55.2%
35–39	3.2	2.2%	62.6%	14.6	10.8%	60.2%	17.8	6.3%	61.5%
40–44	9.7	6.6%	69.2%	9.7	7.2%	67.5%	19.5	6.9%	68.4%
45–49	14.6	9.9%	79.1%	8.1	6.0%	73.5%	22.7	8.0%	76.4%
50–54	1.6	1.1%	80.2%	4.9	3.6%	77.1%	6.5	2.3%	78.7%
55–59	8.1	5.5%	85.7%	4.9	3.6%	80.7%	13.0	4.6%	83.3%
60–64	6.5	4.4%	90.1%	9.7	7.2%	88.0%	16.2	5.7%	89.1%
65–69	4.9	3.3%	93.4%	6.5	4.8%	92.8%	11.4	4.0%	93.1%
70–74	3.2	2.2%	95.6%	6.5	4.8%	97.6%	9.7	3.4%	96.6%
75–79	0.0	0.0%	95.6%	0.0	0.0%	97.6%	0.0	0.0%	96.6%
80–84	4.9	3.3%	98.9%	3.2	2.4%	100.0%	8.1	2.9%	99.4%
85–89	0.0	0.0%	98.9%	0.0	0.0%	100.0%	0.0	0.0%	99.4%
90–94	0.0	0.0%	98.9%	0.0	0.0%	100.0%	0.0	0.0%	99.4%
95–99	0.0	0.0%	98.9%	0.0	0.0%	100.0%	0.0	0.0%	99.4%
100–104	0.0	0.0%	98.9%	0.0	0.0%	100.0%	0.0	0.0%	99.4%
Missing	1.6	1.1%	100.0%	0.0	0.0%	100.0%	1.6	0.6%	100.0%
Total	**147.7**	**100.0%**	**100.0%**	**134.7**	**100.0%**	**100.0%**	**282.3**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2023.

up 13% of the total population and individuals from ages 35–69 composed 38% of the total population. Household sizes ranged from 1 to 8 individuals and averaged 3 individuals per household (Table 2-3). The average length of residency in Huslia was 28 years for the total population and 44 years for those identifying as household heads. The majority percentage of both residents (71%) and household heads (56%) stated their parents resided in Huslia when they were born (tables 2-4 and 2-5). While less than 5% of respondents and household heads also identified several contemporary communities such as Fairbanks, Ambler, and Galena, a small percentage were born while their parents still lived in camps along the Koyukuk River (2% residents; 4% household heads).

Income and Cash Employment

Survey respondents were asked about both earned income (i.e., jobs held, and wages earned by all household members 16 and older) and other forms of income (e.g., Alaska Permanent Fund Dividend, Social Security payments, and adult public assistance). In 2022, 72% of Huslia adults were employed (Table 2-6). Of these, 44% were employed year-round. There was an average of two jobs per employed household, with a maximum of six jobs. Huslia households earned or received a combined $5,348,774 or an average household income of $62,195 (Table 2-7). Of the total community income $3,399,018 (64%) was earned income and $1,949,756 (37%) was other income. Table 2-8 shows the median income for Huslia estimated by this study as well as estimates by the ACS for Huslia between 2017 and 2021 and all of Alaska between 2018 and 2022. Results from this study indicate that the median annual income for Huslia residents in 2022 was $33,285; The median annual income values reported by ACS were $44,375 for Huslia and $80,287 for all of Alaska.

Overall, local government jobs provided the most income for Huslia residents in 2022, contributing an estimated $1,563,648 (29%) to the community's total income (Figure 2-4; Table 2-7). These local government jobs provided 45% of Huslia's total jobs and employed half of the residents (65% of households) (Table 2-9). The second largest income contributor was the Permanent Fund Dividend at $859,491 (16%; Figure 2-4). Income sources such as jobs in services ($502,321; 18% of jobs), retail trade ($215,913; 5% of jobs), mining ($163,738; 4% of jobs), and other income sources like Native corporation dividends ($337,561) and Social Security benefits ($251,988), each made up less than 10% of the total income (Figure 2-4; tables 2-7 and 2-9).

Summary of Harvest and Use Patterns

Individual Participation in the Harvesting and Processing of Wild Resources

Table 2-10 shows the expanded levels of individual participation in the harvest and processing of wild resources by all Huslia residents in 2022. Overall, 75% of Huslia residents hunted, fished, trapped, or gathered wild foods, and 79% helped to process these resources. Across nearly all resource categories, participation in processing was higher than participation in harvesting. The resource categories with the largest differences between individual harvest and processing participation were large land mammals (44% and 61%, respectively), and birds and eggs (39% and 52%, respectively). The exception was vegetation, where 61% of households gathered and 53% processed; unlike other resource groups, plants and berries do not require specialized equipment to harvest and can be accessed more easily around the community by harvesters of all age groups.

Harvest and Use of Wild Resources at the Household Level

Figure 2-5 shows by resource category the percentages of households that used, attempted to harvest, and harvested wild foods. Nearly all responding households used salmon (85%), large land mammals (98%), birds and eggs (85%), and vegetation (87%). Less than 50% of respondents harvested the majority of the resources, except for vegetation, which 70% of respondents reported harvesting. Residents reported using large land mammals more than any other category (98%). In this resource category, residents also reported the largest difference between attempted harvest (62%) and those that successfully harvested (40%). One respondent mentioned that competition between hunters had been an issue in the past during moose hunting season which, if still an issue, could explain the difference between how many households

Table 2-3.–Sample and demographic characteristics, Huslia, 2022.

Characteristics	Huslia
Sampled households	53
Eligible households	86
Percentage sampled	61.6%
Sampled population	174
Estimated community population	282.3
Household size	
Mean	3.3
Minimum	1
Maximum	8
Age	
Mean	31.7
Minimum[a]	0
Maximum	83
Median	24
Length of residency	
Total population	
Mean	28.2
Minimum[a]	1
Maximum	84
Heads of household	
Mean	44.2
Minimum[a]	3
Maximum	82
Alaska Native	
Estimated households[b]	
Number	84.4
Percentage	98.1%
Estimated population	
Number	266.1
Number percentage	94.3%

Source ADF&G Division of Subsistence household surveys, 2023.

a. A minimum age of 0 (zero) is used for infants who are less than 1 year of age.

b. The estimated number of households in which at least 1 head of household is Alaska Native.

Table 2-4.–Birthplaces of population, Huslia, 2022.

Birthplace	Percentage
Ambler	1.1%
Anchorage	0.6%
Fairbanks	6.3%
Galena	1.1%
Hughes	1.7%
Huslia	71.3%
Kaltag	0.6%
Koyukuk	1.7%
Nulato	1.7%
Ruby	0.6%
Saint George	0.6%
Tanana	1.1%
Allakaket	2.3%
Cutoff	1.1%
Koyukuk River	1.7%
Other U.S.	5.2%
Missing	1.1%

Source ADF&G Division of Subsistence household surveys, 2023.

Note "Birthplace" means the residence of the parents of the individual when the individual was born.

Table 2-5.–Birthplaces of household heads, Huslia, 2022.

Birthplace	Percentage
Ambler	2.5%
Fairbanks	1.3%
Galena	2.5%
Hughes	3.8%
Huslia	55.7%
Kaltag	1.3%
Koyukuk	3.8%
Nulato	3.8%
Ruby	1.3%
Saint George	1.3%
Tanana	2.5%
Allakaket	3.8%
Cutoff	2.5%
Koyukuk River	3.8%
Other U.S.	8.9%
Missing	1.3%

Source ADF&G Division of Subsistence household surveys, 2023.

Note "Birthplace" means the residence of the parents of the individual when the individual was born.

Table 2-6.–Employment characteristics, Huslia, 2022.

Characteristic	Huslia
All adults	
Number	182.8
Mean weeks employed	25.4
Employed adults	
Number	132.1
Percentage	72.3%
Jobs	
Number	170.0
Mean	1.3
Minimum	1
Maximum	3
Months employed	
Mean	8.1
Minimum	1
Maximum	12
Percentage employed year-round	44.3%
Mean weeks employed	35.2
Households	
Number	86
Employed	
Number	76.1
Percentage	88.5%
Jobs per employed household	
Mean	2.2
Minimum	1
Maximum	6
Employed adults	
Mean	
Employed households	1.7
Total households	1.5
Minimum	1
Maximum	6
Mean person-weeks of employment	61.0

Source ADF&G Division of subsistence households surveys, 2023.

Table 2-7.–Estimated earned and other income, Huslia, 2022.

Income source	Estimated number of employed adults	Estimated number of households	Estimated income for community	95% Confidence interval range	Mean per household	Percentage of total community income
Earned income						
Local government, including tribal	65.9	49.5	$1,563,648	$1,019,107 – $2,248,798	$18,182	29.2%
Services	28.1	23.2	$502,321	$243,719 – $814,130	$5,841	9.4%
Industry not specified	26.4	21.4	$413,952	$98,834 – $1,140,310	$4,813	7.7%
Retail trade	8.3	8.3	$215,913	$71,370 – $419,437	$2,511	4.0%
Transportation, communication, and utilities	4.9	4.9	$187,376	$11,406 – $635,042	$2,179	3.5%
Mining	6.4	6.4	$163,738	$19,010 – $483,156	$1,904	3.1%
Federal government	4.8	4.8	$119,931	$0 – $306,521	$1,395	2.2%
Agriculture, forestry, and fishing	3.3	3.3	$100,983	$0 – $374,497	$1,174	1.9%
Construction	5.0	3.3	$87,492	$0 – $313,792	$1,017	1.6%
Manufacturing	3.4	3.4	$43,664	$0 – $129,252	$508	0.8%
Earned income subtotal	**132.1**	**76.1**	**$3,399,018**	**$2,543,559 – $4,531,655**	**$39,523**	**63.5%**
Other income						
Alaska Permanent Fund		82.8	$859,491	$719,382 – $1,017,792	$9,994	16.1%
Native Corp. Dividend		82.8	$337,561	$259,454 – $434,762	$3,925	6.3%
Social Security		19.3	$251,988	$83,005 – $436,374	$2,930	4.7%
Pension/Retirement		6.4	$150,512	$3,273 – $392,679	$1,750	2.8%
Food Stamps		14.6	$122,950	$27,348 – $267,478	$1,430	2.3%
Energy assistance		30.9	$64,894	$24,800 – $128,252	$755	1.2%
Unemployment		12.9	$62,828	$14,620 – $155,548	$731	1.2%
Child support		4.9	$55,005	$671 – $165,318	$640	1.0%
Disability		4.9	$18,390	$217 – $73,290	$214	0.3%
Other income, continued						
Other		3.3	$10,277	$0 – $30,668	$120	0.2%
Adult Public Assistance (OAA, APD)		1.7	$7,253	$0 – $35,244	$84	0.1%
Supplimental Security Income (SSI)		1.7	$7,253	$0 – $35,244	$84	0.1%
Rental income		1.6	$812	$0 – $2,849	$9	0.0%
Longevity Bonus		1.6	$542	$0 – $2,373	$6	0.0%
TANF (Temp. Cash Asst. for needy families)		0.0	$0	$0 – $0	$0	0.0%
Workmans comp		0.0	$0	$0 – $0	$0	0.0%
Veterans assistance		0.0	$0	$0 – $0	$0	0.0%

-continued-

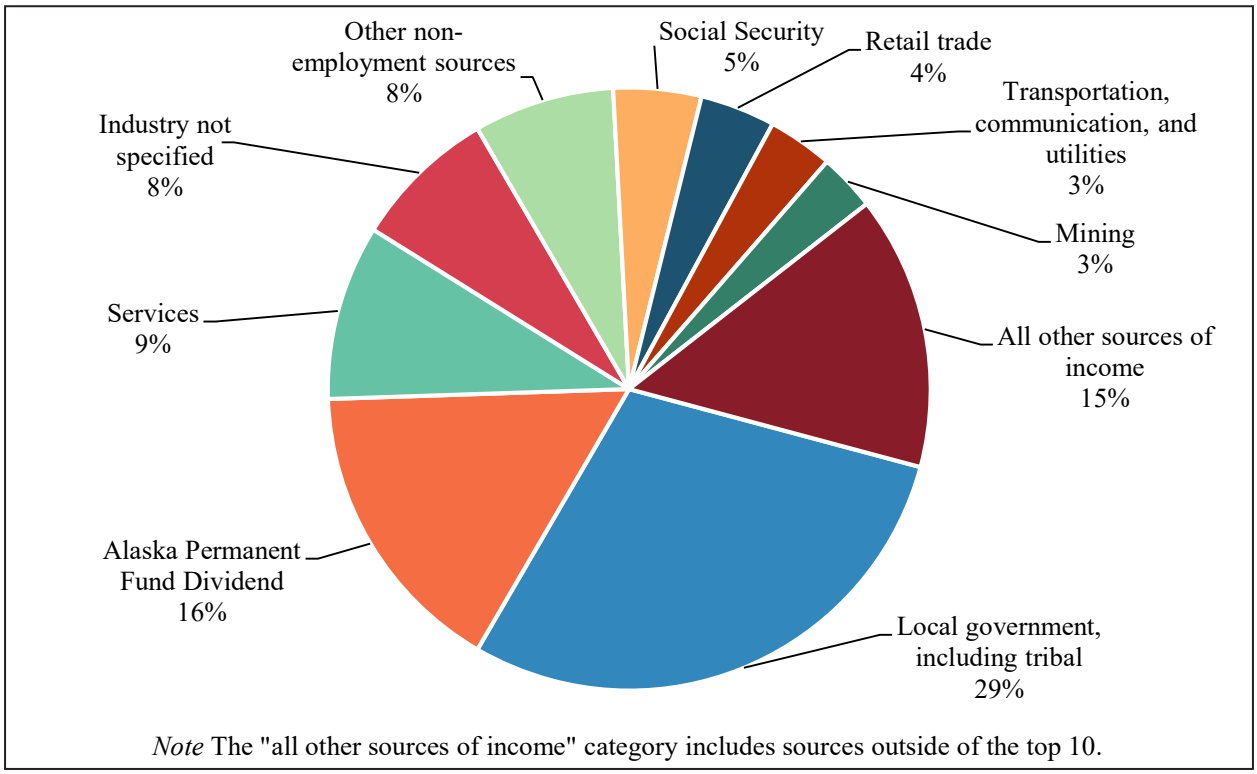
Table 2-7.–Page 2 of 2.

Income source	Estimated number of employed adults	Estimated number of households	Estimated income for community	95% Confidence interval range	Mean per household	Percentage of total community income
Foster care		0.0	$0	$0 – $0	$0	0.0%
Fuel Vouchers		0.0	$0	$0 – $0	$0	0.0%
Meeting Honoraria		0.0	$0	$0 – $0	$0	0.0%
Economic impact payment (stimulus check)		0.0	$0	$0 – $0	$0	0.0%
Other income subtotal		**84.4**	**$1,949,756**	**$1,593,160 – $2,370,248**	**$22,672**	**36.5%**
Community income total		**85.8**	**$5,348,774**	**$4,389,031 – $6,452,905**	**$62,195**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2023.

Note Lower range confidence intervals for non-zero income estimates indicate low precision and high variability. Total reported income from survey forms for these income sources may plausibly be the total community income for that source. Reported values are omitted to maintain confidentiality.

Note Any zero amount that is in black font indicates a value that is smaller than 0.05.



Note The "all other sources of income" category includes sources outside of the top 10.

Figure 2-4.–Top income sources, Huslia, 2022.

Table 2-8.–Comparison of median household income estimates, Huslia, 2022.

Data source	Median[a]	Range[b,c]
2022 Division of Subsistence estimate	$33,285	$26,000 – $56,000
2017–2021 ACS (Huslia)	$44,375	$28,671 – $60,079
2018–2022 ACS (All Alaska)	$80,287	$79,242 – $81,332

Sources ADF&G Division of Subsistence household surveys, 2019 for 2022 estimate; U.S. Census Bureau for American Community Survey (ACS) 5-year survey estimate.

a. 2022 Division of Subsistence estimate does not include categories of income excluded in the 2017–2021 and 2018–2022 ACS median estimates, including food stamps, housing assistance, and one-time payments.

b. Range is a 95% confidence interval of the estimated median.

c. ACS data range is the reported margin of error.

Table 2-9.–Employment by industry, Huslia, 2022.

Industry	Jobs	Households	Individuals	Percentage of wage earnings
All industries	**170.0**	**76.1**	**132.1**	**$3,399,018**
Federal government	**2.9%**	**6.4%**	**3.7%**	**3.5%**
Executive, administrative, and managerial	1.0%	2.2%	1.3%	1.4%
Service occupations	0.9%	2.0%	1.2%	0.7%
Handlers, equipment cleaners, helpers, and laborers	1.0%	2.1%	1.2%	1.5%
Local government, including tribal	**44.7%**	**65.0%**	**49.9%**	**46.0%**
Executive, administrative, and managerial	4.9%	11.0%	6.4%	11.8%
Engineers, surveyors, and architects	1.0%	2.1%	1.2%	0.2%
Social scientists, social workers, religious workers, and lawyers	1.0%	2.2%	1.3%	0.5%
Teachers, librarians, and counselors	7.7%	15.0%	9.9%	9.7%
Administrative support occupations, including clerical	2.9%	6.4%	3.7%	4.1%
Service occupations	8.8%	17.4%	10.0%	4.8%
Mechanics and repairers	0.9%	2.1%	1.2%	0.6%
Construction and extractive occupations	3.9%	8.6%	5.0%	5.2%
Precision production occupations	2.0%	4.4%	2.6%	3.7%
Transportation and material moving occupations	1.9%	4.3%	2.5%	0.5%
Handlers, equipment cleaners, helpers, and laborers	5.9%	6.6%	7.6%	4.3%
Miscellaneous occupations	3.9%	8.6%	5.0%	0.8%
Agriculture, forestry, and fishing	**1.9%**	**4.3%**	**2.5%**	**3.0%**
Agricultural, forestry, and fishing occupations	1.9%	4.3%	2.5%	3.0%

-continued-

Table 2-9.–Page 2 of 2.

Industry	Jobs	Households	Individuals	Percentage of wage earnings
Mining	**3.8%**	**8.5%**	**4.9%**	**4.8%**
Service occupations	1.0%	2.1%	1.2%	0.8%
Handlers, equipment cleaners, helpers, and laborers	2.8%	6.3%	3.6%	4.0%
Construction	**2.9%**	**4.3%**	**3.8%**	**2.6%**
Construction and extractive occupations	1.9%	4.3%	2.5%	2.4%
Handlers, equipment cleaners, helpers, and laborers	1.0%	2.2%	1.3%	0.2%
Manufacturing	**2.0%**	**4.4%**	**2.6%**	**1.3%**
Writers, artists, entertainers, and athletes	2.0%	4.4%	2.6%	1.3%
Transportation, communication, and utilities	**2.9%**	**6.5%**	**3.7%**	**5.5%**
Marketing and sales occupations	1.0%	2.2%	1.2%	0.4%
Precision production occupations	0.9%	2.1%	1.2%	0.5%
Transportation and material moving occupations	1.0%	2.2%	1.3%	4.6%
Retail trade	**4.9%**	**10.9%**	**6.3%**	**6.4%**
Executive, administrative, and managerial	3.0%	6.6%	3.8%	3.7%
Retail trade, continued				
Administrative support occupations, including clerical	1.0%	2.2%	1.2%	1.3%
Handlers, equipment cleaners, helpers, and laborers	1.0%	2.2%	1.2%	1.3%
Services	**17.5%**	**30.5%**	**21.3%**	**14.8%**
Social scientists, social workers, religious workers, and lawyers	2.0%	4.4%	2.5%	4.3%
Teachers, librarians, and counselors	1.0%	2.2%	1.3%	1.2%
Writers, artists, entertainers, and athletes	1.9%	4.3%	2.5%	0.2%
Service occupations	9.7%	19.5%	12.5%	7.1%
Construction and extractive occupations	1.0%	2.1%	1.2%	1.5%
Handlers, equipment cleaners, helpers, and laborers	1.9%	4.4%	2.5%	0.4%
Industry not specified	**16.5%**	**28.1%**	**20.0%**	**12.2%**
Executive, administrative, and managerial	1.9%	4.3%	2.5%	3.9%
Technologists and technicians, except health	1.0%	2.2%	1.3%	0.2%
Administrative support occupations, including clerical	1.0%	2.2%	1.3%	0.9%
Service occupations	1.9%	4.3%	2.5%	0.7%
Handlers, equipment cleaners, helpers, and laborers	1.9%	4.3%	2.5%	0.3%
Miscellaneous occupations	1.0%	2.2%	1.3%	0.2%
Occupation not specified	7.7%	17.3%	9.9%	5.9%

Source ADF&G Division of Subsistence household surveys, 2023.

Table 2-10.–Individual participation in subsistence harvesting and processing activities, Huslia, 2022.

Total number of people	**282.3**
Fish	
Fish	
Number	100.6
Percentage	35.6%
Process	
Number	112.0
Percentage	39.7%
Large land mammals	
Hunt	
Number	124.9
Percentage	44.3%
Process	
Number	173.6
Percentage	61.5%
Small land mammals	
Hunt or trap	
Number	51.9
Percentage	18.4%
Process	
Number	56.8
Percentage	20.1%
Marine mammals	
Hunt	
Number	0.0
Percentage	0.0%
Process	
Number	0.0
Percentage	0.0%
Birds and eggs	
Hunt/gather	
Number	110.3
Percentage	39.1%
Process	
Number	146.0

-continued-

Table 2-10.–Continued.

Total number of people	**282.3**
Percentage	51.7%
Marine invertebrates	
Gather	
Number	3.2
Percentage	1.1%
Process	
Number	3.2
Percentage	1.1%
Vegetation	
Gather	
Number	173.6
Percentage	61.5%
Process	
Number	150.9
Percentage	53.4%
Any resource	
Attempt harvest	
Number	210.9
Percentage	74.7%
Process	
Number	222.3
Percentage	78.7%

Source ADF&G Division of Subsistence household surveys, 2023.

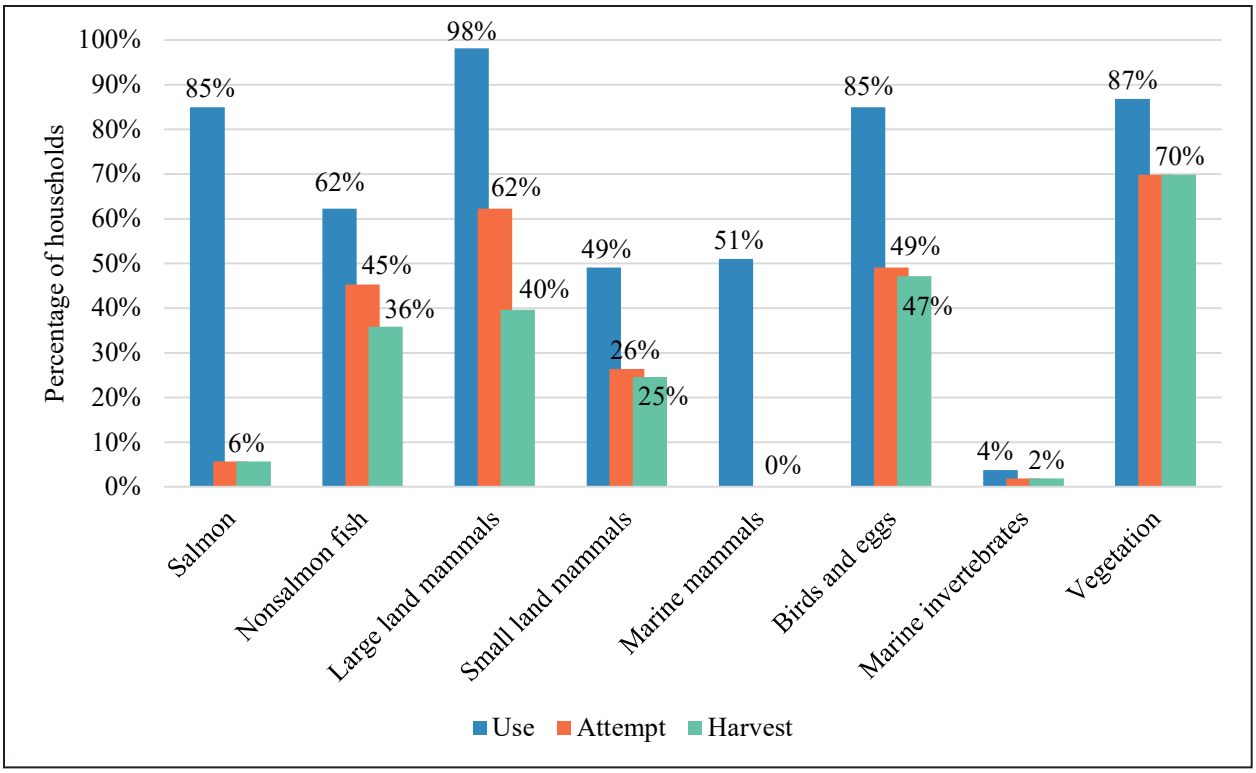


Figure 2-5.–Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Huslia, 2022.

attempted to harvest, and those that were successful (03242023HSL04). This could also be due to groups hunting together and harvesting only one animal per group. Only the hunter that shoots the animal is recorded as successfully harvesting while the others are recorded as attempting. The substantial difference between harvest and use among households indicates that this resource is significantly shared throughout the community. The salmon and marine mammals use is also significant as only 6% reported harvesting salmon and 0% reported harvesting marine mammals. The significant difference between the use and harvest of salmon is related to low salmon returns during the study year and is detailed in the salmon section of Use and Harvest Characteristics by Resource Category below. In contrast, marine resources are not typically available to Huslia as a boreal, riverine community. Rather, there is a long history of extensive trade networks throughout Alaska, and Huslia often receives seal oil and muktuk from coastal communities (Brown et al. 2017; Magdanz and Wolfe 1988).

Table 2-11 summarizes resource harvest and use characteristics for Huslia in 2022 at the household level. The average harvest was 711 lb usable weight of wild food per household. During the study year, community households harvested an average of 7 kinds of resources and used an average of 13 kinds of resources. The maximum number of resources used by any household was 42. In addition, households gave away an average of 5 kinds of resources. Overall, as many as 105 resources were reported as available for households to harvest in the study area; this included species that survey respondents identified but were not asked about in the survey instrument.

Sharing of Wild Resources

Household Specialization in Resource Harvesting

Previous studies (Wolfe 1987; Wolfe et al. 2010) have shown that in most rural Alaska communities, a relatively small portion of households produces most of the community's fish and wildlife harvests, which they share with other households. A study of 3,265 households in 66 rural Alaska communities found that

Table 2-11.–Resource harvest and use characteristics, Huslia, 2022.

Characteristic	Huslia
Mean number of resources used per household	12.7
Minimum	1
Maximum	42
95% confidence interval (±)[a]	12.8%
Median	10
Mean number of resources attempted to harvest per household	7.7
Minimum	0
Maximum	40
95% confidence interval (±)[a]	20.8%
Median	4
Mean number of resources harvested per household	6.9
Minimum	0
Maximum	39
95% confidence interval (±)[a]	22.4%
Median	3
Mean number of resources received per household	7.0
Minimum	1
Maximum	22
95% confidence interval (±)[a]	12.7%
Median	6
Mean number of resources given away per household	5.2
Minimum	0
Maximum	31
95% confidence interval (±)[a]	21.3%
Median	3
Mean household harvest (lb)	710.7
Minimum	0.0
Maximum	8,807.2
Median	88.0
Total harvest weight (lb)	61,118.4
Community per capita harvest (lb)	216.5
Percentage using any resource	100.0%
Percentage attempting to harvest any resource	88.7%
Percentage harvesting any resource	79.2%
Percentage receiving any resource	100.0%
Percentage giving away any resource	83.0%
Number of resources on the survey[b]	105

Source ADF&G Division of Subsistence household surveys, 2023.

a. 95% confidence intervals are calculated as a percentage range around the mean.

b. Includes resources printed on the survey and any resource volunteered by one or more households.

about 33% of the households accounted for 76% of subsistence harvests (Wolfe et al. 2010). Although overall the set of very productive households was diverse, factors that were associated with higher levels of subsistence harvests included larger households with a pool of adult male labor, higher wage income, involvement in commercial fishing, and community location.

As shown in Figure 2-6, in the 2022 study year in Huslia, about 69% of the harvests of wild resources as estimated in pounds usable weight were harvested by 13% of the community's households. This percentage is lower than earlier estimates described above, and this may be in part due to the lack of subsistence fishing opportunities in recent years. Salmon fishing, as opposed to large land mammal hunting, is more common among households of all types, which can increase the number of productive households in a community. Further analysis of the study findings, beyond the scope of this report, might identify characteristics of the highly productive households in Huslia and the other study communities.

Harvest Quantities and Composition

Table 2-12 reports estimated wild resource harvests and use by Huslia residents in 2022 and is organized first by general category and then by species. All edible resources are reported in pounds usable weight (see appendices C and D for conversion factors).[6] The harvest category includes resources harvested by any member of the surveyed household during the study year. The use category includes all resources taken, given away, or used by a household, and resources acquired from other harvesters, either as gifts, by barter or trade, through hunting partnerships, or as meat given by hunting guides and non-local hunters. Purchased foods are not included, but resources such as firewood are included because they are an important part of the subsistence way of life. Differences between harvest and use percentages reflect sharing among households, which results in a wider distribution of wild foods.

In 2022, Huslia residents harvested a total of 61,118 lb (217 lb per capita) of wild resources (Table 2-12). Large land mammals made up the greatest percentage of the total harvest (44%) with a total of 26,683 lb (95 lb per capita) harvested by Huslia residents in 2022 (Table 2-12; Figure 2-7). Nonsalmon fish accounted for 42% of the harvest (25,595 lb total, 91 lb per capita). The other five categories each made up less than 5% of the total harvest weight.

Use and Harvest Characteristics by Resource Category

Table 2-12 lists all reported resources that Huslia households used in 2022. The table shows the percentage of households that used, attempted to harvest, successfully harvested, received, and gave away each resource. Additionally, the table displays the same percentages for the overall resource categories. The percentage of households using is frequently higher than the percentage harvesting a resource due to a high rate of sharing wild foods within the community. Except for marine invertebrates and vegetation, all resource categories showed this difference between harvest and use. Virtually all Huslia households reported using large land mammals (98%) in 2022, despite less than half reporting harvest (40%). This difference can be explained by the high rate of sharing that was reported (64% gave away; 83% received). While salmon had one of the lowest rates of harvest (6%), due to the restrictions placed on the Yukon River drainage, nearly all households used (85%) salmon in 2022. Unlike the large land mammal resource there was very little salmon reported as given away (28%), but 81% of households received salmon in 2022. TCC coordinated with local tribal councils across the region, including the one in Huslia, to distribute boxes of frozen Chinook and chum salmon, from Bristol Bay and Kodiak fisheries to Huslia households.[7]

Table 2-13 lists the top-ranked resources used by households, and Figure 2-8 shows the species with the highest harvest by weight during the 2022 study year. Moose was not only the most used resource (96% of

6. Resources that are not eaten, such as firewood and some furbearers, are included in the table but are assigned a conversion factor of zero.
7. Fishermen's News, "2022 Seafood Donations to the Yukon River Villages Via SeaShare Reach 74,000 Pounds," Accessed May 15, 2024, https://fishermensnews.com/article/2022-seafood-donations-to-yukon-river-villages-via-seashare-reach-74000-pounds/

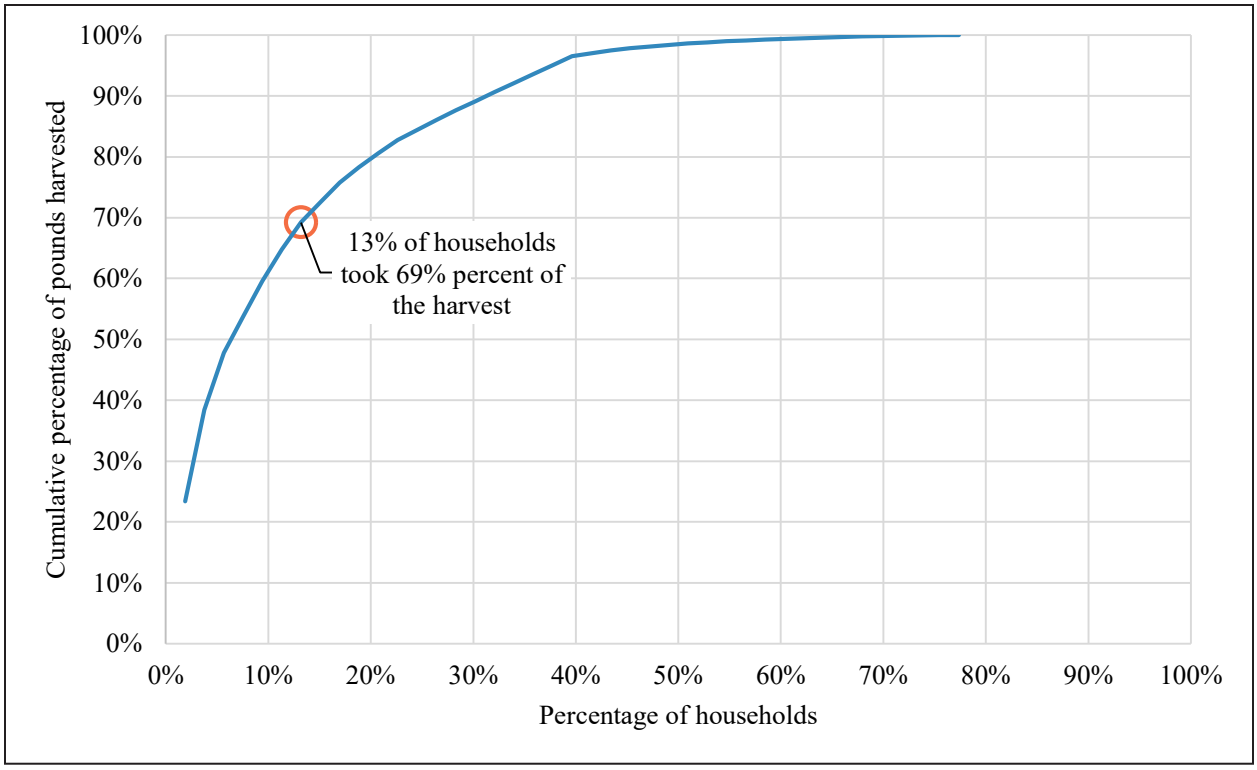


Figure 2-6.–Household specialization, Huslia, 2022.

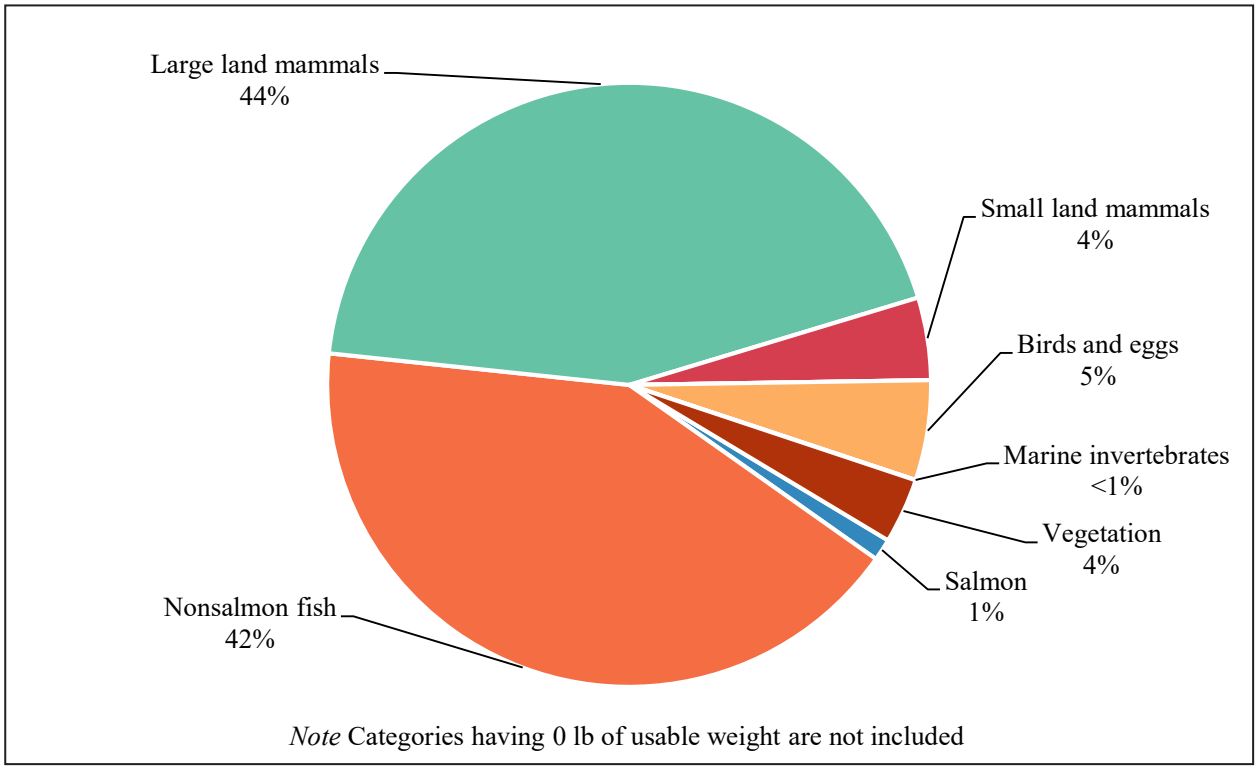


Figure 2-7.–Composition of harvest in pound usable weight, by resource category, Huslia, 2022.

Table 2-12.–Estimated use and harvest of fish, game, and vegetation resources, Huslia, 2022.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount[a]			CI (±) harvest[b] %
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
All resources	**100.0**	**88.7**	**79.2**	**100.0**	**83.0**	**61,118.4**	**710.7**	**216.5**	**61,118.4**	**lb**	**710.7**	**36.5**
Salmon	**84.9**	**5.7**	**5.7**	**81.1**	**28.3**	**721.0**	**8.4**	**2.6**	**92.5**	**ind**	**1.1**	**114.7**
Summer chum salmon	3.8	1.9	1.9	1.9	1.9	138.8	1.6	0.5	24.3	ind	0.3	124.3
Fall chum salmon	7.5	3.8	3.8	3.8	3.8	212.8	2.5	0.8	37.3	ind	0.4	109.0
Coho salmon	3.8	1.9	1.9	1.9	0.0	7.6	0.1	0.0	1.6	ind	0.0	124.3
Chinook salmon	1.9	1.9	1.9	0.0	0.0	340.8	4.0	1.2	24.3	ind	0.3	124.3
Pink salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Sockeye salmon	1.9	1.9	1.9	0.0	1.9	21.1	0.2	0.1	4.9	ind	0.1	124.3
Unspecified salmon	81.1	0.0	0.0	81.1	22.6	0.0	0.0	0.0	0.0	ind	0.0	0.0
Nonsalmon fish	**62.3**	**45.3**	**35.8**	**41.5**	**22.6**	**25,595.1**	**297.6**	**90.7**	**25,595.1**	**lb**	**297.6**	**65.4**
Pacific herring	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pacific herring roe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pacific halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	lb	0.0	0.0
Alaska blackfish	1.9	1.9	1.9	0.0	1.9	1.1	0.0	0.0	1.6	ind	0.0	0.0
Burbot	13.2	5.7	5.7	7.5	3.8	204.5	2.4	0.7	48.7	ind	0.6	87.0
Dolly Varden	3.8	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Arctic grayling	5.7	1.9	0.0	5.7	1.9	0.0	0.0	0.0	0.0	ind	0.0	0.0
Northern pike	32.1	30.2	26.4	9.4	13.2	16,123.1	187.5	57.1	4,885.8	ind	56.8	84.5
Sheefish	50.9	32.1	24.5	34.0	20.8	5,095.9	59.3	18.0	926.5	ind	10.8	68.9
Broad whitefish	24.5	22.6	17.0	13.2	13.2	1,872.3	21.8	6.6	585.1	ind	6.8	77.3
Bering cisco	1.9	1.9	1.9	0.0	1.9	170.4	2.0	0.6	121.7	ind	1.4	124.3
Least cisco	1.9	1.9	1.9	0.0	1.9	22.7	0.3	0.1	32.5	ind	0.4	124.3
Unspecified ciscoes	1.9	1.9	1.9	0.0	1.9	4.9	0.1	0.0	3.9	ind	0.0	124.3
Humpback whitefish	17.0	15.1	11.3	5.7	9.4	573.8	6.7	2.0	273.2	ind	3.2	68.3
Round whitefish	3.8	1.9	1.9	1.9	1.9	11.4	0.1	0.0	16.2	ind	0.2	124.3

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Table 2-12.–Page 2 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount[a]			CI (±) harvest[b] %
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Unspecified whitefishes	11.3	7.5	7.5	5.7	3.8	1,515.1	17.6	5.4	382.9	ind	4.5	105.7
Nonsalmon fish, continued												
Unspecified nonsalmon fish	1.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Large land mammals	**98.1**	**62.3**	**39.6**	**83.0**	**64.2**	**26,682.5**	**310.3**	**94.5**	**97.4**	**ind**	**1.1**	**24.0**
Black bear	20.8	15.1	7.5	18.9	7.5	605.4	7.0	2.1	22.7	ind	0.3	117.2
Brown bear	9.4	7.5	5.7	3.8	5.7	290.0	3.4	1.0	9.7	ind	0.1	119.6
Caribou	43.4	11.3	9.4	35.8	17.0	3,089.5	35.9	10.9	22.7	ind	0.3	68.4
Moose	96.2	60.4	35.8	69.8	54.7	22,697.5	263.9	80.4	42.2	ind	0.5	26.1
Common muskox	1.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Dall sheep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Small land mammals	**49.1**	**26.4**	**24.5**	**37.7**	**20.8**	**2,703.2**	**31.4**	**9.6**	**1,096.9**	**ind**	**12.8**	**58.8**
Beaver	47.2	22.6	20.8	34.0	20.8	2,597.6	30.2	9.2	266.1	ind	3.1	60.4
Arctic fox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Red fox	5.7	5.7	5.7	0.0	1.9	0.0	0.0	0.0	51.9	ind	0.6	72.4
Snowshoe hare	5.7	7.5	5.7	0.0	5.7	50.6	0.6	0.2	210.9	ind	2.5	119.6
Lynx	9.4	9.4	9.4	0.0	3.8	0.0	0.0	0.0	94.1	ind	1.1	59.5
Martens	9.4	7.5	7.5	1.9	3.8	0.0	0.0	0.0	185.0	ind	2.2	66.3
Mink	1.9	1.9	1.9	0.0	0.0	0.0	0.0	0.0	6.5	ind	0.1	124.3
Muskrat	5.7	7.5	1.9	3.8	1.9	0.0	0.0	0.0	97.4	ind	1.1	124.3
Porcupine	11.3	9.4	9.4	3.8	5.7	55.0	0.6	0.2	51.9	ind	0.6	117.2
Gray wolf	11.3	11.3	9.4	1.9	7.5	0.0	0.0	0.0	97.4	ind	1.1	60.8
Wolverine	7.5	7.5	7.5	1.9	3.8	0.0	0.0	0.0	35.7	ind	0.4	63.2
Marine mammals	**50.9**	0.0	0.0	**50.9**	**17.0**	0.0	0.0	0.0	0.0	**ind**	0.0	0.0
Bearded seal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

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Table 2-12.–Page 3 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount[a]			CI (±) harvest[b] %
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Unspecified seals	24.5	0.0	0.0	24.5	7.5	0.0	0.0	0.0	0.0	ind	0.0	0.0
Bowhead whale	7.5	0.0	0.0	7.5	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified whales	39.6	0.0	0.0	39.6	11.3	0.0	0.0	0.0	0.0	ind	0.0	0.0
Birds and eggs	**84.9**	**49.1**	**47.2**	**56.6**	**39.6**	**3,271.4**	**38.0**	**11.6**	**1,818.5**	**ind**	**21.1**	**39.7**
Bufflehead	1.9	1.9	1.9	0.0	1.9	4.6	0.1	0.0	8.1	ind	0.1	124.3
Canvasback	3.8	3.8	3.8	0.0	3.8	31.1	0.4	0.1	17.8	ind	0.2	87.4
Unspecified eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified goldeneyes	1.9	1.9	1.9	0.0	1.9	10.3	0.1	0.0	8.1	ind	0.1	124.3
Mallard	20.8	17.0	17.0	5.7	11.3	172.4	2.0	0.6	107.1	ind	1.2	56.4
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Northern pintail	13.2	11.3	11.3	1.9	3.8	86.2	1.0	0.3	73.0	ind	0.8	66.2
Black scoter	7.5	7.5	7.5	0.0	3.8	120.1	1.4	0.4	79.5	ind	0.9	102.0
Surf scoter	1.9	1.9	1.9	0.0	1.9	47.4	0.6	0.2	32.5	ind	0.4	124.3
White-winged scoter	3.8	3.8	3.8	0.0	3.8	29.6	0.3	0.1	11.4	ind	0.1	95.0
Unspecified scoters	1.9	1.9	1.9	0.0	1.9	5.2	0.1	0.0	3.2	ind	0.0	124.3
Northern shoveler	3.8	3.8	3.8	0.0	3.8	8.4	0.1	0.0	9.7	ind	0.1	87.0
Unspecified teals	5.7	3.8	3.8	1.9	1.9	4.6	0.1	0.0	9.7	ind	0.1	104.6
American wigeon	9.4	7.5	7.5	3.8	5.7	57.9	0.7	0.2	55.2	ind	0.6	82.3
Unspecified ducks	5.7	0.0	0.0	5.7	1.9	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified Canada/ cackling geese	67.9	39.6	35.8	43.4	30.2	1,120.5	13.0	4.0	395.9	ind	4.6	53.4
Snow goose	11.3	7.5	5.7	7.5	3.8	31.8	0.4	0.1	11.4	ind	0.1	91.5
Greater white-fronted goose	49.1	32.1	30.2	24.5	20.8	916.9	10.7	3.2	288.3	ind	3.4	37.2
Unspecified geese	3.8	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified swans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

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Table 2-12.–Page 4 of 5.

Resource	Percentage of households: Use %	Attempt %	Harvest %	Receive %	Give %	Harvest weight (lb): Total	Mean per household	Per capita	Harvest amount[a]: Total	Unit	Mean per household	CI (±) harvest[b] %
Sandhill crane	1.9	1.9	1.9	0.0	1.9	35.0	0.4	0.1	6.5	ind	0.1	124.3
Unspecified loons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Spruce grouse	39.6	28.3	26.4	17.0	15.1	388.9	4.5	1.4	457.6	ind	5.3	57.1
Birds and Eggs, continued												
Sharp-tailed grouse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Ruffed grouse	9.4	7.5	7.5	1.9	3.8	146.2	1.7	0.5	172.0	ind	2.0	77.8
Unspecified grouses	3.8	1.9	1.9	1.9	1.9	7.4	0.1	0.0	8.1	ind	0.1	124.3
Ptarmigans	13.2	7.5	7.5	5.7	1.9	46.2	0.5	0.2	60.0	ind	0.7	86.8
Duck eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Goose eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Gull eggs	1.9	1.9	1.9	0.0	0.0	0.7	0.0	0.0	3.2	ind	0.0	124.3
Marine invertebrates	**3.8**	**1.9**	**1.9**	**3.8**	**0.0**	**3.9**	**0.0**	**0.0**	**3.9**	**lb**	**0.0**	**124.3**
Butter clam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Freshwater clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Razor clam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Unspecified clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Dungeness crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
King crabs	1.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Tanner crab	1.9	1.9	1.9	1.9	0.0	3.9	0.0	0.0	9.7	ind	0.1	124.3
Unspecified crabs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Vegetation	**86.8**	**69.8**	**69.8**	**49.1**	**49.1**	**2,141.3**	**24.9**	**7.6**	**610.5**	**gal**	**7.1**	**33.5**
Blueberry	64.2	49.1	45.3	34.0	30.2	701.2	8.2	2.5	175.3	gal	2.0	31.3
Lowbush cranberry	69.8	47.2	47.2	32.1	34.0	846.8	9.8	3.0	211.7	gal	2.5	36.6
Highbush cranberry	37.7	22.6	22.6	17.0	9.4	250.7	2.9	0.9	62.7	gal	0.7	49.1
Crowberry	11.3	7.5	7.5	3.8	5.7	12.2	0.1	0.0	3.0	gal	0.0	75.2

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Table 2-12.–Page 5 of 5.

Resource	Percentage of households: Use %	Attempt %	Harvest %	Receive %	Give %	Harvest weight (lb): Total	Mean per household	Per capita	Harvest amount[a]: Total	Unit	Mean per household	CI (±) harvest[b] %
Cloudberry	62.3	39.6	39.6	30.2	20.8	212.1	2.5	0.8	53.0	gal	0.6	34.5
Raspberry	17.0	13.2	13.2	5.7	0.0	67.3	0.8	0.2	16.8	gal	0.2	85.5
Other wild berries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Wild rhubarb	1.9	1.9	1.9	0.0	0.0	0.4	0.0	0.0	0.4	gal	0.0	124.3
Vegetation, continued												
Wild potato	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Hudson's Bay (Labrador) tea	17.0	11.3	11.3	7.5	5.7	13.6	0.2	0.0	13.6	gal	0.2	68.2
Dandelion greens	1.9	1.9	1.9	0.0	1.9	1.6	0.0	0.0	1.6	gal	0.0	124.3
Spruce tips	5.7	5.7	5.7	0.0	1.9	0.0	0.0	0.0	22.7	gal	0.3	92.4
Wild rose hips	9.4	7.5	7.5	1.9	3.8	26.5	0.3	0.1	6.6	gal	0.1	74.2
Yarrows	1.9	1.9	1.9	1.9	0.0	1.6	0.0	0.0	1.6	gal	0.0	124.3
Other wild greens	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Unspecified mushrooms	1.9	1.9	1.9	0.0	0.0	1.6	0.0	0.0	1.6	gal	0.0	124.3
Fireweed	1.9	1.9	1.9	0.0	0.0	5.7	0.1	0.0	5.7	gal	0.1	124.3
Stinkweed	1.9	1.9	1.9	1.9	0.0	0.0	0.0	0.0	1.6	gal	0.0	124.3
Punk	24.5	22.6	22.6	7.5	7.5	0.0	0.0	0.0	19.5	gal	0.2	0.0
Chaga	17.0	13.2	13.2	5.7	3.8	0.0	0.0	0.0	11.4	gal	0.1	0.0
Mousefoods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Willows	1.9	1.9	1.9	0.0	0.0	0.0	0.0	0.0	1.6	gal	0.0	124.3

Source ADF&G Division of Subsistence household surveys, 2023.

Note Resources where the percentage using is greater than the combined received and harvest indicate use from resources obtained during a previous year.

Note Any zero harvest amount that is in black font indicates a harvest value that is smaller than 0.05.

Note For small land mammals, species that are not typically eaten show a non-zero harvest amount with a zero harvest weight. Harvest weight is not calculated for species harvested but not eaten.

a. The harvest amount for summary rows is converted to the unit "pounds" to avoid tally conflicts if there are incompatible units of measure among resources in the category.

b. The CI (±) harvest % is the 95% confidence interval calculated as a percentage range around the mean pounds harvested. For species not eaten, this value is the confidence interval around the mean harvest in units.

households) but also made up the largest percentage of harvested resources (37%). Unspecified salmon[8] followed, with 81% of households reporting use, though this resource was not in the top most harvested. Northern pike were the second-most harvested (26%) resource by weight but are not part of the top ten used in the community. All other resources in Figure 2-8 such as sheefish, caribou, and beaver, made up less than 10% each of the most harvested resources in 2022. Lowbush cranberry, unspecified Canada/cackling geese, blueberry, and cloudberry were each used by between 60% and 70% of households, while sheefish, greater white-fronted goose, beaver, and caribou were used by 50% or less of households (Table 2-13).

Table 2-13.–Top ranked resources used by households, Huslia, 2022.

Rank	Resource	Percent using
1.	Moose	96.2%
2.	Unspecified salmon	81.1%
3.	Lowbush cranberry	69.8%
4.	Unspecified Canada/cackling geese	67.9%
5.	Blueberry	64.2%
6.	Cloudberry	62.3%
7.	Sheefish	50.9%
8.	Greater white-fronted goose	49.1%
9.	Beaver	47.2%
10.	Caribou	43.4%

Source ADF&G Division of Subsistence household surveys, 2023.

Salmon

Historically, the Yukon and Kuskokwim River watersheds have supported the world's largest subsistence Chinook and chum salmon fishery.[9] The last decade has seen a general decline in salmon returns to spawning grounds. This decline has several contributing factors, including a warming climate and declining marine prey density. For Chinook and chum salmon in particular these factors affect each species differently.[10] Furthermore, while the number of Chinook salmon juveniles and correlated returning adults match, the overall number of juveniles has been in decline from year to year. This indicates that factors are affecting the Chinook salmon either very early in their lifecycle or causing them to produce fewer eggs. On the contrary, chum salmon have had higher numbers of juveniles but lower numbers of returning adults, indicating that they are being affected during their years in the ocean.

While this long-term population decline is devastating on many levels, sudden mass mortality events, such as the one that occurred in 2019, are abrupt with an effect that can continue to be felt years later (von Biela et al. 2020). Many of the salmon that died during 2019 did so after entering their respective brood rivers, but before spawning. One Huslia resident mentioned seeing around 100 chum salmon on the banks of the Hog River prior to spawning, as evidenced by the presence of eggs in their bodies. While the respondent was unsure of the cause of death, they noted that the water was too warm (03232023HSL07). Mass mortality events such as in 2019 not only impact the overall population of salmon, but also the subsistence opportunities for years to come.

8. The 'unspecified salmon' recorded by the survey were likely received as part of a coordinated effort between the Tanana Chiefs Conference and several fish processors around Alaska to distribute commercially caught and processed salmon to Yukon River communities. In 2022, these boxes of fish contained mostly frozen fish fillets and so the species was not always identifiable by respondents.
9. NOAA in the Arctic, "Arctic Report card: Update for 2023," Accessed May 24, 2024, https://arctic.noaa.gov/report-card/report-card-2023/divergent-responses-of-western-alaska-salmon-to-a-changing-climate/
10. NOAA Fisheries, "What's Behind Chinook and Chum Salmon Declines in Alaska?," Accessed May 24, 2024, https://www.fisheries.noaa.gov/feature-story/whats-behind-chinook-and-chum-salmon-declines-alaska

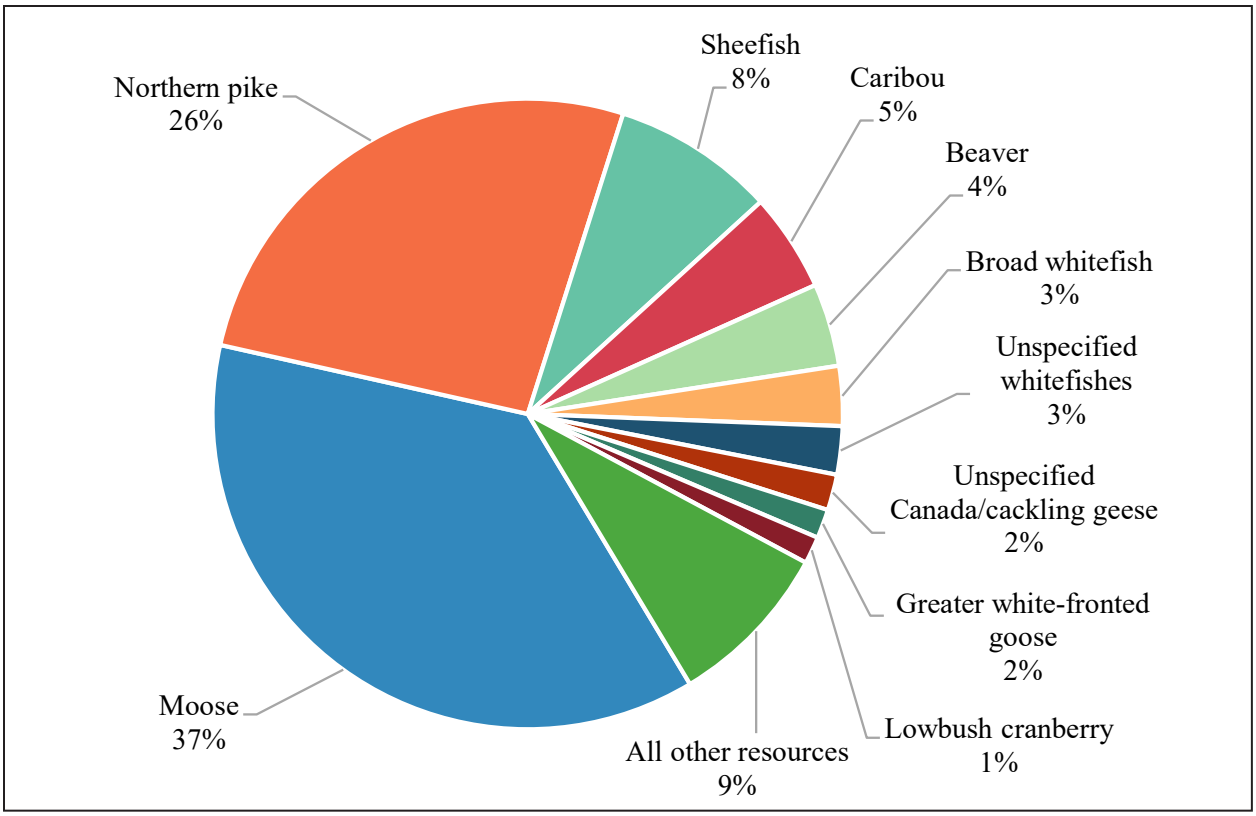


Figure 2-8.–Top resources harvested by percentage of total harvest in pounds usable weight, Huslia, 2022.

Due to the low returns of Chinook salmon, summer chum, and fall chum salmon, Huslia residents were limited in their subsistence opportunities during the 2022 fishing season.[11,12,13,14] The subsistence fisheries throughout the Yukon River drainage were closed to the harvest of Chinook salmon and both seasonal runs of chum salmon. Fishers could retain pink, sockeye, and coho salmon using selective gear types such as beach seines, dip nets, and manned fish wheels, though they were encouraged to target nonsalmon fish using 4-inch mesh. Only six percent of households attempted to harvest salmon, and all were successful (Table 2-12).[15] Nearly all households reported receiving (81%), and using (85%) salmon, while 28% reported giving salmon away (Table 2-12). The majority of the salmon within the community in 2022 was provided by donations from commercial fishers to the regional Alaska Native nonprofit, TCC, and then distributed in the community by the Huslia Tribal Council. These fish arrived frozen and gutted, and as a result, the species was difficult to identify, therefore the fish were categorized as unspecified salmon. These unspecified salmon were used by 81% of households. Besides unspecified salmon, the most commonly used species was fall chum salmon (8%), followed by summer chum salmon (4%), and coho salmon (4%).

Huslia households harvested an estimated 92 salmon (721 lb) in 2022 (Table 2-12). This amount equated to an average of 8 lb per household and 3 lb per capita. Figure 2-9 shows salmon harvest composition by

11. Alaska Department of Fish & Game. 2022. Division of Commercial Fisheries. "Yukon River Salmon Fall Fishery Announcement #2." 1419447591.pdf (alaska.gov)
12. Alaska Department of Fish & Game. 2022. Division of Commercial Fisheries. "Yukon River Salmon Fall Fishery Announcement #5." https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1429484971.pdf
13. Alaska Department of Fish & Game. 2022. Division of Commercial Fisheries. "Yukon River Salmon Fall Fishery Announcement #11." https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1439936940.pdf
14. Alaska Department of Fish & Game. 2022. Division of Commercial Fisheries. "Yukon River Salmon Fall Fishery Announcement #16." http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1438464463.pdf
15. Some residents harvested salmon outside of the Yukon River drainage.

edible weight. Of the total salmon harvest, 47% was Chinook salmon, 30% was fall chum salmon, and 19% was summer chum salmon. Sockeye and coho salmon each made up less than 5% of the total harvest. In 2022, the only gear used to harvest salmon was the set gillnet (Table 2-14; Figure 2-10; Table 2-15).

While Huslia residents have a wide variety of resources available to them, the cultural role that salmon plays in the community cannot be replaced by other resources (03242023HSL03; 03242023HSL04; 03232023HSL02; 03252023HSL05).

> A lot of people are just upset because not only 'cause of lack of salmon but because they feel like they're losing part of their culture and their heritage. Because why would they go out to fish camp anymore if they can't get, you know, salmon? Or they can't feed their dogs and they can't have their traditional food with the salmon. And, you know, and so it's just losing a way of life and that's hard. (03242023HSL03)

Children used to be raised at fish camp each summer (03232023HSL02; 03242023HSL03). As some key respondents observed, fish camp was something for people to do in the summer, but now that the younger generations are consumed by technology, there is nothing to do to get their attention away from it (03232023HSL02; 03252023HSL06; 03242023HSL03). Salmon is traditionally one of the most prized resources presented at a memorial potlatch but has become rare at these events (03252023HSL05). One respondent believes in part that the poor salmon returns are due to the disrespect given to the salmon:

> I used to listen to what my elders told me and I hear one time they told me a story about, about these animals. They said they all got these spirits that you have to listen to. And if you don't treat 'em right, they're not going to come back. And, um, they start telling me about how these people are treating fish down [there]. They, they were commercial fishing. And say, they said they get all this fish and just cut it open and take the eggs and just toss the fish. And, uh, I said, "Why?" You know. Up here, we, we, we get everything, we take everything. We even, you know, eat the innards. You know, we, we, we make sure that we treat that fish good and you put it right place. Which is back in the river. You treat him the right way. You don't just, you know, disrespect that fish. That's a lot of food right there. (03242023HSL04)

The respondent went on to describe commercial fishing and the waste of bycatch harvest by saying, "[We] have a certain way we treat our animals, but when you see the way other people treat it, you say, 'Hey, man, that's a waste of food there'" (03242023HSL04).

Some respondents shared their memories of how salmon harvest looked when they were younger (03242023HSL04; 03232023HSL07; 03232023HSL01). Families would travel from Huslia to their fish camp in May and prepare for the summer harvest by putting up the fish racks and getting the camp ready for several months of residency (03242023HSL04). They would stay at fish camp from June to August or September. In the past, the drying of fish was especially important because there was no electricity or refrigeration. Dog teams were also more common, and larger salmon harvests were needed to feed the teams (03242023HSL01; 03232023HSL04). The harvest of summer chum salmon was used mostly for dog food (03242023HSL01; 03232023HSL04). Throughout the summer, salmon would be cut, hung, and smoked before being bundled up in bales of 50 fish for transport (03242023HSL01; 03232023HSL04).

Respondents shared their observations on the changing environment and their concerns about the effect these changes have on the declining salmon population (03252023HSL05; 03232023HSL07). They noted that there is less permafrost and, as a result, the land is now drier; some smaller lakes and beaver ponds have dried up entirely:

> When I was walking around the woods when I was a kid you'd hit, uh, your feet would be wet no matter what; unless you had real good rubber boots because everywhere you walk the ground is ma-, marshy and full of ponds…You can't go

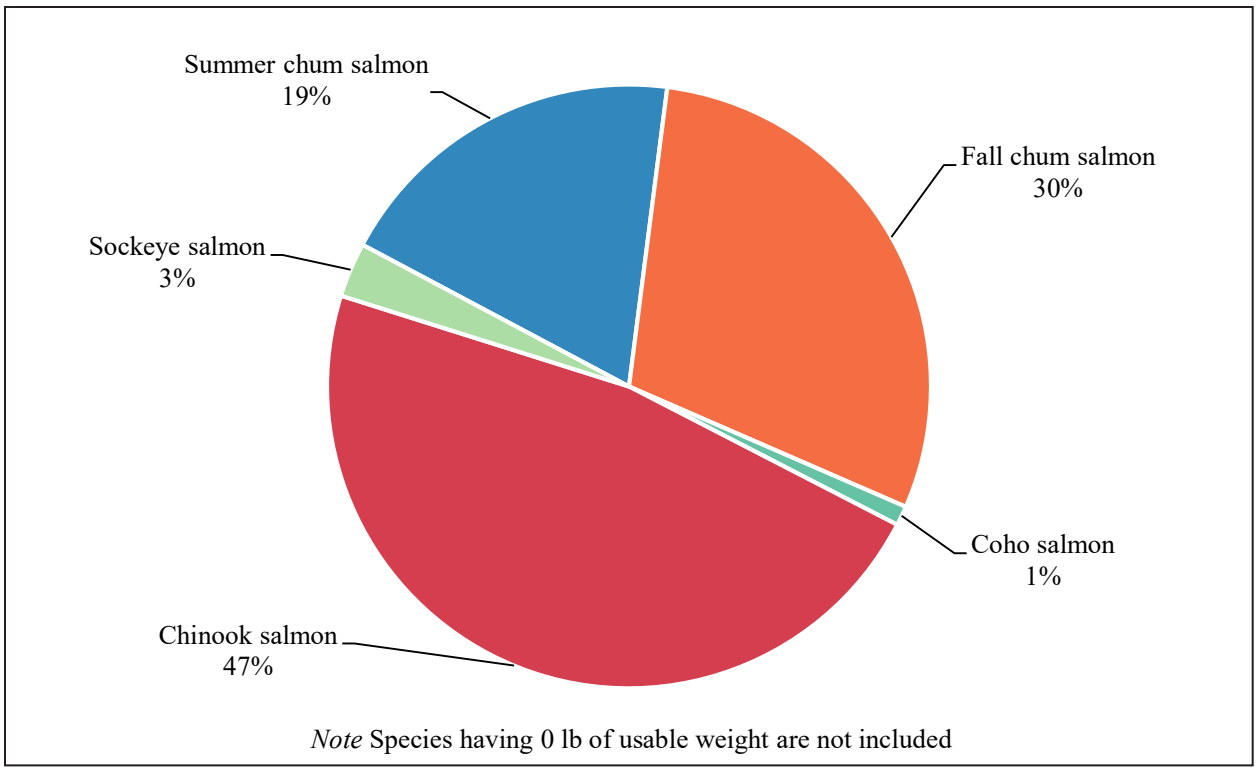


Figure 2-9.–Composition of salmon harvest in pounds usable weight, Huslia, 2022.

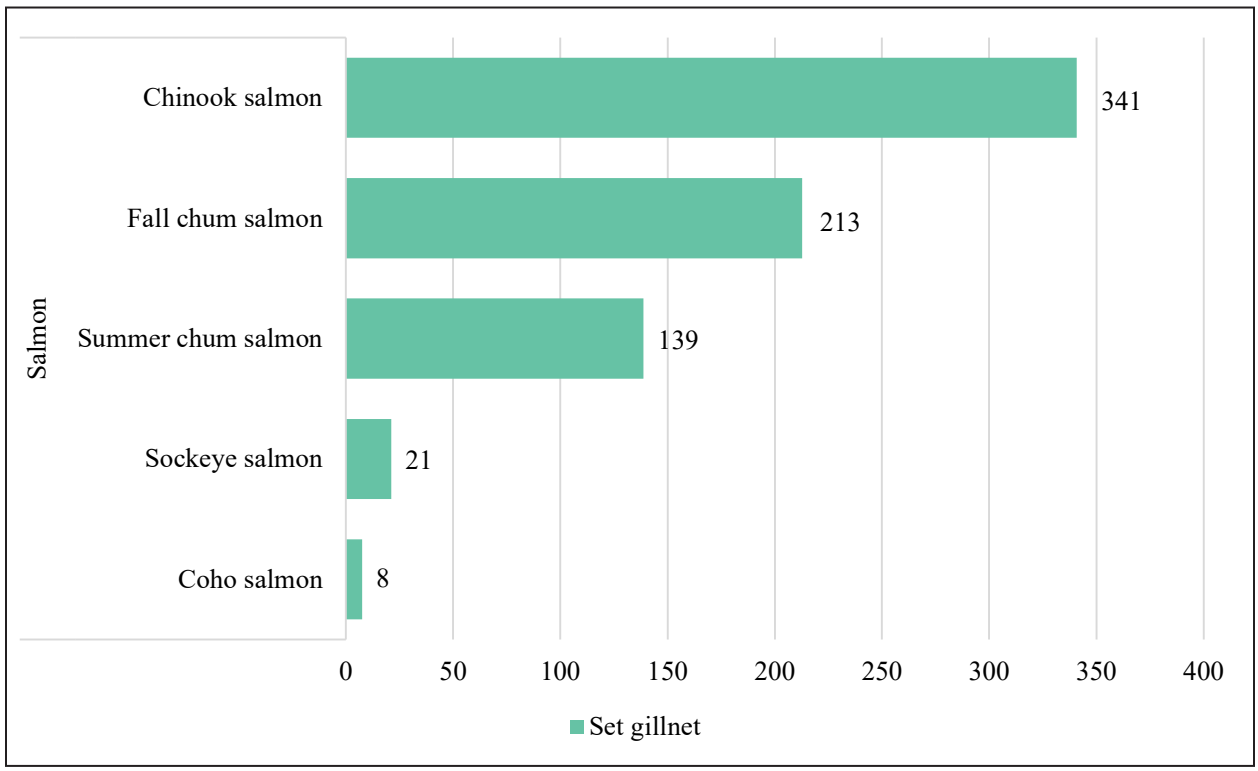


Figure 2-10.–Estimated harvest of salmon in pounds usable weight by gear type and resource, Huslia, 2022.

Table 2-14.–Estimated harvest of salmon by gear type and resource, Huslia, 2022.

Resource	Drift gillnet		Set gillnet		Seine		Dip net		Other subsistence gear[a]	
	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**0.0**	**0.0**	**92.5**	**721.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Summer chum salmon	0.0	0.0	24.3	138.8	0.0	0.0	0.0	0.0	0.0	0.0
Fall chum salmon	0.0	0.0	37.3	212.8	0.0	0.0	0.0	0.0	0.0	0.0
Coho salmon	0.0	0.0	1.6	7.6	0.0	0.0	0.0	0.0	0.0	0.0
Chinook salmon	0.0	0.0	24.3	340.8	0.0	0.0	0.0	0.0	0.0	0.0
Pink salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sockeye salmon	0.0	0.0	4.9	21.1	0.0	0.0	0.0	0.0	0.0	0.0
Unspecified salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2023.

a. No other subsistence gear types were reported by respondents.

Table 2-15.–Percentage of salmon harvested by subsistence gear types, resource, and total salmon harvest, Huslia, 2022.

Resource	Percent base	Drift gillnet		Set gillnet		Seine		Dip net		Other subsistence gear[a]	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	**Gear type**	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
	Resource	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
	Total	**0.0%**	**0.0%**	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Summer chum salmon	Gear type	0.0%	0.0%	26.3%	19.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	26.3%	19.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fall chum salmon	Gear type	0.0%	0.0%	40.4%	29.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	40.4%	29.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Coho salmon	Gear type	0.0%	0.0%	1.8%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	1.8%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Chinook salmon	Gear type	0.0%	0.0%	26.3%	47.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	26.3%	47.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pink salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sockeye salmon	Gear type	0.0%	0.0%	5.3%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	5.3%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unspecified salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2023.

a. No other subsistence gear types were reported by respondents.

Note Percentage base of gear type depicts the contribution of each resource harvested with a specified gear type to the total harvest of all salmon using the same gear type.

Note Percentage base of resource is the percent contribution of harvest using the specified gear type to the total harvest of the specified resource, including harvests from gear other than subsistence.

Note Percentage base of Total is the percentage contribution to the harvest of all salmon for the specified gear type and resource, including harvests from gear other than subsistence.

> far without hitting a pond. Now you can walk for, you, you can walk all day in tennis shoes. (03252023HSL05)

Some of the rivers have also begun to change, becoming brown with increased sediment, and there are fewer small organisms seen in the freshwater (03252023HSL05). Table 2-16 shows the estimated salmon harvest for feeding dogs. In 2022, all 24 (139 lb) summer chum salmon that were harvested were fed to dogs. This represents 19% of the total salmon harvest.[16] Huslia has a rich history of dog mushing and most households kept dogs, which were fed with salmon and whitefish throughout the year (03252023HSL06; 03242023HSL03; 03242023HSL04; 03232023HSL01). The salmon declines along the Yukon River have had a major impact on this traditional practice; one community respondent mentioned that when they first arrived around five years ago there were four dog teams in Huslia, but even that small number has gone down in recent years:

> They are now down to two dog teams here because they can't afford to feed their dogs if you can't go out and have nets out all summer. You can't feed your dogs, and so people have—even the two kennels that are left—I know at least one of them is reducing the number of dogs that they own because they can't feed 'em anymore. (03242023HSL03)

Plate 2-3.–Huslia sled dog. © ADF&G.

16. No fishing locations were recorded for the reported salmon harvest in 2022. All parts of the survey are voluntary, and respondents may choose not to identify their harvest locations.

Table 2-16.–Estimated harvests of salmon and nonsalmon fish for consumption by dogs, Huslia, 2022.

Resource	Total harvest		Harvested for dogs		
	Number	Pounds	Number	Pounds	Percent
Salmon	**92.5**	**721.0**	**24.3**	**138.8**	**19.2%**
Summer chum salmon	24.3	138.8	24.3	138.8	100.0%
Nonsalmon fish	**7,278.1**	**25,595.1**	**3,644.5**	**11,944.4**	**46.7%**
Alaska blackfish	1.6	1.1	1.6	1.1	100.0%
Burbot	48.7	204.5	8.1	34.1	16.7%
Northern pike	4,885.8	16,123.1	3,443.6	11,363.8	70.5%
Sheefish	926.5	5,095.9	32.3	177.4	3.5%
Broad whitefish	585.1	1,872.3	71.7	229.3	12.2%
Least cisco	32.5	22.7	32.5	22.7	100.0%
Humpback whitefish	273.2	573.8	51.6	108.4	18.9%
Round whitefish	16.2	11.4	1.6	1.1	10.0%
Unspecified whitefishes	382.9	1,515.1	1.6	6.4	0.4%

Source ADF&G Division of Subsistence, household surveys, 2023.

Note Only species having reported instances of use for dog food are included.

While dog owners use other fish species, store-bought food, and other resources like beaver donated by trappers to feed their dogs, nothing has been able to replace salmon as a source of accessible, nutritious, and affordable dog food (03232023HSL02).

Nonsalmon Fish

In 2022, Huslia residents harvested a total of 25,595 lb (91 lb per capita) of nonsalmon fish (Table 2-12). Thirty-five percent of Huslia households harvested and 62% used nonsalmon fish. The most used species were sheefish (51%), and pike (32%), which were harvested by 25% and 26% of households, respectively. In pounds usable weight, pike made up the largest percentage (63%) of the nonsalmon harvest (Figure 2-11). Huslia residents harvested 16,123 total pounds (57 lb per capita) of pike in 2022. Sheefish made up 20% of the harvested usable weight at 5,096 total pounds (18 lb per capita). All other species made up less than 10% each of the harvested usable weight.

Fishers in Huslia caught the majority of their nonsalmon fish using set gillnets (57%; 14,638 lb) (Table 2-17; Table 2-18; Figure 2-12). Residents also used spears or gaffs (5%; 137 lb), and nets set under the ice (2%; 533 lb). Other gear such as drift gillnets (0.4%; 107 lb), under-ice jigging or rod and reel, and longline or skate gear were also used in 2022, and each accounted for less than 1% of the harvest.

Huslia residents harvested 72% of their pike using set gillnets, and this harvest accounted for 79% of the total set gillnet harvest for nonsalmon fish (Table 2-18). The nets used for both set gillnetting in open water and set gillnetting under the ice are the same. Ethnographic respondents mentioned that in the fall time, after the salmon run, they would set their nets for pike and whitefish, and this continued after freeze-up until around December when it became too cold (3252023HSL05; 03232023HSL01; 03232023HSL02). According to one respondent, his family would set their nets to target whitefish, but they had to pick out all the pike before they were able to get the whitefish (03232023HSL02).

The harvest of nonsalmon fish helps to fill in gaps in subsistence harvest opportunities by being available during the times when other resources such as salmon and moose are unavailable (03242023HSL04). Some species such as Alaska blackfish are often thought of as survival food:

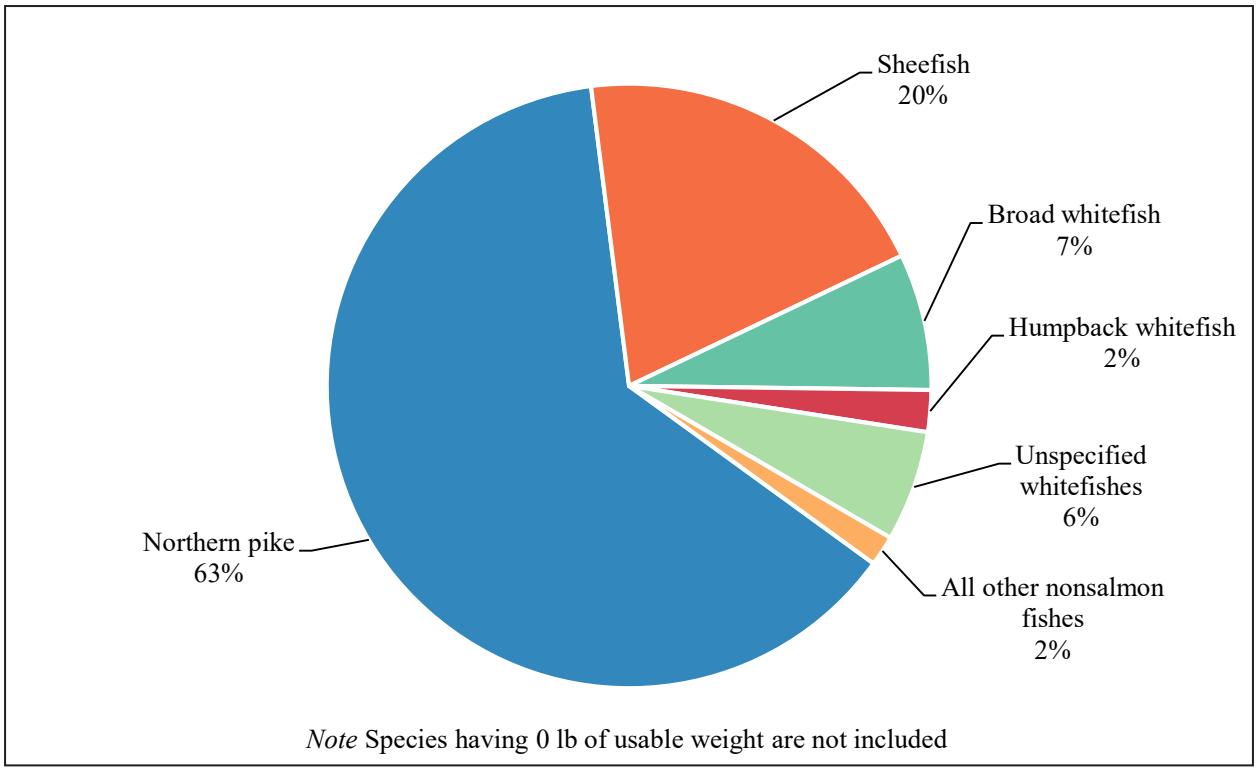
> That's why I really appreciate my Native culture and, um, they say that that blackfish could always provide protein no matter how hungry we, we, you were. It

> was always like kinda like the last resort. And also, they used it for, uh, you boil it and, uh, the broth, its real oily. It's actually really oily. (03252023HSL05)

This same respondent also mentioned that this oily broth was used as a milk substitute for babies when nothing else was available: "That was what kept the Natives alive…that's the one that kept the babies alive, so. And it's always there, ya know? Any mossy lake, any lake with moss in there, no running water through it, you're gonna find blackfish" (03252023HSL05). While Alaska blackfish can become a hindrance when trapping beaver, since the trapper must shovel the fish out of the way to set their snare, there is comfort found for respondents in knowing there is a protein source readily available whenever they need:

> Back in the day, like the elders say, the blackfish was really important because, uh, no matter how hard times were, you couldn't catch 'em. There's always like protein right in front of those beaver house or any of those deep lakes, and if ya see a hole in the middle of the lake that's those blackfish making their own spot. (3252023HSL05)

The residents of Huslia also utilized nonsalmon fish for feeding their dog teams. Table 2-16 shows the estimated nonsalmon fish harvest for feeding dogs. In 2022, respondents reported using nine species of nonsalmon species of fish to feed dogs. Nearly half (47%) of the total (25,595 lb) nonsalmon fish that were harvested in 2022 were fed to dogs (11,944 lb). While residents did consume some pike, the majority of the pike harvested was for dog teams (71%; 11,363 lb). During winter fishing, they would toss the pike on



Note Species having 0 lb of usable weight are not included

Figure 2-11.–Composition of nonsalmon fish harvest in pounds usable weight, by percentage, Huslia, 2022.

Table 2-17.–Harvests of nonsalmon fish by subsistence gear type, Huslia, 2022.

Resource	Drift gillnet		Set gillnet		Under ice net		Under ice jigging or rod and reel		Longline/skate		Spear/gaff		Other subsistence gear[a]	
	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Nonsalmon fish	**32.5**	**107.1**	**4,522.9**	**14,637.5**	**149.3**	**532.6**	**29.2**	**104.9**	**8.1**	**34.1**	**405.7**	**1,338.7**	**34.1**	**137.4**
Pacific herring	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific herring roe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alaska blackfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.1
Burbot	0.0	0.0	8.1	34.1	0.0	0.0	0.0	0.0	8.1	34.1	0.0	0.0	32.5	136.3
Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arctic grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Northern pike	32.5	107.1	3,496.8	11,539.4	16.2	53.5	9.7	32.1	0.0	0.0	405.7	1,338.7	0.0	0.0
Sheefish	0.0	0.0	172.0	946.0	32.5	178.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Broad whitefish	0.0	0.0	452.7	1,448.7	81.1	259.6	1.6	5.2	0.0	0.0	0.0	0.0	0.0	0.0
Bering cisco	0.0	0.0	121.7	170.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Least cisco	0.0	0.0	32.5	22.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unspecified ciscoes	0.0	0.0	3.9	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Humpback whitefish	0.0	0.0	219.1	460.0	19.5	40.9	1.6	3.4	0.0	0.0	0.0	0.0	0.0	0.0
Round whitefish	0.0	0.0	16.2	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unspecified whitefishes	0.0	0.0	0.0	0.0	0.0	0.0	16.2	64.2	0.0	0.0	0.0	0.0	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2023.

a. Includes two reports of unspecified subsistence gear.

Table 2-18.–Percentage of nonsalmon fish harvested by subsistence gear types, resource, and total salmon harvest, Huslia, 2022.

Resource	Percent base	Drift gillnet		Set gillnet		Under ice net		Under ice jigging or rod and reel		Longline/skate		Spear/gaff		Other subsistence gear[a]	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Nonsalmon fish	**Gear type**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Resource	**0.4%**	**0.4%**	**62.1%**	**57.2%**	**2.1%**	**2.1%**	**0.4%**	**0.4%**	**0.1%**	**0.1%**	**5.6%**	**5.2%**	**0.5%**	**0.5%**
	Total	**0.4%**	**0.4%**	**62.1%**	**57.2%**	**2.1%**	**2.1%**	**0.4%**	**0.4%**	**0.1%**	**0.1%**	**5.6%**	**5.2%**	**0.5%**	**0.5%**
Pacific herring	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pacific herring roe	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pacific halibut	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Alaska blackfish	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.8%	0.8%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Burbot	Gear type	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	95.2%	99.2%
	Resource	0.0%	0.0%	16.7%	16.7%	0.0%	0.0%	0.0%	0.0%	16.7%	16.7%	0.0%	0.0%	66.7%	66.7%
	Total	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.4%	0.5%
Dolly Varden	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Arctic grayling	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Northern pike	Gear type	100.0%	100.0%	77.3%	78.8%	10.9%	10.1%	33.3%	30.6%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%
	Resource	0.7%	0.7%	71.6%	71.6%	0.3%	0.3%	0.2%	0.2%	0.0%	0.0%	8.3%	8.3%	0.0%	0.0%
	Total	0.4%	0.4%	48.0%	45.1%	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	5.6%	5.2%	0.0%	0.0%

-continued-

Table 2-18.–Page 2 of 3.

Resource	Percent base	Drift gillnet		Set gillnet		Under ice net		Under ice jigging or rod and reel		Longline/skate		Spear/gaff		Other subsistence gear[a]	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Sheefish	Gear type	0.0%	0.0%	3.8%	6.5%	21.7%	33.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	18.6%	18.6%	3.5%	3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	2.4%	3.7%	0.4%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Broad whitefish	Gear type	0.0%	0.0%	10.0%	9.9%	54.3%	48.8%	5.6%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	77.4%	77.4%	13.9%	13.9%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	6.2%	5.7%	1.1%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bering cisco	Gear type	0.0%	0.0%	2.7%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	1.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Least cisco	Gear type	0.0%	0.0%	0.7%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unspecified ciscoes	Gear type	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Humpback whitefish	Gear type	0.0%	0.0%	4.8%	3.1%	13.0%	7.7%	5.6%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	80.2%	80.2%	7.1%	7.1%	0.6%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	3.0%	1.8%	0.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Round whitefish	Gear type	0.0%	0.0%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

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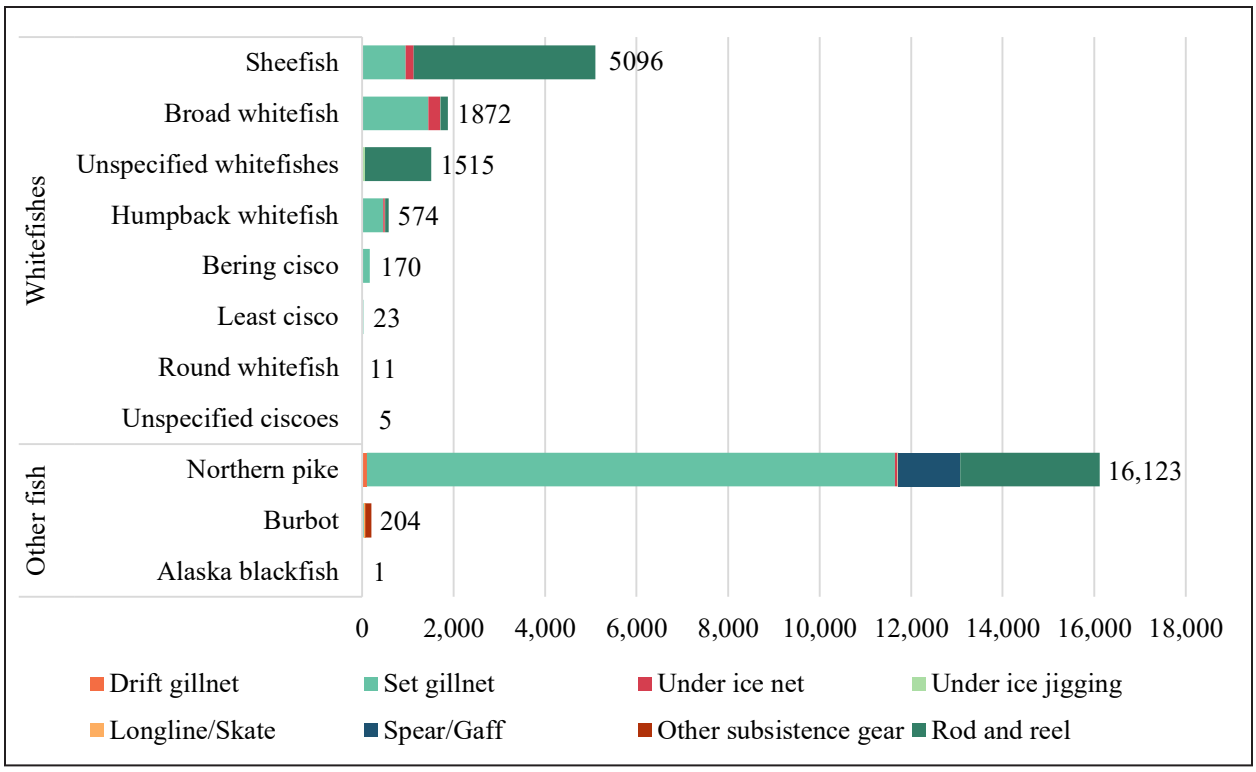


Figure 2-12.–Estimated harvest of nonsalmon fish in pounds usable weight by gear type and resource, Huslia, 2022.

the bank and let them freeze, where they could then stack them like cordwood to later be fed to their dogs (03232023HSL02; 03242023HSL03).

Huslia residents searched for and harvested their nonsalmon fish along the Koyukuk River as far up as Cutoff Slough and 20 to 30 miles downriver (Figure 2-13). Some traveled to the Dulbi Slough, downriver from Huslia, and others went upriver to Nuna Slough off the Huslia River. One respondent mentioned that instead of targeting salmon, some people went to either the Huslia River or Dulbi Slough to harvest sheefish, but that it was a personal preference (03242023HSL03).

Large Land Mammals

Most households (98%) in Huslia used large land mammals during the study year, although less than half of the households harvested large land mammals (40%; Table 2-12). In terms of usable weight, moose made up 85% of the large land mammals harvested in 2022 (Figure 2-14). While 60% of households attempted to harvest moose in 2022, 36% were successful. Although less than half of Huslia's households harvested moose in 2022, 96% reported using moose, 79% reported receiving some, and 55% reported sharing some. Huslia residents harvested an estimated 42 moose, yielding 22,697 lb of edible weight (264 lb per household, 80 lb per capita). All moose were harvested in September, and all were male (Table 2-19). One respondent worried about what would happen if the moose population were to decline as there are no other large mammal resources to take its place. He was especially concerned about the effect bear predation has on the moose population:

> Sometimes you got up in the Huslia River and down around the Dulbi River, there's some big grizzlies now. And those grizzlies came out from the mountains. So they're hungry. And, uh, the one year I was coming around the bend, I saw a cow standing there. It was looking back in the woods. It wanted to go back in there. Its baby was in there, but it was already too late. And then I went around maybe

Table 2-18.–Page 3 of 3.

Resource	Percent base	Drift gillnet		Set gillnet		Under ice net		Under ice jigging or rod and reel		Longline/skate		Spear/gaff		Other subsistence gear[a]	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Unspecified whitefishes	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	55.6%	61.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.2%	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2023.

a. Other subsistence gear includes unspecified subsistence gear.

Note Percentage base of Gear type depicts the contribution of each resource harvested with a specified gear type to the total harvest of all nonsalmon fish using the same gear type.

Note Percentage base of Resource is the percent contribution of harvest using the specified gear type to the total harvest of the specified resource, including harvests from gear other than subsistence.

Note Percentage base of Total is the percentage contribution to the harvest of all nonsalmon fish for the specified gear type and resource, including harvests from gear other than subsistence.

> two more bends, the same thing, cow again. And that was up the Huslia River. So you know they're coming out of the mountains. (03242023HSL04)

Caribou were the second most harvested large land mammal (9%) and made up 12% of the total large land mammal harvest by weight. Although less than 10% of households successfully harvested caribou, 11% attempted, 36% reported receiving, and 43% used caribou in 2022. Hunters harvested an estimated 23 caribou, equaling about 3,090 lb (36 lb per household, 11 lb per capita). Most of the caribou harvest occurred in March and April (8 males, 11 females) with a smaller harvest in November (2 males, 2 females; Table 2-19).

Historically, Huslia residents hunted caribou more than other resources (03242023HSL04). This respondent envisioned his resource dependency as a circle, much like a pie graph. A large part of the circle used to be made up of caribou, but according to the respondent, once the pipeline was constructed, local access to caribou declined. A large herd used to migrate near the community, but caribou have been seldom seen since the construction of the Dalton Highway to the east. Now hunters must travel at least 40 miles from the community to find a herd sometimes towards Shugnak (03242023HSL03; 03232023HSL01). Other years the herd is close to 100 miles away. Many residents travel in pairs as a safety measure in case their snowmachines break down or someone is injured. In years when the herd is closer, more people are able to hunt.

Both black and brown bear were harvested in 2022 (8% and 6% of households respectivly). Bears are considered to have very powerful spirits and are highly respected (03242023HSL04; 03242023HSL03; 03232023HSL02; 03232023HSL01; Nelson 1983). Traditionally, women of childbearing age are prohibited from eating bear meat or even referring to them by name, instead using the vague term, "big animals." When a bear is harvested the men in the community come together to cook and eat it, which helps to strengthen relationships among the men and boys (03242023HSL03). According to respondents, bear meat is also one of the important meats provided at potlatches (03242023HSL04). A small percentage of residents (2%) used musk ox and received it, likely through sharing networks.

Data were collected for the search and harvest areas for both bears and moose (Figure 2-15). While there is significant overlap between the two, there are a few notable differences. Hunters travel by boat up most rivers and sloughs surrounding the community which also gives them access to the nearby lakes to hunt both bears and moose. Survey respondents identified a large search area along the Dakli River for bears which extends up into the neighboring Zane Hills and Purcell Mountains. Hunters travel further down the Koyukuk River when searching for moose and, for the most part, keep their search to the area surrounding the waterways.

Small Land Mammals/Furbearers

Nearly half of Huslia's households (49%) used small land mammals for either food or fur in 2022 (Table 2-12). An estimated 26% of Huslia households reported attempting to harvest small land mammals and most were successful. Additionally, nearly all who were successful shared their harvest. Trapping is still popular in Huslia, and trappers harvested a variety of animals in 2022. Beaver accounted for the largest component of the small land mammal harvest (24%), followed by snowshoe hare (19%), marten (17%), gray wolf (9%), muskrat (9%), and lynx (8%; Figure 2-16). Of the small land mammals harvested, only beaver, snowshoe hare, and porcupine were reported to be used for food (74%; 58%; 57%, respectively; Table 2-20).

Traditionally, most of the small land mammal harvest would occur during the winter months (Nelson 1983). Snares were set for furbearers such as mink, marten, and fox starting around mid-November. Lynx, wolverine, otter, and wolf were also targeted in the colder months when their fur was thickest. Beavers were targeted in the spring when the temperature began to warm up, but the ice was still thick. In 2022, harvesters did not stray from tradition with the bulk of their harvests occurring in November, December, and January (Table 2-21). The majority of Huslia's beaver harvests occurred in February, March, and April. The exception to the winter harvest is porcupine, which are typically harvested during the summer when they

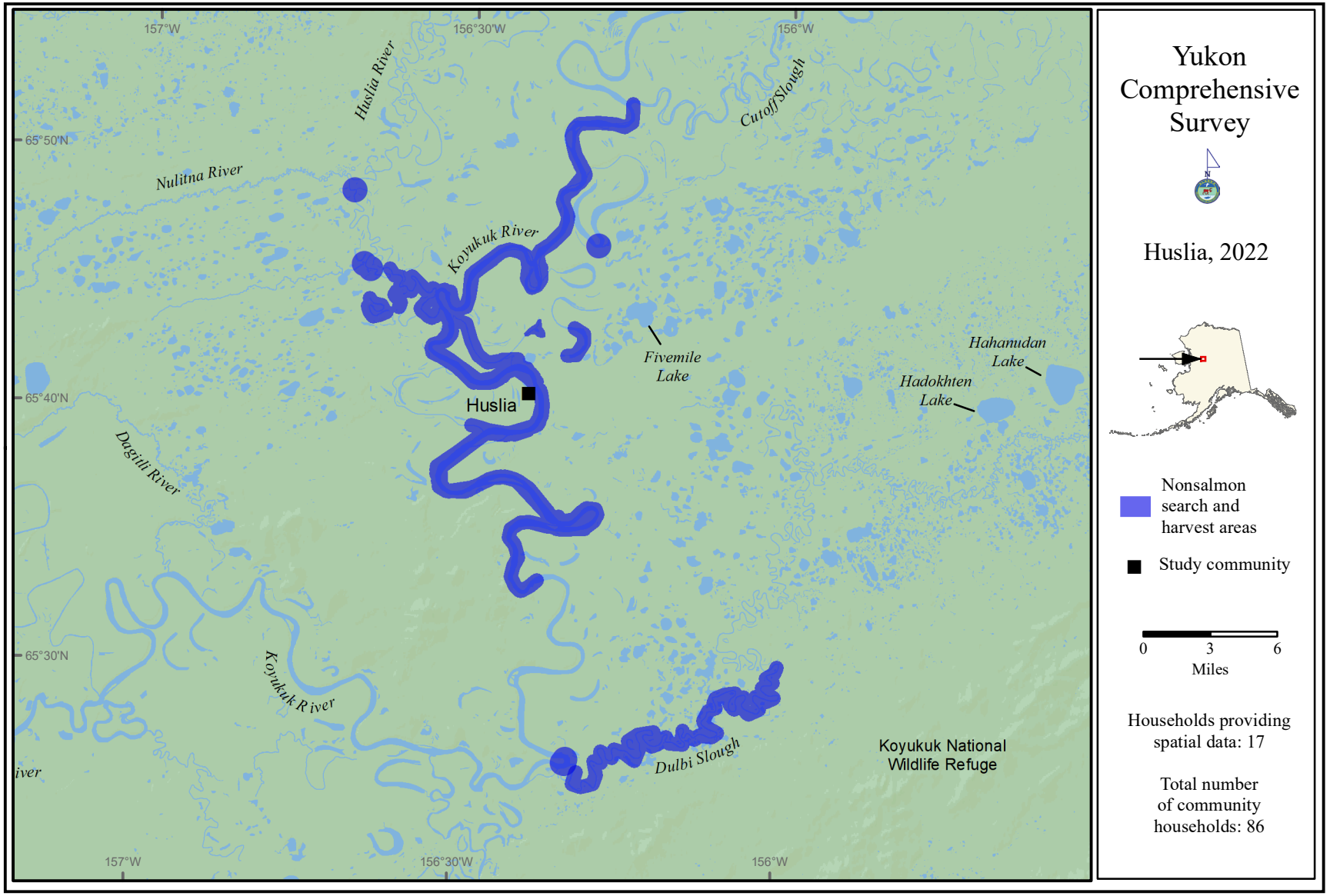


Figure 2-13.–Fishing and harvest locations of nonsalmon fish, Huslia, 2022.

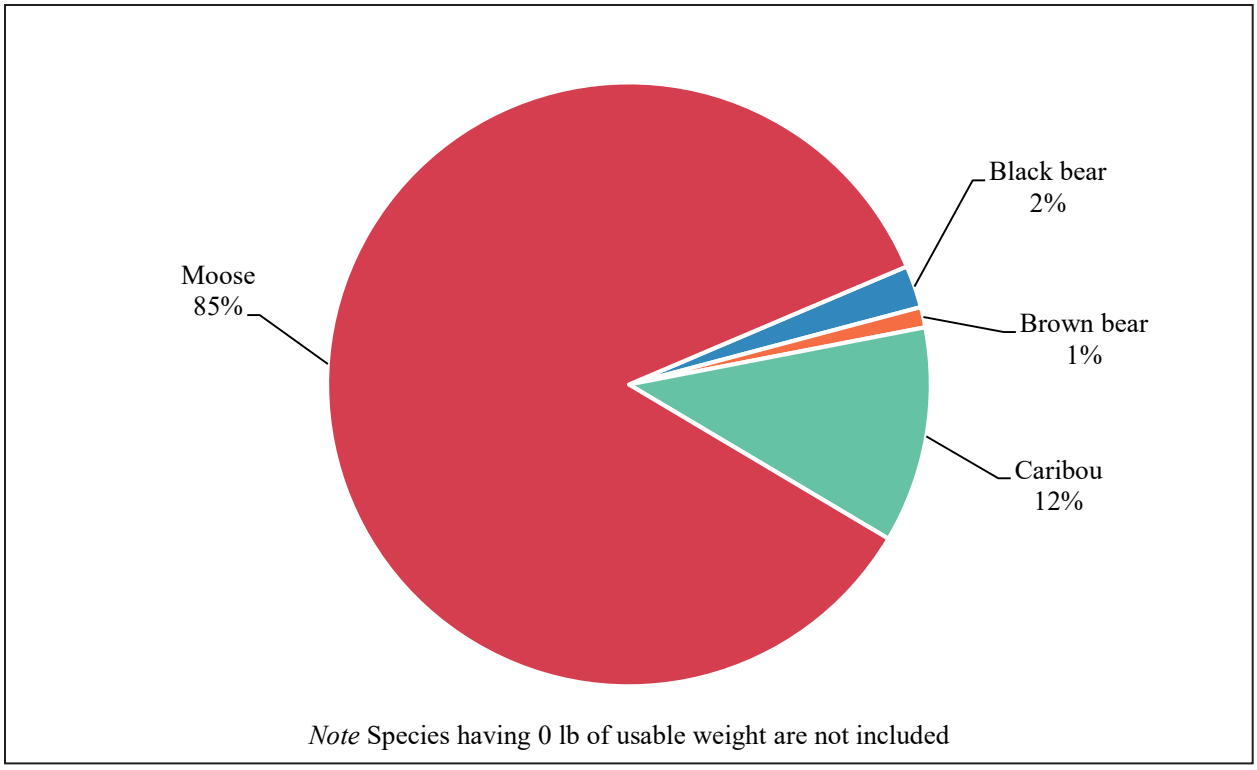


Figure 2-14.–Composition of large land mammal harvest in pounds usable weight, Huslia, 2022.

Table 2-19.–Estimated large land mammal harvests by month and sex, Huslia, 2022.

	Estimated harvest by month													
Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	**Total**
Large land mammals	0.0	0.0	**16.2**	**6.5**	**3.2**	0.0	0.0	**6.5**	**48.7**	**9.7**	**3.2**	0.0	**3.2**	**97.4**
Black bear	0.0	0.0	0.0	0.0	3.2	0.0	0.0	6.5	3.2	9.7	0.0	0.0	0.0	**22.7**
Brown bear	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	3.2	0.0	0.0	0.0	3.2	**9.7**
Caribou	0.0	0.0	16.2	3.2	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	**22.7**
Caribou, male	0.0	0.0	4.9	3.2	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	**9.7**
Caribou, female	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	**13.0**
Caribou, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.2	0.0	0.0	0.0	0.0	**42.2**
Moose, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.2	0.0	0.0	0.0	0.0	**42.2**
Moose, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Common muskox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Dall sheep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**

Source ADF&G Division of Subsistence household surveys, 2023.

have the most fat (Nelson 1983). In 2022, residents harvested all porcupines between July and September (Table 2-21).

Beaver was the most used small land mammal in 2022 (47%). There was a high success rate (23% attempted; 21% successful) and all who harvested shared (21%). In total, an estimated 266 beavers were harvested in 2022 (2,598 lb total; 9 lb per capita). Beavers are often eaten by Huslia residents and are common offerings at community gatherings, such as potlatches (03232023HSL01). Beavers were harvested in more months (six) than any other small land mammal possibly due to local preference for beaver meat. Beaver scraps, and those harvested that are unfit for human consumption, are given to mushers to use as dog food (03232023HSL02).

During fieldwork, a subsistence staff member was invited to participate in beaver trapping, as part of the Healing Gathering. Participants traveled on snowmachines to a location in the Dulbi Flats area.[17] The group checked four locations where snares had been set the day before. Each location had three to six snares for a total of 18. According to the subsistence staff member who participated in the beaver trapping, trappers prefer to harvest beaver when their fur is in prime condition, and they are easily captured using bait. These conditions generally occur in February and March in interior Alaska. According to Huslia trappers, traps must be set conservatively and in a way that allows a beaver lodge to sustain itself over time. For this reason, trappers typically harvest only two or three beavers per lodge per year. Larger lodges can support more beavers and thus can withstand larger annual harvests.

Plate 2-4.–Under ice snare for beaver. © ADF&G.

17. Andrew Slear, ADF&G Fish and Wildlife Technician 2, Huslia participant observation field notes, March 31, 2023.

Plate 2-5.–Closeup of under ice snare for beaver. © ADF&G.

Several steps are involved with setting a snare to harvest beaver. When setting a snare near a lodge, trappers use chisels or long sticks to test the thickness and strength of the ice. Thin or weak ice indicates a hole that the beaver uses to access their under-ice food cache. Once located, the trapper chips away at the hole to increase its diameter to 12 to 16 inches. Snares are typically made from a loop of galvanized steel cable that has a locking mechanism to ensure that a snared animal cannot loosen the cable. The tail of the snare is anchored by a log tripod set over the hole. Between the legs of the tripod, the trapper may leave fresh-cut willow, birch, or cottonwood sticks as bait. The trap and bait, called a "set," are then covered with fresh snow. A trapper usually checks a trap every one or two days.

On the last day of the healing gathering, the trappers successfully harvested one beaver. An elder then demonstrated how to properly skin and process the beaver. As described in researcher field notes, it was explained that the beaver must be thawed first before it can be skinned.[18] Cuts are made around the feet and tail before the feet are removed. Starting at the base of the tail a cut is made straight up the center of the belly to the mouth, cutting around the genital vent. It is important to not puncture the hide, castoreum glands, or guts while making this cut. A scraping tool is used to separate the hide from the other connective tissue. The elder who led the demonstration used his great-grandfather's moose bone scraper to accomplish this. The head is the last part to be skinned out. If the fur is being kept, the processor needs to remove as much tissue as possible so it will dry properly and not spoil. The head, castoreum glands, surrounding fat, and most entrails are removed and disposed of. The castoreum glands are occasionally used as bait for other animals. The liver and tail are kept for eating, and the hind feet are sometimes cooked for elders.

18. Andrew Slear, ADF&G Fish and Wildlife Technician 2, Huslia participant observation field notes, March 31, 2023.

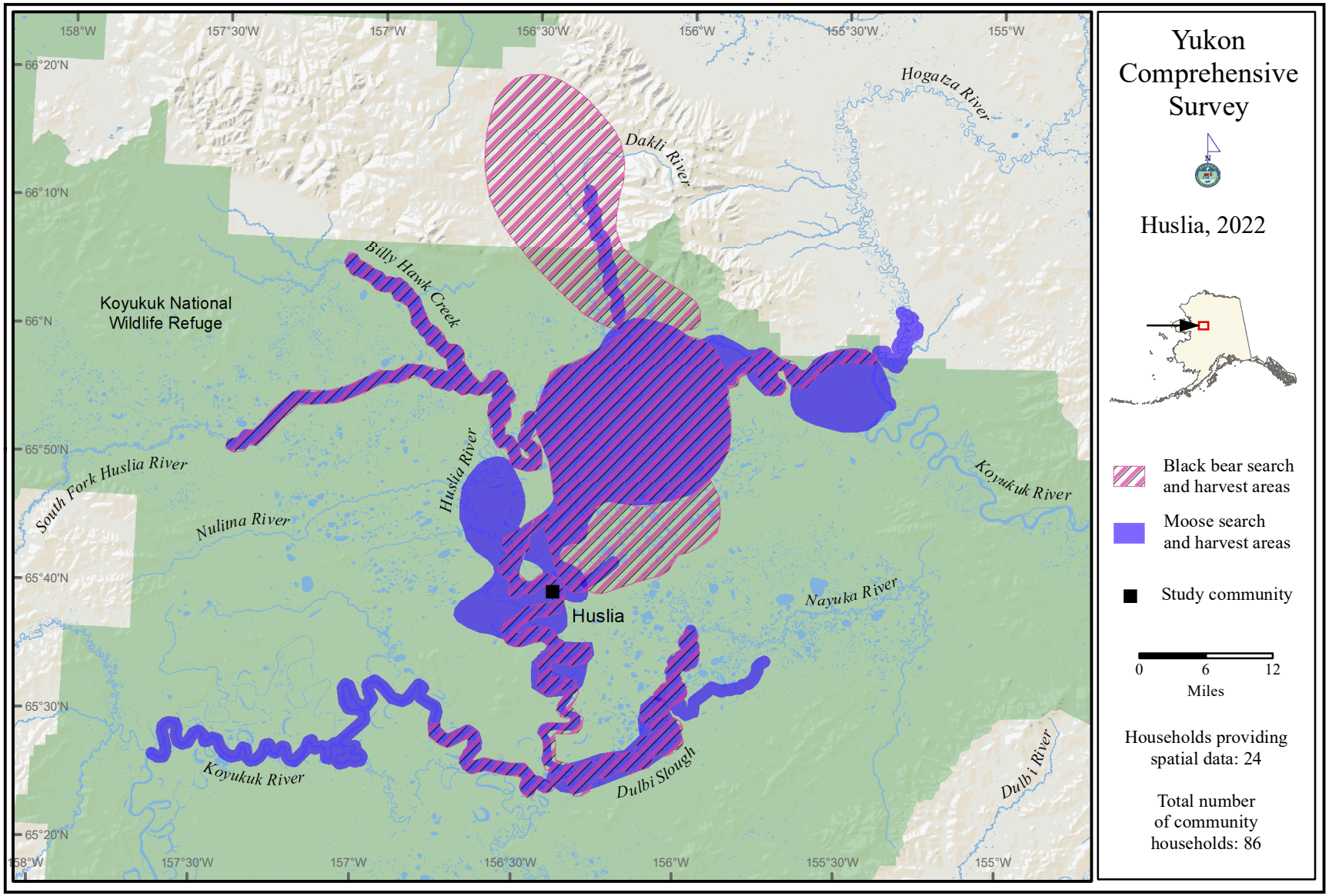


Figure 2-15.–Hunting locations of black bear and moose, Huslia, 2022.

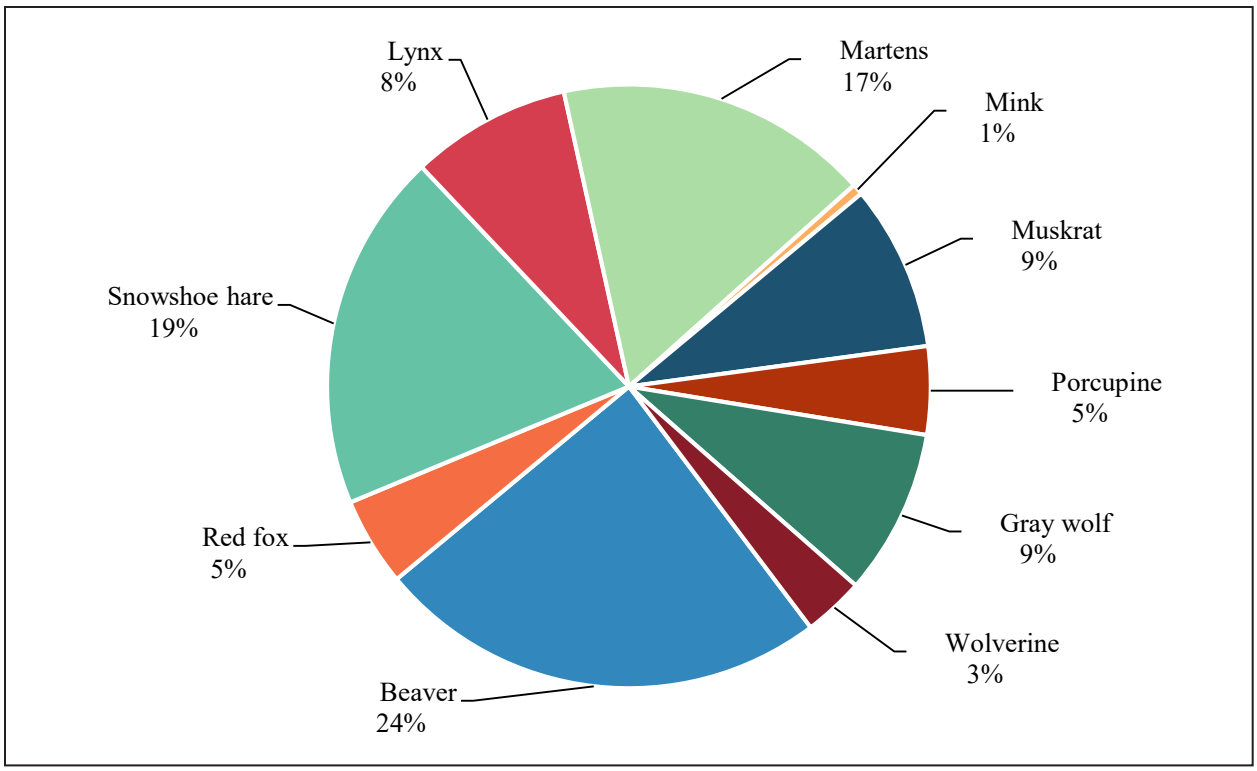


Figure 2-16.–Composition of small land mammal harvest in individual animals, Huslia, 2022.

Table 2-20.–Estimated small land mammal/furbearer harvests for fur and food only, Huslia, 2022.

	Estimated		Fur only		
Resource	Amount	Pounds	Amount	% of resource	% of small land mammals
Small land mammals	1096.9	2703.2	747.2	68%	68%
Beaver	266.1	2597.6	68.1	26%	6%
Arctic fox	0.0	0.0	0.0	0%	0%
Red fox	51.9	0.0	51.9	100%	5%
Snowshoe hare	210.9	50.6	88.6	42%	8%
Lynx	94.1	0.0	94.1	100%	9%
Martens	185.0	0.0	185.0	100%	17%
Mink	6.5	0.0	6.5	100%	1%
Muskrat	97.4	0.0	97.4	100%	9%
Porcupine	51.9	55.0	22.5	43%	2%
Gray wolf	97.4	0.0	97.4	100%	9%
Wolverine	35.7	0.0	35.7	100%	3%

Source ADF&G Division of Subsistence, household surveys, 2023.

Note Amounts are in individual animals.

Table 2-21.–Estimated small land mammal/furbearer harvests by month, Huslia, 2022.

Resource	Estimated harvest by month													Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	
Small land mammals	**233.7**	**81.1**	**123.3**	**87.6**	**0.0**	**0.0**	**9.7**	**9.7**	**32.5**	**32.5**	**178.5**	**142.8**	**165.5**	**1,096.9**
Beaver	9.7	38.9	110.3	87.6	0.0	0.0	0.0	0.0	3.2	0.0	0.0	13.0	3.2	**266.1**
Arctic fox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Red fox	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.7	16.2	**51.9**
Snowshoe hare	64.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	129.8	0.0	16.2	**210.9**
Lynx	22.7	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	55.2	**94.1**
Martens	87.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2	48.7	32.5	**185.0**
Mink	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	**6.5**
Muskrat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.5	32.5	32.5	0.0	**97.4**
Porcupine	0.0	0.0	0.0	0.0	0.0	0.0	9.7	9.7	29.2	0.0	0.0	0.0	3.2	**51.9**
Gray wolf	35.7	16.2	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	26.0	**97.4**
Wolverine	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	13.0	**35.7**

Source ADF&G Division of Subsistence household surveys, 2023.

Plate 2-6.–Beaver snared during the Healing Gathering, and then used to demonstrate processing techniques. © ADF&G. Photo by Andrew Slear.

Plate 2-7.–An elder demonstrates how to skin a beaver. © ADF&G. Photo by Andrew Slear.

Beavers are considered to have powerful spirits, and if they are not treated properly when hunted and processed the consequences can include bad luck in trapping, illness, and in some cases death (Nelson 1983). A respondent described the disposal of the beaver carcass to ensure it is being treated respectfully:[19]

> And it's the same with the, um, the animals. You know, other animals, like beaver. And, uh, the bones. We never, uh, throw it in the trash. We usually—I have some out there. You put it in a bag and then you either put it in the lake or somewhere. Or you know, like, in, uh, streams. (03232023HSL01)

This respondent also explained that there are certain pieces of meat, such as the hips, that women of childbearing age should avoid as it makes giving birth harder. Other beaver-related considerations include women not stepping over trapping equipment, wearing the clothing that men use while trapping, or walking where beaver blood has been spilled.[20] Trappers also need to dispose of the beaver heads during the trapping season to avoid bad luck.

Local knowledge of small land mammals is needed to trap them successfully, but also to explain the interconnections of the ecosystem and how different species depend on one another to survive (3252023HSL05). This respondent explained that success as a hunter is dependent on knowing its habits and role in the ecosystem:

> When we think of the animal, not so much is trying to harvest it, but our deeper understanding of it. Like beaver, you might see a lodge and you think, "Oh, there's a beaver house and there's some, uh, feed pile in front of it." But it, it's deeper than that. Like especially like, um, that animal's ability to not freeze in in the

19. Andrew Slear, ADF&G Fish and Wildlife Technician 2, Huslia participant observation field notes, March 31, 2023.
20. Andrew Slear, ADF&G Fish and Wildlife Technician 2, Huslia participant observation field notes, March 31, 2023.

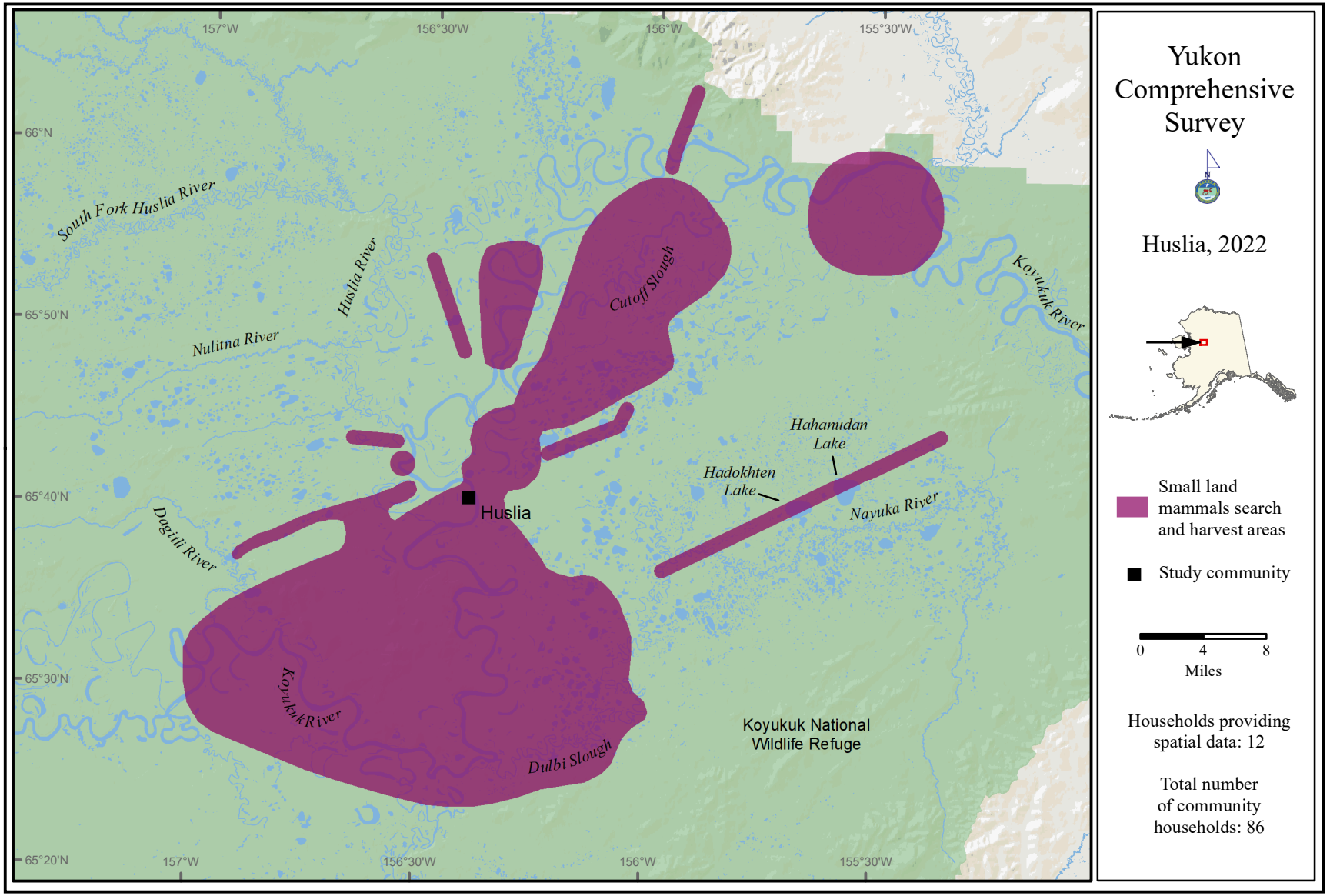


Figure 2-17.–Hunting and trapping locations of small land mammals, Huslia, 2022.

> winter. That's what your ah—how does it not freeze in? So, it's like some animals do freeze in, but that beaver is like the master of not freezing into it's—freezing to death and havin' its feet not freeze up. And the way he does that is he digs a trench in front of his, uh, house and then it puts its feed pile down there, and even if it's a small pond it can dig a pretty deep hole there. And then it, every time it go in and out of there after the ice freeze, it lets a little air out and it creates a big layer of air under the ice which is basically an insulator to keep it from freezing down. And then you have the, um, the blackfish that work with the, uh, with that beaver and, uh, muskrat too. The muskrat live in that beaver house, 'cause it don't wanna freeze in either. (03252023HSL05)

Unlike beavers, wolves are only harvested for their fur. However, the price of fur rarely makes trapping wolves economical, especially when considering the cost of the necessary gear, but there are still those in the community who trap wolves (3252023HSL05; 03232023HSL02). In 2022, 11% of households attempted to harvest wolves, 9% were successful, 8% shared, and 11% used wolves (Table 2-12). For one respondent, wolves were a predatory concern for the moose and caribou population. They also mentioned that wolves tend to target the female caribou, which have more fat on them (03242023HSL04). This respondent wanted to see more active predator control in response to the wolves' rising population. Another respondent also mentioned the importance of trapping wolves as a form of predator control (03232022HSL02). According to this respondent, wolves are intelligent and learn where snares are set, so the trapper must move their traps periodically to follow the pack. This causes the wolf packs to continuously move around in response rather than settle into one area. The respondent theorized that this approach to trapping is itself a form of population control in that the packs that must move around a lot to avoid trappers have fewer pups due to having a harder time hunting.

Traditionally, traplines are passed from one person to another, often through family ties; those who don't have a trap line must ask permission or be invited to use someone's line (03232023HSL01; 03242023HSL02; 03232023HSL03). When asked about trapping locations, respondents collectively identified a large swath of land reaching from the Cutoff Slough to the Dulbi Slough and the Koyukuk River (Figure 2-17). There are several smaller trapping areas marked outside of the large swath above the Cutoff Slough and close to the Nayuka River. Because trapping is often done in the winter months, historically with sled dogs and now with snowmachines, trappers are not limited to the waterways (03232023HSL02).

Marine Mammals

Huslia residents did not harvest marine mammals in 2022 (Table 2-12), which is unsurprising given their distance from marine environments. However, 51% of households reported using marine mammals, and 51% reported receiving marine mammals. Unspecified seals (25%) and bowhead whale (8%) were the only marine mammal resources used in 2022. Most likely these illustrate the exchange of seal oil and muktuk from coastal areas.

Birds and Eggs

Birds and eggs were used by 85% of Huslia residents in 2022 (Table 2-12). Half of the households attempted to harvest (49%), and most were successful (47%). Birds and eggs were widely shared with 57% of households receiving them and 40% giving them away. The most commonly used birds were Canada/cackling geese (70%), and greater white-fronted geese (49%). Only 2% of Huslia residents harvested and used eggs (gull) in 2022.

The total harvest of birds and eggs was 3,271 lb (38 lb per household; 12 lb per capita). The largest proportion of edible weight comprised unspecified Canada/cackling geese (34%), Greater white-fronted geese (28%), and spruce grouse (12%) (Figure 2-18). The remainder of the resources included other birds and eggs, Mallards, black scoter, ruffed grouse, northern pintail, and American wigeon, each of which contributed less than 10% of the total harvest weight.

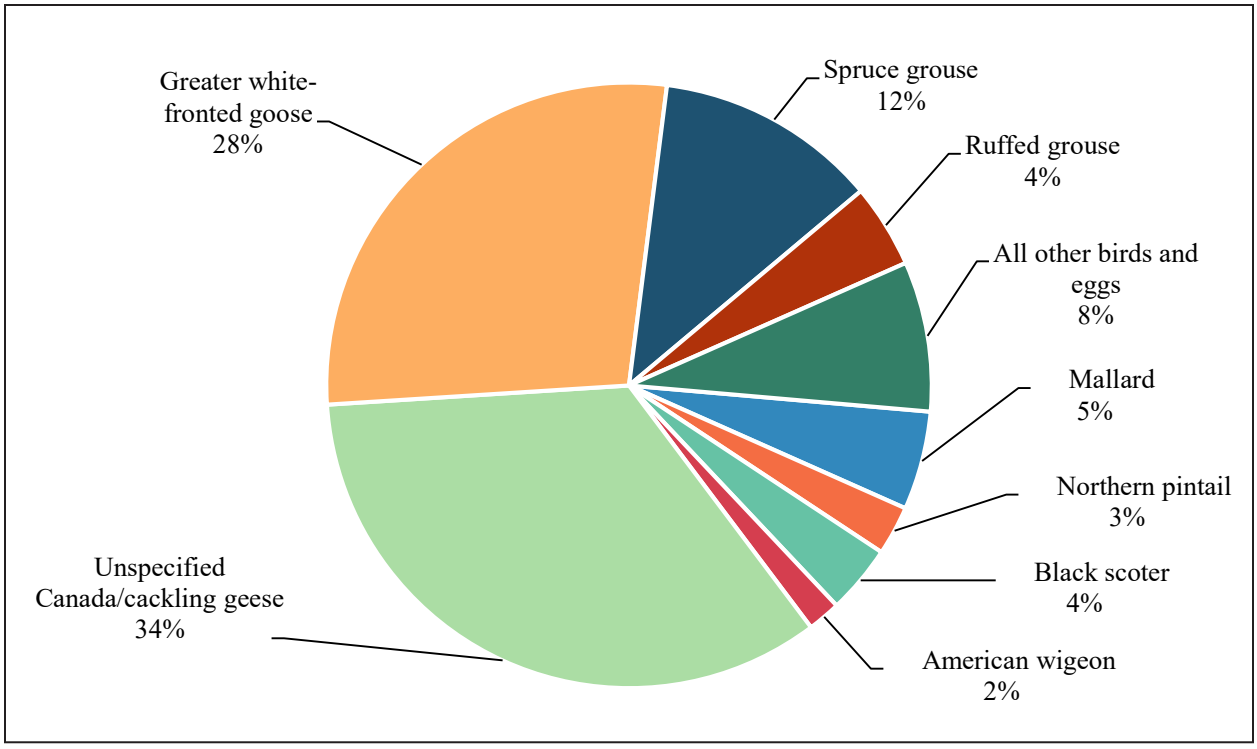


Figure 2-18.–Composition of bird and bird egg harvest in pounds usable weight, Huslia, 2022.

Table 2-22.–Estimated bird harvests by season, Huslia, 2022.

Resource	Spring	Summer	Fall	Winter	Season unknown	**Total**
All birds	**612.9**	0.0	**1,152.1**	**40.6**	**9.7**	**1,815.2**
Bufflehead	8.1	0.0	0.0	0.0	0.0	**8.1**
Canvasback	17.8	0.0	0.0	0.0	0.0	**17.8**
Unspecified eiders	0.0	0.0	0.0	0.0	0.0	**0.0**
Unspecified goldeneyes	8.1	0.0	0.0	0.0	0.0	**8.1**
Mallard	34.1	0.0	71.4	0.0	1.6	**107.1**
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0
Northern pintail	30.8	0.0	40.6	0.0	1.6	**73.0**
Black scoter	11.4	0.0	64.9	0.0	3.2	**79.5**
Surf scoter	32.5	0.0	0.0	0.0	0.0	**32.5**
White-winged scoter	11.4	0.0	0.0	0.0	0.0	**11.4**
Unspecified scoters	3.2	0.0	0.0	0.0	0.0	**3.2**
Northern shoveler	4.9	0.0	4.9	0.0	0.0	**9.7**
Unspecified teals	0.0	0.0	8.1	0.0	1.6	**9.7**
American wigeon	29.2	0.0	24.3	0.0	1.6	**55.2**
Unspecified ducks	0.0	0.0	0.0	0.0	0.0	**0.0**
Unspecified Canada/cackling geese	173.6	0.0	222.3	0.0	0.0	**395.9**

-continued-

Table 2-22.–Page 2 of 2.

Resource	Spring	Summer	Fall	Winter	Season unknown	**Total**
All birds, continued						
Snow goose	9.7	0.0	1.6	0.0	0.0	**11.4**
Greater white-fronted goose	231.5	0.0	56.8	0.0	0.0	**288.3**
Unspecified geese	0.0	0.0	0.0	0.0	0.0	**0.0**
Unspecified swans	0.0	0.0	0.0	0.0	0.0	**0.0**
Sandhill crane	6.5	0.0	0.0	0.0	0.0	**6.5**
Unspecified loons	0.0	0.0	0.0	0.0	0.0	**0.0**
Spruce grouse	0.0	0.0	441.4	16.2	0.0	**457.6**
Sharp-tailed grouse	0.0	0.0	0.0	0.0	0.0	**0.0**
Ruffed grouse	0.0	0.0	167.1	4.9	0.0	**172.0**
Unspecified grouses	0.0	0.0	8.1	0.0	0.0	**8.1**
Ptarmigans	0.0	0.0	40.6	19.5	0.0	**60.0**

Source ADF&G Division of Subsistence household surveys, 2023.

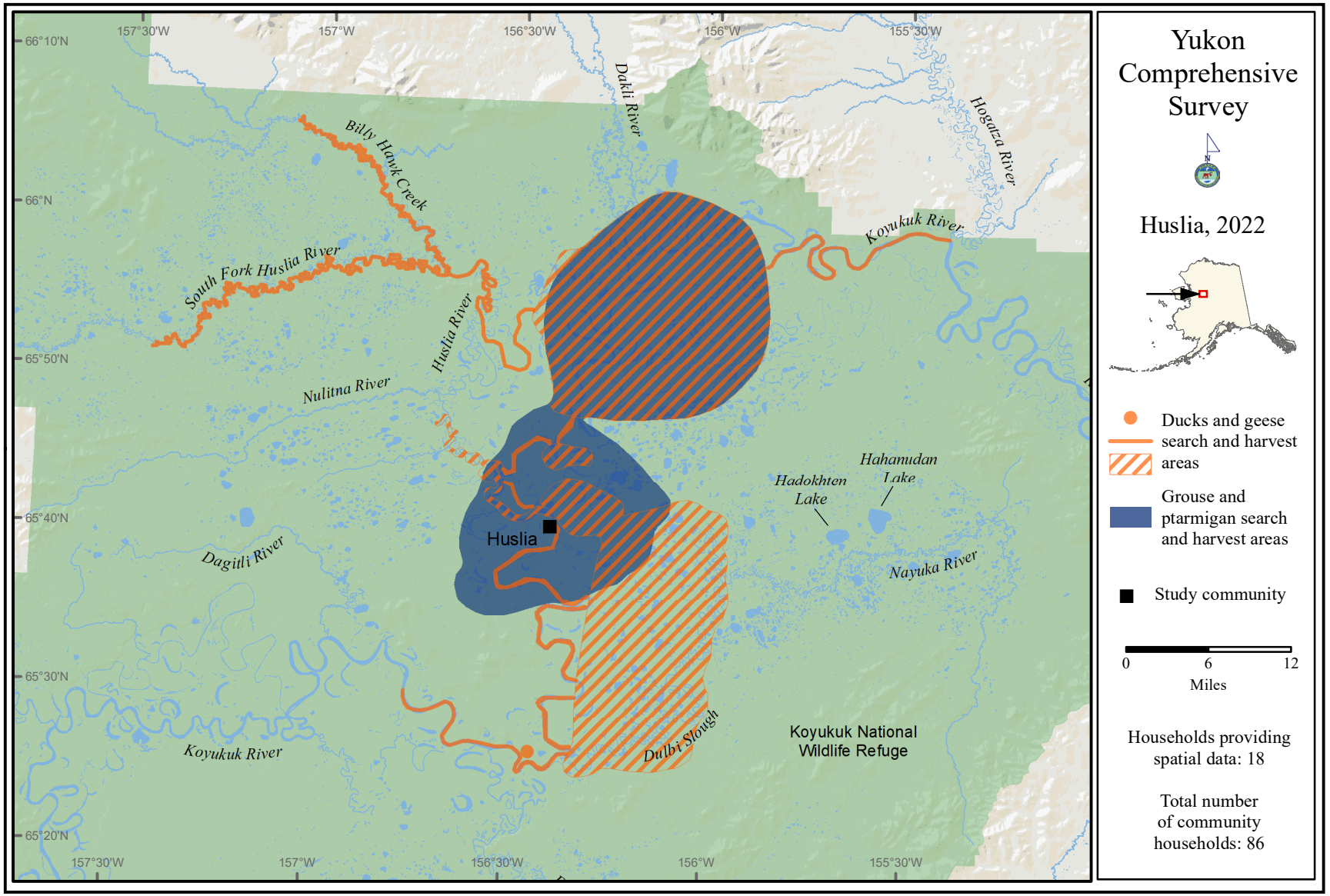


Figure 2-19.–Hunting and harvest locations of birds, Huslia, 2022.

Huslia residents did not report any harvest of birds and eggs in summer and very few in winter (41 birds), as grouse (spruce and ruffed) and ptarmigan were the only birds harvested in the winter (Table 2-22). Rather, they harvested some birds during the spring migration (613 birds or 34% of the total migratory bird harvest) and the majority during the fall migration (1,152 birds or 63% of the total).

For one respondent spring bird hunting is preferred as there is still snow on the ground which makes access via snowmachine easier (03232023HSL01). One respondent mentioned that while bird hunting is essentially a way to bridge the gap between other resource groups, it is considered a fun activity and a way to hang out with friends (03242023HSL04). This respondent also described how to store birds for later consumption. If there isn't a freezer available then they are half dried and stored in plastic bags buried in the ground, and if they are frozen, they are done so whole with the guts intact, which prevents freezer burning.

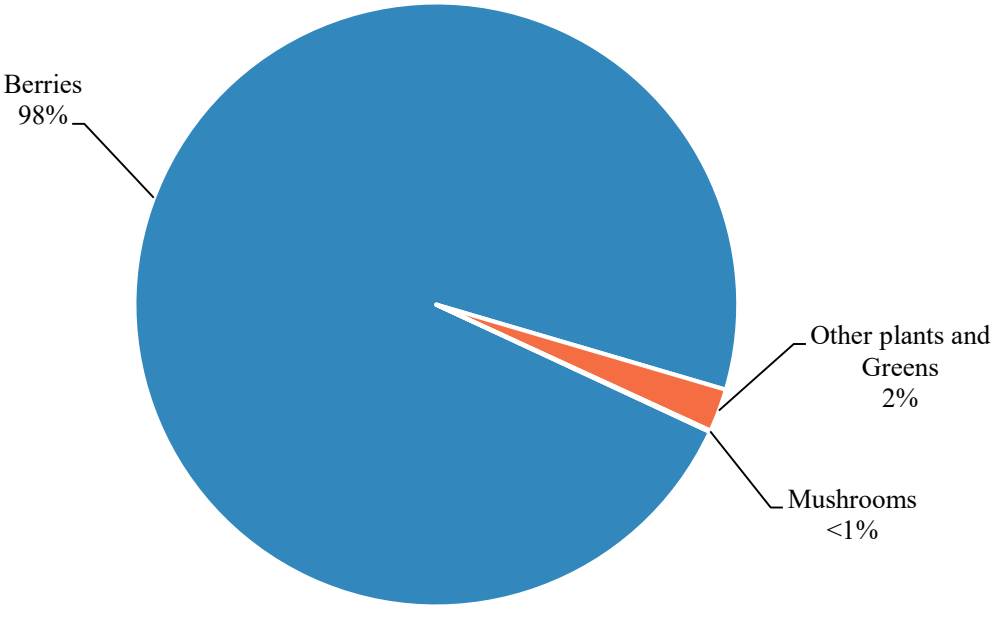
Compared to other species in the birds and eggs resource category, harvesters identified the widest search and harvest area for ducks and geese (Figure 2-19). Hunters traveled along the Koyukuk River for some distance south of Huslia, past the community to the Hogatza River, and up both forks of the Huslia River. Respondents also identified large sections of wetlands north of Huslia and around the Dulbi slough. Grouse and ptarmigan were harvested in a broad area directly around the community and upriver to the Dakli River.

Marine Invertebrates

There was very little harvest (2%) or use (4%) of marine invertebrates in Huslia (Table 2-12). In 2022, 2% of Huslia households harvested tanner crab, likely having traveled to the coast to do so. Residents used both tanner crab (2%) and King crab (2%).

Vegetation

Nearly all Huslia's households (87%) reported using vegetation in 2022 (Table 2-12). All households that attempted (70%) to harvest vegetation were successful. The total edible vegetation harvest amounted to 2,141 lb (25 lb per household; 8 lb per capita) and was composed of 98% berries, 2% other plants and greens, and less than 1% mushrooms (Figure 2-20; Table 2-12). In total, households harvested 847 lb (10 lb



Note Species having 0 lb of usable weight are not included

Figure 2-20.–Composition of vegetation harvest by type in pounds usable weight, Huslia, 2022.

per household; 3 lb per capita) of lowbush cranberries, 701 lb (8 lb per household; 3 lb per capita) of blueberries, and 251 lb (3 lb per household; 1 lb per capita) of highbush cranberries. Other berries such as cloudberries, crowberries, raspberries, and other plants were harvested in smaller quantities. One respondent recalled harvesting a wide variety of berries near the community with their mom (0232023HSL01). When asked about medicinal plants, she remembered her mom would use spruce pitch on cuts and it would help them heal. Of the 53 households who responded to whether or not they used firewood to heat their homes, 9 (17%) did not use wood, 14 (26%) used wood and met 25% or less of their annual heating requirement with firewood, and 8 (15%) households met 100% of their home heating needs with wood (Table 2-23).

Table 2-23.–Use of firewood for home heating, Huslia, 2022.

	Households reporting	
Percent of home heating from wood	Number	Percentage
Sampled households	53	
No use of firewood	9	17.0%
1–25%	14	26.4%
26–50%	8	15.1%
51–75%	7	13.2%
76–99%	6	11.3%
100%	8	15.1%
Missing	1	1.9%

Source ADF&G Division of Subsistence household surveys, 2023.

Much of the greens and berries harvested by Huslia residents were found along the Koyukuk River both above and below the community (Figure 2-21). A respondent mentioned that her family would travel by boat to some nearby lakes to harvest rhubarb which would then be used for pudding (0232023HSL01). They also used large areas further up the Koyukuk River, where it meets the Hogatza River, and up the Dakli River.

Food Security

Survey respondents were asked a set of questions intended to assess their household's food security, defined as, "access by all people at all times to enough food for an active, healthy life" (Coleman-Jensen et al. 2020). The food security questions were modeled after those developed by the USDA but modified by ADF&G to account for differences in access to subsistence and store-bought foods. Based on their responses to these questions, households were broadly categorized as being food secure or food insecure following a USDA protocol (Bickel et al. 2000). Food secure households were broken down further into two subcategories—high or marginal food security. Food insecure households were divided into two subcategories—low food security or very low food security.

Households in the high food security category did not report any food access problems or limitations. Households in the marginal food security category reported one or two instances of food access problems or limitations—typically anxiety over food sufficiency or a shortage of particular foods in the house—but gave little or no indication of changes in diets or food intake. Households in the low food security category reported reduced quality, variety, or desirability of their diet, but they gave little indication of reduced food intake. Households classified as having very low food security were those that reported multiple instances of disrupted eating patterns and reduced food intake (Coleman-Jensen et al. 2020).

Table 2-24 shows whether households reported having enough of their desired foods during the study year. For those households that responded that they did not have enough of the kinds of food they wanted to eat, surveyors asked specific questions about food insecure conditions and timing, which are summarized in Figure 2-22. Of the responding households, 34% reported having enough of the kinds of foods they wanted, and 57% said that while they had enough food in 2022, it was not their preferred food. Less than 10% of

Table 2-24.–Households' assessments of food security conditions, Huslia, 2022.

Statement	Percentage of sampled households
Had enough of the kinds of foods desired	34.0%
Had enough food, but not the desired kind	56.6%
Sometimes, or often, did not have enough food	9.4%

Source ADF&G Division of Subsistence household surveys, 2023.

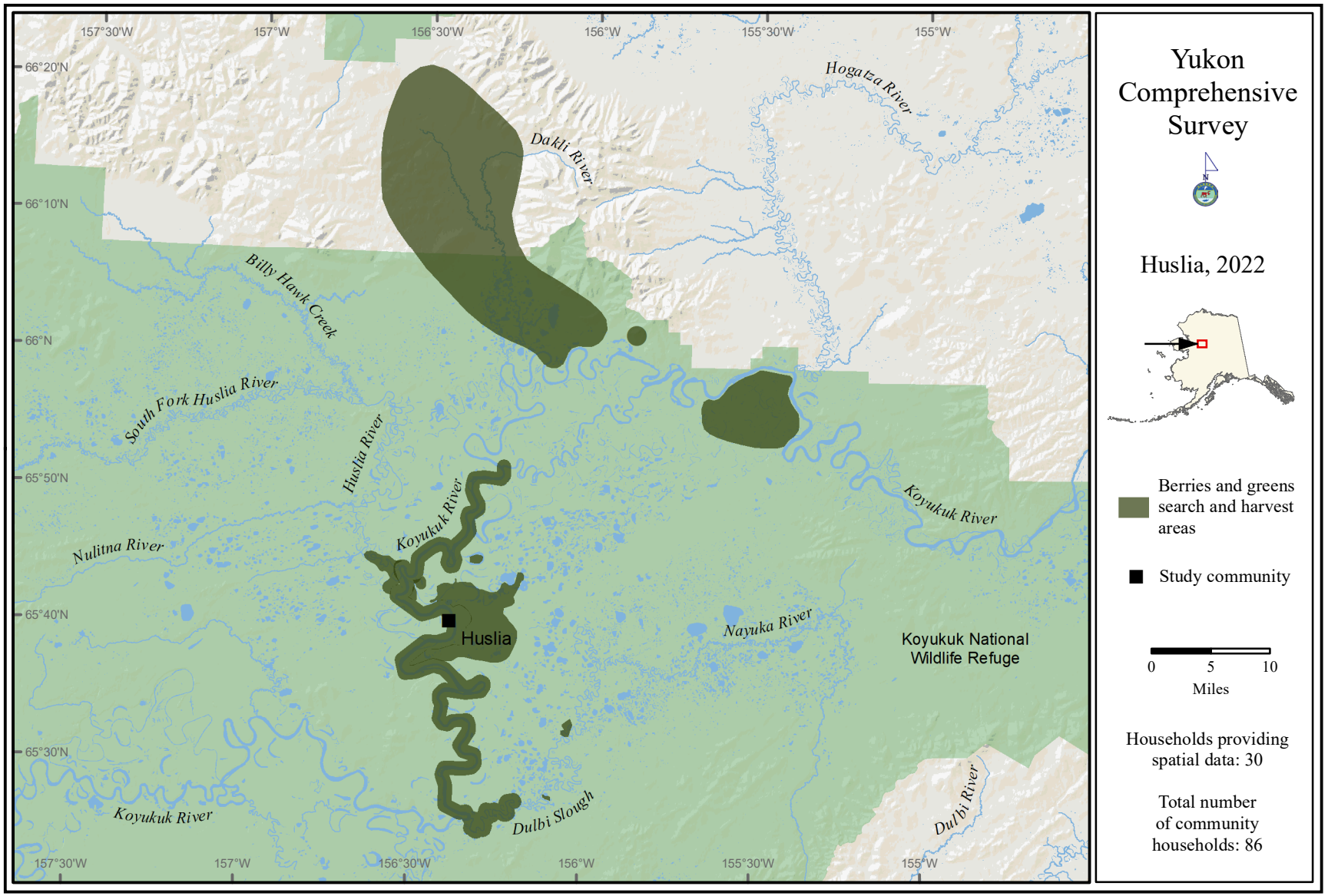


Figure 2-21.–Gathering and harvest locations of berries and greens, Huslia, 2022.

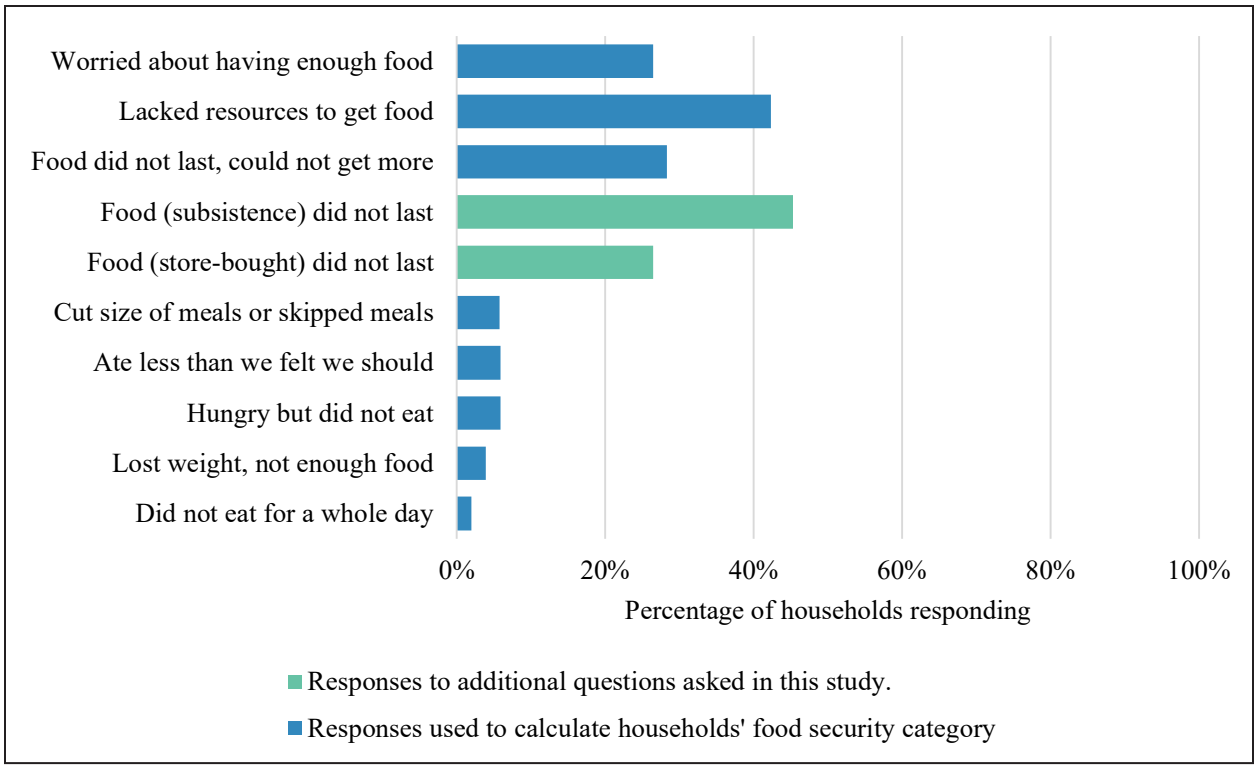


Figure 2-22.–Responses to questions about food insecure conditions, Huslia, 2022.

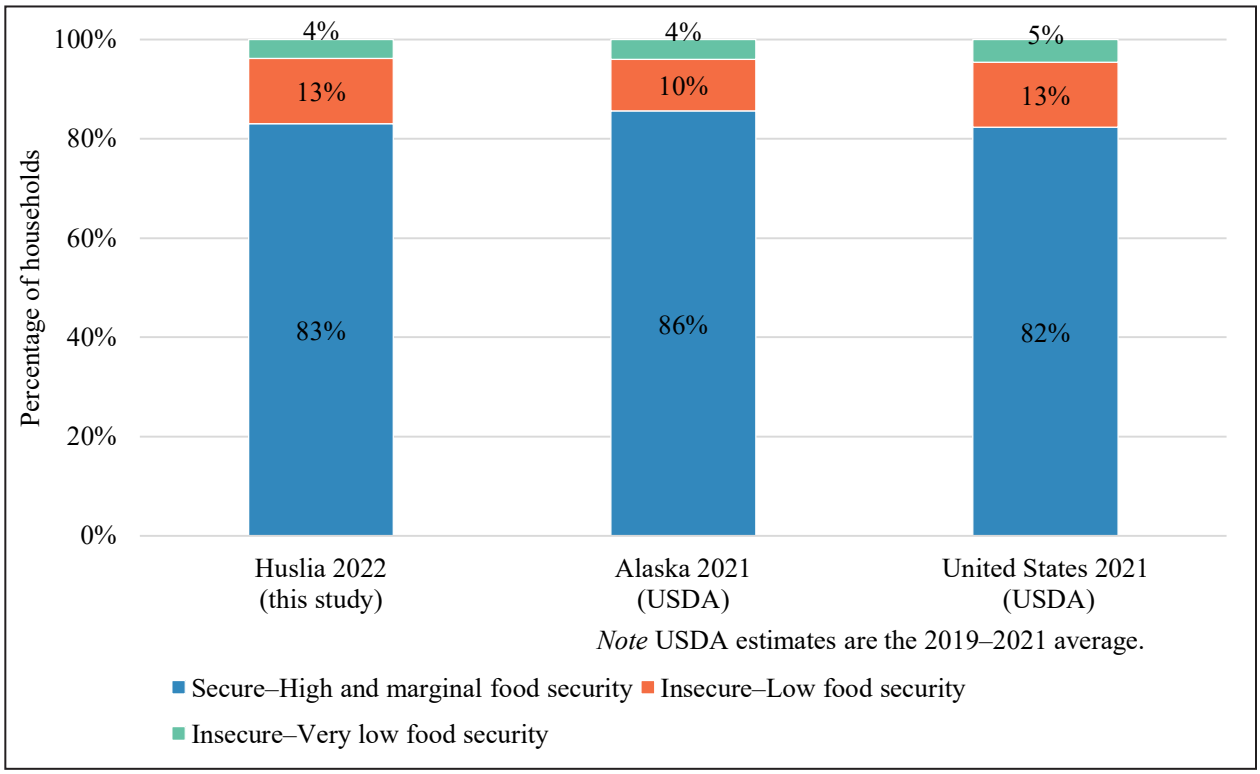


Figure 2-23.–Comparison of food security categories, Huslia, Alaska, and United States, 2022.

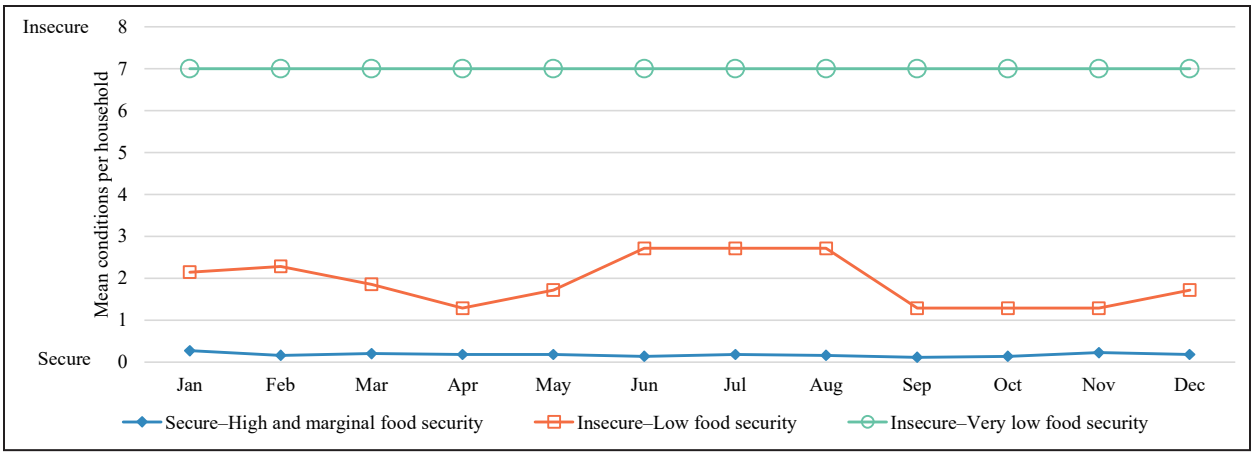


Figure 2-24.–Mean number of food insecure conditions by month and by household food security category, Huslia, 2022.

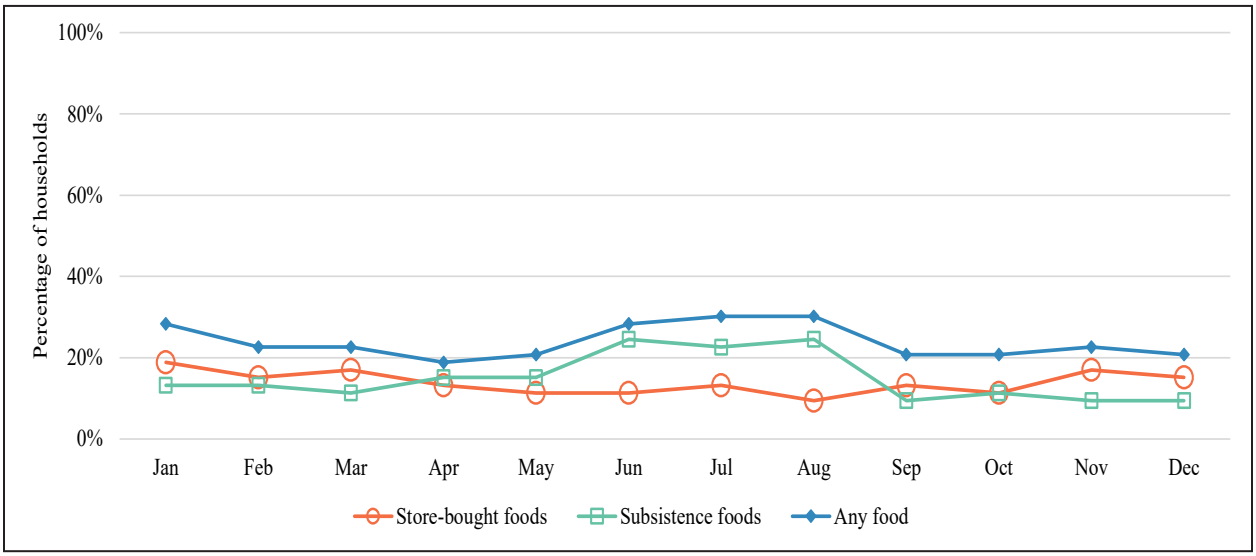


Figure 2-25.–Comparison of months when food did not last, Huslia, 2022.

households sometimes, or often, did not have enough food (Table 2-24). Nearly half of the respondents (45%) said their subsistence food did not last, while 26% of households ran out of store-bought food. Respondents said they lacked the resources to get food (42%), and 28% reported that food in general did not last and they could not get more (Figure 2-22). Less than 10% of the responding households reported cutting the size of, or skipping meals (6%), eating less than they felt they should (6%), and going hungry but not eating (6%).

Food security results for surveys for Huslia, all communities in Alaska, and the U.S. are summarized in Figure 2-23. While Huslia (83%) ranked marginally higher than the rest of the U.S. (82%) for secure households, food security in the community was slightly lower than in Alaska as a whole (86%). While Huslia and Alaska are equal in their percentage of very low-security households (4%), Huslia had more households that fell into the low food security category (13% Huslia; 10% Alaska).

Figure 2-24 shows the mean number of food insecure conditions per household by food security category by month. Figure 2-25 shows which months households reported running out of subsistence foods, store-bought foods, and any foods. When looked at together, these two figures show the impact that availability of different foods has on the community's food security. The households that fell into the very low food

security category reported it as a year-round condition, as did those in the high food security group (Figure 2-24). There was no significant fluctuation per month for these two categories. The low food security category showed the most variation throughout the year. Respondents in this category identified the months of June, July, and August as the most food insecure. This trend is reflected in Figure 2-25, specifically in terms of subsistence foods. Store-bought food was available throughout the year, with slight decreases during the winter months (Figure 2-25). The pattern of low access to subsistence foods in the summer is also seen in the "any food" category suggesting that the availability of subsistence foods has a larger impact on the community's food security than store-bought foods.

One respondent mentioned some factors that may explain the summer subsistence shortage. He explained that salmon have been the main subsistence food harvested in the summer; however, since salmon have become less available there is a gap in the subsistence harvest cycle that is difficult to fill. This respondent also stated that it is hard for him to harvest in the summer since he works from March to August (03242023HSL04). Seasonal work can bring in needed income but at the cost of harvesting subsistence resources.

Comparing Harvests and Uses in 2022 with Previous Years

Harvest Assessments

Researchers asked respondents to assess their own harvests in two ways: whether they used more, less, or about the same amount of eight resource categories in 2022 as in the past five years, and whether they got "enough" of each of the eight resource categories; the same questions were asked about all wild resources overall. Households also were asked to provide reasons if their use was different or if they were unable to get enough of a resource. If they did not get enough of a resource, they were asked to evaluate the severity of the impact on their household as a result of not getting enough. They were further asked whether they did anything differently (such as supplement with store-bought food or switch to a different subsistence resource) because they did not get enough. This section discusses responses to those questions.

Together, Table 2-25 and Figure 2-26 provide a broad overview of households' assessments of their harvests in 2022. Because not everyone uses all resource categories, some households did not respond to the assessment questions. Additionally, some households that do typically use a resource category simply did not answer questions.

Over half of the responding households (66%) said they used less of all subsistence resources in 2022 compared to recent years, while 81%, 60%, and 52% said they used less salmon, nonsalmon fish, and vegetation, respectively (Table 2-25; Figure 2-26). Of the households that reported using less salmon, 75% cited regulations as the reason and 21% said the resource was less available (Table 2-26). Although a large percentage of responding households used less resources than in recent years, 65%, 45%, and 42% reported using the same amount of large land mammals, birds and eggs, and vegetation, respectively (Table 2-25; Figure 2-26). Very few households reported harvesting more of any resource. Seven households said they harvested more large land mammals than in recent years; three of those households cited substituting large land mammals for other resources (Table 2-27).

Of the 52 households that responded to questions about whether they got enough resources in 2022, 24 (46%) said they did not get enough of all resources (Table 2-28). Ten households (42%) were severely impacted by the shortage, and 9 (38%) were majorly impacted. Out of 37 (71%) households that reported not getting enough salmon, 17 (46%) said it had a severe impact. When asked if there were any resources they needed more of, 20 households (38% of responses) said they needed more salmon in general while 32 (60%) stated they needed more Chinook salmon, and 16 (30%) households needed more fall chum salmon (Table 2-29).

Of the 20 (39%) households that reported not getting enough nonsalmon fish in 2022, 7 (35%) were severely affected, and 7 (35%) were majorly affected (Table 2-28; Figure 2-27). Sheefish (12 households; 23%) and whitefishes (15 households; 28%) were the nonsalmon species households reported needing the most (Table 2-29). While 19 (36%) households stated they did not get enough vegetation, nearly half of them (8 households; 42%) said this was a minor impact; 6 (32%) said it severely impacted them (Table 2-28;

Table 2-25.–Changes in household uses of resources compared to recent years, Huslia, 2022.

Resource category	Valid responses[a]	Households reporting use: Total households Number	Total households Percent	Less Number	Less Percent	Same Number	Same Percent	More Number	More Percent	Households not using Number	Households not using Percent
Any resource	53	53	100.0%	51	96.2%	46	86.8%	13	24.5%	52	98.1%
All resources	53	53	100.0%	35	66.0%	16	30.2%	2	3.8%	0	0.0%
Salmon	53	48	90.6%	43	81.1%	3	5.7%	2	3.8%	5	9.4%
Nonsalmon fish	52	43	82.7%	31	59.6%	8	15.4%	4	7.7%	9	17.3%
Large land mammals	52	52	100.0%	11	21.2%	34	65.4%	7	13.5%	0	0.0%
Small land mammals	53	30	56.6%	13	24.5%	16	30.2%	1	1.9%	23	43.4%
Marine mammals	53	27	50.9%	8	15.1%	17	32.1%	2	3.8%	26	49.1%
Birds and eggs	49	41	83.7%	17	34.7%	22	44.9%	2	4.1%	8	16.3%
Marine invertebrates	53	2	3.8%	0	0.0%	1	1.9%	1	1.9%	51	96.2%
Vegetation	52	52	100.0%	27	51.9%	22	42.3%	3	5.8%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2023.

a. Valid responses include the number of households out of the original sample of n = 53 that provided a valid response to the question.

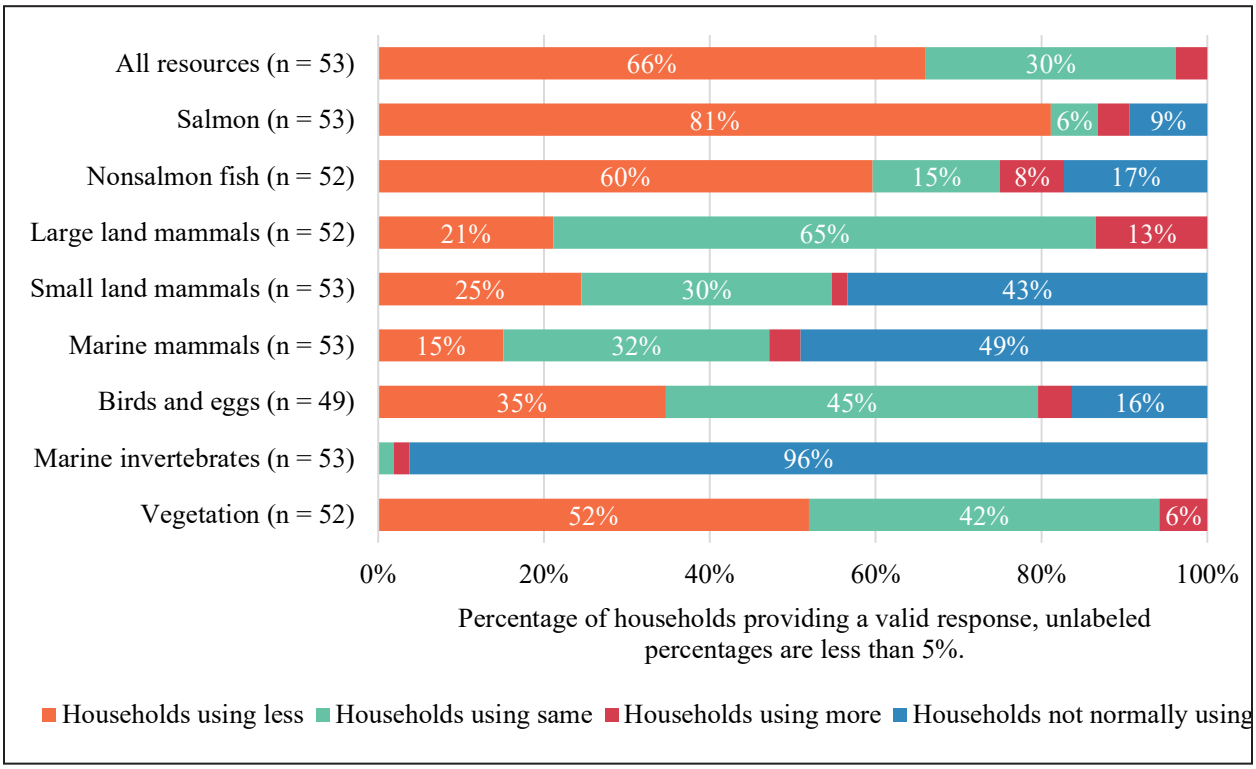


Figure 2-26.–Changes in household uses of resources compared to recent years, Huslia, 2022.

Table 2-26.–Reasons for less household uses of resources compared to recent years, Huslia, 2022.

Resource category	Households reporting less use[a]	Households providing valid reasons[b]	Resources less available		Lack of effort		Less sharing		Working / no time		Family / personal	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Any resource	51	51	32	62.7%	14	27.5%	18	35.3%	13	25.5%	9	17.6%
All resources	35	35	14	40.0%	3	8.6%	2	5.7%	4	11.4%	5	14.3%
Salmon	43	43	9	20.9%	0	0.0%	4	9.3%	0	0.0%	2	4.7%
Nonsalmon fish	31	31	4	12.9%	6	19.4%	5	16.1%	6	19.4%	2	6.5%
Large land mammals	11	11	2	18.2%	0	0.0%	2	18.2%	1	9.1%	1	9.1%
Small land mammals	13	13	2	15.4%	3	23.1%	3	23.1%	2	15.4%	1	7.7%
Marine mammals	8	8	1	12.5%	0	0.0%	6	75.0%	0	0.0%	0	0.0%
Birds and eggs	17	17	3	17.6%	4	23.5%	2	11.8%	3	17.6%	1	5.9%
Marine invertebrates	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	27	27	17	63.0%	4	14.8%	1	3.7%	4	14.8%	4	14.8%

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Table 2-26.–Continued.

Resource category	Households reporting less use[a]	Households providing valid reasons[b]	Unsuccessful		Weather / environment		Lack of equipment		Did not need		Regulations	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Any resource	51	51	3	5.9%	14	27.5%	3	5.9%	3	5.9%	34	66.7%
All resources	35	35	0	0.0%	6	17.1%	1	2.9%	0	0.0%	14	40.0%
Salmon	43	43	0	0.0%	0	0.0%	1	2.3%	0	0.0%	32	74.4%
Nonsalmon fish	31	31	1	3.2%	2	6.5%	2	6.5%	1	3.2%	6	19.4%
Large land mammals	11	11	2	18.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Small land mammals	13	13	0	0.0%	0	0.0%	0	0.0%	1	7.7%	0	0.0%
Marine mammals	8	8	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds and eggs	17	17	0	0.0%	3	17.6%	0	0.0%	1	5.9%	0	0.0%
Marine invertebrates	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	27	27	0	0.0%	11	40.7%	0	0.0%	0	0.0%	0	0.0%

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Table 2-26.–Page 2 of 2.

Resource category	Households reporting less use[a]	Households providing valid reasons[b]	Too far to travel		Small / diseased animals		Did not have help		Other reasons	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent
Any resource	51	51	4	7.8%	4	7.8%	2	3.9%	11	21.6%
All resources	35	35	0	0.0%	2	5.7%	0	0.0%	1	2.9%
Salmon	43	43	0	0.0%	1	2.3%	0	0.0%	2	4.7%
Nonsalmon fish	31	31	1	3.2%	0	0.0%	0	0.0%	1	3.2%
Large land mammals	11	11	3	27.3%	0	0.0%	1	9.1%	3	27.3%
Small land mammals	13	13	0	0.0%	0	0.0%	1	7.7%	0	0.0%
Marine mammals	8	8	0	0.0%	0	0.0%	0	0.0%	2	25.0%
Birds and eggs	17	17	0	0.0%	1	5.9%	1	5.9%	3	17.6%
Marine invertebrates	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	27	27	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2023.

Note this table summarizes open-ended responses that have been categorized into one or more standard classifications. Only reasons offered by respondents for the study have been included.

a. Includes only households indicating less historical use.

b. Includes only households indicating less historical use and provided at least one valid reason.

Table 2-27.–Reasons for more household uses of resources compared to recent years, Huslia, 2022.

Resource category	Households reporting more use[a]	Households providing valid reasons[b]	Received more		Increased effort		More success		Increased resource availability		Needed more	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Any resource	13	13	5	38.5%	4	30.8%	1	7.7%	1	7.7%	2	15.4%
All resources	2	2	1	50.0%	0	0.0%	1	50.0%	0	0.0%	1	50.0%
Salmon	2	1	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%
Nonsalmon fish	4	4	0	0.0%	1	25.0%	0	0.0%	1	25.0%	1	25.0%
Large land mammals	7	7	2	28.6%	0	0.0%	1	14.3%	0	0.0%	1	14.3%
Small land mammals	1	1	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	2	2	2	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds and eggs	2	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	1	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	3	3	0	0.0%	2	66.7%	0	0.0%	0	0.0%	0	0.0%

-continued-

Table 2-27.–Page 2 of 2.

Resource category	Households reporting more use[a]	Households providing valid reasons[b]	Had more time		Substitution for other resources		Store-bought expense		Had more help		Other reasons	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Any resource	13	13	1	7.7%	6	46.2%	1	7.7%	1	7.7%	1	7.7%
All resources	2	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Salmon	2	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Nonsalmon fish	4	4	0	0.0%	2	50.0%	0	0.0%	0	0.0%	0	0.0%
Large land mammals	7	7	0	0.0%	3	42.9%	1	14.3%	0	0.0%	1	14.3%
Small land mammals	1	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Marine mammals	2	2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds and eggs	2	2	0	0.0%	1	50.0%	0	0.0%	1	50.0%	0	0.0%
Marine invertebrates	1	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	3	3	1	33.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2023.

Note this table summarizes open-ended responses that have been categorized into one or more standard classifications. Only reasons offered by respondents for the study have been included.

a. Includes only households indicating more historical use.

b. Includes only households indicating more historical use and provided at least one valid reason.

Table 2-28.–Reported impact to households reporting that they did not get enough of a type of resource, Huslia, 2022.

	Households not getting enough _____.				Impact to those not getting enough _____.									
	Valid responses[a,b]		Did not get enough		No response		Not noticable		Minor		Major		Severe	
Resource category	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Any resource	53	100.0%	44	83.0%	2	4.5%	6	13.6%	21	47.7%	22	50.0%	25	56.8%
All resources	52	98.1%	24	46.2%	1	4.2%	0	0.0%	4	16.7%	9	37.5%	10	41.7%
Salmon	52	98.1%	37	71.2%	0	0.0%	1	2.7%	6	16.2%	13	35.1%	17	45.9%
Nonsalmon fish	51	96.2%	20	39.2%	1	5.0%	3	15.0%	2	10.0%	7	35.0%	7	35.0%
Large land mammals	52	98.1%	10	19.2%	0	0.0%	0	0.0%	7	70.0%	2	20.0%	1	10.0%
Small land mammals	51	96.2%	13	25.5%	0	0.0%	1	7.7%	5	38.5%	3	23.1%	4	30.8%
Marine mammals	53	100.0%	3	5.7%	0	0.0%	2	66.7%	1	33.3%	0	0.0%	0	0.0%
Birds and eggs	49	92.5%	9	18.4%	0	0.0%	2	22.2%	4	44.4%	1	11.1%	2	22.2%
Marine invertebrates	53	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	53	100.0%	19	35.8%	0	0.0%	1	5.3%	8	42.1%	4	21.1%	6	31.6%

Source ADF&G Division of Subsistence, household surveys, 2023.

a. Valid responses include households responding yes or no to the question and households that never used the resource.

b. Percentage of valid responses is based on a sample of 53 households.

Table 2-29.–Resources that households reported needing, Huslia, 2022.

Resource	Households needing	Percent of sampled households[a]
Fish	2	3.8%
Salmon	20	37.7%
Chum salmon	5	9.4%
Summer chum salmon	8	15.1%
Fall chum salmon	16	30.2%
Coho salmon	2	3.8%
Chinook salmon	32	60.4%
Sockeye salmon	1	1.9%
Nonsalmon fish	1	1.9%
Burbot	1	1.9%
Arctic grayling	2	3.8%
Northern pike	4	7.5%
Sheefish	12	22.6%
Whitefishes	15	28.3%
Broad whitefish	2	3.8%
Black bear	6	11.3%
Brown bear	1	1.9%
Caribou	2	3.8%
Moose	9	17.0%
Beaver	11	20.8%
Snowshoe hare	1	1.9%
Lynx	1	1.9%
Martens	2	3.8%
Unspecified seal oil	2	3.8%
Whales	2	3.8%
Birds and eggs	1	1.9%
Ducks	1	1.9%
Geese	3	5.7%
Canada/cackling geese	6	11.3%
Greater white-fronted goose	4	7.5%
Berries	8	15.1%
Blueberry	19	35.8%
Lowbush cranberry	8	15.1%
Highbush cranberry	4	7.5%
Cloudberry	8	15.1%
Raspberry	2	3.8%
Salmonberry	1	1.9%
Spruce tips	1	1.9%
Wood	4	7.5%

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2023.

a. Percentages are based on the 53 sampled households in Huslia.

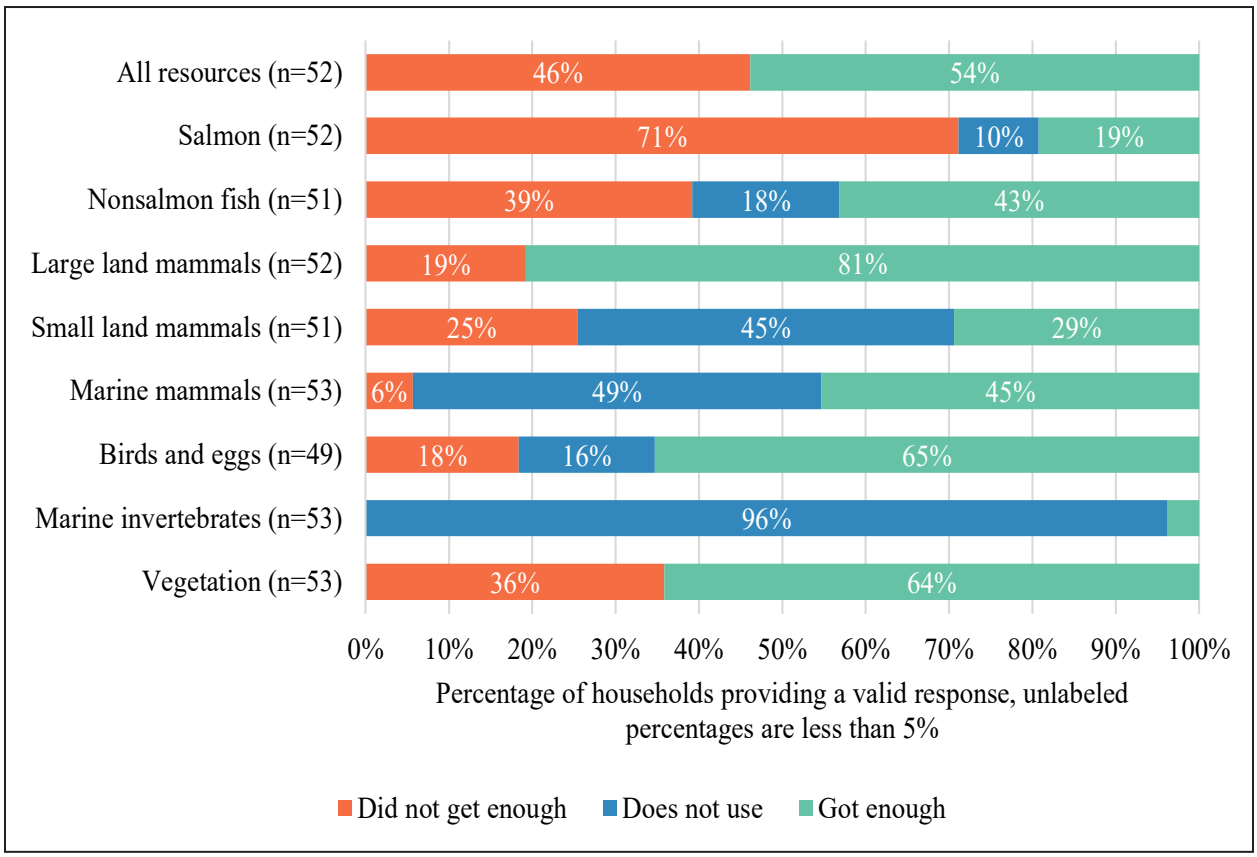


Figure 2-27.–Percentage of sampled households reporting whether they had enough resources, Huslia, 2022.

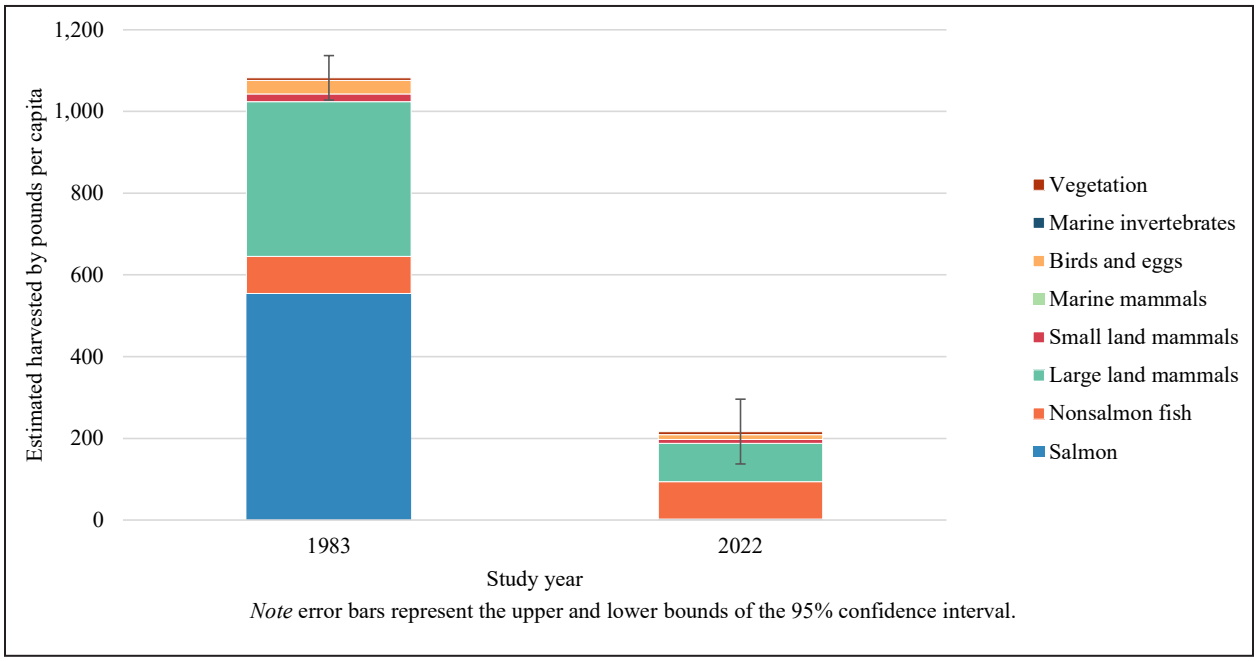


Figure 2-28.–Composition of harvest in pounds per capita, by resource category, 1983 and 2022, Huslia..

Figure 2-26). Responding households (19; 36%) indicated that blueberries were the vegetation resource most needed in 2022 (Table 2-29).

Harvest Data

Changes in the harvest of resources by Huslia residents can be discerned through comparisons with findings from earlier study years. Comprehensive subsistence harvest surveys were conducted in Huslia for the study year 1983. More recently, large land mammal studies were conducted for the years 1997 through 2002 (Andersen et al. 1998; 2000; 2001). Historical data for salmon harvest by species is available from 1983 to present (figures 2-28–2-32). The yearly data points are provided by three sources: Division of Subsistence household surveys in 1983 and 2022 (this study), and Yukon River postseason salmon surveys compiled in the ASFDB.[21] Finally, there was a 2004 study conducted by the Division of Subsistence which included the 2002 nonsalmon fish harvest data. To accurately depict changes in harvest, the per capita numbers are used rather than the total harvest numbers, which is influenced by changes in population. The following section compares the results from this study with these earlier findings.

There was a significant difference between the 1983 and 2022 harvest amounts in most resource categories (Table 2-30; figures 2-28 and 2-29). In 1983, Huslia residents harvested 1,082 lb per capita of subsistence resources, while in 2022 they harvested 217 lb per capita. Changes in the harvest of salmon between these two study years explain much of the decrease in this per capita harvest. In 1983, residents harvested an estimated 555 lb per capita compared to 3 lb per capita harvested in 2022. Across all four species of salmon, the 2022 survey harvest estimates for the community of Huslia are significantly lower than the 1983 harvest estimates (figures 2-28–2-32). In the last 40 years, Chinook salmon harvest has ranged from a high of 969 Chinook salmon in 2009 to 24 in 2022. The fall chum salmon harvest ranged from close to 2,000 (1,909 total in 2012) to 37 total (2022), while the summer chum salmon harvest ranged from over 20,000 (20,953 total in 1983) to 24 total (2022), finally the coho salmon harvest ranged from just under 1,000 (980 total in 2018) to 2 total (2022). While harvests of all four salmon species have experienced major fluctuations since 1983, Chinook salmon and summer chum salmon abundance has declined. Salmon harvests documented in this study remain low. The lack of salmon harvest opportunities is a source of major concern for many community members, not only because of the effect it has on a major food source, but because of the impact on their culture:

> [It's] … killing our culture, you know. I mean, especially down on the Yukon. But it's here just as bad. 'Cause people here have fish camps all up and down the river. And they're empty too in the summer. Yukon is, I think is as least as bad because people not only fish for subsistence, they make a little money on it. They don't sell commercially, like when we were, when I was younger and fishing downriver, we used to sell commercially. But we don't do that anymore. Um, but just culturally it's like, it's like taking the buffalo from the Indians down the lower forty-eight to me, you know. It's a, it's a real blow on the culture. (03232023HSL02)

As salmon decline, it has become harder for residents to justify the cost of traveling to their fish camps. The buildings are falling into disrepair and the current generation is growing up without that experience (03232023HSL02).

Additionally, there are six years of big game harvest information to compare to the 2022 harvest data spanning from 1983 to 2002 (Table 2-30; figures 2-28 and 2-29). The highest harvest per capita was 311 lb (59,850 lbs total) in 1983, and 1998 had the lowest harvest at 158 lb per capita (38,880 lbs total). The other recorded years ranged between 165 lb per capita (35,910 lbs total; 2002) and 200 lb per capita (43,572 lbs total; 1997). All recorded historical harvests were significantly higher than 2022's harvest of 80 lb per capita (22,698 lbs total; Table 2-12). One respondent explained that, while moose comprised 90% of their subsistence harvest, the population has dropped (03242023HSL04). They attributed this decline to increasing calf predation, primarily by large grizzlies coming down from the mountains. Another respondent

21. Alaska Subsistence Fisheries Database, Version 3.5, 2004, Division of Subsistence, Alaska Department of Fish and Game.

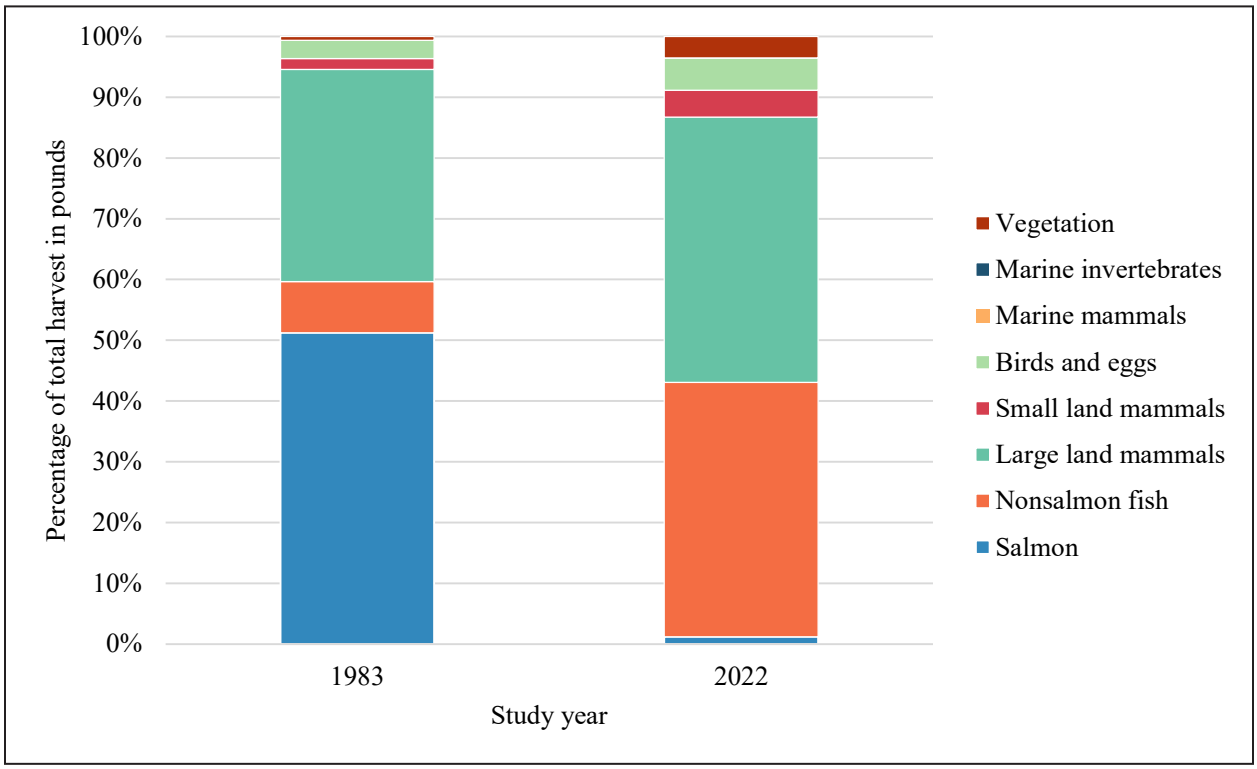


Figure 2-29.–Composition of harvest by category for Huslia, 1983 and 2022.

Table 2-30.–Comparison of estimated total and per capita harvests, Huslia, 1983 and 2023.

	Estimated harvest in pounds usable weight					
	1983			2022		
Resource	Total	Per capita	95% CI	Total	Per capita	95% CI
All resources	**208,165.00**	**1,082.1**	**5.0%**	**61,118.4**	**216.5**	**36.5%**
Salmon	106,674.0	554.5	7.0%	721.0	2.6	114.7%
Nonsalmon fish	17,454.0	90.7	7.0%	25,595.1	90.7	65.4%
Large land mammals	72,838.0	378.6	3.0%	26,682.5	94.5	24.0%
Small land mammals	3,604.0	18.7	4.0%	2,703.2	9.6	58.8%
Marine mammals	0.0	0.0	0.0%	0.0	0.0	0.0%
Birds and eggs	6,359.0	33.1	3.0%	3,271.4	11.6	39.7%
Marine invertebrates	0.0	0.0	0.0%	3.9	0.0	124.3%
Vegetation	1,235.0	6.4	3.0%	2,141.3	7.6	33.5%

Sources For 2023, ADF&G Division of Subsistence household surveys, 2023; for previous years, ADF&G Division of Subsistence Community Subsistence Information System (CSIS), accessed 2023.

a. 95% confidence intervals were calculated as a percent range around the mean. This percentage applies to the mean, per capita, and total estimated harvests.

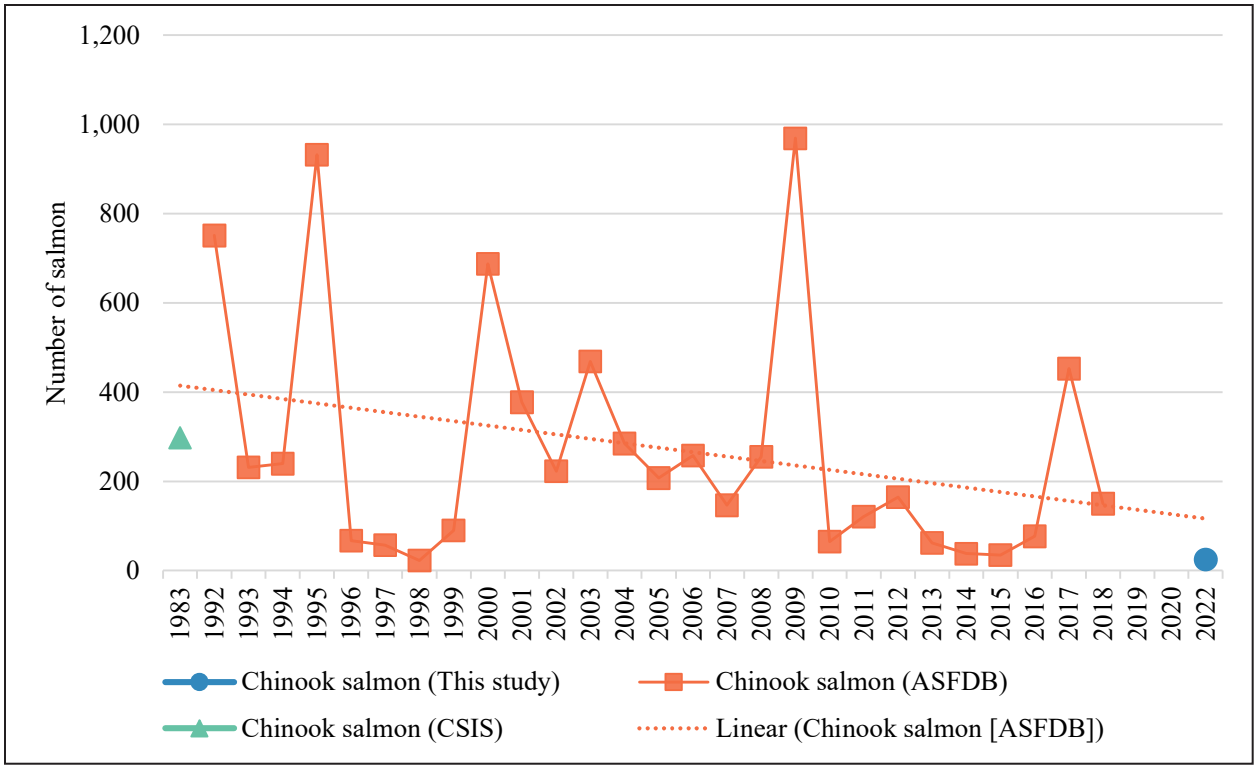


Figure 2-30.–Comparison of Chinook salmon harvests, 1983–2022, Huslia.

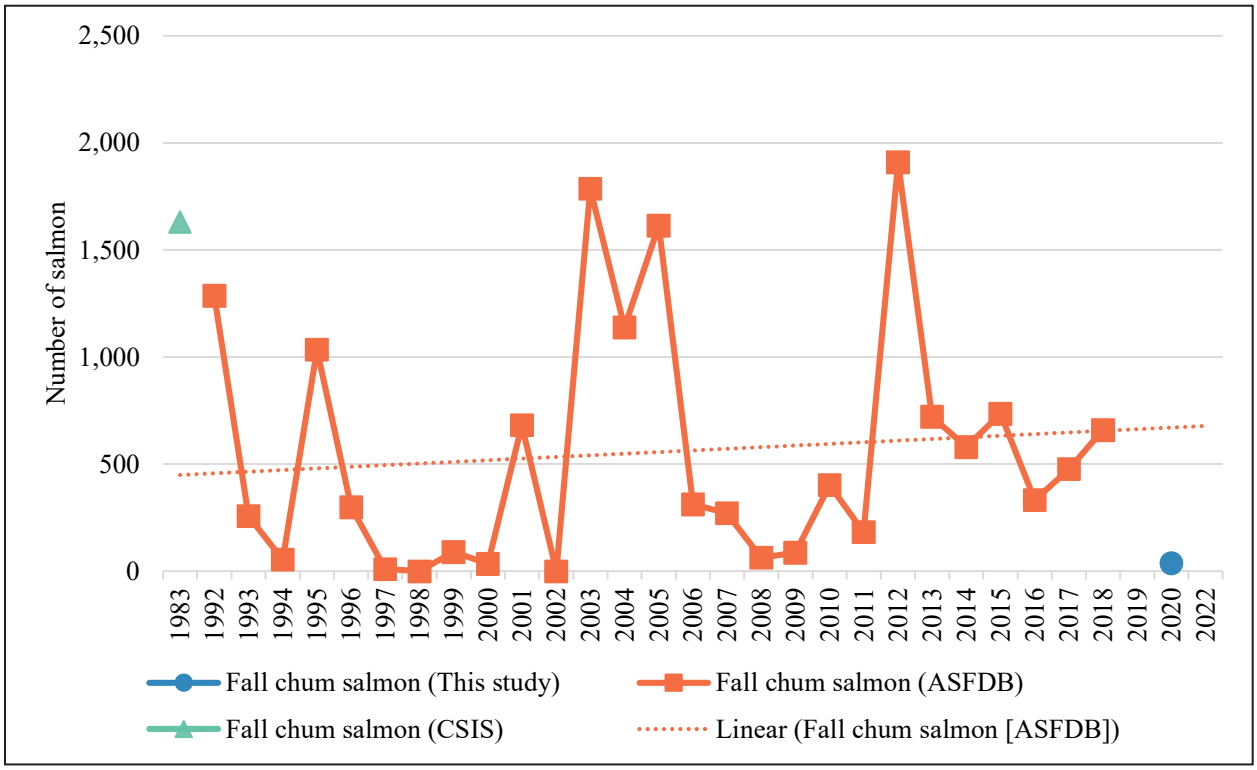


Figure 2-31.–Comparison of fall chum salmon harvests, 1983–2022, Huslia.

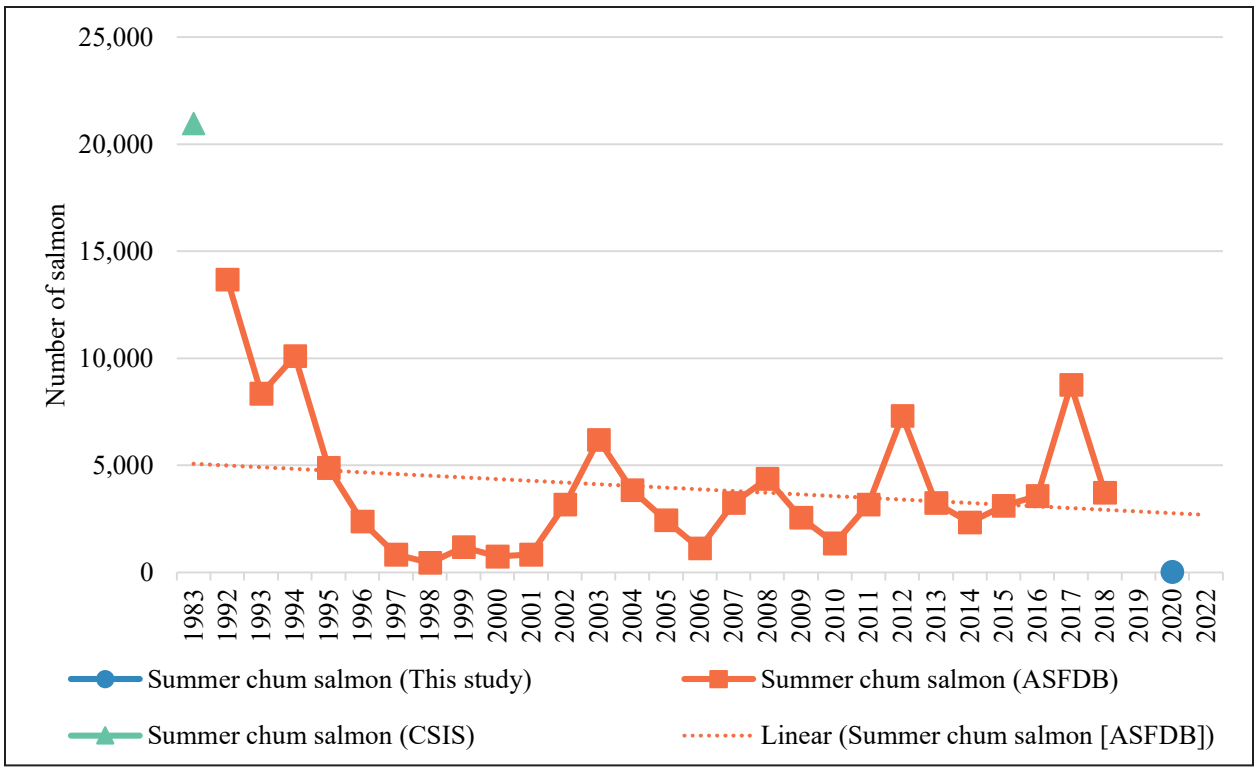


Figure 2-32.–Comparison of summer chum salmon harvests, 1983–2022, Huslia.

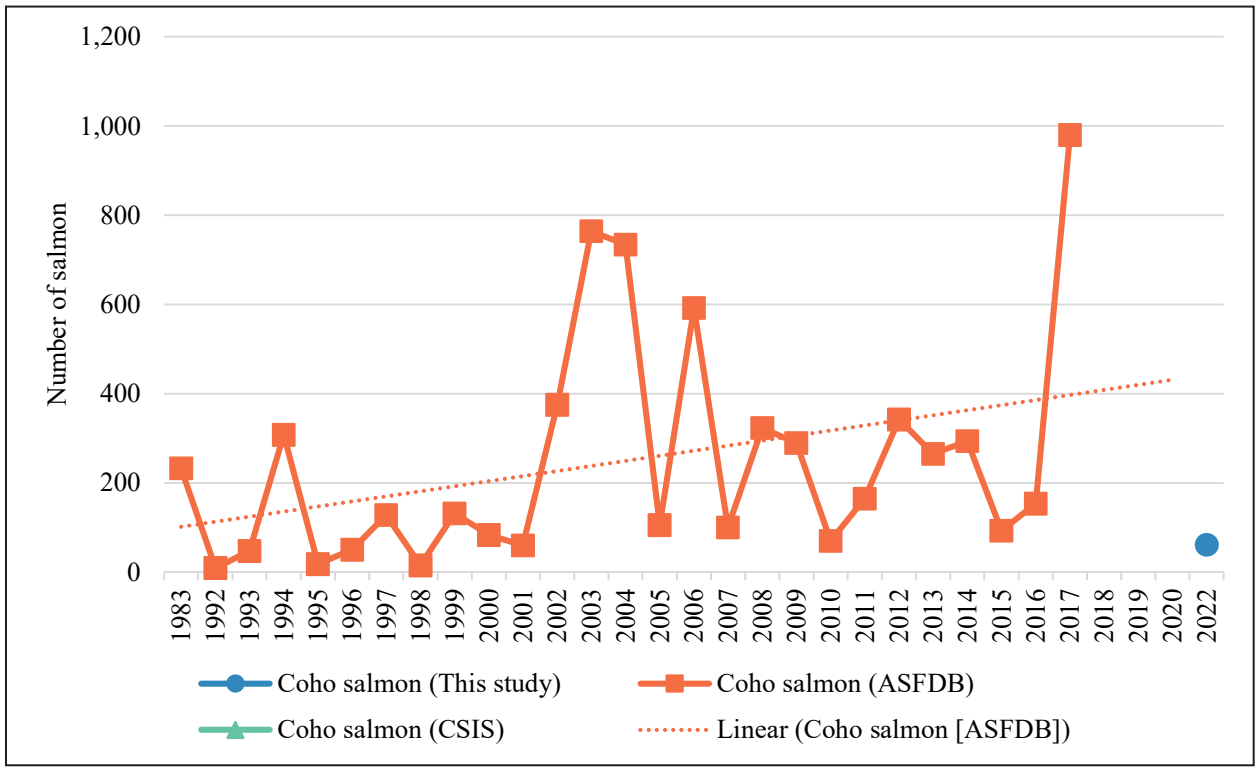


Figure 2-33.–Comparison of coho salmon harvests, 1983–2022, Huslia.

said moose are migrating out of the area. While they mentioned predation and hunters as possible reasons for this migration, they also suggested that a rise in the gnat population has driven the moose to move out of the area (03232023HSL07).

Huslia's nonsalmon can be compared between three different harvest years. This study, the 1983 comprehensive study, and Andersen et. al's (2004) paper on traditional ecological knowledge which included nonsalmon harvest data for 2002. While the total pounds of nonsalmon fish harvested increased between 1983 (17,454 lb) and 2022 (25,595 lb), the per capita harvest total weight stayed the same at 91 lb. Between the three comparison years, Huslia residents had the largest harvest in 2002 when they harvested a total of 33,365 lb of nonsalmon fish (134 lb per capita) (Andersen et al. 2004). While the data show a general pattern of decreasing use, certain species stand out. In 2002, 40% of Huslia residents used grayling, and a total harvest of 274 lb was harvested (1 lb per capita). In 2022, only 6% of households reported using grayling with no reported harvests. Sheefish showed very little change in use between the study years. Around half of Huslia's households used sheefish in both years (60% in 2002; 51% in 2022), and the difference in harvest amount was small at 5,410 lb (22 lb per capita) in 2002 and 5,096 lb (18 lb per capita) in 2022. Compared to other nonsalmon species, the pike harvest and use were unusual. Though the use dropped from 55% (2002) to 32% (2022), the total harvest amount (5,501 lb and 16,123 lb, respectively) and per capita amounts (22 lb and 57 lb, respectively) more than doubled. This suggests that while fewer Huslia residents are using pike, more are being harvested than in 2004. Ethnographic interviews suggested one possible reason for this increase in pike harvest was to supplement dog food (03242023HSL03; 03232023HSL02; 03252023HSL05). Also, a documented increase in the pike population may mean that more pike were being caught even when not targeted.[22]

Vegetation stands out as an outlier among the resource categories compared between 1983 and 2022 (Table 2-30). Though the increase from six pounds (1983) per capita to eight pounds per capita (2022) is not significant, vegetation is the only resource Huslia residents harvested more of in the study years. Without additional information, it is unknown if this increase was because more people are targeting vegetation, or if there were other factors such as a good or bad berry year.

Current and Historical Harvest Areas

The Marcotte (1986) study included some of Huslia's harvest and use areas for that year. While those maps do not cover all the same information gathered in 2022, they can still be compared to the present study's maps for a better understanding of how search and harvest locations have changed over time.

In 1983, respondents identified small sections of the Koyukuk River up- and downriver from Huslia for nonsalmon fishing. This contrasts heavily with this study where the whole Koyukuk River—from the Cutoff Slough to far downriver—and a large section of the Dulbi Slough were identified. Marcotte (1986) also recorded salmon harvest locations which this study did not. Residents in 1983 mainly marked small sections of the river downriver from Huslia as areas where they targeted salmon; the respondents also marked several fish camp sites that existed within the salmon harvest locations. Ethnographic respondents who participated in this study noted that they no longer travel to fish camps because of low salmon abundance and fishing closures.

Large land mammal search and harvest areas were similar between the two study years. Contemporary hunters traveled farther downriver than hunters did in 1983 to search for moose (Marcotte 1986). This suggests that hunters' use of the river for traveling to and accessing hunting locations has not changed as the primary method of moose hunting. However, in the past, hunters used the Dakli River to search for caribou, whereas respondents of this survey identified that area only as a place to find black bears.

Marcotte (1986) combined areas for hunting birds and trapping small land mammals—including trapline locations—on one map. Grouse and ptarmigan were also grouped in with the small land mammals such as hare and porcupine. By contrast, this study separates search and harvest areas for birds and small land

22. Tim Bodony, "Huslia Pleads to Rein in Burgeoning Pike Population" Alaska Public Media. January 6, 2016. Accessed April 17, 2024: https://alaskapublic.org/2016/01/06/huslia-pleas-to-rein-in-burgeoning-pike-population/

mammals. In general, the search areas for waterfowl and small land mammals have not changed substantially over time. The 1983 trapline map indicated that extensive land around Huslia, as well as the rivers and nearby mountain ranges, were used by individual households for their traplines. However, the current study identifies a smaller extent of land used for trapping or hunting small land mammals. This could be due to fewer people participating in trapping activities.

Local Comments and Concerns

The following is a summary of local observations of wild resource populations and trends that were recorded during the surveys. Some households did not offer any additional information during the survey interviews, so not all households are represented in the summary. Other respondents expressed their concerns about wild resources during the community review meeting of preliminary data, and these concerns have been included in the summary.

Of the 35 comments given during surveys, 16 included the effects of salmon closures.[23] Respondents wondered when salmon harvesting opportunities would open again. Some comments mentioned commercial fishing and were upset that commercial intercept fishing elsewhere in the state continues while those who rely on fish caught for subsistence uses are not allowed to harvest. One respondent said that when the salmon population dropped "a lot of people lost the fishing culture."[24] Two other respondents expressed that taking away the salmon is the same as killing their culture and taking away their traditions, and language.

While most of the survey comments provided were about salmon, a few also mentioned moose.[25] One survey respondent believed fish and game allowed too much moose harvest in the Fairbanks area, while another expressed concern about the number of non-local hunters traveling to Huslia for moose. A couple of survey comments also touched on the desire for predator control of wolves and bears as their increasing populations affect moose.

During the ethnographic interviews, key respondents mentioned the changing climate and their concern over how it affects their subsistence practices and the local ecology (03232023HSL01; 03242023HSL03; 03252023HSL05; 03232023HSL07). When the winters are warmer than usual, harvesters were unable to use their snowmachines to access their harvest locations (03232023HSL01; 03242023HSL03). One respondent said that rather than having a winter that is consistently cold, they instead experience "cold spells" with warmer temperatures in between (03232023HSL01). These fluctuations created more work for those creating winter trails due to the trails being set during the colder spells, only to then get covered by fresh snow during a period of warmer temperatures, adding the time and effort already necessary for subsistence harvest (03242023HSL03).

Warmer summer temperatures also concerned key respondents (03232023HSL07; 03252023HSL05). The increase in the water temperature was attributed as a major factor in the 2019 salmon die-off. One respondent noticed that as the water temperature increased, the permafrost decreased, and the terrain around their remote camp became drier (03252023HSL05). As the land has dried up, they have also noticed fewer small organisms in the water and a decrease in water quality, which they think may have a negative effect on the salmon.

23. ADF&G Division of Subsistence household survey comments, 2022.
24. ADF&G Division of Subsistence household survey comments, 2022.
25. ADF&G Division of Subsistence household survey comments, 2022.

3. KOYUKUK

This chapter summarizes findings from household surveys conducted in 2023 for the study year 2022 in Koyukuk, Alaska including demographic characteristics, responses to harvest assessment questions, harvest estimates, sharing of wild resources, employment, income, and food security. This study sampled 33 (89%) of eligible households (Table 3-1). Note that harvest numbers are expanded estimates. Results from this survey are available online in the CSIS. In addition to the comprehensive survey, seven ethnographic interviews were conducted with eight key respondents. The ethnographic interviews help to provide context for the quantitative data presented in this chapter. Findings from interviews, historical background information, and comparisons to earlier studies are presented throughout the chapter.

Community Background

Koyukuk, a predominately Koyukon Athabascan community, is located within the Yukon-Koyukuk census area. The community sits along the north bank of the Yukon River at the mouth of the Koyukuk River, which begins just over 500 miles from the mouth of the Yukon River (VanHatten 2004). Koyukuk is 30 miles west of Galena, 16 miles northeast of Nulato, and 290 air miles west of Fairbanks. Although there are around 3 miles of roads within the community, there are no overland roads connecting Koyukuk to other communities. Residents must instead utilize trails to travel between villages with all-terrain vehicles. Commercially, Koyukuk is accessed five days a week by aircraft or by boat during the summer, and the community receives deliveries from multiple barge services roughly three times per year when the river is ice-free.[1]

Climate conditions within the surrounding area undergo drastic seasonal variations. In the summer, temperatures can reach upwards of 92 °F, whereas in the winter extreme temperatures can reach as low as -64 °F. The averages for the community range from a high of 70 °F to a low between 0 °F and 10 °F, but temperatures as low as -40 °F are a regular occurrence during the winter. Annual precipitation in Koyukuk is very low, averaging only 13 inches of rainfall and around 60 inches of snowfall.[2]

The community lies adjacent to both the KNWR and the Kaiyuh Flats which is located in the northern part of the INWR. Both KNWR and Kaiyuh Flats encompass more than 4,000,000 acres of rich wetlands and boreal forest lowlands in their entirety. A plethora of fish and wildlife species inhabit these areas. Mammals such as bears, moose, beavers, foxes, wolves, and lynx often wander the vast Koyukuk River drainage. The lush vegetation and abundant invertebrates found here provide a productive habitat for a variety of migratory birds, such as various waterfowl, songbirds, and raptors. The extensive streams, winding rivers, and numerous lakes that encompass the largely pristine landscape support salmon, sheefish, Arctic grayling, and record-sized pike.[3,4] The expansive riparian forest surrounding Koyukuk has traditionally and contemporarily provided residents access to building materials, firewood, and wild subsistence resources used for food and clothing through various means of trapping, hunting, and fishing for hundreds of years (Kirsis 1996).

The Koyukon Athabascan or Ten'a people have historically followed a yearly subsistence cycle by moving between spring, summer, fall, and winter camps while traveling alongside wild game migrations

1. Koyukuk Tribal Council and Tanana Chiefs Conference, "2018-2023 Koyukuk Community Plan," Accessed December 05, 2023, https://www.tananachiefs.org/wp-content/uploads/2022/07/2018-Koyukuk-Community-Plan.pdf.
2. Tanana Chiefs Conference, Communities in our region, Koyukuk Climate, Accessed December 05, 2023. https://www.tananachiefs.org/about/communities/koyukuk/.
3. U.S. Fish and Wildlife Service, "Innoko National Wildlife Refuge," Accessed December 05, 2023. https://www.fws.gov/refuge/innoko/what-we-do.
4. U.S. Fish and Wildlife Service, "Koyukuk National Wildlife Refuge," Accessed December 05, 2023. https://www.fws.gov/refuge/koyukuk/about-us

Table 3-1.–Sample and demographic characteristics, Koyukuk, 2022.

Characteristics	Koyukuk
Sampled households	33
Eligible households	37
Percentage sampled	89.2%
Sampled population	62
Estimated community population	69.5
Household size	
Mean	1.9
Minimum	1
Maximum	5
Age	
Mean	45.7
Minimum[a]	1
Maximum	89
Median	57
Length of residency	
Total population	
Mean	36.0
Minimum[a]	0
Maximum	77
Heads of household	
Mean	45.7
Minimum[a]	1
Maximum	77
Alaska Native	
Estimated households[b]	
Number	37.0
Percentage	100.0%
Estimated population	
Number	67.3
Number percentage	96.8%

Source ADF&G Division of Subsistence household surveys, 2023.

a. A minimum age of 0 (zero) is used for infants who are less than 1 year of age.

b. The estimated number of households in which at least 1 head of household is Alaska Native.

for millennia. Moose populations were not always common to the Koyukon landscape, thus migratory birds, fish, furbearers, caribou, and bears were all utilized as subsistence resources. After their populations significantly increased in the 1930s, moose became a valued wild food (Kirsis 1996; LeResche et al. 1973; Solomon et al. 1981; 04042023KYU01). It was not until the mid-1950s when Koyukon Athabascan bands received either a federal or territorial school, that the Koyukon people began to establish permanent settlements. Despite having a fixed place to call home, the residents of those newly formed communities actively maintained their deeply ingrained cultural practices—as they continue to maintain them to this day.

Koyukuk was established in the late 1880s with its traditional Native name, Mineelghaadze T'oh, meaning, "village at the base of the bluff." The name Koyukuk comes from the phrase kuik-yuk meaning "river" in Central Yup'ik. Petr Malakhov, a Russian explorer, orthographically named both the community and the adjacent river "Kuyukak" because he was unable to pronounce the Koyukon name upon arrival (Zagoskin 1967). Koyukuk first appeared on the U.S. Census as "Koyukuk Settlements" in 1880 and did not receive its present-day, stand-alone spelling until it appeared on the 1910 census. Most of the people who settled in Koyukuk came from as far up the Koyukuk River as the Dulbi River. Because of Koyukuk's location at the confluence of the Yukon and Koyukuk rivers, Athabascans have gathered there to participate in cultural events, reunions, and trade for hundreds of years.[5,6]

For generations, before the arrival of Europeans, the Koyukon, the Kobuk Iñupiat, and the Brooks Range Iñupiat participated in an extensive trade network built through long-standing relationships. In 1838, Petr Vasilevich Malakhov of the Russian American Company reached the mouth of the Koyukuk. Upon arrival, he established a trading post in Nulato in part to disrupt Koyukon and Iñupiaq trading relationships (Arundale and Jones 1989; Clark 1981).[7] A year later, a smallpox epidemic—the first of many European diseases brought by Western contact—rapidly spread through the Koyukon region. Later, after the United States purchased Alaska, a military telegraph line was erected along the north side of the Yukon River, and one of the stations was placed in Koyukuk around 1867. In 1880, Russian traders opened the first trading post in Koyukuk, just four years prior to the beginning of the gold rush in 1884–85. In 1897, during the Klondike Gold Rush, the first of many steamboats ascended the Koyukuk River providing wood-cutting jobs to locals.

The gold rush, which lasted until 1906 brought further changes to the Koyukuk area. Missionaries arrived with the gold prospectors and opened a Roman Catholic church and school in nearby Nulato. A post office, which only operated for two years, opened in 1898. At this time, the population of Koyukuk was around 150 people; however, in 1900, a devastating measles epidemic swept through the region and, coupled with food shortages, decimated the Native population by one-third. The post office reopened in 1933, and Koyukuk's first school was built in 1939. The school required youth aged five years or older to attend, forcing nomadic families to shift to living in Koyukuk year-round, consequently stifling years of generational knowledge transfer (Arundale and Jones 1989; Clark 1981; Kirsis 1996). In the early 1940s, the federal government cut funding to the Bureau of Indian Affairs (BIA) to reallocate resources toward the Second World War. This loss of funding led to difficulty in finding and keeping teachers employed in BIA schools. As a result,

5. Koyukuk Tribal Council and Tanana Chiefs Conference, "2018-2023 Koyukuk Community Plan," Accessed December 05, 2023, https://www.tananachiefs.org/wp-content/uploads/2022/07/2018-Koyukuk-Community-Plan.pdf.
6. Yukon-Koyukuk School District, "Ella B. Vernetti School: About Koyukuk," Accessed December 13, 2023, https://www.yksd.com/page/ella-b-vernetti-school.
7. Explorenorth.com, "The History of Koyukuk," Accessed December 13, 2023, https://www.explorenorth.com/library/communities/alaska/bl-Koyukuk.htm.

Koyukuk's school was shut down in 1942 and was not reopened until 1949 (Boxer 2009).[8,9] It was not until 1973 that Koyukuk was formally incorporated as a second-class city.[10]

The original site of the then-smaller community was located directly on the bank of the Yukon River, south of the contemporary site (04052023KYU02). Due to a massive ice jam and the ensuing flood on the Yukon River in 1963, residents relocated 13 homes,[11] along with other structures in the community, to their current location on higher ground. One respondent recalled his involvement in the relocation:

> Nineteen sixty-four is the last big flood we had here...it went over the bank out here. We used to have floods in nineteen sixty-three. We were gonna move the village down to where Last Chance Liquor Store [is]. We brought the dozer up from Nulato and cleared a place but there was too much permafrost, so I was elected as the chief here. So, I went muskrat hunting back there in a canoe, and I come back, and I was on the only high ground here. The rest of the village was all under water dow—out there… So, I suggest what the tribal council that the high ground back here and we moved the village back here. So, we moved. Nineteen sixty-four we built the first cabins. Everyone moved back. (04042023KYU01)

Koyukuk has experienced periodic erosion and flooding every 5–20 years since the 1920s. Based on estimates made from aerial photographs and measurements, the community eroded 25 to 75 feet between 1984 and 1995 at a rate of about 5 feet per year. The current southernmost road that runs adjacent to the riverbank was once considered the north or "back" side of town. Although the community has been moved once before, some residential homes, smokehouses, drying racks, parts of Spruce Street, telephone lines, and an old cemetery site are currently threatened by periods of high water, severe flooding, and erosion on the Yukon River.[12]

Koyukuk's present-day infrastructure includes a washeteria with showers, potable water, and laundry services; a tribal city office, post office, and community hall; the Meneelghaadze T'oh health clinic; and a 3,000-foot airstrip. Residents have access to the Last Chance liquor store just six miles south of the community. There is one local general store owned by Kateel Enterprises, a power plant providing electricity, and large fuel tanks for heating oil and gasoline. Koyukuk also has St. Patrick's catholic church, and the Ella B. Vernetti school, which is part of the Yukon-Koyukuk School District (YKSD). The village is equipped with volunteer firefighters, EMTs, and a search and rescue team but no police presence or village public safety officer.

Population Estimates and Demographic Information

Figure 3-1 shows the historical Koyukuk population estimates between 1950 and 2022. The figure shows counts made every five years by the U.S. Census Bureau, annual estimates by the Alaska Department of Labor, and this study's estimate for 2022. Differences between population and demographic estimates from this study and the U.S. Census likely result from variations in the sampling methods, timing of surveys, refusal rates, and definitions of residency. Koyukuk's population peaked in the 1990s with approximately 260 residents in 1996, according to the Alaska Department of Labor. The population has been steadily dropping

8. University of Alaska Fairbanks, Project Jukebox, Raven's Story, "Benedict Jones," November 13, 2002. Accessed December 10, 2023, https://jukebox.uaf.edu/p/3595.
9. U.S. Department of the Interior, Indian Affairs, "200 Years of Bureau of Indian Affairs History," Accessed December 13, 2023, https://www.bia.gov/bia.
10. Koyukuk Tribal Council and Tanana Chiefs Conference, "2018-2023 Koyukuk Community Plan," Accessed December 05, 2023, https://www.tananachiefs.org/wp-content/uploads/2022/07/2018-Koyukuk-Community-Plan.pdf.
11. Jesse Coleman, ADF&G Subsistence Resource Specialist, Division of Subsistence field notes, April 7, 2023.
12. U.S. Army Corps of Engineers Alaska District, February 2008, "Erosion Information Paper - Koyukuk, Alaska," Accessed December 15, 2023, https://www.poa.usace.army.mil/Portals/34/docs/civilworks/BEA/Koyukuk_Final%20Report.pdf.

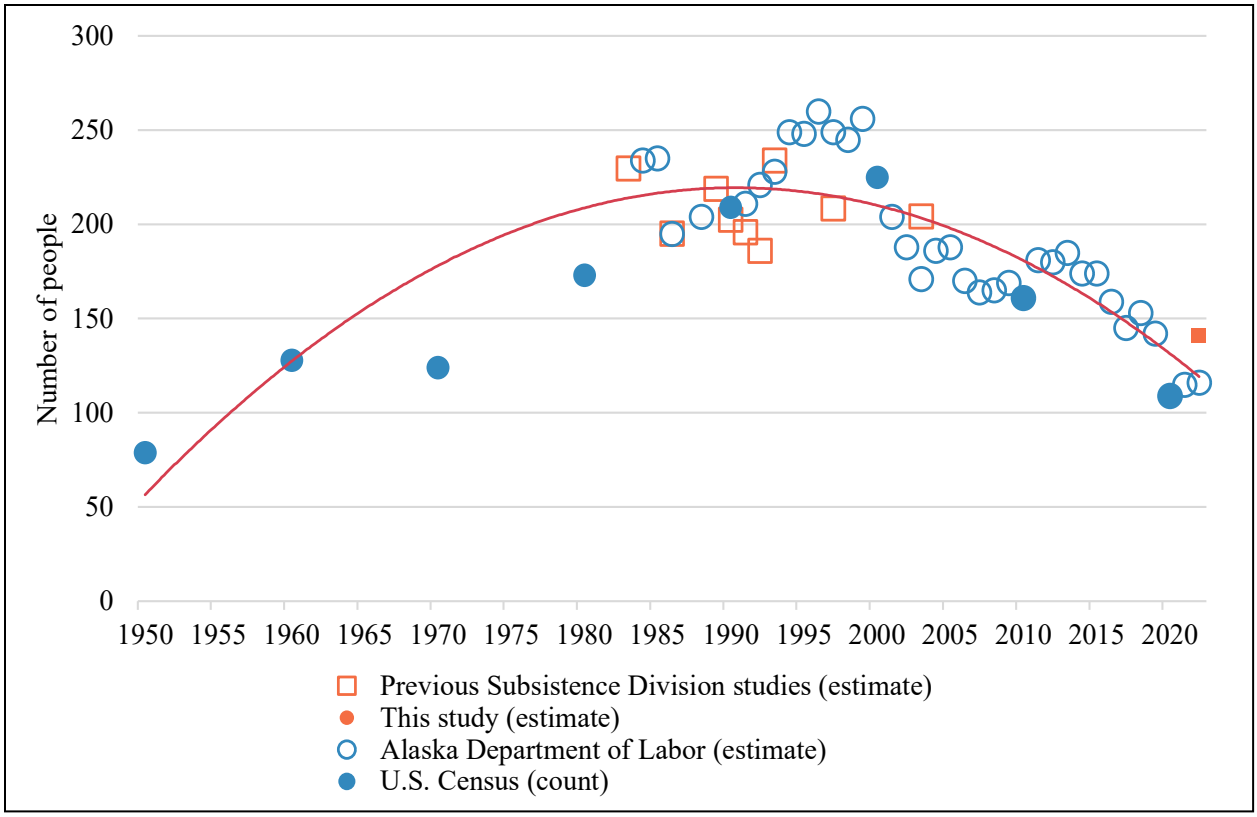


Figure 3-1.–Historical population estimates, Koyukuk, 1950–2022.

since. This could be due to several factors, one being that Koyukuk has always been a small community, and another could be the lack of education for older children. Young adults in Koyukuk often leave the community to attend regional boarding schools or college, and to seek career opportunities; however, the act of harvesting, processing, and sharing salmon has often been a family effort that many returned home for the summer to assist with (Holder and Senecal-Albrecht 1998). Though this was common in the past, the decline and recent lack of opportunity to harvest salmon has likely made some of the young adults who left Koyukuk to pursue other opportunities reconsider returning to Koyukuk in the summer to participate. One woman explained that up until the recent subsistence salmon fishery closures, many seasonal residents returned home but now find that fruitless and prefer to return in the fall for the advantageous moose harvest:

> It was a common thing up until this past couple years…It's just not worth it anymore. Them coming home and they can't fish. So, a lot of our visitors don't come home anymore now. Our tribal members, mostly our tribal members, will come back…and fish. So now they save their time for, to come and hunt for moose in September. (04062023KYU03)

Expanding for the unsurveyed households, the estimated population of Koyukuk in 2022 was 70 residents in 37 total households (Table 3-2). The population was 97% Alaska Native, including 34 male and 36 female residents (Table 3-2; Table 3-3). This is down from 100% of the then 98 residents in Koyukuk being Alaska Native in 2020 (Figure 3-2).

Households ranged in size from one to five occupants, with a mean size of two occupants (Table 3-1). The average age during the study year was 46 and the average length of residency was 36 years. Most women were aged between 60 and 64 years old, while most men were aged 64 to 70 years old. There was only one male elder between the ages of 84 and 89 and only one female elder between the ages of 80 and 84. There were no young teenagers aged from 14 to 20 years, no young adults from 24 to 30 years

Table 3-2.–Population estimates, Koyukuk, 2020 and 2023.

	U.S. Census (2020)	American Community Survey (2018–2022)		This study (2022)	
		Estimate	Range[a]	Estimate	Range[b]
Total population					
Households	58	59	47 – 71	37	–
Population	98	52	35 – 69	69.5	65 – 74
Alaska Native					
Population	98	52	35 – 69	67.3	62 – 72
Percentage	100.0%	100.0%	94 – 101	96.8%	89.8% – 103.8%

Sources U.S. Census Bureau (2021) for 2020 estimate; U.S. Census Bureau for American Community Survey (ACS) 2022 estimate (5-year average); and ADF&G Division of Subsistence household surveys, 2022, for 2023 estimate.

Note Division of Subsistence household surveys eligibility requirements differ from those used by the U.S. Census Bureau.

Note U.S. Census Bureau publishes population estimates rounded to 0 digits of decimal precision, the Division of Subsistence publishes 1 digit of decimal precision.

a. ACS data range is the reported margin of error.

b. No range of households is estimated for division surveys.

of age, or any 50 to 54-year-old adults (Table 3-3; Figure 3-3). The school in Koyukuk only educates students from kindergarten through 6th grade, therefore junior-high- and high-school-age children attend boarding schools or learning centers within the YKSD in either Nulato, Nenana, or, more regularly, the Galena Interior Learning Academy. With young people leaving the community for school, and the reduced availability of subsistence resources like salmon, young adults are losing the ability and desire to learn traditional subsistence skills and they are much less likely to return to Koyukuk for full-time residency.

> After eighth grade, they have to leave and else, before it was up to tenth grade. I agree with tenth grade because I honestly believe that sending your kid away when they just turned fourteen is kinda too early. It's shocking. It's like when they used to take them away long time ago. My kids, they lived here [in Koyukuk], and they lived in Fairbanks. I lived in Fairbanks with them up until my son was eight and my daughter was four. Then I moved back home, and taught, e—stayed here for five years, and did cultural things with them. But then I moved back to Fairbanks after my son turned th—thirteen and my daughter was eight. So, I moved back in and the thing is…they care to come home and do it, but they can't stay that long because they're in the Wes—ya know, grow up in the Western culture. (04062023KYU03)

Many of Koyukuk's oldest elders have either passed away or moved away to reside in an assisted living facility. One respondent explained that older elders call those aged 50–55 "baby elders;" however, many in the community are in their sixties and seventies and "don't want to call themselves elders," which causes yet another interruption in the passing of generational knowledge (04052023KYU02). The expectation is that those in the community who are in their sixties or seventies will take on the responsibility of the elder role once they reach a certain age, yet many do not want to be considered elders, likely because they do not want to accept their old age. Most (70%) household heads—commonly community elders—reported Koyukuk as their birthplace, although several were born in Tanana (7%), likely due to the presence of a regional hospital in the community, and 5% were born in Huslia or at camps along the Koyukuk River (Table 3-4). Traditionally Koyukon people were nomadic; hence, those born along the river had parents living at

Table 3-3.–Population Age Profile, Koyukuk, 2022.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0–4	2.2	6.7%	6.7%	2.2	6.3%	6.3%	4.5	6.5%	6.5%
5–9	2.2	6.7%	13.3%	1.1	3.1%	9.4%	3.4	4.8%	11.3%
10–14	3.4	10.0%	23.3%	3.4	9.4%	18.8%	6.7	9.7%	21.0%
15–19	0.0	0.0%	23.3%	0.0	0.0%	18.8%	0.0	0.0%	21.0%
20–24	3.4	10.0%	33.3%	1.1	3.1%	21.9%	4.5	6.5%	27.4%
25–29	0.0	0.0%	33.3%	0.0	0.0%	21.9%	0.0	0.0%	27.4%
30–34	2.2	6.7%	40.0%	2.2	6.3%	28.1%	4.5	6.5%	33.9%
35–39	1.1	3.3%	43.3%	2.2	6.3%	34.4%	3.4	4.8%	38.7%
40–44	2.2	6.7%	50.0%	1.1	3.1%	37.5%	3.4	4.8%	43.5%
45–49	0.0	0.0%	50.0%	1.1	3.1%	40.6%	1.1	1.6%	45.2%
50–54	0.0	0.0%	50.0%	0.0	0.0%	40.6%	0.0	0.0%	45.2%
55–59	4.5	13.3%	63.3%	4.5	12.5%	53.1%	9.0	12.9%	58.1%
60–64	3.4	10.0%	73.3%	6.7	18.8%	71.9%	10.1	14.5%	72.6%
65–69	5.6	16.7%	90.0%	5.6	15.6%	87.5%	11.2	16.1%	88.7%
70–74	1.1	3.3%	93.3%	2.2	6.3%	93.8%	3.4	4.8%	93.5%
75–79	1.1	3.3%	96.7%	1.1	3.1%	96.9%	2.2	3.2%	96.8%
80–84	0.0	0.0%	96.7%	1.1	3.1%	100.0%	1.1	1.6%	98.4%
85–89	1.1	3.3%	100.0%	0.0	0.0%	100.0%	1.1	1.6%	100.0%
90–94	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
95–99	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
100–104	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
Missing	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.0%	100.0%
Total	**33.6**	**100.0%**	**100.0%**	**35.9**	**100.0%**	**100.0%**	**69.5**	**100.0%**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2023.

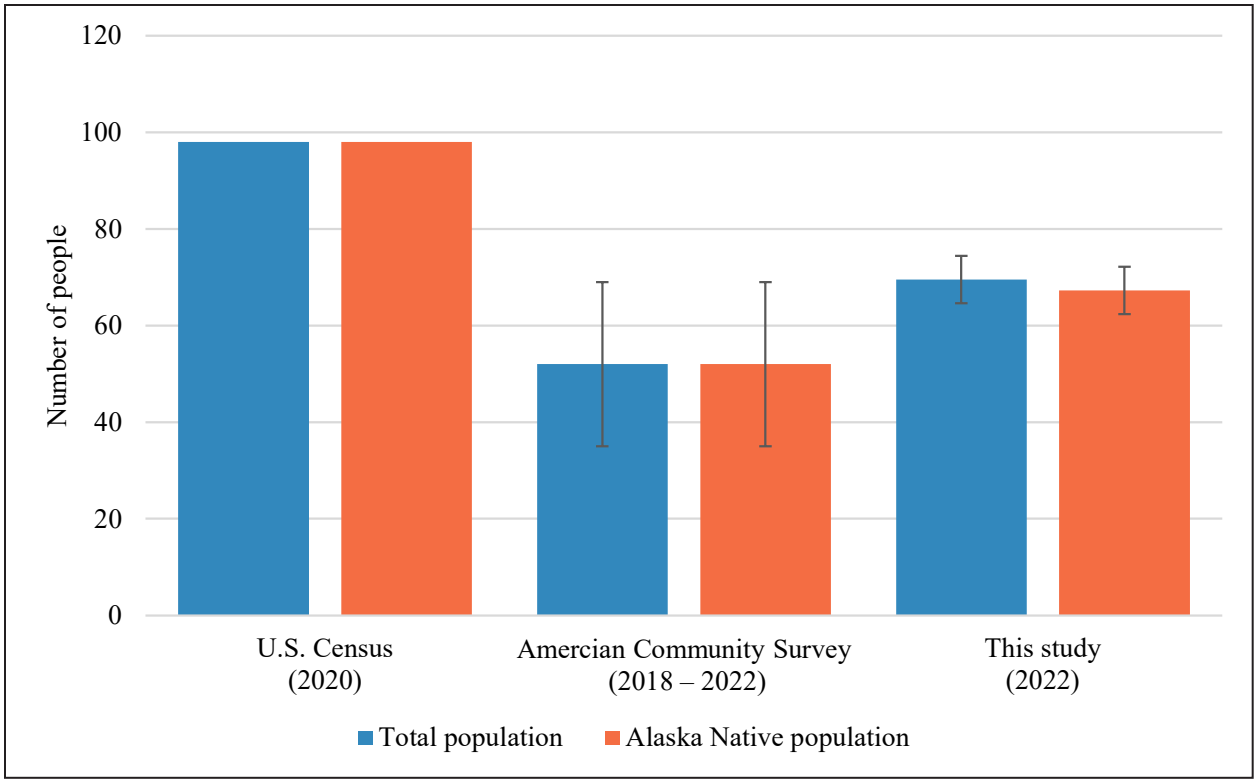


Figure 3-2.–Alaska Native and overall population estimates, Koyukuk, 2020 and 2022.

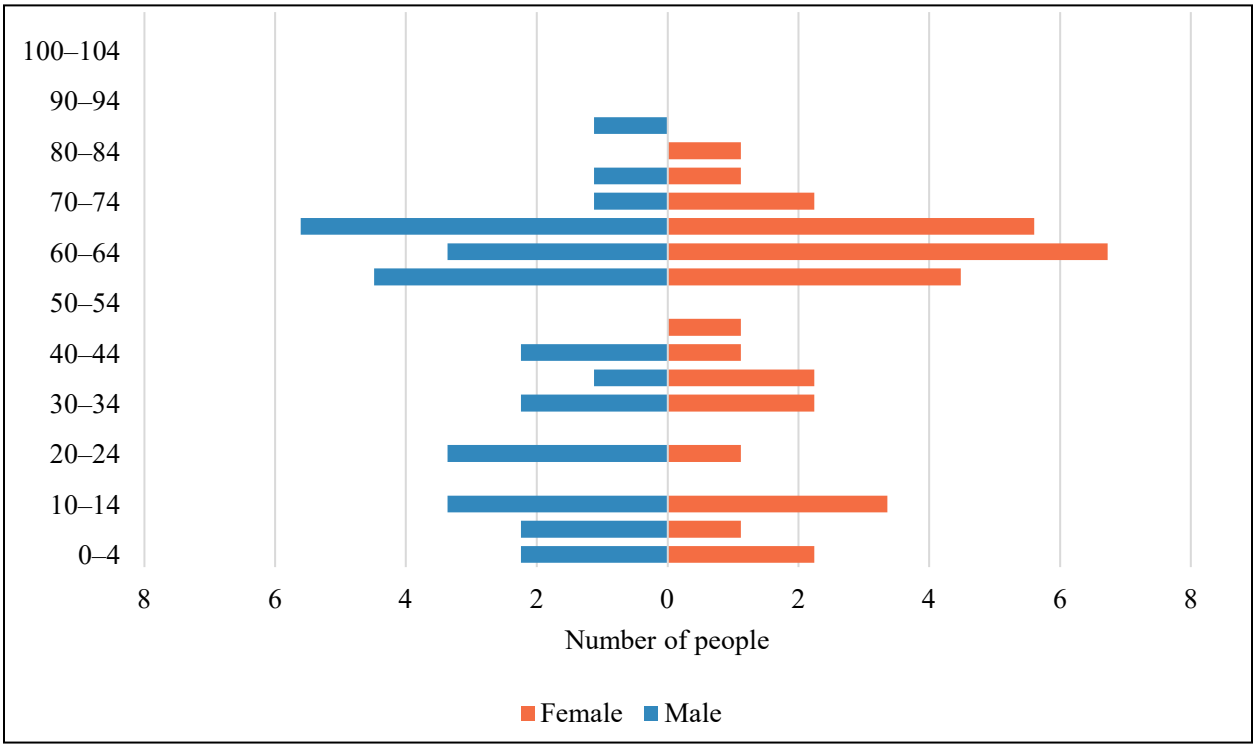


Figure 3-3.–Population profile, Koyukuk, 2022.

Table 3-4.–Birthplaces of household heads, Koyukuk, 2022.

Birthplace	Percentage
Fairbanks	2.3%
Galena	2.3%
Huslia	4.7%
Koyukuk	69.8%
Nulato	2.3%
Tanana	7.0%
Allakaket	2.3%
Cutoff	2.3%
Koyukuk River	4.7%

Source ADF&G Division of Subsistence household surveys, 2023.

Note "Birthplace" means the residence of the parents of the individual when the individual was born.

Table 3-5.–Birthplaces of population, Koyukuk, 2022.

Birthplace	Percentage
Fairbanks	8.1%
Galena	1.6%
Huslia	4.8%
Koyukuk	71.0%
Nulato	1.6%
Tanana	4.8%
Allakaket	1.6%
Cutoff	1.6%
Koyukuk River	3.2%

Source ADF&G Division of Subsistence household surveys, 2023.

Note "Birthplace" means the residence of the parents of the individual when the individual was born.

and utilizing traditional seasonal subsistence camps during their birth (Arundale and Jones 1989; Kirsis 1996; Solomon et al. 1981; 04062023KYU05; 04072023KYU08).[13,14] After broadening the parameters to include the entire population and not only household heads, only 3% of the entire population was born on the Koyukuk River (Table 3-5). This decrease in birth rates along the Koyukuk River reflects a distinctive shift in birthplace based on the age of the population, showing that elders were traditionally born in camps. In recent decades, however, fewer residents of Koyukuk were born at these camps due to the abandonment of the semi-nomadic lifestyle and settlement in a centralized location. Most residents were born in Koyukuk (71%), and the second most common birthplace was Fairbanks (8%; Table 3-5).

Income and Cash Employment

Survey respondents were asked about both earned income (jobs held and wages earned by all household members 16 years and older) and other income from sources such as the Alaska Permanent Fund Dividend, Social Security payments, and public assistance. The survey also asked employed residents about their months worked and work schedules. Table 3-6 shows that in 2022, Koyukuk households cumulatively earned or received an estimated $1,831,827, of which $1,192,847 was from wage employment, and $638,980 was from other sources. The average total income per household in 2022 was $49,509. The ACS estimated median income for Koyukuk households ($20,893) was less than the 2022 Division of Subsistence estimated median household income ($38,400) and far less than the estimate for the state of Alaska at $80,287 (Figure 3-4).

Figure 3-5 shows the percentage of community income by source, both earned and other income. Local government, including tribal government, represented 50% of Koyukuk's total income, while the Alaska Permanent Fund Dividend (11%) and Native Corporation Dividend (9%) were the next highest sources of income in 2022.

In 2022, 72% of Koyukuk households were employed, and the number of jobs held per employed household ranged from 1 to 4 with the average being 2 jobs. An estimated 38 out of 55 adults (69%) held at least one job. The greatest number of jobs an employed adult had was 3, with the average being 1. On average, those

13. Yukon-Koyukuk School District, Ella B. Vernetti School, About Koyukuk, Accessed December 13, 2023, https://www.yksd.com/domain/32.
14. U.S. Department of the Interior, Bureau of Indian Affairs, History of BIA, https://www.bia.gov/bia.

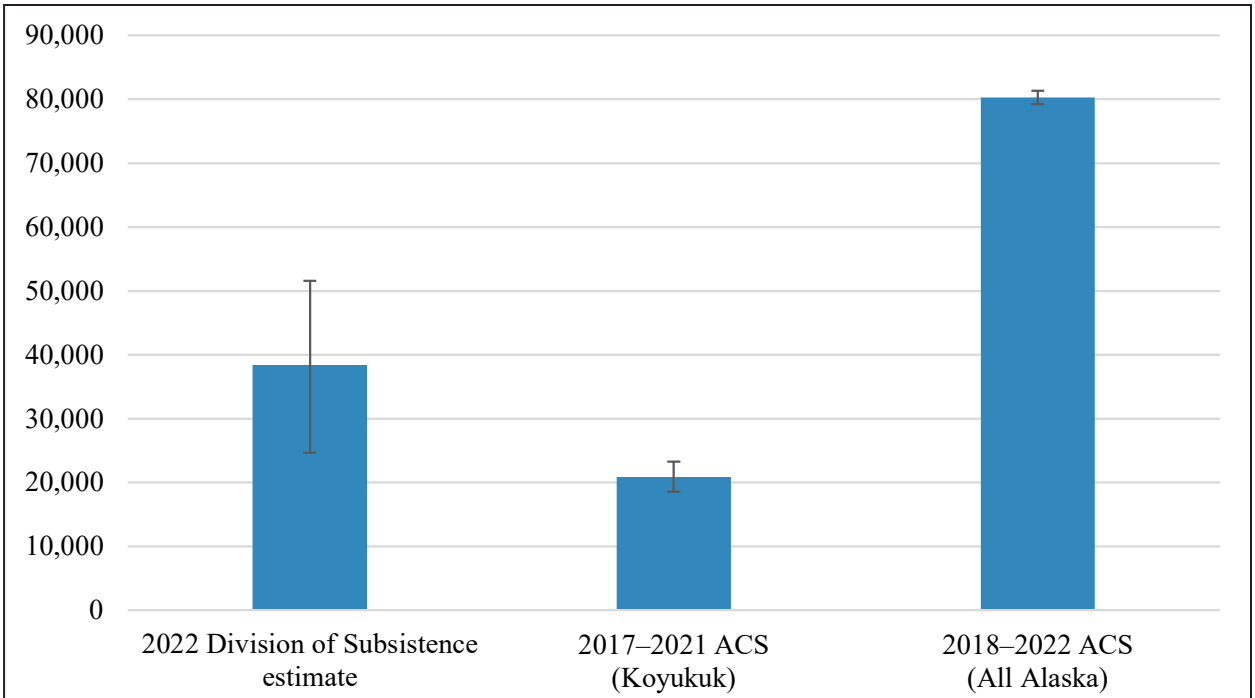
Table 3-6.–Estimated earned and other income, Koyukuk, 2022.

Income source	Estimated number of employed adults	Estimated number of households	Estimated income for community	95% Confidence interval range	Mean per household	Percentage of total community income
Earned income						
Local government, including tribal	26.7	22.3	$912,742	$550,761 – $1,310,471	$24,669	49.8%
Services	3.3	2.2	$126,151	$0 – $395,806	$3,409	6.9%
Transportation, communication, and utilities	6.7	6.7	$65,626	$14,713 – $168,683	$1,774	3.6%
Federal government	2.2	2.2	$51,596	$0 – $174,324	$1,394	2.8%
Industry not specified	2.3	2.3	$36,732	$0 – $127,545	$993	2.0%
Earned income subtotal	**37.9**	**26.8**	**$1,192,847**	**$740,782 – $1,777,579**	**$32,239**	**65.1%**
Other income						
Alaska Permanent Fund		35.9	$205,625	$162,011 – $250,380	$5,557	11.2%
Native Corp. Dividend		37.0	$165,305	$133,141 – $206,316	$4,468	9.0%
Social Security		12.4	$103,287	$34,296 – $183,478	$2,792	5.6%
Disability		4.4	$54,605	$1,410 – $148,000	$1,476	3.0%
Pension/Retirement		5.6	$50,914	$2,151 – $163,220	$1,376	2.8%
Energy assistance		19.0	$37,293	$19,329 – $61,766	$1,008	2.0%
Adult Public Assistance (OAA, APD)		4.6	$13,571	$2,960 – $29,990	$367	0.7%
Food Stamps		3.3	$7,126	$0 – $22,379	$193	0.4%
Longevity Bonus		1.1	$1,015	$0 – $2,045	$27	0.1%
Medicare/Medicaid		1.1	$120	$0 – $596	$3	0.0%
Supplimental Security Income (SSI)		1.1	$120	$0 – $499	$3	0.0%
TANF (Temp. Cash Asst. for needy families)		0.0	$0	$0 – $0	$0	0.0%
Workmans comp		0.0	$0	$0 – $0	$0	0.0%
Unemployment		0.0	$0	$0 – $0	$0	0.0%
Veterans assistance		0.0	$0	$0 – $0	$0	0.0%
Child support		0.0	$0	$0 – $0	$0	0.0%
Other		0.0	$0	$0 – $0	$0	0.0%
Foster care		0.0	$0	$0 – $0	$0	0.0%
Fuel Vouchers		0.0	$0	$0 – $0	$0	0.0%
Meeting Honoraria		0.0	$0	$0 – $0	$0	0.0%
Economic impact payment (stimulus check)		0.0	$0	$0 – $0	$0	0.0%
Other income subtotal		**37.0**	**$638,980**	**$517,277 – $789,441**	**$17,270**	**34.9%**
Community income total		**37.0**	**$1,831,827**	**$1,413,383 – $2,475,213**	**$49,509**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2023.

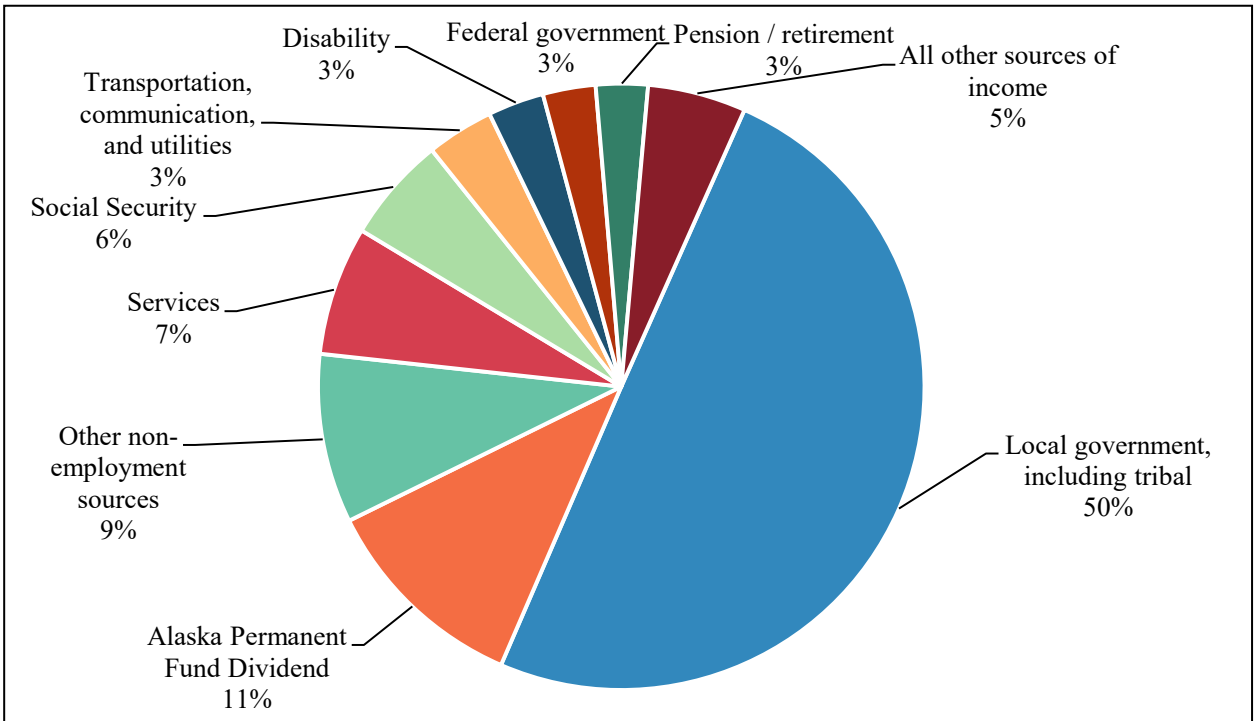
Note Lower range confidence intervals for non-zero income estimates indicate low precision and high variability. Total reported income from survey forms for these income sources may plausibly be the total community income for that source. Reported values are omitted to maintain confidentiality.

Note Any zero amount that is in black font indicates a value that is smaller than 0.05.



Note The 2022 Division of Subsistence estimate does not include categories of income excluded by the 2017 – 2021 and 2018 – 2022 ACS median estimates, including food stamps houseing,

Figure 3-4.–Comparison of household median income estimates, Koyukuk, 2022.



Note The "all other sources of income" category includes sources ouside of the top 10.

Figure 3-5.–Top income sources, Koyukuk, 2022.

adults with jobs worked approximately 10 months of the year; the average number of weeks employed was 44. Only 64% of residents were employed year-round (Table 3-7).

Table 3-8 shows the percentage of employment by industry. The majority of Koyukuk residents were employed by the local government (70%) which was the most significant source of community income ($912,742; Table 3-6). Employment in the transportation, communication, and utilities industry supported 18% of residents, while only 9% of employed adults had jobs in the service industry including administrative support positions. Federal government jobs employed the least number of Koyukuk residents in 2022, only equating to 6% of residents and $51,596 of the community's total earned income.

Table 3-7.–Employment characteristics, Koyukuk, 2022.

Characteristic	Koyukuk
All adults	
Number	54.9
Mean weeks employed	30.4
Employed adults	
Number	37.9
Percentage	68.9%
Jobs	
Number	47.9
Mean	1.3
Minimum	1
Maximum	3
Months employed	
Mean	10.2
Minimum	2
Maximum	12
Percentage employed year-round	64.1%
Mean weeks employed	44.2
Households	
Number	37
Employed	
Number	26.8
Percentage	72.4%
Jobs per employed household	
Mean	1.8
Minimum	1
Maximum	4
Employed adults	
Mean	
Employed households	1.4
Total households	1.0
Minimum	1
Maximum	3
Mean person-weeks of employment	62.4

Source ADF&G Division of Subsistence households surveys, 2023.

Summary of Harvest and Use Patterns

Individual Participation in the Harvesting and Processing of Wild Resources

Figure 3-6 reports the expanded levels of individual participation in the harvest and processing of wild resources by all Koyukuk residents in 2022. Overall, 61% of residents harvested resources, and 61% of the population helped process the harvest. Residents reported either harvesting or processing resources from all resource categories except marine mammals and marine invertebrates. In all resource categories except vegetation, a higher percentage of people processed wild food than participated in the harvest of those foods. Further, fish and large land mammals had the greatest differences between individual participation in harvest (24% and 31% respectively) and processing (50% and 44% respectively). This could reflect that certain resources require more gear, time, or skill to harvest but, when successfully harvested, a greater number of individuals cooperatively help process them. In contrast, more people harvested vegetation (50%) than processed it (39%). This could be due to how easily accessible vegetation was to residents of all ages. Small land mammals were the least harvested (10%) and processed (13%) out of all resource categories. The small percentage of participation may indicate that fewer Koyukuk residents hunted or trapped small land mammals than in the past; these patterns will be described in more detail below.

Harvest and Use of Wild Resources at the Household Level

Figure 3-7 shows, by resource category, the percentages of households that used, attempted to harvest, and harvested wild foods. Almost all households in Koyukuk used salmon (97%) and large land mammals (91%). Both birds and eggs as well as vegetation were used by 64% of households and 55% of households utilized

Table 3-8.–Employment by industry, Koyukuk, 2022.

Industry	Jobs	Households	Individuals	Percentage of wage earnings
All industries	**47.9**	**26.8**	**37.9**	**$1,192,847**
Federal government	**4.6%**	**8.3%**	**5.9%**	**4.3%**
Executive, administrative, and managerial	4.6%	8.3%	5.9%	4.3%
Local government, including tribal	**67.4%**	**83.2%**	**70.4%**	**76.5%**
Executive, administrative, and managerial	4.6%	8.2%	5.8%	9.5%
Social scientists, social workers, religious workers, and lawyers	6.9%	12.3%	8.7%	8.6%
Teachers, librarians, and counselors	4.6%	8.2%	5.8%	12.6%
Technologists and technicians, except health	4.8%	8.6%	6.1%	4.7%
Administrative support occupations, including clerical	7.0%	12.5%	8.8%	9.0%
Service occupations	12.1%	13.0%	9.2%	6.8%
Construction and extractive occupations	11.4%	16.3%	14.4%	13.5%
Precision production occupations	2.3%	4.1%	2.9%	3.3%
Handlers, equipment cleaners, helpers, and laborers	6.9%	12.3%	8.7%	3.7%
Miscellaneous occupations	2.4%	4.3%	3.0%	0.1%
Transportation, communication, and utilities	**14.0%**	**24.9%**	**17.7%**	**5.5%**
Administrative support occupations, including clerical	2.4%	4.3%	3.0%	0.8%
Precision production occupations	9.3%	16.5%	11.7%	4.6%
Transportation and material moving occupations	2.3%	4.1%	2.9%	0.1%
Services	**9.2%**	**8.2%**	**8.7%**	**10.6%**
Administrative support occupations, including clerical	2.3%	4.0%	2.8%	8.1%
Service occupations	7.0%	4.2%	5.9%	2.5%
Industry not specified	**4.7%**	**8.4%**	**6.0%**	**3.1%**
Service occupations	2.3%	4.1%	2.9%	0.9%
Occupation not specified	2.4%	4.3%	3.0%	2.2%

Source ADF&G Division of Subsistence household surveys, 2023.

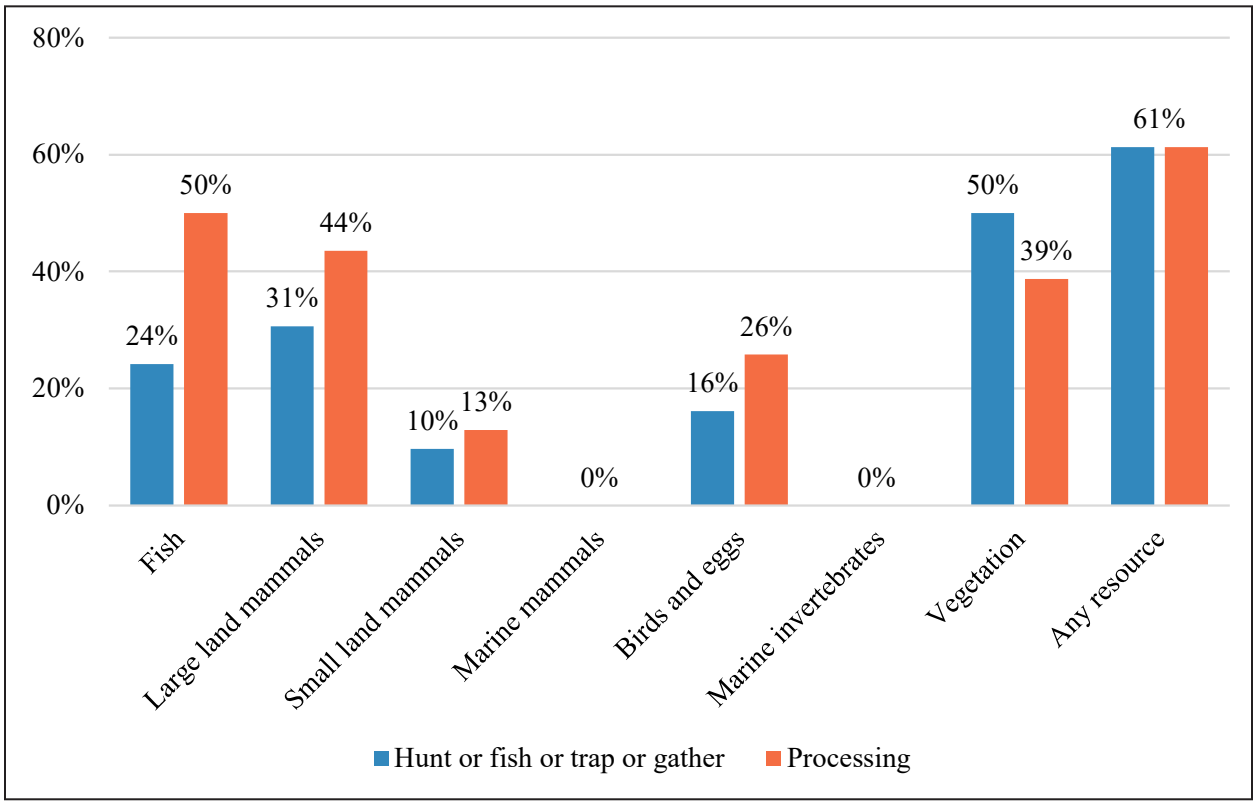


Figure 3-6.–Individual participation in subsistence harvesting and processing activities, Koyukuk, 2022.

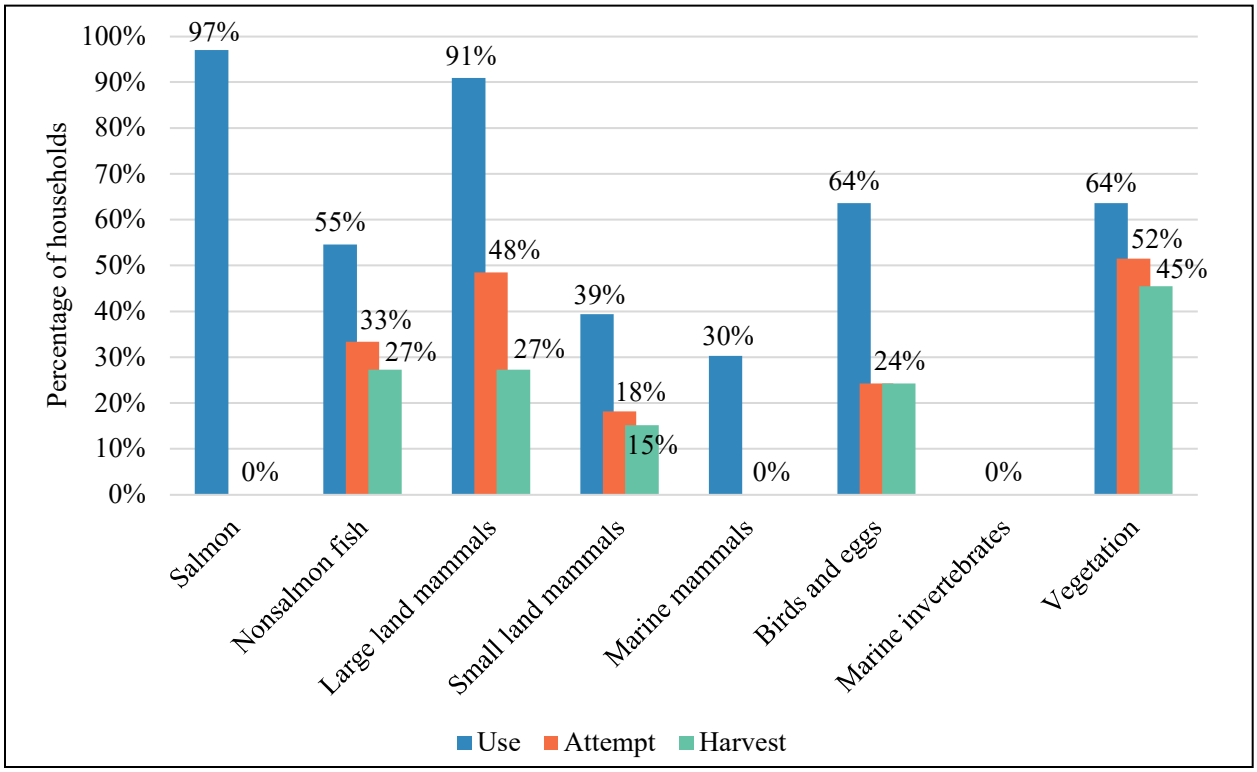


Figure 3-7.–Percentage of households using, attempting to harvest, and harvesting wild resources, by resource category, Koyukuk, 2022.

nonsalmon fish. Small land mammals were used by 39% and 30% of households used marine mammals. Marine invertebrates were not used by any household. In all resource categories, a greater percentage of households used wild foods than those that harvested them. This likely demonstrates the importance of a wide sharing, trading, and bartering network spanning across Alaska.

An estimated 27% of Koyukuk households reported harvesting both large land mammals and nonsalmon fish, but more attempted to harvest large land mammals (48%) than nonsalmon fish (33%). This difference could be attributed to the harvest success rate of large land mammals being inherently lower than that of nonsalmon fish or due to the cooperative harvesting of large land mammals by households. For example, if multiple households hunted together, one individual typically harvests the animal, which was then associated with that individual's household.[15] Koyukuk households that reported harvesting small land mammals were largely successful in their efforts; 18% of households attempted to harvest and 15% successfully did so.

Every household (24%) that attempted to harvest birds and eggs was successful. There was no harvest or attempt to harvest salmon or marine mammals by Koyukuk households in 2022.

Table 3-9 summarizes resource harvest and use characteristics for Koyukuk in 2022 at the household level. The average harvest of wild food was 293 lb usable weight per household. During the study year, community households harvested an average of 3 kinds of resources and used an average of 7 kinds of resources. The maximum number of resources used by any household was 18. In addition, households gave away an average of 3 kinds of resources, and at most 14. The average number of resources received by households was 5 with 13 being the most. Overall, as many as 91 resources were available for households to harvest in the study area; these included resources that survey respondents identified but were not asked about in the survey instrument.

Sharing of Wild Resources

Household Specialization in Resource Harvesting

Previous studies (Wolfe 1987; Wolfe et al. 2010) have shown that in most rural Alaska communities, a relatively small portion of households produces most of the community's fish and wildlife harvests which they share with other households. A study of 3,265 households in 66 rural Alaska communities found that about 33% of the households accounted for 76% of subsistence harvests (Wolfe et al. 2010). Although overall the set of very productive households was diverse, factors that were associated with higher levels of subsistence harvests included larger households with a pool of adult male labor, higher wage income, involvement in commercial fishing, and community location.

As shown in Figure 3-8, in the 2022 study year in Koyukuk, 15% of the community's households harvested about 67% of wild resources as estimated in pounds usable weight. These resources are sometimes shared as described by this key respondent:

> Our fish, and our meat, our moose, a lot of that was shared with the community. They were known for that…We had an aunt…they'd send her an arm, off of the moose or whatever. They'd send her, if she didn't get very much, she'll send for fish. So, they'd send her [fish]. (04062023KYU05)

The sharing of multiple resources within Koyukuk has been, and continues to be, a cornerstone of its residents' culture and is one of the ways that younger hunters and fishers show respect to their elders. Some donate the first large fish they harvest to their elders to ensure they get to taste the first fish of the season, while others share beaver with elders because they were brought up solely on wild foods and are no longer able to harvest those resources for themselves (04062023KYU06; 04062023KYU03).

Further analysis of the study findings, beyond the scope of this report, might identify characteristics of the highly productive households in Koyukuk and the other study communities.

15. To minimize double counting of large land mammal harvests, the harvest is attributed to a single household, even if multiple households hunted cooperatively.

Table 3-9.–Resource harvest and use characteristics, Koyukuk, 2022.

Characteristic	Koyukuk
Mean number of resources used per household	6.9
Minimum	1
Maximum	18
95% confidence interval (±)[a]	7.4%
Median	6
Mean number of resources attempted to harvest per household	3.5
Minimum	0
Maximum	14
95% confidence interval (±)[a]	13.1%
Median	2
Mean number of resources harvested per household	2.8
Minimum	0
Maximum	13
95% confidence interval (±)[a]	14.6%
Median	1
Mean number of resources received per household	4.7
Minimum	1
Maximum	13
95% confidence interval (±)[a]	7.5%
Median	4
Mean number of resources given away per household	3.2
Minimum	0
Maximum	14
95% confidence interval (±)[a]	12.3%
Median	2
Mean household harvest (lb)	293.1
Minimum	0.0
Maximum	3,280.8
Median	8.0
Total harvest weight (lb)	10,845.9
Community per capita harvest (lb)	156.0
Percentage using any resource	100.0%
Percentage attempting to harvest any resource	75.8%
Percentage harvesting any resource	63.6%
Percentage receiving any resource	100.0%
Percentage giving away any resource	78.8%
Number of resources on the survey[b]	91

Source ADF&G Division of Subsistence household surveys, 2023.

a. 95% confidence intervals are calculated as a percentage range around the mean.

b. Includes resources printed on the survey and any resource volunteered by one or more households.

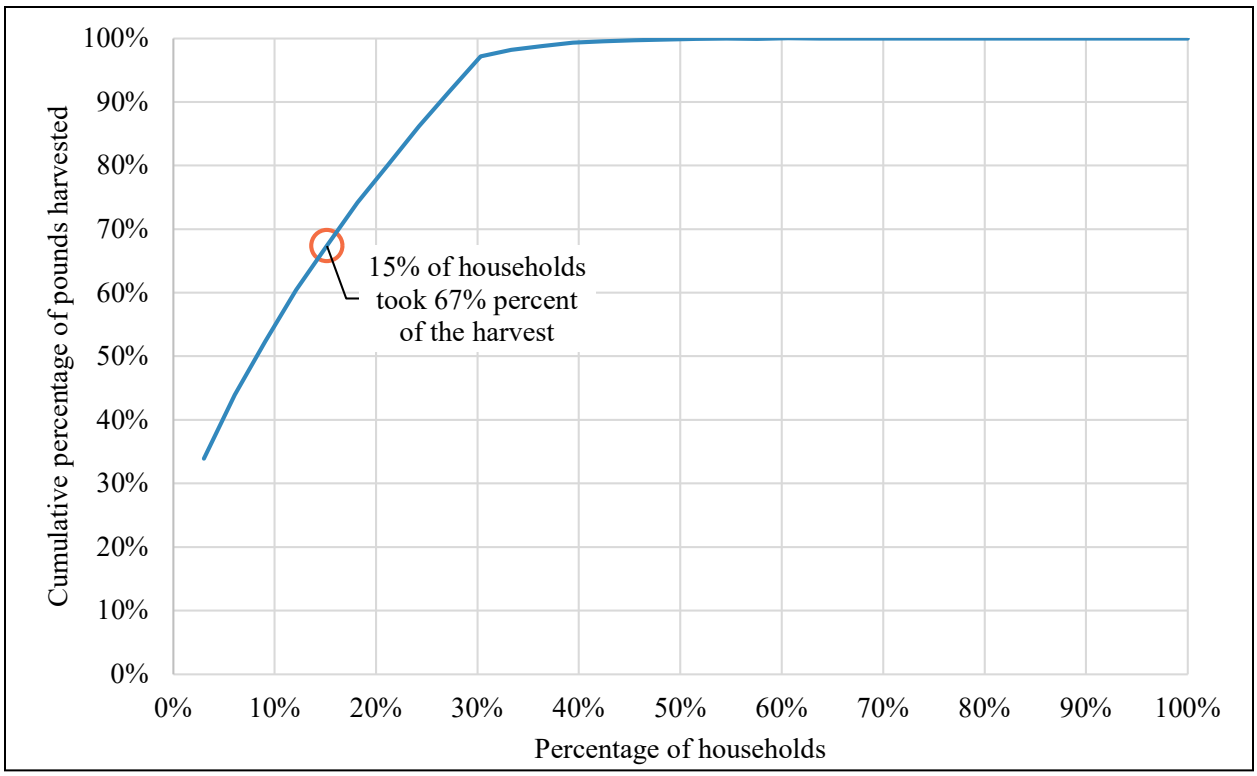


Figure 3-8.–Household specialization, Koyukuk, 2022.

Harvest Quantities and Composition

Table 3-10 reports estimated wild resource harvests and uses by Koyukuk residents in 2022 and is organized first by general category and then by species. All edible resources are reported in pounds usable weight (see Appendix D for conversion factors).[16] The harvest category includes resources harvested by any member of the surveyed household during the study year. The use category includes all resources taken, given away, or used by a household, and resources acquired from other harvesters, either as gifts, by barter or trade, through hunting partnerships, or as meat given by hunting guides and non-local hunters. Purchased foods are not included, but resources such as firewood are included because they are an important part of the subsistence way of life. Differences between harvest and use percentages reflect sharing among households, which results in a wider distribution of wild foods.

Koyukuk residents harvested 10,846 edible pounds of wild foods or 156 lb per capita in 2022 (Table 3-10). When compared to other Yukon River communities of similar size, Koyukuk—total population of 70—residents' total harvest of subsistence foods in 2022 is substantially lower. In 2014, Rampart had 39 residents and harvested a total of 14,754 edible pounds (378 lb per capita) and in 2011, Anvik had a population of 88 and harvested 34,401 lb (391 lb per capita) of wild resources (Brown et al. 2016; Ikuta et al. 2014). The uniquely low harvest quantities in Koyukuk could be due to a lack of prime age subsistence harvesters, in which both Rampart and Anvik have more of, explained in the above demographic information section.

Figure 3-9 shows the composition of the harvest in pounds usable weight by resource category. In the past, communities along the Yukon River relied heavily on salmon and their substantial salmon harvest used to make up the majority of each community's total harvest. Now, three years after the subsistence salmon fishery closures on the Yukon River, other resource categories comprise the majority of the total harvest. Large land mammals made up the greatest percentage of the total harvest (80%) with a total of 8,643 lb or

16. Resources that are not eaten, such as firewood and some furbearers, are included in the table but are assigned a conversion factor of zero.

Table 3-10.–Estimated use and harvest of fish, game, and vegetation resources, Koyukuk, 2022.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount[a]			CI (±) harvest[b] %
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
All resources	**100.0**	**75.8**	**63.6**	**100.0**	**78.8**	**10,845.9**	**293.1**	**156.0**	**10,845.9**	**lb**	**293.1**	**24.6**
Salmon	**97.0**	**0.0**	**0.0**	**97.0**	**51.5**	**0.0**	**0.0**	**0.0**	**0.0**	**ind**	**0.0**	**0.0**
Summer chum salmon	3.0	0.0	0.0	3.0	3.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Fall chum salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Coho salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Chinook salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Pink salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Sockeye salmon	15.2	0.0	0.0	15.2	6.1	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified salmon	81.8	0.0	0.0	81.8	45.5	0.0	0.0	0.0	0.0	ind	0.0	0.0
Nonsalmon fish	**54.5**	**33.3**	**27.3**	**42.4**	**24.2**	**571.1**	**15.4**	**8.2**	**571.1**	**lb**	**15.4**	**30.1**
Pacific herring	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pacific herring roe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Pacific halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	lb	0.0	0.0
Burbot	6.1	9.1	6.1	0.0	3.0	23.5	0.6	0.3	5.6	ind	0.2	47.6
Arctic grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Northern pike	18.2	15.2	15.2	12.1	12.1	129.5	3.5	1.9	39.2	ind	1.1	39.9
Sheefish	42.4	18.2	15.2	33.3	12.1	271.3	7.3	3.9	49.3	ind	1.3	46.4
Broad whitefish	15.2	9.1	6.1	12.1	6.1	71.8	1.9	1.0	22.4	ind	0.6	46.6
Bering cisco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Least cisco	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Humpback whitefish	15.2	12.1	9.1	6.1	9.1	47.1	1.3	0.7	22.4	ind	0.6	41.1
Round whitefish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified whitefishes	6.1	6.1	6.1	3.0	6.1	27.9	0.8	0.4	6.7	ind	0.2	49.3

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Table 3-10.–Page 2 of 5.

Resource	Percentage of households: Use %	Attempt %	Harvest %	Receive %	Give %	Harvest weight (lb): Total	Mean per household	Per capita	Harvest amount[a]: Total	Unit	Mean per household	CI (±) harvest[b] %
Large land mammals	**90.9**	**48.5**	**27.3**	**69.7**	**54.5**	**8,642.3**	**233.6**	**124.3**	**20.2**	**ind**	**0.5**	**29.5**
Black bear	9.1	6.1	6.1	3.0	6.1	197.3	5.3	2.8	4.5	ind	0.1	67.0
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Caribou	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Moose	90.9	48.5	27.3	69.7	54.5	8,445.0	228.2	121.5	15.7	ind	0.4	30.0
Common muskox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Dall sheep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Small land mammals	**39.4**	**18.2**	**15.2**	**24.2**	**21.2**	**1,121.2**	**30.3**	**16.1**	**62.8**	**ind**	**1.7**	**34.6**
Beaver	36.4	18.2	15.2	21.2	21.2	1,121.2	30.3	16.1	60.5	ind	1.6	34.6
Arctic fox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Red fox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Snowshoe hare	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Lynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Martens	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Muskrat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Porcupine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Gray wolf	3.0	3.0	3.0	0.0	3.0	0.0	0.0	0.0	2.2	ind	0.1	67.0
Wolverine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Marine mammals	**30.3**	0.0	0.0	**30.3**	**15.2**	0.0	0.0	0.0	0.0	ind	0.0	0.0
Bearded seal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified seals	12.1	0.0	0.0	12.1	9.1	0.0	0.0	0.0	0.0	ind	0.0	0.0
Beluga whale	6.1	0.0	0.0	6.1	3.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Bowhead whale	12.1	0.0	0.0	12.1	9.1	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified whales	15.2	0.0	0.0	15.2	3.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

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Table 3-10.–Page 3 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount[a]			CI (±) harvest[b] %
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Birds and eggs	**63.6**	**24.2**	**24.2**	**51.5**	**33.3**	**276.9**	**7.5**	**4.0**	**158.1**	**ind**	**4.3**	**32.3**
Bufflehead	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified goldeneyes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Mallard	12.1	9.1	9.1	6.1	3.0	46.9	1.3	0.7	29.2	ind	0.8	43.1
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Northern pintail	9.1	6.1	6.1	3.0	3.0	31.8	0.9	0.5	26.9	ind	0.7	46.6
Black scoter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
White-winged scoter	3.0	3.0	3.0	3.0	0.0	5.9	0.2	0.1	2.2	ind	0.1	67.0
Unspecified scoters	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Northern shoveler	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified teals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
American wigeon	3.0	3.0	3.0	0.0	3.0	2.4	0.1	0.0	2.2	ind	0.1	67.0
Unspecified Canada/ cackling geese	42.4	15.2	15.2	27.3	18.2	63.5	1.7	0.9	22.4	ind	0.6	36.3
Emperor goose	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Snow goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Greater white-fronted goose	39.4	15.2	15.2	27.3	18.2	85.6	2.3	1.2	26.9	ind	0.7	33.8
Unspecified swans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified loons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Spruce grouse	30.3	18.2	18.2	12.1	15.2	41.0	1.1	0.6	48.2	ind	1.3	27.4
Sharp-tailed grouse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Ruffed grouse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Ptarmigans	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Duck eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0

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Table 3-10.–Page 4 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount[a]			CI (±) harvest[b] %
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Birds and Eggs, continued												
Goose eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Gull eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Marine invertebrates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	lb	0.0	0.0
Butter clam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Freshwater clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Razor clam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Unspecified clams	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Dungeness crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
King crabs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Tanner crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Unspecified crabs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ind	0.0	0.0
Vegetation	**63.6**	**51.5**	**45.5**	**39.4**	**24.2**	**234.3**	**6.3**	**3.4**	**86.3**	**gal**	**2.3**	**22.5**
Blueberry	30.3	30.3	18.2	18.2	9.1	37.0	1.0	0.5	9.2	gal	0.3	32.5
Lowbush cranberry	12.1	18.2	9.1	6.1	3.0	17.9	0.5	0.3	4.5	gal	0.1	39.9
Highbush cranberry	27.3	24.2	24.2	6.1	12.1	100.9	2.7	1.5	25.2	gal	0.7	33.2
Crowberry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Cloudberry	27.3	21.2	9.1	21.2	6.1	12.3	0.3	0.2	3.1	gal	0.1	37.8
Raspberry	27.3	18.2	18.2	12.1	9.1	56.1	1.5	0.8	14.0	gal	0.4	29.6
Wild rhubarb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Wild potato	3.0	3.0	3.0	0.0	0.0	2.2	0.1	0.0	2.2	gal	0.1	67.0
Hudson's Bay (Labrador) tea	6.1	6.1	6.1	0.0	3.0	3.4	0.1	0.0	3.4	gal	0.1	49.3
Spruce tips	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Wild rose hips	3.0	3.0	3.0	3.0	0.0	4.5	0.1	0.1	1.1	gal	0.0	67.0
Other wild greens	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0

-continued-

Table 3-10.–Page 5 of 5.

Resource	Percentage of households					Harvest weight (lb)			Harvest amount[a]			CI (±) harvest[b] %
	Use %	Attempt %	Harvest %	Receive %	Give %	Total	Mean per household	Per capita	Total	Unit	Mean per household	
Vegetation, continued												
Unspecified mushrooms	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Stinkweed	3.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	1.1	gal	0.0	67.0
Punk	9.1	6.1	6.1	3.0	0.0	0.0	0.0	0.0	22.4	gal	0.6	46.6
Chaga	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0
Mousefoods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	gal	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2023.

Note Resources where the percentage using is greater than the combined received and harvest indicate use from resources obtained during a previous year.

Note Any zero harvest amount that is in black font indicates a harvest value that is smaller than 0.05.

Note For small land mammals, species that are not typically eaten show a non-zero harvest amount with a zero harvest weight. Harvest weight is not calculated for species harvested but not eaten.

Note Some birch was also reportedly harvested to be used as fire starter.

a. The harvest amount for summary rows is converted to the unit "pounds" to avoid tally conflicts if there are incompatible units of measure among resources in the category.

b. The CI (±) harvest % is the 95% confidence interval calculated as a percentage range around the mean pounds harvested. For species not eaten, this value is the confidence interval around the mean harvest in units.

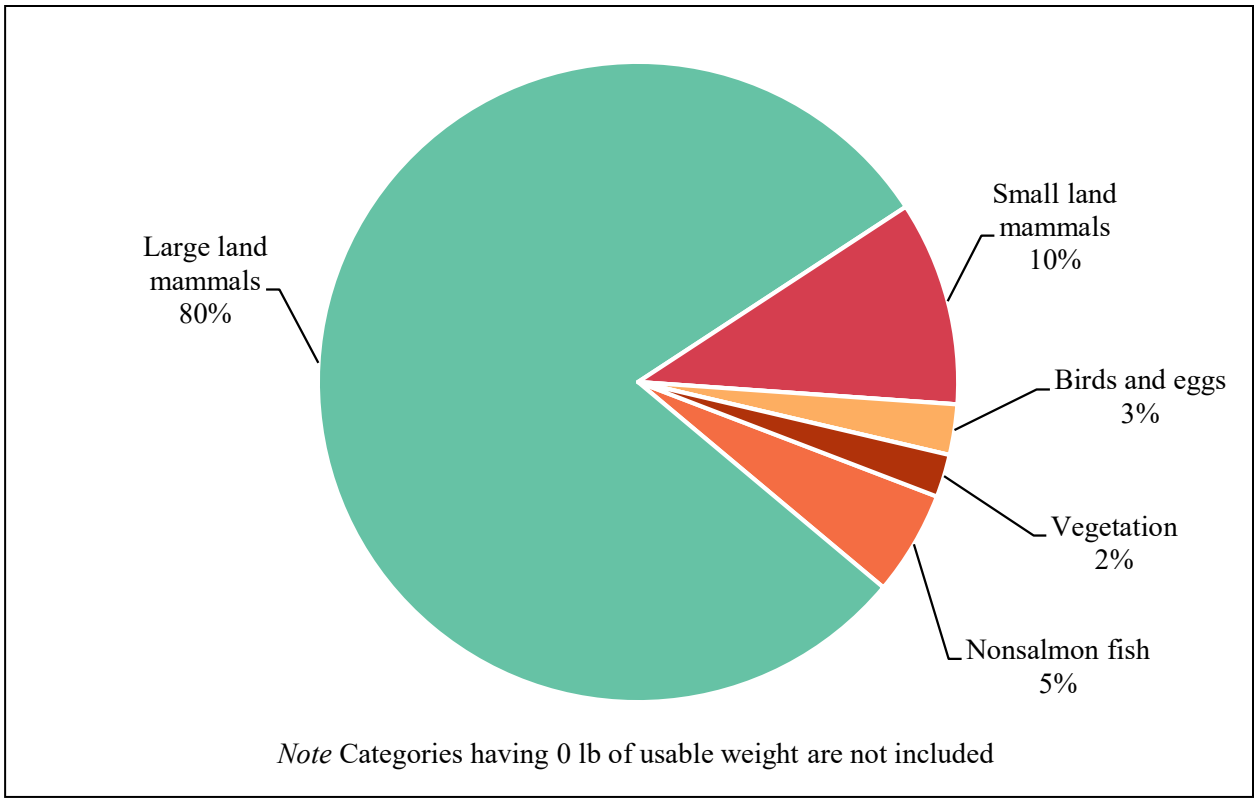


Figure 3-9.–Composition of harvest in pound usable weight, by resource category, Koyukuk, 2022.

124 lb per capita, and small land mammals were the next greatest percentage (10%) of the total harvest or 1,121 lb (16 lb per individual; Table 3-10; Figure 3-9). Nonsalmon fish accounted for 5% (571 lb) of the total harvest by edible weight or 8 lb per capita. Each of the remaining resource categories made up much smaller percentages of the harvest; birds and eggs added 3% or 277 lb, and vegetation consisted of only 2% or 234 lb. Harvest weight per individual was 4 lb and 3 lb, respectively. Sampled households did not report harvesting any salmon, marine invertebrates, or marine mammals in 2022.

Use and Harvest Characteristics by Resource Category

Table 3-10 shows the importance of sharing in Koyukuk; 100% of households received all resources and 79% of households gave some of all their resources away, whether they had been harvested by themselves or received from others. In all resource categories, there was a higher percentage of households that received than gave away; this is indicative of a widespread sharing network that extends outside of Koyukuk. The most received resource was salmon (97%) while the least received by households was small land mammals (24%). This trend could be attributed to the decreasing need for and use of furbearers as well as the decrease in the number of trappers, discussed further under the Small Land Mammals section, and to the TCC's distribution of Bristol Bay salmon to communities within their region in 2022.[17] Large land mammals (55%) were given away by the most households, while marine mammals (15%) were the least shared resource.

Table 3-11 lists the top ten ranked resources used by households, and Figure 3-10 shows the top ten species with the highest harvests during the 2022 study year. Moose were not only the most used (91%) resource but also the most harvested (78%). Unspecified salmon were the next most used resource by households (82%). Although salmon was the second most used resource, Koyukuk residents did not harvest any salmon

17. Margaret Bauman. The Cordova Times, "State, partners deliver salmon donations for Yukon, Kuskokwim villages," Jun. 17, 2022. Accessed January 8, 2023. https://www.thecordovatimes.com/2022/06/17/state-partners-deliver-salmon-donations-for-yukon-kuskokwim-villages/

due to the subsistence salmon fishery closures in 2022. Instead, residents likely used salmon received from distributions made by the TCC. Beaver was the next most harvested species (10%) and were used by 36% of households. When the harvest of salmon was still permitted, similar-sized Yukon River communities harvested much less beaver, and it was highly unlikely that beaver would be both one of the top three most harvested resources and harvested by only 10% of households at that time (Brown et al. 2016; Ikuta et al. 2014). Sheefish was the third most used resource (42%); however, sheefish made up a much smaller percentage of the total harvest (3%). Unspecified Canada/cackling geese were also used by 42% of households, but residents harvested less than 1%. . The remaining resources including greater white-fronted geese, spruce grouse, blueberries, highbush cranberries, and cloudberries were used by less than 40% of households (Table 3-11). The remaining top ten harvested resources, such as black bear, pike, highbush cranberries, greater white-fronted geese, broad whitefish, and raspberries, all made up less than 2% of Koyukuk's total harvest. All other harvested resources equated to 3% (Figure 3-10).

Table 3-11.–Top ranked resources used by households, Koyukuk, 2022.

Rank	Resource	Percent using
1.	Moose	90.9%
2.	Unspecified salmon	81.8%
3.	Sheefish	42.4%
4.	Unspecified Canada/cackling geese	42.4%
5.	Greater white-fronted goose	39.4%
6.	Beaver	36.4%
7.	Spruce grouse	30.3%
8.	Blueberry	30.3%
9.	Highbush cranberry	27.3%
10.	Cloudberry	27.3%

Source ADF&G Division of Subsistence household surveys, 2023.

Salmon

In 2022, subsistence harvests of Chinook salmon and both summer and fall chum salmon were prohibited in District 4-A[18] of the upper Yukon River from mid-June through mid-October.[19] However, fishers were still permitted to harvest nonsalmon fish with 4-inch mesh size gillnets of 60 ft or less in length, as well as fish wheels, dip nets, hook and line, and rod and reel.[20, 21] Fishers were also encouraged to harvest nonsalmon species in areas where Chinook and chum salmon were less likely to be encountered. If caught live, Chinook and chum salmon were required to be released immediately, whereas coho, pink, or sockeye salmon harvested incidentally with nonsalmon gear could be kept. However, pink and sockeye salmon do not typically travel upriver as far as Koyukuk and encountering them in nets is rare.

Presumably due to these closures, Koyukuk residents did not harvest salmon of any species in 2022 (Table 3-10). One fisher described his reaction upon hearing about the closure:

> It's tough when they stop us fishin', ya know. It's depressin' actually. 'Cause last May I came down from Nenana, and I was, like, "well I hope they let us fish" and gettin' all ready. Did all the grass cuttin', repaired the tables and—get the fish drying place tore down and make a new one. I was just putting up the new one.

18. ADF&G Division of Commercial Fisheries, Salmon Statistical Area Charts, "Yukon River - District 4," Accessed January 8, 2023, https://www.adfg.alaska.gov/static/fishing/PDFs/commercial/yukon/yukon_district4.pdf.
19. ADF&G Division of Commercial Fisheries. 22 July 2022, "2022 Yukon River Salmon Fall Fishery Announcement #2: District 4 Subsistence Fishing Schedule," Accessed January 8, 2023. https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1413448518.pdf
20. ADF&G Division of Commercial Fisheries. 8 June 2022, "2022 Yukon River Salmon Fall Fishery Announcement #5: District 4 and Koyukuk River Subsistence Fishing Schedule," Accessed January 8, 2023. https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1378220580.pdf.
21. ADF&G Division of Commercial Fisheries. 23 September 2022, "2022 Yukon River Salmon Fall Fishery Announcement #16: District 4 and Koyukuk River Subsistence Fishing Schedule," advisory announcement, June 8, 2022. Accessed January 8, 2023. https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1438464463.pdf.

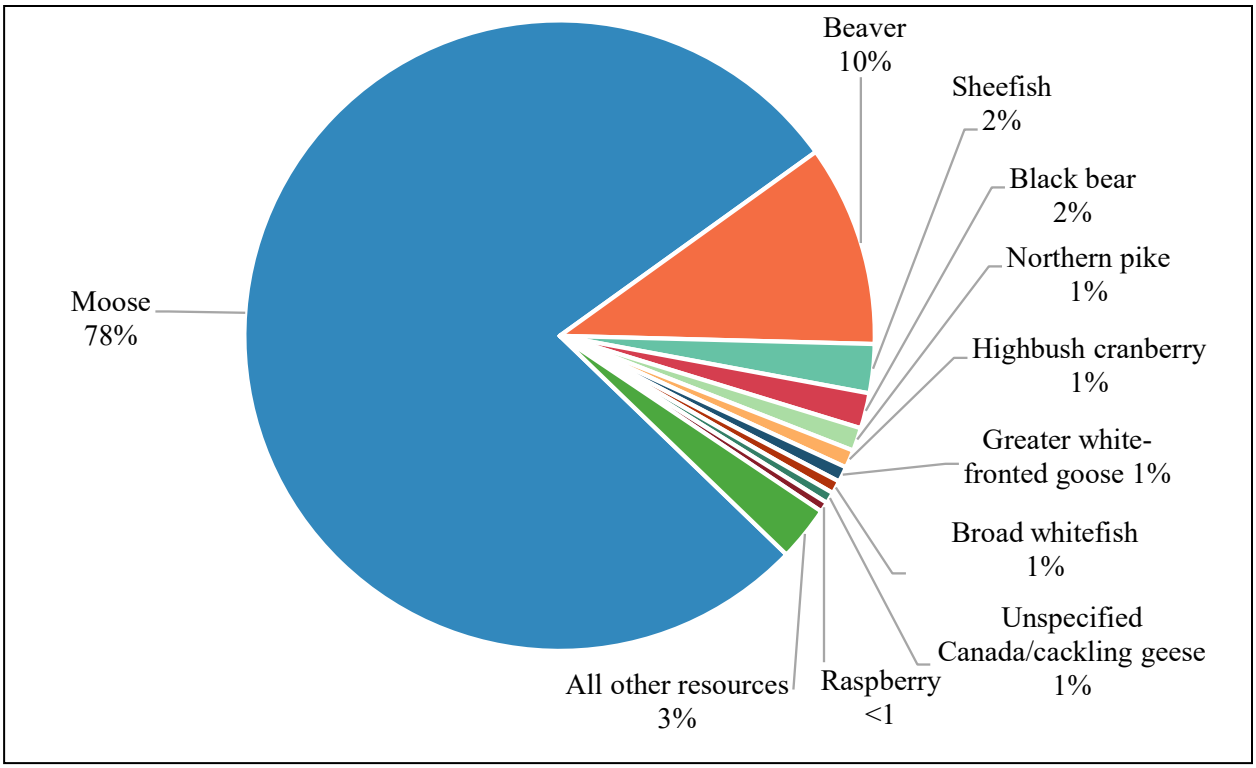


Figure 3-10.–Top resources harvested by percentage of total harvest in pounds usable weight, Koyukuk, 2022.

> They said "no fishin"…And I just left that, all the stuff right there. Walked off… I was like, "Oh well, no fishin." So, that's how I felt, was depressed a little bit. 'Cause—let the grass grow back up and no smoke comin' out a smokehouse. Too many closures, I guess. (04062023KYU04)

Historically, Koyukon people moved their entire families to various seasonal subsistence camps. Although Koyukuk residents no longer move around to multiple camps, many people still utilize their summer fish camps during the salmon season from late June through the fall. For these residents, the period before the summer fishing months is full of anticipation and excitement which develops into various preparation efforts for the upcoming fishing season. This tradition has been passed down for generations and spans hundreds of years. However, without the opportunity to harvest salmon, some respondents "go into shock for a month in June and July" (04032023KYU03). Other respondents said the inability to harvest salmon has both disrupted sharing and the passing on of generational knowledge, as well as negatively affected people's mental health.

> It makes me…angrier at people, you know. I don't openly show it, but it's always in the back of my mind. And it's very depressing because I can't feed my family—like I used to or even my community. And I can't teach the younger people, the younger generation, the things that [we] were brought up [on], and what we were taught. Because it's not there no more. It's not our, within our reach, because they took that away from us. Just kinda tied our hands and that's, now we can't even fish for one fish. (04072023KYU08)

Residents of Koyukuk value salmon greatly, not only as a food source but also as an integral part of their culture. The halt to salmon fishing is "just a complete stop to our culture, to our food" (04062023KYU03). The same respondent went on to describe how people rely on salmon as a source of energy and its role during holidays:

> It's heartbreakin'. It's probably three years without our main source of food. It was on every holiday table. Every holiday there was salmon on the tables. We go out to the wood yards; we go out camping, dry fish and salmon strips was always with us—on traveling… It's a fast source of food, good food, and energy. Now we don't have that. (04062023KYU03)

Despite the inability to harvest, almost the entire community (97%) used salmon (Table 3-10). In the early summer months of 2022, Koyukuk residents received all the salmon they reported using through a collaborative distribution project between Kwik'Pak Fisheries in Emmonak, Copper River Seafoods, multiple fish processors in Interior Alaska, and TCC. This donation was organized to provide Yukon River communities with salmon amidst the subsistence fishery closures.[22,23] One respondent described how thankful she was to receive the offering of whole fish:

> I was grateful for them [Tanana Chiefs] to send us fish last year. They send us, before they were sending us gutted out reds. And basically the, everybody just shut down with it, we want to clean out our own fish, ya know, so. They went to this Copper River cannery…and they send us whole Copper River reds without, with the heads and the guts and everything in there. Which was really good because it, they'll [be] freezer burned. And I managed to harvest a lot of that so. (04062023KYU03)

Although many respondents were grateful for the salmon delivery, a few surveyed residents described disliking the taste of the salmon they received in their comments. Some said the fish's quality was poor, some mentioned noticing a distinct ocean taste, and another claimed they couldn't eat it and ended up giving the salmon to their dogs instead.[24]

While some salmon were delivered whole, other salmon were processed into portions and then delivered packaged and frozen. Because much of the salmon that respondents used was already processed when they received it, survey respondents were unable to identify the species and indicated that they used "unspecified salmon" the most (82%), while 15% of households acknowledged that the donated salmon they used was sockeye or "reds," and 3% reported using summer chum salmon (Table 3-10). However, it is important to note that summer chum salmon were not donated by TCC. It is possible respondents inaccurately identified the fish they received from TCC or received summer chum salmon that were harvested elsewhere in the Yukon River and thus not recorded in this study's harvest estimates.

Even though no one was able to harvest their own salmon and all that was used was received from others, over 50% of Koyukuk households still chose to share their limited resource with others (Table 3-10). This demonstrates how much sharing amongst each other is valued by Koyukuk residents. One respondent explained that he knew he had enough salmon when he "could share it lots" and described himself as a provider for his family and for "all the families" before the closures (04062023KYU04).

In addition to the decrease in salmon harvest opportunities in recent years, Koyukuk residents have had to adapt to the effects of large mesh gillnets and changing climate on salmon abundance and size. The Yukon River historically saw huge Chinook salmon—ranging from 60 to 85 pounds and with lengths of up to 5 feet—return to its waters every summer. During that time, fishers commonly used 8-inch mesh size gillnets, which selectively harvested the larger and older Chinook salmon for years, thus leading to a decrease in the size of returning spawning salmon. Though no Koyukuk residents mentioned gear mesh size as the reason for the decline in salmon abundance and size, some did report not seeing any more 8-year-old Chinook salmon and speculated that climate change is the reason (04072023KYU08; 04042023KYU01). Residents

22. Margaret Bauman, 2022, "State, partners deliver salmon donations for Yukon, Kuskokwim villages," The Cordova Times, Accessed January 8, 2023, https://www.thecordovatimes.com/2022/06/17/state-partners-deliver-salmon-donations-for-yukon-kuskokwim-villages/.
23. Fisherman's News, 2022, "2022 Seafood Donations to Yukon River Villages Via SeaShare Reach 74,000 Pounds," Accessed January 8, 2023, https://fishermensnews.com/article/2022-seafood-donations-to-yukon-river-villages-via-seashare-reach-74000-pounds/.
24. ADF&G Division of Subsistence household survey comments, 2023.

speculate that climate change and subsequently warmer waters have affected salmon migration behavior. One Koyukuk elder noticed that the salmon used to travel up the Yukon River just under the surface of the water, whereas now the salmon travel up the river favoring deeper and cooler waters:

> Do you know when I moved back down here? 1990. The lot of kings you could still, right on the surface, so you could tell where they were migrating to Canada. But couple years after I bought a fish finder and took a water temperature and Yukon River was fifty degrees and Koyukuk River was fifty-one degrees. One degree different. And about, but now that they're climate change, they, not, no permafrost nowadays on the bank and no more glaciers on the river. So, the water temperature changed too and now that the kings, the Canadian bound kings they're twenty-four feet down from the surface now. They went down because the water, the water temperature changed. (04042023KYU01)

In 2019, a salmon mortality event occurred across Alaska, where multiple salmon species were seen floating dead along their migration routes prior to spawning (von Biela et al. 2020). The mortality event coincided with record-breaking temperatures across Alaska. The largest die-off reportedly occurred in the Koyukuk River where over 1,000 pre-spawning salmon were counted dead along a 275 km section of the river in just 2 days (Westley 2020). "Around Hughes, it's all gravel bottom. And from Hog River up there lotta, they found lotta fall chums, dead fall chums. 'Cause the water temperature changed" (04042023KYU01). Although the extreme air temperatures and warm waters during this period likely caused the high rate of salmon mortality, one respondent explained how some salmon might have survived the mortality event by migrating to waters north of the Yukon River:

> I think they're not really comin' that far up the Yukon anymore because the global warming. The water is warm. About five years ago a lotta the fish come floatin' out, come floatin' up. They said the water was too warm so a lotta fish was floatin' down the Yukon. That's the year that all the fish, my friend over in Unalakleet, she said that they never harvest king salmon in their life, but they were gettin' abundant amount a sa—in the Unalakleet River. It whe—that's why. They were following the cold water. (04062023KYU03)

As the warming air temperatures thaw permafrost and glaciers along the salmon spawning rivers and tributaries, the water temperatures are also rising (04042023KYU01). Many respondents believe this is why they are no longer seeing any Chinook salmon on the Yukon River. Some elders foresaw the effects of the environmental changes and warned youth to take special care of the providing land. One woman described how her grandmother taught her to respect the river's omnipotence:

> My grandma…used to say, she was ninety-eight years old…and she used to tell me, "You know you have respect for that Yukon River, that's our people's lifeline. It can take a life when it want, but it can also feed you year-round." She said that, "You always have respect for it, it's bigger than you." (04062023KYU03)

Because there were no harvests of salmon in Koyukuk during the study year, no data were collected on salmon fed to dogs in 2022. However, in the past when dog teams were prevalent in the area, fishers would harvest summer chum salmon, also known as "dog salmon," to feed their dogs throughout the winter (04052023KYU02; 04072023KYU08). Before the decline of salmon populations and restrictions on salmon harvest, some fishers used to harvest 100 bales of chum salmon for their dogs alone.

> They get about, maybe about hundred bales of fish, you know, hundred bales of dog fish for their winter supply. But they feed all their dogs all summer what they got from the fish so they didn't really waste anything…Whatever they all got, they used everything. They didn't waste nothin.' But it seems like today, you know, it's more different today…we're throwing the scraps back into the river because we don't have any more dogs. (04052023KYU02)

Scraps from processing and cooking fish used to always go to the dogs—no part of the fish was wasted. However, now that most Koyukuk residents do not have dog teams anymore, it is becoming more common for harvesters to discard their fish scraps in the river. Though the decline in dog mushers cannot be attributed to one cause, some note the introduction of snow machines diminished the use of dog teams almost entirely. "It's nothin' now. There are no teams, Galena, Koyukuk, Nulato, Kaltag, Ruby" (04062023KYU04; Andersen 1992; Andersen et al. 2004).

> That's our main mode of transportation wintertime, dog teams. Everybody used to have a dog team. Anywhere from seven to eight dogs, on up. Some people had fifteen dogs, twelve-dog teams, you know. Like big racing teams, traveling dogs. Smaller teams were about seven…after snow machines came around, everybody started losing sight of dogs. Of course, they was not as dependable as dog teams. You never run out of power when you got dog teams. Never break down, unless you run out of dog feed [laughter]. Which is never the case. (04072023KYU08)

While it is true that dogs will eat any fish including nonsalmon fish, many people fed their working dog teams with salmon due to the highly productive subsistence salmon fishery in the middle and upper Yukon River. Therefore, although not the sole reason, it is likely that the decline in salmon abundance could have played a part in the steady decline of dog mushers in the region (Andersen 1992; Andersen et al. 2004).

Dog mushing played an important role in Athabascan culture, and, with the number of mushers dwindling closer to zero in recent years, one respondent lamented the loss this decline represents to the culture. "Nobody, I don't see anybody to this day to—that is doing what they did [dog mushing]. It seems like we lost part of our culture, which is really sad…I really don't know how to get it back" (04062023KYU02).

Because no salmon were harvested by Koyukuk residents in 2022, no harvest location figure was prepared.

Nonsalmon Fish

Nonsalmon fish were used by over half (55%) of Koyukuk households in 2022 (Table 3-10). Almost every household that attempted (33%) to harvest nonsalmon species was successful (27%), and those that harvested nonsalmon fish collected a total of 571 lb or 8 lb per capita. Of the various species of nonsalmon fish that fishers could harvest, Koyukuk residents harvested six species (Table 3-10). Harvests were distributed widely to households within the community; 42% of households reported receiving nonsalmon fish, while 24% of households gave them away. Least cisco was not harvested, but 3% of households did use and receive this fish.

Sheefish are favored for their large size, high oil content, and flaky white meat (Andersen et al. 2004; Trainor et al. 2020), thus they contributed the most (47%) edible weight (271 lb) to the nonsalmon harvest (Table 3-10; Figure 3-11). Sheefish have two runs, one in March and the other in June; the first run contains notably larger fish, which is most likely why they are primarily targeted at that time (Andersen et al. 2004). Further confirming this, in 2022, sheefish were most commonly caught in gillnets placed under the ice (185 lb). Residents harvested the remaining sheefish with open water gear, likely during their second run up the Yukon River, rod and reel (62 lb), and both set gillnets and longline/skate gear (12 lb; Table 3-12; Figure 3-12).

Pike are present in most of the Koyukuk River drainage and provide residents a source of food year-round (Andersen et al. 2004). Fishers harvested 130 lb of pike in 2022, which accounted for 23% of the total nonsalmon fish harvest in 2022 (Table 3-10; Figure 3-11). Many Koyukuk residents described the pike population as "gettin' out of control;" their numbers are increasing rapidly, and many of these fish are growing to extremely large sizes (04042023KYU01; 04062023KYU04). Due to the enormous size of the pike, there is concern that small fish populations, ducks, and muskrats are being heavily predated now; "They're huge and they're just killin' off everything" (04062023KYU04). There is currently no competitive fishing derby for pike; however, one respondent had a suggestion to stabilize their booming population numbers: "If there's a way to spark interest in catchin' 'em, people should do that all over the state" (04062023KYU04). Harvesters caught pike equally in drift and set gillnets (56 lb).15 lb were caught

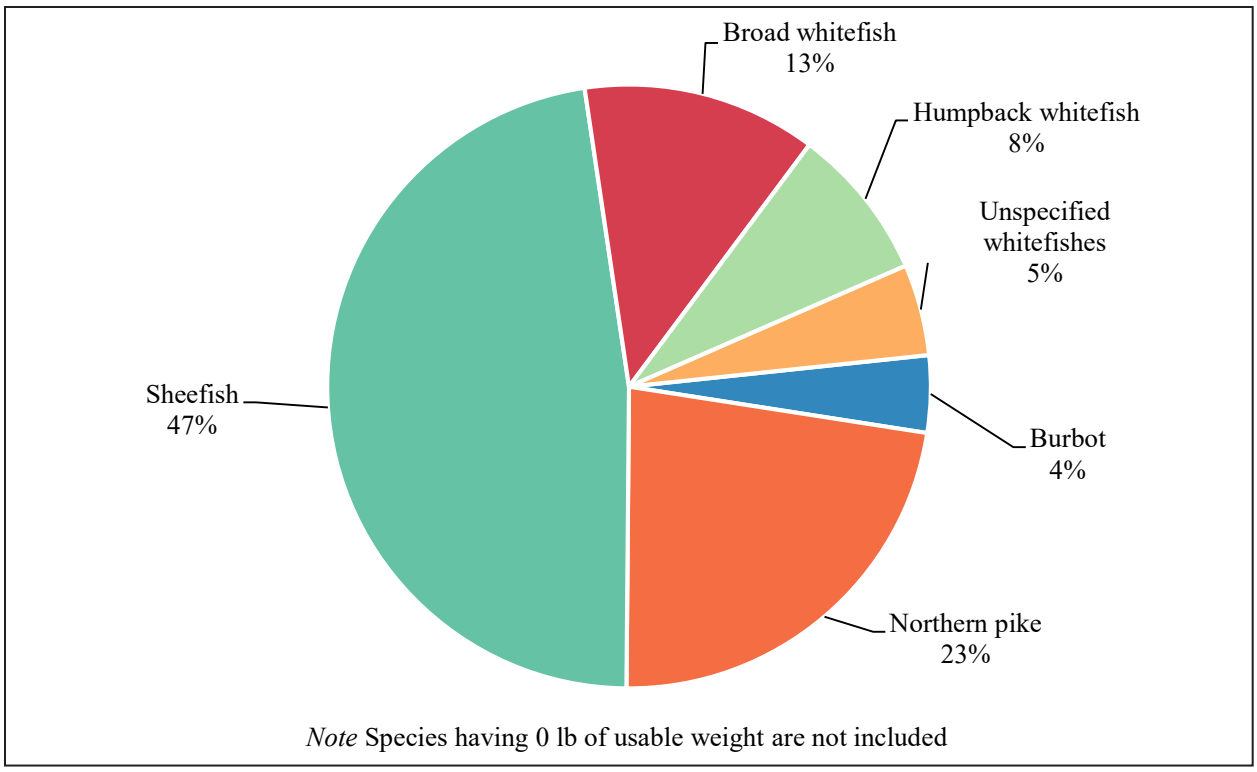


Figure 3-11.–Composition of nonsalmon fish harvest in pounds usable weight, by percentage, Koyukuk, 2022.

with rod and reel, and roughly 4 lb were caught with longline or skate gear, locally referred to as setlines (Table 3-12; Figure 3-12).

Broad whitefish made up 13% of the total nonsalmon harvest weight with a total harvest of 72 lb; all of which was caught using set gillnets (Figure 3-11; Table 3-12). Although no nonsalmon fish species were harvested with fish wheels in 2022, whitefish were occasionally caught incidentally in fish wheels targeting salmon in summer. "They use wheels in the water. All summer they run wheels. For the salmon. And then fall time they, catch the whitefish with 'em too. But they move to use nets in the fall time" (04072023KYU08). Set gillnets are commonly used during the fall to harvest whitefish when they are fat and full of eggs during migration to their spawning grounds (04042023KYU01; 04062023KYU03; 04062023KYU06; 04072023KYU08; Andersen et al. 2004). Fishers often target whitefish at this time for their eggs and organs, which are considered delicacies during potlatch ceremonies.

> Another thing, in the fall time…we set nets and we get a whole bunch a dog and whitefish. And we basically do that for the fish eggs, and the fish guts. That's a delicacy in my culture, is the bulb, that white bulb inside the whitefish. And the fish egg, fish roe eggs. We make caviar [with] the fish eggs. You have to get a lotta fish to get at least three, four packages of that dinner. And basically, the dinners are, ya know, a family has an upcoming potlatch, a lotta this foods that's preserved throughout the seasonal year is used for traditional potlatches. (04062023KYU03)

Whitefish are also commonly caught in nets set under the ice after freeze-up (04042023KYU01; 04062023KYU04; 04062023KYU05; 04062023KYU06; 04072023KYU08); however, in 2022, only 16 lb of humpback whitefish and 19 lb of unspecified whitefish were harvested in under-ice nets (Table 3-12). The remaining 3 species contributing to the total harvest of nonsalmon fish were humpback whitefish (8%), unspecified whitefish (5%), and burbot (4%; Figure 3-12).

Table 3-12.–Harvests of nonsalmon fish by subsistence gear type, Koyukuk, 2022.

Resource	Drift gillnet		Set gillnet		Under ice net		Under ice jigging or rod and reel		Longline/skate		Other subsistence gear[a]	
	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Nonsalmon fish	**19.1**	**64.8**	**56.1**	**177.3**	**46.0**	**220.1**	0.0	0.0	**5.6**	**25.5**	0.0	0.0
Pacific herring	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific herring roe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burbot	0.0	0.0	3.4	14.1	0.0	0.0	0.0	0.0	2.2	9.4	0.0	0.0
Arctic grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Northern pike	16.8	55.5	16.8	55.5	0.0	0.0	0.0	0.0	1.1	3.7	0.0	0.0
Sheefish	0.0	0.0	2.2	12.3	33.6	185.0	0.0	0.0	2.2	12.3	0.0	0.0
Broad whitefish	0.0	0.0	22.4	71.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bering cisco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Least cisco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Humpback whitefish	0.0	0.0	11.2	23.5	7.8	16.5	0.0	0.0	0.0	0.0	0.0	0.0
Round whitefish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unspecified whitefishes	2.2	9.3	0.0	0.0	4.5	18.6	0.0	0.0	0.0	0.0	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2023.

a. No other subsistence gear types were reported by respondents.

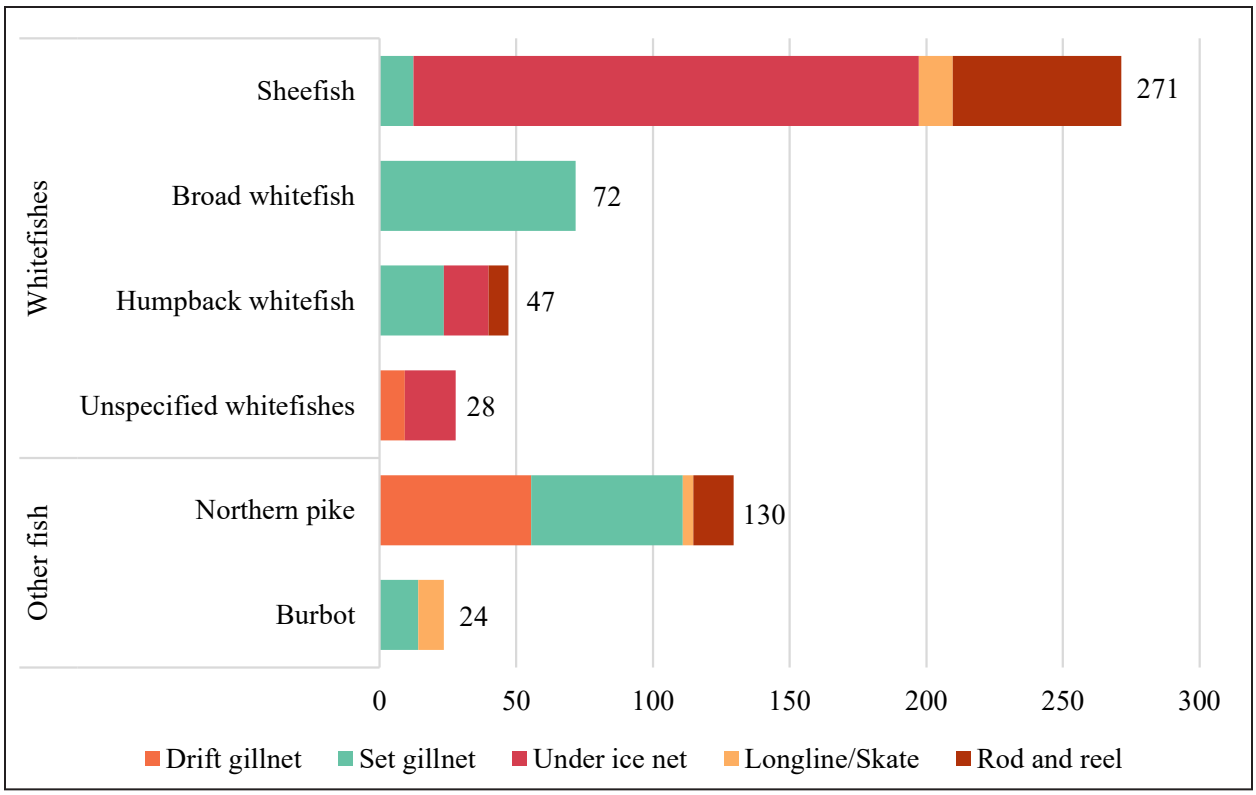


Figure 3-12.–Estimated harvest of nonsalmon fish in pounds usable weight by gear type and resource, Koyukuk, 2022.

As estimated in total pounds of fish, under-ice nets accounted for approximately 39% of the nonsalmon fish harvests by gear type while set gillnet accounted for 31%, drift gillnet 11%, and only 5% of nonsalmon fish were harvested using longline/skate (Table 3-13). The use of longline/skate gear is much less common than it used to be (04072023KYU08); however, this gear was used to harvest small amounts of sheefish, pike, and burbot in 2022. One fisher describes how to set a longline under the ice to catch burbot:

> They put hooks along with that, put 'em all under the ice. That's how they catch their burbot…We call 'em lush around here. Same thing, though…They get some pretty big ones, too…They go to shallow places, you know, not very deep water. Maybe about like that [four or five feet] at least. And they string wire from one pole to another pole. The line maybe about length of this house. All they do is, they cut holes here and there. And they shove a rope underneath the ice with a pole… When they hook it, they make it all the way through that line under the ice like that. (04072023KYU08)

Table 3-14 shows the estimated nonsalmon fish harvested for feeding dogs. Out of all the nonsalmon fish harvested in Koyukuk (571 lb), 85 lb or 15% were fed to dogs in 2022. In the past, it was very common for people in Koyukuk to maintain dog teams as their primary mode of transportation in the winter (04042023KYU01; 04052023KYU02; 04062023KYU04; 04062023KYU05; 04072023KYU08). Those dogs were fed with various species of fish, although salmon were preferred for their high nutrient density. Now that dog teams are not as prevalent in Koyukuk, significantly fewer fish—consisting solely of nonsalmon fish—are harvested for feeding dogs due to harvest restrictions. The most common species of nonsalmon fish fed to dogs was pike (43%). Portions of burbot (20%), broad whitefish (25%), humpback whitefish (5%), and unspecified whitefish (17%) were also fed to dogs.

Table 3-13.–Percentage of nonsalmon fish harvested by subsistence gear types, resource, and total nonsalmon harvest, Koyukuk, 2022.

Resource	Percent base	Drift gillnet		Set gillnet		Under ice net		Under ice jigging or rod and reel		Longline/skate		Other subsistence gear[a]	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Nonsalmon fish	Gear type	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%
	Resource	13.1%	11.3%	38.5%	31.0%	31.5%	38.5%	0.0%	0.0%	3.8%	4.5%	0.0%	0.0%
	Total	13.1%	11.3%	38.5%	31.0%	31.5%	38.5%	0.0%	0.0%	3.8%	4.5%	0.0%	0.0%
Pacific herring	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pacific herring roe	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pacific halibut	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Burbot	Gear type	0.0%	0.0%	6.0%	8.0%	0.0%	0.0%	0.0%	0.0%	40.0%	37.0%	0.0%	0.0%
	Resource	0.0%	0.0%	60.0%	60.0%	0.0%	0.0%	0.0%	0.0%	40.0%	40.0%	0.0%	0.0%
	Total	0.0%	0.0%	2.3%	2.5%	0.0%	0.0%	0.0%	0.0%	1.5%	1.6%	0.0%	0.0%
Arctic grayling	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Northern pike	Gear type	88.2%	85.7%	30.0%	31.3%	0.0%	0.0%	0.0%	0.0%	20.0%	14.5%	0.0%	0.0%
	Resource	42.9%	42.9%	42.9%	42.9%	0.0%	0.0%	0.0%	0.0%	2.9%	2.9%	0.0%	0.0%
	Total	11.5%	9.7%	11.5%	9.7%	0.0%	0.0%	0.0%	0.0%	0.8%	0.6%	0.0%	0.0%
Sheefish	Gear type	0.0%	0.0%	4.0%	7.0%	73.2%	84.1%	0.0%	0.0%	40.0%	48.5%	0.0%	0.0%
	Resource	0.0%	0.0%	4.5%	4.5%	68.2%	68.2%	0.0%	0.0%	4.5%	4.5%	0.0%	0.0%
	Total	0.0%	0.0%	1.5%	2.2%	23.1%	32.4%	0.0%	0.0%	1.5%	2.2%	0.0%	0.0%
Broad whitefish	Gear type	0.0%	0.0%	40.0%	40.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	15.4%	12.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bering cisco	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

-continued-

Table 3-13.–Page 2 of 2.

Resource	Percent base	Drift gillnet		Set gillnet		Under ice net		Under ice jigging or rod and reel		Longline/skate		Other subsistence gear[a]	
		Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Least cisco	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Humpback whitefish	Gear type	0.0%	0.0%	20.0%	13.3%	17.1%	7.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	50.0%	50.0%	35.0%	35.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	7.7%	4.1%	5.4%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Round whitefish	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Gear type	11.8%	14.3%	0.0%	0.0%	9.8%	8.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unspecified whitefishes	Resource	33.3%	33.3%	0.0%	0.0%	66.7%	66.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	1.5%	1.6%	0.0%	0.0%	3.1%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2023.

a No other subsistence gear types were reported by respondents.

Note Percentage base of gear type depicts the contribution of each resource harvested with a specified gear type to the total harvest of all salmon using the same gear type.

Note Percentage base of resource is the percent contribution of harvest using the specified gear type to the total harvest of the specified resource, including harvests from gear other than subsistence.

Note Percentage base of Total is the percentage contribution to the harvest of all salmon for the specified gear type and resource, including harvests from gear other than subsistence.

Table 3-14.–Estimated harvests of salmon and nonsalmon fish for consumption by dogs, Koyukuk, 2022.

	Total harvest		Harvested for dogs		
Resource	Number	Pounds	Number	Pounds	Percent
Nonsalmon fish	**145.8**	**571.1**	**25.7**	**84.8**	**14.8%**
Burbot	5.6	23.5	1.1	4.7	20.0%
Northern pike	39.2	129.5	16.7	55.1	42.6%
Broad whitefish	22.4	71.8	5.6	17.9	25.0%
Humpback whitefish	22.4	47.1	1.1	2.4	5.0%
Unspecified whitefishes	6.7	27.9	1.1	4.6	16.7%

Source ADF&G Division of Subsistence, household surveys, 2023.

Note Only species having reported instances of use for dog food are included.

Figure 3-13 depicts the search and harvest areas for nonsalmon fish by Koyukuk households in 2022. Nonsalmon fish were searched for and harvested in roughly five areas along the Yukon and Koyukuk rivers. One area where Koyukuk residents harvested nonsalmon fish was at the mouth of the Nulato River—south of the community with the same name. Another area used along the Yukon River is downriver from Koyukuk, at the mouth of a slough that branches into the INWR. Koyukuk residents also fished for nonsalmon on the Yukon River upstream from the community, and just downriver from Pilot Mountain. On the Koyukuk River, there were two nonsalmon search and harvest areas found halfway along the western side of Traders Island.

Large Land Mammals

The only two large land mammal species harvested by Koyukuk residents in 2022 were moose and black bear. Just over half of those who attempted (49%) to harvest large land mammals were successful (27%; Table 3-10). Moose were a substantial part of residents' diets: over 90% of households reported using them. Moose harvests equated to 8,455 lb of the total edible weight (122 lb per capita), which comprised 98% of the total large land mammal harvest (Figure 3-14; Table 3-10). Many residents not only used the meat but also used the moose tallow in place of dipping oil or cooking fat (04052023KYU02; 04062023KYU03). In the past, more people knew how to tan the hide which was used for making clothing. The lack of moose hide use in present-day Koyukuk could be due to the intricate tanning process; one respondent explained in detail the multitude of steps that must be taken to prepare a moose hide before tanning:

> In the fall time, they'll collect a moose brain. They cut the moose brain out and they put it in a jar. And the moose brain has a certain kinda acid that breaks down the membrane and makes it soft and easy to work with…They have to ferment that moose brain for at least a year inside the jar. And then you mix it with five gallons of water, and it [chemical in moose brains] has that, the same thing that they use to, the commercial tanneries use to tan moose skins…So, we save that if we're planning to tan some kinda hide. It makes it softer and easier to work with…We'll save the moose skin in the fall time and let it freeze…you have to wait till it turn thirty or forty below outside to go and scrape the hair off. It'll shave right off… Because you're taking that outside hair, all the moose hair off. So, it's easier to shave it…when it's cold. Then you bring it back in and then you sew. Then they'll save it for springtime. This, they'll start soak p—probably May 1st…they'll start tanning their moose hide, but it's a lot of work. (04062023KYU03)

She then went into more detail about the amount of work that it takes to tan the skin after it has been prepared, and that, although it is a complex process, she would do it herself rather than spend thousands of dollars on the completed product.

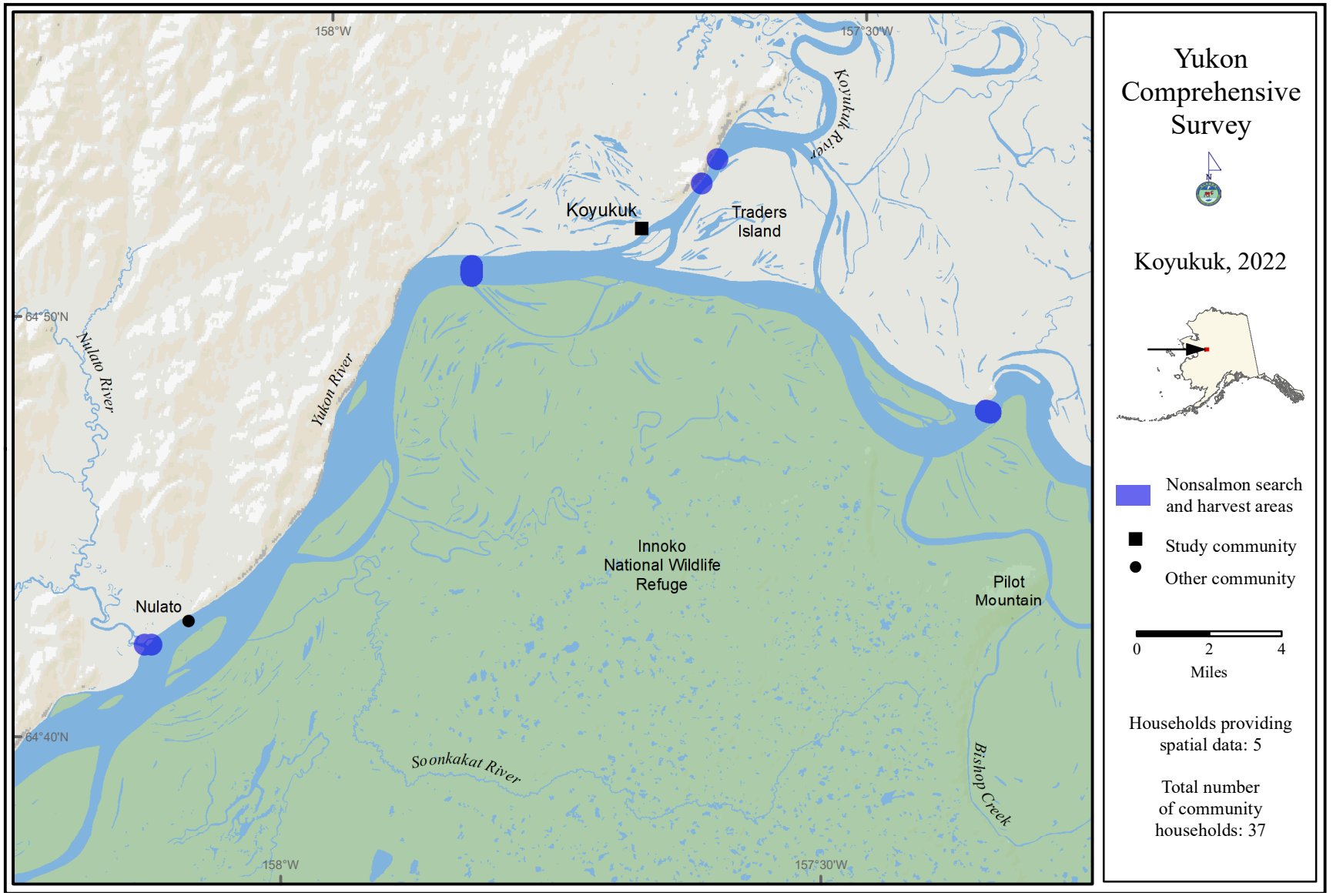
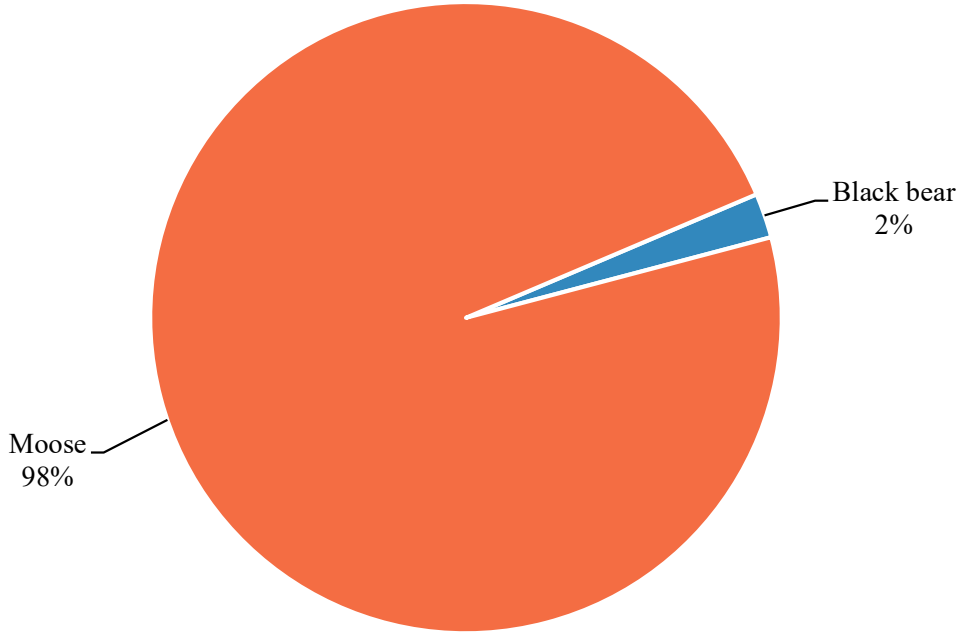


Figure 3-13.–Fishing and harvest locations of nonsalmon fish, Koyukuk, 2022.



Note Species having 0 lb of usable weight are not included

Figure 3-14.–Composition of large land mammal harvest in pounds usable weight, Koyukuk, 2022.

> You have to put spikes in, and go around and stretch it out, and they beat it a lot, ya know, trying to break the muscle apart inside the moose skin, so. Break it. It's a lotta work, that's why I said it's one of my, on my bucket list to tan my own moose hide. 'Cause now it's like almost three thousand dollars for a moose hide. Well, over these past couple years, I've only been able to buy like a quarter section 'cause they charge almost four hundred bucks for a quarter section. [Sigh] So, go and get this skunk wood, they call it skunk wood. When you go out…[go] where the high ridges [are] and there's lotta timber. You go look for that really orange, rotten wood that the ants break down. That's how the moose skin actually get its color. They use that's. If you ever look at the moose skin and you look at that rotten skunk wood, they're the same color. That's what they use to dye it. They'll grind it up finely. And they'll rub it into the moose skin, then smoke it. Then rinse it, then smoke it…That's what they use to, for the color. (04062023KYU03)

Moose signs were first observed on the landscape by local hunters in the 1930s, and moose numbers began to increase during the 1940s and 1950s. This population boom occurred due to increased predator control activities before finally peaking in 1970. Moose densities in the lower Koyukuk and Yukon rivers generally increased until around 1993. There have been fluctuations in moose abundance due to various reasons since 2001 (Stout 2018). In recent years, Koyukuk residents stated the overall trend in the moose population has been in decline on the upper Koyukuk River. Some believed this could be due to sport hunters and their guides taking a large number of moose in too short of a timespan, thus not allowing the population adequate time to successfully recover. One respondent expressed that "it's gotten harder" for local hunters to find and harvest moose, and that the sport hunting guides have "over-hunted it for years" (04062023KYU04). He continued to say,

> I think they said three hundred moose were taken out of there one fall. Two hundred average sometime. That's quite a bit of moose. Bulls. Well, they used to be able to take cows too but not anymore. (04062023KYU04)

Many community members were taught by parents and elders from a young age to not waste and to only take what they need. This principle is applied widely and informs decisions harvesters make regarding the ammunition used to harvest, the proper preservation methods of harvested resources, and the amount of resources harvested (04052023KYU02; 04062023KYU04; 04062023KYU05; 04072023KYU08). One respondent went into detail about how he feels it is his responsibility as an Alaska Native to respect and care for the wildlife and their environment:

> We respect all our animals, we treat it good, we treat it with respect. We take care of it good. We don't abuse 'em, or we don't, no one waste or nothin.' Every animal on this earth that we take around here, even the fish we treat good. Nothing goes to waste…that's the way our people were brought up. It's like the lower forty-eight, the Native Indians. It's the same way. We respect the land, animals, the water. That's what we do up here. Respect the land, animals, the water, the fish. Everything that comes from Mother Earth, because we're caretakers, we're stewards of the land. That's what we're put here for. To take care of it. (04072023KYU08)

This respect paid to an animal does not stop after it has been harvested. Many local hunters believe that if the meat of the animal spoils to the point it cannot be eaten, it is not only wasteful but also disrespectful. The previous respondent went on to explain how he always hunts for moose during cool weather to avoid ruining the meat in the heat:

> We never had those 'frigerators and freezers like we have nowadays. They usually just, we always get our moose in the fall time, late fall. Right before freeze-up and everything. That way it don't spoil with the heat. There's hardly any heat then. Nights are cool. They could crust over and outside, but that thick crust, I guess. And all the inside is just pure, solid, meat. Never get the raw influence. At the age of the outsides. But it's well protected. And it's cold already. (04072023KYU08)

Other hunters who cannot avoid the warm weather opt to shorten their hunting trips by traveling up the river in the morning, planning to be home in the evening. Their goal in this is to get the meat into the freezer as soon as possible, knowing that if they decide to camp for the night after harvesting a moose, they risk losing their meat. One respondent described refusing moose meat from a group of sport hunters because they had spent too much time camping:

> I didn't take any anyway. Some of it's dirty and some of it kinda sour. They stay out there long just campin'…We just have luck right away. But we don't really camp out there with it. If it's hot, we just come right back…If it's cool, we'll still come right back though. 'Cause, maybe don't camp out there though, like, stay around camp, let's drink coffee and enjoy it [laughing]. Like in the pictures in a Cabela's. (04062023KYU04)

According to respondents, climate change is not only affecting hunters' access to moose but is also influencing the timing of the rut. The transition of summer to fall typically brings in cooler weather and therefore signifies to moose that their breeding season is near. Climate change is not only increasing average temperatures but prolonging the end of summer, thus one resident believes it is affecting the life cycles of wildlife that rely on weather patterns to guide crucial behaviors:

> Back then, it [moose rut] was always in late September. Nowadays they say September too. But it's warm now…Some people were telling me that now they even start, they'll start rutting in month of October… [trying to avoid] the warm weather and the seasons. Climate change…They [the moose] couldn't understand why it's still like summertime and [why] that's at their ruttin' season. (04072023KYU08)

The same hunter went on to explain how drastically different winter temperatures used to be in the region:

> Yeah, it was cold, too. It was fifty, sixty below back in the days, then…A lot of different weather back then, then it is nowadays. Today…we don't even have winters now, like we used to have. Winters we used to have, run from November all the way through, probably, even cold in March. Thirty-below, March sometimes, morning, nights. Warm up during the day enough, the sun comes up, though… Sixty below for a few weeks to one month. And then warm 'til about forty below then get up to thirty and say, "Gee, it's getting warm, it's getting warm." And you get twenty-below ya say, "Gee, heat wave" [laughter]. Now, twenty-below, see, it's cold for us. Used to that twenty-above, you know. Winter is really mild nowadays. (04072023KYU08)

Koyukuk residents harvested 16 male moose in September (Table 3-15). This is because the 2022 moose harvest was open from September 1–25 and allowed only one bull collected per permit. However, a few respondents noted that in 2022 there was an emergency order posted under 5AAC 85.045(a)(19) offering another harvest opportunity in March, only for those who did not successfully hunt a moose in the fall (04062023KYU04; 04062023KYU03).[25] Despite this, many respondents preferred to harvest moose in the fall because they were not "in too good of shape" and "cutting frozen meat by myself is not fun…it just takes way too long to cut anything" during the March opener (04062023KYU04; 04062023KYU06).

In 2022, residents harvested a total of 5 black bears which contributed 2% or 197 lb to the total large land mammal edible weight (Table 3-10; Figure 3-14). This could be due to bears being perceived as animals with a powerful spirit or that "there's no more, hardly any more black bears now" due to climate change (04042023KYU01). One woman described how, as a member of the bear clan, she would not eat bear meat:

> We have the eagle clan, the caribou clan, [and] the bear clan. It, for me it's like the bear, it's like our brother. You know, we have these different clans and tribes. And we belong to the bear clan. So, we were raised on bear meat as kids you know. We ate every kind of dish with bear meat. Roast bear meat, fried bear meat. We ate every kind of dish with it. Today I don't eat bear meat. I'll drink the soup, or the broth, but I won't eat bear meat. (04062023KYU05)

Black bears were used by 9% of the community, and all who attempted to harvest them were successful (6%). All households that harvested black bears also harvested moose (Table 3-10). The bears were harvested in the summer, either during July or August (Table 3-15). This could be due to a lack of knowledge of how to hunt them after they have gone into their dens (04042023KYU01). Residents not only use bears for their meat but also render their fat to use as oil to dip meat and fish into when seal oil is unavailable (04062023KYU03). Some people even like to save the bear grease to use as a butter substitute while cooking (04052023KYU02).

Figure 3-15 depicts the search and harvest areas for moose used by Koyukuk households. Moose were primarily searched for and harvested along the Koyukuk River. Residents observed an overall decline in moose abundance along the Koyukuk River; however, residents identified different search and harvest areas, likely based on their hunting patterns. Historically, hunters in Koyukuk and the nearby villages of Kaltag, Nulato, and Galena state that they used to go around 70 to 100 miles up the Koyukuk river to harvest moose in the 1980s–2000s, and did so until high fuel prices restricted lengthy travel in the 2000s–2010s (Stout 2018). Koyukuk respondents agree that they used to travel up to 100 miles upriver; while in recent years, they now have had to travel much farther to search for moose (04062023KYU06; 04072023KYU08; Stout 2018). Some residents scouted for moose up the Yukon River as far as Galena and along Bishop Creek.

25. Alaska Department of Fish and Game, "Hunting and Trapping Emergency Order, 1 March 2022, EO No. 03-02-22," Accessed March 2024, https://www.adfg.alaska.gov/static/applications/publicnotification/2022/orders/03-02-22.pdf.

Table 3-15.–Estimated large land mammal harvests by month and sex, Koyukuk, 2022.

	Estimated harvest by month													
Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	**Total**
Large land mammals	0.0	0.0	0.0	0.0	0.0	0.0	**2.2**	**2.2**	**15.7**	0.0	0.0	0.0	0.0	**20.2**
Black bear	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2	0.0	0.0	0.0	0.0	0.0	**4.5**
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Caribou	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Caribou, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Caribou, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Caribou, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7	0.0	0.0	0.0	0.0	**15.7**
Moose, male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7	0.0	0.0	0.0	0.0	**15.7**
Moose, female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Moose, unknown sex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Common muskox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Dall sheep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**

Source ADF&G Division of Subsistence household surveys, 2023.

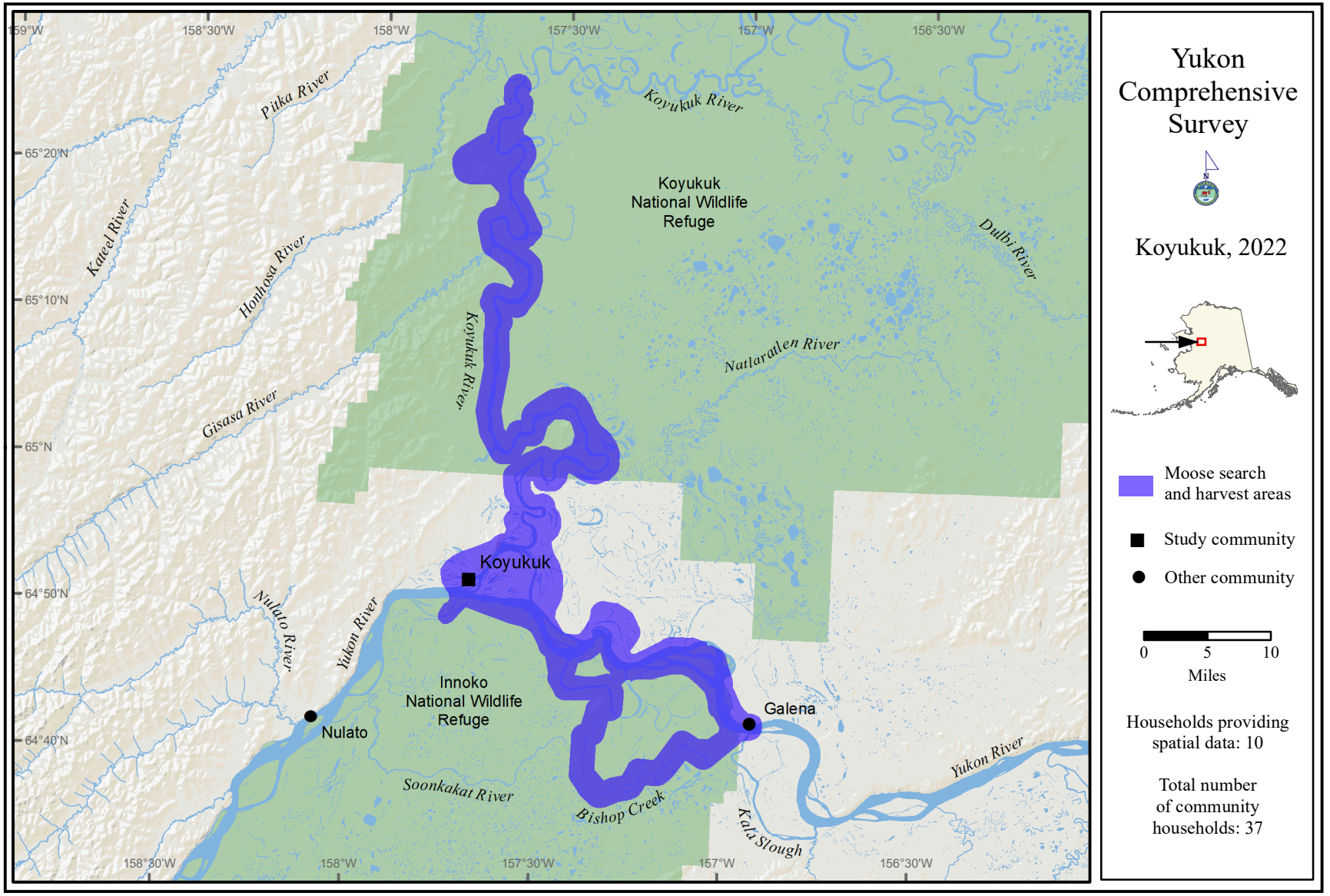


Figure 3-15.–Hunting locations of moose, Koyukuk, 2022.

Small Land Mammals/Furbearers

Trapping in Koyukuk is not as prevalent as it used to be. Historically, people living in rural communities had a higher dependence on subsistence resources and would travel to winter camps to focus on trapping furbearers and collecting firewood to heat their homes. Before moose arrived on the landscape, people primarily depended on small land mammals and birds to provide for their families throughout the winter months (04042023KYU01). While living at winter camp, it was crucial to stay busy and to be efficient. This resident spoke of using dog teams in the past to move about the snowy landscape:

> We lived in camp in the wintertime…everyone lived in camp in the wintertime… But I remember when we lived up there and dad used to go out a lot with the dog team. We didn't have snowmachine back then. So, he used to go out with the dog team and go get dry wood to keep us warm and while he's out there gettin' dry wood, he used to set out marten traps, wolf snares, and beaver snares. So, they were always doin' somethin'. They were always busy tryin' to keep us warm and to feed us. (04052023KYU02)

In the past, when the winter season began to draw near, Koyukuk residents would pack up their entire families and supplies for winter before using dog teams to move to winter settlements. Mushing used to be the primary mode of transportation to and from camps as well as between traplines, but that quickly changed with the introduction of snowmachines due to the convenience they brought to subsistence activities. One respondent stated, "Like it's easy today, you know, because they have, you know, snowmachine and they have, uh, weapons, you know, and, um, it's easier for them to, uh, you know, to get all that stuff" (04052023KYU02). She then went on to describe that although snow machines increased accessibility to wild resources, they lacked the same reliability as dogs: "You can't depend on [a] snowmachine because when it break down, it break down, you have to order parts" (04052023KYU02). Snowmachines may have been convenient, but dog teams were more reliable when out on the trapline.

> I trap all my life with my dad but not anymore. Yeah, now and then, you know. [I] just don't get out much like I used to anymore. Used to trap with dog team all the time. Then I got my first snowmachine, then, I started doing that, but we still had dogs, so. But snowmachines, they don't last forever. Good for three, four, five years, maybe by then. You know, one year—one good year and then you gotta start buying parts—or work, try to keep it running. (04072023KYU08)

Snowmachines are subject to mechanical failure and thus require maintenance and repairs. They can be expensive to maintain and, as the respondent above mentioned, owning one requires a job to afford the cost of maintenance and repairs. In recent years, the value of fur has declined due to low demand, and the cost of trapping has outpaced the profit earned from selling fur. People used to trap the area's furbearers—marten, mink, fox, otters, and wolves in the fall and then beaver from January through March—to bring to the Koyukuk Station to trade (04052023KYU02). Later, Dominic Vernetti's trading post in Koyukuk was so well known that people traveled from all over the Middle Yukon region to sell fur and buy goods there.[26] "That's how people used to make their living" (04072023KYU08). In addition to expensive snow machine parts and meager profits from selling furs, the high cost of gasoline for snowmachines is contributing to the decline in trapping effort (04052023KYU02).

Trapping can be difficult; traps or snares are set deep in the wilderness and must be checked, ideally, once per day. If traveling by snowmachine, the trips may be quicker but carry a higher risk of getting stuck in deep snow, hence many do not like to trap alone. Older trappers may lack the necessary physical capabilities to trap alone. Many seasoned Koyukuk trappers are struggling to motivate youth to join them in their trapping efforts, leading to a loss of generational learning and a decrease in participation by knowledgeable trappers.

26. Jesse Coleman, ADF&G Subsistence Resource Specialist, field notes, April 7, 2023.

> I think we're getting older, and our body is getting slower. And if we fall down, it's hard for us to get back up. See. And there's too many of us like that here but, we're not accept—we're not accepting it and we're not—We don't wanna accept it. Because nobody is steppin', no young people is stepping up to the plate to say, "Oh, okay." 'Cause even my, even my brother…he's having hard time to get somebody in our family to go over to our trappings spots…He's having hard time, getting his boys and getting my son to go with him and to take over. 'Cause he can't do it anymore…And so—If they [youth] follow him and then if they start doin' it. And then it could get passed on, but they're not doing it. They're, too much into, they wanna play a game or they have too much other things that, at home that's more important for them to go out there on the land. (04052023KYU02)

Despite being the lowest resource category harvested (15%), small land mammals were used by almost 40% of Koyukuk households. Twenty-four percent received, while 21% of households gave some of their beaver harvests away (Table 3-10). Small land mammals can provide both a source of food and fur for households in Koyukuk. However, out of all the small land mammals that were harvested for fur, only beaver was also eaten (Table 3-16). Of the total beavers harvested, 4% were not eaten and were used for fur only (Table 3-16). Beavers were the sole small land mammal that contributed to the harvested edible weight of 1,121 lb (16 lb per capita; Table 3-10).[27] A total of 61 beavers were harvested, comprising 96% of the entire small land mammal harvest (Table 3-10; Figure 3-16). Residents not only regularly include beavers in their diets but also consider them delicacies for potlatch memorials among other wild foods (04062023KYU03). Koyukuk residents harvested the majority of their beavers in January (27) and March (29) when their pelts are prime and trapping effort is highest (Table 3-17). Beaver fur was once used for bedding and is more commonly used today for hats and mittens due to its extreme warmth and natural water-repellent properties (04062023KYU05).

In 2022, 3% of Koyukuk households harvested two wolves. Both wolves were harvested in December, likely because wolves are not eaten but instead trapped for their thick winter coats (Table 3-10; Table 3-17). Wolf fur is commonly used to make ruffs on parkas and given as treasured gifts during potlatches (04062023KYU03; 04062023KYU04; 04072023KYU08). Both wolves that were harvested were given away to members of another community (3%) because no wolves were reported received in Koyukuk (Table 3-10). All households that attempted to harvest wolves were successful (Table 3-10); although, it is uncertain how each wolf was harvested. One respondent explained his success with using snares instead of other traps for wolves:

> Well, we snared this one. 'Cause we were on a moose kill…You can trap them too…But mostly snares. I know people who have used mostly snares…'Cause they kill them, and traps hold 'em, ya know. And if you're not able to check the trap in time [the wolf could get loose]. (04062023KYU04)

Snares, foot-hold traps, and body-grip traps are all employed in the trapping of wolves. Foot-hold traps are often tied to a "drag" made of a log or other weight to slow the animal's escape while still depriving it of the leverage needed to break free of the trap. Snares will likely prove lethal to an animal if caught around its neck, while a body-grip trap relies on the compression of the animal's head, neck, or torso to be effective. Yet, any of these methods can allow for the animal to free itself if captured only by the foot or leg.

In 2022, respondents reported no wolverines were harvested; wolverines are culturally revered and treated with the utmost respect.

> Those animals are very spiritual. It's like they're the king of the animals up around here, anyway. They…call them doyonh, Native word. Means they're king of the forest, king of the animals…We respect that animal very much. You know, if you catch 'em and you bring 'em home that night, you haul them home. Or even if

27. Resources that are not eaten, such as firewood and some furbearers, are included in the table but are assigned a conversion factor of zero.

Table 3-16.–Estimated small land mammal/furbearer harvests for fur and food only, Koyukuk, 2022.

	Estimated		Fur only		
Resource	Amount	Pounds	Amount	% of resource	% of small land mammals
Small land mammals	62.8	1,121.2	4.5	7%	7%
Beaver	60.5	1,121.2	2.2	4%	4%
Arctic fox	0.0	0.0	0.0	0%	0%
Red fox	0.0	0.0	0.0	0%	0%
Snowshoe hare	0.0	0.0	0.0	0%	0%
Lynx	0.0	0.0	0.0	0%	0%
Martens	0.0	0.0	0.0	0%	0%
Muskrat	0.0	0.0	0.0	0%	0%
Porcupine	0.0	0.0	0.0	0%	0%
Gray wolf	2.2	0.0	2.2	100%	4%
Wolverine	0.0	0.0	0.0	0%	0%

Source ADF&G Division of Subsistence, household surveys, 2023.

Note Amounts are in individual animals.

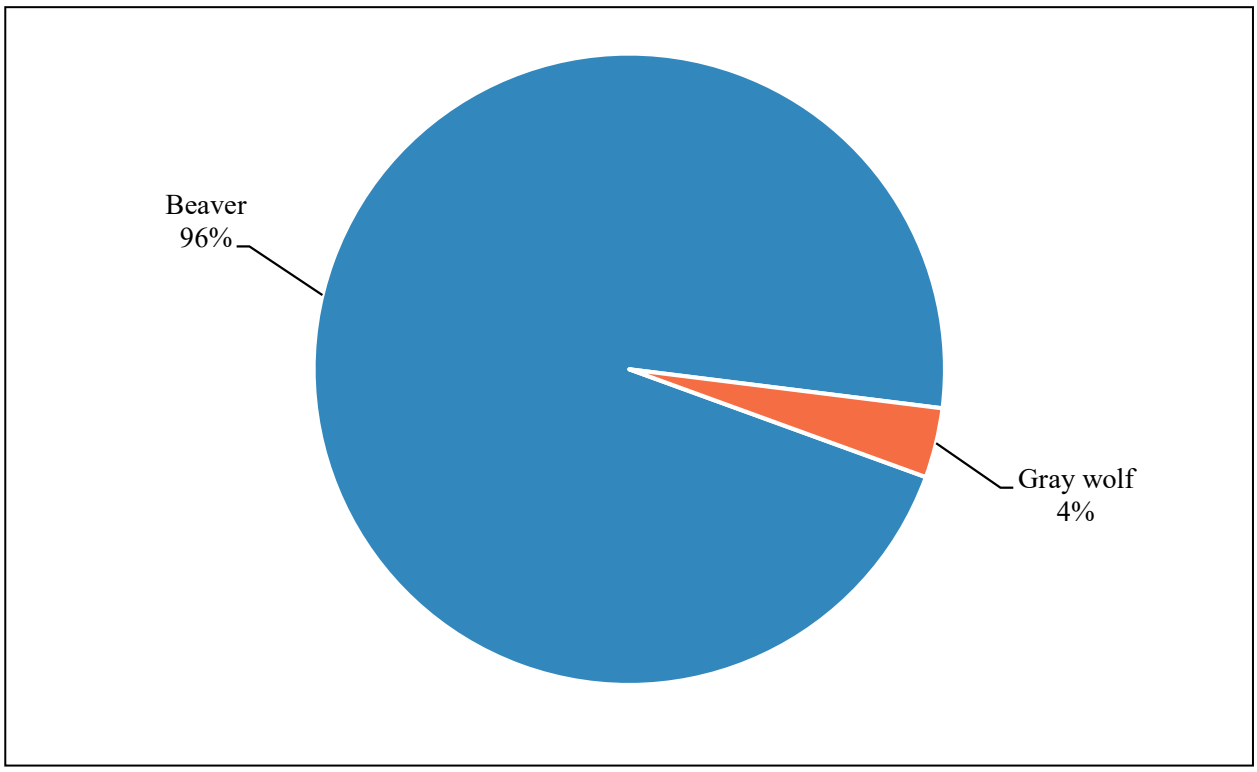


Figure 3-16.–Composition of small land mammal harvest in individual animals, Koyukuk, 2022.

Table 3-17.–Estimated small land mammal/furbearer harvests by month, Koyukuk, 2022.

Resource	Estimated harvest by month													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk	Total
Small land mammals	**26.9**	0.0	**29.2**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**4.5**	**2.2**	0.0	**62.8**
Beaver	26.9	0.0	29.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	**60.5**
Arctic fox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red fox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Snowshoe hare	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Lynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Martens	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Muskrat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Porcupine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Gray wolf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	**2.2**
Wolverine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**

Source ADF&G Division of Subsistence household surveys, 2023.

> you're draggin' or carryin' it home. You haul it, its Native word, doyonh ahus. Meanin,' big chief comin' into town. He's the chief of the animals…So, every time we would ever catch that animal, we would bring it in like that, even if you were out at camp or something…the tradition is that you put fish in their mouths and then they fool around, buy little snacks like cookies, crackers and stuff like that. It's like a little potlatch, sort of. Same thing. They do that to all the…wolverines they catch. (04072023KYU08)

Koyukuk residents did not harvest any marten in 2022; however, one respondent did describe the method of baiting and trapping marten:

> For marten we use any kind of bait. Same as marten urine, nowadays. Buy it from stores. Back in the days we used to use fishing stuff— fish skins. They'd still have that tainted smell to it, ya know. And a lot of people used, take the brains out of the moose head. And they let it sour, and they used that for baits, too. It was pretty, very effective, that one, you see. They [could also] just get that rabbit skin, rub it in there and then rub it on trees here and there. It usually track 'em right in. A lot of people use fish skin and fish. Stuff like that. (04072023KYU08)

Both snowshoe hare and marten were used and received by 3% of households, likely from outside the community because no Koyukuk residents reported giving either away (Table 3-10). It is uncertain whether these small mammals were used as food or for their skin; however, marten skin has been commonly tanned by women in the past (04052023KYU02; 04062023KYU03).

Although respondents in Koyukuk were asked about where they harvested small land mammals in 2022, due to a small sample size, those results are not reported here to protect respondents' identities.

Marine Mammals

Koyukuk residents did not harvest any marine mammals in 2022. However, some households did use marine mammal resources that they received from family or friends in coastal communities that did harvest them. In 2022, 30% of households used and received marine mammal products such as unspecified seals (seal oil; 12%), beluga whale (6%), bowhead whale (12%), and muktuk (unspecified whales; 15%). Half (15%) of the percentage of households that received (30%) marine mammals gave a portion of it away (Table 3-10). Although Koyukuk is isolated from the ocean, residents value marine mammal resources to supplement their locally available wild foods. Koyukuk residents often dip dried fish and meat into seal oil, which has become a favored part of this Interior community's culture due to years of trading and bartering with coastal communities (04062023KYU03).

Because marine mammals were not harvested by Koyukuk residents in 2022, no harvest location figure was prepared.

Birds and Eggs

Birds and eggs were used by 64% of Koyukuk residents; however, no eggs were used, and this was the only resource category where everyone who attempted to harvest (24%) was successful (Table 3-10). This could indicate residents' skill level or the accessibility to various gear options used to harvest these resources. Birds are commonly shot with guns but have also been harvested with old fishing nets as one resident described:

> Some people used to even use fishnets, like over on the sandbar where you have a lot of waves about that big. A lot of ptarmigans in those kinds of places. Instead of huntin' them, they'd put a little old net, regular ol' net that they don't use no more. They… net 'em like that sometimes. They get [tied] up, and they go over, wring their neck, and bring 'em home…Most people like to hunt 'em with a twenty-two or four-ten shotguns. …They had means of getting the means. They always had the means for gettin' it. (04072023KYU08)

Many residents own noncompliant fishing nets which were once used to harvest salmon or nonsalmon fish. As those old nets gather dust in storage, some found ways to repurpose their valuable gear to avoid being wasteful. The above respondent explained that in the past ptarmigan, spruce grouse, and willow grouse were all sources of food: "Back in the days, I never did eat nothin' out of the stores. Everything came off my supermarket out in my backyard" (04072023KYU08).

When harvested, birds are shared widely within Koyukuk; over half of households (52%) received birds while 33% gave them away. One respondent described that hunters would, "Come back with couple sleds full, and they just go through town droppin' thr—ya know, how much the homeowner wants. Yeah, so it's shared" (04062023KYU03). Although no eggs were utilized or harvested in 2022, one respondent shared an early childhood memory about his family's egg use:

> I remember my dad; he brought a couple of eggs home from cranes. You know, big, sandhill cranes. There were huge ones, like that. Feeds one whole family…one egg… He would bring a couple home, like that. (04072023KYU08)

Out of the 10 different species of birds used, the unspecified Canada/cackling geese (42%), greater white-fronted geese (39%), and spruce grouse (30%) were utilized the most. Ptarmigan, emperor geese, and northern shovelers were all three received rather than harvested by Koyukuk households.

The total harvested weight of birds was 277 lb, equating to 4 lb per person. Figure 3-17 demonstrates how greater white-fronted geese (31%), unspecified Canada/cackling geese (23%), and mallard ducks (17%) made up the most pounds of edible weight due to their respective sizes. Species such as the spruce grouse, northern pintail, white-winged scoter, and American wigeon composed 15% or less of the total harvested weight.

The prime time to harvest birds is in the spring just before ice breakup; however, this is a very dangerous time to travel on ice. Many hunters wear life jackets on snowmachines and travel up the Koyukuk River together, in case they fall through the ice (04062023KYU03; Plate 3-1). One respondent mentioned a way

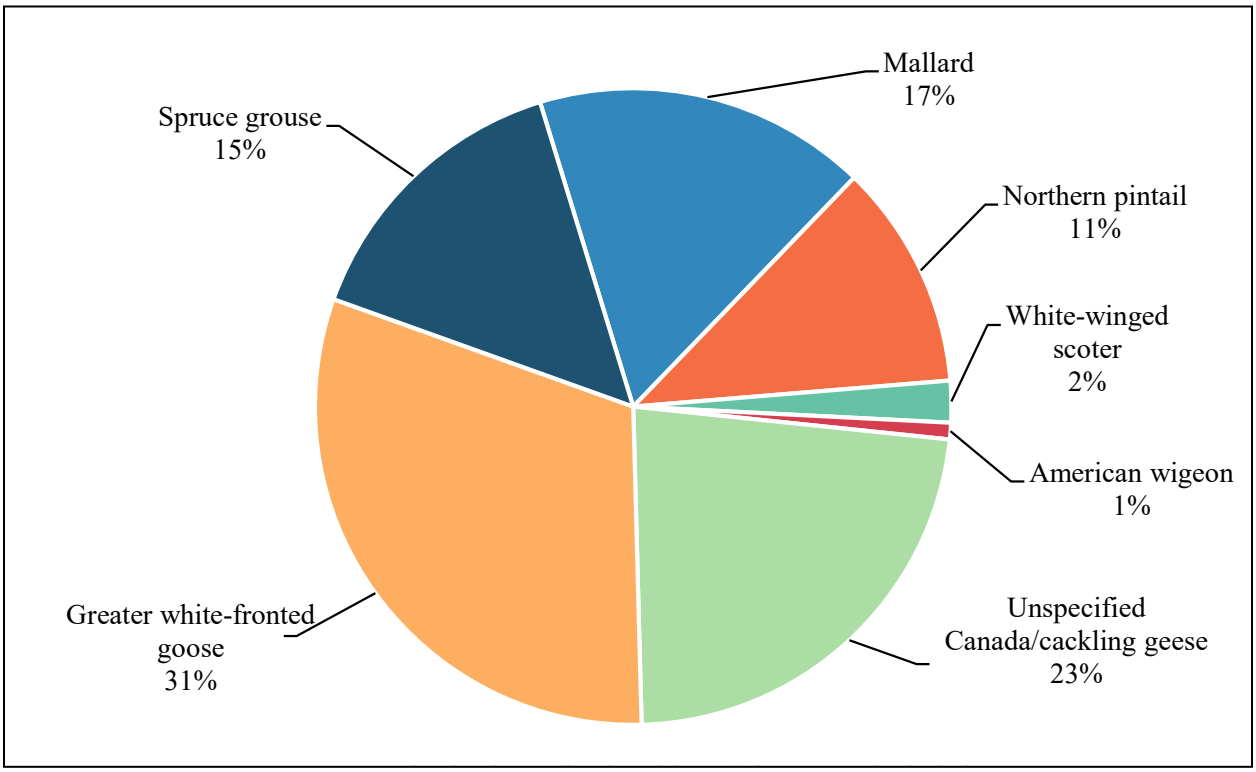


Figure 3-17.–Composition of bird and bird egg harvest in pounds usable weight, Koyukuk, 2022.

Plate 3-8.–Snow machine trail on the Koyukuk River. © ADF&G. Photo by Jesse Coleman.

to avoid weak ice at the start of a hunting trip by stating, "you could go early," so that you and the geese arrive at the hunting ground as the ice is beginning to melt. However, after a few days of camping, "The trouble [is] gettin' back…within a couple days it [the ice] turn pretty, pretty rotten" (04062023KYU04). Even if residents avoid dangerous ice at the beginning of their trip, the ice is not likely to remain strong for the duration of a bird hunt camping trip, so hunters must practice vigilance while traveling. Of all harvested birds (158), the most (108) were harvested during the spring and no birds were harvested during the winter in 2022. Two white-winged scoters and 42 spruce grouse were harvested in the fall, while spruce grouse (7) were the only birds harvested in the summer (Table 3-18).

Most ducks and geese were harvested in two locations near Koyukuk: a small area across the Yukon River from Koyukuk and within Kaiyuh Flats, as well as a larger area just east and adjacent to the community within the first 10 miles of the Koyukuk River. The last area residents searched for and harvested these birds from was along the Koyukuk River approximately 50 air miles from the river's mouth within the KNWR (Figure 3-18).

Marine Invertebrates

No surveyed households reported using or attempting to harvest any marine invertebrates in 2022 (Table 3-10). Because Koyukuk residents did not harvest marine invertebrates in 2022, no harvest location figure was prepared.

Table 3-18.–Estimated bird harvests by season, Koyukuk, 2022.

Resource	Spring	Summer	Fall	Winter	Season unknown	**Total**
All birds	**107.6**	**6.7**	**43.7**	**0.0**	**0.0**	**158.1**
Bufflehead	0.0	0.0	0.0	0.0	0.0	**0.0**
Unspecified eiders	0.0	0.0	0.0	0.0	0.0	**0.0**
Unspecified goldeneyes	0.0	0.0	0.0	0.0	0.0	**0.0**
Mallard	29.2	0.0	0.0	0.0	0.0	29.2
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0
Northern pintail	26.9	0.0	0.0	0.0	0.0	26.9
Black scoter	0.0	0.0	0.0	0.0	0.0	0.0
White-winged scoter	0.0	0.0	2.2	0.0	0.0	2.2
Unspecified scoters	0.0	0.0	0.0	0.0	0.0	0.0
Northern shoveler	0.0	0.0	0.0	0.0	0.0	0.0
Unspecified teals	0.0	0.0	0.0	0.0	0.0	0.0
American wigeon	2.2	0.0	0.0	0.0	0.0	2.2
Unspecified Canada/cackling geese	22.4	0.0	0.0	0.0	0.0	22.4
Emperor goose	0.0	0.0	0.0	0.0	0.0	0.0
Snow goose	0.0	0.0	0.0	0.0	0.0	0.0
Greater white-fronted goose	26.9	0.0	0.0	0.0	0.0	26.9
Unspecified swans	0.0	0.0	0.0	0.0	0.0	0.0
Unspecified loons	0.0	0.0	0.0	0.0	0.0	0.0
Spruce grouse	0.0	6.7	41.5	0.0	0.0	48.2
Sharp-tailed grouse	0.0	0.0	0.0	0.0	0.0	0.0
Ruffed grouse	0.0	0.0	0.0	0.0	0.0	0.0
Ptarmigans	0.0	0.0	0.0	0.0	0.0	0.0

Source ADF&G Division of Subsistence household surveys, 2023.

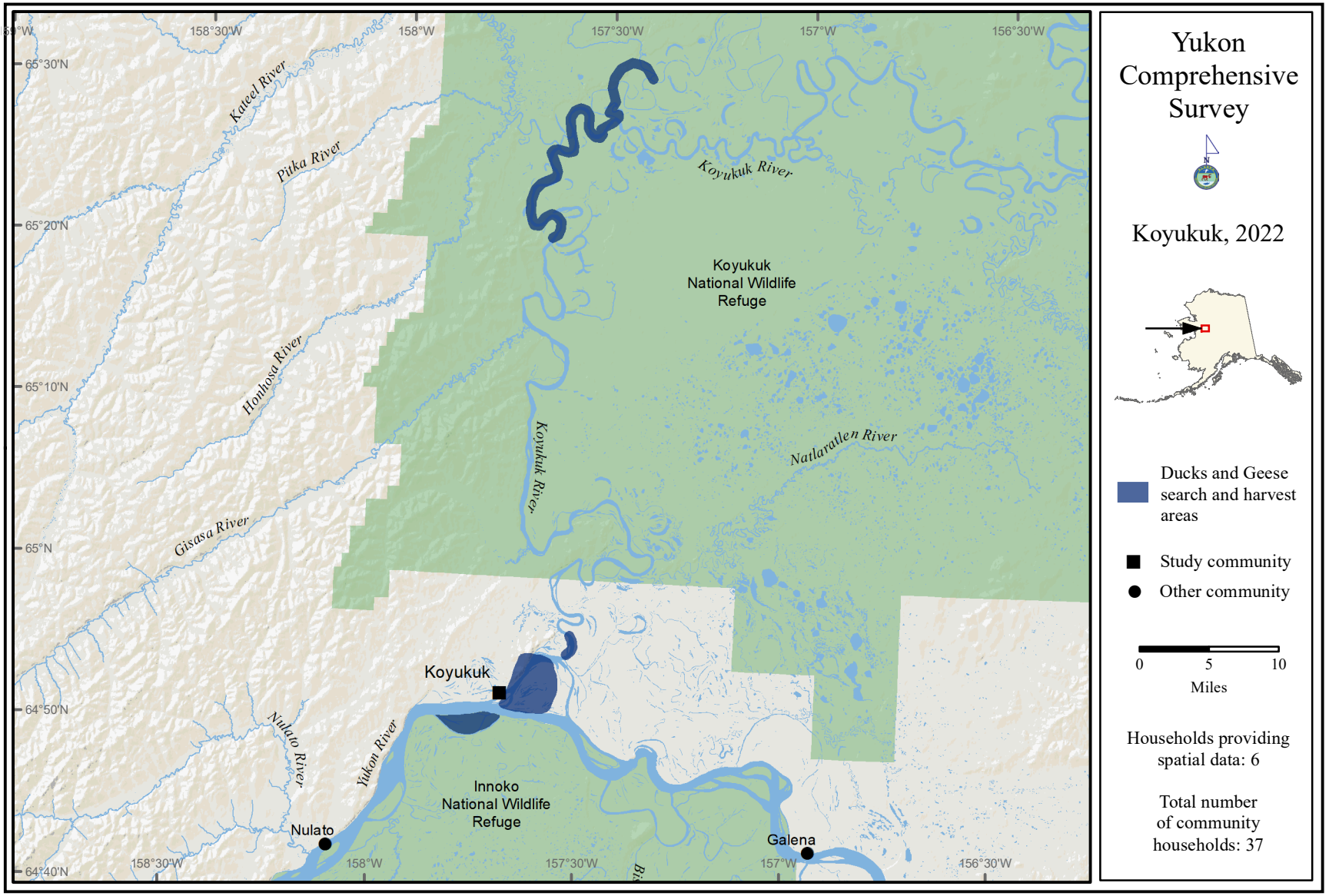


Figure 3-18.–Hunting and harvest locations of birds, Koyukuk, 2022.

Vegetation

Many Koyukuk residents use (64%) and harvest (46%) vegetation such as berries, plants, fungi, and firewood for subsistence (Table 3-10). In 2022, vegetation was the resource that was harvested by most households in Koyukuk likely because it is one of the simplest subsistence resources to collect by residents of all ages except for those inhibited by their health.[28,29] Additionally, no special tools, gear, or extensive knowledge is needed to harvest most plants, which lowers the barrier to participation. The attempt to harvest vegetation was slightly higher (52%) than the percentage of households who successfully harvested (46%). This is likely due in part to the inability of gatherers to locate a species while they searched the landscape. Most foragers returned to areas where a specific plant was abundant in the past; however, residents cited climate change as negatively affecting the growing season of moisture-dependent berries, further inhibiting residents from finding healthy plants.

> It seem like we're goin' further and further away for berries. We have beautiful summers here, but I have to say we get extreme heat…The berries will do good, May and middle of June until the extreme heat come out. And it, all the sudden, they're just dried up. (04062023KYU03)

Although it is probable that climate change and the increasingly warmer weather are causing berries to dry up more quickly than is considered normal, one survey respondent recalled in their comments that a good berry season occurs approximately every five years, depending on the amount of sun and rain the area receives. It is possible that 2022 could have been a poor berry harvesting year due to extreme heat and little precipitation.

The total edible vegetation harvest amounted to 234 lb (3 lb per capita), and, although it was a particularly warm and dry season, the 2022 harvest was still composed of mostly berries (96%) and only 4% of other plants and greens (Figure 3-19; Table 3-10). Of the five types of berries used in Koyukuk, residents harvested highbush cranberries (24%), raspberries (18%), and blueberries (18%) the most; the total harvested weight of each was 101 lb, 56 lb, and 37 lb, respectively. Koyukuk households widely shared berries.

Foraging for vegetation is capable of reminding individuals of a time of simplicity before the advent of technology and grocery stores. One ethnographic respondent explained his fondness for the accessibility of fresh wild berries:

> When I grew up, we didn't have no lights like this, you know, with candle or kerosene lantern, or stuff like that, gasoline lamps. The only kinda stove we had was the Yukon stove or tank stove. Not stove like this or nothin' like this. No 'fridgerators. No, nothin'. Everything was just, prehistoric tools…we made things work. Made everything do, survived…People just [went] out and [got] berries. Pick[ed] berries full, blueberries and cranberries, raspberries, every kind of berries you can get. High bush, low bush cranberries, salmonberries. Every berry you can pick around here or you can find and preserve 'em for the winter. It was the food pick first, fresh food in our own backyards. (04072023KYU08)

The same man explained how wild plants and vegetation provide a wide variety of nutrients that help to keep people mentally and physically healthy. He believed that the improper disposal of toxic waste at White Alice Communications System sites, located on the nearby Indian and Granite Mountains, had caused the waste to leak into his people's wild foods, thereby increasing the risk of cancer and suicides.

> Lotta natural nutrients in there that, back in the days, we never had such things… [like] suicides. No such things as cancer. All that stuff has come into light now because of all the toxin materials that they waste, and they buried all of them in lands. And [where] they have contact with the animals and everythin' else. The [toxins] drains into the water and the people eat the animals, and the fish, and

28. ADF&G Division of Subsistence household surveys, 2023.
29. ADF&G Division of Subsistence household surveys, 2023.

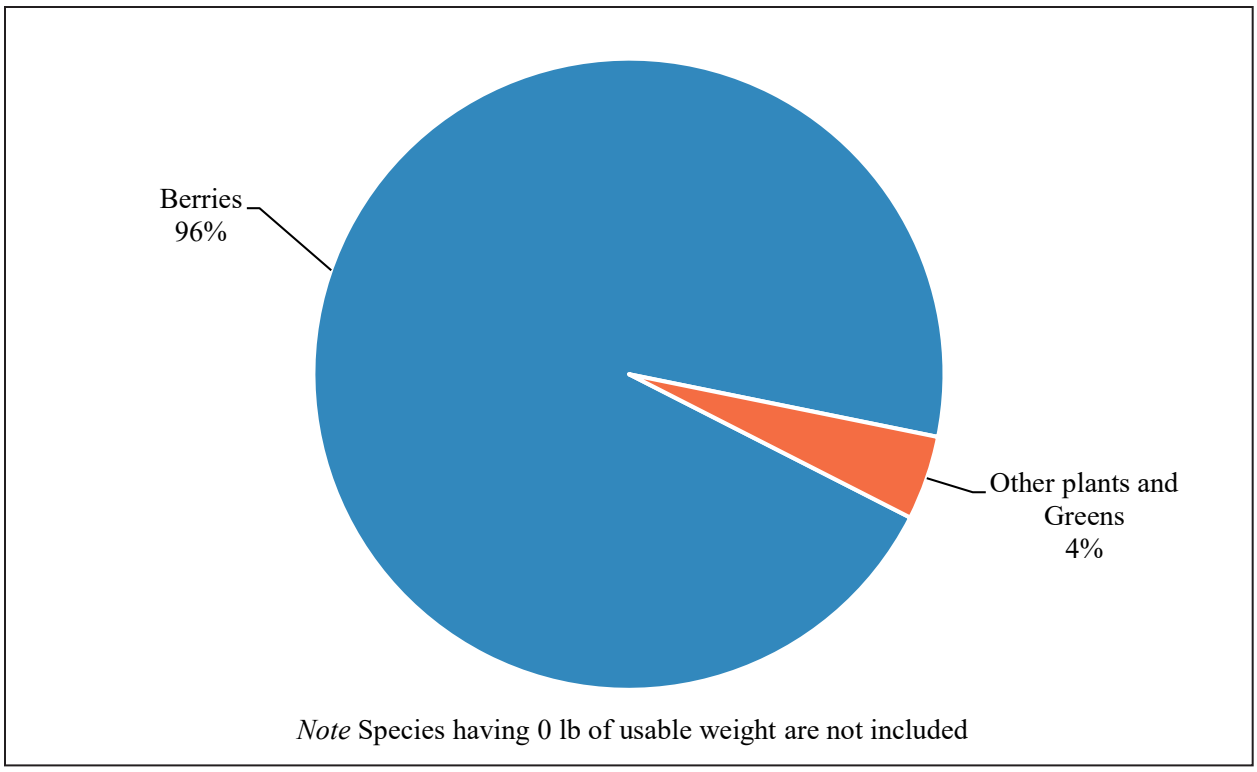


Figure 3-19.–Composition of vegetation harvest by type in pounds usable weight, Koyukuk, 2022.

> stuff and the berries, and whatnot…And they bond there, and take some of that toxic chemicals in [them]…Destroy, destroyed our ecosystem. That's where all this cancer stuff came 'bout. (04072023KYU08)

When free from toxins, some vegetation such as stinkweed and labrador tea serve medicinal purposes when ingested. One woman described just how good the aforementioned plants are to the human body when harvested before flowering:

> There's a lot of medicine in that plant that'll help your kidneys. It cleanses your body…Antioxidants...it's like very healthy for you. Another plant is…stinkweed. We use that as a medicinal use which I get early spring when there's maybe, I don't pick 'em after they flower. Because they don't have the medic—just like the Labrador tea. I won't bother with them after they get the white flowers on them… basically like springtime, we can harvest. (04062023KYU03)

Koyukuk households successfully harvested 4 lb of Labrador tea (6%), 5 lb of wild rose hips (3%), 2 lb of wild potato (3%), 1 gallon of stinkweed (3%), and 22 gallons of punk—a fungus containing natural mosquito repelling properties when burnt (6%; 04062023KYU06; Table 3-10).

Wood was gathered and used for heating homes and smoking salmon. Although some homes have switched to heating systems that use liquid fuel, most homes still depend on firewood as fuel to heat their homes. There were 8 households, or 24%, that used firewood to provide 100% of their home heating in 2022, 7 households (21%) that used firewood to meet the vast majority (76–99%) of their fuel needs for heating, and 4 households (12%) used wood as the majority of (51–75%) their fuel used for heating (Table 3-19). In the past, Koyukuk residents would travel with their families to gather sometimes up to 15 cords of wood that they would lash together to bring back to their winter homes (04052023KYU02; 04062023KYU05). Only 5 homes did not use firewood to heat their homes in 2022 (Table 3-19).

Cottonwood is mostly harvested for smoking salmon and can also be used to keep flies away, however not all cottonwood trees burn the same (04062023KYU06). Those collecting cottonwood for smoking must know whether the wood they gather is either dead and dry or green and wet, for each has a different effect on the drying salmon.

> We don't use any other kinda wood but a certain kinda wood and that's called the…cottonwood. And, we don't go, just cut down any kinda cottonwood. I mean they'll keep growin', you'll see branches on there. But we only get the standing dry. Because that will provide heat and it's basically, we'll use that one in the fall time for silvers. You wanna get it mild, not too dry in July for the sil—king salmon because it's already enough heat. Don't wanna cook your fish hanging in there. So, we'll, the standing dry will be for like silvers and then we get the semi-dry wood for the king salmon. It [wetter wood] doesn't burn as fast, but it provides a lotta smoke because we need that smoke to preserve, it's [king salmon] way oilier. (04062023KYU03)

Table 3-19.–Use of firewood for home heating, Koyukuk, 2022.

	Households reporting	
Percent of home heating from wood	Number	Percentage
Sampled households	33	
No use of firewood	5	15.2%
1–25%	2	6.1%
26–50%	7	21.2%
51–75%	4	12.1%
76–99%	7	21.2%
100%	8	24.2%
Missing	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2023.

In 2022, Koyukuk residents searched for and harvested berries and greens in multiple locations. The first location was around the lakes and ponds directly behind the community, while another area was just west of Nulato and east of the Nulato River. However, the two largest areas residents searched for and collected these resources were located first, within the INWR situated halfway between Koyukuk and Galena and, second, within the KNWR east of the Koyukuk River. Residents also searched for and gathered berries and greens in various other smaller areas along the Koyukuk River (Figure 3-20).

Figure 3-21 displays the areas where Koyukuk residents searched and harvested firewood in 2022. Most residents collected firewood along the Koyukuk River, as far north as where the river joins the Honhosa River, while some residents harvested in areas adjacent to the community.

Food Security

Survey respondents were asked a set of questions intended to assess their household's food security, defined as, "access by all people at all times to enough food for an active, healthy life" (Coleman-Jensen et al. 2020). The food security questions were modeled after those developed by the USDA but modified by ADF&G to account for differences in access to subsistence and store-bought foods. Based on their responses to these questions, households were broadly categorized as being food secure or food insecure following a USDA protocol (Bickel et al. 2000). Food secure households were broken down further into two subcategories—high or marginal food security. Food insecure households were divided into two subcategories—low food security or very low food security.

Households in the high food security category did not report any food access problems or limitations. Households in the marginal food security category reported one or two instances of food access problems or limitations—typically anxiety over food sufficiency or a shortage of particular foods in the house—but gave little or no indication of changes in diets or food intake. Households in the low food security category reported reduced quality, variety, or desirability of their diet, but they, too, gave little indication of reduced food intake. Households classified as having very low food security were those that reported multiple instances of disrupted eating patterns and reduced food intake (Coleman-Jensen et al. 2020).

Table 3-20 shows by percentage of sampled households the assessment results regarding eating desired types of food during the study year. Over half of the respondents (76%) reported that they had enough food

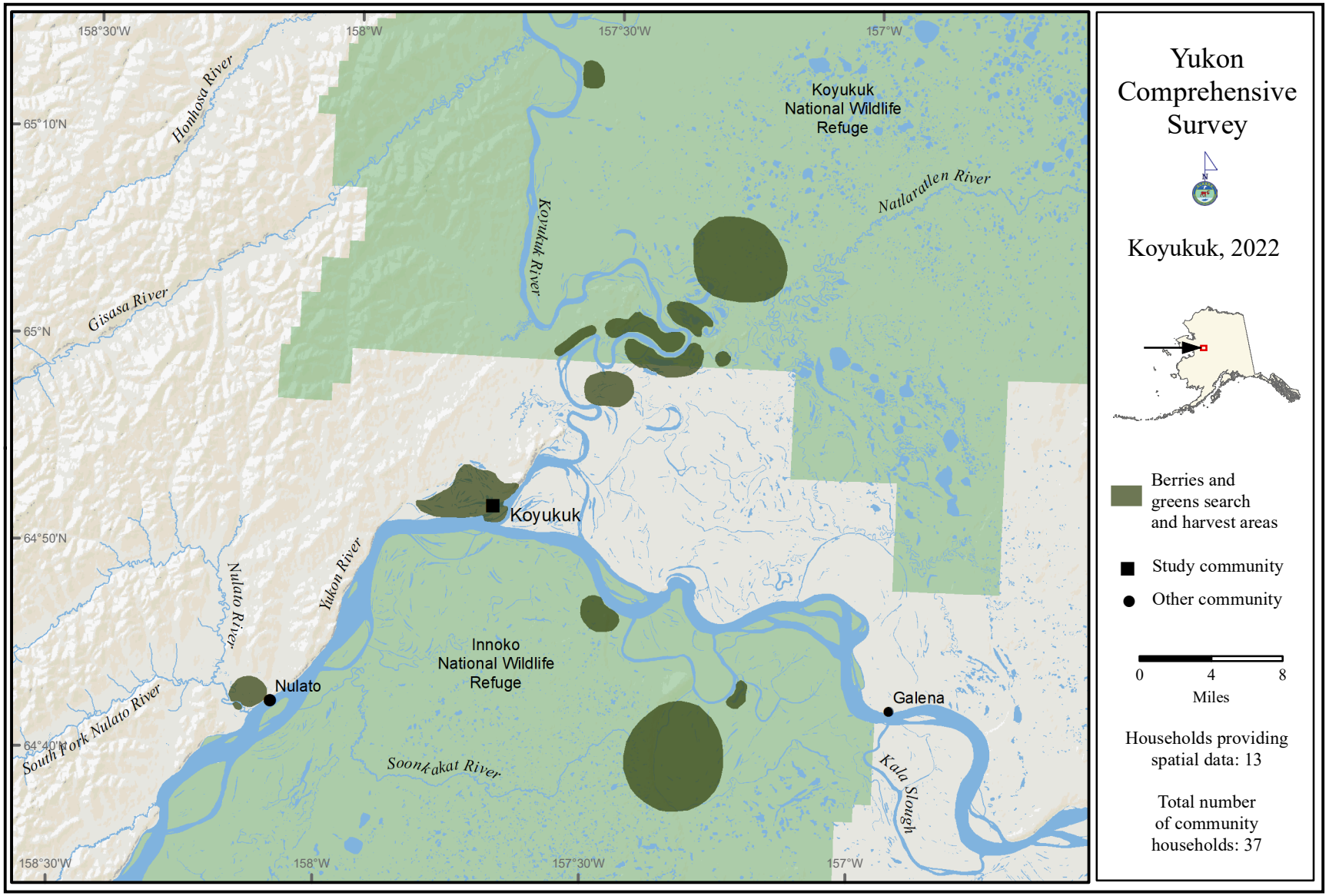


Figure 3-20.–Gathering and harvest locations of berries and greens, Koyukuk, 2022.

Figure 3-21.–Gathering and harvest locations of firewood, Koyukuk, 2022.

but not the kinds of food they wanted to eat, while 15% reported they did have enough of the kinds of food they wanted to eat. Only 6% of sampled households claimed they sometimes or often did not have enough food.

Table 3-20.–Households' assessments of food security conditions, Koyukuk, 2022.

Statement	Percentage of sampled households
Had enough of the kinds of foods desired	15.2%
Had enough food, but not the desired kind	75.8%
Sometimes, or often, did not have enough food	6.1%

Source ADF&G Division of Subsistence household surveys, 2023.

Core questions and responses from Koyukuk households who responded that they did not have enough of the kinds of food they wanted to eat are summarized in Figure 3-22. Roughly one quarter (24%) of households worried that they would not have enough food and 58% of residents indicated they lacked the resources to obtain enough food. Some households indicated that both their store-bought foods and subsistence foods did not last; however, significantly more households (49%) reported that their subsistence foods did not last, than those (21%) that had run out of store-bought foods. Almost 20% of respondents ate less food than they felt they should in 2022, while 13% stated they lost weight due to not having enough available food. Only 3% of respondents were occasionally hungry and did not eat, and the same percentage reported not eating for an entire day due to the lack of food.

Food security results for surveys for Koyukuk, the state of Alaska, and the United States are summarized in Figure 3-23. Koyukuk households (79%) were less secure than both the state of Alaska (86%) and the United States (82%) in 2022. Koyukuk also had the highest percentage of households that experienced low food security (18%), while only 10% reported low food security in the rest of the state, and 13% in the United States. However, only 3% of households were considered to have very low food security, as compared to 4% for the rest of Alaska and 5% for the U.S.

Figure 3-24 portrays the mean number of food insecure conditions per household by food security category by month. As discussed previously, subsistence harvests occur year-round based on the seasonal availability of wild resources. The availability of wild resources fluctuates throughout the year and may affect the month-to-month food security of households participating in subsistence activities. Households with high and marginal food security (shown in blue) did not experience many fluctuations throughout the year and reported less than 1 food insecure condition in any given month. Households with very low food security (shown in green) reported an average of 8 of the 9 food insecure conditions every month of the year in 2022. These data points likely reflect only a few households that were insecure to this degree all year long. Low food-secure households (shown in orange) experienced the greatest fluctuation throughout the year. There were households with at least one insecure condition during all months of the year. However, during the summer months, June through September, households reported an average of 2 or 3 insecure conditions. This was likely due to the inability to fish for salmon during their migration spawning runs that occur during these months. In December, January, March, and April, households reported an average of almost 2 insecure conditions. Wild resources become less available during the winter, and residents need to spend more money on heating their homes. This, along with limited seasonal employment opportunities, may all contribute to affecting households with low food security more so than those that are food secure.

Figure 3-25 shows in which months households reported foods not lasting. In each month of the year, more households reported running out of subsistence foods (shown in green) than store-bought foods. The highest percentage of households ran out of subsistence foods in the summer months of June, July, and August; the same months when low food secure households felt the most food insecure. Store-bought foods (shown in orange) lasted most of the year; however, in January and December, a little over 10% of households reported their store-bought foods not lasting.

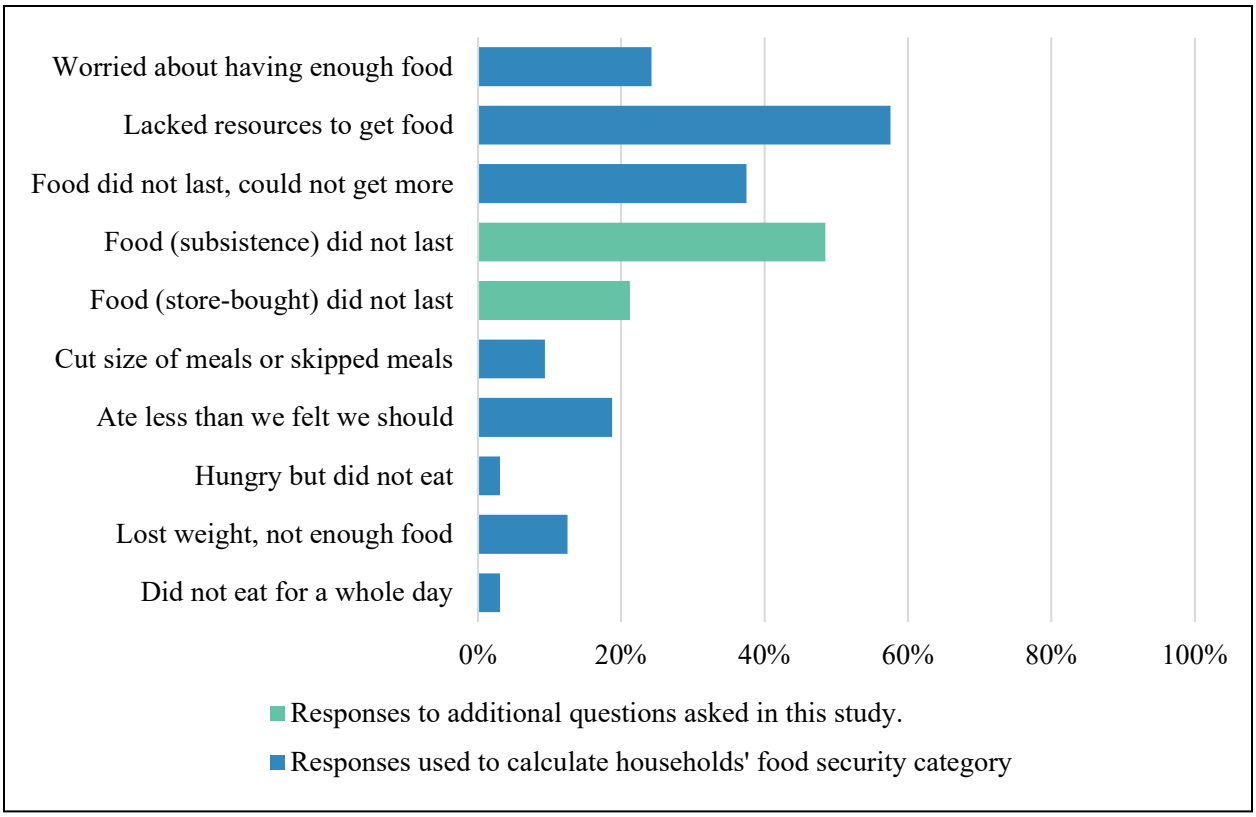


Figure 3-22.–Responses to questions about food insecure conditions, Koyukuk, 2022.

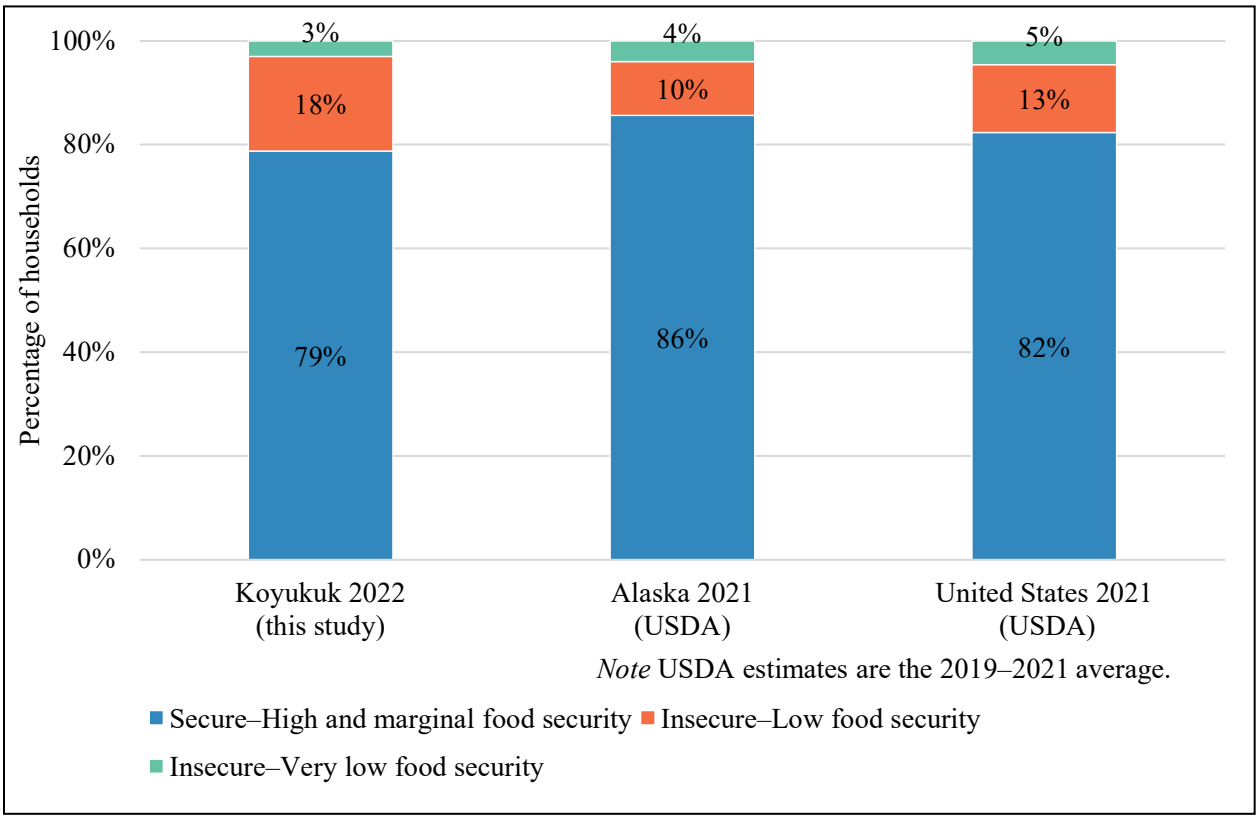


Figure 3-23.–Comparison of food security categories, Koyukuk, Alaska, and United States, 2022.

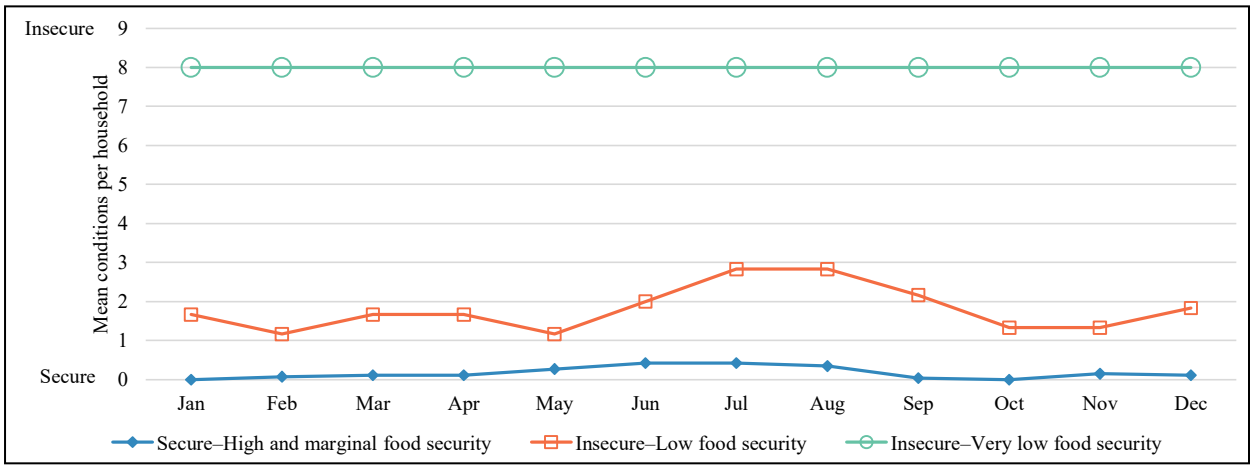


Figure 3-25.–Mean number of food insecure conditions by month and by household food security category, Koyukuk, 2022.

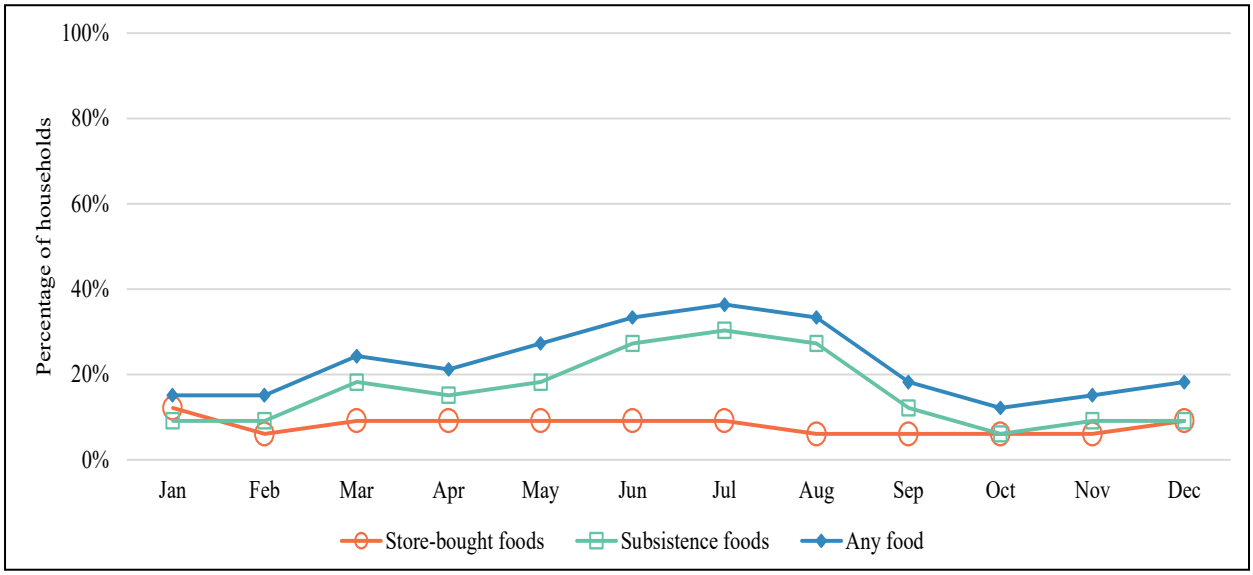


Figure 3-24.–Comparison of months when food did not last, Koyukuk, 2022.

Comparing Harvests and Uses in 2022 with Previous Years

Harvest Assessments

Researchers asked respondents to assess their own harvests in two ways: whether they used more, less, or about the same amount of eight resource categories in 2022 as in the past five years, and whether they got "enough" of each of the eight resource categories; the same questions were asked about all wild resources overall. Households were also asked to provide reasons if their use was different or if they were unable to get enough of a resource. If they did not get enough of a resource, they were asked to evaluate the severity of the impact on their household as a result of not getting enough. This section discusses responses to those questions.

Together, Table 3-21 and Figure 3-26 provide a broad overview of households' assessments of their harvests in 2022. Because not everyone uses all resource categories, some households did not respond to the assessment questions. Additionally, some households that do typically use a resource category simply did not answer questions.

Almost every responding household in Koyukuk (97%) described using at least one subsistence resource less than in previous years, and over 80% of all households said they used less of all their subsistence resources (Table 3-21). Salmon was the most prominent resource households (88%) claimed they used less of in 2022, and most (86%) attributed this to the subsistence salmon fishery regulations (Figure 3-26; Table 3-22). Both vegetation and large land mammals were used less by 55% of households, and 42% of households used less nonsalmon fish. Though a large percentage of responding households used less resources than in recent years, 30% of all Koyukuk households reported using the same amount of large land mammals and vegetation (Figure 3-26). Less than a third of households reported they harvested more of any resource, but 4 households (12%) did state they used more large land mammals mostly (75%) due to receiving more from others (Table 3-21; Figure 3-26; Table 3-23).

Of the 30 households that responded to questions about whether they got enough resources in 2022, 17 (57%) said they did not get enough of all resources; of those not getting enough, 59% stated the impact was severe, while 24% stated they were majorly impacted (Table 3-24 Figure 3-27). Seventeen (53%) responding households said they did not get enough salmon, 65% of those claimed the impact to be severe, and for 24% the impact was major. Vegetation closely followed as the next resource 46% of all households did not get enough of, with most stating the impact was major (53%; Table 3-24; Figure 3-27). Table 3-25 shows the percentage of households that reported needing more of a resource. The highest percentage of households described needing Chinook salmon (73%). Fall chum salmon and blueberries followed, at 52% and 49% respectively. More moose was needed by 42% of Koyukuk households.

Overall, Koyukuk residents used less salmon in 2022 than in past years due to the subsistence salmon fishery closures on the Yukon River prohibiting harvest. As a result, households did not get enough salmon, even with the TCC fish donation. This lack of salmon had a severe impact on most households, leaving many desiring more.

Harvest Data

Changes in the harvest of resources by Koyukuk residents can also be discerned through comparisons with findings from other study years. This was the first comprehensive subsistence survey conducted by ADF&G in Koyukuk. However, ADF&G Division of Commercial Fisheries and the Division of Subsistence have been documenting salmon harvest data through annual postseason subsistence harvest surveys along the Yukon River since 1992.[30] Between 2021 and 2022—the year of this study—there was no harvest data collected for any species, and in 2020 for both summer and fall chum salmon, due to the subsistence salmon fishery closures on the Yukon River during those years; the following data was collected from 1992 through 2020.

30. Alaska Subsistence Fisheries Database, Version 3.5. 2004, Division of Subsistence, Alaska Department of Fish and Game.

Table 3-21.–Changes in household uses of resources compared to recent years, Koyukuk, 2022.

Resource category	Valid responses[a]	Households reporting use: Total households Number	Total households Percent	Less Number	Less Percent	Same Number	Same Percent	More Number	More Percent	Households not using Number	Households not using Percent
Any resource	33	33	100.0%	32	97.0%	22	66.7%	9	27.3%	33	100.0%
All resources	31	31	100.0%	25	80.6%	5	16.1%	1	3.2%	0	0.0%
Salmon	33	32	97.0%	29	87.9%	1	3.0%	2	6.1%	1	3.0%
Nonsalmon fish	33	21	63.6%	14	42.4%	4	12.1%	3	9.1%	12	36.4%
Large land mammals	33	32	97.0%	18	54.5%	10	30.3%	4	12.1%	1	3.0%
Small land mammals	33	18	54.5%	13	39.4%	3	9.1%	2	6.1%	15	45.5%
Marine mammals	33	12	36.4%	7	21.2%	4	12.1%	1	3.0%	21	63.6%
Birds and eggs	31	16	51.6%	8	25.8%	8	25.8%	0	0.0%	15	48.4%
Marine invertebrates	33	0	0.0%	0	0.0%	0	0.0%	0	0.0%	33	100.0%
Vegetation	33	30	90.9%	18	54.5%	10	30.3%	2	6.1%	3	9.1%

Source ADF&G Division of Subsistence household surveys, 2023.

a. Valid responses include the number of households out of the original sample of n = 53 that provided a valid response to the question.

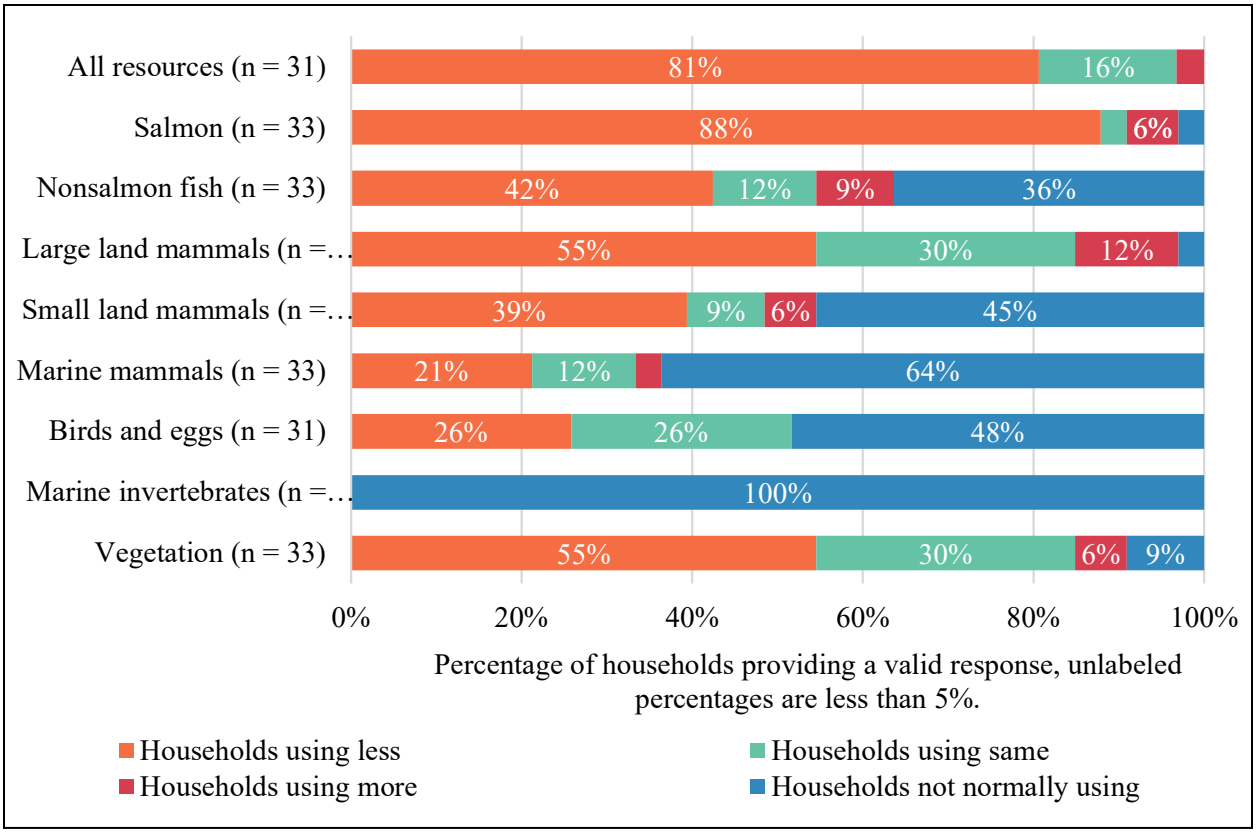


Figure 3-26.–Changes in household uses of resources compared to recent years Koyukuk, 2022.

Table 3-22.–Reasons for less household uses of resources compared to recent years, Koyukuk, 2022.

Resource category	Households reporting less use[a]	Households providing valid reasons[b]	Resources less available		Lack of effort		Less sharing		Working / no time		Family / personal	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Any resource	32	32	17	53.1%	9	28.1%	14	43.8%	5	15.6%	11	34.4%
All resources	25	24	9	37.5%	3	12.5%	4	16.7%	3	12.5%	3	12.5%
Salmon	29	29	5	17.2%	0	0.0%	2	6.9%	0	0.0%	0	0.0%
Nonsalmon fish	14	14	5	35.7%	3	21.4%	4	28.6%	1	7.1%	1	7.1%
Large land mammals	18	18	2	11.1%	0	0.0%	4	22.2%	3	16.7%	4	22.2%
Small land mammals	13	13	1	7.7%	3	23.1%	3	23.1%	1	7.7%	2	15.4%
Marine mammals	7	7	0	0.0%	0	0.0%	6	85.7%	0	0.0%	1	14.3%
Birds and eggs	8	8	2	25.0%	1	12.5%	2	25.0%	0	0.0%	1	12.5%
Marine invertebrates	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	18	18	7	38.9%	3	16.7%	2	11.1%	1	5.6%	4	22.2%

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Table 3-22.–Continued.

Resource category	Households reporting less use[a]	Households providing valid reasons[b]	Unsuccessful		Weather / environment		Lack of equipment		Did not need		Regulations	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Any resource	32	32	5	15.6%	9	28.1%	5	15.6%	6	18.8%	25	78.1%
All resources	25	24	1	4.2%	2	8.3%	2	8.3%	0	0.0%	10	41.7%
Salmon	29	29	0	0.0%	0	0.0%	0	0.0%	2	6.9%	25	86.2%
Nonsalmon fish	14	14	0	0.0%	0	0.0%	2	14.3%	0	0.0%	1	7.1%
Large land mammals	18	18	3	16.7%	1	5.6%	1	5.6%	2	11.1%	0	0.0%
Small land mammals	13	13	1	7.7%	3	23.1%	1	7.7%	0	0.0%	0	0.0%
Marine mammals	7	7	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Birds and eggs	8	8	0	0.0%	1	12.5%	3	37.5%	0	0.0%	0	0.0%
Marine invertebrates	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	18	18	1	5.6%	2	11.1%	1	5.6%	2	11.1%	0	0.0%

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Table 3-22.–Page 2 of 2.

Resource category	Households reporting less use[a]	Households providing valid reasons[b]	Equipment / fuel expense		Too far to travel		Small / diseased animals		Did not have help		Other reasons	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent		
Any resource	32	32	4	12.5%	2	6.3%	2	6.3%	1	3.1%	6	18.8%
All resources	25	24	2	8.3%	1	4.2%	0	0.0%	0	0.0%	1	4.2%
Salmon	29	29	0	0.0%	0	0.0%	1	3.4%	0	0.0%	0	0.0%
Nonsalmon fish	14	14	1	7.1%	0	0.0%	0	0.0%	1	7.1%	1	7.1%
Large land mammals	18	18	0	0.0%	0	0.0%	1	5.6%	0	0.0%	3	16.7%
Small land mammals	13	13	2	15.4%	0	0.0%	1	7.7%	0	0.0%	0	0.0%
Marine mammals	7	7	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	14.3%
Birds and eggs	8	8	0	0.0%	1	12.5%	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	18	18	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	5.6%

Source ADF&G Division of Subsistence household surveys, 2023.

Note this table summarizes open-ended responses that have been categorized into one or more standard classifications. Only reasons offered by respondents for the study have been included.

a. Includes only households indicating less historical use.

b. Includes only households indicating less historical use and provided at least one valid reason.

Table 3-23.–Reasons for more household uses of resources compared to recent years, Koyukuk, 2022.

Resource category	Households reporting more use[a]	Households providing valid reasons[b]	Received more		Increased resource availability		Needed more	
			Number	Percent	Number	Percent	Number	Percent
Any resource	9	9	6	66.7%	1	11.1%	3	33.3%
All resources	1	1	1	100.0%	0	0.0%	0	0.0%
Salmon	2	1	0	0.0%	0	0.0%	0	0.0%
Nonsalmon fish	3	3	0	0.0%	0	0.0%	0	0.0%
Large land mammals	4	4	3	75.0%	1	25.0%	1	25.0%
Small land mammals	2	2	1	50.0%	0	0.0%	1	50.0%
Marine mammals	1	1	1	100.0%	0	0.0%	0	0.0%
Birds and eggs	0	0	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	0	0	0	0.0%	0	0.0%	0	0.0%
Vegetation	2	2	0	0.0%	0	0.0%	1	50.0%

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Table 3-23.–Page 2 of 2.

Resource category	Households reporting more use[a]	Households providing valid reasons[b]	Substitution for other resources		Store-bought expense		Other reasons	
			Number	Percent	Number	Percent	Number	Percent
Any resource	9	9	2	22.2%	1	11.1%	2	22.2%
All resources	1	1	0	0.0%	0	0.0%	0	0.0%
Salmon	2	1	0	0.0%	0	0.0%	1	100.0%
Nonsalmon fish	3	3	2	66.7%	0	0.0%	0	0.0%
Large land mammals	4	4	0	0.0%	0	0.0%	0	0.0%
Small land mammals	2	2	0	0.0%	0	0.0%	1	50.0%
Marine mammals	1	1	0	0.0%	0	0.0%	0	0.0%
Birds and eggs	0	0	0	0.0%	0	0.0%	0	0.0%
Marine invertebrates	0	0	0	0.0%	0	0.0%	0	0.0%
Vegetation	2	2	0	0.0%	1	50.0%	0	0.0%

Source ADF&G Division of Subsistence household surveys, 2023.

Note this table summarizes open-ended responses that have been categorized into one or more standard classifications. Only reasons offered by respondents for the study have been included.

a. Includes only households indicating more historical use.

b. Includes only households indicating more historical use and provided at least one valid reason.

Table 3-24.–Reported impact to households reporting that they did not get enough of a type of resource, Koyukuk, 2022.

	Households not getting enough _____.				Impact to those not getting enough _____.									
	Valid responses[a,b]		Did not get enough		No response		Not noticeable		Minor		Major		Severe	
Resource category	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Any resource	33	100.0%	28	84.8%	4	14.3%	1	3.6%	13	46.4%	15	53.6%	15	53.6%
All resources	30	90.9%	17	56.7%	1	5.9%	0	0.0%	2	11.8%	4	23.5%	10	58.8%
Salmon	32	97.0%	17	53.1%	0	0.0%	0	0.0%	2	11.8%	4	23.5%	11	64.7%
Nonsalmon fish	32	97.0%	9	28.1%	0	0.0%	1	11.1%	4	44.4%	2	22.2%	2	22.2%
Large land mammals	33	100.0%	8	24.2%	1	12.5%	0	0.0%	1	12.5%	4	50.0%	2	25.0%
Small land mammals	33	100.0%	5	15.2%	1	20.0%	0	0.0%	2	40.0%	2	40.0%	0	0.0%
Marine mammals	33	100.0%	4	12.1%	1	25.0%	0	0.0%	2	50.0%	0	0.0%	1	25.0%
Birds and eggs	31	93.9%	6	19.4%	0	0.0%	0	0.0%	5	83.3%	1	16.7%	0	0.0%
Marine invertebrates	33	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Vegetation	33	100.0%	15	45.5%	0	0.0%	0	0.0%	3	20.0%	8	53.3%	4	26.7%

Source ADF&G Division of Subsistence, household surveys, 2023.

a. Valid responses include households responding yes or no to the question and households that never used the resource.

b. Percentage of valid responses is based on a sample of 33 households.

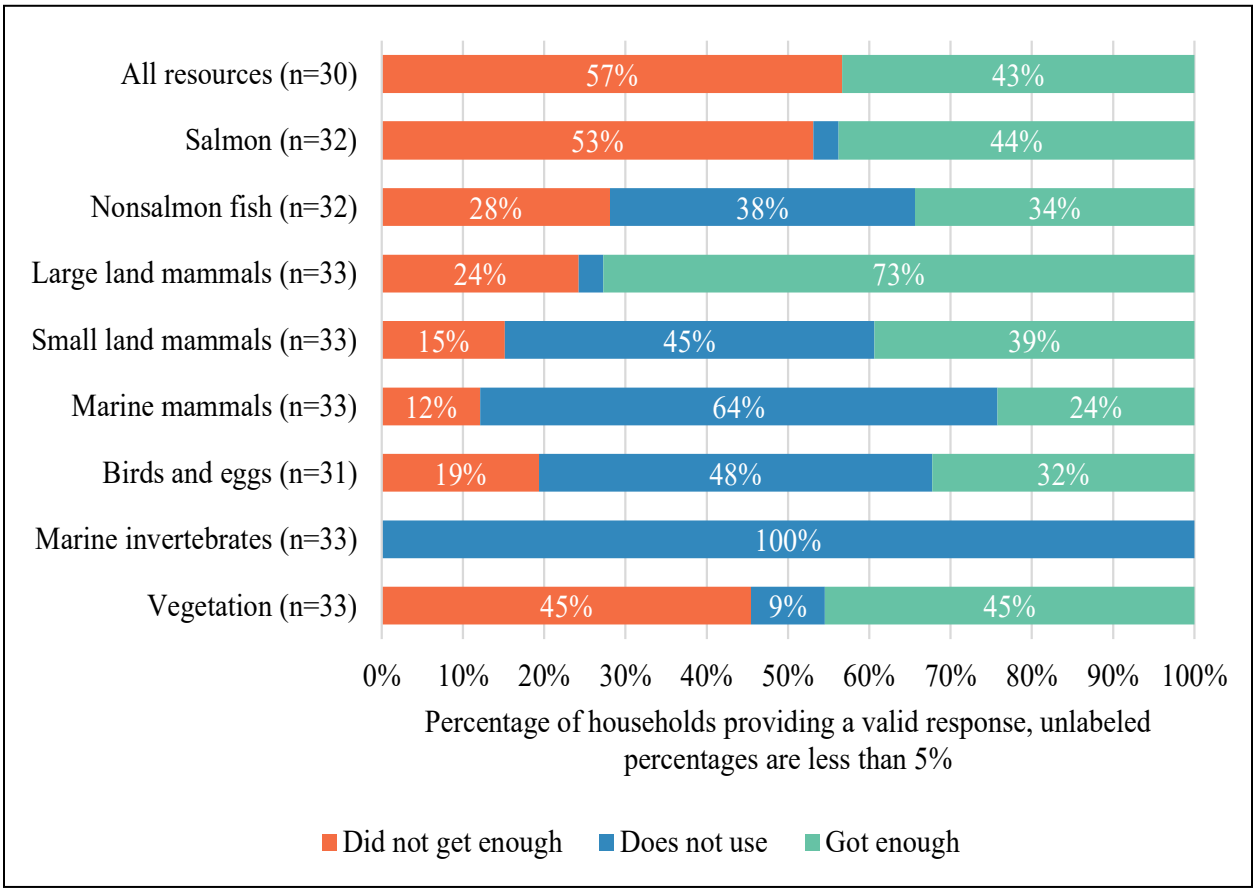

Figure 3-27.–Percentage of sampled households reporting whether they had enough resources, Koyukuk, 2022.

Table 3-25.–Resources that households reported needing, Koyukuk, 2022.

Resource	Households needing	Percent of sampled households[a]
Fish	2	6.1%
Salmon	6	18.2%
Fall chum salmon	17	51.5%
Coho salmon	3	9.1%
Chinook salmon	24	72.7%
Burbot	1	3.0%
Northern pike	3	9.1%
Sheefish	10	30.3%
Whitefishes	5	15.2%
Land mammals	1	3.0%
Black bear	1	3.0%
Moose	14	42.4%
Beaver	5	15.2%
Whales	3	9.1%
Bowhead whale	1	3.0%
Mallard	2	6.1%
Geese	1	3.0%
Canada/cackling geese	1	3.0%
Greater white-fronted goose	1	3.0%
Grouses	1	3.0%
Spruce grouse	2	6.1%
Berries	2	6.1%
Blueberry	16	48.5%
Lowbush cranberry	9	27.3%
Highbush cranberry	1	3.0%
Crowberry	1	3.0%
Cloudberry	11	33.3%
Raspberry	1	3.0%
Wood	3	9.1%

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2023.

a. Percentages are based on the 33 sampled households in Koyukuk.

Figure 3-28 shows the annual harvests of Chinook salmon between 1992 and 2020 for residents of Koyukuk. Chinook salmon harvests have fluctuated over time but have remained relatively low, ranging from 26 fish harvested in 2015 to a total of 1,349 in 2011, with an annual average of 608 fish over the 29-year dataset. Chinook salmon are typically only ever harvested for human consumption and are prized for their large size and high oil content, resulting in fewer individual Chinook salmon needed and thus harvested to meet the subsistence needs of a historically small community. Though Chinook salmon populations have been decreasing on the Yukon River since 1998, with significant crashes in 2000, 2010, and 2014, Koyukuk resident's harvests of Chinook salmon only correlated with the crash of population numbers in 2000 and 2014 where harvests were 175 and 52 fish respectively. Harvest numbers in 2014 reflect that it was the first year that fishers were banned from harvesting Chinook salmon through strict closures on the Yukon River. In 2019, Koyukuk residents harvested Chinook salmon the most (1,088), likely due to the chum salmon mortality event discussed earlier in this report. Despite the peaks in 2011 and 2019, Koyukuk resident's harvests of Chinook salmon have been decreasing (Figure 3-28).

Koyukuk residents historically harvested both fall chum (34,799 total) and summer chum salmon (20,549 total) the most (figures 3-29 and 3-30). It is likely the prevalence of commercial fishing that accounts for the higher reliance on chum salmon than any other salmon species. Beginning in 1974 a commercial chum salmon roe fishery flourished in the middle Yukon River for over 20 years. Many subsistence fishers from Kaltag, Nulato, and Tanana participated in the commercial roe fishery as both subsistence and commercial fisheries occurred simultaneously, and the harvested surplus was allowed to be kept. When summer chum salmon were harvested, their roe was stripped and sold commercially while the remaining carcasses were counted toward subsistence harvests and had to be hung, dried, and often fed to dogs (Brown et al. *In prep.*; Brown and Godduhn 2015).

> If you had a seven-dog team, you'd usually put about, these are all dried fish that you carried over the summer, I bale 'em up and put 'em away. Maybe about four, you would put one per about seven dogs. (04072023KYU08)

Although Koyukuk was not one of the communities that heavily participated in the commercial fishery, it is likely that, due to its location, a small number of fishers did, and that many of the chum salmon carcasses were shared with Koyukuk.

One of the lowest years of summer chum salmon harvests in Koyukuk was 1996, when only 41 total salmon were harvested (Figure 3-29). This significant decrease in harvest amounts is likely because the commercial chum salmon roe fishery was eradicated around that same year due to the use of farmed salmon roe which severely decreased the marketable value (Brown and Godduhn 2015). The end of the commercial roe fishery in the mid to late 1900s is significantly connected to the decrease in dog populations in the middle river during the same time. Contrary to lower Yukon River communities, most summer chum salmon harvested by middle river communities were fed to dogs for two main reasons. First, the reliance on dog teams for transportation and subsistence activities in the area. Second, the low quality of the salmon's meat by the time these fish reach the mouth of the Koyukuk River, where summer chum are known to spawn, limits their use to mostly dog food (Andersen 1992).

> I remember one summer where we really did good fishing. It was a lot of work, everybody had to work. We had, the kids had to help out because there was so much fish. We must've had, if I remember, eleven or fourteen racks of fish…There must've been about thirty-five hundred or forty-five [hundred] fish. That's both for the dogs and the, for our consumption. We must've had, I wanna say, probably about, counting their pups, close to thirty [dogs]. (04062023KYU05)

Salmon harvests for dog food in the region peaked during the early 20th century, while the number of dogs owned by salmon fishing households peaked in 1993 (Wolfe and Spaeder 2009). Because of the high demand for dog food by the many mushers in the region, it was common for salmon fishers without dogs in the area to trade excess bundles of dry fish at Vernetti's store for other goods; if traveling mushers ran out of food for their dog teams, those bundles of fish could be purchased to feed their dogs.

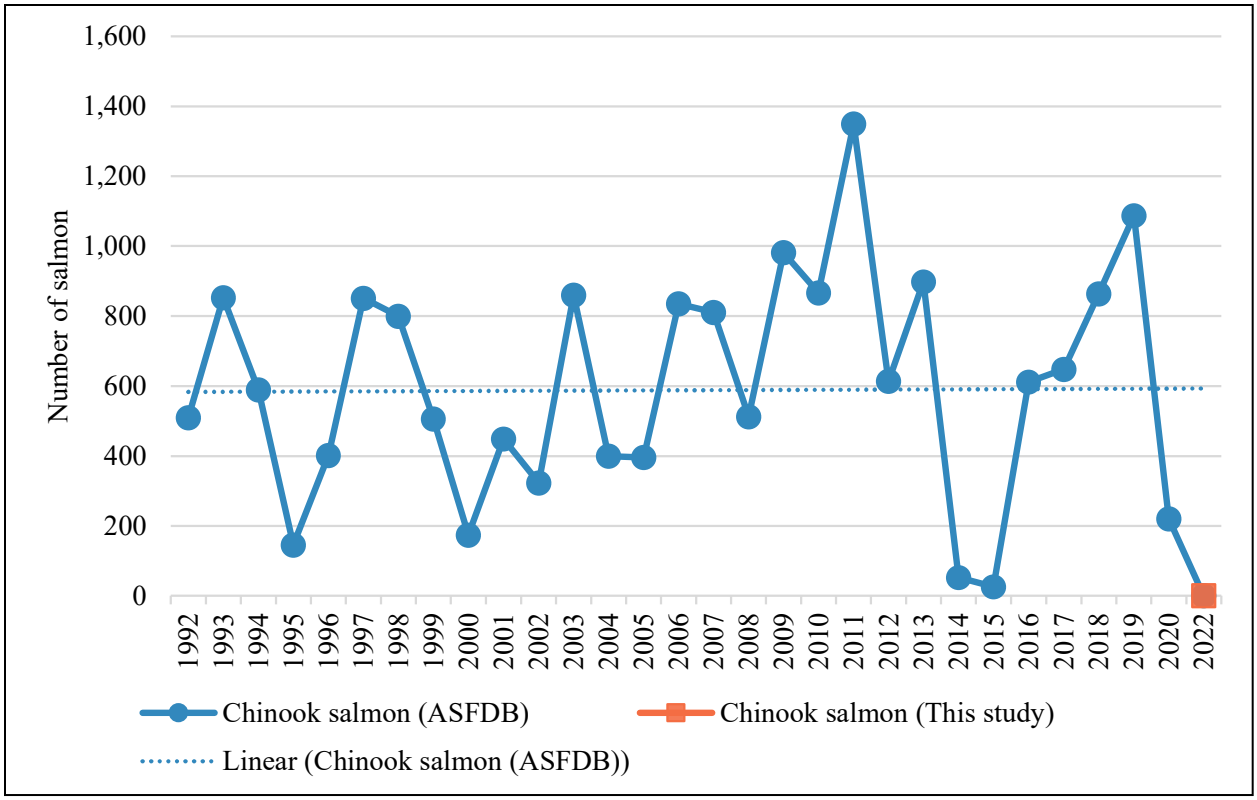

Figure 3-28.–Comparison of Chinook salmon harvests, 1983–2022, Koyukuk.

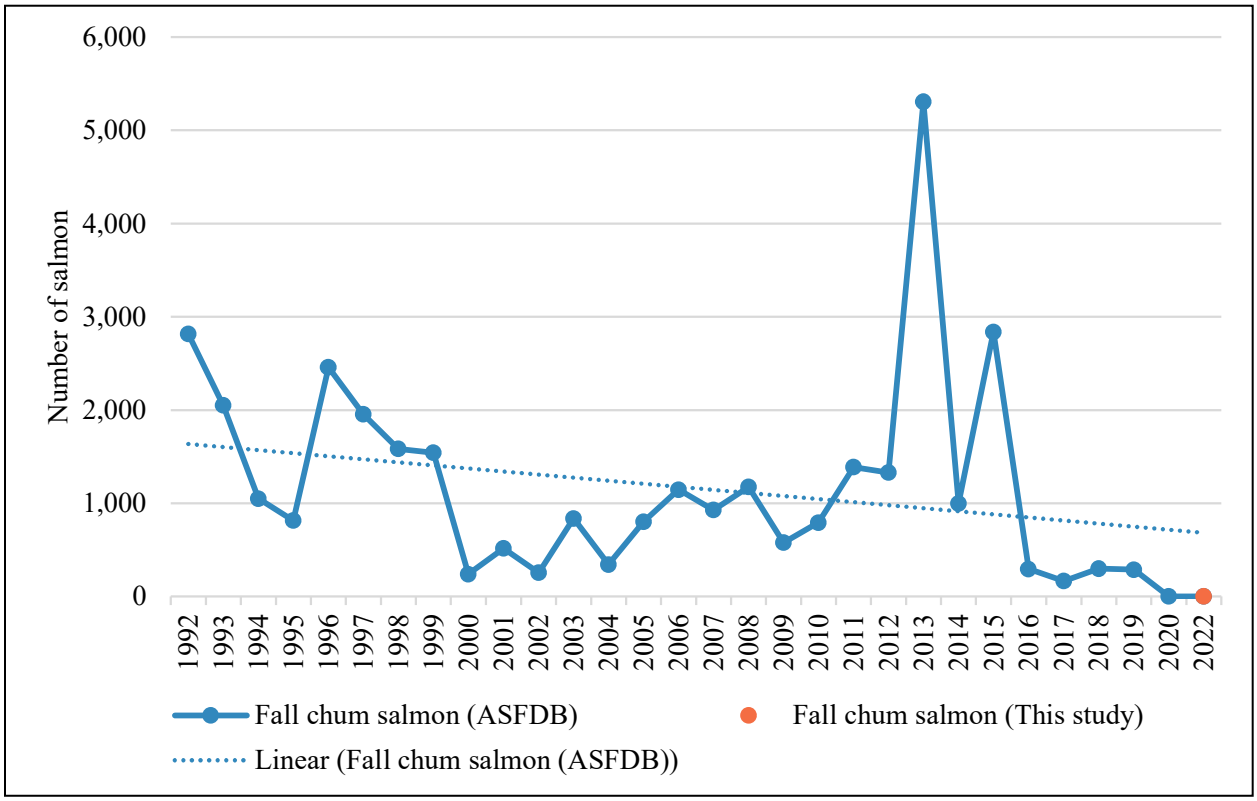

Figure 3-29.–Comparison of fall chum salmon harvests, 1983–2022, Koyukuk.

Despite the peak harvest year for chum salmon in 2013 when summer chum harvests equaled 4,459 and 5,308 fall chum salmon, the overall trend of chum salmon harvests in Koyukuk has been decreasing. The harvest of summer and fall chum salmon has remained relatively low with most harvests never surpassing 2,500 fish; though Koyukuk residents harvested a total of 34,799 fall chum salmon in the 28 years of data collection, the highest quantity of all species compared (Figure 3-29; Figure 3-30).

Figure 3-31 displays annual coho salmon harvests by Koyukuk, where residents generally harvested under 500 coho salmon per year, averaging 369 fish, except for the high harvest in 2013, which totaled 3,267 salmon. Coho salmon were the least harvested of all species in the study, with a total of 10,725 harvested across 29 years. Harvests of coho salmon have remained low and since 2016 those numbers have dropped to minute amounts.

Collectively, Koyukuk harvests of all salmon were much greater in the year data collection began than they were during the study year. Chinook salmon harvests have been decreasing since the 2000s due to declines in abundance and subsequently stricter harvest restrictions. However, the remaining salmon species harvests in the study have only recently begun to decline sharply, since around 2014, for the same reasons. Many factors likely contribute to the decline in Koyukuk residents' harvests of salmon over time. As mentioned prior, the commercial chum salmon roe fishery no longer exists and the number of dogs has declined in the region, requiring less harvest of salmon to feed those dogs. Also, salmon population numbers have plummeted, and in response, there has been an increase in the implementation of conservative measures resulting in a significant reduction in harvest opportunity, which in recent years has been nonexistent. Salmon populations have likely been decreasing for more than the recorded three decades as one Koyukuk elder describes a time before harvest data had been collected when he and his father harvested thousands of salmon:

> Back in nineteen fifties…Then when we catch about, put about a thousand fish in the boat…And three times a day they're on the wheel, about nine hours and we catch a little over three thousand fish. During that time. Summer chum. (04042023KYU01)

During a study on the patterns and trends of salmon harvest and use in the Yukon River from 1990–2014, it was found in the middle Yukon River that when Chinook salmon harvest in pounds increased prior to 2000, other salmon species' harvest numbers decreased. Also in contrast, when Chinook salmon harvests decreased after 2000, middle river resident's harvests of other salmon species slightly increased; possibly indicating a species substitution (Brown et al. *In prep.*). However, this trend is not prevalent in Koyukuk.

It is unknown why harvests of all species except Chinook salmon increased drastically in 2013; however, this trend could be due to multiple Chinook salmon conservation efforts. In 2013, gillnet mesh size was restricted to 6 inches or less, and early-season subsistence fishery closures following the Chinook salmon run were implemented as they migrated upriver (Newland 2013). It is possible that, in an attempt to adapt to the limited Chinook harvest opportunities, Koyukuk residents targeted more abundant coho and chum salmon as a replacement for the harvest of almost 900 Chinook in 2013 (Figure 3-28).

In 2002, Andersen et al. (2004) conducted research on the traditional knowledge and subsistence harvests of nonsalmon fish in communities along the Koyukuk River Drainage, including Koyukuk. That study found that Koyukuk residents harvested nine different species of nonsalmon fish, compared to 2022 when six different species were harvested. Although the number of species harvested by households varies between years, the primary species harvested in both 2002 and 2022 were the same: sheefish (48% and 15% respectively) and pike (43% and 15% respectively). However, in 2022, humpback whitefish (9%) were the most harvested species of whitefish, and, in 2002, broad whitefish (41%) were primarily harvested. Residents set nets under the ice and commonly catch pike, whitefish, and sheefish (04062023KYU04). In the past, fishers used to harvest copious amounts of whitefish.

> Fall time, they used to go out and fish for whitefish and sheefish…a lot of whitefish in the fall time. Even under the ice in the wintertime, they used to fish from. They used to make big piles of whitefish they got. Stockin' up. (04072023KYU08)

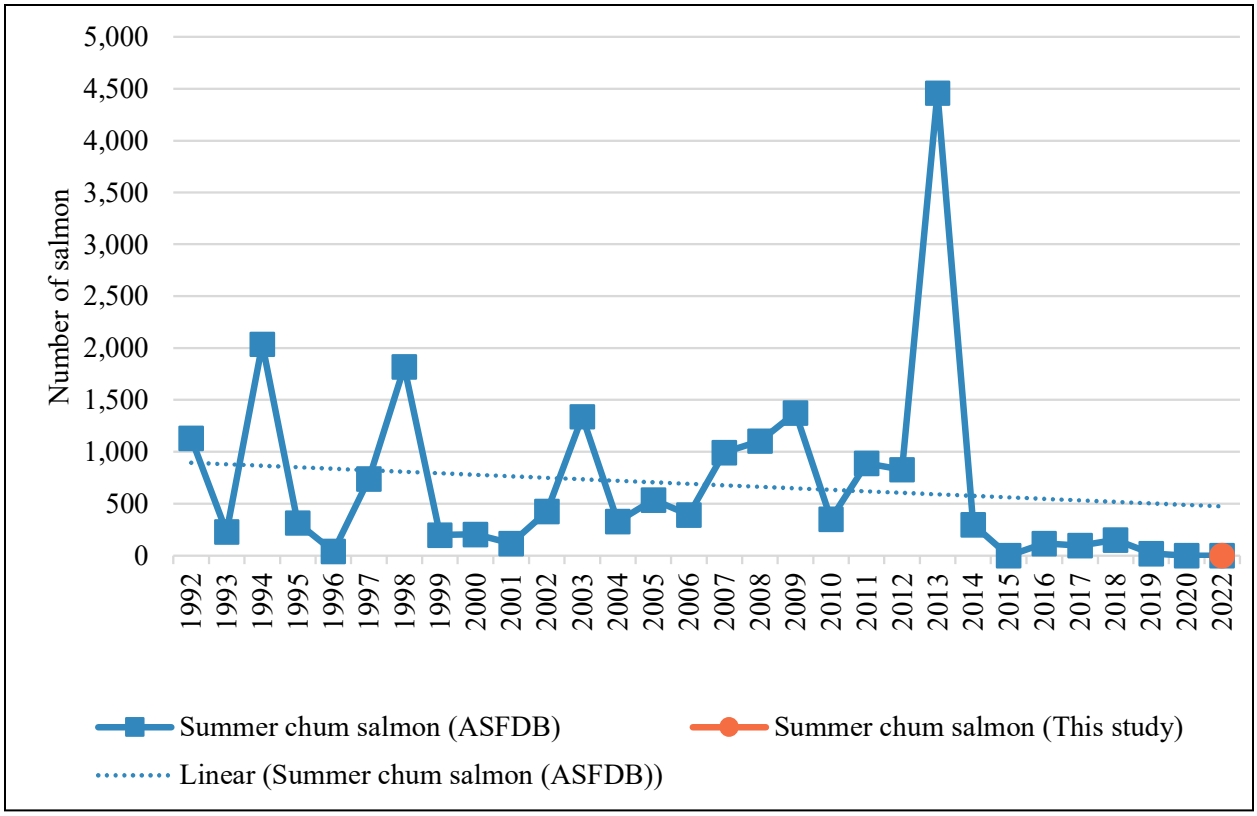

Figure 3-30.–Comparison of summer chum salmon harvests, 1983–2022, Koyukuk.

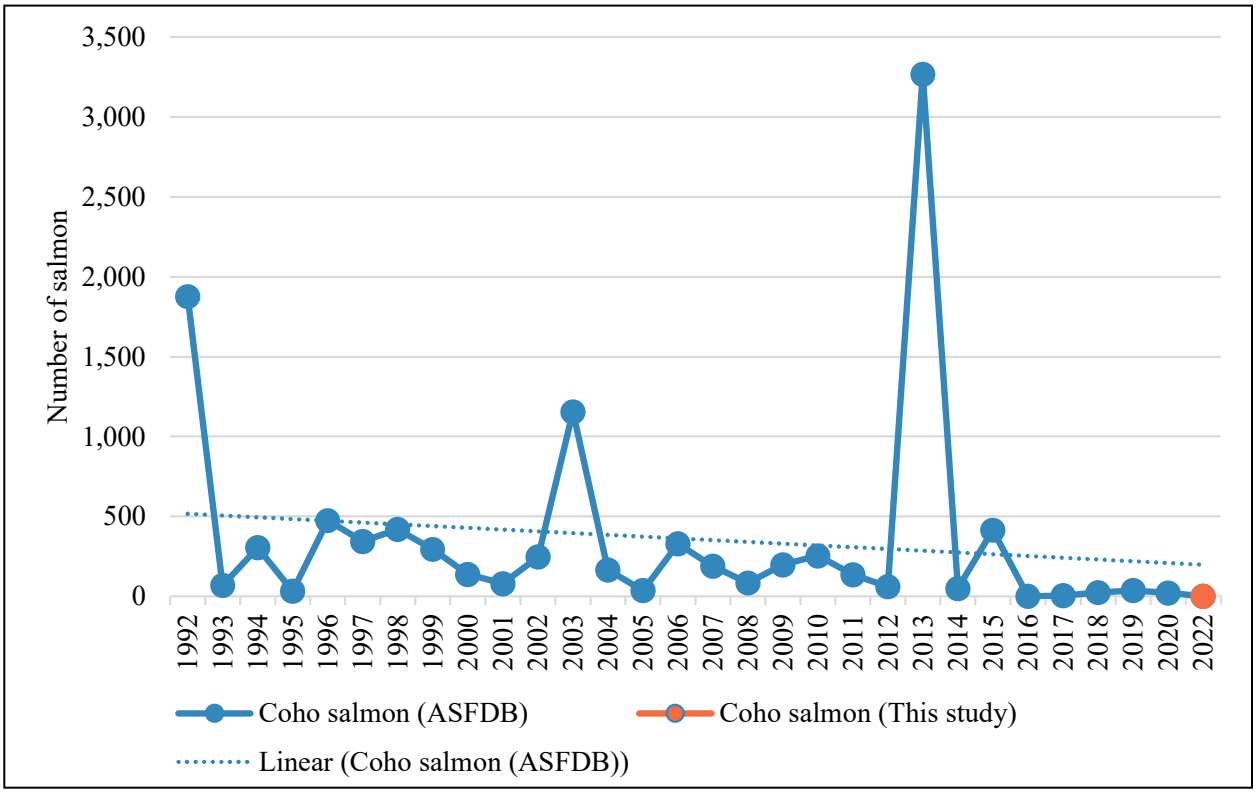

Figure 3-31.–Comparison of coho salmon harvests, 1983–2022, Koyukuk.

The per capita harvest of nonsalmon fish was 71 lb in 2002, and 20 years later the per capita harvest was 8 lb, nearly 9 times less. In 2002, Koyukuk harvested the least amount of nonsalmon fish out of all the other communities in the study (Andersen et al. 2004). Historically, Koyukuk residents have harvested comparatively low amounts of nonsalmon fish, which continues today, yet harvest quantities have been further declining. While the reason for the nonsalmon fish harvest decline is uncertain, one possible explanation could be due to the increase in pike populations as one resident explained, "Well, in the last two years, I usually fish in the fall, but there's more pikes right now. There, there isn't hardly [any] young whitefish" (04042023KYU01).

Current and Historical Harvest Areas

There are no previous map studies in Koyukuk to compare historical harvest areas with this study year's current harvest areas.

Local Comments and Concerns

Following is a summary of local observations of wild resource populations and trends that were recorded during the surveys. Some households did not offer any additional information during the survey administration, so not all households are represented in the summary. In addition to the surveys, some respondents expressed their concerns about wild resources during the community review meeting of preliminary data. These concerns have been included in the summary.

Salmon

Among survey participants, the most voiced concern was about the closures of subsistence salmon fisheries for the second year in a row. Many residents expressed frustrations with commercial fisheries harvests, claiming it's just "not right" that subsistence fishers on the Yukon River are being restricted while commercial vessels offshore are continuing to harvest Yukon salmon.[31] Many felt the fishery managers prioritized and served only commercial fisheries and asked, "When are they going to fight the trawlers, and when will they support subsistence?"[32] Several participants expressed that the inability to harvest salmon not only constrained their access to their most highly valued food source but also eliminated their culture entirely, "Our people have been on this land as long as the river been here. I don't think Fish and Game has a right to take our fish from us; our culture, our traditions, language, and even our food."[33]

Large Land Mammals

Many surveyed in Koyukuk expressed concerns over the growing grizzly bear and wolf populations both of which, consequently, negatively affect moose abundance. Residents also voiced concerns about the number of moose harvested by non-local hunters coming from the nearby community of Huslia as well as from communities on the road system such as Fairbanks. Some surveyed residents asked wildlife managers to provide them with updates on predator harvest numbers, and others asked the Board of Game for increased opportunities to harvest predators in the interest of population control. Another resident requested an additional moose hunting opportunity in March. All the suggestions made by residents related to counteracting the impact of declining moose populations on those in Koyukuk.

31. ADF&G Division of Subsistence household survey comments, 2022.
32. ADF&G Division of Subsistence household survey comments, 2022.
33. ADF&G Division of Subsistence household survey comments, 2022.

4. DISCUSSION AND CONCLUSIONS

Overview of Findings for the Study Communities, 2022

This study represented an effort to document comprehensive subsistence harvest and use information for the communities of Huslia and Koyukuk. Comprehensive household survey data were last collected in Huslia in 1983 by Marcotte (1986), working for the ADF&G Division of Subsistence. However, this study documented harvest and use of all wild resources in the community of Koyukuk for the first time, which had previously only been surveyed about household harvest and use of nonsalmon fish by Andersen et al. (2004) in the mid-2000s. Other communities in the Koyukuk and middle Yukon River drainages have been surveyed within the last 14 years, including Nulato, Galena, and Ruby in 2010, Hughes in 2014, and Kaltag in 2018 (Brown et al. 2015; Marcotte 1990; Marcotte and Haynes 1985; McDavid and Cunningham 2020; Wilson and Kostick 2016). Prior to these recent efforts, comprehensive data were collected in Hughes in 1982, Huslia in 1983, and Galena in 1985 (Marcotte 1986; 1990; Marcotte and Haynes 1985). These earlier studies may be considered a baseline against which the more recent (2010 to 2022) data may be compared to understand broad changes in the harvest and use of wild resources among communities in the middle Yukon River and lower Koyukuk River area.[1]

At the most basic level, quantifying how many households use or harvest wild foods can indicate the degree of importance of subsistence resources at the household and community levels. High levels of use of wild foods, where 'use' includes receiving or harvesting, were common in the present and all previous studies where data were available (>90% of households). While use patterns show, in the broadest sense, what portion of a community relies on wild foods, the percentage of households harvesting characterizes the productive base of the wild food system in a community. In this study, we documented that 79% and 64% of households in Huslia and Koyukuk, respectively, harvested wild foods. In previous studies on the region, the range was 77% (Hughes, 2014) to 100% (Huslia, 1983).[2] Similarly, the percentage of individuals who participated in the harvesting of any resource in Huslia and Koyukuk during 2022 was 75% and 61%, respectively.[3]

The amount of wild food harvested in a community is often correlated with the size of a community's population. For this reason, per capita estimates of subsistence food production provide a means for comparing harvests across population levels and thus between communities and time periods. In terms of edible weight, the per capita harvests of wild food among Yukon-Koyukuk area communities have decreased by half or more since the 1980s (Figure 4-1). The average per capita harvest of all wild foods in this area in the 1980s was 1,120 lb, while the average from 2010 to 2022 was 258 lb (a 77% decrease). In 1983, the per capita harvest in Huslia was 1,082 lb. This study documented per capita harvests in Huslia and Koyukuk of 217 lb and 156 lb, respectively. For Huslia, this change represented an 80% decrease in per capita harvests between 1983 and 2022. Comparing the results of the present study with these two temporal reference points—the 1980s and the mid-2000s—reveals that, although per capita harvest of wild food has decreased over the past four decades, 2022 estimates are similar to those of other Yukon-Koyukuk communities in the mid-2000s. In this study, participants described various changes that have affected their use and harvest of wild foods; these changes will be discussed in detail below.

In many ways, harvest and use patterns—if not quantities—have remained stable through time. Harvest and use of wild resources remains high; all households in the present study used wild foods, although the percentage of households that directly harvested their wild food has decreased. Compared to coastal and lower Yukon River communities, Interior communities typically have less diverse subsistence resource profiles, independent of change over time. This is often the result of having limited direct access to marine

1. Henceforth this area will be referred to as the 'Yukon-Koyukuk area'.
2. Percentage of households using any wild food was not documented in the 1983 Huslia study.
3. Individual participation in harvesting any wild food was not documented in the 1980s studies of Hughes, Huslia, or Galena.

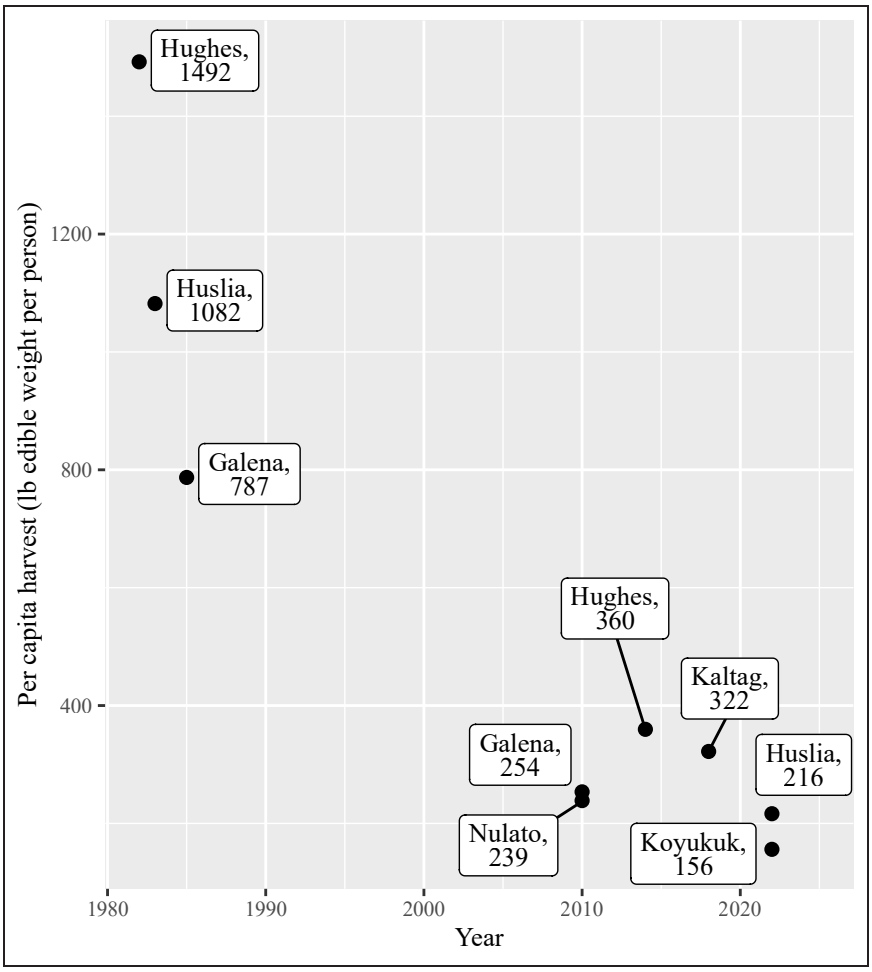

Figure 4-1.–Per capita harvests of wild resources, in pounds edible weight, in Yukon-Koyukuk area communities, 1982–2022.

resources, such as whales, seals, invertebrates, and marine fishes as well as migratory bird species that nest in coastal wetland areas. Although not strictly true, total subsistence harvests in Interior communities are generally smaller in terms of pounds per capita than they are in coastal communities (Wolfe and Walker 1987).

The diversity of subsistence resources available to the communities in the Yukon-Koyukuk area has also remained relatively stable through time. This has been generally true for salmon species, although declines in overall salmon abundance have been severe in recent years. For generations prior, residents of these communities have had varying levels of access to different salmon runs on the Yukon and Koyukuk rivers, depending on fishing location. For instance, spawning populations of Chinook salmon have been documented in the Gisasa and Kateel rivers—tributaries of the Koyukuk River located upstream of Huslia—and in the upper reaches of the Koyukuk River (Brown et al. 2017; Giefer and Graziano 2023). These small subpopulations of Chinook salmon typically migrate up the Koyukuk River, while the majority of Chinook salmon travel along the south bank of the Yukon River on their way to spawning locations elsewhere in Alaska and Canada. Thus, Koyukuk households with fish camps on the mainstem Yukon River have historically had greater access to Chinook salmon than households in Koyukuk River communities such as Huslia (Figure 4-2). The Koyukuk River is generally considered a major producer of chum salmon, and harvests of chum salmon are proportionally greater among Koyukuk River communities than they are for Chinook salmon at varying levels of population abundance. Despite record low harvests in recent years, the

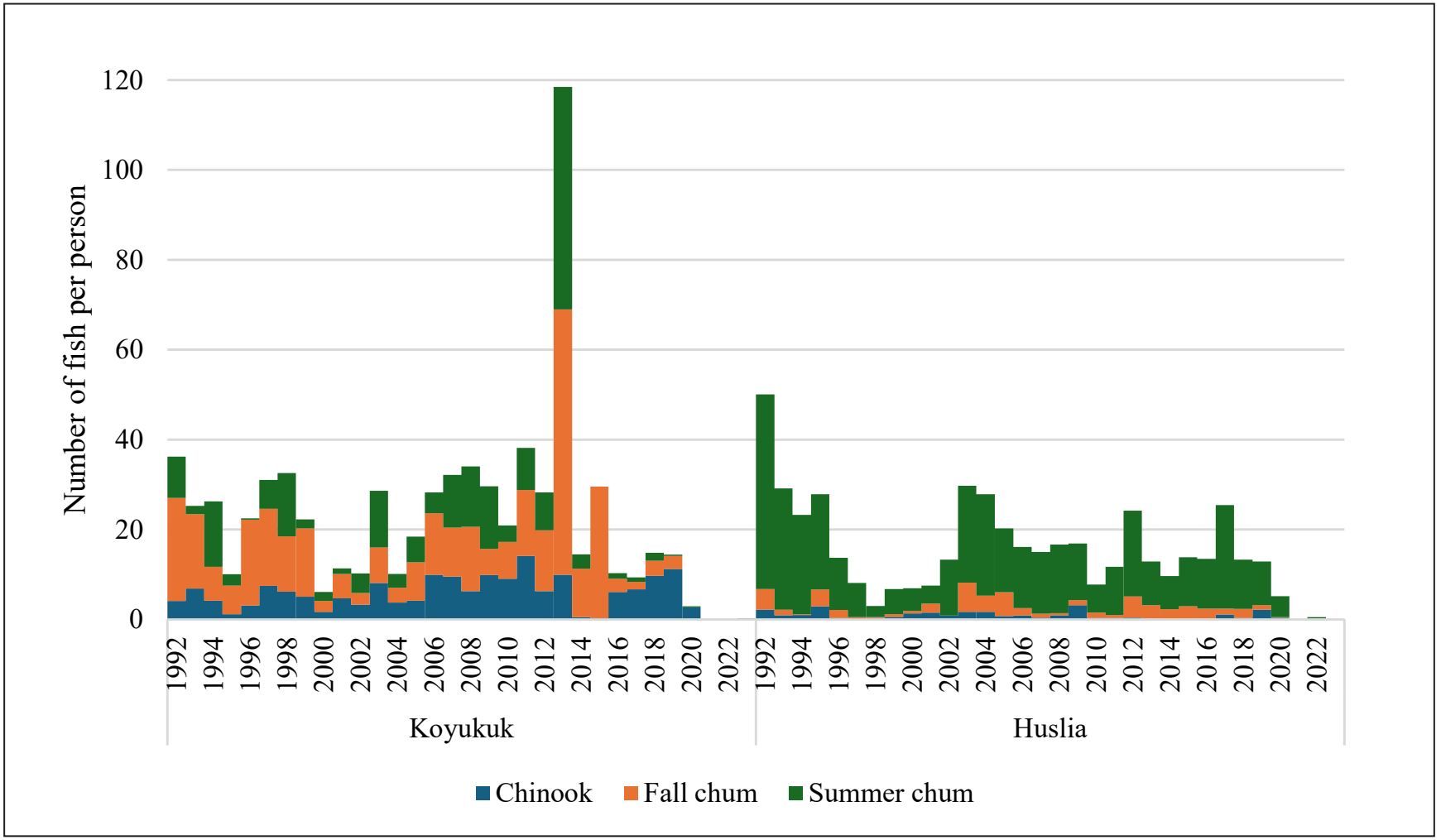

Figure 4-2.–Per capita subsistence salmon harvests, Huslia and Koyukuk, 1992–2023.

use of Chinook and chum salmon was high in the present study as well as in previous studies in the area.[4] Similarly, there remains a high degree of dependence on nonsalmon fish such as sheefish, whitefish, pike, and burbot, and other core resources such as moose, firewood, and furbearers.

Trapping is still relatively common, although this activity has decreased in both study communities. In 2022, 26% of households trapped (25% successfully) in Huslia. Nearly two-thirds of households (64%) in Huslia trapped in 1983. During that time, marten and fox were the most commonly targeted species. Among all communities in the area, the percentage of households successfully harvesting small land mammals[5] decreased from 62% in the 1980s to less than 24% in the recent period (2010 to present). This study documented, as observed by local trappers, that both the lack of a market for furs and the expense of gasoline to run traplines by snowmachine have contributed to the decrease in the number of active trappers in the communities (03252023HSL02). Although trapping has declined in Huslia and is low in Koyukuk (18% of households attempted), trapping is still more common in the Interior than in the coastal areas of the Yukon River drainage: the most recent data collected in the Yukon delta by Coleman et al. (2023) showed that 12% and 11% of Hooper Bay and Chevak households attempted to harvest small land mammals in 2021.

Although the importance of wild resources at the household and community level has persisted through time in Huslia and Koyukuk, the major themes of this study largely pertain to significant and rapid environmental, economic, social, and demographic shifts. As mentioned above, long-term trends in subsistence productivity are evident from comparisons with studies from the 1980s, but several respondents in this study emphasized that many of the drastic changes they have experienced have occurred in the last two decades, and even in the last several years (03252023HSL05; 04062023KYU03; 04042023KYU01). The changes that will be discussed below include declines in Chinook and chum salmon abundance and harvest, variability in moose abundance and harvest, decreases in dog teams for transportation and culture, and demographic and environmental changes that have affected subsistence ways of life in the communities.

The study year, 2022, was the second year that subsistence salmon fishing was closed to protect runs of Canadian-origin Chinook salmon due to low abundance. Additionally, runs of summer and fall chum salmon were extremely small and late compared to recent years. The low abundances of these three runs, with the added Chinook salmon mortality resulting from suspected infections of the parasite *Ichthyophonus*, created a dire need to reduce incidental catches of these species and protect spawning salmon to the extent possible. In 2022, subsistence fishing in District 4, encompassing the middle Yukon River and the Koyukuk River, was limited to 4-inch mesh gillnets that do not typically catch salmon and other gear types that would allow incidentally caught salmon to be released alive. Fishers were asked by fishery managers to avoid areas with migrating salmon and to instead target nonsalmon fish species, such as whitefish. Predictably, these restrictions resulted in extremely low harvests of salmon in the communities in 2022.

Huslia harvested 721 lb (less than 3 lb per capita) of salmon and Koyukuk harvested no salmon in 2022. These amounts represented 1% and 0% of the total subsistence harvest by weight in Huslia and Koyukuk, respectively. In 1983, salmon contributed 51% to the total subsistence harvest in Huslia. From 2010 to 2018—prior to subsistence salmon fishery closures—salmon made up, on average, 46% of the subsistence harvest in other area communities (Figure 4-3). These data show that just prior to subsistence salmon fishery closures on the Yukon River, the average proportion of the subsistence harvest represented by salmon was relatively similar to that documented in the 1980s. The amounts of salmon harvested by the communities were certainly smaller than in the 1980s yet remained proportionally stable through time. This is no longer true; the amounts of salmon harvested and the contribution of salmon to the overall production of wild foods in these communities are now essentially zero.

4. Although salmon harvests were extremely low in 2022, most Huslia and Koyukuk households received about 40 lbs each of donated salmon through a joint effort with Tanana Chiefs Conference, Yukon Delta Fisheries Development Association, and the nonprofit SeaShare.
5. The comprehensive survey assumed all small land mammals were taken with traps.

Figure 4-3.–Composition of subsistence harvests by edible weight in Yukon-Koyukuk area communities, 1982–2022.

The significance of the concurrent declines in salmon abundance and subsistence fishing opportunities in the last few years to the people of Huslia and Koyukuk was well documented in the present study. The survey results showed that for households with marginal or low food security, the timing of food insecure conditions coincided with the months during which, in a typical year, many households would have access to fresh salmon (i.e., June through September). Most respondents—71% in Huslia and 53% in Koyukuk—also said that they needed more salmon than they received last year, despite efforts to distribute donated salmon to Yukon River communities. Not being able to harvest and process salmon also limited opportunities to gather at fish camp and engage in the practices of subsistence. The cultural implications of the lack of salmon were explained by a Huslia resident:

> [The fishery closures are] killing our culture, you know. I mean especially down on the Yukon [River]. But it's—here—just as bad. 'Cause people here have fish camps all up and down the river. And they're empty too in the summer. … It's like taking the buffalo from the Indians down the lower forty-eight [states] to me, you know. It's a—it's a real blow on the culture. (03252023HSL02)

Another cultural change related to salmon declines described by key respondents was the decrease in dog teams in the Yukon-Koyukuk area over the past few decades (03252023HSL04; 03252023HSL02). Although this was not a new development, the number of teams has taken a sharp downturn in recent years. Beginning in the 1960s, dog teams were largely replaced by snowmachines for cross-country travel, including subsistence hunting and trapping (Andersen 1992). More recently, however, the number of dogs has decreased because of the lack of salmon needed to feed a dog team. Competitive mushing—especially sprint racing—has been a popular activity and cultural practice in the Yukon-Koyukuk area for decades insofar as Huslia's school sports teams are known as the "Huslia Huslers," in honor of legendary mushers Jimmy Huntington, Bobby Vent, Cue Bifelt, Bergman Sam, and George Attla, Jr. (Newman et al. 2023).[6] Marcotte (1986) documented 202 dogs present in Huslia in 1983, but a mere 4 dog teams—around 60 dogs—were reported anecdotally during this study.[7] In 2020, Padilla and Hamazaki (2024) estimated 10 households in Hughes and Huslia combined that fed salmon to dogs, and zero households in Koyukuk. The 2020 study also estimated that households in Hughes and Huslia harvested just over 2,000 summer chum, 38 fall chum, and 60 coho salmon to feed to dogs.

How communities have adapted and continue to adapt to the declines in Chinook and chum salmon is not fully evident yet. However, some respondents in this study described relying more on other subsistence resources in the absence of salmon (46% of responding households; 04062023KYU03). Accordingly, we documented that large land mammals and nonsalmon fish dominated harvests in both communities in 2022. Moose has long been an important resource for households in both communities but is becoming even more important in times of salmon declines and subsistence fishery closures. Over 29% of the subsistence harvest composition in 1983 in Huslia was of moose; in 2022, it was 37% in Huslia and 78% in Koyukuk. In the last decade, moose population abundance has been either stable or increasing in the Yukon-Koyukuk area (Stout 2018). There are both state and federal hunting opportunities in the area, with fall and winter seasons available in most years. However, residents still found difficulty in successfully harvesting moose (04072023KYU08). Since 2022, ADF&G has extended the fall moose season in GMU 21 multiple times, at the request of residents,[8] to increase opportunity. Both communities reported experiencing competition during moose hunting season and predation by other animals which affects their costs, time spent, and success in moose hunting (04062023KYU04; 04072023KYU08; 03242023HSL04). The establishment of the KCUA surrounding Huslia was meant to mitigate some of the access and transportation-related conflicts among non-local and local moose hunters, but the popularity of the area has resulted in crowded hunting conditions, trespass, and other user conflicts.

6. Yukon-Koyukuk School District. 2023, "About Huslia," Accessed 22 April 2024, https://www.yksd.com/domain/34.
7. The actual number of dogs was not recorded. J. Coleman, field notes, March 24, 2023.
8. Glenn Stout, ADF&G Area Management Biologist, personal communication, January 18, 2024.

Many of the changes in subsistence harvest and use patterns documented by this study are responses to climate-induced environmental changes. Observations made by survey and interview respondents included streambank erosion, drying of wetlands, and water quality changes related to thawing permafrost (03252023HSL05; 04042023KYU01; 04062023KYU06). Areas that had been previously known as good spawning habitats for salmon no longer support salmon (03232023HSL07). In addition, respondents noted unusually high river temperatures with negative consequences for the survival and spawning success of migrating salmon (03232023HSL01; 03232023HSL07; 04042023KYU01). Earlier ice breakup on the Yukon and Koyukuk rivers has meant that snowmachine travel may become unsafe as soon as late April or early May. The inability to travel by snowmachine can impede access to spring waterfowl hunting areas when migrating ducks and geese are available (03242023HSL03). Similarly, warmer temperatures have caused freeze-up to occurring later in the season, sometimes as late as December, which pushes the date that under-ice nets can be safely set to well past the time when sheefish and whitefishes outmigrate. Warm temperatures have been persisting later into the fall, well into the moose hunting season, which sometimes creates challenges for hunters in preventing meat spoilage (04062023KYU04; 04072023KYU08). These changes have required that subsistence hunters and fishers adapt the timing and location of their subsistence efforts, often at increased costs.

Residents of Huslia and Koyukuk have also had to adapt their cultural practices due in part to the environmental shifts described above. The survey effort in Huslia took place during a community-wide traditional healing gathering. The gathering linked participation in subsistence activities, food sharing, and using wild resources for crafts with the well-being of the individual and community. This gathering demonstrated the need for cultural expression through subsistence and related activities as a way of overcoming hardship. The relationships between subsistence practices and well-being have been documented for Indigenous populations across the United States and beyond (e.g., Burnette et al. 2018; Gall et al. 2021). In Koyukuk and Huslia, key respondents described the importance of subsistence foods in honoring deceased loved ones at potlatch ceremonies and how these traditions are challenged by the lack of salmon. Small adaptations, such as substituting store-bought fish for pike or sheefish in fish ice cream for potlatches[9] or bringing frozen whole salmon to fish camp for cutting and smoking,[10] support the continuation of important cultural traditions.

Conclusions

Subsistence ways of life are never static. The practices of harvesting wild resources are the result of the balanced integration of experience and knowledge—passed down through generations—with innovations and adaptations borne of change. Subsistence users have long been able to account for the variability of animal populations, weather, and other factors affecting successful harvests. In this study, the observations from interviewees and the reported harvest and use patterns from the survey respondents suggest new and significant changes that have accelerated the need for adaptation by subsistence users. Changing marine and freshwater conditions, shifting weather and long-term climate, and concerning migratory and health patterns of animal and fish populations have also been documented outside of this study. These studies make clear that the increase in variability in climatic processes, animal population dynamics, and environmental conditions makes predicting change difficult. Such rapid and severe changes represent a new reality for most residents of Interior Alaska. They also represent deeply felt losses, such as those stemming from the declines in salmon and their consequential effects on food provision, cultural traditions, and community and individual well-being. However, those who rely on the land to feed themselves have long proven to be adaptable to the changing circumstances around them. This study, in addition to documenting changes experienced by residents of two communities with largely subsistence-based economies in Interior Alaska, served to document the ways that people are learning to adapt to those changes and continue to practice their customary and traditional harvest and use of wild resources.

9. Jesse Coleman, ADF&G Subsistence Resource Specialist, field notes, March 24, 2023.
10. Jesse Coleman, ADF&G Subsistence Resource Specialist, field notes, April 6, 2023.

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APPENDIX A–SAMPLE SURVEY INSTRUMENT (HUSLIA)

COMPREHENSIVE WILD FOOD HARVEST SURVEY

HUSLIA, ALASKA

From January 1, 2022 to December 31, 2022

This survey is used to estimate wild food harvests and to describe rural community economies. We will publish a summary report, and send it to all households in your community. Summarized information is shared with the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, the National Park Service, and the general public. We work with the Federal Regional Advisory Councils and with local Fish and Game Advisory Committees to better manage wild food resources.

We will NOT identify your household. We will NOT use this information for enforcement. Participation in this survey is voluntary. Even if you agree to be surveyed, you may skip questions or stop at any time.

HOUSEHOLD ID:		
COMMUNITY ID:	Huslia	165
INTERVIEWER 1:		
INTERVIEWER 2:		
INTERVIEW DATE:		
START TIME:		
STOP TIME:		
DATA CODED BY:		
DATA ENTERED BY:		
SUPERVISOR:		

COOPERATING ORGANZATIONS

ALASKA DEPARTMENT OF FISH AND GAME
1300 COLLEGE RD.
FAIRBANKS, AK 99701
907-328-6120

HUSLIA TRIBAL COUNCIL
PO BOX 70
HUSLIA, AK 99746
907-829-2294

HOUSEHOLD MEMBERS

HOUSEHOLD ID HHID

First, I would like to ask about the people in your household, permanent members of your household who sleep at your house. This includes students who return home every summer. I am NOT interested in people who lived with you temporarily, even if they stayed several months.

Last year, that is, between January 1, 2022 and December 31, 2022 WHO were the head or heads of your household?

Is this person answering questions on this survey?		How is this person related to HEAD 1?	Is this person MALE or FEMALE?	Is this person ALASKA NATIVE?	In what YEAR was this person born?	Where were parents living when this person was born?	Total years person lived in Huslia?
ID #	*(circle)*	*(relation)*	*(circle)*	*(circle)*	*(year)*	*(AK city or state)*	*(year)*
HEAD 1	Y N		M F	Y N			
1							
NEXT enter spouse or partner. If a household has a SINGLE HEAD, leave HEAD 2 row BLANK and move to PERSON 3.							
HEAD 2	Y N		M F	Y N			
2							
BELOW, enter children (oldest to youngest), grandchildren, grandparents, or anyone else living full-time in this household.							
PERSON 03	Y N		M F	Y N			
3							
PERSON 04	Y N		M F	Y N			
4							
PERSON 05	Y N		M F	Y N			
5							
PERSON 06	Y N		M F	Y N			
6							
PERSON 07	Y N		M F	Y N			
7							
PERSON 08	Y N		M F	Y N			
8							
PERSON 09	Y N		M F	Y N			
9							
PERSON 10	Y N		M F	Y N			
10							
PERSON 11	Y N		M F	Y N			
11							
PERSON 12	Y N		M F	Y N			
12							
PERSON 13	Y N		M F	Y N			
13							
PERSON 14	Y N		M F	Y N			
14							
PERSON 15	Y N		M F	Y N			
15							

PERMANENT HH MEMBERS: 01 **HUSLIA: 165**

HOUSEHOLD PARTICIPATION

HOUSEHOLD ID HHID

To continue our questions about people in your household, I would like to ask a few questions about participation in harvesting wild foods…

Between January 1, 2022 and December 31, 2022 ...

Did this person….

PERSON ID FROM PAGE 2	FISH		LARGE LAND MAMMALS		SMALL LAND MAMMALS/ FURBEARERS		MARINE MAMMALS		MARINE INVERTEBRATES		BIRDS AND EGGS		PLANTS/ BERRIES/ WOOD	
	FISH FOR	PROCESS	HUNT	PROCESS	HUNT/ TRAP	PROCESS	HUNT	PROCESS	GATHER	PROCESS	HUNT/ GATHER	PROCESS	GATHER	PROCESS
ID #	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*	*(circle)*
HEAD 1	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
1														
HEAD 2	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
2														
PERSON 03	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
3														
PERSON 04	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4														
PERSON 05	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5														
PERSON 06	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
6														
PERSON 07	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
7														
PERSON 08	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
8														
PERSON 09	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
9														
PERSON 10	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
10														
PERSON 11	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
11														
PERSON 12	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
12														
PERSON 13	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
13														
PERSON 14	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
14														
PERSON 15	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
15														

PERMANENT HH MEMBERS: 01 **HUSLIA: 165**

RETAINED COMMERCIAL HARVESTS

HOUSEHOLD ID HHID

1. Do you or members of your household USUALLY participate in any commercial fishery?..... Y N

2. During the last year (January 1, 2022 and December 31, 2022),
did you, or members of your houseohld PARTICIPATE in any commercial fishery?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer to QUESTION 2 is *YES*, continue on this page...

During the last year,[1]
did you or members of your household…

A … FISH commercially for _____?

B … KEEP any ____ from your commercial catch for your own use[2] or to share?

C Was the ____ that you kept INCIDENTAL[4] catch?

if keep is "yes"

Please estimate how many fish ALL MEMBERS OF YOUR HOUSEHOLD removed from commercial harvests for personal use during the last year.

Include COMMERCIALLY HARVESTED fish that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If helping others, report ONLY THIS HOUSEHOLD's share.

Read names below in blanks above	A COMM FISH?	B KEEP?	C INCI?	How many were removed for your OWN USE?[5] *number*	How many were removed for your CREW?[5] *number*	How many were removed for your OTHERS? *number*	Units[3] *specify*	*comments*
CHINOOK (KING) SALMON *Ggaał*	Y N	Y N	Y N				IND.	
113000001								
SOCKEYE (RED) SALMON	Y N	Y N	Y N				IND.	
115000001								
COHO (SILVER) SALMON *Noídlaagha*	Y N	Y N	Y N				IND.	
112000001								
CHUM (DOG) SALMON *Noolaagha (Dog)/ Saanlaagha (Fall)*	Y N	Y N	Y N				IND.	
111000001								
PINK (HUMPIES) SALMON	Y N	Y N	Y N				IND.	
114000001								
HALIBUT	Y N	Y N	Y N				LB.	
121800001								
HERRING	Y N	Y N	Y N				GAL.	
120200001								
HERRING ROE	Y N	Y N	Y N				GAL.	
120300001								
CRAB	Y N	Y N	Y N				IND.	
501099001								
	Y N	Y N	Y N					
	Y N	Y N	Y N					

During the last year, did your household retain any other kind of commercialy retained fish or marine invertebrate?..... Y N

IF YES, enter the name in a blank row above, and answer the questions in that row.

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*
4 *"INCIDENTAL CATCH" means the fish kept was not being commercially fished. For example, a king salmon kept from a chum commerical fishery.*
5 *Double counting (captains' removals for crew members and crew members' removal for own uses) is fixed in analysis. Collect both.*

COMMERCIAL FISHING: 03 **HUSLIA: 165**

HARVESTS: SALMON

HOUSEHOLD ID HHID

1. Do you or members of your household USUALLY fish for salmon for subsistence, personal use, or sport?..... Y N

IF YES… How many do you USUALLY harvest for YOUR household?

Chinook….....	# CHINOOK
Summer Chum….....	# SUMMER CHUM
Fall Chum….....	# FALL CHUM
Coho..….....	# COHO
Pink….....	# PINK
Sockeye….....	# SOCKEYE
Other _____	# OTHER

2. During the last year (January 1, 2022 and December 31, 2022),

did you, or members of your household USE or TRY TO HARVEST salmon ?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer to QUESTION 2 is *YES*, continue on this page...

During the last year,[1]
did you or members of your household…

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many salmon ALL MEMBERS OF YOUR HOUSEHOLD got during the last year. How many were harvested with ….

INCLUDE salmon that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest. DO NOT INCLUDE catch and release fish or retained commercial harvests.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	SET GILL NET	DRIFT GILL NET	SEINE	DIP NET	ROD & REEL[3]	OTHER GEAR (specify type)	Units[4]	# of those used just for dog food?
						(number harvested by each gear type)					*amount / type*	*unit*	*amount*
SUMMER CHUM *noolaagha*	Y N	Y N	Y N	Y N	Y N						/	IND.	
111010000													
FALL CHUM *saanlaagha*	Y N	Y N	Y N	Y N	Y N						/	IND.	
111020000													
CHINOOK (KING) SALMON *Ggaał*	Y N	Y N	Y N	Y N	Y N						/	IND.	
113000000													
COHO *Nołdlaagha*	Y N	Y N	Y N	Y N	Y N						/	IND.	
112000000													
PINK SALMON	Y N	Y N	Y N	Y N	Y N						/	IND.	
114000000													
SOCKEYE SALMON	Y N	Y N	Y N	Y N	Y N						/	IND.	
115000000													
UNKNOWN SALMON	Y N	Y N	Y N	Y N	Y N						/	IND.	
119000000													

… continue with assessments questions on the NEXT PAGE

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *"ROD AND REEL" includes fish caught in open water with a hook and a line attached to a rod or a pole.*
4 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

HARVEST SUMMARY: SALMON

HOUSEHOLD ID HHID

If this household DID NOT USE or HARVEST salmon last year, go to the ASSESSMENT section below.

Otherwise, continue with mapping, and assessment sections…

MAPPING *Refer to data collection maps and mapping instructions to map salmon…*

ASSESSMENTS: SALMON 110000000

To conclude our salmon section, I am going to ask a few general questions about salmon.

During the last year,[1]

...Did your household use LESS, SAME, or MORE salmon than in recent years?..... X L S M

X = do not use

IF LESS or MORE …

WHY was your use different? _____ 1

_____ 2

During the last year,[1]

… did your household GET ENOUGH salmon?..... Y N

IF NO…

What KIND of salmon did you need? _____

_____

_____

How would you describe the impact to your household of not getting enough last year?

not noticable?	*minor?*	*major?*	*severe?*
(0)	(1)	(2)	(3)

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*

HARVESTS: NONSALMON

HOUSEHOLD ID HHID

1. Do you or members of your household USUALLY fish for nonsalmon for subsistence, personal use, or sport?..... Y N

2. During the last year (January 1, 2022 and December 31, 2022),
did you, or members of your household USE or TRY TO HARVEST nonsalmon ?..... Y N

IF the answer to QUESTION 2 is NO, go to the *NEXT PAGE*.

IF the answer to QUESTION 2 is *YES*, continue on this page...

During the last year,[1]
did you or members of your household…

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many nonsalmon ALL MEMBERS OF YOUR HOUSEHOLD got during the last year. How many were harvested with ….

INCLUDE nonsalmon that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest. DO NOT INCLUDE catch and release fish or retained commercial harvests.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	OPEN WATER SET GILL NET	OPEN WATER DRIFT GILL NET	UNDER ICE SET GILL NET	OPEN WATER JIGGING or ROD & REEL[3]	UNDER ICE JIGGING or ROD & REEL[3]	OTHER GEAR (specify type)	Units[4]	# of those used just for dog food?
						(number harvested by each gear type)					*amount / type*	*unit*	*amount*
HUMPBACK WHITEFISH *holehge, holaahga*	Y N	Y N	Y N	Y N	Y N						/	IND.	
126408000													
LEAST CISCO *tsaabaaye, tsabagha*	Y N	Y N	Y N	Y N	Y N						/	IND.	
126406060													
BROAD WHITEFISH *taaseze, taasiza*	Y N	Y N	Y N	Y N	Y N						/	IND.	
126404000													
BERING CISCO	Y N	Y N	Y N	Y N	Y N						/	IND.	
126406040													
ROUND WHITEFISH *hulten, tilagha*	Y N	Y N	Y N	Y N	Y N						/	IND.	
126412000													
SHEEFISH *edlaaghe, nidlagha*	Y N	Y N	Y N	Y N	Y N						/	IND.	
125600000													
UNKNOWN WHITEFISH	Y N	Y N	Y N	Y N	Y N						/	IND.	
126499000													
PIKE *K'oolkkoya*	Y N	Y N	Y N	Y N	Y N						/	IND.	
125500000													
BURBOT	Y N	Y N	Y N	Y N	Y N						/	IND.	
124800000													
ARCTIC GRAYLING *tłaghalbaaya*	Y N	Y N	Y N	Y N	Y N						/	IND.	
125200000													
	Y N	Y N	Y N	Y N	Y N						/		

During the last year, did your household use any other kind of nonsalmon fish?..... Y N

IF YES, enter the name in a blank row above, and answer the questions in that row.

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *"ROD AND REEL" includes fish caught in open water with a hook and a line attached to a rod or a pole.*
4 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

OTHER FISH: 06 **HUSLIA: 165**

HARVEST SUMMARY: NONSALMON

HOUSEHOLD ID HHID

If this household DID NOT USE or HARVEST nonsalmon last year, go to the ASSESSMENT section below.

Otherwise, continue with mapping, and assessment sections…

MAPPING *Refer to data collection maps and mapping instructions to map nonsalmon…*

ASSESSMENTS: NONSALMON 120000000

To conclude our nonsalmon section, I am going to ask a few general questions about nonsalmon.

During the last year,[1]

...Did your household use LESS, SAME, or MORE nonsalmon than in recent years?..... X L S M

X = do not use

IF LESS or MORE …

WHY was your use different? 1 _____

2 _____

During the last year,[1]

… did your household GET ENOUGH nonsalmon?..... Y N

IF NO…

What KIND of nonsalmon did you need? _____

_____

_____

How would you describe the impact to your household of not getting enough last year?

not noticable?	*minor?*	*major?*	*severe?*
(0)	(1)	(2)	(3)

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*

ASSESSMENTS OF NONSALMON: 66 **HUSLIA: 165**

HARVESTS: LARGE LAND MAMMALS

HOUSEHOLD ID HHID

1. Do you or members of your household USUALLY hunt for large land mammals?..... Y N

2. During the last year (January 1, 2022 and December 31, 2022),
did you, or members of your household USE or TRY TO HARVEST large land mammals ?..... Y N

IF the answer to QUESTION 2 is NO, go to the NEXT PAGE.

IF the answer to QUESTION 2 is *YES*, continue on this page...

During the last year,[1]
did you or members of your household…

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many large land mammals ALL MEMBERS OF YOUR HOUSEHOLD got during the last year.

INCLUDE large land mammals that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	SEX	January	February	March	April	May	June	July	August	September	October	November	December	Unknown	Units[3]	# used for food or food & fur?
						M/F	(specify amount harvested per month)														(num)
MOOSE *dineega*	Y N	Y N	Y N	Y N	Y N	M														IND.	
						F														IND.	
211800000						UNK														IND.	
211800001						1															
211800002						2															
211800009						-9															
CARIBOU *bidziyh*	Y N	Y N	Y N	Y N	Y N	M														IND.	
						F														IND.	
211000000						UNK														IND.	
211000001						1															
211000002						2															
211000009						-9															
BLACK BEAR *sis / daatłł'idza*	Y N	Y N	Y N	Y N	Y N															IND.	
210600000																					
BROWN BEAR *tłaaghoa / sis tłaagga' / noonee*	Y N	Y N	Y N	Y N	Y N															IND.	
210800000																					
DALL SHEEP *dibee*	Y N	Y N	Y N	Y N	Y N															IND.	
212200000																					
MUSKOX	Y N	Y N	Y N	Y N	Y N															IND.	
212000000																					
	Y N	Y N	Y N	Y N	Y N															IND.	
	Y N	Y N	Y N	Y N	Y N																
	Y N	Y N	Y N	Y N	Y N																

During the last year, did your household use any other kind of large land mammals?..... Y N

IF YES, enter the name in a blank row above, and answer the questions in that row.

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

LARGE LAND MAMMALS: 10 **HUSLIA: 165**

HARVEST SUMMARY: LARGE LAND MAMMALS

HOUSEHOLD ID HHID

If this household DID NOT USE or HARVEST large land mammals last year, go to the ASSESSMENT section below.

Otherwise, continue with mapping, and assessment sections…

MAPPING *Refer to data collection maps and mapping instructions to map large land mammals…*

ASSESSMENTS: LARGE LAND MAMMALS 210000000

To conclude our large land mammals section, I am going to ask a few general questions about large land mammals.

During the last year,[1]

...Did your household use LESS, SAME, or MORE large land mammals than in recent years?..... X L S M

X = do not use

IF LESS or MORE …

WHY was your use different? _____ 1

_____ 2

During the last year,[1]

… did your household GET ENOUGH large land mammals?..... Y N

IF NO…

What KIND of large land mammals did you need? _____

_____

_____

How would you describe the impact to your household of not getting enough last year?

not noticable?	*minor?*	*major?*	*severe?*
(0)	(1)	(2)	(3)

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*

ASSESSMENTS OF LARGE LAND MAMMALS: 66 **HUSLIA: 165**

HARVESTS: SMALL LAND MAMMALS OR FURBEARERS

HOUSEHOLD ID HHID

1. Do you or members of your household USUALLY hunt or trap for small land mammals or furbearers ?..... Y N

2. During the last year (January 1, 2022 and December 31, 2022),
did you, or members of your household USE or TRY TO HARVEST small land mammals or furbearers ?..... Y N

IF the answer to QUESTION 2 is NO, go to the NEXT PAGE.

IF the answer to QUESTION 2 is *YES*, continue on this page...

During the last year,[1]
did you or members of your household…

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many small land mammals or furbearers ALL MEMBERS OF YOUR HOUSEHOLD got during the last year.

INCLUDE small land mammals or furbearers that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting or trapping with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	January	February	March	April	May	June	July	August	September	October	November	December	Unknown	# used for food or food & fur? (num)	Units[3]
						(specify amount harvested per month)														
BEAVER *noya'a, ggaagga*	Y N	Y N	Y N	Y N	Y N															IND.
220200000																				
MUSKRAT *bikinaala*	Y N	Y N	Y N	Y N	Y N															IND.
222400000																				
PORCUPINE *dikahona*	Y N	Y N	Y N	Y N	Y N															IND.
222600000																				
WOLF *teekkona*	Y N	Y N	Y N	Y N	Y N															IND.
223200000																				
WOLVERINE *niltseeł*	Y N	Y N	Y N	Y N	Y N															IND.
223400000																				
SNOWSHOE HARE *gguh*	Y N	Y N	Y N	Y N	Y N															IND.
221004000																				
RED FOX *nohbaaya, naaggadla, kkaaghalggoya*	Y N	Y N	Y N	Y N	Y N															IND.
220804000																				
LYNX *kaazina*	Y N	Y N	Y N	Y N	Y N															IND.
221600000																				
MARTEN *sooga*	Y N	Y N	Y N	Y N	Y N															IND.
222000000																				
ARCTIC FOX *k'its'eeyh baaya'*	Y N	Y N	Y N	Y N	Y N															IND.
220802000																				
	Y N	Y N	Y N	Y N	Y N															IND.

During the last year, did your household use any other kind of small land mammals or furbearers?..... Y N

IF YES, enter the name in a blank row above, and answer the questions in that row.

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

SMALL LAND MAMMALS OR FURBEARERS: 14 **HUSLIA: 165**

HARVEST SUMMARY: SMALL LAND MAMMALS/FURBEARERS

HOUSEHOLD ID HHID

If this household DID NOT USE or HARVEST small land mammals/furbearers last year, go to the ASSESSMENT section below.

Otherwise, continue with mapping, and assessment sections…

MAPPING *Refer to data collection maps and mapping instructions to map small land mammals/furbearers…*

ASSESSMENTS: SMALL LAND MAMMALS/FURBEARERS 220000000

To conclude our small land mammals/furbearers section, I am going to ask a few general questions about small land mammals/furbearers.

During the last year,[1]

...Did your household use LESS, SAME, or MORE small land mammals/furbearers than in recent years?..... X L S M

X = do not use

IF LESS or MORE …

WHY was your use different? _____ 1

_____ 2

During the last year,[1]

… did your household GET ENOUGH small land mammals/furbearers?..... Y N

IF NO…

What KIND of small land mammals/furbearers did you need? _____

_____

_____

How would you describe the impact to your household of not getting enough last year?

not noticable?	*minor?*	*major?*	*severe?*
(0)	(1)	(2)	(3)

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*

ASSESSMENTS OF SMALL LAND MAMMALS/FURBEARERS: 66 **HUSLIA: 165**

HARVESTS: BIRDS

HOUSEHOLD ID HHID

1. Do you or members of your household USUALLY hunt for birds ?..... Y N

2. During the last year (January 1, 2022 and December 31, 2022),
did you, or members of your household USE or TRY TO HARVEST birds ?..... Y N

IF the answer to QUESTION 2 is NO, go to the NEXT PAGE.

IF the answer to QUESTION 2 is *YES*, continue on this page...

During the last year,[1]
did you or members of your household…

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many birds ALL MEMBERS OF YOUR HOUSEHOLD got during the last year.

INCLUDE birds that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	November - March WINTER	April - June SPRING	July - August SUMMER	September - October FALL	Season of harvest unknown (number)	Units[3] (specify)
						(specify amount harvested per season)					
CANADA GEESE *belaalzene / delghaa'e*	Y N	Y N	Y N	Y N	Y N						IND.
410404990											
WHITE-FRONTED GEESE *k'edot'aagge*	Y N	Y N	Y N	Y N	Y N						IND.
410410000											
SNOW GEESE *hugguh*	Y N	Y N	Y N	Y N	Y N						IND.
410408000											
SWAN *tobaa*	Y N	Y N	Y N	Y N	Y N						IND.
410699000											
LOON *tl'edlebaa/dodsene/tok'ootseghe/dodebeeye*	Y N	Y N	Y N	Y N	Y N						IND.
411216990											
AMERICAN WIGEON *seseeye*	Y N	Y N	Y N	Y N	Y N						IND.
410236020											
TEAL *hundzughutl*	Y N	Y N	Y N	Y N	Y N						IND.
410232990											
MALLARD *tletlkkughuyh*	Y N	Y N	Y N	Y N	Y N						IND.
410214000											
NORTHERN PINTAIL	Y N	Y N	Y N	Y N	Y N						IND.
410220000											
NORTHERN SHOVELER *delolegge*	Y N	Y N	Y N	Y N	Y N						IND.
410230000											
BLACK SCOTER *dets'en zene*	Y N	Y N	Y N	Y N	Y N						IND.
410228020											

… continue on next page

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

BIRDS: 15 **HUSLIA: 165**

HARVESTS: BIRDS

HOUSEHOLD ID HHID

IF this household did not USE or TRY TO HARVEST birds during the last year (January 1, 2022 and December 31, 2022) skip this page.

… continued from previous page

During the last year,[1]
did you or members of your household…

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many birds ALL MEMBERS OF YOUR HOUSEHOLD got during the last year.

INCLUDE birds that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	November - March WINTER	April - June SPRING	July - August SUMMER	September - October FALL	Season of harvest unknown (number)	Units[3] (specify)
						(specify amount harvested per season)					
WHITE-WINGED SCOTER *njaa*	Y N	Y N	Y N	Y N	Y N						IND.
410228060											
OTHER SCOTER	Y N	Y N	Y N	Y N	Y N						IND.
410228990											
BUFFLEHEAD *tl'aal*	Y N	Y N	Y N	Y N	Y N						IND.
410202000											
UNKNOWN GOLDENEYE *bentl'o dzaah ledloye*	Y N	Y N	Y N	Y N	Y N						IND.
410210990											
UNKNOWN EIDER	Y N	Y N	Y N	Y N	Y N						IND.
410206990											
LONG-TAILED DUCK	Y N	Y N	Y N	Y N	Y N						IND.
410218000											
PTARMIGAN *dilbagga*	Y N	Y N	Y N	Y N	Y N						IND.
421804000											
SPRUCE GROUSE *deyh*	Y N	Y N	Y N	Y N	Y N						IND.
421802020											
RUFFED GROUSE *k'eltuyhdle*	Y N	Y N	Y N	Y N	Y N						IND.
421802060											
SHARP-TAILED GROUSE *tsonggude*	Y N	Y N	Y N	Y N	Y N						IND.
421802040											
	Y N	Y N	Y N	Y N	Y N						IND.
	Y N	Y N	Y N	Y N	Y N						IND.

During the last year, did your household use any other kind of birds?..... Y N

IF YES, enter the name in a blank row above, and answer the questions in that row.

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

BIRDS: 15 **HUSLIA: 165**

HARVESTS: BIRD EGGS

HOUSEHOLD ID HHID

1. Do you or members of your household USUALLY gather bird eggs ?..... Y N

2. During the last year (January 1, 2022 and December 31, 2022),
did you, or members of your household USE or TRY TO HARVEST bird eggs ?..... Y N

IF the answer to QUESTION 2 is NO, go to the NEXT PAGE.

IF the answer to QUESTION 2 is *YES*, continue on this page...

During the last year,[1]
did you or members of your household…

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many bird eggs ALL MEMBERS OF YOUR HOUSEHOLD got during the last year.

INCLUDE bird eggs that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If gathering with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	AMOUNT	Units[3] (specify)	COMMENTS
GULL EGGS	Y N	Y N	Y N	Y N	Y N		IND.	
431212000								
GEESE EGGS	Y N	Y N	Y N	Y N	Y N		IND.	
430400000								
DUCK EGGS	Y N	Y N	Y N	Y N	Y N		IND.	
430200000								
	Y N	Y N	Y N	Y N	Y N		IND.	
	Y N	Y N	Y N	Y N	Y N		IND.	
	Y N	Y N	Y N	Y N	Y N		IND.	
	Y N	Y N	Y N	Y N	Y N		IND.	
	Y N	Y N	Y N	Y N	Y N		IND.	
	Y N	Y N	Y N	Y N	Y N			
	Y N	Y N	Y N	Y N	Y N			
	Y N	Y N	Y N	Y N	Y N			

During the last year, did your household use any other kind of bird eggs?..... Y N

IF YES, enter the name in a blank row above, and answer the questions in that row.

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

HARVEST SUMMARY: BIRDS AND EGGS

HOUSEHOLD ID HHID

If this household DID NOT USE or HARVEST birds and eggs last year, go to the ASSESSMENT section below.

Otherwise, continue with mapping, and assessment sections…

MAPPING *Refer to data collection maps and mapping instructions to map birds and eggs…*

ASSESSMENTS: BIRDS AND EGGS 400000000

To conclude our birds and eggs section, I am going to ask a few general questions about birds and eggs.

During the last year,[1]

...Did your household use LESS, SAME, or MORE birds and eggs than in recent years? ..... X L S M

X = do not use

IF LESS or MORE …

WHY was your use different? _____ 1

_____ 2

During the last year,[1]

… did your household GET ENOUGH birds and eggs? ..... Y N

IF NO…

What KIND of birds and eggs did you need? _____

_____

_____

How would you describe the impact to your household of not getting enough last year?	*not noticable?* (0)	*minor?* (1)	*major?* (2)	*severe?* (3)

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*

HARVESTS: PLANTS AND BERRIES (INCLUDING WOOD)

HOUSEHOLD ID HHID

1. Do you or members of your household USUALLY gather plants and berries (including wood) ?..... Y N

2. During the last year (January 1, 2022 and December 31, 2022),
did you, or members of your household USE or TRY TO HARVEST plants and berries (including wood) ?..... Y N

IF the answer to QUESTION 2 is NO, go to the NEXT PAGE.

IF the answer to QUESTION 2 is *YES*, continue on this page...

During the last year,[1]
did you or members of your household…

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many plants and berries (including wood) ALL MEMBERS OF YOUR HOUSEHOLD got during the last year.

INCLUDE plants and berries (including wood) that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If gathering with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	AMOUNT	Units[3] (specify)	COMMENTS
BLUEBERRY *geege*	Y N	Y N	Y N	Y N	Y N		GAL.	
601002000								
LOW BUSH CRANBERRY *denaalekk'eze*	Y N	Y N	Y N	Y N	Y N		GAL.	
601004000								
RASPBERRY *dets'en tl'aakk*	Y N	Y N	Y N	Y N	Y N		GAL.	
601020000								
HIGH BUSH CRANBERRY *donaaldloye*	Y N	Y N	Y N	Y N	Y N		GAL.	
601006000								
CROWBERRY (BLACKBERRY) *deenaalt'aas*	Y N	Y N	Y N	Y N	Y N		GAL.	
601007000								
CLOUD BERRY *ggaal ch'ejege*	Y N	Y N	Y N	Y N	Y N		GAL.	
601016000								
LABRADOR TEA *leyel*	Y N	Y N	Y N	Y N	Y N		GAL.	
602018000								
ROOTS (FOR FOOD)	Y N	Y N	Y N	Y N	Y N		GAL.	
602009000								
ROSE HIPS *kooyh*	Y N	Y N	Y N	Y N	Y N		GAL.	
602036000								
MUSHROOMS *nen' dzeghe'*	Y N	Y N	Y N	Y N	Y N		GAL.	
602040000								
MOUSEFOODS	Y N	Y N	Y N	Y N	Y N		GAL.	
602060000								
SPRUCE TIPS	Y N	Y N	Y N	Y N	Y N		GAL.	
602030000								

… continue on next page

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

HARVESTS: PLANTS AND BERRIES (INCLUDING WOOD)

HOUSEHOLD ID HHID

IF this household did not USE or TRY TO HARVEST plants and berries (including wood) during the last year (January 1, 2022 and December 31, 2022) skip this page.

… continued from previous page

During the last year,[1] **did you or members of your household…**

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many plants and berries (including wood) ALL MEMBERS OF YOUR HOUSEHOLD got during the last year.

INCLUDE plants and berries (including wood) that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If gathering with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	AMOUNT	Units[3] (specify)	COMMENTS
OTHER WILD GREENS	Y N	Y N	Y N	Y N	Y N		GAL.	
WILD RHUBARB	Y N	Y N	Y N	Y N	Y N		GAL.	
602006000								
CHAGA	Y N	Y N	Y N	Y N	Y N		GAL.	
602046040								
PUNK *kk'eeyh edaanee'one*	Y N	Y N	Y N	Y N	Y N		GAL.	
602046010								
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		GAL.	
	Y N	Y N	Y N	Y N	Y N		IND.	
	Y N	Y N	Y N	Y N	Y N		IND.	

FIREWOOD

	USE?	TRY TO HARVEST?	HARVEST?	RECEIVE?	GIVE AWAY?
FIREWOOD	Y N	Y N	Y N	Y N	Y N
604000000					

Please estimate the percentage of your household's heating needs in 2022 that came from firewood.

0%	1% - 25%	26% - 50%	51%-75%	76%-99%	100%
(0)	(1)	(2)	(3)	(4)	(5)

(circle one)

During the last year, did your household use any other kind of plants and berries (including wood)?..... Y N

IF YES, enter the name in a blank row above, and answer the questions in that row.

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

HARVEST SUMMARY: PLANTS AND BERRIES

HOUSEHOLD ID HHID

If this household DID NOT USE or HARVEST plants and berries last year, go to the ASSESSMENT section below.

Otherwise, continue with mapping, and assessment sections…

MAPPING *Refer to data collection maps and mapping instructions to map plants and berries…*

ASSESSMENTS: PLANTS AND BERRIES 600000000

To conclude our plants and berries section, I am going to ask a few general questions about plants and berries.

During the last year,[1]

...Did your household use LESS, SAME, or MORE plants and berries than in recent years? ..... X L S M

X = do not use

IF LESS or MORE …

WHY was your use different? _____ 1

_____ 2

During the last year,[1]

… did your household GET ENOUGH plants and berries? ..... Y N

IF NO…

What KIND of plants and berries did you need? _____

_____

_____

How would you describe the impact to your household of not getting enough last year?

not noticable?	*minor?*	*major?*	*severe?*
(0)	(1)	(2)	(3)

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*

ASSESSMENTS OF PLANTS AND BERRIES: 66 **HUSLIA: 165**

HARVESTS: MARINE MAMMALS

HOUSEHOLD ID HHID

1. Do you or members of your household USUALLY hunt for marine mammals?..... Y N

2. During the last year (January 1, 2022 and December 31, 2022),
did you, or members of your household USE or TRY TO HARVEST marine mammals ?..... Y N

IF the answer to QUESTION 2 is NO, go to the NEXT PAGE.

IF the answer to QUESTION 2 is *YES*, continue on this page...

During the last year,[1]
did you or members of your household…

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many marine mammals ALL MEMBERS OF YOUR HOUSEHOLD got during the last year.

INCLUDE marine mammals that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	SEX	January	February	March	April	May	June	July	August	September	October	November	December	Unknown	Units[3]
						M/F	*(specify amount harvested per month)*													*(specify)*
BEARDED SEAL	Y N	Y N	Y N	Y N	Y N	M														IND.
						F														IND.
300802000						UNK														IND.
300812000						1														
301200000						2														
300804000						-9														
WHALE (SPECIFY)	Y N	Y N	Y N	Y N	Y N															IND.
301699000																				
UNKNOWN SEAL *tsu'uyh*	Y N	Y N	Y N	Y N	Y N															IND.
300899000																				
	Y N	Y N	Y N	Y N	Y N															IND.
	Y N	Y N	Y N	Y N	Y N															IND.
	Y N	Y N	Y N	Y N	Y N															IND.
	Y N	Y N	Y N	Y N	Y N															IND.
	Y N	Y N	Y N	Y N	Y N															IND.
	Y N	Y N	Y N	Y N	Y N															IND.
	Y N	Y N	Y N	Y N	Y N															IND.
	Y N	Y N	Y N	Y N	Y N															IND.

During the last year, did your household use any other kind of marine mammals?..... Y N

IF YES, enter the name in a blank row above, and answer the questions in that row.

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

MARINE MAMMALS: 12 **HUSLIA: 165**

HARVEST SUMMARY: MARINE MAMMALS

HOUSEHOLD ID HHID

If this household DID NOT USE or HARVEST marine mammals last year, go to the ASSESSMENT section below.

Otherwise, continue with mapping, and assessment sections…

MAPPING *Refer to data collection maps and mapping instructions to map marine mammals…*

ASSESSMENTS: MARINE MAMMALS 300000000

To conclude our marine mammals section, I am going to ask a few general questions about marine mammals.

During the last year,[1]

...Did your household use LESS, SAME, or MORE marine mammals than in recent years? ..... X L S M

X = do not use

IF LESS or MORE …

WHY was your use different? _____ 1

_____ 2

During the last year,[1]

… did your household GET ENOUGH marine mammals? ..... Y N

IF NO…

What KIND of marine mammals did you need? _____

_____

_____

How would you describe the impact to your household of not getting enough last year?

not noticable?	*minor?*	*major?*	*severe?*
(0)	(1)	(2)	(3)

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*

ASSESSMENTS OF MARINE MAMMALS: 66 **HUSLIA: 165**

HARVESTS: MARINE INVERTEBRATES

HOUSEHOLD ID HHID

1. Do you or members of your household USUALLY harvest marine invertebrates?..... Y N

2. During the last year (January 1, 2022 and December 31, 2022),
did you, or members of your household USE or TRY TO HARVEST marine invertebrates ?..... Y N

IF the answer to QUESTION 2 is NO, go to the NEXT PAGE.

IF the answer to QUESTION 2 is *YES*, continue on this page...

During the last year,[1]
did you or members of your household…

A … use[2] _____?
B … receive _____ from another HH or community?
C … give ____ to another HH or community?
D …try[2] to harvest _____?
E … actually harvest any _____?

if harvest is "yes"

Please estimate how many marine invertebrates ALL MEMBERS OF YOUR HOUSEHOLD got during the last year. How many were harvested?

INCLUDE marine invertebrates that members of this household gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If harvesting with or helping others, report ONLY THIS HOUSEHOLD'S share of the harvest. DO NOT INCLUDE retained commercial harvests.

Read names below in blanks above	A USE	B REC	C GIVE	D TRY	E HAR	Amount *(amount)*	Units[3] *unit*	Comments
DUNGENESS CRAB	Y N	Y N	Y N	Y N	Y N		IND.	
501004000								
KING CRAB	Y N	Y N	Y N	Y N	Y N		IND.	
501008000								
TANNER CRAB	Y N	Y N	Y N	Y N	Y N		IND.	
501012000								
RAZOR CLAMS	Y N	Y N	Y N	Y N	Y N		GAL.	
500612000								
FRESHWATER CLAMS *hultl'ogle tl'oge'*	Y N	Y N	Y N	Y N	Y N		GAL.	
500604000								
BUTTER CLAMS	Y N	Y N	Y N	Y N	Y N		GAL.	
500602000								
CLAMS	Y N	Y N	Y N	Y N	Y N		GAL.	
500699000								
	Y N	Y N	Y N	Y N	Y N			
	Y N	Y N	Y N	Y N	Y N			
	Y N	Y N	Y N	Y N	Y N			
	Y N	Y N	Y N	Y N	Y N			

During the last year, did your household use any other kind of marine invertebrates?..... Y N
IF YES, enter the name in a blank row above, and answer the questions in that row.

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*
2 *"USE" includes eating, feeding to dogs, sharing or trading with others, etc.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

HARVEST SUMMARY: MARINE INVERTEBRATES

HOUSEHOLD ID HHID

If this household DID NOT USE or HARVEST marine invertebrates last year, go to the ASSESSMENT section below.

Otherwise, continue with mapping, and assessment sections…

MAPPING *Refer to data collection maps and mapping instructions to map marine invertebrates…*

ASSESSMENTS: MARINE INVERTEBRATES 500000000

To conclude our marine invertebrates section, I am going to ask a few general questions about marine invertebrates.

During the last year,[1]

...Did your household use LESS, SAME, or MORE marine invertebrates than in recent years?..... X L S M

X = do not use

IF LESS or MORE …

WHY was your use different? _____ 1

_____ 2

During the last year,[1]

… did your household GET ENOUGH marine invertebrates?..... Y N

IF NO…

What KIND of marine invertebrates did you need? _____

_____

_____

How would you describe the impact to your household of not getting enough last year?

not noticable?	*minor?*	*major?*	*severe?*
(0)	(1)	(2)	(3)

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*

ASSESSMENTS OF MARINE INVERTEBRATES: 66 **HUSLIA: 165**

HARVEST SUMMARY: ALL RESOURCES

HOUSEHOLD ID HHID

ASSESSMENTS: ALL RESOURCES 0

To conclude our harvests section, I am going to ask a few general questions about wild resources

During the last year,[1]

...Did your household use LESS, SAME, or MORE all resources than in recent years?..... X L S M

X = do not use

IF LESS or MORE …

WHY was your use different? _____ 1

_____ 2

During the last year,[1]

… did your household GET ENOUGH all resources?..... Y N

IF NO…

What KIND of all resources did you need? _____

_____

_____

How would you describe the impact to your household of not getting enough last year?	*not noticable?* (0)	*minor?* (1)	*major?* (2)	*severe?* (3)

1 *"LAST YEAR" means between January 1, 2022 and December 31, 2022.*

ASSESSMENTS OF ALL RESOURCES: 66 **HUSLIA: 165**

FOOD SECURITY

HOUSEHOLD ID HHID

The questions on this page have been asked all over the United States to find out if Americans have enough to eat. We would like to know if people in your community have enough to eat. I'd like you to think about all your household's food, both and store-bought...

Which of these three statements best describes the food eaten in your household in the last 12 months…

(circle one)

HH1

❶ **STATEMENT 1**. We had enough of the kinds of food we wanted to eat……
❷ **STATEMENT 2**. We had enough food, but not always the KIND of food we wanted to eat……
❸ **STATEMENT 3**. Sometimes, or often, we did **NOT HAVE ENOUGH** food to eat……

1 2 3

If *STATEMENT 2* or *STATEMENT 3* was *TRUE*, continue with food security questions on this page. Otherwise, go to next section…

Now I am going to read you several statements about different food situations.
Please tell me whether EACH statement was true for your household (HH) in the last 12 months.

❹ **STATEMENT 4. We WORRIED that our household would run out of food before we could get more.** HH4

In the last 12 months, was this ever true for your household?..... N Y ?

If YES…

…in which months did this happen? J F M A M J J A S O N D

…did this happen because your household couldn't get WILD FOOD,
your HH couldn't get STORE-BOUGHT food, or your HH couldn't get BOTH KINDS of food?..... WILD STOR BOTH

❺ **STATEMENT 5. We could not get the kinds of foods we wanted to eat because of a LACK OF RESOURCES.** HH5

In the last 12 months, was this ever true for your household?..... N Y ?

If YES…

…in which months did this happen? J F M A M J J A S O N D

…did this happen because your household couldn't get WILD FOOD,
your HH couldn't get STORE-BOUGHT food, or your HH couldn't get BOTH KINDS of food?..... WILD STOR BOTH

❻ **STATEMENT 6. The food we had JUST DID NOT LAST, and we could not get more.** HH6

In the last 12 months, was this ever true for your household?..... N Y ?

If YES…

…in which months did this happen? J F M A M J J A S O N D

Now, think just about your household's WILD FOOD…

❼ **STATEMENT 7. The WILD food we had JUST DID NOT LAST, and we could not get more.** HH7

In the last 12 months, was this ever true for your household?..... N Y ?

If YES…

…in which months did this happen? J F M A M J J A S O N D

Now, think just about your household's STORE-BOUGHT food…

❽ **STATEMENT 8. The STORE-BOUGHT food we had JUST DID NOT LAST, and we could not get more.** HH8

In the last 12 months, was this ever true for your household?..... N Y ?

If YES…

…in which months did this happen? J F M A M J J A S O N D

If any ONE of the STATEMENTS 4, 5, OR 6 was "YES," continue with food security questions on next page. Otherwise, go to next section…

FOOD SECURITY

HOUSEHOLD ID HHID

If any ONE of the STATEMENTS 4, 5, or 6 on previous page was "YES," continue with food security questions below. Otherwise, go to next section…

In the past 12 months, did you or other adults in your household ever CUT THE SIZE OF YOUR MEALS OR SKIP MEALS because the HH could not get the food that was needed? …… AD1 N Y ?

If YES…

…in which months did this happen? J F M A M J J A S O N D

In the last 12 months, did you or other adults in your household ever EAT LESS THAN YOU FELT YOU SHOULD because the HH could not get the food that was needed?..... AD2 N Y ?

In the last 12 months, were adults in the HH ever HUNGRY BUT DID NOT EAT because there was not enough food?..... AD3 N Y ?

In the last 12 months, did adults in the HH LOSE WEIGHT because there was not enough food?..... AD4 N Y ?

In the last 12 months, did adults in the HH ever NOT EAT FOR A WHOLE DAY because there was not enough food?..... AD4 N Y ?

If YES…

…in which months did this happen? J F M A M J J A S O N D

EMPLOYMENT

HOUSEHOLD ID HHID

The next few pages ask about jobs and income. We ask about these things because we are trying to understand all parts of the community economy. Many people use wages from jobs to support hunting, fishing, and gathering activities.

Between January 1, 2022 and December 31, 2022 ...

…Did any members of your household earn money from a JOB or from SELF EMPLOYMENT?..... Y N

Between January 1, 2022 and December 31, 2022 ...

For each member of this household born before 2007, list EACH JOB held last year. For household members who did not have a job, write: RETIRED, UNEMPLOYED, STUDENT, HOMEMAKER, DISABLED, etc..

				INCLUDE EACH PERSON 16 YEARS AND OLDER EVEN IF THEY DID NOT HAVE A JOB				WORK SCHEDULE[2]					
				Person code from page 2	What kind of work did he or she do in this job?	For whom did he or she work in this job?	In the past year, what months did he or she work in this job?	FULL TIME	PART TIME	SHIFT - FULL TIME	ON CALL, VARIES	SHIFT PART-TIME	In the past year how much did he or she earn in this job?
				(ID #)	*(job title [1])*	*(employer)*	*(circle each month worked)*	*(circle one)*					*(gross income [3])*
	1ST JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
1	6	910100000			*SOC:*	*SIC:*		schedule:					
	2ND JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
2	6	910100000			*SOC:*	*SIC:*		schedule:					
	3RD JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
3	6	910100000			*SOC:*	*SIC:*		schedule:					
	4TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
4	6	910100000			*SOC:*	*SIC:*		schedule:					
	5TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
5	6	910100000			*SOC:*	*SIC:*		schedule:					
	6TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
6	6	910100000			*SOC:*	*SIC:*		schedule:					
	7TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
7	6	910100000			*SOC:*	*SIC:*		schedule:					
	8TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
8	6	910100000			*SOC:*	*SIC:*		schedule:					
	9TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
9	6	910100000			*SOC:*	*SIC:*		schedule:					
	10TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
10	6	910100000			*SOC:*	*SIC:*		schedule:					
	11TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ /YR
11	6	910100000			*SOC:*	*SIC:*		schedule:					

If a person FISHES COMMERCIALLY or is otherwise SELF-EMPLOYED, list that as a separate job. For job title, enter COMMERCIAL FISHER, CARVER, SEWER, BAKER, etc. Work schedule usually will be ON CALL. For gross income from self-employment, enter revenue MINUS expenses.

If a person does not earn money from any kind of work, enter RETIRED, UNEMPLOYED, DISABLED, STUDENT, or HOMEMAKER or other appropriate description as the job title.

Leave employer, months worked, schedule, and gross income blank.

WORK SCHEDULE
FT *- Fulltime (35+ hr/wk)*
PT *- Parttime (<35 hr/wk)*
SF *- Shift (2wks on/2wks off, etc.)*
SP *- Shift - part time*
OC *- Irregular, on call -- -Unemployed*

GROSS INCOME is the same as TAXABLE INCOME on a W-2 form. Self-employment, enter revenue - expense

OTHER INCOME

HOUSEHOLD ID HHID

Between January 1, 2022 and December 31, 2022 ...

…Did any members of your household receive a dividend from the Permanent Fund or a native corporation?..... Y N

IF NO, go to the next section on this page

IF YES, continue below…

		Did anyone in your household receive income from _____ in 2022 (circle one)		TOTAL amount all members of your household received from _____ in 2022 (dollars)	
DIVIDENDS	ALASKA PERMANENT FUND DIVIDEND	Y	N	$	/YR
	32				
	NATIVE CORPORATION DIVIDENDS	Y	N	$	/YR
	13				

Alaska PFD IN 2022
1 PFD = $3,284
2 PFD = $6,568
3 PFD = $9,852
4 PFD = $13,136
5 PFD = $16,420
6 PFD = $19,704
7 PFD = $22,988
8 PFD = $26,272
9 PFD = $29,556
10 PFD = $32,840
11 PFD = $36,124
12 PFD = $39,408

Regional corporations	***Dividend***
Doyon Ltd. Class A, B, C, D, E	$14.71/Share

Village corporations	***Dividend***
K'oyitl'ots'ina Ltd. (K Corp)	$27.00/Share

Between January 1, 2022 and December 31, 2022 ...

…Did any members of your household receive OTHER income such as SENIOR BENEFITS or UNEMPLOYMENT?..... Y N

IF NO, go to the next section on this page

IF YES, continue below…

		Received? (circle one)		Total amount? (dollars)	
EMPLOYMENT RELATED	UNEMPLOYMENT	Y	N	$	/YR
	12				
	WORKERS' COMP	Y	N	$	/YR
	8				
	SOCIAL SECURITY	Y	N	$	/YR
	7				
	PENSION & RETIREMENT	Y	N	$	/YR
	5				
	DISABILITY	Y	N	$	/YR
	31				
	VETERANS ASSISTANCE	Y	N	$	/YR
	35				
ENTITLEMENTS	FOOD STAMPS (SNAP/QUEST CARDS)	Y	N	$	/YR
	11				
	ADULT PUBLIC ASSISTANCE	Y	N	$	/YR
	3				
	SUPPLIMENTAL SECURITY INCOME (SSI)	Y	N	$	/YR
	10				
STATE BENEFITS	ENERGY ASSISTANCE	Y	N	$	/YR
	9				
	ALASKA SENIOR BENEFITS (LONGEVITY)	Y	N	$	/YR
	6				

		Received? (circle one)		Total amount? (dollars)	
FAMILY & CHILD	TANF (say "tanif", used to be ADFC)	Y	N	$	/YR
	2				
	CHILD SUPPORT	Y	N	$	/YR
	15				
	FOSTER CARE	Y	N	$	/YR
	41				
OTHER	FUEL VOUCHERS	Y	N	$	/YR
	49				
	MEETING HONORARIA *(not per diem*)*	Y	N	$	/YR
	50				
	STIMULUS CHECK *(economic impact payment)*	Y	N	$	/YR
	51				
	OTHER (describe)	Y	N	$	/YR
	OTHER (describe)	Y	N	$	/YR

* per diem covers travel expenses, and is not counted as income.

Senior Benefits of $125 per month for 12 months = $1,500 per elder

Senior Benefits of $175 per month for 12 months = $2,100 per elder

Senior Benefits of $250 per month for 12 months = $3,000 per elder

Scratch paper for calculations

for _____ weeks =
for _____ weeks =

for _____ weeks =
for _____ weeks =

for _____ weeks =
for _____ weeks =

COMMENTS

HOUSEHOLD ID HHID

DO YOU HAVE ANY QUESTIONS, COMMENTS OR CONCERNS?

INTERVIEW SUMMARY:

DON'T FORGET TO FILL IN THE STOP TIME _____

COMMENTS: 300 **HUSLIA: 165**

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APPENDIX B–INTERVIEW PROTOCOL

Comprehensive Subsistence Survey Ethnographic Protocol

Part 1. Demographic Information
In the beginning of each interview, I recommend asking some basic demographic questions:

1. name
2. year/location born
3. parents names and where from?
4. how long has respondent been hunting/fishing?

Then, it is often useful to take the seasonal round approach when doing interviews and let people answer the questions below through the structure of a description of the parts of the seasonal round that they participate in. That way, you can also document seasonal camps used in the past or currently used by respondent. **[Keep in mind that you do not have to do it this way, but the species sections below are ordered by a seasonal round. Skip around if that works better for you and your respondent.]**

Beginning in the spring with bird hunting…

Part 2. Migratory Bird hunting

1. Please describe your current migratory bird hunting practices:

a. what are the primary species you try to get every year? Do you collect eggs (which kinds?)

b. who do you hunt with year to year? How is this determined?

c. if you are successful, what do you do with the birds – how do you distribute/share it?

d. How do you preserve/process your harvest?

e. how do you feel the different bird populations are doing right now? Why do you think the population is declining/increasing? Are the different bird species healthy?

f. Are there environmental factors that contribute to changes in bird migrations and hunting? (changing weather patterns, changing habitat, etc)

g. are younger people learning to hunt birds? If so, how do they do that? How did you learn?

h. can you show us where you hunt now (or in the last 5 years?) what about the last 10 or 20 years? Have those areas changed at all?

i. are there any rules about hunting or the treatment of birds during hunting/harvest?

j. native names for birds or other aspects of bird hunting? Do you remember any traditional stories about birds or bird hunting in your village?

k. are there any natural seasonal indicators that you use to know when the birds will come?

Part 3. Non-salmon fishing – ask questions for each species (households are likely to harvest multiple species. While we want to document all species they harvest, the most important species to cover will be: whitefish [differentiate species if possible], sheefish, and pike. If a household heavily harvests another species, document that as much as possible.**)**

1. Please describe your current non-salmon fishing practices:

a. which species do you harvest? Timing of that harvest (for each species)?

b. do you fish with other people? How is this determined?

c. what are the primary means you use to harvest different species of non-salmon? (gear type by species?)

d. what do you do with the non-salmon you harvest – how do you distribute/share it?

e. are younger people learning to fish? If so, how do they do that? How did you learn?

f. how do you feel the non-salmon population is doing right now? Why do you think the population is declining/increasing? Are the non- salmon healthy?

g. Have your fishing areas changed at all? (map changes in area – currently and 10-20 years ago)

h. if there are changes to your fishing areas, what explains those changes? (environmental conditions, personal circumstances, traditional areas, changes in the fish population, regulations, etc)

i. Are there environmental factors that contribute to changes in non-salmon fishing? (weather, river conditions, etc)

g. which parts of the fish do you use? How do you preserve/process these parts?

h. are there any rules about fishing or the treatment of fish/nets during fishing?

i. native names for non- salmon species or other aspects of fishing? Do you remember any traditional stories about non-salmon species or fishing in your village?

Part 4. Salmon fishing

1. Please describe your current salmon fishing practices:

a. do you fish with other people? How is this determined?

b. which species do you harvest? Timing of that harvest?

c. what are the primary means you use to harvest salmon? (gear type by species?)

d. what do you do with the salmon you harvest – how do you distribute/share it?

e. which parts of the salmon do you use? How do you preserve/process these parts?

f. how do you feel the salmon population is doing right now? Why do you think the population is declining/increasing? Are the salmon healthy?

g. Have your fishing areas changed at all? (map changes in area – currently and 10-20 years ago)

h. if there are changes to your fishing areas, what explains those changes? (environmental conditions, personal circumstances, traditional areas, changes in the fish population, regulations, etc)

i. Are there environmental factors that contribute to changes in salmon fishing? (weather, river conditions, etc)

j. many people say that the elders used observations of the environment (changes in the land or water, weather, other animals' behavior) to know when salmon were coming and how many might come. Do you remember any of these 'natural indicators'?

k. are younger people learning to fish? If so, how do they do that? How did you learn?

l. are there any rules about fishing or the treatment of fish/nets during fishing?

m. native names for salmon species or other aspects of fishing? Do you remember any traditional stories about salmon or fishing in your village?

Part 5. Moose hunting

1. Please describe your current moose hunting practices

a. who do you hunt with year to year? How is this determined?

b. if you are successful, what do you do with the moose – how do you distribute/share it?

c. which parts of the moose do you use? How do you preserve/process these parts?

d. how do you feel the moose population is doing right now? Why do you think the population is declining/increasing (e.g. predation concerns, hard winters, good habitat, etc?)? Are the moose healthy?

e. Are there environmental factors that contribute to changes in moose hunting? (weather, river conditions, etc)

f. are younger people learning to hunt? If so, how do they do that? How did you learn?

g. can you show us where you hunt now (or in the last 5 years?) what about the last 10 or 20 years? Have those areas changed at all?

h. are there any rules about hunting or the treatment of moose or other animals during moose hunting/harvest?

i. native names for moose or other aspects of moose hunting? Do you remember any traditional stories about moose or moose hunting in your village?

Part 6. Other large game hunting (brown bear, black bear, caribou)

1. Please describe your current big game hunting practices (for each…)

a. who do you hunt with year to year? How is this determined?

b. if you are successful, what do you do with the bear/caribou – how do you distribute/share it?

c. which parts of the bear/caribou do you use? How do you preserve/process these parts?

d. how do you feel the bear/caribou population is doing right now? Why do you think the population is declining/increasing? Are they healthy?

e. can you show us where you hunt now (or in the last 5 years?) what about the last 10 or 20 years? Have those areas changed at all?

f. Are there environmental factors that contribute to changes in bear/caribou hunting? (weather, river conditions, winter conditions, migratory routes (caribou), etc)

g. are younger people learning to hunt? If so, how do they do that? How did you learn?

h. are there any rules about hunting or the treatment of bear/caribou or other animals during moose hunting/harvest?

i. native names for bear/caribou or other aspects of bear/caribou hunting? Do you remember any traditional stories about bear/caribou or bear/caribou hunting in your village?

Part 7. Trapping

1. Please describe your current trapping practices:

a. do you trap with anyone else? How is this determined?

b. how do you 'hold' your trapline? From whom (if anyone) did you get it/take it over?

c. are younger people learning to trap? If so, how do they do that? How did you learn?

d. what species do you trap? Why?

e. how do you feel the population of the animals you trap is doing right now? Why do you think the population is declining/increasing? Are the species you trap healthy?

f. can you show us where you trap now (or in the last 5 years?) what about the last 10 or 20 years? Have those areas changed at all?

g. Are there environmental factors that contribute to changes in trapping? (changing weather, snow pack, river conditions, etc)

APPENDIX C–CONVERSION FACTORS, HUSLIA, ALASKA

The following table presents the conversion factors used in determining how many pounds were harvested of each resource surveyed. For instance, if respondents reported harvesting 3gal of burbot, the quantity would be multiplied by the appropriate conversion factor (in this case 4.2) to show a harvest of 12.6 lb of burbot.

Resource name	Reported units	Conversion factor
Summer chum salmon	Individual	5.701
Fall chum salmon	Individual	5.701
Chum salmon [CF retention]	Individual	5.701
Coho salmon	Individual	4.671
Coho salmon [CF retention]	Individual	4.671
Chinook salmon	Individual	14.003
Chinook salmon [CF retention]	Individual	14.003
Pink salmon	Individual	2.370
Pink salmon [CF retention]	Individual	2.370
Sockeye salmon	Individual	4.336
Sockeye salmon [CF retention]	Individual	4.336
Unspecified salmon	Individual	0.000
Pacific herring [CF retention]	Gallons	6.000
Pacific herring roe [CF retention]	Gallons	6.000
Pacific halibut [CF retention]	Pounds	1.000
Alaska blackfish	Individual	0.700
Burbot	Individual	4.200
Dolly Varden	Individual	3.300
Arctic grayling	Individual	0.900
Northern pike	Individual	3.300
Sheefish	Individual	5.500
Broad whitefish	Individual	3.200
Bering cisco	Individual	1.400
Least cisco	Individual	0.700
Unspecified ciscoes	Individual	1.253
Unspecified ciscoes	Quarts	1.500
Humpback whitefish	Individual	2.100
Round whitefish	Individual	0.700
Unspecified whitefishes	Individual	3.957
Unspecified nonsalmon fish	Individual	0.000
Black bear	Individual	88.000
Brown bear	Individual	86.000
Caribou	Individual	136.000
Moose	Individual	538.000
Common muskox	Individual	295.000
Dall sheep	Individual	104.000
Beaver	Individual	20.000
Arctic fox	Individual	0.000

-continued-

Conversion factors, Huslia.–Page 2 of 4.

Resource name	Reported units	Conversion factor
Red fox	Individual	0.000
Snowshoe hare	Individual	1.500
Lynx	Individual	0.000
Martens	Individual	0.000
Mink	Individual	0.000
Muskrat	Individual	0.000
Porcupine	Individual	8.000
Gray wolf	Individual	0.000
Wolverine	Individual	0.000
Bearded seal	Individual	286.000
Unspecified seals	Individual	0.000
Bowhead whale	Individual	0.000
Unspecified whales	Individual	0.000
Bufflehead	Individual	0.570
Canvasback	Individual	1.740
Unspecified eiders	Individual	0.000
Unspecified goldeneyes	Individual	1.270
Mallard	Individual	1.610
Long-tailed duck	Individual	1.160
Northern pintail	Individual	1.180
Black scoter	Individual	1.510
Surf scoter	Individual	1.460
White-winged scoter	Individual	2.610
Unspecified scoters	Individual	1.598
Northern shoveler	Individual	0.860
Unspecified teals	Individual	0.470
American wigeon	Individual	1.050
Unspecified ducks	Individual	0.000
Unspecified Canada/cackling geese	Individual	2.830
Snow goose	Individual	2.800
Greater white-fronted goose	Individual	3.180
Unspecified geese	Individual	0.000
Unspecified swans	Individual	10.980
Sandhill crane	Individual	5.400
Unspecified loons	Individual	3.600
Spruce grouse	Individual	0.850
Sharp-tailed grouse	Individual	1.030
Ruffed grouse	Individual	0.850
Unspecified grouses	Individual	0.910

-continued-

Conversion factors, Huslia.–Page 3 of 4.

Resource name	Reported units	Conversion factor
Ptarmigans	Individual	0.770
Duck eggs	Individual	0.000
Goose eggs	Individual	0.000
Gull eggs	Individual	0.214
Butter clam	Gallons	3.000
Freshwater clams	Gallons	3.000
Razor clam	Gallons	3.000
Unspecified clams	Gallons	3.000
Dungeness crab	Individual	0.700
King crabs	Individual	2.101
Tanner crab	Individual	0.400
Unspecified crabs [CF retention]	Individual	0.000
Blueberry	Gallons	4.000
Blueberry	Quarts	1.000
Lowbush cranberry	Gallons	4.000
Lowbush cranberry	Quarts	1.000
Highbush cranberry	Gallons	4.000
Highbush cranberry	Quarts	1.000
Highbush cranberry	Pints	0.500
Crowberry	Gallons	4.000
Crowberry	Quarts	1.000
Crowberry	Pints	0.500
Cloudberry	Gallons	4.000
Cloudberry	Quarts	1.000
Cloudberry	Cups	0.250
Raspberry	Gallons	4.000
Raspberry	Pints	0.500
Other wild berries	Gallons	4.000
Wild rhubarb	Gallons	1.000
Wild rhubarb	Quarts	0.250
Wild potato	Gallons	1.000
Hudson’s Bay (Labrador) tea	Gallons	1.000
Hudson’s Bay (Labrador) tea	Quarts	0.250
Hudson’s Bay (Labrador) tea	Pints	0.130
Dandelion greens	Gallons	1.000
Spruce tips	Gallons	0.000
Wild rose hips	Gallons	4.000
Yarrows	Gallons	1.000
Other wild greens	Gallons	1.000
Unspecified mushrooms	Gallons	1.000

-continued-

Conversion factors, Huslia.–Page 4 of 4.

Resource name	Reported units	Conversion factor
Unspecified mushrooms	Plastic bag	1.000
Fireweed	Gallons	1.000
Fireweed	Quarts	0.250
Stinkweed	Gallons	0.000
Punk	Pounds	0.000
Punk	Gallons	0.000
Punk	Plastic bag	0.000
Chaga	Pounds	0.000
Chaga	Gallons	0.000
Chaga	Quarts	0.000
Chaga	Plastic bag	0.000
Mousefoods	Gallons	1.000
Willows	Gallons	0.000

Source ADF&G Division of Subsistence household surveys, 2022.

a. Conversion factors were not calculated for the resources that were not reportedly harvested during the study year and for which no value is available in the CSIS.

APPENDIX D–CONVERSION FACTORS, KOYUKUK, ALASKA

The following table presents the conversion factors used in determining how many pounds were harvested of each resource surveyed. For instance, if respondents reported harvesting 3gal of burbot, the quantity would be multiplied by the appropriate conversion factor (in this case 4.2) to show a harvest of 12.6 lb of burbot.

Resource name	Reported units	Conversion factor
Summer chum salmon	Individual	5.701
Fall chum salmon	Individual	5.701
Chum salmon [CF retention]	Individual	5.701
Coho salmon	Individual	4.671
Coho salmon [CF retention]	Individual	4.671
Chinook salmon	Individual	14.003
Chinook salmon [CF retention]	Individual	14.003
Pink salmon	Individual	2.370
Pink salmon [CF retention]	Individual	2.370
Sockeye salmon	Individual	4.336
Sockeye salmon [CF retention]	Individual	4.336
Unspecified salmon	Individual	0.000
Pacific herring [CF retention]	Gallons	6.000
Pacific herring roe [CF retention]	Gallons	6.000
Pacific halibut [CF retention]	Pounds	1.000
Burbot	Individual	4.200
Arctic grayling	Individual	0.900
Northern pike	Individual	3.300
Sheefish	Individual	5.500
Broad whitefish	Individual	3.200
Bering cisco	Individual	1.400
Least cisco	Individual	0.700
Humpback whitefish	Individual	2.100
Round whitefish	Individual	0.700
Unspecified whitefishes	Individual	4.143
Black bear	Individual	88.000
Brown bear	Individual	86.000
Caribou	Individual	136.000
Moose	Individual	538.000
Common muskox	Individual	295.000
Dall sheep	Individual	104.000
Beaver	Individual	20.000
Arctic fox	Individual	0.000
Red fox	Individual	0.000
Snowshoe hare	Individual	1.500
Lynx	Individual	0.000
Martens	Individual	0.000
Muskrat	Individual	0.000

-continued-

Conversion factors, Koyukuk.–Page 2 of 3.

Resource name	Reported units	Conversion factor
Porcupine	Individual	8.000
Gray wolf	Individual	0.000
Wolverine	Individual	0.000
Bearded seal	Individual	286.000
Unspecified seals	Individual	0.000
Beluga whale	Individual	995.000
Bowhead whale	Individual	0.000
Unspecified whales	Individual	0.000
Bufflehead	Individual	0.570
Unspecified eiders	Individual	0.000
Unspecified goldeneyes	Individual	1.270
Mallard	Individual	1.610
Long-tailed duck	Individual	1.160
Northern pintail	Individual	1.180
Black scoter	Individual	1.510
White-winged scoter	Individual	2.610
Unspecified scoters	Individual	0.000
Northern shoveler	Individual	0.860
Unspecified teals	Individual	0.470
American wigeon	Individual	1.050
Unspecified Canada/cackling geese	Individual	2.830
Emperor goose	Individual	3.080
Snow goose	Individual	2.800
Greater white-fronted goose	Individual	3.180
Unspecified swans	Individual	10.980
Unspecified loons	Individual	3.600
Spruce grouse	Individual	0.850
Sharp-tailed grouse	Individual	1.030
Ruffed grouse	Individual	0.850
Ptarmigans	Individual	0.770
Duck eggs	Individual	0.000
Goose eggs	Individual	0.000
Gull eggs	Individual	0.214
Butter clam	Gallons	3.000
Freshwater clams	Gallons	3.000
Razor clam	Gallons	3.000
Unspecified clams	Gallons	3.000
Dungeness crab	Individual	0.700
King crabs	Individual	2.101

-continued-

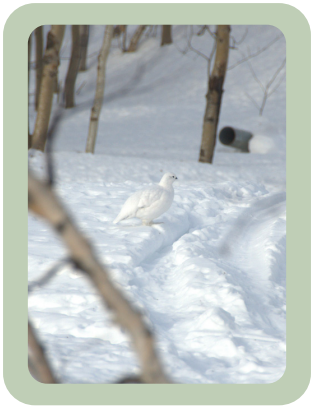
Conversion factors, Koyukuk.–Page 3 of 3.

Resource name	Reported units	Conversion factor
Tanner crab	Individual	0.400
Unspecified crabs [CF retention]	Individual	0.000
Blueberry	Gallons	4.000
Blueberry	Quarts	1.000
Lowbush cranberry	Gallons	4.000
Highbush cranberry	Gallons	4.000
Highbush cranberry	Quarts	1.000
Crowberry	Gallons	4.000
Cloudberry	Gallons	4.000
Cloudberry	Quarts	1.000
Raspberry	Gallons	4.000
Raspberry	Quarts	1.000
Wild rhubarb	Gallons	1.000
Wild potato	Gallons	1.000
Hudson's Bay (Labrador) tea	Gallons	1.000
Spruce tips	Gallons	0.000
Wild rose hips	Gallons	4.000
Other wild greens	Gallons	1.000
Unspecified mushrooms	Gallons	1.000
Stinkweed	Gallons	0.000
Punk	Gallons	0.000
Chaga	Gallons	0.000
Mousefoods	Gallons	1.000

Source ADF&G Division of Subsistence household surveys, 2022.

a. Conversion factors were not calculated for the resources that were not reportedly harvested during the study year and for which no value is available in the CSIS.

APPENDIX E–COMMUNITY SUMMARY, HUSLIA, ALASKA



COMMUNITY SUMMARY - Technical Paper No. 505

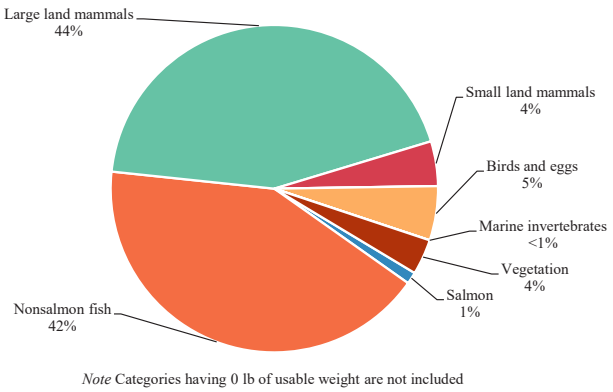
Huslia

Subsistence Harvests in 2022

This document summarizes the results of research on the subsistence harvests and uses of wild resources in Huslia, Alaska in 2022.

Background

In March 2023, Alaska Department of Fish and Game Division of Subsistence staff conducted household subsistence harvest surveys in the community of Huslia. Our team worked with four local research assistants to complete surveys with 53 of Huslia's 86 households (62% sampling rate). Eighteen households could not be contacted (21%), and 15 declined to be surveyed (17%). The survey asked questions about fish, game, and vegetation harvests during 2022. Researchers also mapped harvest areas and conducted traditional knowledge interviews with eight Huslia residents.



Note Categories having 0 lb of usable weight are not included

Figure 1.–Composition of harvest in pounds usable weight by category, Huslia, 2022.

> "A lot of people are just upset because not only 'cause of lack of salmon but because they feel like they're losing part of their culture and their heritage. Because why would they go out to fish camp anymore if they can't get, you know, salmon? Or they can't feed their dogs and they can't have their traditional food with the salmon. And, you know, and so it's just losing a way of life and that's hard."
>
> Huslia resident

Results

- Our study showed that wild foods are important to the large majority of Huslia households. In total, people harvested over 61,000 pounds of wild foods. Nearly 80% of households harvested at least one resource, while 100% of households received at least one resource through sharing (Table 1).
- During 2022, Huslia residents harvested mostly large land mammals, including moose, caribou, and bears (44% by edible weight), and nonsalmon fish (42%) including whitefishes, burbot, pike, and other species (Figure 1). The rest of the harvest was made up of birds (5%), small land mammals (4%), and vegetation (4%). Salmon made up 1% of the harvest by weight; these fish were likely harvested in areas outside of the Yukon River drainage.

Where to find the full report?

The document is available online at:

https://www.adfg.alaska.gov/techpap/TP505.pdf

Use your phone camera to scan the code

Results
(continued)

- Although the importance of wild resources at the household and community level has persisted through time in Huslia, the themes of this study largely pertained to significant and rapid environmental, economic, social, and demographic shifts that have occurred in the last several years (Figure 2). We documented the severity and the impact of the loss of salmon to Huslia residents, as well as the importance of continuing other customary and traditional practices like trapping and holding potlatches.

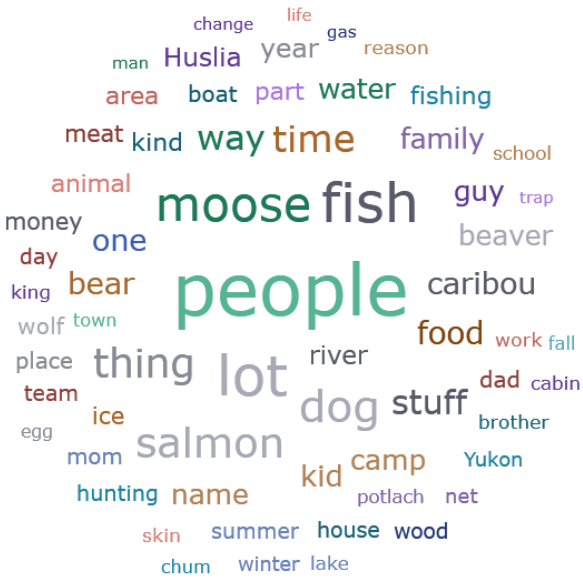


Figure 2.–Word cloud of the most used words in traditional knowledge interviews, Huslia, 2022.

Observations

- Declines in salmon abundance: changing migration patterns and poor salmon health
- River bank erosion, streams "rusting," and lake levels decreasing from thawing permafrost
- Changes in timing of river ice freeze-up and breakup contributing to safety concerns for winter river travel
- Increased competition from nonlocal moose hunters on the Koyukuk River
- Changes to cultural practices such as potlatch and dog mushing because of the lack of salmon

Riverbank erosion near Huslia.

Table 1.–Resource harvest and use.

Characteristic	Huslia
Total harvest weight (lb)	61,118.4
Community per capita harvest (lb)	216.5
Percentage using any resource	100.0%
Percentage attempting to harvest any resource	88.7%
Percentage harvesting any resource	79.2%
Percentage receiving any resource	100.0%
Percentage giving away any resource	83.0%
Number of resources on the survey[a]	105

Source ADF&G Division of Subsistence household surveys, 2023.

a. Includes resources printed on the survey and any resource volunteered by one or more households.

Participants of the Healing Gathering enjoying Potlatch.

Comparisons with Other Years and Communities

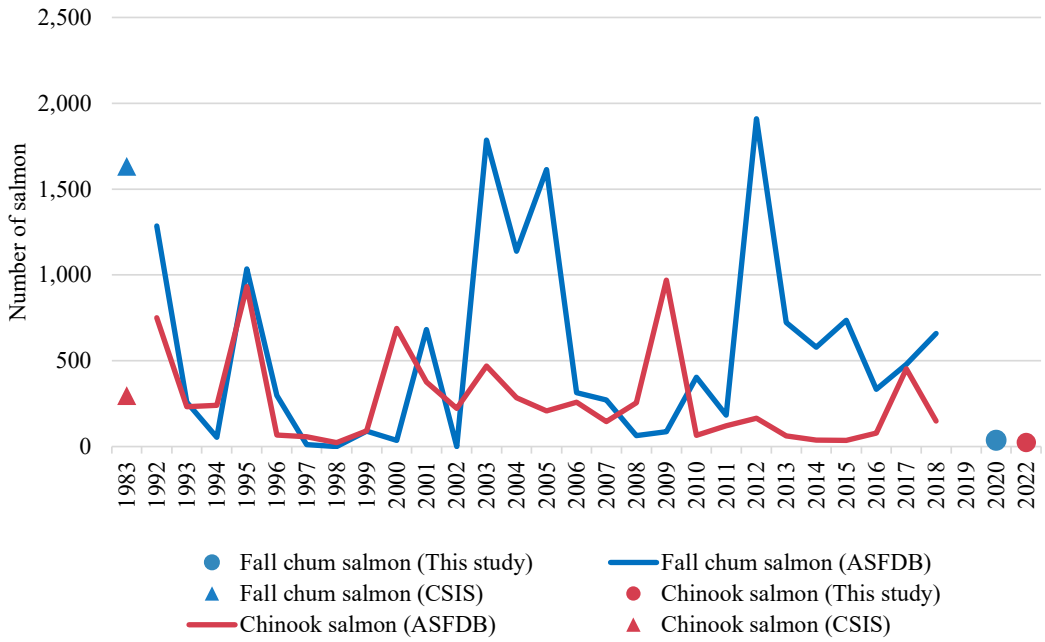


Figure 3.–Comparison of Chinook and fall chum salmon harvests, 1983–2022, Huslia.

The last time the Division of Subsistence conducted a comprehensive subsistence harvest survey in Huslia was over 40 years ago (Figure 3). In 1983, we showed that the per capita harvest of wild foods was 1,082 pounds (Figure 4). We have surveyed other Koyukuk River and middle Yukon River communities since that time, and the per capita subsistence harvests (in pounds) are shown in the figure to the right. While the per capita harvest of wild foods—especially salmon—has decreased over time, the importance of those foods to the people of Huslia has not.

Moose swimming across the Yukon River.

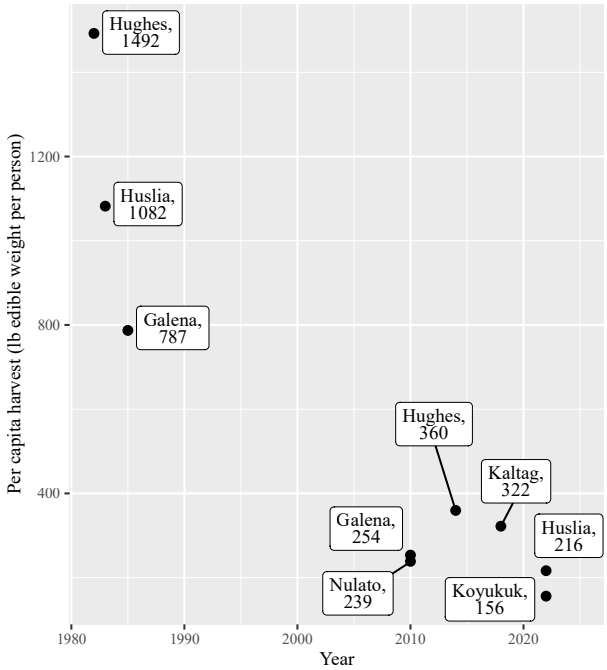


Figure 4.–Historical and study year per capita harvests for communities in the Yukon-Koyukuk area.

Conclusions

Subsistence ways of life are never static. The practices of harvesting wild resources are the result of the balanced integration of experience and knowledge—passed down through generations—with innovations and adaptations borne of change. Subsistence users have long been able to account for the variability of animal populations, weather, and other factors affecting successful harvests. In this study, we documented new and significant changes that have accelerated the need for adaptation by subsistence users.

Changes in marine and freshwater conditions, shifting weather and long-term climate, and declines in the health and abundance of animal and fish populations have also been documented outside of this study. These rapid and severe changes represent a new reality for most residents of Interior Alaska. They also represent deeply felt losses, such as those stemming from the declines in salmon and their consequential effects on food provision, cultural traditions, and community and individual well-being. However, those who rely on the land to feed themselves have long proven to be adaptable to the changing circumstances around them. This study, in addition to documenting the harvest and use of wild food by the community of Huslia, served to document the ways that people are learning to adapt to those changes and continue to practice their customary and traditional ways of life.

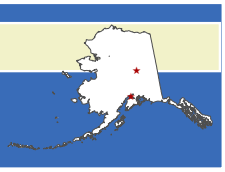
Thank you to the community of Huslia for participating in this study, for so generously welcoming our staff to participate in the Healing Gathering, and for allowing them to learn more about Koyukon culture. As noted during the closing remarks, "Hospitality is in the water, and Huslia is in our hearts."

DIVISION OF SUBSISTENCE

Jesse Coleman
1300 College Rd.
Fairbanks, AK 99701
907-459-7320

Cassidy Somerville
1300 College Rd.
Fairbanks, AK 99701
877-646-7320

Isabelle Tiller
1300 College Rd.
Fairbanks, AK 99701
877-646-7320



APPENDIX F–COMMUNITY SUMMARY, KOYUKUK, ALASKA

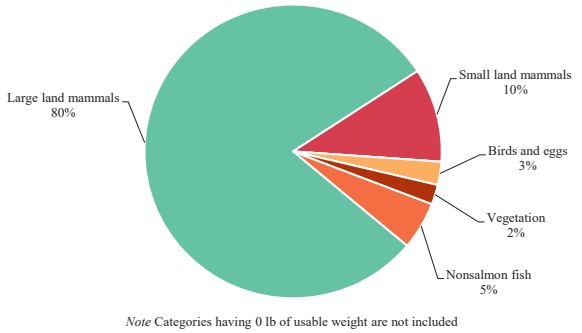
COMMUNITY SUMMARY - Technical Paper No. 505

Koyukuk
Subsistence Harvests in 2022

This document summarizes the results of research on the subsistence harvests and uses of wild resources in Koyukuk, Alaska in 2022.

Background

In April 2023, Alaska Department of Fish and Game Division of Subsistence staff conducted household subsistence harvest surveys with the community of Koyukuk. Our team worked with three local research assistants to complete surveys with 33 of Koyukuk's 37 households (89% sampling rate). Four households could not be contacted (11%) and no households declined to be surveyed. The survey asked questions about fish, game, and vegetation harvests during 2022. Researchers also mapped harvest areas and conducted traditional knowledge interviews with seven Koyukuk residents.



Note Categories having 0 lb of usable weight are not included

Figure 1.–Composition of harvest in pounds usable weight by category, Koyukuk, 2022.

"It's heartbreaking. It's probably three years without our main source of food. It was on every holiday table. Every holiday there was salmon on the tables. We go out to the wood yards; we go out camping, dry fish and salmon strips was always with us—on traveling… It's a fast source of food, good food, and energy. Now we don't have that."

Koyukuk resident

Results

- Our study showed that wild foods are important to the large majority of Koyukuk households. In total, people harvested nearly 11,000 pounds of wild foods (Table 1). Over three quarters of households harvested at least one resource, while 100% of households received at least one resource through sharing.
- During 2022, Koyukuk residents harvested mostly large land mammals including moose and black bear (80% by edible weight) and beaver (10%; Figure 1). The rest of the harvest was made up of nonsalmon fish (5%) including whitefishes, burbot, and pike. Birds made up 3% of the harvest and vegetation made up 2%. Salmon were not harvested by Koyukuk residents in 2022.

Where to find the full report?

The document is available online at:

https://www.adfg.alaska.gov/techpap/TP505.pdf

Use your phone camera to scan the code

Results
(continued)

- Through traditional knowledge interviews, this study documented the impact that the loss of salmon has had on food security and cultural practices. Interviewees also described changes in seasonal timing of river freeze-up and breakup, as well as changes to salmon migration and distribution patterns resulting from warmer river temperatures, and changes to moose movement and harvest timing due to warmer air temperatures in the fall (Figure 2).

Figure 2.–Word cloud of the most used words in traditional knowledge interviews, Koyukuk, 2022.

Table 1.–Resource harvest and use.

Characteristic	Koyukuk
Total harvest weight (lb)	10,845.9
Community per capita harvest (lb)	156.0
Percentage using any resource	100.0%
Percentage attempting to harvest any resource	75.8%
Percentage harvesting any resource	63.6%
Percentage receiving any resource	100.0%
Percentage giving away any resource	78.8%
Number of resources on the survey[b]	91

Source ADF&G Division of Subsistence household surveys, 2023.

a. 95% confidence intervals are calculated as a percentage range around the mean.

b. Includes resources printed on the survey and any resource volunteered by one or more households.

Observations

- Declines in salmon abundance: changing migration patterns and poor salmon health
- River bank erosion, streams "rusting," and lake levels decreasing from thawing permafrost
- Changes in timing of river ice freeze-up and breakup contributing to safety concerns for winter river travel
- Increased competition from nonlocal moose hunters on the Koyukuk River
- Changes to cultural practices such as potlatch and dog mushing because of the lack of salmon

A harvest of sheefish.

Comparisons with Other Years and Communities

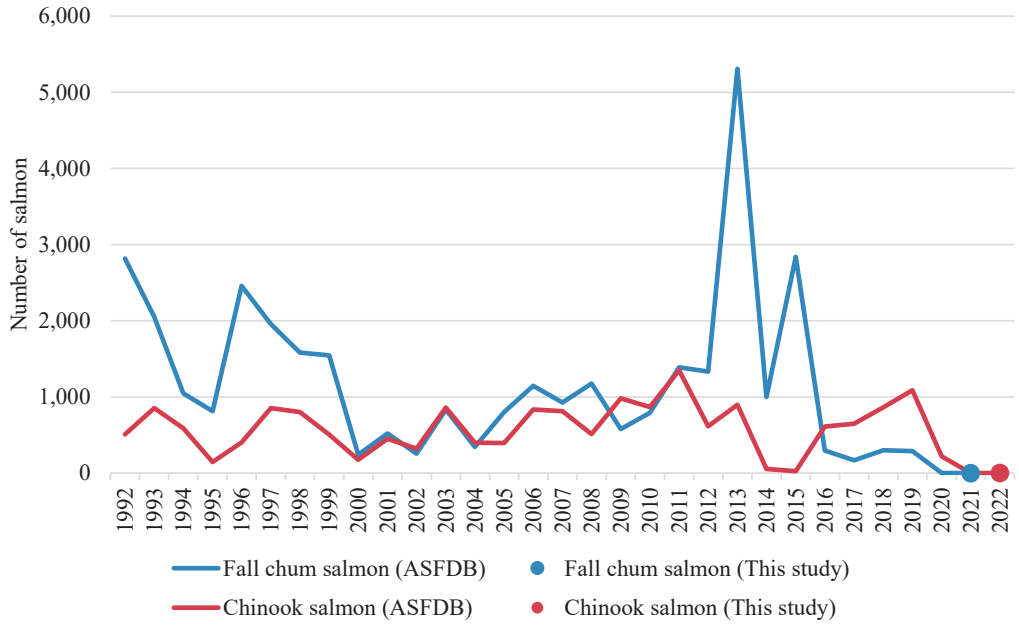


Figure 3.–Comparison of Chinook and fall chum salmon harvests, 1983–2022, Koyukuk.

This was the first comprehensive subsistence harvest survey the Division of Subsistence has conducted in Koyukuk (Figure 3). We estimated the per capita harvest of all wild foods to be 156 pounds. Although we do not have historical data on the community of Koyukuk to compare to this study, we have surveyed other Koyukuk River and middle Yukon River communities since that time. The per capita subsistence harvests (in pounds) for each community are shown in the figure to the right (Figure 4). While the per capita harvest of wild foods—especially salmon—has decreased over time, the importance of those foods to the people of Koyukuk has not.

Moose swimming across the Yukon River.

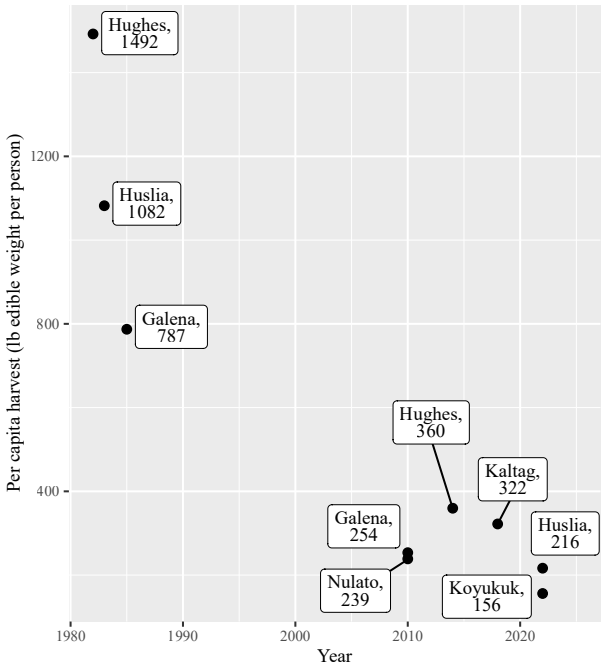


Figure 4.–Historical and study year per capita harvests for Yukon-Koyukuk communities.

Conclusions

Subsistence ways of life are never static. The practices of harvesting wild resources are the result of the balanced integration of experience and knowledge—passed down through generations—with innovations and adaptations borne of change. Subsistence users have long been able to account for the variability of animal populations, weather, and other factors affecting successful harvests. In this study, we documented new and significant changes that have accelerated the need for adaptation by subsistence users.

Changes in marine and freshwater conditions, shifting weather and long-term climate, and declines in the health and abundance of animal and fish populations have also been documented outside of this study. These rapid and severe changes represent a new reality for most residents of Interior Alaska. They also represent deeply felt losses, such as those stemming from the declines in salmon and their consequential effects on food provision, cultural traditions, and community and individual well-being. However, those who rely on the land to feed themselves have long proven to be adaptable to the changing circumstances around them. This study, in addition to documenting the harvest and use of wild food by the community of Huslia, served to document the ways that people are learning to adapt to those changes and continue to practice their customary and traditional ways of life.

Thank you to the community of Koyukuk for participating in this study and making this research possible!

DIVISION OF SUBSISTENCE

Jesse Coleman
1300 College Rd.
Fairbanks, AK 99701
877-646-7320

Cassidy Somerville
1300 College Rd.
Fairbanks, AK 99701
877-646-7320

Isabelle Tiller
1300 College Rd.
Fairbanks, AK 99701
877-646-7320