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Subsistence Harvests and Uses in Bethel, 2012

by

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Weights and measures (metric)

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

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

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

Measures (fisheries)

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

Mathematics, statistics

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

TECHNICAL PAPER NO. 393

BETHEL SUBSISTENCE, 2012: WILD RESOURCE HARVESTS AND USES, LAND USE PATTERNS, AND SUBSISTENCE EONOMY IN THE HUB COMMUNITY OF THE YUKON–KUSKOKWIM DELTA, ALASKA

by

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ABSTRACT

This report describes the harvest and use of wild foods by residents of Bethel, Alaska. It presents results of a one-year (2012) wild food harvest survey, summarizes information from ethnographic interviews, and discusses topics relevant to local natural resource use, economics, and management. Researchers conducted surveys with members of randomly-selected Bethel households in 2013. During surveys, researchers asked participants to recall the wild foods their household used in the previous year (2012) and to estimate the quantities of these foods that their household harvested. Researchers recorded the areas where household members searched for and harvested these foods. Surveys also included questions about demographics, jobs and income, wild food sharing, and assessments of wild food use in 2012 relative to past years. Survey results indicate that most Bethel households used wild fish, game, and plants in 2012. Salmon, nonsalmon fish, and large land mammals composed the majority of Bethel households' wild food harvest by edible weight; marine mammals, birds, and vegetation were also harvested in large quantities. Bethel residents searched for and harvested these resources over a large area of the Yukon-Kuskokwim Delta. Many respondents described receiving wild foods from other households. Bethel residents' Chinook salmon harvest was unusually low in 2012, and this likely had a substantial impact on overall harvest levels. In addition to surveys, researchers conducted interviews with a smaller selection of Bethel residents who shared information about harvest timing, harvest and processing methods, land use patterns, and concerns about wild resource health, abundance, and management. Widespread topics of discussion or concern included abundance, availability, and management of Chinook salmon in particular, as well as moose and caribou. Multiple socioeconomic factors, many related to Bethel's position as a regional center, were often described as influential on residents' wild food harvest and use patterns.

Key words: Bethel, demographic information, employment, furbearers, harvest areas, income, Kuskokwim River, large land mammals, migratory birds, nonsalmon fishes, population estimates, Pacific salmon, subsistence fishing, subsistence hunting, seasonal round, small land mammals, trapping, vegetation

1. INTRODUCTION

Hiroko Ikuta, David S. Koster, James J. Simon, Jeff Park, and David M. Runfola

This report summarizes the results of research conducted in 2013 on the subsistence harvests and uses of wild foods in the study year of 2012 in Bethel, the regional center or "hub community" of the Yukon-Kuskokwim (Y-K) Delta. The project provides comprehensive baseline information about contemporary subsistence uses of fish, wildlife, and plant resources, as well as traditional knowledge about these resources in Bethel. It fills significant data gaps in understanding the extent of dependence and reliance upon fish and wildlife resources among residents of one of Alaska's largest rural hub communities. Systematic documentation of subsistence harvest and use information helps to address long-term information needs in Alaska regarding the role of wild resources in the lives of Bethel residents pursuant to ensuring continued opportunities for customary and traditional uses of Alaska's fish and wildlife resources.

Bethel lies within the boundaries of the Yukon Delta National Wildlife Refuge on the northwest bank of the lower Kuskokwim River, 400 miles west of Anchorage, and approximately 55 air miles from Kuskokwim Bay (Figure 1-1). As Alaska's ninth largest city, Bethel is home to approximately 6,000 Alaskans, and it is the hub community for over 20,000 other Yukon-Kuskokwim (Y-K) Delta residents (Fall 2013; Stinson 1990; Shanks 2009). Many residents of Bethel rely substantially on subsistence hunting, fishing, and gathering for nutrition and to support their customary and traditional ways of life. Subsistence harvests of wild foods from this area include, but are not limited to, salmon, whitefishes, northern pike, moose, geese, ducks, wild berries, and greens.

Project Background

To support the regulatory requirements of defining and prioritizing the customary and traditional uses of fish and wildlife resources, the Alaska Department of Fish and Game (ADF&G) Division of Subsistence conducts systematic social science research "on all aspects of the role of subsistence hunting and fishing in the lives of the residents of the state" (AS 16.05.094). The duties of the division as an agency of state government include assisting the department and regulatory bodies "in determining what uses of fish and game, as well as which users and what methods, should be termed subsistence uses, users, and methods" (AS 16.05.094). The division also conducts research to contribute to the development of "statewide and regional management plans so that those plans recognize and incorporate the needs of subsistence users of fish and game" (AS 16.05.094).

ADF&G Division of Subsistence has conducted multiple research programs, including comprehensive subsistence baseline projects and other species-specific surveys in the Kuskokwim area: 8 central Kuskokwim communities including Aniak, Chuathbaluk, Crooked Creek, Lower Kalskag, Red Devil, Sleetmute, Stony River, and Upper Kalskag in 2010 (Brown et al. 2012a); Akiak, Kwethluk, Oscarville, and Tuluksak in the lower Kuskokwim region and Georgetown and Napaimute in the central Kuskokwim River region in 2012 (Brown, Magdanz, et al. 2013); and Quinhagak in the Kuskokwim Bay region, and Eek and Tuntutuliak in the lower Kuskokwim region in 2013 (Ikuta et al. [ed.] 2016).

In addition to comprehensive subsistence surveys, the department has conducted a number of resource-specific projects in the Kuskokwim area. ADF&G has produced annual salmon harvest estimates by community, based on fish rack or household surveys, since 1960. Studies on the traditional ecological knowledge (TEK) and harvest amounts of nonsalmon fishes have been conducted in Aniak and Chuathbaluk for 2001–2003 (Krauthoefer et al. 2007); Bethel for 2001–2003 (Simon et al. 2007); and Eek, Tuntutuliak, and Nunapitchuk for 2005–2009 (Ray et al. 2010). The Division of Subsistence has conducted ethnographic projects on subsistence salmon fishing in 5 Kuskokwim River communities including Tuntutuliak, Kwethluk, Kalskag, Sleetmute, and Nikolai in 2009 and in the Bethel area in 2012 (Ikuta, Brenner, and Godduhn 2013). Harvest and use surveys and ethnographic research regarding nonsalmon fish was conducted in the upper Kuskokwim drainage communities of Lime Village and Nikolai in 2012–2013 (VanLanen et al. 2015). The

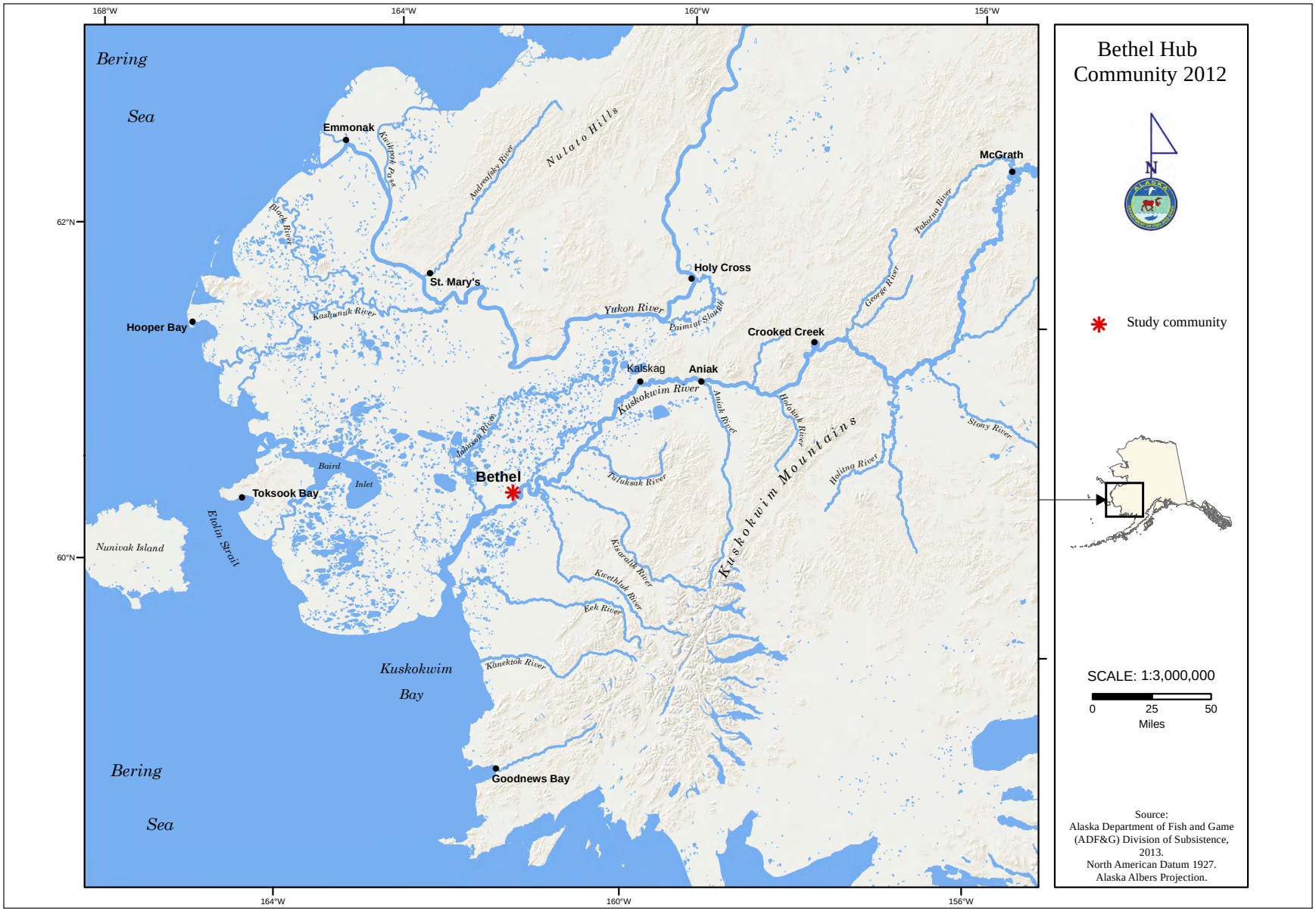

Figure 1-1.–Location of study community, 2012.

division has also conducted land mammal subsistence harvest surveys in Bethel in 2012 (Runfola et al. 2014) and Nunapitchuk in 2013 (J. Simon et al. 2016). Other harvest data, primarily for large game, exist in the hunter-harvest database maintained by ADF&G (WinfoNet[1]); however, because of the remoteness of many communities and of lack of outreach regarding reporting requirements, this database often fails to capture a significant component of the harvest, especially in rural Alaska (Andersen and Alexander 1992; Schmidt and Chapin 2014). Harvest data for the projects listed above, except Georgetown and Napaimute[2] as well as postseason subsistence salmon harvest surveys[3], are available online at the Community Subsistence Information System (CSIS)[4] website maintained by the ADF&G Division of Subsistence.

Prior to this project, no comprehensive subsistence harvest baseline data existed for Bethel. Many residents had long been calling for increased data collection to corroborate their own local observations of hunting and fishing trends. Thus, community support for this subsistence survey effort was strong. This harvest documentation program relied on the public support of the residents of Bethel and the cooperating organizations: the Bethel tribal council, Orutsararmiut Native Council (ONC), and the City of Bethel were contacted and approved the research. It was fully funded by an appropriation of the State of Alaska Legislature as the result of an effort by ONC.

History and Background

Central Yup'ik people have occupied the Y-K Delta, which includes Bethel, for over 2,000 years. In 1880, approximately 3,100 Yup'ik people lived along the banks of the Kuskokwim River as far inland as the present community of Aniak (Nelson 1983rev.:26; Oswalt 1967:5–7; Petroff 1884:11–12; Zagoskin 1967:210). In the Bethel area, Yup'ik people originally settled on the island in front of modern-day Bethel. This location, called *Mamterilleq,* meaning "site of many caches" in Central Yup'ik (Jacobson 1984:225), was chosen because many fish were harvested in the area. Russian fur traders began travelling the Kuskokwim in the 1840s, and by the 1870s there was an Alaska Commercial Company trading post at *Mamterilleq.*

Moravian Church missionaries first settled on the site that is now the City of Bethel in 1885 (Lenz and Barker 1985). The missionaries quickly built a church, a school, and an orphanage. The missionaries chose this site in part because there were 3 nearby communities which would be likely to send their children to Bethel for schooling.

Gold strikes in the early 1900s as close the Kwethluk River headwaters, led to thousands of prospectors traveling up the Kuskokwim River (Lenz and Barker 1985:38). With the miners came sternwheel steamboats and supplies that were never before available in Bethel. The population of Bethel grew as many prospectors and shopkeepers settled there. Gradually the old site of *Mamterilleq* was abandoned as people moved across the river to Bethel. The Yukon-Kuskokwim Delta was among the regions most affected by the influenza and measles epidemics of the early 20th century (Wolfe 1982). The Alaska Native population of Bethel was devastated by these epidemics, which started with influenza in 1900.

In 1910, the U.S. Army Corps of Engineers mapped the deepest channel of the Kuskokwim River, thus enabling deep-draft freight barges to travel the river as far as Bethel (Lenz and Barker 1985). At that time, many federal services were located in the upriver community of Akiak, but Bethel's accessibility to barges sealed its fate as the hub of southwestern Alaska. The federal government built a Bureau of Indian Affairs

1. Winfonet is the ADF&G Division of Wildlife Conservation's intranet website. The site provides a wide variety of tools to allow users to access, update, and download different kinds of data, including large mammal harvest data.

2. Survey results from Georgetown and Napaimute are not included in the CSIS. All known Georgetown tribal members and all Napaimute community members except for 1 individual were permanent residents of other communities during the study year; as a result, the results from these households are reported in the community of residence aggregates.

3. The results of postseason subsistence salmon harvest surveys in the Arctic-Yukon-Kuskokwim region are available at the ADF&G Arctic-Yukon-Kuskokwim Database Management System (AYK-DBMS).
http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx

4. ADF&G Division of Subsistence, Juneau. "Community Subsistence Information System: CSIS."
https://www.adfg.alaska.gov/sb/CSIS

(BIA) school for Alaska Natives in Bethel in 1913 and a territorial school for Caucasians and students of mixed descent in 1923.

The 1940s and World War II brought more people and more permanent changes to Bethel (Lenz and Barker 1985). The Alaska Area Native Service opened a hospital in Bethel in 1940, and in 1942 the U.S. Army built an airfield and a base that housed over 700 people across the river from Bethel. Bethel was incorporated as a second-class city in 1957.

Bethel's population doubled from 1970 to 1980 (Lenz and Barker 1985). After the construction of a regional high school in 1973, many families with school-aged children relocated to Bethel from nearby communities. In the early 1980s, several new facilities were constructed in Bethel including a day care center, a teen center, a pre-maternal home, a regional jail, a sea wall, and an expanded port.

Over the decades Bethel's local economy has been supplemented by exporting a variety of natural resources to other parts of the state and other parts of the world. In 1892, Christian missionaries who wanted to provide a stable, year-round food source introduced reindeer herding to Northwest Alaska (J. Simon 1998). In 1901, reindeer were first introduced in the Bethel area (McAtee 2010). Eventually reindeer numbered more than 600,000 in Western Alaska and the Seward Peninsula, and reindeer meat and byproducts became an important source of income for herders. Reindeer herding grew less lucrative as the number of miners in the region diminished. Although wild fur, particularly mink, was always an important resource in the region, fur farming grew in popularity in the early 20th century. In the 1920s and 1930s, Bethel was the home of several fox and mink farms. However, this too became less lucrative by the 1940s, when fur prices began to decline. Commercial fishing on the Kuskokwim River only became popular in the 1950s after salmon populations dwindled in other, more accessible parts of the state. At its peak in 1982, commercial fishing brought $4.2 million dollars to the local economy (Lenz and Barker 1985). In addition to the sale of salmon, commercial fishing stimulated the local economy with fish processing jobs as well as sales of salmon roe to overseas buyers.

Today, as the largest city in southwestern Alaska, Bethel functions as a transportation, communications, and supply center for the region, which includes 56 smaller communities. As a result, Bethel is home to the third busiest state-owned airport in Alaska. Bethel is home to the Yukon-Kuskokwim Health Corporation, which consists of a 50-bed hospital that provides medical, optical, dental, and behavioral health services, as well as 52 subregional and community clinics serving the Yukon-Kuskokwim Delta. The Lower Kuskokwim School District, which operates 28 schools in the region, is located in Bethel, as is the Association of Village Council Presidents (AVCP), a nonprofit tribal organization that serves southwestern Alaska. Bethel also has most of the services and facilities that one could expect to find in any Alaska community of comparable size including a senior center, library, cultural center and art guild, and a University of Alaska Fairbanks satellite campus. Access to the Alaska road system is provided by commercial passenger air services to Anchorage. River travel is the primary means of local transportation in the summer, and in the winter the Kuskokwim River becomes a maintained ice road to surrounding communities. Seagoing barges from Seattle and Anchorage offload at the Port of Bethel, and a barge service based in Bethel distributes goods to upstream Kuskokwim River communities.

Bethel is located within ADF&G Game Management Unit (GMU) 18. The land and natural resources of this area are owned and managed by a variety of entities, including Calista Corporation (an Alaska Native Claims Settlement Act [ANCSA] corporation), AVCP, U.S. Fish and Wildlife Service (the Yukon–Kuskokwim Delta Region federal subsistence management areas, including the Yukon Delta National Wildlife Refuge), and ADF&G (Kuskokwim Management Area fishing regulatory area, GMU 18). The areas utilized by Bethel subsistence fishing households include both state and federal waters.

Regulatory Context

The regulation of hunting and fishing for subsistence practices has a unique history in Alaska. Both state and federal laws provide priorities for customary and traditional subsistence hunting and fishing over other consumptive uses, such as commercial fishing. In 1971, ANCSA extinguished aboriginal hunting and fishing rights. However, recognizing the importance of subsistence as well as the lack of legal protection for Alaska's subsistence traditions, both the Alaska State Legislature and U.S. Congress subsequently adopted laws intended to preserve opportunities for customary and traditional uses of fish and wildlife in Alaska. In 1978, the Alaska State Legislature adopted priorities for subsistence over other consumptive uses of fish and game, including a subsistence fishing priority under AS 16.05.251(b) and a subsistence hunting priority under AS 16.05.255(b).

In 1980, the U.S. Congress adopted a rural subsistence priority in the Alaska National Interest Lands Conservation Act (ANILCA). Bethel was one of 5 regional center communities—along with Barrow, Dillingham, Kotzebue, and Nome—that were cited in committee report accompanying the legislation as "rural communities" whose residents were intended to be qualified to participate in subsistence hunting and fishing on federal public lands under the provisions of the act (Fall 2016). Four general characteristics typified these hub communities, including moderate population sizes, regional center functions, mixed economies of cash and wild resource uses, and diverse populations (Fall 2013; Wolfe et al. 1986:40).

Between 1985 and 1992, aspects of Alaska's subsistence statutes—primarily those dealing with eligibility for participation in subsistence fishing and hunting and the role of a priority for rural residents in times of shortage—were amended such that state and federal subsistence laws became incongruent. In the *McDowell v. State of Alaska*[5] decision in 1989, the Alaska Supreme Court ruled that the rural priority in the state's amended 1986 subsistence law was unconstitutional. Since then, the Alaska Board of Fisheries (BOF) and the Alaska Board of Game (BOG) have adopted subsistence regulations and made allocations on state-owned and private lands following procedures outlined in AS 16.05.258, titled "Subsistence Use and Allocation of Fish and Game." Fishing and hunting regulations have been further refined by court rulings as well as by state statutes authorizing board activities. The Federal Subsistence Board (FSB) adopts subsistence regulations and allocations on federal public lands (about 60% of the state) with options for managing for a rural priority for federally-qualified users.

The regulation of subsistence harvests of fish and wildlife in Alaska is administered by the State of Alaska under Title 5 of the Alaska Administrative Code and by the federal government under Title 50, parts 92 and 100, of the Code of Federal Regulations. All federal subsistence regulations apply to this region, and those specify that individuals practicing subsistence harvests of fish and wildlife on federal public lands outside federally designated nonrural areas must be permanent rural residents of the area (50 CFR §100.5). State of Alaska regulations cannot require that subsistence harvesters be only rural residents: all Alaskans are eligible to participate in state subsistence programs. Customary and traditional use determinations for subsistence resources are administered by Alaska under AS 16.05.258 and by the federal government under 50 CFR §100.24.

Recently, Bethel's growing population and characteristics of a hub community caught the regulatory attention of the state and federal agencies. In October 2013, Alaska Joint Board of Fisheries and Game (Joint Board) considered a proposal that would create a Bethel nonsubsistence area (Proposal 41). The proposal stated that "the community of Bethel would appear to qualify as a nonsubsistence area." AS 16.05.258(c) directs the Joint Board to identify nonsubsistence areas where "dependence upon subsistence is not a principal characteristic of the economy, culture, and way of life of the area or community" by considering the relative importance of subsistence in the context of the totality of 12 socioeconomic characteristics. In nonsubsistence areas, the BOF and the BOG may not permit subsistence fishing and hunting. Similarly, in April 2014, the FSB reviewed the process for rural determination by considering 5 elements: population thresholds, rural characteristics, aggregation of communities, timelines, and information sources (USFWS Office of Subsistence Management 2014). In the federal system, "a community or area with a population

5. *McDowell v. State of Alaska.* Alaska Supreme Court Files S-2732. 785 P.2d 1 (1989).

between 2,500 and 7,000 will be considered rural or nonrural, based on community characteristics and criteria used to group communities together." Bethel's population—6,080 in 2010—was close to the upper range of the population criteria. In the end, the nonsubsistence area proposal submitted to the Joint Board failed (Fall 2013), and the FSB did not recommend changing Bethel's designation to a nonrural area. However, many people are concerned about the population growth in Bethel, which leads discussions of allocation issues when wild resources, such as Chinook salmon, are scarce.

This section focuses on regulations of 2 major subsistence resources—salmon and moose—because of their prominence in the annual subsistence harvests of the study community.

Salmon

The subsistence salmon fisheries in the Kuskokwim Management Area (Kuskokwim Area)[6] are some of the largest in the state of Alaska in terms of the number of residents who participate and the number of salmon harvested (Fall et al. 2014). Since 1994, when the Alaska Department of Fish and Game (ADF&G) began acquiring reasonably complete statewide coverage of subsistence harvest survey data, over 50% of Chinook salmon harvested under subsistence regulations have been taken in the Kuskokwim Area, mostly in the Kuskokwim River drainage. Between 2010 and 2014 (study years 2009–2013), the Division of Subsistence conducted comprehensive subsistence harvest and use surveys in 23 Kuskokwim Management Area communities. The results indicate that, on average, salmon contribute approximately 40% of the total wild resource harvest (in edible pounds) in the Lower Kuskokwim communities, 60% in the Central Kuskokwim communities, and 41% in the Upper Kuskokwim communities (Brown et al. 2012b; Brown, Ikuta, et al. 2013; Ikuta et al. 2014).

Residents in Y-K Delta, including Bethel, harvest 5 species of Pacific salmon for subsistence purposes: Chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, coho salmon *O. kisutch*, pink salmon *O. gorbuscha*, and sockeye salmon *O. nerka*. Drift gillnetting, set gillnetting, and hook and line fishing are the primary methods used to harvest salmon, although additional gear types are allowed. Communities in the Y-K Delta are heavily reliant upon the annual returns of salmon not only for basic nutrition, but also for maintenance of cultural identity and cultural values, as well as economic opportunities for commercial sales (E. Andrews and Coffing 1986; E. F. Andrews 1989:154; Barker 1993; Brown et al. 2012b, 2013; Coffing 1991; Fienup-Riordan 1990:184, 1995:120, 123; Himmelheber 1987:32; Ikuta et al. 2013, 2014; Oswalt 1963b; Oswalt 1963a; Oswalt 1990; Pete 1993; D.E. Senecal-Albrecht 1990, 1998; Walker and Coffing 1993; Wolfe et al. 1984)

In 2012, the study year of this project, sharp declines in Chinook salmon abundance caused severe hardship for fishery-dependent communities in the Kuskokwim Area. Subsistence fishers were affected by the 12-day rolling closures of all subsistence salmon fishing in the Kuskokwim River and its tributaries. A poor Chinook salmon run and 35 days of management restrictions resulted in harvests of Chinook salmon that were approximately 70% below the recent 10-year average (Shelden et al. 2014). As a result, the U.S. Department of Commerce declared a resource disaster for the Kuskokwim River Chinook salmon fishery on September 12, 2012.[7] This section includes detailed regulatory information of the Kuskokwim subsistence salmon fishery in order to contextualize the low Chinook salmon abundance and its effects on the subsistence fishers in Bethel.

Prior to 1990, there were additional restrictions on participation in the subsistence fishery related to the state's rural priority for subsistence, which subsequently was determined by the Alaska Supreme Court to be

6. The Kuskokwim Area includes the Kuskokwim River drainage, all waters of Alaska that flow into the Bering Sea between Cape Newenham and the Naskonat Peninsula, and Nunivak and St. Matthew islands. Thirty-eight communities are located within this area.

7. National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service, Alaska Regional Office, Juneau. n.d. "NOAA Fisheries seeks comments on a framework for allocating and administering fisheries disaster funds for the Yukon-Kuskokwim and Cook Inlet regions of Alaska." Accessed May 6, 2015.
https://alaskafisheries.noaa.gov/omi/grants/dfunds/salmon.htm

unconstitutional. As a result of the passage of Alaska National Interest Lands Conservation Act (ANILCA) and in light of a 1989 Alaska Supreme Court decision[8], the federal government established the federal subsistence program, which provides subsistence opportunity for qualified rural residents on applicable federal public lands and in applicable federal public waters. Individuals must be Kuskokwim Area residents to participate in the Kuskokwim federal subsistence salmon fishery (50 CFR § 100.5). Federal subsistence schedules, openings, closings, and fishing methods are generally the same as those for state subsistence salmon fisheries, unless superseded by federal special action. Regulatory authority for Kuskokwim River salmon management is shared by the Federal Subsistence Board (FSB) and the State of Alaska Board of Fisheries (BOF). On the Kuskokwim River, ADF&G is responsible for implementing regulations in accordance with the "Kuskokwim River Salmon Management Plan" (5 AAC 07.365) and also has inseason discretionary management authority of salmon, as in all Alaska navigable waters. Waters of the lower Kuskokwim River are largely within or adjacent to federal public lands, namely the Yukon Delta National Wildlife Refuge. As such, the U.S. Fish and Wildlife Service (USFWS) shares in inseason subsistence fishing management decision-making with ADF&G. USFWS holds final decision-making authority over management of salmon in these waters only in the event that the federal subsistence program determines that all nonfederally-qualified subsistence uses must be eliminated in order to meet the federal subsistence priority. The Kuskokwim River Salmon Management Working Group (Working Group) is composed of knowledgeable stakeholders representing communities throughout the Kuskokwim River drainage, commercial fish processors, and sport fishery representatives, as well as an ADF&G management biologist. The Working Group advises state and federal managers through an established process and is currently the primary forum through which management decisions are made regarding Kuskokwim River subsistence, commercial, and sport salmon fisheries (Smith and Linderman Jr. 2008:1). The highest priority in state and federal management of Kuskokwim River salmon populations is biological sustainability of the resources based on principles of sustained yield. In the event that returning salmon numbers are not sufficient to meet established escapement goals that will allow for the maintenance of future generations of salmon populations, consumptive uses of salmon may be restricted. When there is a harvestable surplus beyond these minimum escapement levels, consumptive uses of salmon are prioritized for different user groups.

Alaska Statute 16.05.258, "Subsistence Use and Allocation of Fish and Game," establishes a subsistence use priority (above sport, commercial, and personal uses) when resources are not abundant enough to provide for all consumptive uses, yet are sufficient to allow subsistence use while remaining in accordance with principles of sustained yield. Subsistence uses protected by the subsistence priority are those practices identified as customary and traditional practices which are determined by the BOF. In 1993, the BOF made positive findings for customary and traditional uses of all salmon species in the entire Kuskokwim Area. As part of these findings, the BOF then determined the amount reasonably necessary for subsistence (ANS) in these respective areas as one means to gauge whether there were reasonable opportunities for subsistence uses. Based on historical harvest information, the BOF determined an ANS of 192,000–242,000 for salmon of all species in the Kuskokwim Area (5 AAC 01.286).

In 2001, the BOF amended these ANS ranges for Kuskokwim River using subsistence harvest data from the years 1990 to 1999. After reviewing various options, the BOF made new customary and traditional use and ANS findings for the Kuskokwim area by species. Although not in effect during the study year of 2012, in January 2013, the board again reconsidered and revised ANS ranges by species for the Kuskokwim River (Ikuta 2012).

Subsistence harvest of Pacific salmon species in the Kuskokwim River is allowed without a permit (5 AAC 01.280) and with no closed season (5 AAC 01.260), unless otherwise noted for conservation purposes or under a federal special action. Alaska law allows a variety of gear types to be used in the Kuskokwim River for subsistence salmon fishing, including gillnet, beach seine, hook and line attached a rod or pole, handline, and fish wheel (5 AAC 01.270). There are no bag or possession limits for subsistence salmon harvests in the Kuskokwim River, except for a limit of 2 Chinook salmon when subsistence fishing with a hook and line attached to a rod or pole in a portion of the Aniak River drainage (5 AAC 01.295).

8. *McDowell v. State of Alaska.* Alaska Supreme Court Files S-2732. 785 P.2d 1 (1989).

Federal regulations of all subsistence fish harvests in Alaska federal public lands and waterways, including seasons, gear types, and bag and possession limits, are administered under 50 CFR §100.27.

By regulation, the subsistence salmon fishing season is open unless a subsistence fishing schedule closure is implemented. If closures to the fishery are necessary, they are implemented by emergency order prior to, during, and after commercial fishing periods; or closures to the fishery are implemented by emergency order for conservation purposes (see 5 AAC 01.260 and 5 AAC 07.365). In the Kuskokwim River, a subsistence fishing schedule with periodic fishing closures (openings between these closures were often referred to as "windows" or "openers") was implemented from 2001–2006, but has since been discontinued.

In 2012, preseason outlooks suggested a weak return of Chinook salmon to the Kuskokwim River (ADF&G 2012). Because of a concern for area tributary escapements and the outlook for overall returns, ADF&G and USFWS inseason managers suggested that harvestable surplus of Chinook salmon might not be enough to meet subsistence needs. Preseason tributary closures were followed by inseason mainstem closures. In the Working Group meeting on June 8, the managers recommended a 7-day rolling closure for all subsistence salmon fishing to begin in a section of the lowest portion of Kuskokwim River effective June 10, 2012[9] (ADF&G 2012). The rolling closure was implemented in a stepwise progression up the Kuskokwim River consistent with salmon run timing. By June 15, data from the Bethel Test Fishery catch per unit effort (BTF CPUE) indicated that continued returns of Chinook salmon were still not sufficient to meet the management objective. In the Working Group meeting on June 15, the managers recommended a 5-day extension to the original 7-day rolling closure in an effort to conserve Chinook salmon.

During the Working Group meeting on June 20, the inseason managers presented a recommendation for a 3-day subsistence fishing opening allowing 6-inch or smaller mesh gillnets after each section's 12-day rolling closure (ADF&G 2012). Subsistence salmon fishing opened for 6 consecutive days following the rolling closures. After the 6-day opening, ADF&G and USFWS inseason managers initiated a 2-day rolling closure, followed by an opening with the use of gillnets with 6 inch or less mesh. Subsistence salmon fishing remained open with a 6-inch mesh restriction through July 15, when BTF CPUE indicated the end of the Chinook salmon run in the lower river. On July 16, inseason managers ended restrictions on subsistence salmon fishing, allowing the unrestricted use of gillnets, hook and line gear, and fish wheels in the lower section of Subdistrict 1-B. The restrictions were lifted in the upriver sections with the rolling schedule. On July 23, subsistence salmon fishing with unrestricted gear resumed in sections 4 and 5 in the rolling closure areas.

In 2012, the Kuskokwim Area Chinook salmon subsistence harvest was the lowest on record (Shelden et al. 2014). Furthermore, in 2011 and 2012, estimated Chinook salmon escapement on monitored tributaries was the lowest since 1990, and escapement goals were not met at the Kwethluk, Tuluksak, and George rivers. Kuskokwim River harvests of Chinook salmon fell below the lower limit of the ANS range. Subsistence harvests of chum and coho salmon in the Kuskokwim River were within or exceeded the ANS ranges defined for the area. Sockeye salmon subsistence harvests were above the upper range of the ANS.

Throughout salmon fishing season, many subsistence fishers expressed that harvesting and storing salmon each year is critical to many families' survival. People explained that restrictions to salmon fishing and the resulting disruptions in the seasonal round cause serious limitations to food supplies and the threat of extreme hardship in months to come.

Moose

According to local elders, moose began immigrating to the Yukon-Kuskokwim Delta in the 1940s (Perry 2010:271). The Kuskokwim population of moose is small and is still in the process of colonizing the available riparian habitat. Treeless tundra, which covers most of the Y-K Delta, is not suitable as winter

9. Fishers were prohibited from harvesting Chinook salmon with hook and line gear and restricted to the use of gillnets with 4 inch or less mesh not exceeding 60 feet in length. Subsistence fishers were permitted to retain incidental catches of Chinook salmon with the use of a legal gillnet. Fish wheels were permitted; however, they were required to be equipped with a livebox, which fishers were required to check at least every 6 hours and return all Chinook salmon to the water alive.

habitat for moose. Although moose are now more common than in the past, overall densities in GMU 18 vary from low to high relative to habitat availability.

The history of moose hunting regulations throughout GMU 18 has been dynamic and often restrictive, largely due to variability in the abundance and distribution of the region's moose population. Appendix A summarizes state and federal moose hunting regulations in GMU 18. From 1960 through the 2003–2004 regulatory year, hunters were permitted to harvest 1 bull moose under general hunting regulations with use of a harvest ticket throughout most of GMU 18 including the lower Kuskokwim River area.[10] During this period, heavy hunting pressure from residents of lower Kuskokwim River communities limited moose population growth in the area (Perry 2012a). By 2003, ADF&G, in conjunction with the BOG, identified moose population growth in the lower Kuskokwim River area as a primary management goal. Therefore, beginning in the 2004–2005 regulatory year—and with broad local community support—the BOG established a moratorium on moose hunting in the lower Kuskokwim River drainage roughly extending from the boundary with GMU 19 to Kuskokwim Bay. This moratorium continued until the 2009–2010 regulatory year, when ADF&G administered a registration permit hunt for the same area, which was to be closed by emergency order once hunters reached a quota of 75 bull moose. In the 2011–2012 regulatory year, ADF&G increased this quota to 100 bull moose, and the quota had not changed in the 2012– 2013 regulatory year. Although there are other opportunities for residents to harvest moose in GMU 18, including a winter hunt for "any" moose in the lower Yukon River region, accessing these areas from communities of the lower Kuskokwim River area often requires long-distance travel by snowmachine.

Study Objectives

The project had the following objectives for Bethel:

1. Estimate subsistence harvests and uses of wild fish, game, and vegetation resources in a 12-month study year (January through December 2012);
2. Map areas used for hunting, fishing, and gathering in the study year;
3. Collect demographic information for the community including population size and composition, ethnicity, birthplace, and length of residency in Bethel;
4. Collect information about involvement in the cash economy, including jobs and other sources of cash income;
5. Evaluate trends in subsistence harvests;
6. Document traditional knowledge observations regarding resources used for subsistence purposes;
7. Evaluate food security patterns for both store-bought and wild foods;
8. Document social networks of sharing subsistence resources among households and between communities; and
9. Conduct preliminary scoping of current issues related to subsistence hunting and fishing.

Within this harvest assessment project, the Division of Subsistence and cooperating organizations discussed the Bethel research design, trained community residents in administration of the survey instruments, and administered surveys to a representative sample of occupied households in Bethel. After data collection, the researchers reviewed and interpreted survey findings and published this report. Study findings were shared with the community in community review meetings that were held in Bethel. Summary results are published online at the CSIS website.

10. In the lowest Yukon River region, the BOG established a moose hunting moratorium from the 1988–1989 regulatory year through the 1993–1994 regulatory year in order to allow for recovery of the moose population in the area.

Research Methods

Ethical Principles for the Conduct of Research

The project was guided by the research principles adopted by the Alaska Federation of Natives in its guidelines for research (Alaska Federation of Natives 2013), the National Science Foundation, Office of Polar Programs in its *Principles for the Conduct of Research in the Arctic* (National Science Foundation Interagency Social Science Task Force 2012), the *Ethical Principles for the Conduct of Research in the North* (Association of Canadian Universities for Northern Studies 2003), as well as the Alaska confidentiality statute (AS 16.05.815). These principles stress community consultation and approval of research designs, informed consent, anonymity 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

In order to obtain community approval, David Runfola, Subsistence Resource Specialist, initiated contact with ONC and the City of Bethel in fall 2012 by sending a letter introducing the project and making subsequent telephone contact. Runfola and a former ADF&G employee had meetings with ONC on November 7, 2012 and the City of Bethel on November 27, 2012. In the meetings, they presented the scope of the proposed research and identified issues of concern to incorporate into the research design in advance of the survey effort.

Systematic Household Surveys

The primary method for collecting subsistence harvest and use information in this project was a systematic household survey. Following receipt of comments at the community approval meetings, ADF&G finalized the survey instrument in February 2013. 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 Bethel and with data in the CSIS. Appendix B is an example of the survey instrument used in this project. In addition to harvest and use data, staff collected demographic information and information on hunting and fishing participation levels, sharing of wild resources, and the seasonality of some harvests to provide important context for the harvest data. Based on retrospective recall, respondents were asked to provide specific information on numbers and species harvested.

A total of 1,888 Bethel households were initially identified as potentially eligible for the study. Due to the large size of Bethel, a sample goal of 25% of households was determined to be adequate to provide precision comparable to other sources of estimated community harvests. Through the course of the survey an additional 140 potentially eligible households were added to the list, bringing the total possible number to 2,028. The 25% sample was drawn from the entire list of 2,028 households, and each household selected for interview was assigned a disposition to indicate its eligibility and occupancy. The total numbers of ineligible and vacant households in the community were estimated from the dispositions of selected households, and were subsequently deducted from the total number of households, bringing the total estimate of eligible and occupied households to 1,645. The resulting interview goal of 25% came to 411 households. Researchers made contact with a total of 733 households, and completed 466 interviews (28.3% sample; Table 1-1). The average survey length was 33 minutes (Table 1-2).

Mapping Locations of Subsistence Hunting, Fishing, and Gathering

During household interviews, the researchers asked respondents to indicate the locations of their hunting, fishing, and gathering activities during the study year. Division staff established a standard mapping method. Specifically, interviewers asked the respondents to mark or otherwise indicate on the maps the search areas for species harvested, the amounts harvested, and the location and months of harvest. Points were used for harvest locations, and polygons (circled areas) were used for harvest effort areas, such as areas searched while hunting moose. Some lines were also drawn when the harvesting activity did not occur at a specific point, such as trap lines or courses taken while drift gillnetting for fish.

Table 1-1.–Sample summary, Bethel, 2012.

Bethel sample calculation sheet				
Initial estimates				
A	Initial estimate of dwellings		1888	
B	New households	(+)	140	
C	Revised estimate of dwellings		2028	
D	Interview goal (25%)		507	
Summary of contacts				
E	Households selected for interview		1279	
F	Total contacts		733	
G	Interviewed		466	
H	Nonresident[a]		44	
I	Refused		223	
J	Vacant[b]		169	
K	Moved		4	
L	Deceased		2	
M	No contact[c]		371	
Adjustment factors for elegible & occupied households[d]				
N	Vacancy factor	(-)	268	13.2%
O	Nonresident	(-)	111	5.5%
P	Deceased	(-)	3	0.2%
Final sample achievement summary				
Q	Estimate of elegible households		1645	
R	Interview goal (25%)		411	
S	Final sample achievement		28.3%	

Calculations

D = C * 0.25	P = L
E = F + J + K + L + M	Q = C - (N + O + P)
F = G + H + I	R = Q * 0.25
N = J	S = G / Q
O = H + K + [(H / F) * M]	

Source ADF&G Division of Subsistence household surveys, 2013.
a. Households that were contacted for interview, but failed to meet minimum residency requirements for this survey.
b. Households that were clearly unoccupied at the time of the survey, including units that can no longer be occupied.
c. Households that were not vacant, and 3 attempts were made to survey, but failed.
d. Factors applied to the revised estimate of dwelling units to derive estimated numbers of occupied and elegible households.

Table 1-2.–Survey length, Bethel, 2012.

	Interview length (in minutes)		
	Average	Minimum	Maximum
Bethel	33	4	148

Source ADF&G Division of Subsistence household surveys, 2013.

The maps used for this project were produced by Terri Lemons from the Division of Subsistence using ArcGIS 10 software[11] on 11″ x 17″ paper. Maps were printed at several scales (or extents) to accommodate both local and distant searches and harvests. The maps included 10 grayscale elevation maps ranging in scale from 1:100,000 to 1:1,000,000 depicting portions of the Kuskokwim River drainage, the lower Yukon River drainage, and the Yukon-Kuskokwim Delta; and 1 high-resolution U.S. Geological Survey (USGS) topographic map centered on Bethel at a scale of 1:35,000.

During each mapping session, researchers recorded the household's identification number, the date of the mapping interview, and the interviewer's initials on each map. All responses are confidential at the household level, and only a community summary map for the various species searched for and harvested is included in this report. Harvest locations for game species are not published, and fishing harvest areas are generalized.

With regard to the mapping effort, some mapping procedures differed from researcher to researcher. Some researchers chose to do the mapping while conducting the survey; that is, mapping each resource as it arose during the interview. Others chose to map all harvest areas immediately following the survey.

Key Respondent Interviews

While researchers were in Bethel, they consulted with the tribal government and other community leaders to identify key respondents and conducted 34 interviews with 40 key respondents; 33 of the interviews were recorded with the interviewees' consent. The purpose of the key respondent interviews was to provide additional context for the quantitative data as well as information for the community background section, the seasonal round section, harvest over time analysis, and the community comments and concerns section. Key respondent interviews were semi-structured and directed by a key respondent interview protocol designed by ADF&G staff in consultation with community members (see Appendix C). In addition to gathering qualitative data through the key respondent interview protocol, ADF&G staff took notes during interviews to provide additional context for this report. All key respondent interviews were transcribed and then analyzed along with interview notes in preparation for this report.

Household Survey Implementation

After obtaining community approval in January 2013, a team of 12 ADF&G staff members traveled to Bethel from March 1 to April 26 to administer the surveys and key respondent interviews. They worked in teams of 2 with 17 local research assistants (LRAs). Table 1-3 lists all project staff involved with surveying the community and developing this report. Subsistence resource specialists trained LRAs, and the teams began collecting data on March 2. In addition to the harvest and use surveys, researchers conducted 34 ethnographic key respondent interviews with 40 key respondents, mostly in April. After surveys were administered, researchers coded the surveys in the field and checked again for completeness and accuracy once they returned to the Fairbanks Division of Subsistence office.

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

Table 1-3.–Project staff.

Task	Name	Organization
Northern Regional Program Manager	James Simon	ADF&G Division of Subsistence
Natural Resource Director	Greg Roczicka	Orutsararmiut Native Council
Principal Investigator	Hiroko Ikuta	ADF&G Division of Subsistence
Project Lead	David Runfola	ADF&G Division of Subsistence
Data Management Lead	David Koster	ADF&G Division of Subsistence
Administrative support	Pam Amundson	ADF&G Division of Subsistence
	Tamsen Coursey-Willis	ADF&G Division of Subsistence
	DeAnne Lincoln	ADF&G Division of Subsistence
Programmer	David Koster	ADF&G Division of Subsistence
Data entry	Margaret Cunningham	ADF&G Division of Subsistence
	Barbara Dodson	ADF&G Division of Subsistence
	John Dwyer	ADF&G Division of Subsistence
	Zayleen Kalalo	ADF&G Division of Subsistence
	Theresa Quiner	ADF&G Division of Subsistence
Data cleaning/validation	Margaret Cunningham	ADF&G Division of Subsistence
Data analysis	David Koster	ADF&G Division of Subsistence
	Marylynne Kostick	ADF&G Division of Subsistence
Cartography	Terri Lemons	ADF&G Division of Subsistence
Editorial Review Lead	Rebecca Dunne	ADF&G Division of Subsistence
Production Lead	Rebecca Dunne	ADF&G Division of Subsistence
Field research staff	Andrew Brenner	ADF&G Division of Subsistence
	Jason Esler	ADF&G Division of Subsistence
	Michelle Gillette	ADF&G Division of Subsistence
	Anna Godduhn	ADF&G Division of Subsistence
	Hiroko Ikuta	ADF&G Division of Subsistence
	Elizabeth Mikow	ADF&G Division of Subsistence
	Odin Miller	ADF&G Division of Subsistence
	Loraine Navarro	ADF&G Division of Subsistence
	Jeff Park	ADF&G Division of Subsistence
	David Runfola	ADF&G Division of Subsistence
	Erin Shew	ADF&G Division of Subsistence
	Seth Wilson	ADF&G Division of Subsistence
Local research assistants	Theresa Albert	Bethel
	Bessie Alexie	Bethel
	Mandy Alexie	Bethel
	Agrafina Baugh	Bethel
	Jaclyn Cabales	Bethel
	David Chief	Bethel
	Jaclyn Evans	Bethel
	Willie John	Bethel
	Lawson Kalistook	Bethel
	Richard Kingeak	Bethel
	Jody Malus	Bethel
	Eric Morgan	Bethel
	Dhane Pierce	Bethel
	Amos Prunes	Bethel
	Melissa Savage	Bethel
	Xavier Villon	Bethel

Source ADF&G Division of Subsistence 2015.

Data Analysis and Review

Survey Data Entry and Analysis

All data were coded for data entry by Division of Subsistence staff during fieldwork. Surveys were reviewed by project staff for consistency. Responses were coded following standardized conventions used by the Division of Subsistence to facilitate data entry. Information Management staff within the Division of Subsistence set up database structures within the 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 were available on a secured Internet site. Daily incremental backups of the database occurred, and transaction logs were backed up hourly. Full backups of the database occurred twice weekly in order to ensure that no more than 1 hour of data entry would be lost in the unlikely event of a catastrophic failure. All survey data were entered twice and each set compared in order to minimize data entry errors.

Once data were entered and confirmed, information was processed with the use of Statistical Package for the Social Sciences (SPSS) software, version 20. 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 D for conversion factors).

Staff also used SPSS for analyzing the survey information. Analysis included review of raw data frequencies, cross tabulations, table generation, estimation of population parameters, and calculation of confidence intervals for the estimates. Missing information was dealt with on a case-by-case basis according to standardized practices, such as minimal value substitution or using an averaged response for similarly-characterized households. Typically, missing data are an uncommon, randomly-occurring phenomenon in household surveys conducted by the division. In unusual cases where a substantial amount of survey information was missing, the household survey was treated as a “nonresponse” and not included in community estimates. Division researchers documented all adjustments.

Harvest estimates and responses to all questions were calculated based upon the application of weighted means (Cochran 1977). These calculations are standard methods for extrapolating sampled data. As an example, the formula for harvest expansion is:

$$H_i = \overline{h}_i S_i \tag{1}$$

$$\overline{h}_i = \frac{h_i}{n_i} \tag{2}$$

where:

H_i = the total estimated harvest (numbers of resource or pounds) for the community i,

$\overline{h}_i$ = the mean harvest of returned surveys,

h_i = the total harvest reported in returned surveys,

n_i = the number of returned surveys, and

S_i = the number of households in a community.

As an interim step, the standard deviation (SD), or variance (V; which is the SD squared), was also calculated with the raw, unexpanded data. The standard error (SE), or SD of the mean, was also calculated. This was used to estimate the relative precision of the mean, or the likelihood that an unknown value would fall within a certain distance from the mean. In this study, the relative precision of the mean is shown in the tables as a confidence limit (CL), expressed as a percentage. Once the standard error was calculated, the CL was determined by multiplying the SE by a constant that reflected the level of significance desired, based on a normal distribution. The constant for 95% confidence limits is 1.96. Though there are numerous ways to express the formula below, it contains the components of an SD, V, and SE.

Relative precision of the mean (CL%):

$$C.L.\%(\pm) = \frac{t_{(\alpha/2)} \times \frac{s}{\sqrt{n}} \times \sqrt{\frac{N-n}{N-1}}}{\overline{h}} \tag{3}$$

where:

s = sample standard deviation,

n = sample size,

$\overline{h}$ = mean harvest of returned surveys,

N = population size, and

$t_{\alpha/2}$ = student's t statistic for alpha level ($\alpha = 0.95$) with n–1 degrees of freedom.

Small CL percentages indicate that an estimate is likely to be very close to the actual mean of the sample. Larger percentages mean that estimates could be further from the mean of the sample.

The corrected final data from the household surveys were added to the Division of Subsistence CSIS. This publicly-accessible database includes community-level study findings.

Population Estimates and Other Demographic Information

As noted above, a goal of the research was to collect demographic information for all year-round households in Bethel. For this study, "year-round" was defined as being domiciled in the community when the surveys took place and for at least 3 months during the 12-month study period. Because not all households were interviewed, a population estimate for the community was calculated by multiplying the average household size of interviewed households by the total number of year-round households, as identified by Division of Subsistence researchers.

There may be several reasons for the differences between the population estimate generated from the division's surveys and other demographic data developed by the 2010 federal census (U.S. Census Bureau 2011), the U.S. Census Bureau's American Community Survey (U.S. Census Bureau n.d.), and the Alaska Department of Labor and Workforce Development (ADLWD n.d.). Sampling methodology (e.g., timing of surveys or eligibility criteria) may explain differences in the population estimates. As will be seen in the

community-specific results, seasonal employment, which is prevalent in rural Alaska communities, may translate into seasonal occupancy, and the presence or absence of seasonally-occupied households during surveys may affect population estimates.

Map Data Entry and Analysis

Information Management staff checked maps for consistency with data recorded on the survey forms. They also removed extraneous marks from the maps to ensure that the digitizing process would occur with minimal error. The map design included tick marks, similar to registration marks, used to pinpoint geographical features and thus provide accuracy during the digitizing process. Each map could then be aligned by the staff member who digitized the polygons, points, and lines that researchers had drawn by hand on the paper maps during the interviews. The final wild resource harvest area maps included in this report were produced by Division of Subsistence staff. Maps were reviewed at a community meeting to ensure accuracy as well as identify any data the community would like to keep confidential.

Network Analysis

The Networks section of the survey asked each respondent to recall from the study year the number of households that harvested and processed 3 different categories of fish resources that the respondent's household used and the communities where the harvesting and processing households were located. The 3 fish resources that appeared on the survey were Chinook salmon, salmon other than Chinook, and whitefishes and sheefish. The survey also asked each respondent to recall from which communities their household received and to which communities it gave away these 3 fish resources. Data analyzed from the Networks module provide a graphic representation of resource distribution webs by community.

Community Review Meetings

David Runfola presented preliminary survey findings and associated search area and harvest maps at a meeting with the Orutsararmiut Native Council (ONC) on January 8, 2014 and the Bethel City Council on January 14, 2014. The executive director of ONC, 8 council members, and a few members of the public attended the meeting with ONC. Eight City Council members and approximately 20 members of the public attended the meeting with the Bethel City Council, and the meeting was broadcasted by the local public radio (KYUK) in the region. In both meetings, some council members shared concerns about regulations related to salmon and moose, but these concerns are not directly related to the project presented.

Final Report Organization

This report summarizes the results of systematic household surveys, key respondent interviews and use area mapping conducted by staff from ADF&G as well as LRAs, and the report also summarizes resident feedback provided at community review meetings. The results chapter includes tables and figures that report findings on demographic characteristics, employment characteristics, characteristics of resource harvests and uses—including the sharing of wild foods—and other topics such as household self-assessments of use, and also harvest and use trends over time. Additionally, qualitative information gathered through key respondent interviews and researchers' notes made during interviews is incorporated in each chapter.

Maps depicting hunting, fishing, and gathering areas used by community members in 2012 are included in the results chapter. The final chapter of the report compares quantitative survey results for Bethel to results from recent and similar research in other lower Kuskokwim communities.

The Division of Subsistence provided a draft report to Orutsararmiut Native Council and City of Bethel for their review and comment. After receipt of comments, the report was finalized. ADF&G mailed a short (5-page) summary of the study findings to every mailbox holder in Bethel in summer 2014 (Appendix E[12]).

12. Due to issues related to conversion factors, the harvest results data were rerun in April 2015. Estimated harvest data presented in the community summary are slightly different from the data in this report.

2. RESULTS

David M. Runfola, Hiroko Ikuta, and Jeff Park

In the spring of 2013, researchers surveyed 466 households, or 28% of the estimated total eligible households, and conducted 37 ethnographic interviews in Bethel (Table 1-1). It was the first comprehensive household survey conducted in the community and the largest survey effort in a single community in Division of Subsistence history. Expanding for unsurveyed households, Bethel's estimated total harvest of wild foods in 2012 was 940,426 lb (±15%; Table 2-1). The average estimated harvest per household was 572 lb (±15%), or 166 lb per capita (±15%). Of all households in the community, 97% used wild resources, 85% harvested wild resources, 92% received wild resources, and 70% shared resources with others.

This chapter summarizes findings from the household surveys, including demographic characteristics, harvest estimates, responses to harvest assessment questions, social networks, employment, income, and local concerns about subsistence. Harvest numbers are expanded estimates. Information from ethnographic interviews contextualizes the survey results. Additional tables appear in Appendix F. Results from this survey are available online in the Division of Subsistence Community Subsistence Information System (CSIS).[1]

Seasonal Round

Spring is an active time for many subsistence activities, partly due to longer days and increasing temperatures. Many Bethel residents will embark on the last hunting and fishing trips of the season before travel becomes impossible with river-ice breakup and snow melt. By March and April, numerous Bethel residents fish for northern pike by jigging through the ice. Daily ice-fishing trips to the mouth of the Johnson River are popular:

> They're starting to gather big numbers under the ice [in March], especially by the mouth of Johnson, Gweek, and these tributaries, and all are starting to get a bunch. Ninety-nine percent of what you catch is pike, but there are definitely [burbot] down there. Once in a blue moon somebody will catch a sheefish or a whitefish but mainly what they're catching is pike. (BET – 17)

Waterfowl hunting is also among the first springtime subsistence hunting opportunities just prior to and during the breakup season. Since 2003, spring and summer migratory bird hunting has been managed by the U.S. Fish and Wildlife Service with regulations advised by the Alaska Migratory Bird Co-Management Council; however, spring and summer subsistence take of migratory birds was not legalized before then.[2] As one hunter explained, "that's changed since I was a kid. There was no legal season in the spring, and now that there is a legal season, I do a lot of hunting…for spring waterfowl" (BET – 31). Ducks and geese begin to arrive in the region in mid-April, and hunters report having good success by early May. At this point in the season, snow and ice conditions are frequently challenging for snowmachine travel, so many hunters walk from town in search of a good hunting spot to place their blind and decoys:

> …You're kind of locked into walking around town until the river breaks. Every year there's definitely a period of time when you can't get out with a snowmachine and the river's not ready to go by boat. You can have some really good shoots within walking distance of Bethel…if there are dry lakes in the summer and they have the grass in them and they get a little bit of water in the spring, that's where the geese like to be…there's

1. Alaska Department of Fish and Game (ADF&G) Division of Subsistence, Juneau. "Community Subsistence Information System: CSIS." https://www.adfg.alaska.gov/sb/CSIS

2. Alaska Migratory Bird Co-Management Council, U.S. Fish and Wildlife Service, Anchorage: "2003 Alaska Spring/Summer Migratory Bird Subsistence Harvest, Questions and Answers." Accessed May 18, 2016. http://www.fws.gov/alaska/ambcc/ambcc/AMBCC_Q&A.%207-18-03.pdf

Table 2-1.–Resource harvest and use characteristics, Bethel, 2012.

Characteristic	
Resources used per household	
Minimum	0
Maximum	70
95% confidence limit (±)	6.0%
Mean	15
Median	12
Resources attempted to be harvested per household	
Minimum	0
Maximum	67
95% confidence limit (±)	8.0%
Mean	9
Median	6
Resources harvested per household	
Minimum	0
Maximum	65
95% confidence limit (±)	8.1%
Mean	8
Median	6
Resources received per household	
Minimum	0
Maximum	36
95% confidence limit (±)	7.5%
Mean	7
Median	5
Resources given away per household	
Minimum	0
Maximum	44
95% confidence limit (±)	10.3%
Mean	4
Median	2
Household harvest (lb)	
Minimum	0.0
Maximum	15,609.1
Mean	571.7
Median	174.9
Total estimated harvest weight (lb)	940,425.6
Community per capita estimated harvest (lb)	165.8
Percentage of households using any resource	97%
Percentage of households attempting to harvest any resource	86%
Percentage of households harvesting any resource	85%
Percentage of households receiving any resource	92%
Percentage of households giving away any resource	70%
Number of households in sample	466
Number of resources available	172

Source ADF&G Division of Subsistence household survey, 2013.

> no bag limits if you're hunting under the subsistence regulations. But we're walking out most years, so it's mostly what you can carry. (BET – 17)

Timing of spring thaw and breakup also plays an important role in determining hunters' success in these early spring hunts, because late breakup results in more birds concentrated on less open ground:

> Depending on what kind of spring we get, how much open water we get is how much they hole up and where they hole…last spring, we were pretty solid. It was so cold. You were in a pretty good spot if you find any open water at all and…other years, you get out there and everything's open and they're so spread out over the landscape it's hard to get into a concentration of them. (BET – 17)

In May, as soon as the river is clear of ice and safe to travel by boat, some Bethel residents will hunt for beavers and muskrats for food and fur. The majority of beavers and nearly all muskrats are taken during this time of year. One key respondent described his beaver hunting practices:

> With a boat and a 0.22 I hunt them around Bethel up the Gweek River, up to Tubungaluk Creek. As soon as the ice goes out, go hunt them. Spring time they're a little stronger eating. Mainly get 'em for fur in the spring. I'll give some of the meat away to people to eat. Some of it I'll put away for bait. (BET – 27)

He went on to explain that there is a 1-week period after breakup when beavers still have a valuable winter pelt that has not been bleached by the sun. Hunting beavers at this time is less labor intensive, and potentially more profitable, than winter trapping through the ice.

Breakup of the river also provides immediate fishing opportunities in May, prior to the arrival of Chinook salmon in June. Rainbow smelt[3] migrate in the Kuskokwim River in late May. Many Bethel residents take advantage of this brief opportunity by harvesting them with dip nets along the river bank in front of Bethel. They also target sheefish with drift gillnets in late May. "Right after the smelt come through, or even while the smelt come through, that's a good time to get 'em [with 6" drift gillnet]. Right before the king salmon start coming in, you can get some sheefish" (BET – 27).

June marks the beginning of the salmon season, which continues throughout the summer. Chinook salmon begin to run in early June and are being targeted heavily, primarily with drift gillnets, by mid-June. Timing of the Chinook salmon harvest is critical because the majority of the fish are preserved through drying, which depends on suitable weather. Those people who fish for and process Chinook salmon are focused on completing the process prior to wetter weather that the region typically experiences in July and August. Many respondents mentioned July 4 as the date that they target to be done processing Chinook and other salmon in a typical year. Sockeye salmon, followed by chum salmon only slightly later, begin to run 1 or 2 weeks after the Chinook run has started:

> In the very earliest part of the king run, the river, you have a high proportion of kings. But soon after, like in early July, you start getting the chums and the reds mixing in there. And then especially the second half of July on, it's a real hodgepodge of mix. So, those run timings aren't totally separate. The chums are running strong during the king run, and the reds for this river. So, then the proportion totally changes. I mean, you start getting a lot more chum and reds in July, and in June you can, a lot of people don't go fishing at the end of June. (BET – 31)

Sockeye salmon are usually preferred over chum salmon, as one respondent described: "The reds run, and then the dog salmon are right behind them and if you hit it at the wrong time, you'll get a whole slug of dogs. And I don't like dogs. But the reds are good. Really good" (BET – 33). The sockeye salmon typically

3. Rainbow smelt *Osmerus mordax* make a large spawning migration in the Kuskokwim River that passes the community of Bethel each spring. Large numbers of Bethel residents harvest these fish shortly after river ice breakup, and most smelt harvests in Bethel in 2012 were likely of rainbow smelt. Because Bethel households could have harvested or used several other species of smelt from other locations in Alaska, and because these smelts are difficult species for many fishers to distinguish from each other with certainty, Division of Subsistence has recorded harvest and use of these fishes as "unknown smelt."

run until mid-July, and the chum salmon run tends to continue into late July. Both species are targeted primarily with drift gillnets and less frequently with set gillnets. The coho salmon run begins in mid- to late July and continues into late August or early September. Coho salmon are also targeted with drift gillnets. These fish are commonly frozen because the run is too late in the season for other preservation methods.

Berry-picking season begins in mid-summer and continues into the fall. Cloudberries (locally known as salmonberries), blueberries, and crowberries (locally known as blackberries) are picked in July and August. Highbush cranberries are picked in late summer and fall, and lingonberries (also known as lowbush cranberries) are picked later in the season often after the first frost.

Autumn is hunting season, beginning with the fall general hunt for migratory waterfowl that opens on September 1 with bag limits and is regulated by the Alaska Board of Game (5 AAC 85.065(a)(4)). In addition, The USFWS sets bag limits and broad season windows, which states may limit further but not liberalize. One key respondent reported that hunting waterfowl in the fall is easier than in the spring because the birds gather in large numbers as they prepare to migrate south:

> In the fall, it's a different story. You know where the birds are, you know how to work them with decoys. So normally we go down the last week of August, me and my neighbor. Because that's subsistence regulations, there's no limits, there's no bag limits. So you can go down there [Eek Lake] and you can have big days. (BET – 17)

September is the time for extended hunting trips in the Kuskokwim River drainage and its tributaries. Bethel residents primarily target moose at this time, but they may also harvest other animals such as black bears, grouses, or migratory waterfowl opportunistically. The moose population of the lower Kuskokwim River region is increasing, which has resulted in limited moose hunting opportunity in areas close to Bethel:

> There's more and more [moose] since they had that moratorium…I've been taking moose earlier and earlier in the season every year…last year I shot my moose on the 3rd. And the 2 years before that I think it was like the 8th or 9th, and maybe the 12th the year before that. (BET – 27)

September also provides hunting opportunities locally or in other areas of the state for caribou as well as other large land animals. One key respondent reported that September is a month with so much hunting opportunity that he often does not have time to target all of the species that he would like to:

> September, that's a balancing act for me...mostly moose and waterfowl…and I try to actually go out and do a lot of other hunting outside this region. Sheep hunting, goat hunting, bear hunting somewhere else. So it's a balancing act in September to get out and do as much as I could. (BET – 31)

Caribou can be found far up the Kuskokwim tributaries near the mountains in late August and September. Some Bethel residents hunt caribou at this time; however, such hunting trips require extended boat travel or a plane charter and may not have predictable success:

> It's an expensive hunt, too, when you throw gas in a boat and you go up, you know, 2, 3 hours up a river. And then you're limited to the river so you can't hunt the areas as effectively as you could with a snowmachine. And you're lucky to find them that way too. I mean, there's just small bands [of caribou] that come down near the rivers. And that's just recently. In the past it was more reliable. (BET – 31)

For these reasons, the fall caribou hunt has become less common for Bethel residents. Many people choose to target the nearby moose instead, or wait until the caribou can be hunted by snowmachine in the winter.

October and November are months when there are relatively few opportunities for subsistence harvesting: "October and November is kind of the quiet time. There's not a whole lot going on. Winter is setting in and there's not enough snow to travel and it's freezing up enough that you can't go by boat anymore" (BET – 31). October is a popular month to target burbot by jigging in the Kuskokwim River, and some Bethel residents reported hunting waterfowl into October with limited success.

Winter freeze-up and the ability to get around by snowmachine allow for a wide variety of subsistence hunting and fishing opportunities. Caribou are hunted using snowmachines throughout winter whenever portions of the Mulchatna herd are available within the distance of a day trip from Bethel:

> It's a much easier time to hunt for caribou. A lot cleaner, dealing with the meat in the snow versus on the tundra. Those caribou are just right across the river, you know, 15 miles out, and people seen 'em with airplanes and people start talkin' about 'em. And that's when it's nice 'cause you can be there and back in a couple, 3 hours and have your meat. (BET – 27)

Many Bethel residents go moose hunting in the Yukon River drainage in the winter, primarily January through March. This hunt has become popular because the region has a very high moose density and a long winter hunting season:

> Now that we have this Unit 18 remainder [hunt], and with snowmachines being more powerful and reliable, it's not a big deal to go from Bethel to a place called Ohogamiut, which is just upriver from [Marshall]. It's the closest part of the Yukon to Bethel. It's become a popular hunt in this area for the Kuskokwim people, particularly Bethel…it's feasible to go over there and shoot a moose and come back the same day. (BET – 31)

Furbearer trapping is an important subsistence activity throughout the winter for a small number of Bethel residents. Starting in November, trappers primarily target martens, red foxes, and beavers, as well as lynx, wolverines, and wolves.

> November is trapping season, and I just wish the ice and snow would be good enough to travel by the time season opens. Usually it's not…it's usually Thanksgiving before you get it going. Mainly marten lately—that's, ah, that's the one that pays for the trapping. But I'll set for wolverine, wolves, otters, you know pretty much everything that's got fur; I'll set for it, if I got the time. (BET – 27)

Fishing opportunities in early and midwinter are limited to those people who have the knowledge and time to maintain a set gillnet under the ice. These nets primarily target broad whitefish, but may also catch northern pike and burbot. Fishing under the ice with set gillnets will continue until melting ice requires that fishers remove them from the water until after breakup and the summer fishing season begins.

Demography

Division researchers sampled 466 Bethel households, a 28% sample of 1,645 estimated eligible households (Table 2-2). The total estimated population of Bethel in 2012 was 5,673 individuals, with an estimated total female population of 2,833 (50%) and an estimated total male population of 2,840 (50%). The mean Bethel household size in 2012 was 3.4 residents, with 11 members residing in the largest household. The mean age of Bethel residents in 2012 was 30 years, and the median was 28 years. The eldest person sampled was 89 years of age. There was an estimated number of 1,071 households wherein respondents identified at least one resident as Alaska Native, which expanded to an estimated total population of 4,031 Alaska Natives (71%) residing in Bethel in 2012. There was an estimated number of 574 households for which respondents identified no residents as Alaska Native. Expansion of these responses indicated an estimated total population of 1,642 Bethel residents (29%) in 2012 who were not of Alaska Native origin.

In 2010, the U.S. Census Bureau enumerated a total population of 6,080 persons in Bethel residing in 1,896 households (Table 2-3), a difference of 7% from this study's total population estimate and a difference of 15% from the estimated number of total households. The 2010 U.S. Census enumerated the Alaska Native population in Bethel to be 4,334 persons (71%). Although total population and household characteristics differ between this study and U.S. Census Bureau data, the presumed accuracy of this study's estimate of Alaska Native population suggests that randomly selecting 28% of Bethel households for participation in surveys may have provided a representative sample of the Bethel population. Surveys recorded all household members who resided in the household for at least 3 months in the study year. The 2010 U.S.

Table 2-2.–Demographic and sample characteristics, Bethel, 2012.

Characteristics	Community Bethel
Sampled households	466
Eligible households	1,645.0
Percentage sampled	28.3%
Sampled population	1,607
Estimated population	5,673
Household size	
Mean	3.4
Minimum	1
Maximum	11
Age	
Mean	30.4
Minimum	0
Maximum	89
Median	28
Sex	
Estimated male	
Number	2,839.9
Percentage	50.1%
Estimated female	
Number	2,832.8
Percentage	49.9%
Length of residency	
Population	
Average	16.4
Minimum	0
Maximum	77
Household heads	
Average	22.2
Minimum	0
Maximum	77
Alaska Native	
Estimated households	
Number	1,070.7
Percentage	65.1%
Estimated population	
Number	4,031.2
Percentage	71.1%

Source ADF&G Division of Subsistence household surveys, 2013.

Table 2-3.–Comparison of population estimates, Bethel, 2012.

2010 Census				Study findings for 2012			
Total population		Alaska Native population[a]		Total population		Alaska Native population	
Households	Population	Population	Percentage of total	Households	Population	Population	Percentage of total
1,896	6,080	4,334	71.3%	1,645	5,673	4,031	71.1%

Table 2-3.–Continued.

2007–2011 American Community Survey				Study findings for 2012			
Total population		Alaska Native population[c]		Total population		Alaska Native population	
Households	Population[b]	Population	Percentage of total	Households	Population	Population	Percentage of total
1,679	5,702	–	–	1,645	5,673	4,031	71.1%

Sources ADF&G Division of Subsistence household surveys, 2013; U.S. Census, 2010; American Community Survey (ACS) 5-year average results (2007–2011).

a. Alaska Native alone or one or more races.

b. People in occupied housing units only.

c. Information for number of Alaska Native or Alaska Native and other race in occupied housing units only unavailable.

Census recorded number of people living in a household on April 15, 2010. In this way, comprehensive survey methods can potentially estimate a lower population than the U.S. Census.

Bethel experienced nearly a four-fold increase in population in the 50-year period from 1960 through 2010, during which time the community's population rose from 1,258 to 6,080 persons (Figure 2-1). Several key respondents remarked how Bethel has been growing: "It's the hub of the area—I think there's just gonna keep growing and growing and growing and—more and more people are gonna move here, because of the jobs" (BET – 1). Another key respondent described, "People also have to realize that Bethel has grown. There is a lot of people here" (BET – 16). In Figure 2-1, U.S. Census Bureau decennial population estimates are depicted as solid points, and Alaska Department of Labor annual population estimates from 1991 through 2011 are depicted as open circles. The Alaska Department of Labor estimate for 2011 was 6,228 persons, a difference of 10% from this study's estimate for 2012 of 5,673 persons. Differences between this study's estimates of Bethel population characteristics and those of the U.S. Census Bureau and Alaska Department of Labor were likely the result of differences in sampling methodology. For example, although this study estimated population based upon a 28% sample of all Bethel households, U.S. Census Bureau data are recorded from a census of all Bethel households.

The survey also asked respondents to report ages of all persons residing in each household. Survey responses to this question are summarized in Figure 2-2, which shows 5-year age cohorts ranging from the youngest cohort of 0 to 4 years of age to the eldest cohort of 85 to 89 years of age. Each cohort is divided between males on the left of the center axis and females on the right. The largest age cohorts for Bethel in 2012 include the youngest residents, aged 0 to 19 years. Age cohort populations decrease for residents 30 years and older and remain similar until the eldest cohorts aged 60 years and older. The presence of large cohorts of young adults and children in comparison to those of older residents suggest several possible factors affecting the demographic makeup of the community. These could include recent increased birth rate, immigration of young families with children into the community, or movement of individuals or entire families out of Bethel as children age into young adulthood.

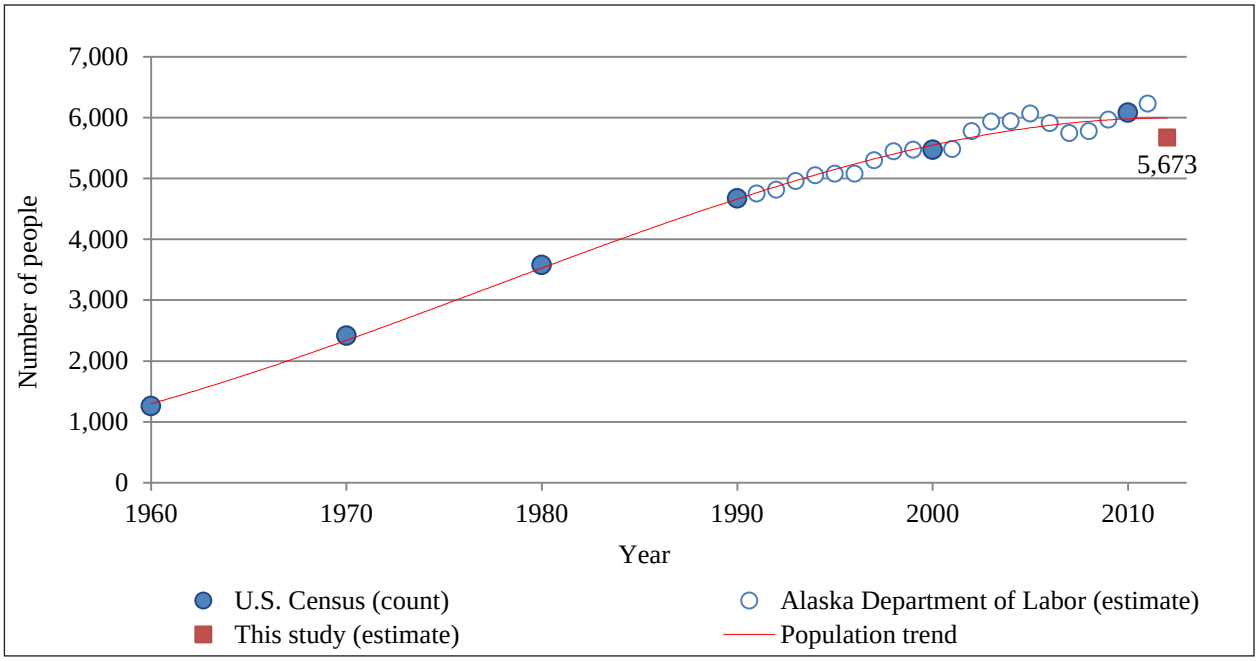

Figure 2-1.–Population history, Bethel, 1960–2012.

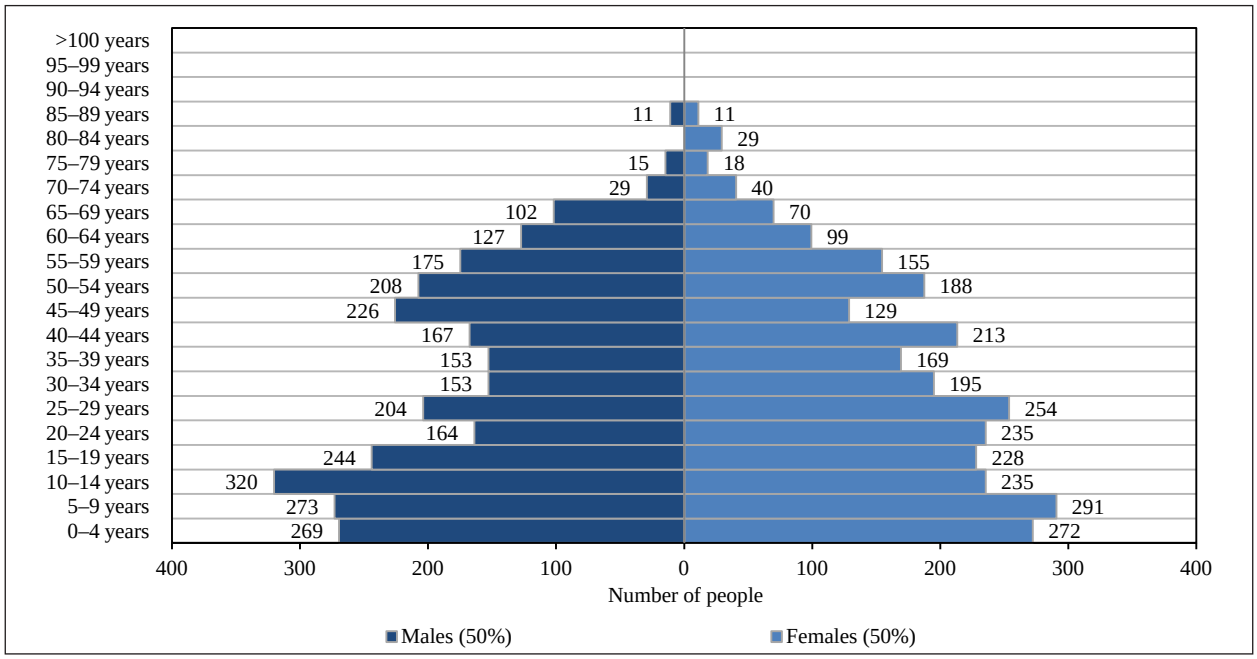

Figure 2-2.–Population profile, Bethel, 2012.

Additional survey questions asked respondents to report a household head's birthplace as determined by the household head's parents' home community when he or she was born. Results indicated that 58% of household heads claimed communities other than Bethel throughout Alaska as their home communities at birth (Table 2-4). About one-quarter of respondents (26%) claimed Bethel as the household head's home community at birth. As a Bethel resident remarked, "We have a lot of people migrating from the villages, Native people, who historically subsist. And the number has grown" (BET – 38). Survey results indicated that 24% of household heads were born in Yukon-Kuskokwim Delta region communities other than Bethel, and that 2% were born in the middle Yukon and central Kuskokwim regions. Respondents also indicated that 6% of household heads originated from other Alaska communities including large population centers (e.g., Anchorage, Fairbanks), rural hub communities (e.g. Nome, Sitka), and a number of small rural communities outside of the Y-K Delta and Kuskokwim River regions (e.g., Arctic Village, Manokotak). Among remaining respondents, 36% of household heads were born to a U.S. home community outside of Alaska, and 4% were born outside of the U.S. The large percentage of household heads originating from outside of Alaska may indicate the nature of employment opportunities in the community. Many Bethel residents are employed by several governmental agencies that provide a variety of public services and require the talents of a specialized labor force. These workers are likely represented by individuals who possess skills that are uncommon in the Alaska-born labor force, or that, due to the difficulty of filling these positions, employers are selecting applicants from a nationwide hiring pool (e.g., medical professionals). One key respondent who was born and raised in Bethel characterized the unique demographics of Bethel as a hub community:

> I like that we are really diverse, we are a very much more diverse community. We have all types of people. And growing up, it was predominantly Yupik, but even back then, Bethel was more diverse than the outlying areas…it's really very accepting of diversity… but at the same time, because we are different and because we are a cast of characters that want a certain way of life…we still like to go to fish camp, we still like to be out there on the tundra picking berries. (BET – 13)

Some Bethel residents were worried about the size of the population in relation to sustainable subsistence activities. A key respondent shared her concerns about the fact that people who migrated from other communities fish in Bethel: "I'm not sure quite what to do about Bethel. I can't help it that people moved here. I mean they are not just people from outside, but people from the villages. Yet, they fish here" (BET – 13). Another respondent was concerned that because of Bethel's fishing power, people in other Kuskokwim communities cannot get enough fish. She explained, "All of a sudden you see…pretty drastic growth in the size of Bethel…I would gladly give up my subsistence right to fish so villagers [in other communities] can [fish]" (BET – 36).

A former fishery management biologist in the Y-K Delta summarized the issue of the growing population of Bethel as it related to the subsistence salmon fishery:

> My major concern about subsistence is…the number of people out here on the Delta has increased dramatically since the 1900s. And there have been huge changes in the technology, in the availability of different types of equipment and gear for harvesting fish. And so, as that technology has gotten better and better and the subsistence fishermen have actually become quite efficient at what they're doing and very selective in what they're harvesting, and as the [population has] increased, we're really at the point now where during these periods of low abundance like we've been seeing over the last few years, that we have sufficient fishing power…we have the ability to harvest [the stock] down to the point below sustainability. (BET – 10)

In the following sections, issues related to the subsistence Chinook salmon fishery in Bethel will be discussed in detail.

Table 2-4.–Birthplaces of household heads, Bethel, 2012.

Residence of parents of household heads	Community of residence of household head Bethel
Akiachak	0.9%
Akiak	0.7%
Anchorage	2.0%
Aniak	0.5%
Arctic Village	0.1%
Atmautluak	0.4%
Bethel	25.8%
Chefornak	0.4%
Chevak	0.3%
Chickaloon	0.1%
Chuathbaluk	0.1%
Dillingham	0.4%
Eek	1.0%
Emmonak	0.4%
Fairbanks	0.3%
Georgetown	0.1%
Goodnews Bay	0.4%
Holy Cross	0.3%
Homer	0.1%
Hooper Bay	0.9%
Kaltag	0.3%
Kasigluk	1.4%
Ketchikan	0.1%
Kipnuk	1.6%
Kotlik	0.1%
Kotzebue	0.1%
Kwethluk	0.8%
Kwigillingok	1.2%
Lime Village	0.1%
Lower Kalskag	0.1%
Manokotak	0.1%
Marshall (Fortuna Ledge)	0.4%
Mekoryuk	0.1%
Mountain Village	0.9%
Napakiak	1.3%
Napaskiak	0.5%
Napaimute	0.1%
Newtok	0.5%
Nightmute	0.5%
Nome	0.1%
Nunapitchuk	2.1%
Oscarville	0.3%
Pilot Station	0.3%
Pitkas Point	0.1%

-continued-

Table 2-4.–Continued.

Residence of parents of household heads	Community of residence of household head Bethel
Platinum	0.1%
Quinhagak	0.3%
Russian Mission	0.7%
Scammon Bay	0.7%
Shageluk	0.3%
Nunam Iqua (Sheldon Point)	0.1%
Sitka	0.3%
Sleetmute	0.3%
Saint Marys (Andreafsky)	0.7%
Stebbins	0.1%
Tanana	0.3%
Togiak	0.3%
Toksook Bay	0.9%
Tuluksak	0.5%
Tuntutuliak	0.9%
Tununak	0.4%
Unalakleet	0.3%
Upper Kalskag	0.1%
Wasilla	0.1%
Yakutat	0.1%
Kodiak Is. (General)	0.1%
Nunivak Island	0.1%
Yukon Delta	0.1%
Kalskag	0.4%
Kusigluk	0.1%
Bethel Area	0.1%
Chignik	0.1%
Nunachuak	0.3%
Nyac	0.3%
Kotlik/Hamilton	0.3%
Other Alaska	0.5%
Other U.S.	36.2%
Foreign	4.0%
Outside Alaska	0.1%
Missing	1.4%

Source ADF&G Division of Subsistence household surveys, 2013.

Harvest and Use Patterns by Category

In Bethel, most households (97%) used wild resources in 2012, and 86% attempted to harvest or harvested resources (Table 2-1). The average harvest was 572 lb edible weight per household or 166 lb per capita. During the study year, households used an average of 15 kinds of resources and harvested an average of 8 kinds of resources. The maximum number of resources used by any household was 70. In addition, respondents gave away an average of 4 different types of resources to other households.

Table 2-5 and Figure 2-3 report estimated wild resource harvests and uses by Bethel residents in 2012. All edible resources are reported in pounds usable weight (see Appendix D for conversion factors[4]). 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 any member of 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 nonlocal hunters. Purchased foods are not included, but resources such as firewood are included because they are a commonly used natural resource in many rural Alaska communities such as Bethel. Differences between the percentages of households harvesting and using different resources reflect sharing among households both within and between communities. Acts of sharing result in a wider distribution of wild foods than one might infer from rates of harvest alone. In fact, sharing is an important characteristic of harvest and use patterns in Bethel. A key respondent said,

> If you spend time with the people—they always use the word *people*, *the people*—it's never been about one person, when you're trying to survive, you know. When you get something, you share it with the people so everybody can survive. And that's…still alive and well today. (BET – 7)

The resource category that showed the highest use was salmon: 90% of households used these fish (Figure 2-3). Approximately one-half (52%) of Bethel households harvested salmon. This suggests that many Bethel households that did not fish for salmon received subsistence salmon resources from others, likely from households in Bethel and potentially from other communities. An estimated 84% of Bethel households used vegetation in 2012 and 77% reported harvests. Similarly, 81% of households used land mammals, which was the only resource category that showed a marked difference between the percentage of households attempting to harvest the resource category (41%) and the percentage of those successfully harvesting (30%). This is likely due to the lower success rate experienced by moose hunters relative to that of individuals attempting to harvest resources in other categories. Seventy-six percent of households used nonsalmon fish, and about one-half of Bethel households (54%) harvested the resource category. Birds and eggs were used by 62% of households; 43% harvested these. The greatest relative difference between percentage of resource category use and percentage of harvest occurred among marine mammals: 45% of Bethel households used this resource category and only 4% actually harvested these resources. Although Bethel is not a coastal community, many households have social connections to communities where marine mammal hunting is common. As a result, some individuals travel from Bethel to the coast to hunt marine mammals, and many more households likely traded or bartered for seal oil, marine mammal meat, and *mangtaq* (beluga whale skin and blubber) or *maktak* (bowhead whale skin and blubber). A small percentage of households used marine invertebrates (8%), and only 2% of households actually harvested this resource category.

In 2012, Bethel households harvested an estimated 940,426 edible pounds of fish, wildlife, and vegetation resources (Table 2-5; Table 2-1). Table 2-5 and Figure 2-4 present Bethel harvests by resource category in terms of total edible pounds. Figure 2-5 depicts per capita harvests as percentages of the total harvest in 2012. Salmon composed the greatest portion of Bethel's subsistence harvest by edible weight. Bethel residents harvested an estimated total of 390,022 edible pounds of salmon, or 41% of the total community harvest of wild foods (Figure 2-4; Figure 2-5). Land mammals constituted 27% of total harvests at 251,515 lb. The estimated harvest of 173,913 lb of nonsalmon fish composed 19% of Bethel's total wild food

4. 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 2-5.–Estimated harvest and use of subsistence resources by category, Bethel, 2012.

	Percentage of households					Pounds harvested			95% conf limit (+/-)[a]
Resource Category	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total	Mean per household	Per capita	Harvest
All resources	96.8%	86.3%	85.2%	92.3%	70.2%	940,425.6	571.7	165.8	14.8%
Salmon	90.3%	53.0%	52.1%	61.2%	39.3%	390,021.8	237.1	68.8	17.2%
Nonsalmon fish	75.8%	54.7%	53.6%	60.3%	37.1%	173,913.3	105.7	30.7	30.0%
Land mammals	80.7%	41.4%	30.0%	70.0%	33.9%	251,514.7	152.9	44.3	16.9%
Marine mammals	44.8%	4.9%	3.9%	44.2%	11.6%	20,410.7	12.4	3.6	0.0%
Birds and eggs	62.4%	45.3%	42.9%	39.3%	31.1%	54,475.6	33.1	9.6	26.9%
Marine invertebrates	8.2%	2.1%	2.1%	6.7%	1.7%	817.2	0.5	0.1	0.0%
Vegetation	84.3%	77.3%	77.0%	40.1%	33.0%	49,272.2	30.0	8.7	12.3%

Source ADF&G Division of Subsistence household surveys, 2013.

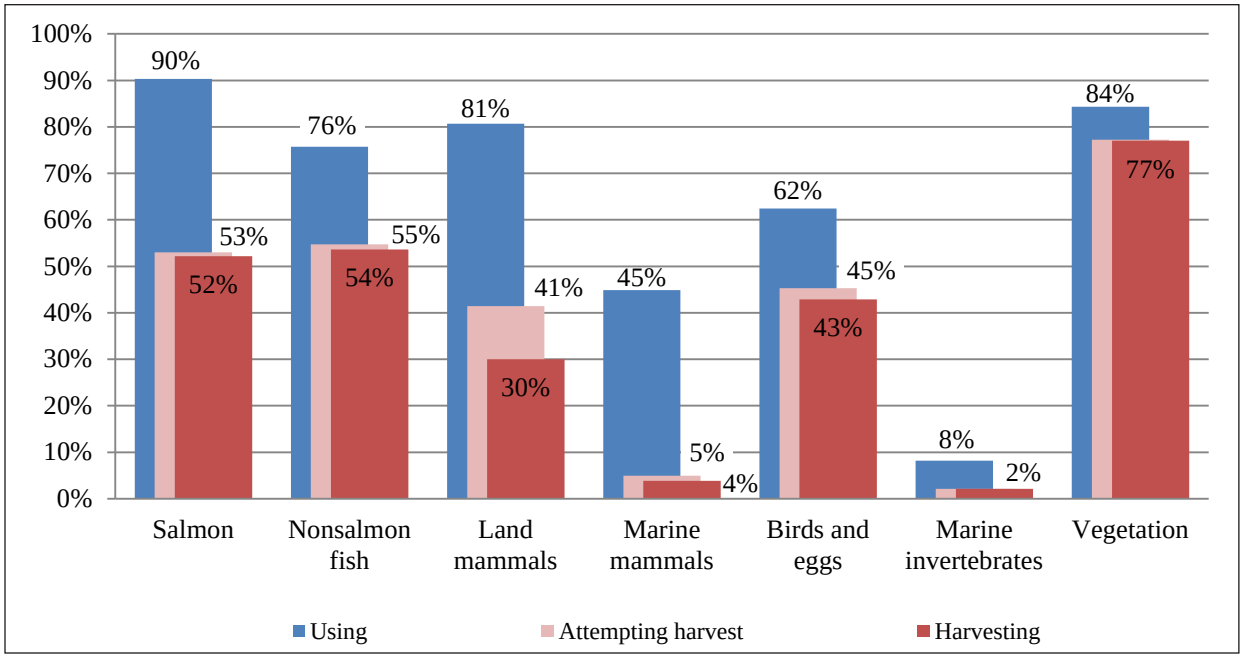

Figure 2-3.–Percentages of households using, attempting to harvest, or harvesting subsistence resources by category, Bethel, 2012.

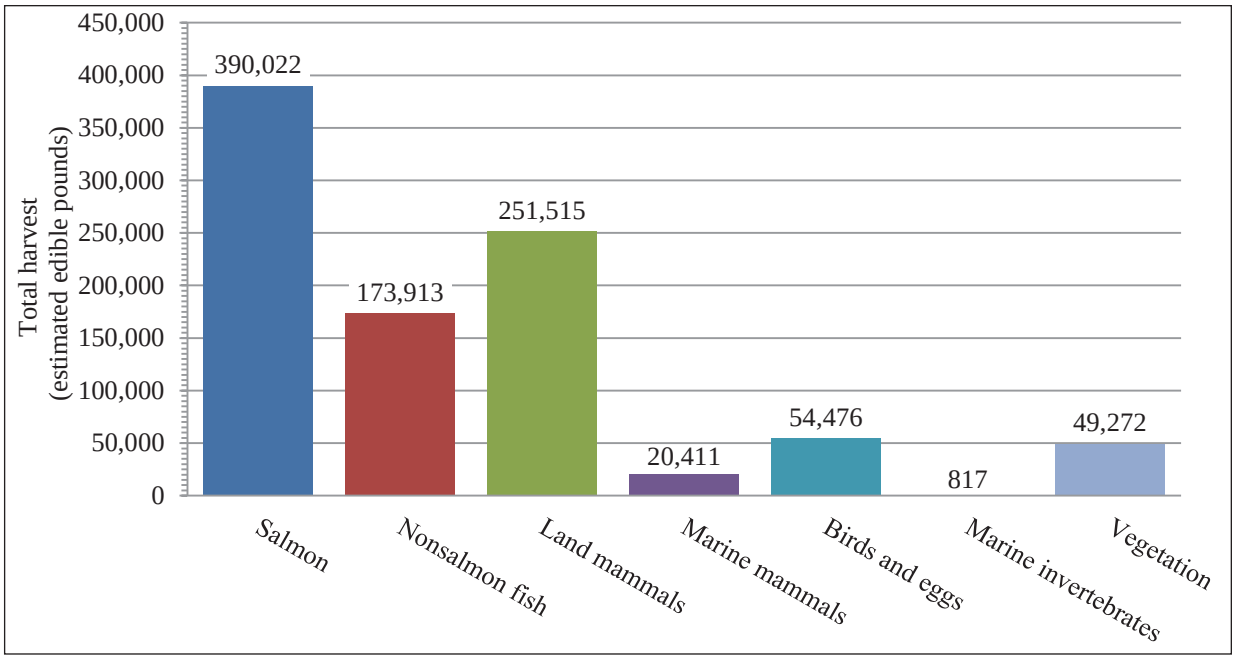

Figure 2-4.–Total subsistence harvests by category, Bethel, 2012.

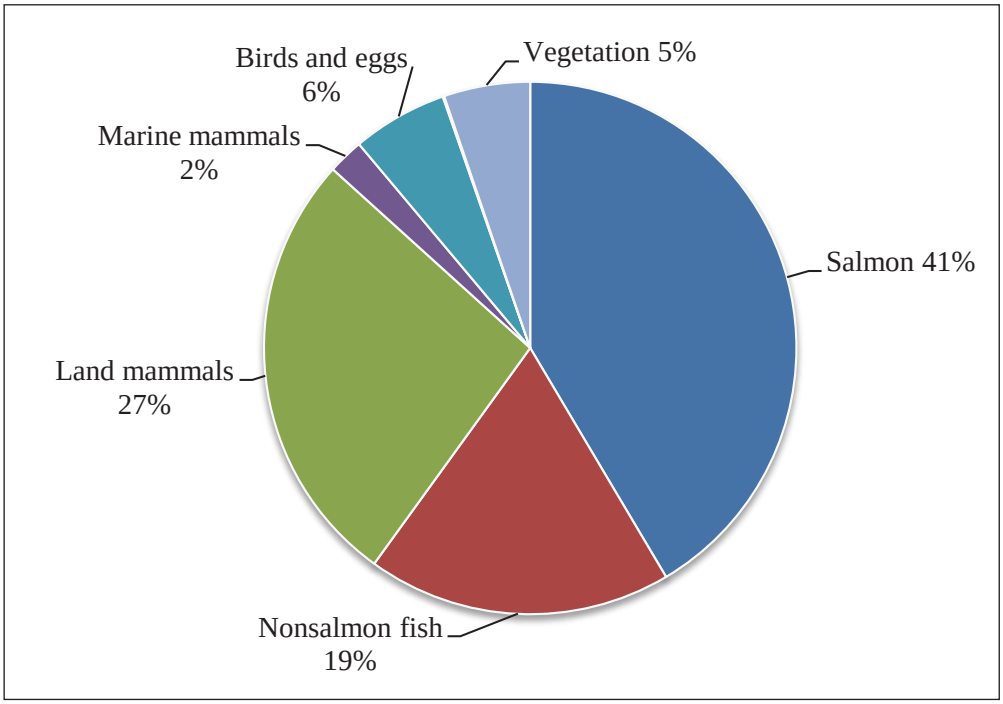

Figure 2-5.–Percentages of per capita harvest by category, Bethel, 2012.

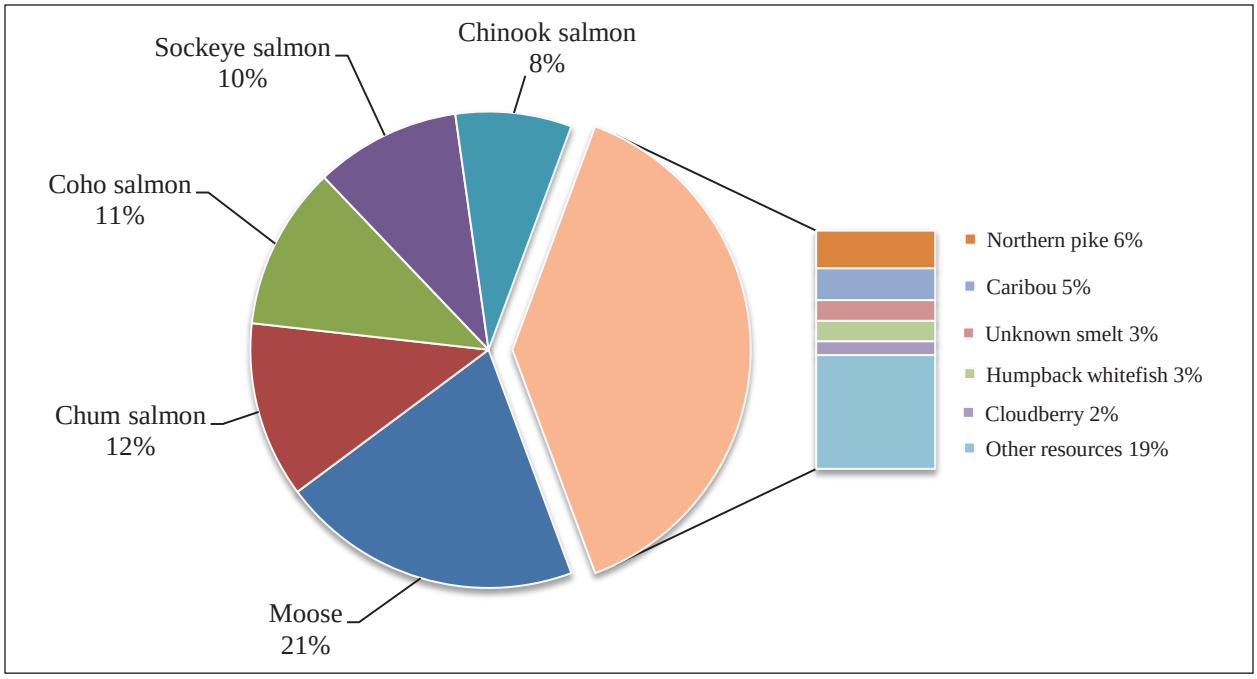

Figure 2-6.–Top 10 species harvested by estimated edible weight, Bethel, 2012.

harvest. Birds and eggs represented 6% of all harvests in 2012: a total of 54,476 lb. The harvest of 49,272 lb of vegetation composed 5% of the total harvest. The marine mammal harvest of an estimated 20,411 lb formed a small portion (2%) of Bethel's total harvest. The harvest of 817 lb of marine invertebrates by Bethel residents was less than 1% of the total harvest for the community in 2012.

Harvest and Use Patterns by Species

Figure 2-6 shows the top 10 resources harvested, in terms of total usable pounds harvested, by Bethel households during the 2012 study year. Moose and 4 species of salmon—chum salmon, coho salmon, sockeye salmon, and Chinook salmon—accounted for 62% of the total subsistence harvest. Moose was the principal subsistence resource in 2012, composing 21% of all subsistence resources harvested (Figure 2-6). Chum salmon were the next largest portion (12%), followed by coho salmon (11%), sockeye salmon (10%), and Chinook salmon (8%). Northern pike contributed 6% to the estimated total edible harvest. Other top 10 species harvested by Bethel households included caribou (5%), followed by smelts and humpback whitefish, each of which contributed 3%. Salmonberries contributed 2%. Seven of the top 10 species harvested in Bethel were fish, which demonstrates the importance of fish in general, and salmon in particular, to the community. Tables 2-6 through 2-11 report estimated wild resource harvests and uses by Bethel residents in 2012; each table represents a resource category with information presented for each species discussed in surveys.

Salmon

Bethel residents harvested an estimated 563,935 lb of fish in 2012, which was 60% of all wild food harvested by the community (Table 2-6). The total estimated harvest of salmon was 390,022 lb or 69,769 fish, which composed 41% of all wild food resources by edible weight. In 2012, chum salmon (112,447 lb, 22,087 fish) accounted for 29% of the estimated subsistence salmon harvest, followed by coho salmon (27%; 104,321 lb; 19,720 fish), sockeye salmon (24%; 92,995 lb; 18,451 fish), Chinook salmon (19%; 74,145 lb; 7,846 fish), and pink salmon (0.8%; 3,227 lb; 1,148 fish). Of the salmon harvest, Bethel residents used 1,599 chum salmon, 1,287 coho salmon, 71 sockeye salmon, and 46 pink salmon to feed dogs (Table F-1). No Chinook salmon were given to dogs.

Table 2-6.–Estimated harvest and use of fish, Bethel, 2012.

	Percentage of households					Estimated pounds harvested				
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita	Total estimated amount[a] harvested by community	95% conf. limit
Fish										
Salmon										
Chum salmon	54.3%	37.1%	36.5%	23.0%	19.7%	112,447.3 lb	68.4 lb	19.8 lb	22,086.6 ind	± 21%
Coho salmon	59.9%	36.7%	35.4%	29.2%	21.5%	104,320.8 lb	63.4 lb	18.4 lb	19,720.4 ind	± 24%
Chinook salmon	61.4%	39.7%	37.3%	32.8%	20.2%	74,144.6 lb	45.1 lb	13.1 lb	7,846.0 ind	± 19%
Pink salmon	7.5%	6.4%	6.0%	1.5%	1.1%	3,227.1 lb	2.0 lb	0.6 lb	1,148.4 ind	± 128%
Sockeye salmon	59.2%	39.1%	38.2%	28.3%	22.5%	92,994.9 lb	56.5 lb	16.4 lb	18,451.4 ind	± 18%
Unknown salmon	6.7%	1.5%	1.5%	6.0%	1.5%	2,887.2 lb	1.8 lb	0.5 lb	516.5 ind	± 87%
Subtotal	**90.3%**	**53.0%**	**52.1%**	**61.2%**	**39.3%**	**390,021.8 lb**	**237.1 lb**	**68.8 lb**	**69,769 ind**	**± 17%**
Char										
Arctic char	0.4%	0.2%	0.2%	0.2%	0.0%	47.7 lb	0.0 lb	0.0 lb	53.0 ind	± 166%
Dolly Varden	7.1%	5.8%	5.8%	1.7%	0.9%	661.8 lb	0.4 lb	0.1 lb	735.4 ind	± 51%
Lake trout	0.6%	0.6%	0.6%	0.0%	0.0%	106.1 lb	0.1 lb	0.0 lb	53.1 ind	± 124%
Subtotal	**7.5%**	**6.2%**	**6.2%**	**1.7%**	**0.9%**	**815.6 lb**	**0.5 lb**	**0.1 lb**	**841.4**	**± 47%**
Trout										
Rainbow trout	6.0%	4.3%	4.3%	2.2%	1.5%	702.9 lb	0.4 lb	0.1 lb	502.1 ind	± 47%
Unknown trout	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Subtotal	**6.2%**	**4.3%**	**4.3%**	**2.4%**	**1.5%**	**702.9 lb**	**0.4 lb**	**0.1 lb**	**502.1 ind**	**± 47%**
Whitefishes										
Sheefish	24.9%	15.5%	14.6%	12.4%	6.0%	12,048.8 lb	7.3 lb	2.1 lb	1,853.7 ind	± 38%
Broad whitefish	28.1%	13.1%	12.7%	18.2%	8.6%	7,886.0 lb	4.8 lb	1.4 lb	5,632.8 ind	± 66%
Bering cisco	4.7%	1.9%	1.7%	3.2%	0.9%	652.4 lb	0.4 lb	0.1 lb	466.0 ind	± 128%
Least cisco	7.9%	4.3%	4.1%	4.5%	1.5%	1,680.3 lb	1.0 lb	0.3 lb	1,680.3 ind	± 76%
Unknown cisco	0.6%	0.4%	0.4%	0.2%	0.2%	103.6 lb	0.1 lb	0.0 lb	95.3 ind	± 118%
Humpback whitefish	32.2%	18.9%	18.2%	16.7%	9.7%	31,280.0 lb	19.0 lb	5.5 lb	10,426.7 ind	± 50%
Round whitefish	2.8%	1.9%	1.7%	1.5%	0.9%	358.3 lb	0.2 lb	0.1 lb	716.6 ind	± 80%
Unknown whitefishes	5.4%	1.9%	1.7%	4.1%	0.2%	1,362.3 lb	0.8 lb	0.2 lb	523.0 ind	± 91%
Subtotal	**56.2%**	**31.5%**	**30.3%**	**36.9%**	**17.0%**	**55,371.7 lb**	**33.7 lb**	**9.8 lb**	**21,394.3 ind**	**± 47%**
Anadromous/marine fish										
Pacific herring	11.6%	0.6%	0.4%	11.6%	1.1%	254.2 lb	0.2 lb	0.0 lb	42.4 gal	± 119%
Pacific herring roe	10.9%	0.2%	0.2%	10.7%	1.3%	296.5 lb	0.2 lb	0.1 lb	42.4 gal	± 166%
Eulachon (hooligan, candlefish)	0.4%	0.0%	0.0%	0.4%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal	± 0%
Unknown smelt	44.2%	32.8%	32.6%	15.0%	18.7%	31,694.5 lb	19.3 lb	5.6 lb	5,282.4 gal	± 21%
Pacific cod (gray)	0.2%	0.2%	0.2%	0.0%	0.0%	63.5 lb	0.0 lb	0.0 lb	7.1 ind	± 166%
Saffron cod	10.5%	0.6%	0.6%	10.3%	1.5%	100.6 lb	0.1 lb	0.0 lb	479.1 ind	± 114%
Flounder	0.4%	0.2%	0.2%	0.2%	0.2%	19.4 lb	0.0 lb	0.0 lb	17.7 ind	± 166%
Lingcod	0.4%	0.2%	0.2%	0.2%	0.2%	28.2 lb	0.0 lb	0.0 lb	7.1 ind	± 166%
Pacific halibut	27.5%	4.7%	4.5%	24.9%	4.9%	6,090.9 lb	3.7 lb	1.1 lb	6,090.9 lb	± 48%
Arctic lamprey	1.9%	0.4%	0.4%	1.5%	0.2%	213.9 lb	0.1 lb	0.0 lb	356.5 ind	± 165%
Unknown rockfish	0.2%	0.2%	0.2%	0.0%	0.2%	10.6 lb	0.0 lb	0.0 lb	7.1 ind	± 166%
Sablefish (black cod)	0.2%	0.2%	0.2%	0.0%	0.0%	21.9 lb	0.0 lb	0.0 lb	7.1 ind	± 166%
Stickleback (needlefish)	1.3%	0.6%	0.6%	0.6%	0.0%	158.9 lb	0.1 lb	0.0 lb	26.5 gal	± 135%
Subtotal	**58.2%**	**34.3%**	**34.1%**	**42.3%**	**22.3%**	**38,953.1 lb**	**23.7 lb**	**6.9 lb**		**± 19%**
Other freshwater fish										
Alaska blackfish	17.2%	4.7%	4.7%	13.5%	4.7%	4,175.2 lb	2.5 lb	0.7 lb	4,175.2 lb	± 56%
Burbot	26.8%	18.7%	17.4%	12.9%	8.2%	15,432.5 lb	9.4 lb	2.7 lb	6,430.2 ind	± 47%
Arctic grayling	4.9%	4.5%	4.5%	0.6%	1.3%	843.4 lb	0.5 lb	0.1 lb	562.3 ind	± 44%
Northern pike	28.3%	22.3%	21.0%	9.7%	10.1%	57,618.9 lb	35.0 lb	10.2 lb	12,804.2 ind	± 34%
Longnose sucker	0.0%	0.0%	0.0%	0.0%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Unknown nonsalmon fish	0.6%	0.0%	0.0%	0.6%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Subtotal	**42.7%**	**32.2%**	**30.7%**	**25.8%**	**18.0%**	**78,069.9 lb**	**47.5 lb**	**13.8 lb**		**± 33%**
All fish	**93.1%**	**67.2%**	**65.5%**	**80.3%**	**52.8%**	**563,935.1 lb**	**342.8 lb**	**99.4 lb**		**± 20%**
All resources	**96.8%**	**86.3%**	**85.2%**	**92.3%**	**70.2%**	**940,425.6 lb**	**571.7 lb**	**165.8 lb**		**± 15%**

Source ADF&G Division of Subsistence household surveys, 2013.

Note "All resources" include all species of fish, wildlife, and plants reported on the survey.

a. Amount of resource harvested is individual units, unless otherwise specified.

As noted earlier, Chinook salmon abundance in the Kuskokwim River drainage in 2012 was the lowest on record at the time. The estimated total run of Kuskokwim River Chinook salmon that year was 98,198 fish (Liller and Hamazaki 2016). This included an estimated drainage-wide harvest of 23,733 fish and an estimated escapement of 74,465. At that time, the estimated 10-year (2002–2011) average total Chinook salmon run was 256,246 fish. Also in 2012, a 35-day fishing closure resulted in the lowest Chinook salmon subsistence harvest ever recorded, which was about 70% below the 10-year average harvest. Before 2010, Chinook salmon was the predominant species among all wild foods that Bethel residents harvested annually: the average Chinook salmon harvest by Bethel households was 86,255 fish between 1990 and 2009. Additionally, Chinook salmon abundance in the Kuskokwim River drainage has decreased since 2007, with some of the lowest total runs occurring in 2010–2012 (Bue et al. 2012; Shelden et al. 2014).[5] Residents of Bethel harvested 32% of the total estimated subsistence Chinook salmon harvest in the entire Kuskokwim River drainage in 2012, which resulted in concerns about the population of Bethel and the power of its fishing fleet.[6] Concerns about Chinook salmon management during the 2012 fishing season shared by key respondents are addressed in this chapter. For a summary of management actions and the effects that the actions had on fishers in the Bethel area during the 2012 salmon fishing season, see the 2012 update chapter in Ikuta et al. (2013:121–126).

Bethel residents consistently identify Chinook salmon as a significantly important food source. Before 2010, Chinook salmon was one of the predominant wild food resources that Bethel residents harvested annually. One Bethel resident stated, "There is one thing that people on the Kuskokwim identify more than with anything else, and that is Chinook. And yes, it is a way of life" (BET – 29). Chinook salmon are processed in a variety of ways; however, they are most commonly cut into strips, then brined, dried, and cold-smoked. One respondent said, "We use the king salmon for strips because you get longer strips out of the king salmon" (BET – 25). Another respondent said that instead of making strips, she used several different methods to preserve Chinook salmon.

> Strips weren't my thing. I didn't know how to do that, so we make slabs and backbone with meat and we dry them, and we used to smoke them. Thanks to [modern technologies], we have freezers now. We smoke them and eat them like dry fish. They were tough, and, but now I put backbones away for half-dried. I smoke them a couple of days and put them away and boil them and eat them with seal oil. And then later I learned to take lots of meat off of backbones and chop it and freeze them for steaks. Salmon steaks. And I process the heads, I salt the heads and bellies and tails. (BET – 6)

In addition to the flesh, Chinook salmon eggs are a delicacy for some people. A man described, "Slightly dried, kind of fermented salmon, king salmon eggs. Crush them. Add salmonberries or cranberries and sugar and whip it up" (BET – 1). This key respondent also discussed processing king salmon as a salted, undried product referred to as *sulunaq* in the lower Kuskokwim River dialect of Central Yup'ik: "We love fish-heads because we [make] *sulunaq*, salted fish heads, out of them" (BET – 1). He continued to describe the taste of fermented fish heads, another delicacy in Yup'ik cuisine.

> We would dig a ditch and throw [Chinook salmon] in there with the fish—livers, spleen, gills and all—and cover them up with grass when the hole gets full, and cover them up with grass. Put dirt, piece of plastic—or not plastic, put cardboard down on top, and cover it up very tightly with dirt. So the flies don't get in there, and we let them sit there, maybe two weeks, maybe three weeks. Let them, letting them ferment...Oooh, it had a wonderful taste and the smell was very powerful…I love fermented fish heads. And the cheeks were nice and soft, you can eat them, just pull everything off and eat it…After we ate fermented fish heads because we would get just lazy and sleepy. Best time to eat those is in the evening so you can sleep good. (BET – 1)

5. K. Schaberg, Kuskokwim Area Research Biologist, ADF&G, personal communication September 12, 2013.

6. T. Hamazaki, Arctic-Yukon-Kuskokwim Region biometrician, ADF&G, personal communication July 17, 2015.

A woman who was born and raised in Bethel summarized both the importance of Chinook salmon among local people and how she processed the fish.

> [It's] a huge part of our lives. Fishing for kings. It's the first salmon…that we have access to. All my life has been about the kings and having fresh fish after that. But getting the kings processed while they are running. I smoke kings, jar kings, plus pressure jar. I freeze kings. Um…what else…smoke, both hot and cold smoke. Kippered. Yeah. So those are the three…three or four main ways that I process kings. (BET – 24)

According to the postseason subsistence salmon harvest survey, Bethel's total chum salmon subsistence harvest increased in 2012, 85% above the recent 10-year average and almost 100% above the recent 5-year average.[7] Similarly, the 2012 sockeye salmon subsistence harvest in Bethel was 42% above the 10-year average and 33% above 5-year average. The coho salmon harvest did not increase significantly in 2012, yet Bethel households accounted for 47% of the estimated total of subsistence-caught coho salmon in the Kuskokwim River drainage. It was possible that subsistence harvesters had been targeting more abundant species in times of Chinook salmon conservation, and the high harvests were tied to both voluntary and involuntary changes in gear usage. Fishers told division researchers various strategies for conserving Chinook salmon. One reported, "We stayed with the regular time with our fishing. We just cut more reds and chums" (BET – 24). A long term resident testified to the abundance of chum salmon and the ease of harvesting the species.

> It's really easy to go out and get all the chum salmon you need pretty quickly…I'm usually pretty busy in the summertime, so I don't have a lot of time to spend doing that. So we go out, it usually only takes one or two trips a year to get, we typically get about maybe between 40 and 60 chum salmon and we can them. We can them all up. (BET – 10)

Another fisher explain that Bethel residents used to harvest a large number of chum salmon, yet due to the decrease in the number of dog teams and changes in food preferences, they did not harvest chum salmon as in the past.

> People ate more of the chum salmon because they had to have that for [dogs]. Half of it was for dog food. Three-quarters of it was for dog food. So, they ate more of the chum salmon, and less of the king salmon…And what they said all the time was, [Chinook salmon is] too oily. They didn't need it. It's too rich for them. And now, the difference is, people, the younger generations are targeting the king salmon and eating less of the chum salmon, dog salmon. Nobody has any dogs anymore. (BET – 18)

Some households preferred sockeye salmon to chum salmon. One fisher explained how he tried to avoid chum salmon when they were abundant.

> My wife really prefers to harvest the reds, but what I am afraid of is because they run at the same time we would just get overloaded in chums and we don't know what to do with them. So we don't harvest that many reds and chums. (BET – 4)

A number of fishers told researchers that they had observed increasing numbers of sockeye salmon. One fisher said, "Early '80s, there was a lot less reds. There is more reds now" (BET – 12). Another fisher told us, "Reds just started showing up, you know, a few years ago" (BET – 26). A resident also described the increasing number of sockeye salmon and explained how he liked the fish.

> The red numbers seem like they are going up. Red salmon. Which is really good. I know a lot of people like the red salmon and we jar them all the time here. We make strips out of them, you know flat fish. And, the reds are really good, but the number on the reds seem like they are coming up. There's a lot more reds. (BET – 37)

Other fishers use sockeye salmon and coho salmon as a substitute for Chinook salmon.

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7. T. Hamazaki, Arctic-Yukon-Kuskokwim Region biometrician, ADF&G, personal communication July 17, 2015.

> If I didn't get enough kings, which the last couple of years has been difficult, is I'm doing a lot of reds and silvers. We are still eating our reds and silvers from…[last year]. We processed enough reds and silvers for the winter. (BET – 13)

One fisher described the abundance of coho salmon in the past and difficulties of processing the fish.

> There used to be so many of them [coho salmon]. You would walk across the river on them. People were scared to go out and fish them, because…you only want, what, 20? The guys would make the mistake of putting the whole net out and would end up with 300 of them. Then, what do you do? You travel all over town and try to give away the silver salmon that everybody has already made that same mistake and everybody is full of them you know. So, silver salmon, the weather is usually not cooperating very well to dry them. So, they were more for fresh eating. And jarring. (BET – 18)

People prefer Chinook salmon to chum, sockeye, or coho salmon partly due to the run timing of this species. Chinook salmon migrate in the Kuskokwim River in June when the weather is generally dry and favorable for drying fish outdoors. Later in the season when other salmon species are present, the weather is more likely to be rainy, which typically results in longer processing times and additional labor to prevent spoilage of fish.

> Early in June is the best time. When it started to get later you start to get more rain and… moisture in the air. It tends to pick up a little bit more towards later June, later in June… when the rain starts coming. And when it's raining and moist. It's not good for drying fish. You could spoil fish pretty easy if you don't watch them pretty good. You just got to try and keep them dry. Or if they are in the smoke house…you have to keep your smoke house lit all of the time…Moisture and dry fish don't go well together. People have had; the fish would spoil so there was nothing they could do about it when it spoils. And that's just because it was late [in the season] and that's no good. (BET – 28)

When it is rainy, fishers have to deal with increased flies in addition to the moisture.

> Those that cut later to compensate for no kings, they probably came up with more flies. Everything gets more rain in July and there's more flies. (BET – 24)

In order to address issues on drying fish during the wet season, some people became creative. Some of the techniques included making a bigger fire, using a fan, and placing plastic tarps on the ground in a smoke house. In the following quote, this fisher explained how he succeeded in drying fish during the rainy season.

> If you're doing it outside in the traditional way in a smoke house and stuff, you gotta make more fire. And then nowadays, electricity, you put a fan on it. Like, I've done some with coho where I'm half drying them, half smoking them, and jarring them. And it was raining the whole time I did it. So I throw them in the smoke house, I hang them up, I start a fire, I get a little bit more heat in there and drive the moisture away, and I'll put a fan on it and I'll keep the fan on there for a few days. And it worked for my purposes. Granted, I wasn't drying them all the way, you know, so they're like jerky. They're only dried part of the way and then I put them in the jar, can them that way, and so they're cooked that way. But, you know, drying fish outside is a real challenge. I even know some people that actually just bring them in the garage now and you could do that in any kind of weather. I honestly know a guy, he has a fish camp and he goes, "Eh, I just do it at home." He goes, "I hang them in the garage, put a fan on them, I dry them, and then once they're dry enough then I throw them in the smoke house and I'm done." So it doesn't even matter what the weather is for him…My smoke house, I put a piece of plastic down and cover it with gravel or dirt. That way you don't have all that moisture coming up through and making it harder to dry fish…That really helps. (BET – 31)

The low abundance of Chinook salmon in 2012 affected other salmon fisheries as well, and fishers were trying to adapt to the new conditions in order to meet their needs for salmon harvest.

Nonsalmon Fish

Twenty-three species of nonsalmon fish contributed 173,913 lb (31 lb per capita) to Bethel residents' total wild food harvest in 2012, composing 19% of all resources by edible weight (Table 2-6; Figure 2-5). Northern pike (57,619 lb) composed 33% of the total nonsalmon fish harvested by edible weight and contributed 10 edible pounds per capita. Whitefishes constituted 32% (55,372 lb; 10 lb per capita) of the total nonsalmon fish harvest by edible weight. Humpback whitefish, sheefish, and broad whitefish predominated the whitefish harvest. Bethel residents harvested 31,280 lb of humpback whitefish, 12,049 lb of sheefish, and 7,886 lb of broad whitefish (Table 2-6). Bering cisco (652 lb), least cisco (1,680 lb), unknown ciscoes (104 lb), round whitefish (358 lb), and unknown whitefishes (1,362 lb) formed the remaining portion of Bethel residents' harvest of whitefishes. Over 1,012 individual whitefishes were used for dog food (Table F-1).

Harvests of other major nonsalmon fish species included smelts (31,695 lb), burbot (15,433 lb), Pacific halibut (6,091 lb), and Alaska blackfish (4,175 lb). Bethel fishers also harvested Arctic grayling (843 lb), Pacific herring (551 lb including harvests of spawned roe), Arctic lamprey (214 lb), saffron cod (101 lb), Pacific cod (64 lb), lingcod (28 lb), sablefish (22 lb), flounders (19 lb), and rockfishes (11 lb).

Fishing Gear

Bethel fishers deployed several different types of gear in order to harvest fish (Figure 2-7). Fishers used drift gillnets to fish for the majority of salmon, 37% (20,750 lb) of whitefishes, and 19% (10,770 lb) of northern pike. An estimated 88% (343,954 lb) of the total subsistence salmon harvest was caught by drift gillnets, including chum salmon (106,481 lb; 95% of the species harvest), coho salmon (92,227 lb; 88%), sockeye salmon (82,516 lb; 89%), and Chinook salmon (58,738 lb; 79%). Set gillnets were used to harvest some salmon, approximately one-half of the total harvest of whitefishes, and some northern pike and burbot. In the late winter and early spring, Bethel fishers primarily jigged with hook and line under the ice to harvest 69% of the northern pike and 54% of the burbot. Residents of Bethel used fish traps to harvest Alaska blackfish and dip nets to harvest smelts.

Marine Invertebrates

Harvests of marine invertebrates are less common than harvests of other resource categories in Bethel. In 2012, the estimated total harvest of marine invertebrates by Bethel residents was 817 lb (0.1 lb per capita). The harvest consisted of 369 lb of unknown clams, 371 lb of cockles, 49 lb of Dungeness crab, and 28 lb of shrimp (Table 2-7). The survey results show that although only 2% of the households in the community harvested 4 species of marine invertebrates, 8% of households used 9 species of marine invertebrates, 5 of which were given by residents in other communities.

Land Mammals

Table 2-8 summarizes the large land mammal and small land mammal/furbearer harvest, use, and sharing data collected for Bethel in 2012. Land mammals constituted the second largest portion of Bethel residents' wild food harvest by resource category, contributing an estimated 251,515 lb or 27% of the total harvest by edible weight (Figure 2-5; Table 2-8). In 2012, moose was the top resource harvested by Bethel residents. The total harvest of moose was 192,529 lb or 21% of the total wild harvests by the community (Figure 2-6; Table 2-8). Bethel residents harvested an estimated 366 moose, and 75% of households used the resource. Two hundred and thirty bull moose were harvested in September (Table F-2).

Key respondents informed researchers that the population of moose in the lower Yukon River has been growing, and they are easier to harvest in recent years than in in the past. One respondent said, "Never had any problem getting a moose. There's more and more since they had that moratorium, the closure…The way they regulate it, the population's really coming back" (BET – 27). Another respondent told researchers, "We are really, really lucky that the lower Yukon got this exploding moose population… All you have to do is get over there and they are there" (BET – 12). Hunters also pointed out that the moose population on the Kuskokwim River is growing.

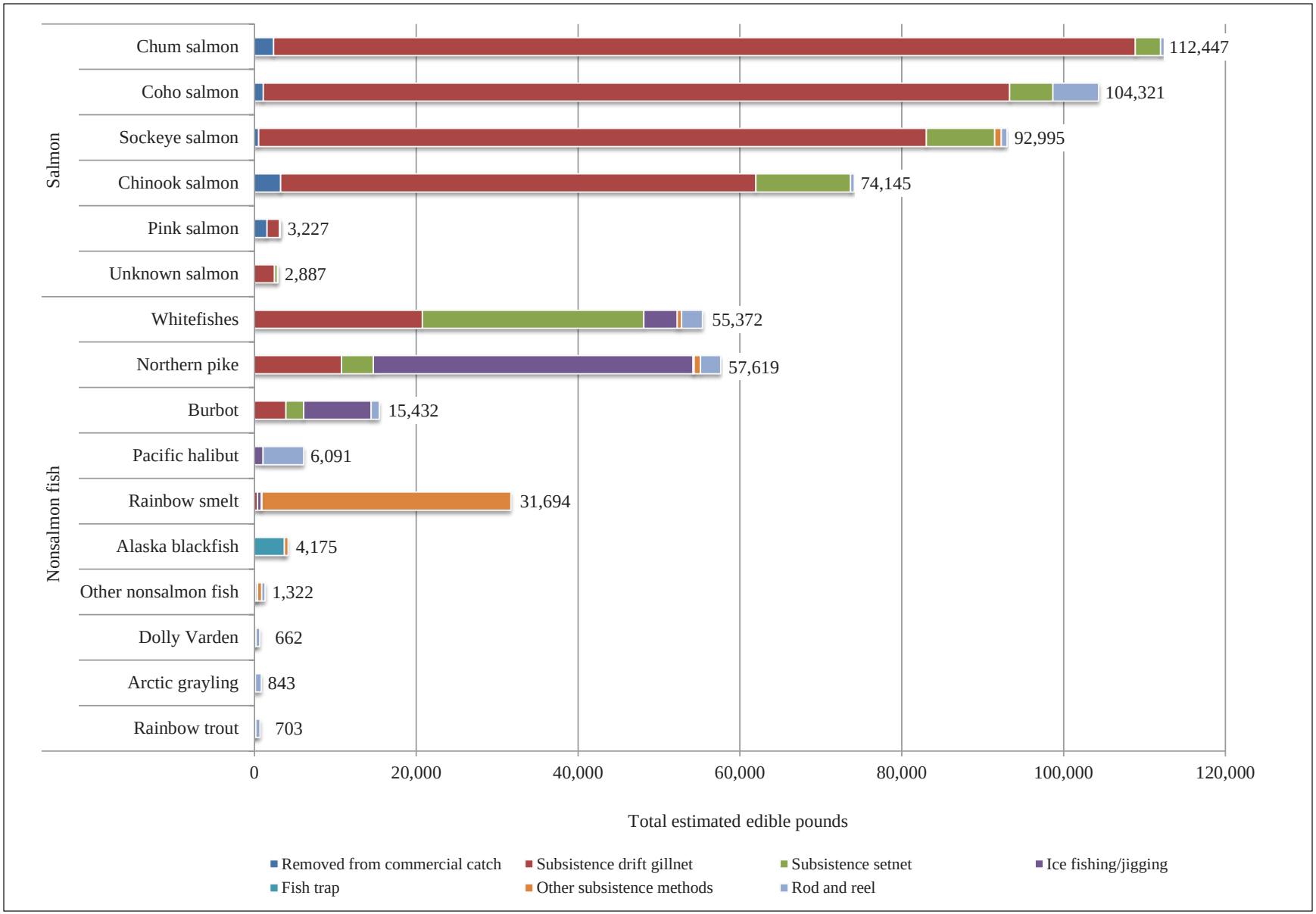


Figure 2-7.–Fish harvests by gear type, Bethel, 2012.

Table 2-7.–Estimated harvest and use of marine invertebrates, Bethel, 2012.

	Percentage of households					Estimated pounds harvested			Total estimated amount[a] harvested by community	95% conf. limit
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita		
Marine invertebrates										
Unknown clams	4.5%	1.5%	1.5%	3.2%	1.1%	368.9 lb	0.2 lb	0.1 lb	123.0 gal	± 87%
Cockles	0.4%	0.2%	0.2%	0.2%	0.2%	370.7 lb	0.2 lb	0.1 lb	123.6 gal	± 166%
Dungeness crab	0.6%	0.2%	0.2%	0.4%	0.0%	49.4 lb	0.0 lb	0.0 lb	70.6 ind	± 166%
Blue king crab	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Unknown king crab	2.1%	0.0%	0.0%	2.1%	0.2%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Tanner crab	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Unknown crab	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Unknown mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal	± 0%
Scallops	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal	± 0%
Shrimp	1.1%	0.2%	0.2%	0.9%	0.2%	28.2 lb	0.0 lb	0.0 lb	28.2 lb	± 166%
Unknown marine invertebrates	0.0%	0.0%	0.0%	0.0%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Subtotal	**8.2%**	**2.1%**	**2.1%**	**6.7%**	**1.7%**	**817.2 lb**	**0.5 lb**	**0.1 lb**		**± 86%**
All marine invertebrates	**8.2%**	**2.1%**	**2.1%**	**6.7%**	**1.7%**	**817.2 lb**	**0.5 lb**	**0.1 lb**		**± 86%**
All resources	**96.8%**	**86.3%**	**85.2%**	**92.3%**	**70.2%**	**940,425.6 lb**	**571.7 lb**	**165.8 lb**		**± 15%**

Source ADF&G Division of Subsistence household surveys, 2013.
Note "All resources" include all species of fish, wildlife, and plants reported on the survey.
a. Amount of resource harvested is individual units, unless otherwise specified

> In the '70s there was hardly any. You had to go up to Holitna and that's where everybody used to go…Since the moratorium, the population of moose has been increasing. I saw more moose last fall than I saw in probably 10 years on this river. (BET– 33)

Caribou were also widely used among Bethel residents. Bethel hunters harvested an estimated 48,644 lb or 374 individual caribou between September and April (tables 2-8 and F-2). A resident mentioned that the Mulchatna herd had returned to the Y-K Delta during the past 3 decades.

> There never used to be caribou around here. Caribou first came back after absence of, I don't know, old folks say 35 years…They start coming back 1985. Yeah, Mulchatna herd moved across, and if you've ever seen tundra move—20,000 caribou all around you—it is amazing. (BET – 33)

This key respondent described caribou hunting as a relatively easy task as long as hunters understand caribou behavior.

> The caribou are very, very easy to hunt...Don't chase them, find out where they are going to go, go in front of them and stop. Get off your snowmachine and hold your rifle...They are nosey. Inquisitive, they will look at you and they'll think you are another caribou, they'll stop and look. If you are a good shot you'll have time enough to get two. But if you chase them, those things will run, they won't stop, especially hard snow like right now. (BET – 33)

Bethel residents also harvested an estimated 21 black bears (2,118 lb) and 7 brown bears (996 lb). A respondent said, "Bears. I'm not really hunting 'em, but if I see them, I'll take 'em [during moose hunting]." Other hunters mentioned that they did not hunt for bears partially because they are uncommon in the Bethel area and many people are not familiar with the taste of bear meat (BET – 31, BET – 33).

In 2012, Bethel residents harvested an estimate of 4 muskoxen (1,041 lb). A key respondent said that he hunted for muskoxen when the moose population was low:

> When the moose was really low and it was closed, I'd go out to Nunivak Island and hunt muskox. That's some good eatin' stuff, but now that the moose population is back up, I haven't gone and done that. (BET – 27)

Table 2-8.–Estimated harvest and use of mammals, Bethel, 2012.

	Percentage of households					Estimated pounds harvested			Total estimated amount[a] harvested by community	95% conf. limit
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita		
Land mammals										
Large land mammals										
Bison	0.0%	0.0%	0.0%	0.0%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Black bear	3.2%	2.4%	1.3%	2.4%	1.3%	2,118.0 lb	1.3 lb	0.4 lb	21.2 ind	± 68%
Brown bear	1.1%	1.3%	0.4%	0.4%	0.2%	995.5 lb	0.6 lb	0.2 lb	7.1 ind	± 118%
Caribou	55.1%	19.5%	13.1%	44.7%	15.1%	48,644.0 lb	29.6 lb	8.6 lb	374.2 ind	± 27%
Deer	0.4%	0.4%	0.0%	0.4%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Moose	74.5%	34.1%	18.7%	59.9%	27.5%	192,528.5 lb	117.0 lb	33.9 lb	356.5 ind	± 17%
Muskox	4.7%	0.2%	0.2%	4.5%	0.9%	1,041.4 lb	0.6 lb	0.2 lb	3.5 ind	± 166%
Dall sheep	1.1%	0.6%	0.4%	0.6%	0.2%	564.8 lb	0.3 lb	0.1 lb	7.1 ind	± 118%
Subtotal	**80.0%**	**37.8%**	**24.7%**	**68.5%**	**32.0%**	**245,892.2 lb**	**149.5 lb**	**43.3 lb**	**769.5 ind**	**± 17%**
Small land mammals										
Beaver	9.4%	6.9%	6.4%	3.4%	3.2%	3,706.5 lb	2.3 lb	0.7 lb	716.6 ind	± 55%
Coyote	0.6%	1.1%	0.6%	0.0%	0.2%	*Not usually eaten*			10.6 ind	± 124%
Arctic fox	0.9%	0.9%	0.6%	0.2%	0.2%	*Not usually eaten*			7.1 ind	± 117%
Red fox	3.6%	4.1%	3.6%	0.4%	0.6%	*Not usually eaten*			1,068.4 ind	± 72%
Alaska hare	2.8%	2.8%	1.9%	1.1%	0.6%	466.0 lb	0.3 lb	0.1 lb	173.0 ind	± 98%
Snowshoe hare	11.8%	9.7%	9.0%	2.8%	3.7%	1,214.3 lb	0.7 lb	0.2 lb	1,224.0 ind	± 46%
River otter	2.6%	2.6%	2.1%	0.4%	0.0%	*Not usually eaten*			113.2 ind	± 62%
Lynx	1.9%	1.9%	1.3%	0.6%	0.4%	*Not usually eaten*			180.4 ind	± 119%
Marmot	0.0%	0.0%	0.0%	0.0%	0.0%	*Not usually eaten*			0.0 ind	± 0%
Marten	1.3%	1.3%	1.3%	0.0%	0.2%	*Not usually eaten*			187.5 ind	± 101%
Mink	2.4%	2.4%	1.9%	0.4%	0.0%	*Not usually eaten*			60.1 ind	± 76%
Muskrat	1.5%	1.7%	1.5%	0.0%	0.9%	66.2 lb	0.0 lb	0.0 lb	127.1 ind	± 111%
Porcupine	2.4%	2.1%	1.9%	0.6%	0.6%	169.4 lb	0.1 lb	0.0 lb	60.0 ind	± 83%
Arctic ground squirrel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Weasel	1.3%	1.3%	1.3%	0.0%	0.0%	*Not usually eaten*			63.7 ind	± 82%
Gray wolf	1.1%	1.9%	0.9%	0.2%	0.0%	*Not usually eaten*			35.4 ind	± 122%
Wolverine	1.7%	2.2%	1.5%	0.2%	0.0%	*Not usually eaten*			67.2 ind	± 72%
Subtotal	**19.5%**	**16.1%**	**14.4%**	**6.7%**	**7.1%**	**5,622.5 lb**	**3.4 lb**	**1.0 lb**	**4,094.3 ind**	**± 43%**
Feral mammals										
Reindeer, feral	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Subtotal	**0.2%**	**0.0%**	**0.0%**	**0.2%**	**0.0%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**0.0 ind**	**± 0%**
Marine mammals										
Bearded seal	10.5%	2.4%	1.1%	9.7%	2.8%	3,953.6 lb	2.4 lb	0.7 lb	28.2 ind	± 83%
Harbor seal	0.9%	0.4%	0.2%	0.6%	0.4%	197.7 lb	0.1 lb	0.0 lb	3.5 ind	± 166%
Ringed seal	8.8%	2.6%	2.1%	7.3%	3.2%	5,535.1 lb	3.4 lb	1.0 lb	98.8 ind	± 62%
Spotted seal	8.4%	2.4%	1.9%	6.7%	2.8%	2,174.5 lb	1.3 lb	0.4 lb	38.8 ind	± 58%
Unknown seal	35.3%	1.1%	0.4%	34.8%	6.9%	395.4 lb	0.2 lb	0.1 lb	7.1 ind	± 118%
Walrus	14.2%	0.9%	0.6%	13.8%	3.9%	8,154.4 lb	5.0 lb	1.4 lb	10.6 ind	± 96%
Beluga whale	13.1%	0.4%	0.0%	12.9%	1.3%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Bowhead whale	8.2%	0.0%	0.0%	8.2%	0.6%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Minke (bottlenose) whale	0.2%	0.0%	0.0%	0.2%	0.2%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Subtotal	**44.8%**	**4.9%**	**3.9%**	**44.2%**	**11.6%**	**20,410.7 lb**	**12.4 lb**	**3.6 lb**	**187.1 ind**	**± 58%**
All land mammals	**80.7%**	**41.4%**	**30.0%**	**70.0%**	**33.9%**	**251,514.7 lb**	**152.9 lb**	**44.3 lb**		**± 17%**
All marine mammals	**44.8%**	**4.9%**	**3.9%**	**44.2%**	**11.6%**	**20,410.7 lb**	**12.4 lb**	**3.6 lb**		**± 58%**
All resources	**96.8%**	**86.3%**	**85.2%**	**92.3%**	**70.2%**	**940,425.6 lb**	**571.7 lb**	**165.8 lb**		**± 15%**

Source ADF&G Division of Subsistence household surveys, 2013.
Note "All resources" include all species of fish, wildlife, and plants reported on the survey.
a. Amount of resource harvested is individual units, unless otherwise specified.

Under current regulations, GMU 18 muskoxen hunters are required to obtain drawing or registration permits to harvest muskoxen, and the only opportunities in GMU 18 are on Nunivak Island or Nelson Island.

Small Land Mammals

Small land mammal harvests composed 0.6 % (5,623 lb) of the total edible pounds of wild food harvests, or 1 lb per capita (Table 2-8). Bethel residents harvested an estimated 717 beavers (3,706 lb edible weight) throughout the year (tables 2-8 and F-3). A respondent mentioned that the beaver population has been growing recently, while the number of trappers has been decreasing:

> Since I've been here, there's always been lots of beavers around. I've heard that in the past there wasn't as many as there are now. But they're everywhere. I mean everywhere you go there's a beaver house…It's worthwhile to hunt beaver and sell 'em for fur mainly…They're a lot of work. You gotta skin 'em, you gotta flesh 'em, stretch 'em. It's a lot of work. Trapping any kind, you know, handling fur. There aren't many people who know how to do it anymore. Seems like it's dying. (BET – 27)

Bethel residents also harvested 173 Alaska hares (466 lb), 1,224 snowshoe hares (1,214 lb), 127 muskrats (66 lb), and 60 porcupines (169 lb) in 2012. Other species of furbearers harvested included red foxes (1,068 individuals) and smaller numbers of coyotes, Arctic foxes, river otters, lynx, martens, minks, weasels, wolves, and wolverines. As described in the previous chapter, Bethel was the home of several fox and mink farms in the 1920s and 1930s. By the 1940s, when fur prices began to decline, fur farming became less lucrative; however, trappers continued to preferentially target mink through the late 20th century.

> When fur price was really good in the '80's, western Alaska had their own fur grade. [Minks] were called Kuskokwim made. They were stretched longer and narrower and with the fur out. And they used to take 10,000 mink out of the delta every year…[Today], I bet you there isn't 500 mink taken in the delta…There is just not many people trapping. (BET – 16)

As discussed by the key respondent quoted above, the so-called "Kuskokwim mink" were highly prized by fur buyers throughout Alaska, the U.S., and elsewhere (Seavoy 2004). During the late 1990s, worldwide fur prices began to decline and harvests of mink, among several other furbearer species, also declined throughout the Y-K Delta region.

Marine Mammals

Marine mammal harvests contributed 2% to the total harvest: an estimated 20,411 lb or 4 lb per capita (Figure 2-5; Table 2-8). Harvests included 99 ringed seals, 39 spotted seals, 28 bearded seals, and 4 harbor seals. Few people in Bethel harvest marine mammals; however, researchers interviewed at least one seal hunter.

> We go down and hunt mainly below Johnson River on down. We do a lot of seal hunting. We're not always successful you know, most of the time. We go after the bigger [seals], the *maklaks* [bearded seal]…And then there's the ones that we call the *issuriq* [spotted seal]…we'll try and go after the bigger *maklaks*…the little spotted seals, they dive here and come up there. They're kind of a little harder to catch. (BET – 37)

He continued to explain how he and his wife process the harvested seals.

> I use the whole thing…what I do is just cut up and cook it. I'll cook it and then I'll use like a flour base, like water and flour, and just use that to thicken up the blood in the soup…[For seal oil] we take the fat and we'll render it. (BET – 37)

Approximately 35% of Bethel households used unknown seals, which may indicate that many households received seal oil from other households in Bethel and outside of the community (Table 2-8). Bethel residents also harvested 11 walruses, which contributed an estimate of 8,154 lb or 1 lb per capita. Eighty-three percent of marine mammals were harvested between March and May (Table F-4).

Birds and Eggs

Tables 2-9 and 2-10 summarize harvest, use, and sharing of birds and eggs in Bethel in 2012. Birds and eggs composed 6% of the total harvest (54,476 lb or 10 lb per capita; Figure 2-5; Table 2-10). The most commonly harvested ducks were mallards (1,524 lb, 1524 individuals), scaups (1,340 lb, 1488 individuals), and black scoters (1,667 lb, 1,852 individuals; Table 2-9). The 2 most harvested geese were Canada/cackling geese[8] (4,937 lb, 4,114 individuals) and white-fronted geese (17,608 lb, 7,337 individuals). A respondent mentioned, "We enjoy hunting them, and when I was a kid it was illegal to go spring goose hunting. Now it's legal, and everybody enjoys eating the geese" (BET – 18). Among other migratory birds, swans contributed 4,281 lb edible weight (428 individuals), followed by sandhill cranes (1,842 lb, 219 individuals). Hunters in Bethel also harvested 14,426 ptarmigans (14,426 lb). Ptarmigan are one of the birds that children harvest when they start hunting. One resident said, "I shot my first ptarmigan at [the age of] five" (BET – 30). Some people also say that ptarmigan is an important resource: "Our family is a little bit bigger so we got maybe 50 or so ptarmigan. But I wasn't the only one hunting. The kids went out hunting too" (BET – 28). The majority of bird harvests occurred during spring (23,499 birds) and fall (7,132 birds), though ptarmigans were harvested mostly during spring and winter (Table F-5).

In 2012, Bethel residents harvested an estimated 5,818 eggs, a total of 1,294 lb (Table 2-10). Various species of gull eggs contributed 55% of the total egg harvests by edible weight (718 lb, 2,394 eggs), followed by goose eggs (184 lb, 614 eggs), and duck eggs (159 lb, 1059 eggs). People in Bethel also harvested swan, crane, shorebird, tern, and ptarmigan eggs.

Vegetation

Vegetation harvests contributed 5% (49,272 lb, 9 lb per capita) of the total harvests of wild food among Bethel residents (Table 2-11). Most households (84%) used vegetation, and 77% of households harvested vegetation. Despite its relatively small percentage of the total weight of Bethel wild food harvests, vegetation (particularly berries) is still highly valued by the community as an important seasonal resource. Cloudberry (locally known as salmonberry) was the plant resource with highest harvest by edible weight, an estimated 20,963 lb or 4 lb per capita. A respondent said, "[We usually get] 10 gallons of salmonberries" (BET – 23). Cloudberries were followed by blueberries (10,578 lb; 2 lb per capita), crowberries (8,013 lb; 1 lb per capita), and lowbush cranberries (2,263 lb; 0.4 lb per capita). A harvester explained how various berries would be in season: "Salmonberries are usually the first ones to get ripe. Then blueberries, well blackberries are later, but then I'll get a bunch of red currants" (BET – 27). Wild rhubarb totaled 3,055 lb or 0.5 lb per capita. Bethel residents also harvested an estimated 2,115 cords of firewood in 2012.

Harvest Areas

As part of the survey, Bethel households were asked to mark on a map the areas where they harvested or searched for subsistence resources. From these data, maps were produced depicting the harvest and search areas in 2012 for the following species or resource categories: salmon, whitefishes, sheefish, northern pike, burbot, smelts, Alaska blackfish, halibut, black bears, brown bears, caribou, moose, small land mammals, beluga whales, seals, walruses, ptarmigans, grouses, ducks, geese, and berries and greens. Figure 2-8 summarizes all the mapped data collected from Bethel households in 2012. Households reported using a total of 17,786 square miles for subsistence activities. Circumstances such as regulatory changes, environmental changes, animal population trends, technological advances, and economic considerations have continuously affected Bethel subsistence users' geographic ranges and areas of use over time. However, according to several respondents, the overall geographic extent of the area considered to be traditionally important for subsistence to the community has not changed. Bethel subsistence users' traditional use area

8. Lesser Canada geese *Branta canadensis* and cackling geese *Branta hutchinsii* are so similar in appearance that many people have difficulty distinguishing them from each other. In order to avoid misrepresentation of harvest amounts, Division of Subsistence has recorded harvests of these 2 species as a single resource category: Canada/cackling goose.

Table 2-9.–Estimated harvest and use of birds, Bethel, 2012.

	Percentage of households					Estimated pounds harvested			Total estimated amount[a] harvested by community	95% conf. limit
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita		
Migratory birds										
Ducks										
Bufflehead	0.6%	0.9%	0.6%	0.0%	0.2%	32.5 lb	0.0 lb	0.0 lb	81.2 ind	± 103%
Canvasback	1.9%	1.9%	1.3%	0.6%	0.9%	248.5 lb	0.2 lb	0.0 lb	225.9 ind	± 92%
Common eider	1.1%	0.4%	0.2%	0.9%	0.2%	117.0 lb	0.1 lb	0.0 lb	53.0 ind	± 166%
King eider	3.6%	0.9%	0.9%	3.2%	0.6%	797.6 lb	0.5 lb	0.1 lb	557.7 ind	± 116%
Spectacled eider	0.4%	0.4%	0.2%	0.2%	0.2%	17.2 lb	0.0 lb	0.0 lb	7.1 ind	± 166%
Goldeneye	1.9%	2.4%	1.9%	0.0%	1.1%	172.6 lb	0.1 lb	0.0 lb	215.8 ind	± 71%
Harlequin duck	0.6%	1.1%	0.6%	0.0%	0.4%	26.5 lb	0.0 lb	0.0 lb	53.0 ind	± 97%
Mallard	17.6%	13.7%	12.9%	5.8%	6.0%	1,523.9 lb	0.9 lb	0.3 lb	1,523.9 ind	± 31%
Unknown merganser	0.4%	0.6%	0.4%	0.0%	0.4%	20.1 lb	0.0 lb	0.0 lb	21.2 ind	± 141%
Long-tailed duck	0.4%	1.1%	0.2%	0.2%	0.2%	42.4 lb	0.0 lb	0.0 lb	53.0 ind	± 166%
Northern pintail	14.8%	12.0%	11.2%	4.1%	4.7%	962.8 lb	0.6 lb	0.2 lb	1,203.5 ind	± 37%
Scaup	5.4%	4.7%	4.3%	1.3%	2.2%	1,339.5 lb	0.8 lb	0.2 lb	1,488.3 ind	± 70%
Black scoter	15.5%	11.2%	9.9%	6.5%	6.0%	1,666.8 lb	1.0 lb	0.3 lb	1,852.0 ind	± 35%
Surf scoter	1.7%	2.4%	1.7%	0.2%	0.9%	187.4 lb	0.1 lb	0.0 lb	208.3 ind	± 71%
White-winged scoter	2.4%	2.1%	1.7%	0.6%	1.3%	143.3 lb	0.1 lb	0.0 lb	159.2 ind	± 76%
Northern shoveler	3.0%	3.2%	2.6%	0.4%	1.1%	301.4 lb	0.2 lb	0.1 lb	502.3 ind	± 119%
Green-winged teal	6.9%	6.9%	6.4%	0.9%	2.8%	175.9 lb	0.1 lb	0.0 lb	586.2 ind	± 45%
American wigeon	5.8%	6.4%	5.8%	0.2%	1.9%	548.3 lb	0.3 lb	0.1 lb	783.3 ind	± 70%
Eurasian wigeon	0.2%	0.2%	0.2%	0.0%	0.0%	4.9 lb	0.0 lb	0.0 lb	7.1 ind	± 166%
Unknown ducks	6.0%	1.3%	1.1%	5.2%	1.1%	104.6 lb	0.1 lb	0.0 lb	120.3 ind	± 110%
Subtotal	**37.6%**	**24.5%**	**23.4%**	**18.7%**	**11.8%**	**8,433.2 lb**	**5.1 lb**	**1.5 lb**	**9,702.2 ind**	**± 33%**
Geese										
Brant	5.2%	1.7%	1.5%	4.1%	0.9%	301.4 lb	0.2 lb	0.1 lb	251.2 ind	± 84%
Cackling goose	0.2%	0.2%	0.2%	0.0%	0.2%	105.9 lb	0.1 lb	0.0 lb	88.3 ind	± 166%
Canada goose	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Canada/cackling goose	37.6%	22.5%	21.2%	19.8%	13.5%	4,937.1 lb	3.0 lb	0.9 lb	4,114.3 ind	± 34%
Emperor goose	1.5%	0.6%	0.4%	1.3%	0.4%	317.7 lb	0.2 lb	0.1 lb	127.1 ind	± 141%
Snow goose	2.4%	1.3%	0.9%	1.5%	1.1%	40.6 lb	0.0 lb	0.0 lb	17.7 ind	± 88%
White-fronted goose	34.5%	23.2%	22.5%	15.5%	12.3%	17,607.6 lb	10.7 lb	3.1 lb	7,336.5 ind	± 43%
Unknown goose	3.2%	1.1%	1.1%	2.4%	0.9%	131.3 lb	0.1 lb	0.0 lb	67.2 ind	± 114%
Subtotal	**48.1%**	**29.0%**	**27.9%**	**27.7%**	**16.7%**	**23,441.6 lb**	**14.3 lb**	**4.1 lb**	**12,002.1**	**± 38%**
Other migratory birds										
Unknown swan	14.4%	9.0%	8.4%	6.7%	3.4%	4,280.5 lb	2.6 lb	0.8 lb	428.1 ind	± 53%
Sandhill crane	8.8%	7.3%	6.7%	2.6%	2.4%	1,842.4 lb	1.1 lb	0.3 lb	219.3 ind	± 36%
Whimbrel	0.4%	0.4%	0.4%	0.2%	0.2%	11.3 lb	0.0 lb	0.0 lb	113.0 ind	± 156%
Unknown shorebirds	0.2%	0.2%	0.2%	0.0%	0.2%	1.8 lb	0.0 lb	0.0 lb	17.7 ind	± 166%
Pacific/Arctic loon	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Unknown loon	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Unknown seabirds	0.0%	0.0%	0.0%	0.0%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Songbirds	0.2%	0.2%	0.2%	0.0%	0.0%	0.0 lb	0.0 lb	0.0 lb	10.6 ind	± 0%
Subtotal	**19.3%**	**13.1%**	**12.4%**	**8.4%**	**5.2%**	**6,136.0 lb**	**3.7 lb**	**1.1 lb**	**788.6 ind**	**± 43%**
Other birds										
Grouse	3.9%	3.4%	3.2%	0.6%	0.9%	744.8 lb	0.5 lb	0.1 lb	744.8 ind	± 85%
Ptarmigan	42.3%	30.0%	29.0%	16.1%	18.3%	14,425.7 lb	8.8 lb	2.5 lb	14,425.7 ind	± 23%
Unknown other birds	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Subtotal	**42.7%**	**30.3%**	**29.2%**	**16.3%**	**18.5%**	**15,170.5 lb**	**9.2 lb**	**2.7 lb**	**15,170.5 ind**	**± 23%**
All migratory birds	**54.1%**	**32.8%**	**32.2%**	**33.7%**	**21.9%**	**38,010.7 lb**	**23.1 lb**	**6.7 lb**		**± 32%**
All other birds	**42.7%**	**30.3%**	**29.2%**	**16.3%**	**18.5%**	**15,170.5 lb**	**9.2 lb**	**2.7 lb**		**± 23%**
All resources	**96.8%**	**86.3%**	**85.2%**	**92.3%**	**70.2%**	**940,426 lb**	**572 lb**	**165.8 lb**		**± 15%**

Source ADF&G Division of Subsistence household surveys, 2013.
Note "All resources" include all species of fish, wildlife, and plants reported on the survey.
a. Amount of resource harvested is individual units, unless otherwise specified.

Table 2-10.–Estimated harvest and use of bird eggs, Bethel, 2012.

	Percentage of households					Estimated pounds harvested			Total estimated amount[a] harvested by community	95% conf. limit
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita		
Bird eggs										
Duck eggs	6.9%	4.9%	3.6%	3.6%	1.5%	158.9 lb	0.1 lb	0.0 lb	1,059.0 ind	± 50%
Goose eggs	8.8%	3.2%	2.4%	6.7%	2.4%	184.3 lb	0.1 lb	0.0 lb	614.2 ind	± 61%
Swan eggs	2.4%	1.5%	0.9%	1.5%	1.1%	74.6 lb	0.0 lb	0.0 lb	118.3 ind	± 94%
Crane eggs	0.4%	0.4%	0.4%	0.0%	0.0%	17.8 lb	0.0 lb	0.0 lb	28.2 ind	± 131%
Unknown shorebird eggs	2.8%	1.9%	1.7%	1.1%	0.4%	24.2 lb	0.0 lb	0.0 lb	483.6 ind	± 94%
Gull eggs	6.4%	3.2%	2.6%	4.3%	1.9%	718.0 lb	0.4 lb	0.1 lb	2,393.4 ind	± 102%
Murre eggs	0.6%	0.0%	0.0%	0.6%	0.2%	0.0 lb	0.0 lb	0.0 lb	0.0 ind	± 0%
Tern eggs	0.6%	0.6%	0.4%	0.2%	0.2%	27.5 lb	0.0 lb	0.0 lb	550.7 ind	± 134%
Ptarmigan eggs	1.3%	1.1%	0.9%	0.2%	0.2%	25.8 lb	0.0 lb	0.0 lb	257.7 ind	± 89%
Owl eggs	0.2%	0.2%	0.2%	0.0%	0.0%	0.5 lb	0.0 lb	0.0 lb	3.5 ind	± 166%
Unknown eggs	2.8%	1.7%	0.9%	1.7%	0.4%	63.0 lb	0.0 lb	0.0 lb	309.0 ind	± 117%
Subtotal	**19.1%**	**9.0%**	**7.3%**	**12.7%**	**4.3%**	**1,294.4 lb**	**0.8 lb**	**0.2 lb**	**5,817.8 ind**	**± 65%**
All birds and eggs	**62.4%**	**45.3%**	**42.9%**	**39.3%**	**31.1%**	**54,475.6 lb**	**33.1 lb**	**9.6 lb**		**± 27%**
All resources	**96.8%**	**86.3%**	**85.2%**	**92.3%**	**70.2%**	**940,425.6 lb**	**571.7 lb**	**165.8 lb**		**± 15%**

Source ADF&G Division of Subsistence household surveys, 2013.
Note "All resources" include all species of fish, wildlife, and plants reported on the survey.
a. Amount of resource harvested is individual units, unless otherwise specified.

is likely represented by a much broader area than was actually documented in 2012 because this study only represents a sample of 28% of Bethel households.

In 2012, fishers searched for and harvested salmon primarily in the mainstem of the Kuskokwim River from the mouth of the river to a point near Akiak (Figure 2-9). Additional areas of search and harvest for salmon species include the Kwethluk River from the mouth to approximately 20 miles upriver and the Kisaralik River from the mouth to 20 miles upriver. Some fishers harvest salmon in the ocean close to Toksook Bay, Hooper Bay, and Quinhagak, as well as in the Kanektok River from the mouth to 5 miles upriver and in the South Fork Goodnews River 10 miles upriver from the mouth. Others fish in the middle Kuskokwim River between Kalskag and Aniak, Napaimute near Holokuk River, and in Holitna River approximately 10 miles upriver from the mouth. Some salmon were harvested in the lower Yukon River near Emmonak and Marshall.

Figure 2-10 shows search and harvest areas for whitefish species. This map depicts whitefish harvest and search areas as polygons and specific set gillnets and jigging sites as points. In addition to the mainstem Kuskokwim River, the whitefish harvest areas extended from the area of tundra lakes in the vicinity of Eek Lake southwest of Bethel to the Johnson River drainage northwest of the community, and further to an area of tundra lakes northeast of Bethel closer to the Yukon River. Some fishers fished for whitefishes in the middle Kuskokwim River near Napaimute and 10 miles upriver from the mouth on the Holitna River.

Bethel fishers searched for and harvested both burbot and northern pike in the mainstem of the Kuskokwim River (Figure 2-11). Northern pike search and harvest areas included an area on the Bering Sea near Toksook Bay, the Johnson River drainage northwest of Bethel, 5–10 miles upriver on the Kwethluk and Kisaralik rivers, in the middle Kuskokwim River near Kalskag, and in the Holitna-Hoholitna rivers from the mouth to 20 miles upriver. Figure 2-12 depicts harvest and search areas for Alaska blackfish and smelts. Alaska blackfish were harvested from several spots near Bethel and in the tundra lake areas in the vicinity of the Johnson River. For smelts, Bethel households used the mainstem of the Kuskokwim River near Bethel and the mouth of Johnson River, areas of tundra lakes south of the community, areas north and south of Kinak Bay, and near the mouth of the Kanektok River in Kuskokwim Bay. Halibut were searched for and harvested mainly in Etolin Strait between Nunivak Island and Nelson Island, and some were harvested in Goodnews Bay (Figure 2-13).

Table 2-11.–Estimated harvest and use of vegetation, Bethel, 2012.

	Percentage of households					Estimated pounds harvested				
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita	Total estimated amount[a] harvested by community	95% conf. limit
Berries										
Blueberry	66.1%	60.7%	59.7%	11.8%	15.1%	10,577.5 lb	6.4 lb	1.9 lb	2,644.4 gal	± 14%
Lowbush cranberry	24.5%	21.2%	20.8%	3.9%	5.2%	2,263.2 lb	1.4 lb	0.4 lb	565.8 gal	± 29%
Highbush cranberry	3.6%	3.6%	3.4%	0.4%	0.9%	641.2 lb	0.4 lb	0.1 lb	160.3 gal	± 80%
Crowberry	40.1%	33.3%	31.8%	12.5%	9.1%	8,012.9 lb	4.9 lb	1.4 lb	2,003.2 gal	± 22%
Currants	1.3%	1.3%	1.3%	0.0%	0.6%	143.5 lb	0.1 lb	0.0 lb	35.9 gal	± 80%
Nagoonberry	2.4%	2.1%	2.1%	0.2%	0.0%	91.8 lb	0.1 lb	0.0 lb	22.9 gal	± 74%
Raspberry	3.2%	2.6%	2.6%	0.6%	0.4%	228.2 lb	0.1 lb	0.0 lb	57.0 gal	± 63%
Cloudberry	58.6%	48.1%	47.6%	17.2%	16.6%	20,962.8 lb	12.7 lb	3.7 lb	5,240.7 gal	± 15%
Strawberry	0.2%	0.2%	0.2%	0.0%	0.2%	141.2 lb	0.1 lb	0.0 lb	35.3 gal	± 166%
Blackberry	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal	± 0%
Other wild berry	0.6%	0.6%	0.6%	0.0%	0.0%	98.8 lb	0.1 lb	0.0 lb	24.7 gal	± 123%
Subtotal	**80.3%**	**71.2%**	**71.0%**	**27.5%**	**25.1%**	**43,161.0 lb**	**26.2 lb**	**7.6 lb**	**10,790.3 gal**	**± 12%**
Plants/greens/mushrooms										
Wild rhubarb	7.3%	6.7%	6.7%	1.1%	1.9%	3,055.0 lb	1.9 lb	0.5 lb	763.8 gal	± 63%
Eskimo potato	0.9%	0.2%	0.0%	0.9%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal	± 0%
Other beach greens	0.6%	0.2%	0.2%	0.6%	0.2%	45.9 lb	0.0 lb	0.0 lb	45.9 gal	± 166%
Devils club	0.2%	0.2%	0.2%	0.2%	0.2%	70.6 lb	0.0 lb	0.0 lb	70.6 gal	± 166%
Fiddlehead ferns	3.4%	2.8%	2.8%	0.6%	0.4%	86.5 lb	0.1 lb	0.0 lb	86.5 gal	± 57%
Hudson's Bay (Labrador) tea	26.4%	24.2%	24.0%	3.4%	5.4%	723.2 lb	0.4 lb	0.1 lb	723.2 gal	± 55%
Mint	1.5%	1.5%	1.5%	0.0%	0.2%	95.3 lb	0.1 lb	0.0 lb	95.3 gal	± 126%
Dandelion greens	0.2%	0.2%	0.2%	0.0%	0.0%	1.8 lb	0.0 lb	0.0 lb	1.8 gal	± 166%
Sourdock	10.3%	6.9%	6.9%	4.7%	1.3%	674.9 lb	0.4 lb	0.1 lb	674.9 gal	± 50%
Pallas buttercup	0.4%	0.4%	0.4%	0.0%	0.0%	63.5 lb	0.0 lb	0.0 lb	63.5 gal	± 129%
Spruce tips	0.9%	0.9%	0.9%	0.0%	0.0%	14.6 lb	0.0 lb	0.0 lb	14.6 gal	± 127%
Willow leaves	0.2%	0.2%	0.2%	0.0%	0.0%	3.5 lb	0.0 lb	0.0 lb	3.5 gal	± 166%
Wild celery	3.6%	2.4%	2.4%	1.7%	0.6%	147.7 lb	0.1 lb	0.0 lb	147.7 gal	± 86%
Wild rose hips	2.8%	2.6%	2.6%	0.2%	0.4%	102.8 lb	0.1 lb	0.0 lb	25.7 gal	± 79%
Yarrow	1.1%	0.9%	0.9%	0.2%	0.0%	10.8 lb	0.0 lb	0.0 lb	10.8 gal	± 121%
Other wild greens	0.4%	0.4%	0.4%	0.0%	0.2%	95.3 lb	0.1 lb	0.0 lb	95.3 gal	± 160%
Unknown mushrooms	1.3%	1.3%	1.3%	0.0%	0.2%	13.7 lb	0.0 lb	0.0 lb	27.9 gal	± 116%
Fireweed	4.7%	4.3%	4.3%	1.1%	1.3%	184.4 lb	0.1 lb	0.0 lb	184.4 gal	± 70%
Stinkweed	14.6%	12.9%	12.9%	2.1%	3.2%	519.2 lb	0.3 lb	0.1 lb	519.2 gal	± 42%
Punk	6.4%	4.9%	3.2%	1.5%	2.2%	0.0 lb	0.0 lb	0.0 lb	2,069.5 gal	± 0%
Puffballs	0.6%	0.6%	0.6%	0.0%	0.0%	8.0 lb	0.0 lb	0.0 lb	7.3 gal	± 149%
Unknown greens from land	5.2%	3.0%	3.0%	2.8%	1.1%	113.1 lb	0.1 lb	0.0 lb	113.1 gal	± 62%
Mousefoods	12.2%	2.6%	2.4%	11.0%	2.2%	81.4 lb	0.0 lb	0.0 lb	81.4 gal	± 99%
Bull kelp	0.2%	0.0%	0.0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal	± 0%
Subtotal	**44.6%**	**39.3%**	**38.2%**	**20.8%**	**14.8%**	**6,111.2 lb**	**3.7 lb**	**1.1 lb**	**5,825.8 gal**	**± 36%**
Wood										
Firewood	28.1%	24.9%	24.9%	5.4%	4.1%				2,114.9 cord	± 58%
Subtotal	**28.1%**	**24.9%**	**24.9%**	**5.4%**	**4.1%**				**2,114.9**	**± 58%**
All vegetation	**84.3%**	**77.3%**	**77.0%**	**40.1%**	**33.0%**	**49,272.2 lb**	**30.0 lb**	**8.7 lb**		**± 12%**
All resources	**96.8%**	**86.3%**	**85.2%**	**92.3%**	**70.2%**	**940,425.6 lb**	**571.7 lb**	**165.8 lb**		**± 15%**

Source ADF&G Division of Subsistence household surveys, 2013.

Note "All resources" include all species of fish, wildlife, and plants reported on the survey.

a. Amount of resource harvested is individual units, unless otherwise specified.

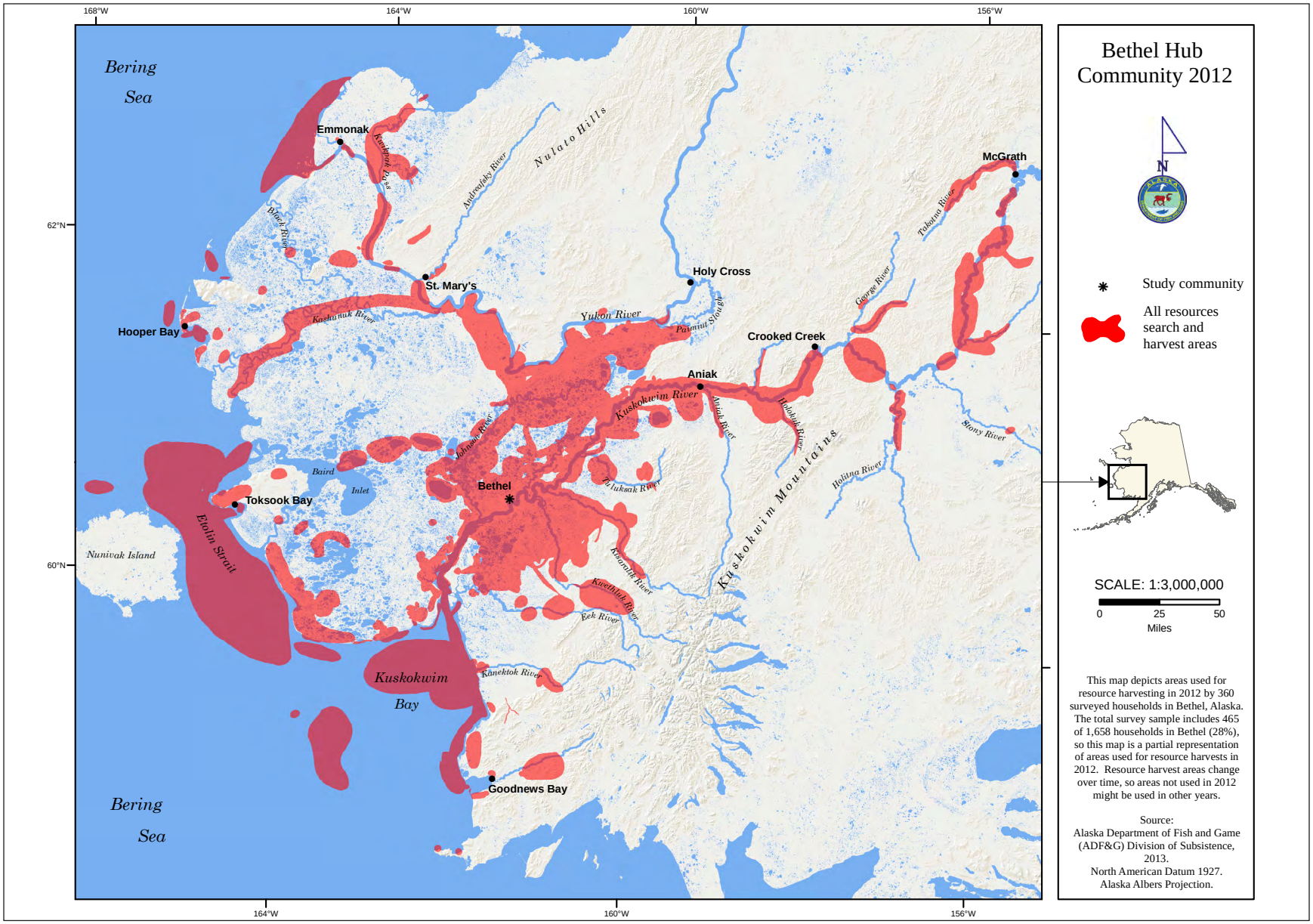


Figure 2-8.–Search and harvest areas, all subsistence resources, Bethel, 2012.

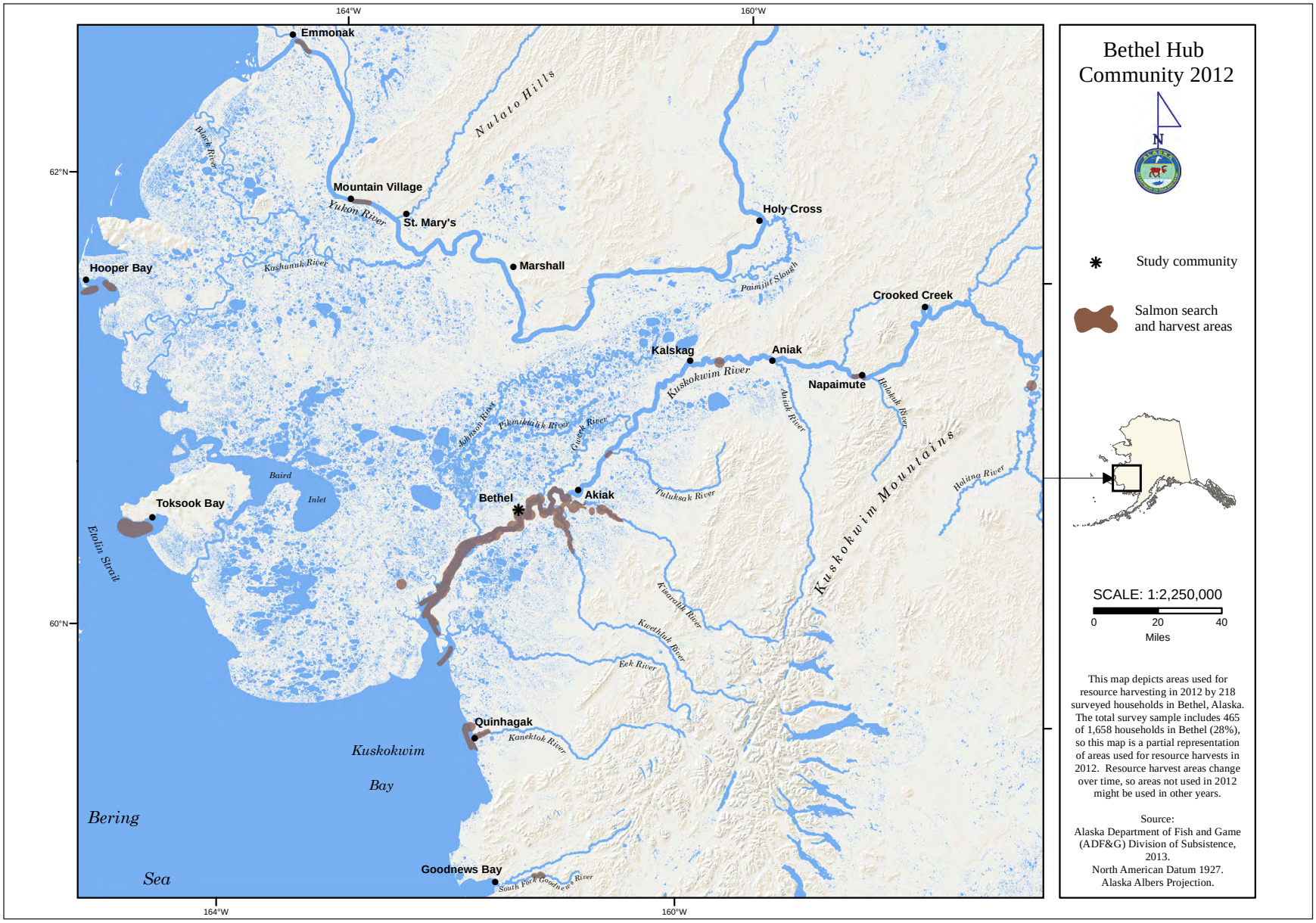


Figure 2-9.–Fishing and harvest areas, salmon, Bethel, 2012.

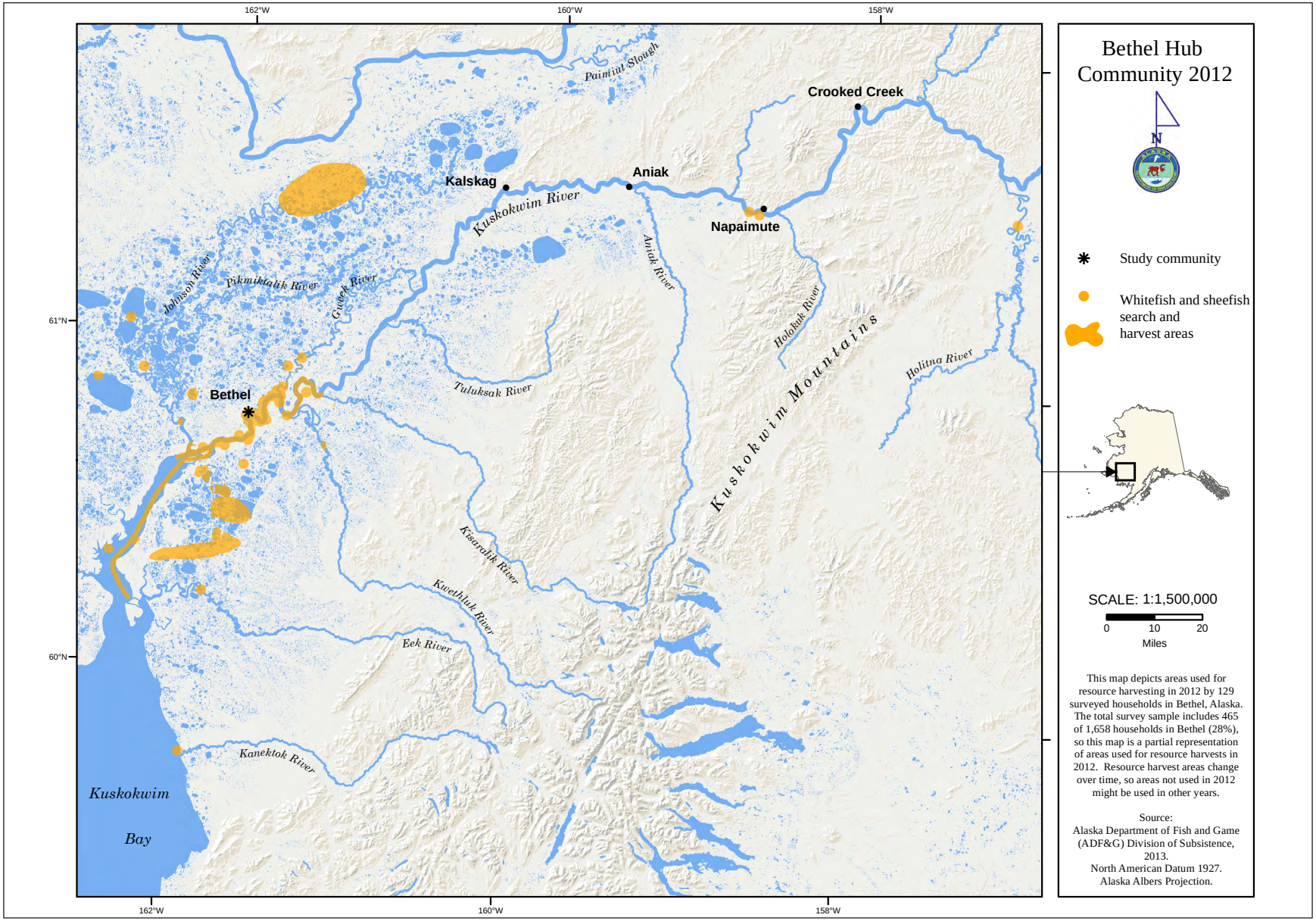


Figure 2-10.–Fishing and harvest areas, whitefishes and sheefish, Bethel, 2012.

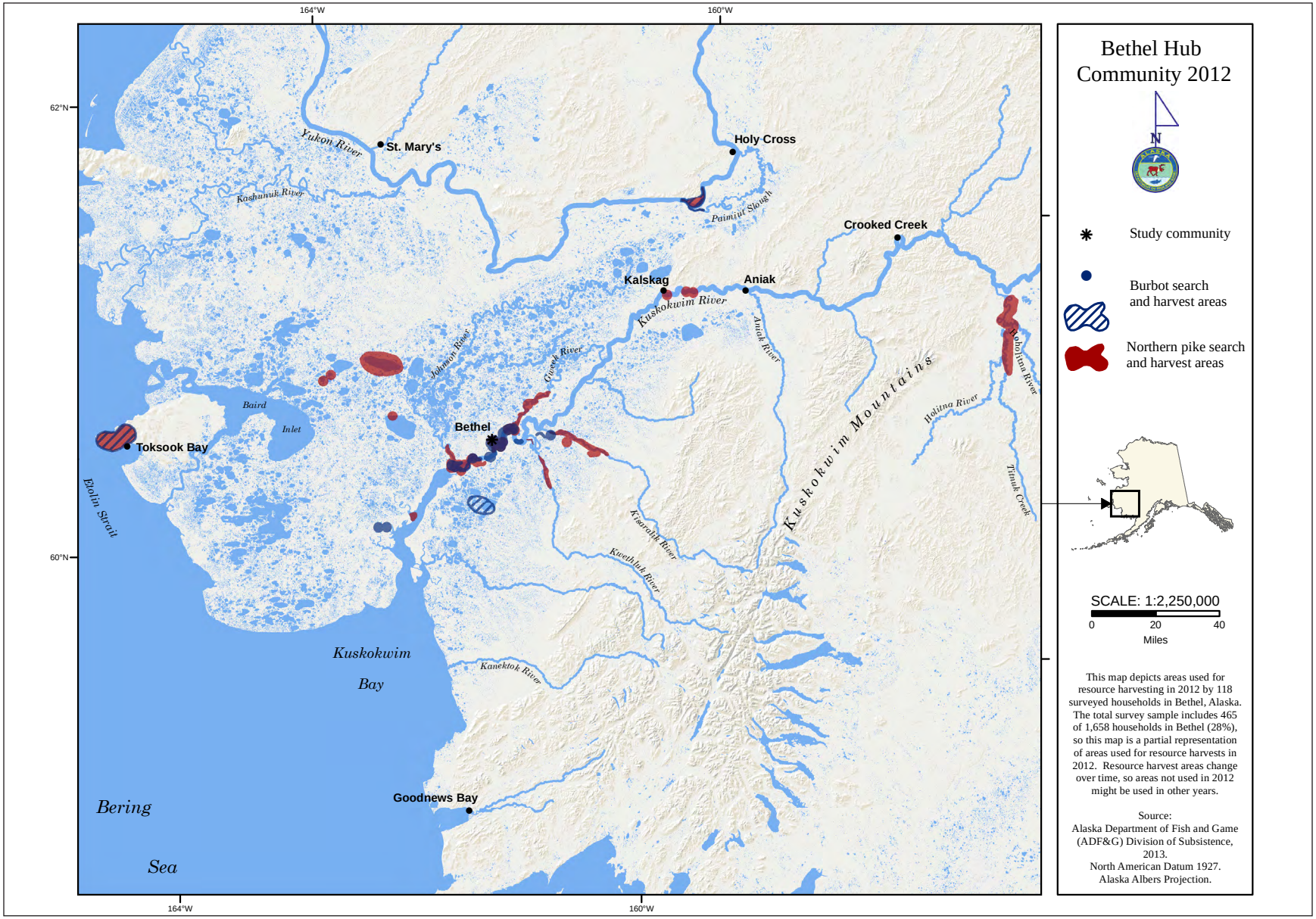


Figure 2-11.–Fishing and harvest areas, burbot and northern pike, Bethel, 2012.

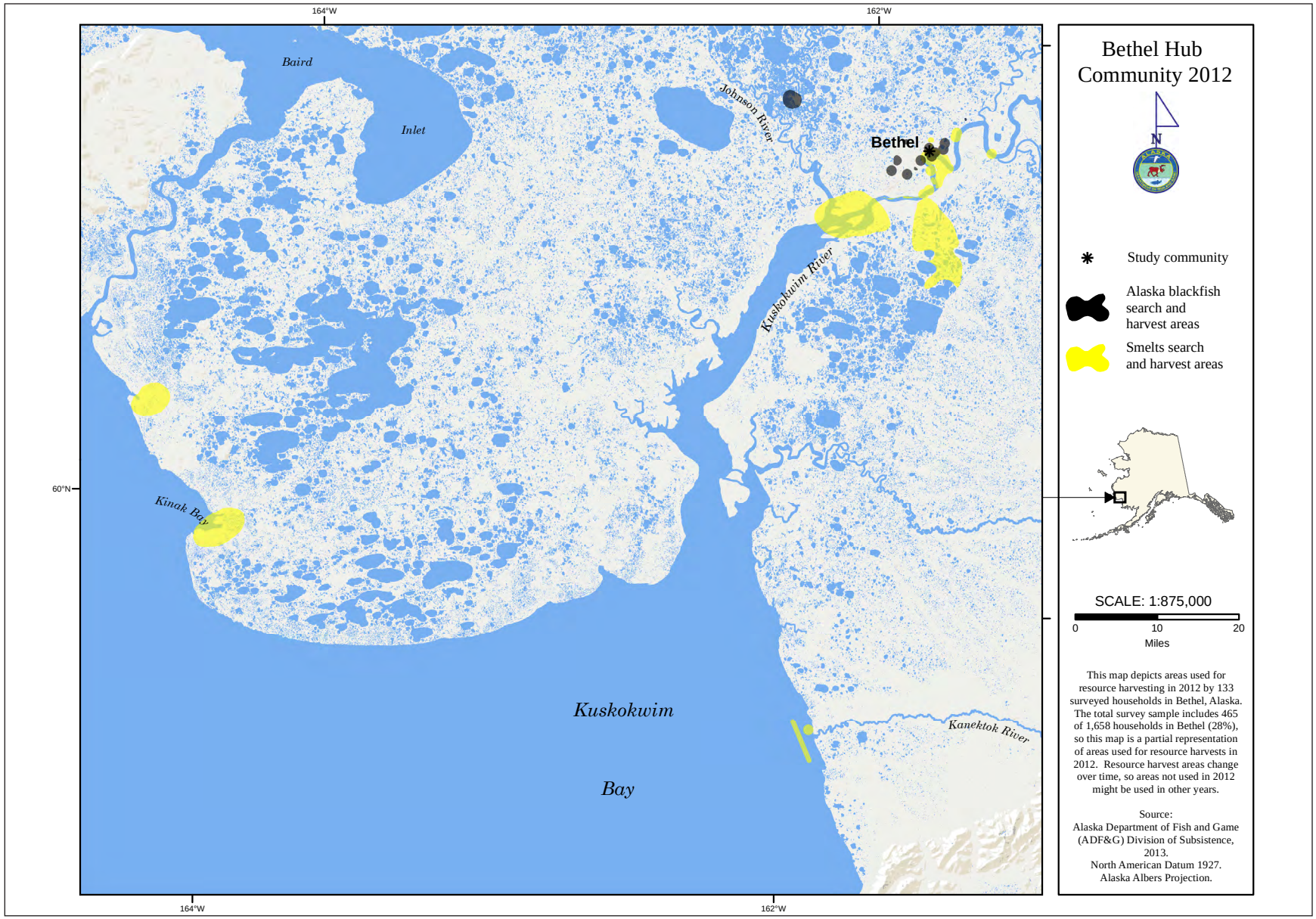


Figure 2-12.–Fishing and harvest areas, Alaska blackfish and smelts, Bethel, 2012.

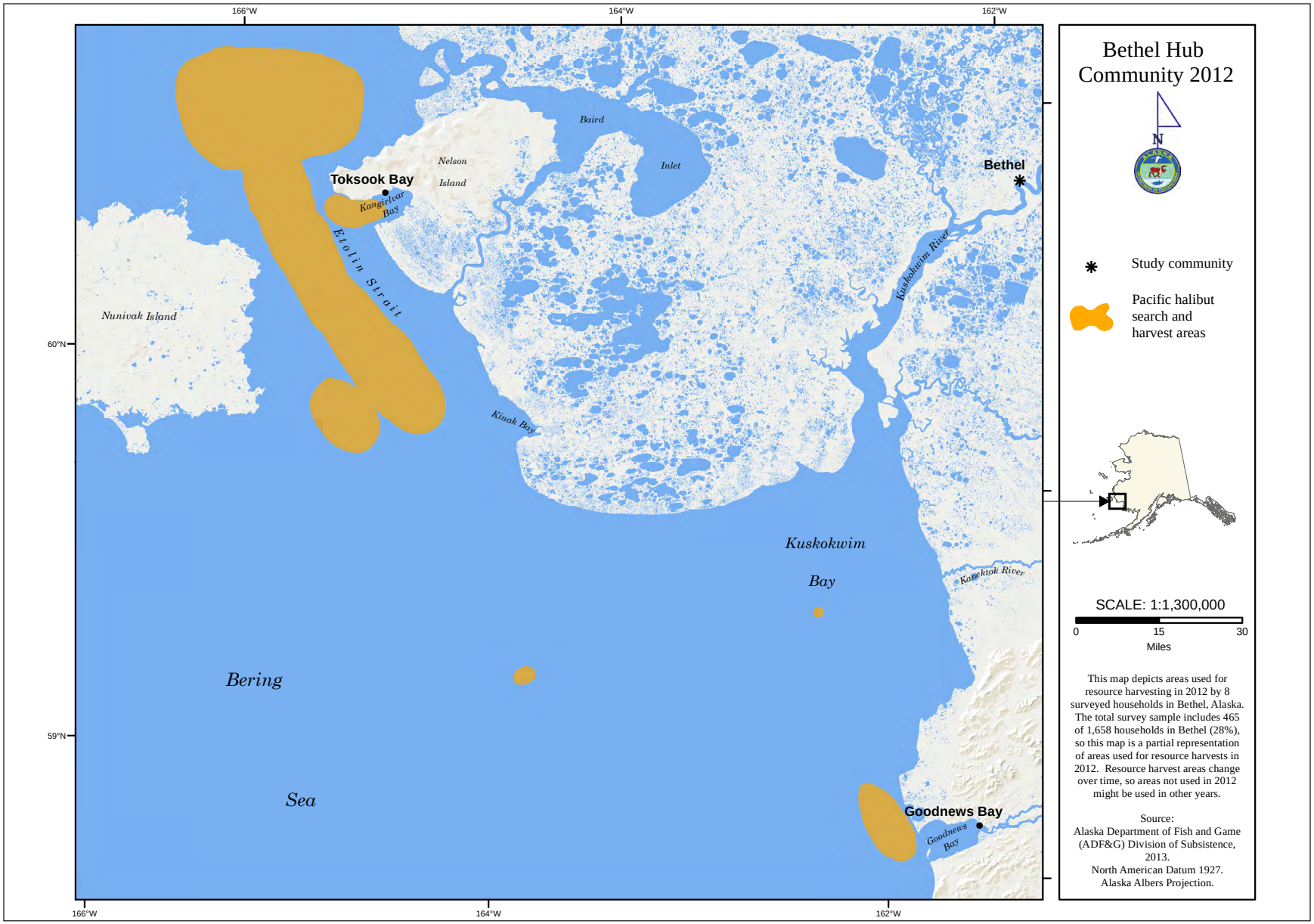


Figure 2-13.–Fishing and harvest areas, Pacific halibut, Bethel, 2012.

Figure 2-14 shows the search and harvest areas for large land mammals, including black bears, brown bears, caribou, and moose. Bethel hunters searched for and harvested moose in a large area of the Yukon-Kuskokwim Delta. Moose search areas along the Kuskokwim River included along the mainstem Kuskokwim River from the mouth of the river to Crooked Creek, the area north of the mouth of the Stony River to McGrath, and in sloughs and lakes on both banks of the Kuskokwim River. Moose were also harvested on the mainstem of the Yukon River from Kotlik to Mountain Village and in sloughs and lakes on the south side of the Yukon River from St. Mary's to Paimiut Slough, and on the Kashunuk River. Bethel hunters searched for and harvested black bears on the Kisaralik River 20 miles upriver from the mouth, as well as on the middle Kuskokwim River near Aniak, and on the upper Kuskokwim River toward McGrath. The primary search areas for brown bears were south of Bethel: in the middle Kanektok River and the Middle Fork Goodnews River. Hunters searched for caribou in the Eek Lake area and in the area between the Eek and Kwethluk rivers.

Bethel households searched for and harvested small land mammals primarily in the areas along the mainstem of Kuskokwim River near Napakiak to just downriver of Kalskag and on the upper Kuskokwim River between Stony River and McGrath (Figure 2-15). These search and harvest areas also included the south side of Kuskokwim River, toward the Kuskokwim Mountains.

Hunters searched for and harvested seals in the Bering Sea near Emmonak, Hooper Bay, Toksook Bay, Quinhagak, and Goodnews Bay (Figure 2-16). Beluga whales were searched for and harvested north of Toksook Bay in Etolin Strait. Bethel residents searched for and harvested walruses in 3 locations: near Hooper Bay, Toksook Bay, and Goodnews Bay; all of these overlap seal search and harvest areas.

The search and harvest area for ducks and geese encompassed the lake and stream systems surrounding Bethel to the tundra lakes in the vicinity of Eek Lake, tundra lakes in the Johnson River drainage, the coastline from the mouth of the Kuskokwim River to Goodnews Bay, and the north side of Kuskokwim Bay to Etolin Strait near Nelson Island (Figure 2-17) Bethel hunters searched for and harvested ptarmigans and grouses mainly near Bethel, as well as on the south side of the Yukon River near Devil's Elbow, in the middle river of the Kisaralik River, and from the tundra area near Baird Inlet.

Bethel residents primarily searched for and harvested berries and greens in sloughs and lakes close to Bethel (Figure 2-18). Some were harvested in coastal areas of the Y-K Delta.

Harvest Assessments

Researchers asked respondents to assess their own harvests in 2 ways: whether they got more, less, or about the same amount of 9 resource categories in 2012 as compared to the last 5 years, and whether they got "enough" of each of the 9 resource categories. 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 to their household as a result of not getting enough. They were further asked whether they did anything differently because they did not get enough (such as supplement with store-bought food or switch to a different subsistence resource). This section discusses responses to those questions.

Together, figures 2-19 and 2-20 and tables F-6 and F-7 provide a broad overview of households' assessments of their harvests in 2012. Because not every household uses all resource categories, some households did not respond to the assessment questions. Additionally, some households that do typically use a resource category chose not to answer questions. Although the percentages displayed in these figures were calculated by including all surveyed households (including those that did not respond to the question), the bars specifically highlight responses provided by households reporting that they typically use the resource category. Generally, the results are presented in this section as they appear in the figures, but it is important to remember that they are not limited to only households that ordinarily use the resources. Additional details are provided in cases where further analysis lends clarity to the discussion of use patterns. Subsistence harvest success also can be assessed by comparing current harvest estimates with past harvest estimates, which will be discussed later in the comparisons section.

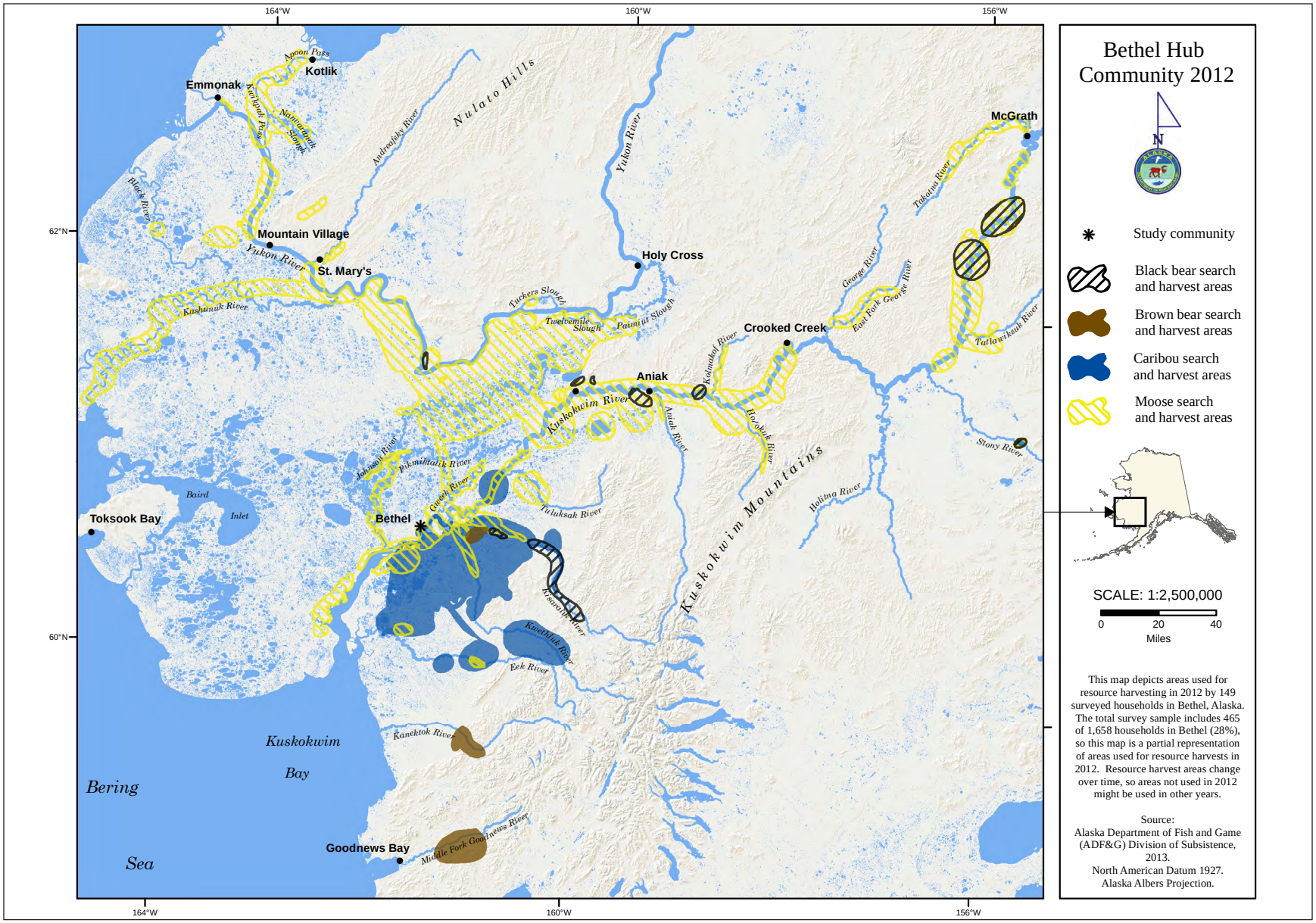


Figure 2-14.–Hunting and harvest areas, large land mammals, Bethel, 2012.

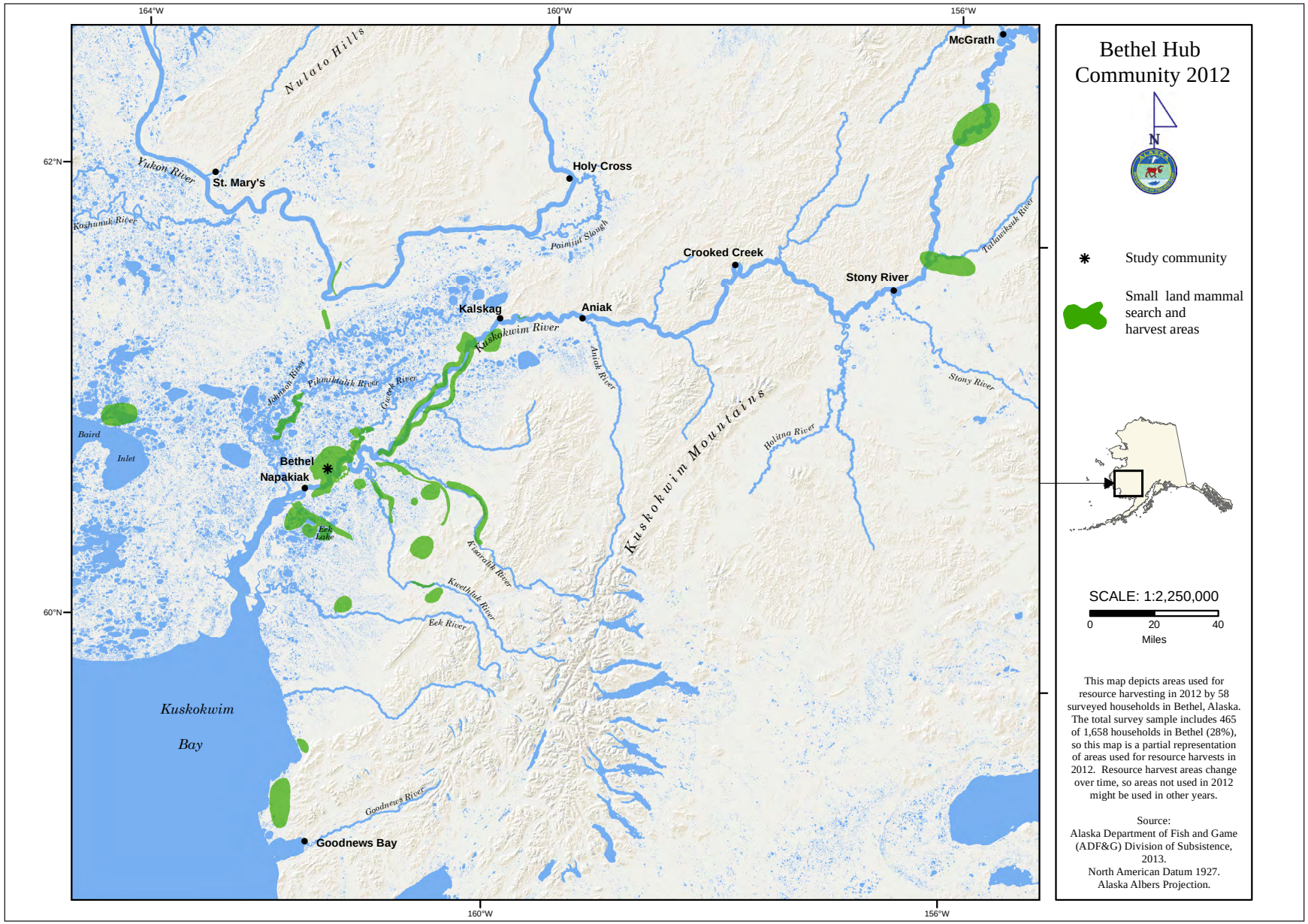


Figure 2-15.–Hunting, trapping, and harvest areas, small land mammals, Bethel, 2012.

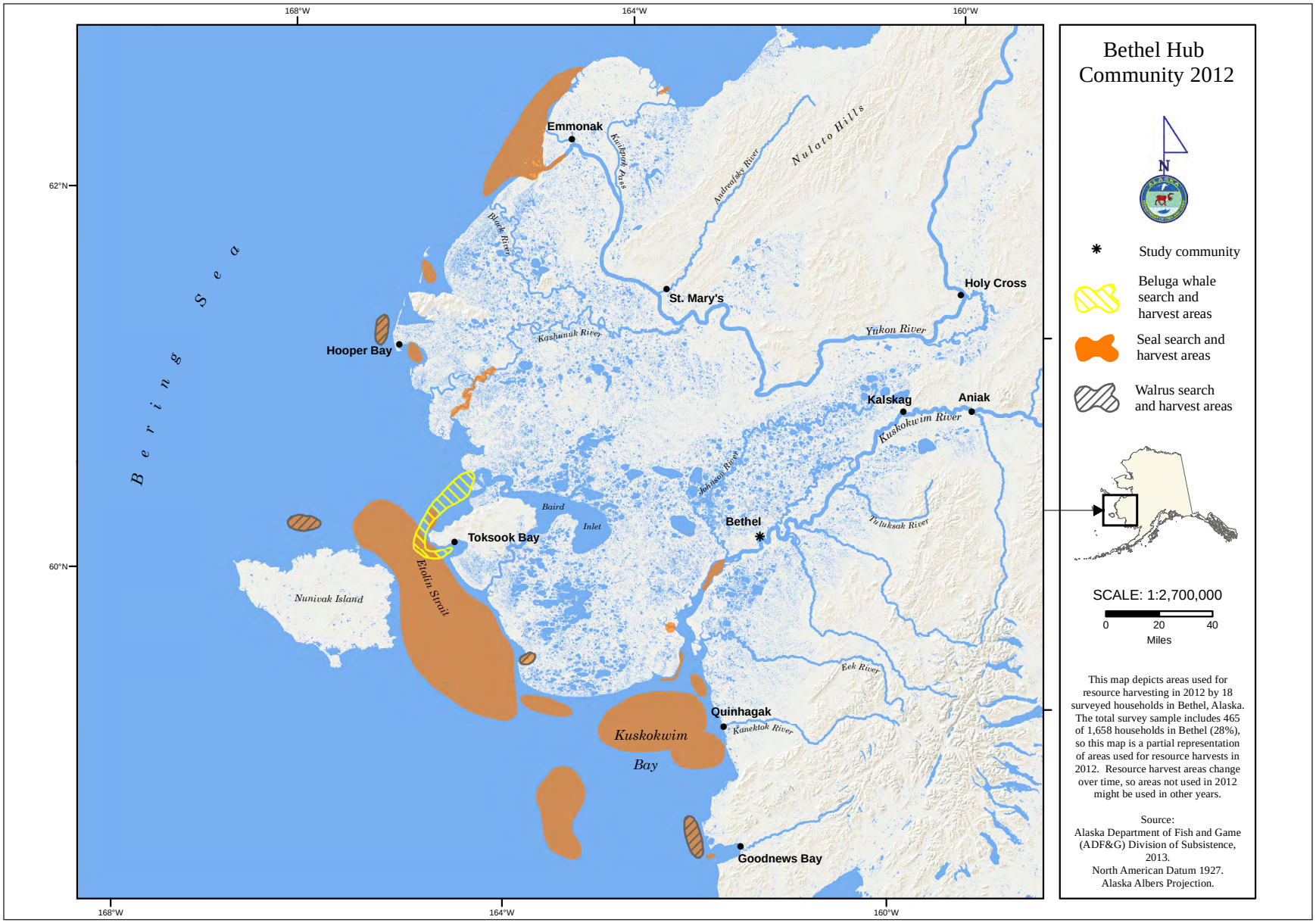


Figure 2-16.–Hunting and harvest areas, marine mammals, Bethel, 2012.

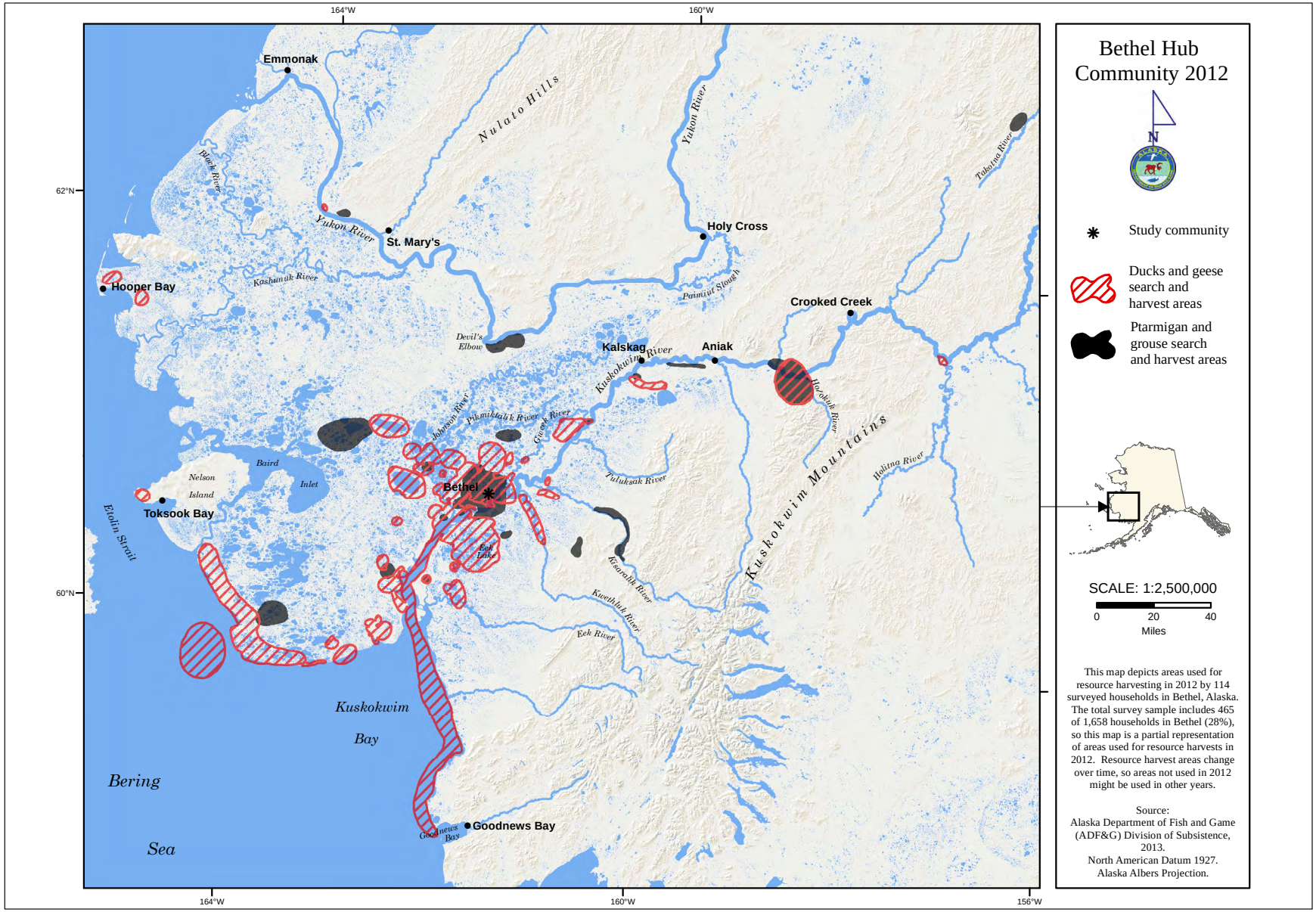


Figure 2-17.–Hunting and harvest areas, birds, Bethel, 2012.

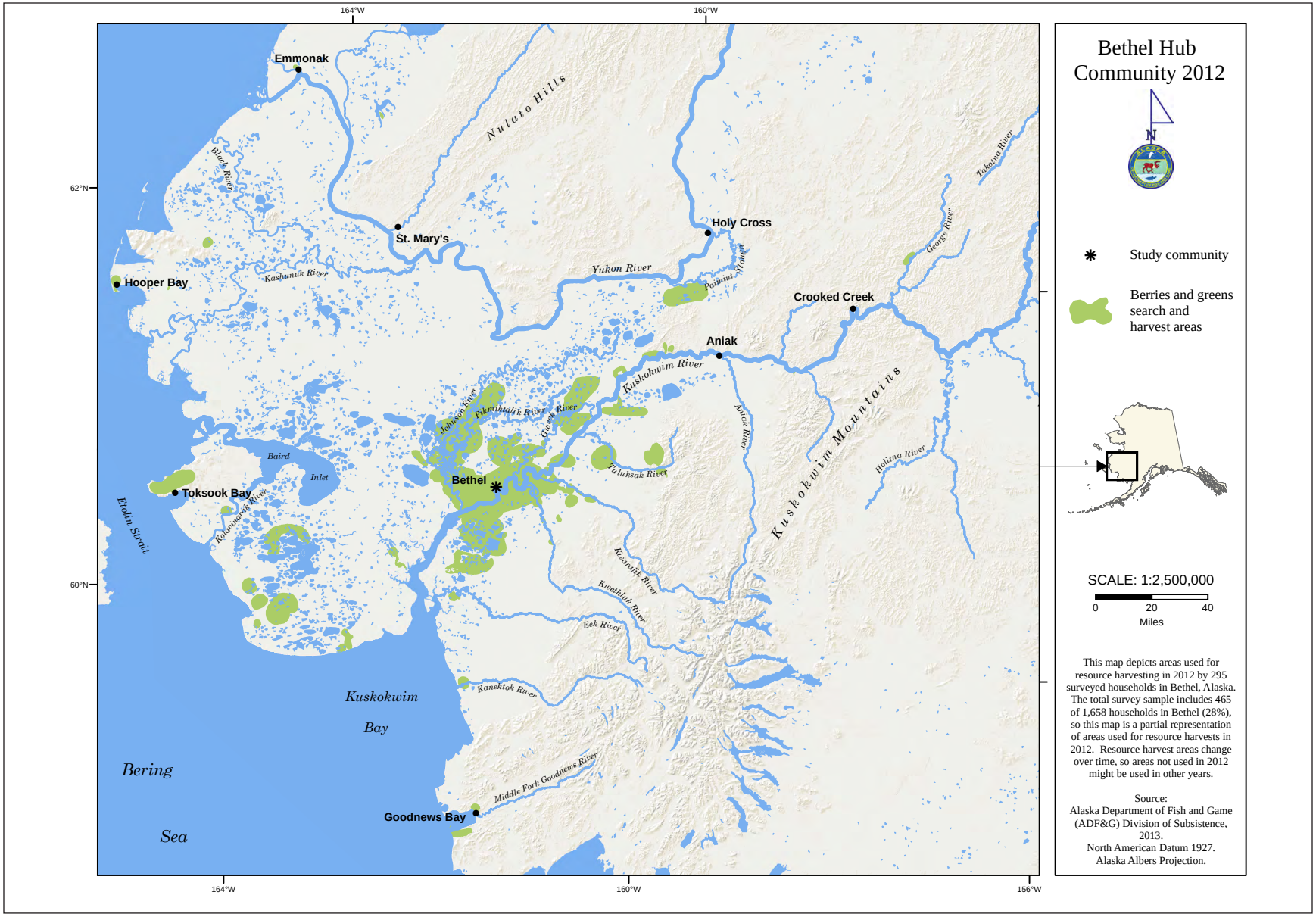


Figure 2-18.–Gathering and harvest areas, vegetation, Bethel, 2012.

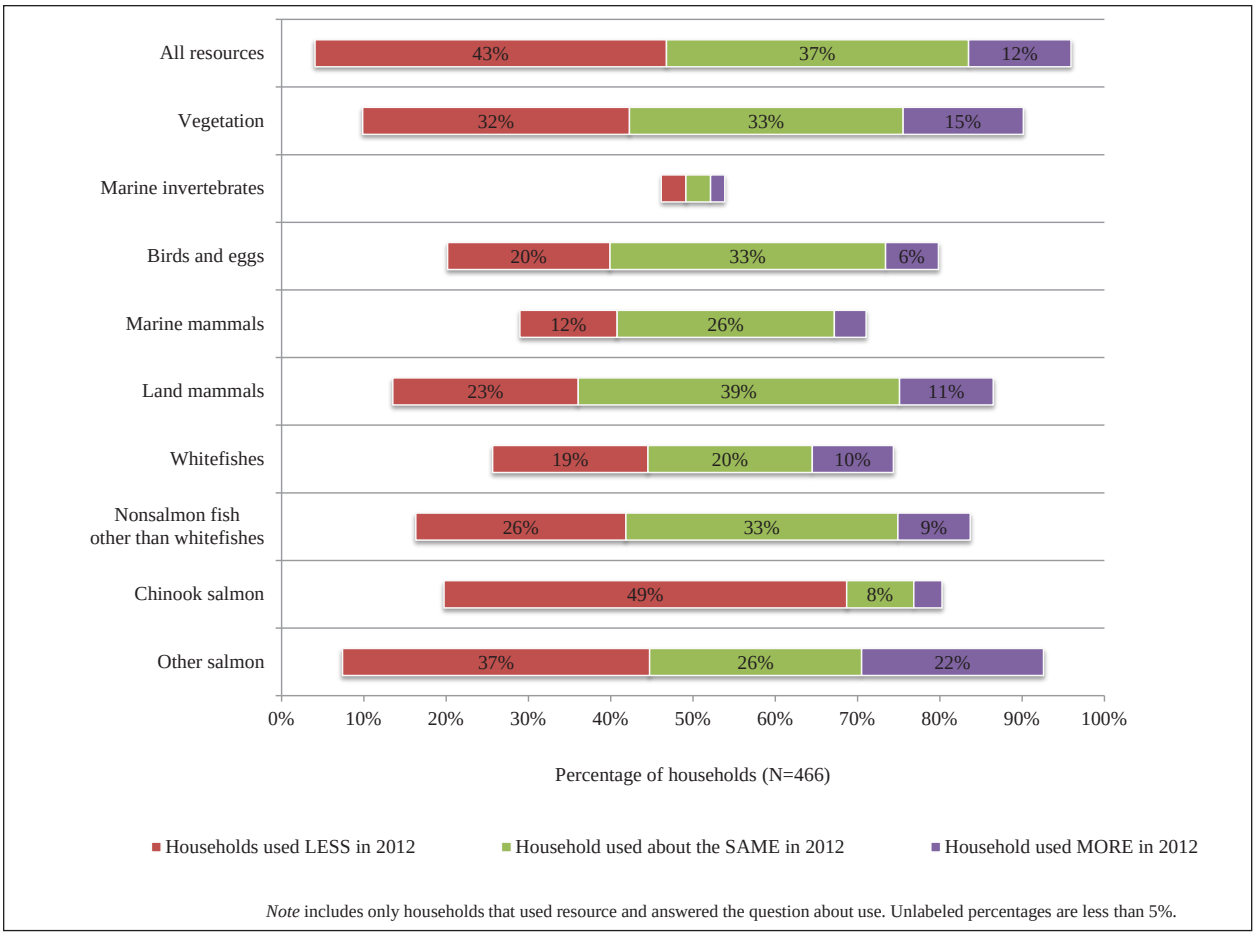
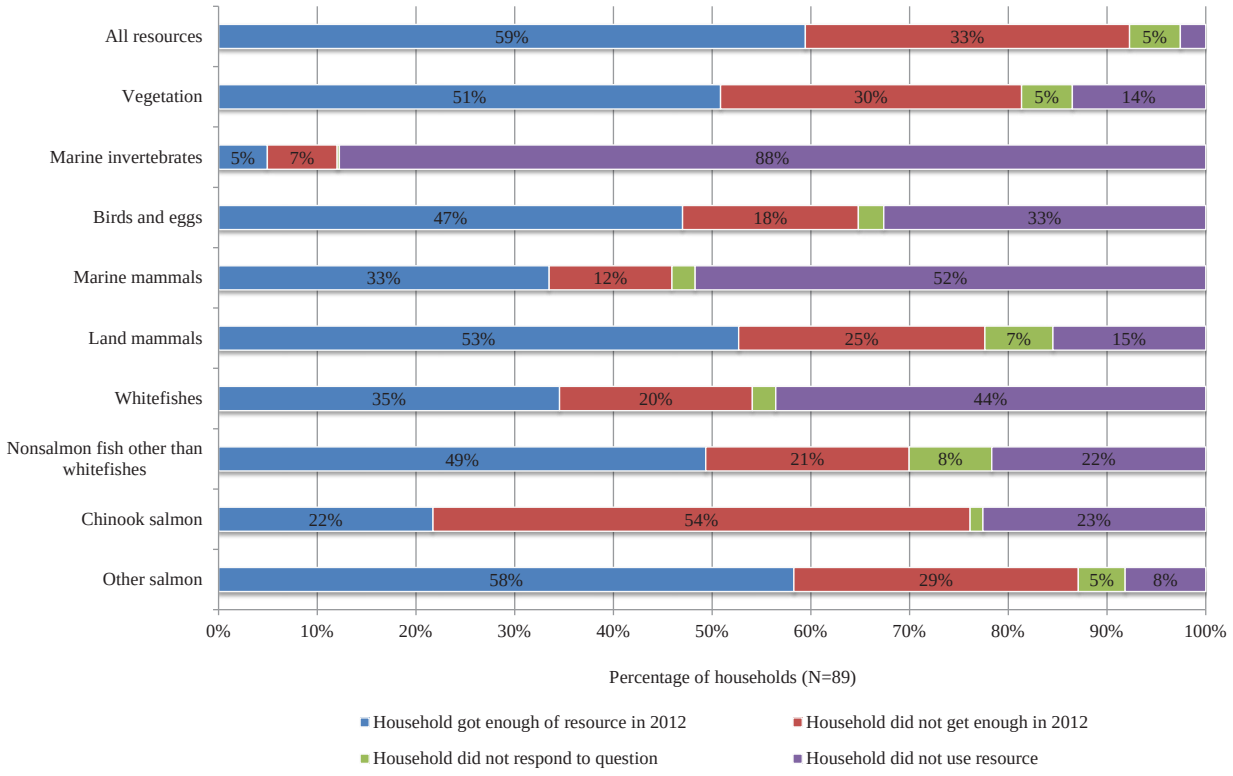


Figure 2-19.–Changes in household uses of resources compared to recent years, Bethel, 2012.

Some harvest assessment questions asked respondents to consider in total all of the subsistence resources that they used as well as those that they felt they would have wanted in order to satisfy their household needs. When asked if they used the same, more, or less of all subsistence resources compared to recent years, 43% of respondents reported using less (Figure 2-19). Also, 37% of households reported using the same, and 12% said they used more. Of the households that reported using less, 24% of households cited a lack of resource availability as the reason they used less (Table F-6). Other reasons for less use of all resources included family or personal reasons (20%), regulations (15%), and other households did not give them as much (12%). Survey results indicated that 59% of responding households that used subsistence resources got enough resources in 2012, while 33% of households reported that they did not get enough of all resources (Figure 2-20).

Researchers also asked respondents whether their households used less, the same, or more resources by category, such as salmon, nonsalmon fishes, land mammals, and birds. Salmon was the most harvested of all subsistence resource categories by Bethel households in 2012; it composed 41% of the total harvest (Figure 2-5). Due to the low abundance of Chinook salmon and subsequent restrictions on the subsistence fishery, researchers divided salmon into 2 categories in the assessments section of the survey instrument, “Chinook salmon” and “other salmon,” and analyzed each separately. Other salmon referred to chum, sockeye, coho, and pink salmon. Forty-nine percent of households explained that they used less Chinook salmon in 2012 than they did in previous years (Figure 2-19). Only 8% of households reported that they used the same amount of Chinook salmon, and 3% used more. When asked why they used less, 55% of respondents said that they did so due to regulation of the subsistence Chinook salmon fishery in 2012 (Table F-6). Others stated that Chinook salmon were not available (25%), or they did not receive them from others



Note n = number of households that used the resource or that indicated they did not use because they did not get. Unlabeled percentages are less than 5%.

Figure 2-20.–Percentages of households reporting whether they got enough resources, Bethel, 2012.

(12%). For those households that used more Chinook salmon in the study year, the major reason is listed as "other" (39%), followed by increased effort (31%), and received more (24%; Table F-7). In 2012, 54% of respondents stated that they did not get enough Chinook salmon (Figure 2-20). Approximately 23% of households did not use Chinook salmon. According to respondents, some households that did not get enough Chinook salmon adapted to the situation by using other salmon and purchasing more food, both commercial and subsistence.

For other salmon species, 37% of households used less, 26% used the same as in previous years, and 22% used more (Figure 2-19). Respondents who reported less use in 2012 cited lack of resource availability (28%), regulations (22%), and that they did not receive salmon as in previous years (17%; Table F-6). Fifty-three percent of households explained that they used more salmon other than Chinook salmon because they needed to compensate for lack of Chinook salmon (Table F-7). In 2012, 58% of households got enough salmon other than Chinook salmon, and 29% did not get enough (Figure 2-20). Eight percent of households did not use salmon other than Chinook salmon. In order to supplement the lack of salmon, some households increased their use of commercial foods and replaced salmon with other subsistence foods, or just lived without the salmon they felt they needed.

Nonsalmon fishes are also very important resources to Bethel households, and they composed 19% of their total subsistence harvest in 2012 (Figure 2-5). Like salmon, nonsalmon fishes are divided into 2 categories: "whitefishes" and "nonsalmon fish other than whitefishes." When households were asked to assess the amount of whitefishes used in comparison with previous years, 19% of respondents used less, 20% used the same as in previous years, and 10% used more (Figure 2-19). When asked why they used less, 28% of the households responded that they did not receive whitefishes as compared to previous years, and 16% stated family or personal reasons (Table F-6). Respondents who reported more use in 2012 cited increased

effort (23%) and receiving more (23%) as reasons for getting more of this resource category (Table F-7). In Bethel, 35% of households got enough whitefishes and 20% did not get enough of them (Figure 2-20). Forty-four percent of households reported they do not use whitefishes.

"Nonsalmon fish other than whitefishes" include smelts, Pacific halibut, Alaska blackfish, burbot, and northern pike. In 2012, 26% of respondents explained that they used less of this resource category, 33% of households used the same amount as in previous years, and 9% used more (Figure 2-19). Among the households that used less in 2012, 22% explained that they had family or personal reasons, 22% did not try or make as much effort as previous years, and 21% reported that they did not receive the resource category (Table F-6). Households that used more of nonsalmon fish other than whitefishes reported that they increased their effort (34%), received more (24%), and got more to compensate for lack of other resources (16%; Table F-7). It is possible that some Bethel fishers chose to increase their effort for whitefishes and other nonsalmon fishes after not getting enough salmon. In 2012, 49% of respondents stated they got enough nonsalmon fish other than whitefishes, while 21% did not get enough of them (Figure 2-20). Twenty-two percent of households said they do not generally use this resource category.

Land mammals is another important resource category for Bethel residents. The category composes 27% of the total wild food harvests in Bethel, and 81% of residents reported using land mammals (Table 2-5; Figure 2-5). Twenty-three percent of respondents described using less land mammals in 2012, while 39% used about the same, and 11% used more (Figure 2-19). Some households (24%) using less land mammals described that they did not try or make an effort, 20% reported that they received less land mammals, 17% of hunters said that they were unsuccessful, and 16% explained that they had family or personal reasons (Table F-6). The majority of households that reported they used more land mammals described that they received more (44%), while others said that they were more successful than in previous years (19%; Table F-7). Approximately 2% of households stated they got more land mammals to compensate for lack of other resources. Fifty-three percent of households reported they got enough land mammals in 2012, while 25% reported that they did not get enough of them (Figure 2-20). Fifteen percent of residents stated that they do not use the resource.

Some households stated that they used less marine mammals in 2012 (12%), while 26% used about the same amount as they did in previous years, and 4% used more (Figure 2-19). In this survey, marine mammals included processed products, such as seal oil. Those households that used less marine mammals described they did not receive as much marine mammal resources from other households (Table F-6). Among households that used more marine mammals, 75% of households reported that they received more. These data indicate the importance of sharing of marine mammal resources between coastal communities and inland communities, such as Bethel. Thirty-three percent of households reported that they got enough marine mammals in 2012, while 12% did not get enough of them (Figure 2-20). Fifty-two percent of households stated that they did not use the resource.

Of marine invertebrates, 6% of households reported that they used less or the same amount in 2012, and 2% of households described that they used more (Figure 2-19). Only 5% of households got enough of the resource, while 7% did not get enough of it (Figure 2-20). Ninety-two percent of households did not use marine invertebrates in 2012.

Among all respondents, 20% used less birds and eggs than recent years, 33% of households used the same amount, and 6% used more (Figure 2-19). Twenty-four percent of residents who reported they used less described that they did not try or make an effort to harvest birds and eggs, 17% stated that they received less from other households, and 16% mentioned that they used less because of family or personal reasons (Table F-6). Of households that reported using more, 40% described that they increased harvest effort, 23% explained that they received more birds and eggs, and 17% stated that their hunting was more successful (Table F-7). In 2012, 47% of Bethel households reported that they got enough birds and eggs, while 18% responded they did not get enough of them (Figure 2-20). Fifty-seven percent of households reported not using birds and eggs in 2012.

Vegetation is the resource category that the highest percentage of Bethel households (77%) harvested in 2012 (Table 2-3). When asked to assess the amount of vegetation they used in comparison with earlier years, 32% of households responded that they used less, 33% stated that they used the same amount, and 15% reported that they used more (Figure 2-19). Twenty-seven percent of households reported that they used less plants and berries because the resources were not available, 21% said that they had family or personal reasons, and 19% of residents stated that they did not try or make an effort to harvest vegetation (Table F-6). The majority of households (42%) that indicated they used more vegetation cited that they increased harvest effort (Table F-7). In 2012, 51% of Bethel households reported that they got enough vegetation, while 30% responded they did not get enough (Figure 2-20). Fourteen percent of households did not use plants and berries in 2012.

Household Specialization in Resource Harvesting

Previous studies (Magdanz et al. 2009; 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 recent 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 it was beyond the scope of this research, previous studies have found a positive association between the ages of household heads and the amount of subsistence foods harvested (Magdanz et al. 2009). Household characteristics associated with higher food production include those households with multiple working-age males, involvement with commercial fishing, community location, and higher wage incomes. Characteristics common to lower producing households included female household heads, age of elders, non-Native household heads, and single-person households (Magdanz et al. 2009; Wolfe et al. 2010). Household "developmental cycles" (i.e., the relative age or "maturity" of household heads and number of productive household members) have also been associated with harvest amounts.

As shown in Figure 2-21, in the 2012 study year, approximately 19% of the community's households took 70% of the harvest of wild resources as estimated in usable pounds. Thirty percent of Bethel households harvested 86% of the resources, and 60% of the households harvested 99% of the resources. Additional research may describe factors that would explain, or at least elucidate, the differences in harvest patterns that

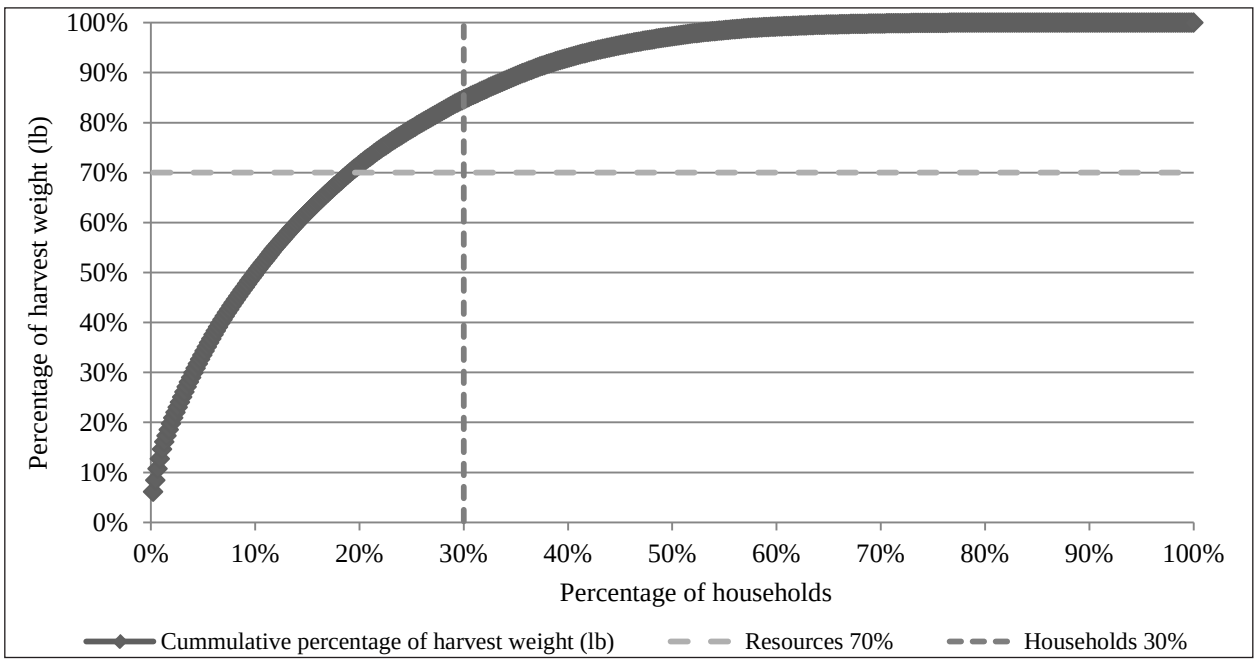


Figure 2-21.–Household harvest specialization, Bethel, 2012.

have been observed in Bethel in comparison with surrounding communities and how resource availability or socioeconomic or cultural factors affect these patterns.

Wild Food Networks

Although subsistence harvest surveys collect information based on individual households, in reality, much of the production (harvest and processing) of subsistence foods is achieved by households within a community that work cooperatively. This cooperation is often organized among extended families and close friends. The organization of the contemporary mixed market–subsistence economies that are predominant in rural Alaska communities has been documented ethnographically by numerous researchers. Of particular interest for Alaska are reports from Anderson et al. (1977), Burch (1988), Ellanna (1983), Langdon and Worl (1981), Magdanz (1990) Magdanz et al. (2002), Wolfe and Walker (1987), Wolfe and Ellanna (1983), and Fall (1990).

Cooperation in the production of foods describes subsistence economies only in part. Subsistence foods are also widely distributed among households within a community through sharing, barter, and trade (Charnley 1984; Kari 1983; Lonner 1980; Magdanz and Wolfe 1988; Magdanz 1988; Magdanz et al. 2007; Pete 1991; Schroeder et al. 1987; Stickney 1984; Stokes 1985; Wolfe et al. 1993). Bethel residents repeatedly emphasized the importance of sharing in their society. A key respondent said, "Sharing is good…my mother used to say, 'If you have something you can share, by all means share it because it will come back to you double...,' and I believe it" (BET – 7). Many households shared subsistence-caught food with their extended family members. Hunters stressed the importance of sharing wild food with elders, widows, single mothers, or people who do not have hunters in their households. One hunter said,

> If there is a hunter in a household, and they have the ability to hunt, then I usually don't give to those kinds of people. Usually, it's like single women, or kids, or elders that don't have anybody to hunt for them. You know, you have people that don't hunt and that don't know how to hunt. So I share some with them. (BET – 18)

Another hunter told the researchers that he prepared wild foods before he brought them to the senior center in Bethel so that the elders could cook them easily.

> In my own personal hunting and gathering, there are a few key elders that I'll bring stuff to, but I always go to the senior center. If you want to spread something around, bring it to the senior center and see a bunch of really happy people. But when I bring stuff, I always try and bring it already prepared to cook. Like, I took a caribou, the whole caribou from the first vertebra behind the head to the tail, little tail bone, and I sawed it all up into pieces…so that it's ready for them to cook. Geese too, I don't bring them birds that aren't plucked. When they get them they're all plucked. (BET – 21)

The Networks section of the survey asked each respondent to recall from the study year the number of households that harvested and processed 3 different categories of fish resources that the respondent's household used and the communities where the harvesting and processing households were located. The 3 fish resources that appeared on the survey were Chinook salmon, salmon other than Chinook, and whitefishes and sheefish. The survey also asked each respondent to recall from which communities their household received and to which communities it gave away these 3 fish resources. Data analyzed from the Networks module provide a graphic representation of resource distribution webs by community.

Figure 2-22 shows the exchange of fish between households in Bethel and those in other communities in Alaska. The survey instrument asked sharing network questions regarding 4 categories of fish: Chinook salmon, salmon other than Chinook salmon, whitefishes (including sheefish), and other nonsalmon fishes. In general, people tend to share many wild food resources other than fish including moose, caribou, marine mammals, birds, and berries. This study does not document the production or sharing of those resources. Instead, the survey instrument aimed to document connections between Bethel and other communities in regard to the resources of greatest production: salmon and nonsalmon fishes. Thus, the figure is a partial representation of sharing, trade, and barter in 2012. The weight of lines shows the number of

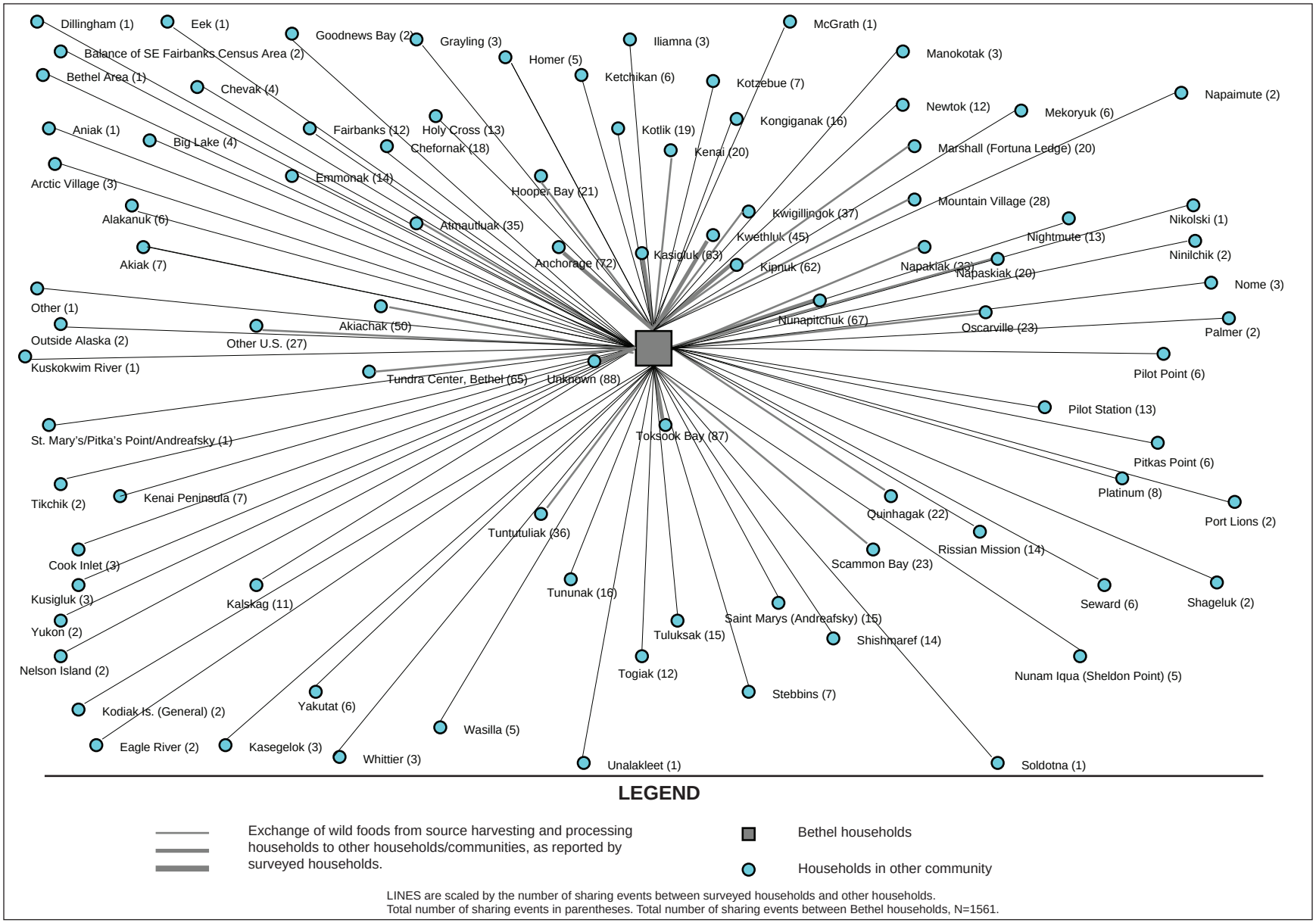


Figure 2-22.–Wild food harvesting and processing network, Bethel, 2012.

exchanges. Bethel households exchanged resources among households in Bethel and households in 49 other communities. One respondent explained his sharing network with his siblings:

> My brother from Kongiganak or my brother from Kipnuk will send me seal oil or dried herring. My brother from Atmautluak, he'll send me dried whitefish and tundra fish. Tundra fish is different from around here because they smoke them with little tundra branches of stuff and they have a different flavor to them. (BET – 1)

Bethel households most commonly gave fish away to other households within their own community. Other than Bethel, the communities to which Bethel households most commonly gave away fish were Anchorage, Akiachak, Kipnuk, Fairbanks, Kasigluk, Toksook Bay, and Tuntutuliak (Table F-8). Among the 4 surveyed resource categories, salmon was the most common resource given away by Bethel households. For example, a fisher told researchers, "There was this one time they closed the Yukon [for subsistence Chinook salmon fishing] pretty hard…so I sent a bunch of king salmon from here to there" (BET – 36).

Residents in Bethel also received fish from other households in Bethel, at least 79 other Alaska communities, and communities outside of Alaska. Other than Bethel, the communities from which Bethel households most commonly received resources included Toksook Bay, Nunapitchuk, Kasigluk, Kipnuk, Kwethluk, Atmautluak, and Kwigillingok (Table F-9). Many households received fish from the Tundra Center, where ADF&G distributed fish caught in the Bethel test fishery. Salmon is the resource that Bethel residents most commonly received from other households inside and outside of the community.

Income and Employment

Respondents were asked about both earned income (jobs held and wages earned by all household members 16 years and older) and income from other sources such as the Alaska Permanent Fund dividend, Social Security, and public assistance. The survey also asked about months worked and work schedules for employed residents in each household. Table 2-12 shows the estimated and reported income by employment occupation and other sources for Bethel in 2012. The estimated total of all earned and unearned income was $159,494,305 for all Bethel households in 2012. Employment earnings accounted for $146,650,917 of this total. In addition, Bethel households received $12,843,388 of unearned income from other sources. The average total income per household for 2012 was $96,957. This included an average earned income of $89,149 per household (92% of the average total household income) and an average unearned income of $7,808 (8% of the average total household income). In Bethel in 2012, the average total income per person was $28,115, which included an average earned income of $25,851 per person and an average of $2,264 in unearned income per person. The estimated median income for Bethel residents in 2012 was $98,634, within a 95% confidence interval of $90,878 to $105,661 (Table 2-13; Figure 2-23). The estimated median income from this study also falls within the margin of error of the median income of $79,929 to $101,629, as estimated by the American Community Survey (ACS) for Bethel for 2008–2012.

Figure 2-24 shows the top 10 sources of income for the community as percentages of total income. Service-related employment, local government, and state government jobs together represented 75% of Bethel's total income in 2012. The main contributors to income not from wage employment were the Alaska Permanent Fund dividend[9] (3% of total community income) and pension and retirement benefits (2% of total community income). An estimated 71% of adults held at least 1 job in 2012 (Table F-10). On average, those adults with jobs worked approximately 45 weeks per year or 10.5 months (tables F-10 and F-11). Of all employed adults, an estimated 69% worked year-round. The number of jobs held per employed household ranged from 1 to 6 with an average of 2 (Table F-10). On average, employed adults held 1 job. Of the jobs reported by Bethel respondents, 85% were full-time positions, 9% were part-time, 6% were on-call or occasional employment, and 0.5% were shift positions (Table F-12).

9. The Alaska Permanent Fund dividend paid $878 to eligible Alaska residents in 2012.

Table 2-12.–Estimated earned and other income, Bethel, 2012.

Income source	Number of people	Number of households	Total for community	Mean per household[a]	Mean per person[b]	Percentage of total
Earned income						
Services	1126.1	865.2	$59,507,043	$36,174	$10,490	37.3%
Local government	766.0	653.5	$39,240,107	$23,854	$6,917	24.6%
State government	314.2	278.5	$21,178,854	$12,875	$3,733	13.3%
Transportation, communication, and utilities	215.3	215.4	$11,172,198	$6,792	$1,969	7.0%
Retail trade	176.5	159.7	$4,721,658	$2,870	$832	3.0%
Construction	74.1	78.0	$3,854,262	$2,343	$679	2.4%
Federal government	49.4	48.3	$3,159,309	$1,921	$557	2.0%
Other employment	35.3	29.7	$2,191,919	$1,332	$386	1.4%
Mining	10.6	11.1	$831,059	$505	$146	0.5%
Finance, insurance, and real estate	17.7	18.6	$541,059	$329	$95	0.3%
Agriculture, forestry, and fishing	28.2	26.0	$222,632	$135	$39	0.1%
Manufacturing	10.6	7.4	$30,818	$19	$5	0.0%
Earned income subtotal	**2,815.3**	**1,496.5**	**$146,650,917**	**$89,149**	**$25,851**	**91.9%**
Other income						
Alaska Permanent Fund dividend		1437.1	$4,052,895	$2,464	$714	2.5%
Pension/retirement		158.9	$3,225,275	$1,961	$569	2.0%
Social Security		151.8	$1,270,870	$773	$224	0.8%
Food stamps		134.1	$1,077,611	$655	$190	0.7%
Native corporation dividend		760.6	$554,412	$337	$98	0.3%
Disability		45.9	$543,685	$331	$96	0.3%
Rental income		43.9	$404,632	$246	$71	0.3%
Foster care		24.7	$371,452	$226	$65	0.2%
Child support		56.5	$277,291	$169	$49	0.2%
Supplemental Security income		49.4	$241,068	$147	$42	0.2%
Unemployment		88.3	$225,358	$137	$40	0.1%
Other		65.0	$201,437	$122	$36	0.1%
Adult public assistance (OAA, APD)		24.7	$94,129	$57	$17	0.1%
TANF (temporary cash assistance for needy families)		24.7	$85,995	$52	$15	0.1%
Citgo fuel voucher		151.8	$66,867	$41	$12	0.0%
Heating assistance		77.7	$49,325	$30	$9	0.0%
Longevity bonus		17.7	$31,907	$19	$6	0.0%
Veterans assistance		17.7	$21,150	$13	$4	0.0%
Women, infants, and children (WIC)		15.6	$19,067	$12	$3	0.0%
Workers' compensation/insurance		3.5	$17,650	$11	$3	0.0%
Meeting honoraria		14.1	$10,613	$6	$2	0.0%
Rental assistance		12.1	$699	$0	$0	0.0%
Other income subtotal		**1,475.7**	**$12,843,388**	**$7,808**	**$2,264**	**8.1%**
Community income total			**$159,494,305**	**$96,957.02**	**$28,114.63**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2013.

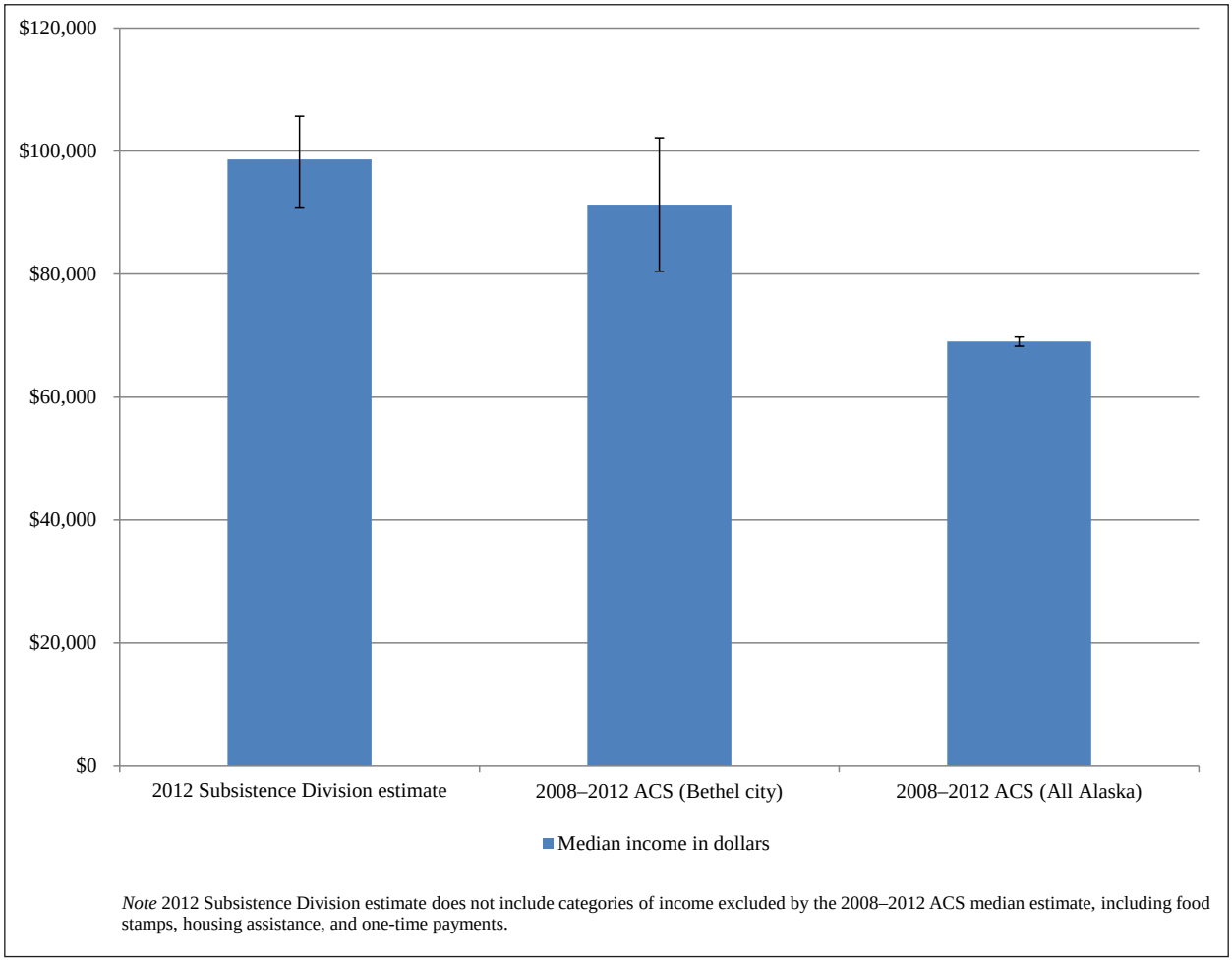
a. Mean per all households in the community.

b. Mean per all people in the community.

Table 2-13.–Comparison of median income estimates, Bethel, 2012.

	Median[a]	Range[b,c]
2012 Subsistence Division estimate	$98,634	$90,878–$105,661
2008–2012 ACS (Bethel city)	$91,302	$79,929–$101,629
2008–2012 ACS (All Alaska)	$69,014	$69,179–$70,655

Source ADF&G Division of Subsistence household surveys, 2013; 2008–2012 American Community Survey (ACS) 5-year estimates.
a. 2012 Subsistence Division estimate does not include categories of income excluded by the 2008–2012 ACS median estimate, 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.



Note 2012 Subsistence Division estimate does not include categories of income excluded by the 2008–2012 ACS median estimate, including food stamps, housing assistance, and one-time payments.

Figure 2-23.–Comparison of median income estimates, Bethel, 2012.

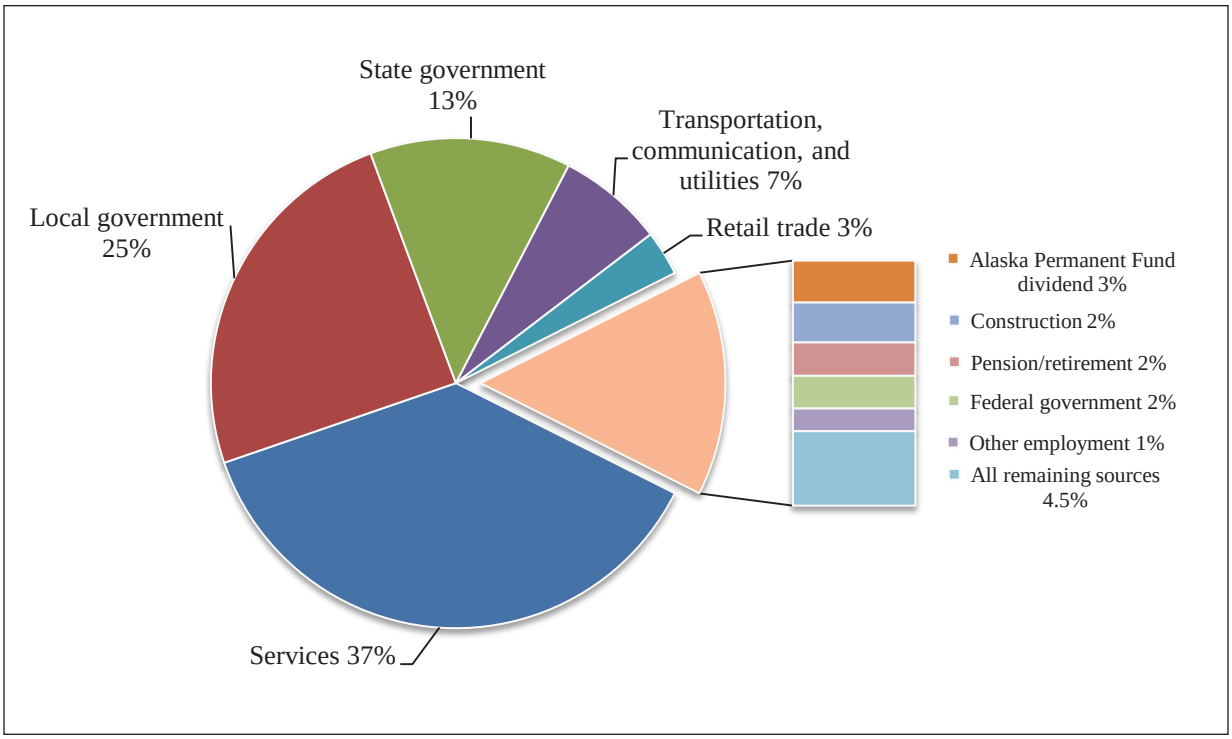


Figure 2-24.–Top 10 income sources based on total estimated income amount, Bethel, 2012.

3. DISCUSSION AND CONCLUSIONS

David M. Runfola and Andrew R. Brenner

The purpose of this study was to document Bethel households' harvests and uses of wild food resources and aspects of the community's demographic and economic characteristics in 2012. Comprehensive household surveys conducted in Bethel showed the widespread use of wild food resources for subsistence by residents of the community in 2012. Additionally, results provided insight into the nature of subsistence harvest and use patterns in an Alaska regional center. To clarify the unique nature of subsistence harvest and use patterns in Bethel as the regional center community of Western Alaska, the following sections highlight the differences between Bethel and other lower Kuskokwim River communities.[1]

Subsistence harvests by individual Bethel residents are often similar to those occurring in other communities throughout the Yukon-Kuskokwim (Y-K) Delta, especially neighboring communities of the lower Kuskokwim River area. Residents of Bethel harvest wild food resources from a large portion of the Y-K Delta area (Figure 2-8), and individual search and harvest areas often border or overlap those of other Y-K Delta communities. As such, available subsistence foods and foods that are actually harvested and used are often similar between Bethel and other communities. Additionally, the shared heritage and history of the lower Kuskokwim River region is related to similar subsistence patterns and traditions for many residents of Bethel and its neighboring communities. In spite of these similarities, there were numerous differences between Bethel results and recent results from other neighboring communities. The following section provides an overview of similarities and differences between quantitative survey results for Bethel in 2012 and other lower Kuskokwim communities with recent and comparable subsistence harvest and use information. These communities include Tuluksak, Akiak, Kwethluk, and Oscarville surveyed for study year 2010 (Brown et al. 2013); Napakiak and Napaskiak surveyed for study year 2011 (Ikuta et al. 2014); and Eek, Tuntutuliak, and Quinhagak surveyed for study year 2013 (Ikuta et al. 2016). The sections following these quantitative comparisons also describe 2 major factors that likely had a strong influence on differences in results between Bethel and other communities: 1) conditions specific to the study year (2012), and 2) differences in community characteristics between a regional center community and other communities of the lower Kuskokwim River area.

Quantitative Comparisons to Other Lower Kuskokwim River Communities

Harvest and Use Patterns

In comparison to other lower Kuskokwim River communities, Bethel households used and harvested less in all resource categories recorded in comprehensive household surveys. The only resource category that showed a similarity of use by Bethel households and households elsewhere in the region was that of salmon. Ninety percent of Bethel households reported using salmon in 2012, whereas 96% of households in other lower Kuskokwim communities together reported use of salmon in 2010, 2011, or 2013 (Figure 2-3; Figure 3-1). Use of salmon is where the similarity ends: for example, in terms of harvesting salmon, 54% of Bethel households harvested salmon and 68% of households in other lower Kuskokwim communities harvested this resource category. In other resource categories there was greater disparity: 76% of Bethel households used nonsalmon fishes and 54% harvested them, compared to 89% of other lower Kuskokwim households using and 73% harvesting nonsalmon fishes. Eighty percent of Bethel households used large land mammals and 25% harvested these animals, whereas 91% of households in other lower Kuskokwim communities

1. In this report the authors refer to communities of the lower Kuskokwim River area. This is an arbitrary distinction; however, the general understanding of Yukon-Kuskokwim Delta residents and individuals familiar with the region is that communities of the lower Kuskokwim River include Tuluksak and all communities downriver to Eek near the river mouth. Also included are the communities of Atmautluak, Nunapitchuk, and Kasigluk. Although it is not situated on the lower Kuskokwim River, the 2013 study community of Quinhagak is included as such in this discussion for simplicity.

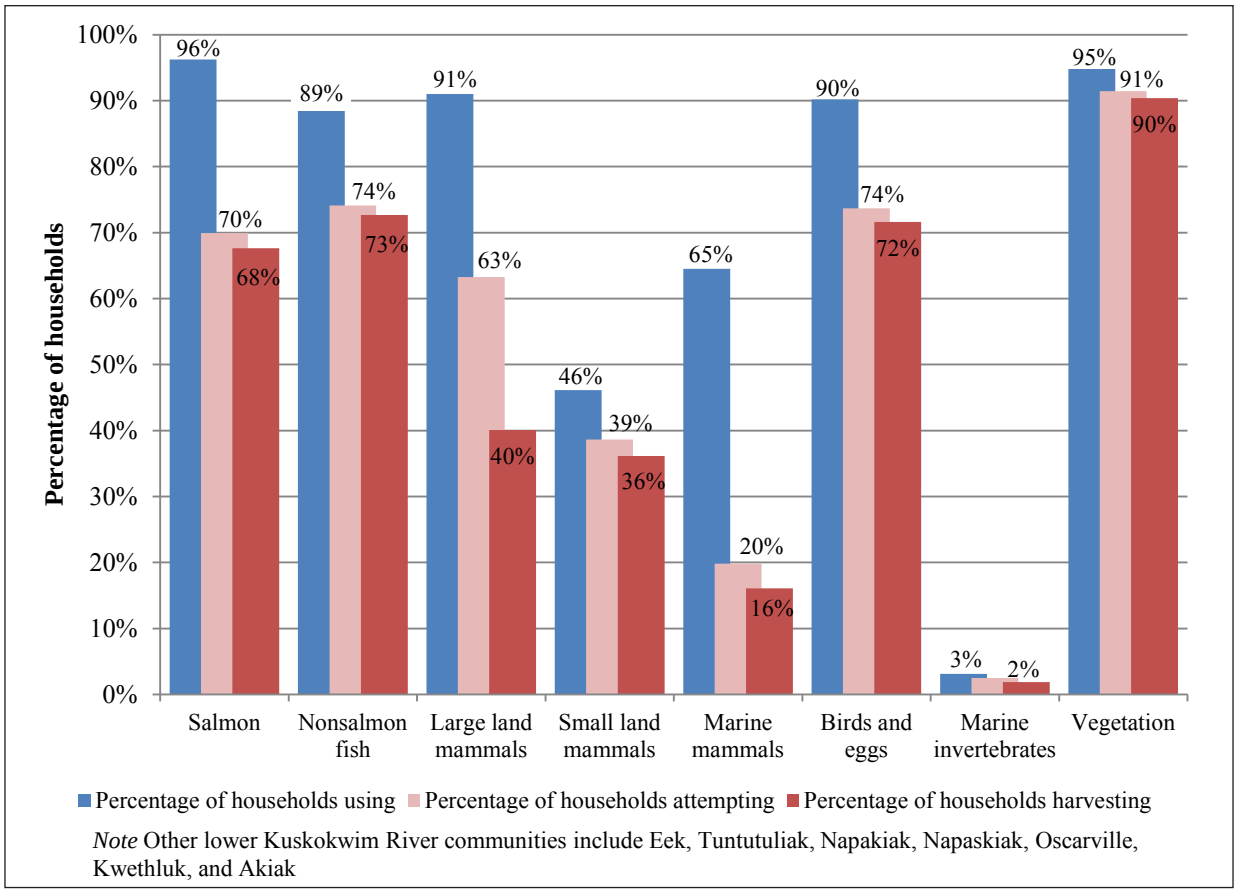
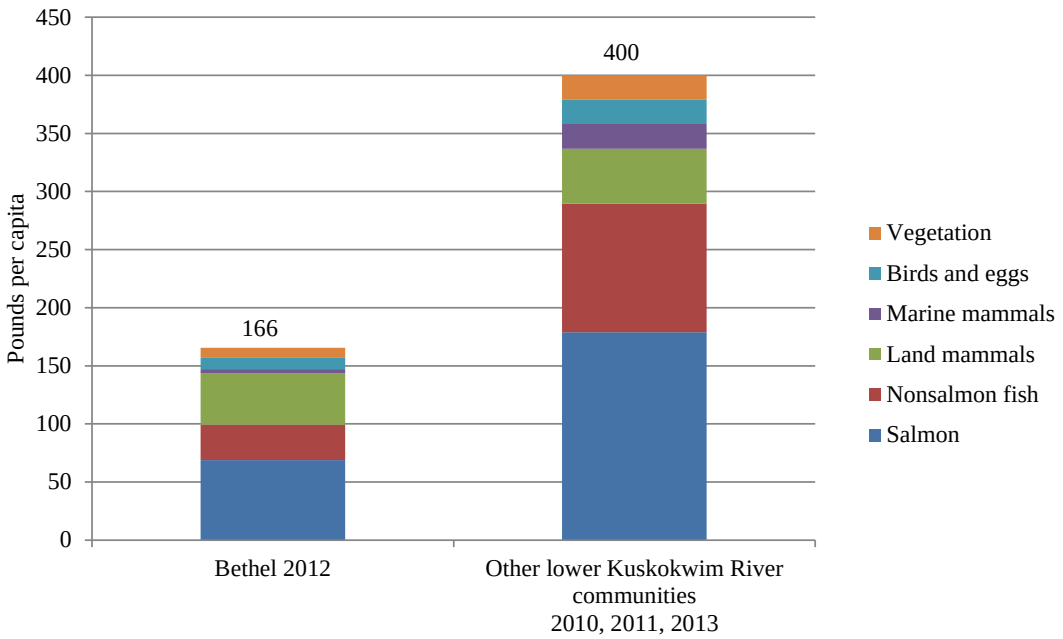


Figure 3-1.–Percentages of households using, attempting to harvest, and harvesting wild resources by category, lower Kuskokwim River communities, not including Bethel, 2010–2013.

used the resource and 40% harvested it. Similar differences were also evident in other resource categories, such as marine mammals, birds and eggs, and vegetation.

In 2012, Bethel residents harvested an average of 166 lb per capita of subsistence resources (Table 2-3; Figure 3-2). This average per capita harvest is lower than all 9 other lower Kuskokwim River communities surveyed between 2010 and 2013. Per capita harvests for these 9 communities ranged from 244 lb per capita in Eek in 2014 to 616 lb per capita in Akiak in 2010 (Table 3-1; Figure 3-3). Bethel per capita harvests of salmon (69 lb per capita) were very similar to Eek household harvests of salmon (71 lb per capita) in 2013. Extensive fishing closures and the resulting low Chinook salmon harvests in the Kuskokwim Area in 2012 is also relevant to discussions of harvest comparisons between Bethel and other communities in other study years. Kuskokwim Area subsistence salmon harvests during the 2012 season were unusually low relative to those of typical fishing seasons prior to those years. The 10-year average total annual subsistence Chinook salmon harvest in the Kuskokwim Area from 2002 through 2011 was approximately 82,100 fish (Liller and Hamazaki 2016). In comparison, the total subsistence Chinook salmon harvest in 2012 was 22,544 fish. This significantly lower than average harvest amount was a result of a weak Chinook salmon run and the unprecedented lengths of time during which subsistence salmon fishing was closed in 2012.[2] It is likely that lower than average Chinook salmon harvests in Bethel in 2012 also reduced the total annual harvest of all subsistence resources during the study year as compared to harvests in previous years. Other years of comprehensive subsistence harvest data for Bethel residents are not available for further comparison.

2. For more information regarding subsistence salmon fishing management actions and other factors that affected Kuskokwim Area subsistence salmon harvests in 2012, please see the Introduction chapter of this report.



Note Other lower Kuskokwim River communities include Eek, Tuntutuliak, Napakiak, Napaskiak, Oscarville, Kwethluk, and Akiak

Figure 3-2.–Harvest by category in pounds per capita, Bethel and other lower Kuskokwim River communities, 2010–2013.

Table 3-1.–Comparisons of per capita harvests by resource category, lower Kuskokwim River communities, 2010–2013.

				Per capita harvest (lb)						
Community	Study year	Population	Total harvest (lb)	All resources	Salmon	Nonsalmon fish	Land mammals	Marine mammals	Birds and eggs	Vegetation
Akiak	2010	386.0	237,441.0	615.7	291.7	208.5	67.1	5.7	20.7	21.2
Kwethluk	2010	713.3	259,698.5	364.1	170.3	84.3	55.9	24.9	12.8	15.9
Oscarville	2010	63.0	32,796.1	520.6	256.0	169.2	41.7	14.0	18.1	21.5
Tuluksak	2010	455.3	163,606.3	359.3	173.0	87.5	41.4	5.9	20.9	30.6
Napakiak	2011	316.3	154,784.6	489.4	232.2	150.7	53.9	9.2	24.6	18.6
Napaskiak	2011	480.0	196,762.9	409.9	174.5	104.9	61.9	29.0	23.6	16.0
Eek	2013	347.3	84,736.5	244.0	71.5	60.6	40.2	18.7	32.5	20.3
Tuntutuliak	2013	412.9	149,047.4	361.0	137.9	97.8	27.6	51.2	18.4	28.0
Quinhagak	2013	732.7	215,949.8	294.7	102.8	45.1	55.2	30.4	30.5	30.3
Bethel	2012	5,673.0	940,425.6	165.8	68.8	30.7	43.3	3.6	9.6	8.7

Sources Brown et al. (2013); Ikuta et al. (2014); Ikuta et al. *In prep*; ADF&G Division of Subsistence household surveys, 2013.

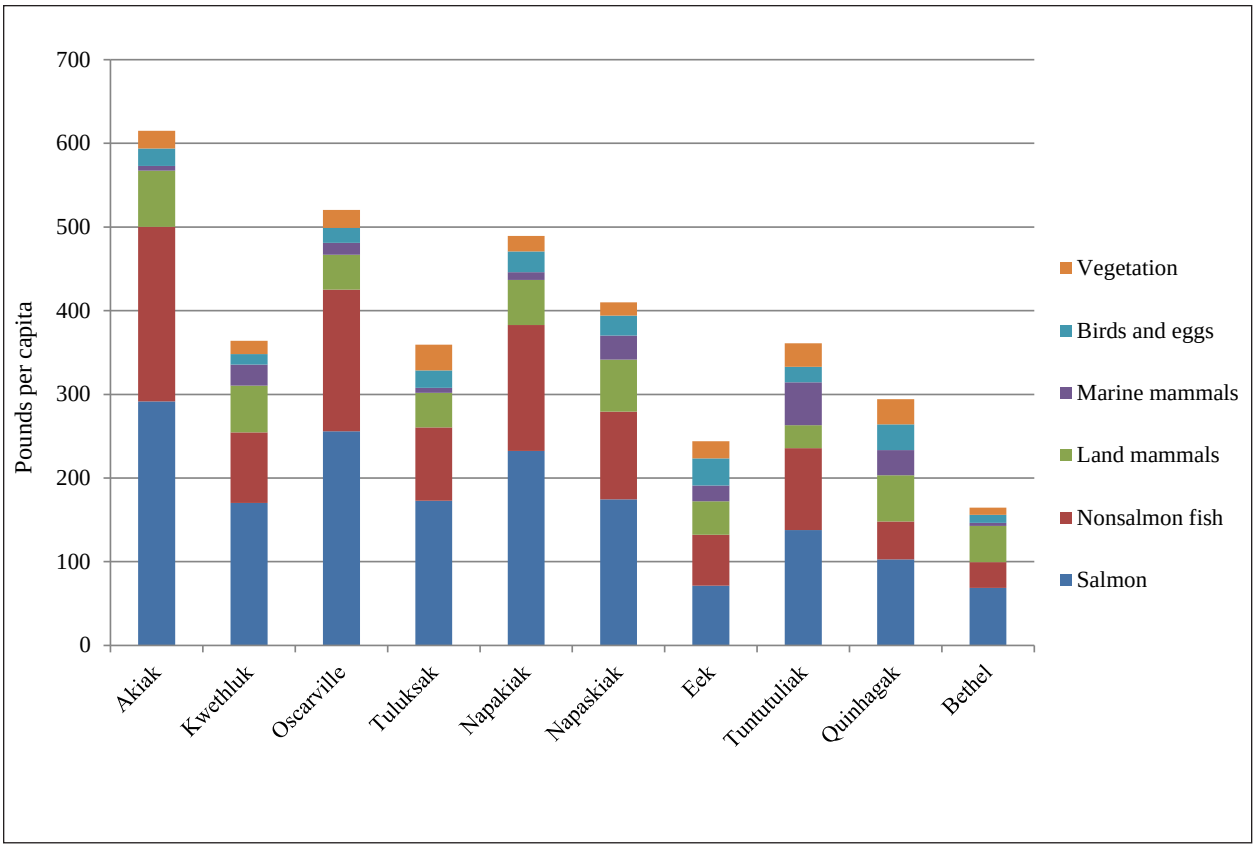


Figure 3-3.–Comparisons of per capita harvests by resource category, lower Kuskokwim River commmunities, 2010–2013.

Bethel land mammal harvests (43 lb per capita) in 2012 were similar to land mammal harvests by residents of Oscarville (42 lb per capita) and Kwethluk (48 lb per capita) in 2011 and by residents of Eek (40 lb per capita) in 2013. Bethel per capita harvest of land mammals was greater than per capita harvests of the resource by residents of Tuluksak in 2010 and Tuntutuliak in 2013. Bethel, Akiak, and Tuluksak also had similar per capita harvests of marine mammals. In addition, the per capita harvests of birds and eggs by Bethel residents were similar to bird and egg harvests of Kwethluk residents in 2010. Figure 3-4 presents subsistence resource category harvests by Bethel households and households of other lower Kuskokwim communities in terms of the percentage of total per capita harvest that each category represents for each community household. Figure 3-4 shows the relative contribution that each category makes to per capita harvest, regardless of the total number of pounds of per capita harvest for households in each community. In this way certain characteristics of resource category harvests can be compared in relative terms. Although relative per capita harvests do not provide information about harvest quantities for comparison among communities, they reveal the predominant resource categories harvested in a community.

The relative contribution of land mammals to per capita harvests by Bethel households in 2012 was greater than that of households in any other lower Kuskokwim River community. Relative per capita harvests of salmon by Bethel households were greater than Eek household harvests, and very similar to salmon harvests of Quinhagak, Tuntutuliak, and Napaskiak households. Bethel households' relative per capita harvests of nonsalmon fish in 2012 were similar to that of Quinhagak households in 2014, but generally less than the relative per capita harvest of nonsalmon fish for any other lower Kuskokwim community. In sum, overall Bethel harvests in 2012 indicate lower total and per capita weights of harvests in comparison to a number of other communities in the region; however, other characteristics of harvest described here indicate that Bethel households harvested some resource categories in manners similar to households in neighboring lower Kuskokwim River communities (figures 3-2 and 3-3).

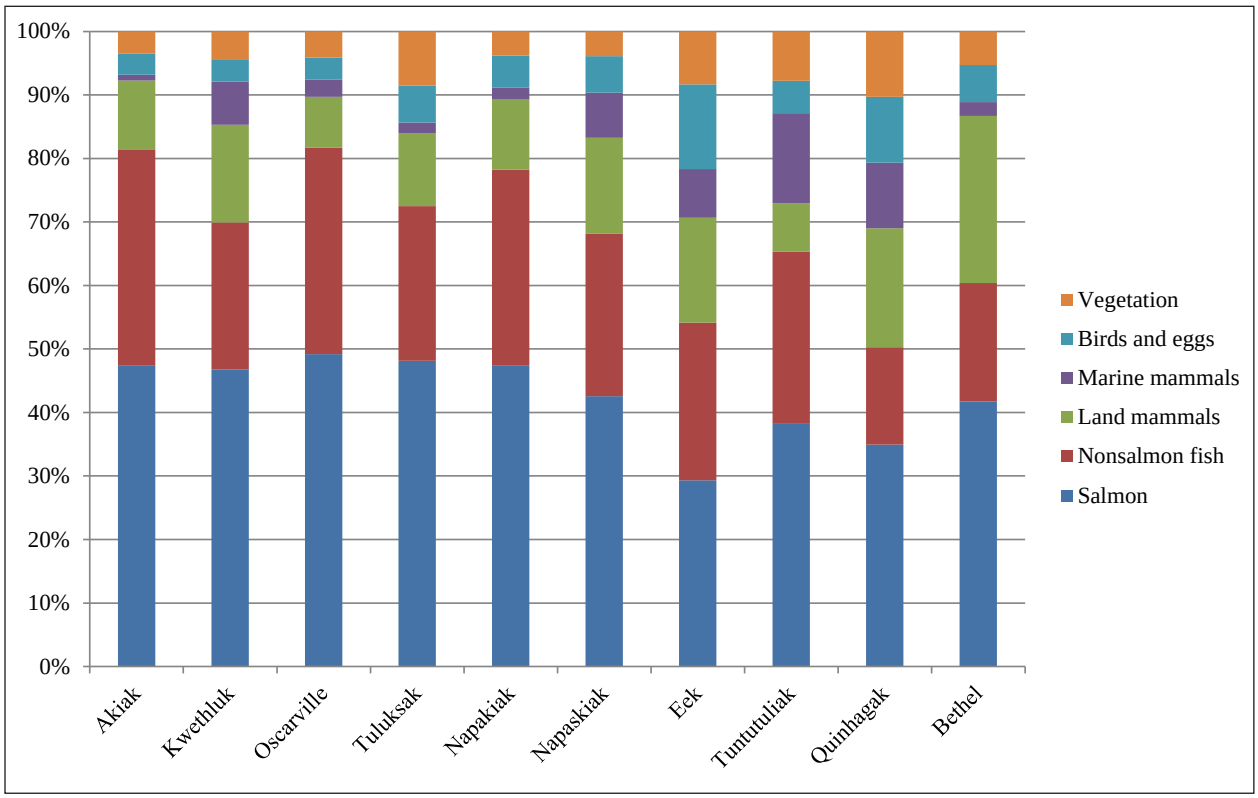


Figure 3-4.–Comparisons of per capita harvests by resource category as percentages of total per capita harvest, lower Kuskokwim River Communities, 2010–2013.

Study Year-specific Factors Related to Bethel 2012 Results

Several factors in 2012 affected overall harvest and use patterns for Bethel households particularly in regard to a number of key subsistence resources. Specifically, survey respondents often described that issues related to abundance and regulation of salmon, moose, and caribou were influential to their harvests during the study year. The following section of this chapter provides a brief overview of these factors as they relate to the results of this study.

Salmon

This section is a revised excerpt from Ikuta et al. (2013).

Due to very low returns of Chinook salmon in the summer of 2012, management of subsistence salmon fishing in the Kuskokwim River during the study year was more restrictive than in any preceding year. The 2012 subsistence salmon fishing season was unique not only in the very low returns of Chinook salmon, but also in ADF&G's resulting management strategy and the public's response to its actions. The seminal event of the season that most affected the livelihood of subsistence fishers was the initial 12-day restriction of subsistence salmon fishing in the Kuskokwim River and its tributaries from June 10 through June 22. During this restricted opening, subsistence fishing in the lower Kuskokwim River was limited to set gillnets 60 feet in length with a mesh size of 4 inches or less. The typical salmon fishing gear preferred by Bethel fishers is 6-inch to 8.5-inch mesh drift gillnets 300 feet in length. The smaller mesh and shorter length gillnets significantly reduced the size and number of salmon that fishers were able to catch in 2012, including large Chinook salmon in particular, while still permitting fishers to harvest other species of nonsalmon fishes such

as whitefishes. The subsistence fishing restrictions implemented in 2012 resulted in harvests of Chinook salmon that were approximately 70% below the previous 10-year average for Bethel (Shelden et al. 2014).[3]

Although fishers were allowed to retain any salmon caught incidentally in 4-inch mesh gillnets, these nets were generally inefficient at harvesting salmon, particularly the principal species, Chinook salmon. When management actions permitted the use of 6-inch and smaller mesh gillnets, chum and sockeye salmon were in greater abundance than Chinook salmon. The 6-inch and smaller mesh drift gillnets deployed during the peaking chum and sockeye salmon runs were very efficient at catching these species, much more so than they were at catching Chinook salmon. As a result, the majority of subsistence salmon harvests immediately following the 12-day closure was composed of chum and sockeye salmon. Although fishers typically harvest large numbers of chum and sockeye salmon each year in the Kuskokwim River, Chinook salmon are the most highly desired of the Pacific salmon species for various economical, nutritional, and sociocultural reasons. Many Bethel survey respondents, in addition to fishers who shared their concerns with Division of Subsistence staff during the 2012 salmon fishing season, expressed that lower harvests of Chinook salmon substantially reduced their households' ability to obtain the subsistence foods they needed for the year overall.

The purpose of the 12-day fishing closure was to prevent or minimize the harvest of Chinook salmon in the subsistence fishery. Managers decided to initiate the closure due to what they observed to be a late and weak run of Chinook salmon, which was likely to result in total salmon returns that would not achieve the escapement needed to meet the management objective. The 12-day closure occurred during the earliest portion of the 2012 Chinook salmon run when fish returning to spawn were at low abundance; however, this was also the period of time when subsistence fishers expected to harvest Chinook salmon. The traditional salmon fishing season begins when migrating Chinook salmon first enter the river. This is typically early to mid-June for Bethel area fishers.

The 12-day fishing closure forced households to harvest salmon later in the season than is typical for the region. The majority of salmon harvests occurred during a time when weather had cooled, rain was common, and egg-laying flies were abundant, particularly in the lower Kuskokwim River. These conditions made preserving salmon with traditional techniques much more difficult than in the periods of warmer, drier weather that the region experienced in early June 2012 when subsistence salmon fishing had been closed. The wetter and cooler weather from late June to mid-July made processing fish more time consuming. When weather is wetter and cooler and flies are laying eggs on processed salmon hanging in fish racks, fishing families need to spend more time keeping fish dry. This usually requires moving the processed fish into smokehouses when rain begins to fall, and moving the fish back to the drying racks when the rain stops or when skies are less overcast. All of this activity significantly increases the amount of work required to process salmon for long-term storage. Unfortunately, despite people's vigilance at their fish racks, many reported that spoilage of fish usually occurred, much more so than if fish had been processed earlier in the season when weather was dry and flies were less abundant.

The 2012 salmon fishing season in the Kuskokwim River was remarkable in that fishery managers initiated some of the most extensive restrictions on subsistence fishing ever implemented in the region. Although some individuals claimed that they were able to adapt to these restrictions, many Bethel residents expressed extreme distress over fishing closures and the associated difficulty of harvesting and processing enough salmon to meet their needs for food. Many survey respondents described difficult challenges in meeting their needs for salmon, particularly Chinook salmon. Despite these challenges and the resulting hardships described by some fishers, numerous respondents also described an ability to adapt to the decreased availability of Chinook salmon and the difficulty of processing fish later in the season during periods of cool and wet weather.

3. The 20-year average subsistence Chinook salmon harvest for Bethel from 1990 to 2009 was 26,440 fish (Hamazaki 2011), in comparison to this study's estimated 7,846 fish harvested in 2012 (Table 2-6).

Moose

This section is a revised excerpt from Runfola et al. (2014).

Moose have historically occurred at low densities in the lower Kuskokwim River region and were virtually absent from the region prior to 1940 (Andrews 1989; Charnley 1983; Perry 2010). Moose gradually colonized the region throughout the latter 20th century and became a major component of subsistence harvests. Relatively low local abundance of moose has resulted in a history of Bethel hunters traveling outside of the region to hunt moose. During the early 1940s, some lower Kuskokwim River residents began traveling by boat up the mainstem Kuskokwim River to hunt relatively abundant moose in tributaries of the central and upper Kuskokwim River (Coffing 1991). This practice became increasingly important to Bethel residents' moose hunting patterns as hunters obtained larger boats with larger horsepower motors throughout the 1980s and 1990s.

Although hunters harvested some moose within the lower Kuskokwim river region, they also traveled extensively outside of the area to harvest moose (Charnley 1983). In the late 20th century, user conflicts among hunters began to develop as residents of communities in both the lower and central Kuskokwim River regions accessed tributaries of the central Kuskokwim River in GMU 19 for moose hunting. Charnley (1983) describes a disruption of customary laws of land tenure in the central Kuskokwim River area. This was exemplified by the extensive use of the Holitna and Hoholitna river drainages during the fall moose season by residents of lower Kuskokwim River communities, including Bethel: hunters who typically did not have familial or other social ties with residents of local communities (Charnley 1983). Beginning in the 1992–1993 regulatory year, as a response to growing user conflicts particularly within the Holitna river drainage, the Board of Game (BOG) established the Holitna-Hoholitna Controlled Use Area, which the BOG closed to big game hunting with use of any boat equipped with a motor that exceeded 40 horsepower (Runfola et al. 2014).

Due to declining moose populations in GMU 19A and following the development of the "Central Kuskokwim Moose Management Plan," the BOG adopted an extremely conservative regulatory regime for moose hunting in the central Kuskokwim River region. Beginning in the 2006–2007 regulatory year, the BOG established a Tier II moose hunt in western GMU 19A, from the George River drainage downstream to the community of Upper Kalskag (Runfola et al. 2014).[4] In the same regulatory year, the BOG closed moose hunting in the remainder of 19A. These regulations were in place during the 2011–2012 regulatory year. Because lower Kuskokwim River residents have historically travelled into GMU 19A to hunt moose, these regulatory changes affected many hunters residing in GMU 18. Currently, the Tier II permit requirements allow hunting by only a limited number of hunters who scored high enough on an application ranking their customary use of and direct dependence on moose within western GMU 19A. Furthermore, eastern GMU 19A, particularly the Holitna and Hoholitna river drainages, has historically been very popular among Bethel moose hunters. Its closure to moose hunting has further restricted access to an important subsistence resource for members of the community.[5]

The history of moose hunting regulations throughout GMU 18 has been dynamic, and often restrictive, largely due to variability in the status of the region's moose populations (Appendix A; Simon et al. 2016:41–56). From 1960 through the 2003–2004 regulatory year, hunters were permitted to harvest 1 bull moose under general hunt provisions throughout most of GMU 18, including the lower Kuskokwim River area.[6] During this period, heavy hunting pressure from residents of lower Kuskokwim River communities

4. State Tier II hunts are held when there is not enough of a game population with customary and traditional uses to provide a reasonable opportunity for subsistence uses. Hunters must answer questions on an application concerning their dependence on the game for their livelihood and availability of alternative resources. Applications are scored based on responses to the questionnaire and permits are issued to those with the highest scores.

5. See Brown et al. (2012a) for a more detailed discussion of these regulatory changes.

6. In the lowest Yukon River region, the BOG established a moose hunting moratorium from the 1988–1989 regulatory year through the 1993–1994 regulatory year. The purpose of the moratorium was to allow for recovery of the moose population in the area (Perry 2010).

limited moose population growth in the area (Perry 2010). In 2003, ADF&G identified moose population growth in the lower Kuskokwim River area as a primary management goal. Therefore, beginning in the 2004–2005 regulatory year, the BOG established a moratorium on moose hunting in the lower Kuskokwim River drainage roughly extending from the boundary with GMU 19 south to the Eek River and west to a line from the Ishkowik River and north into the upper Johnson River drainage. This moratorium continued until the 2009–2010 regulatory year, when ADF&G administered a registration permit hunt for the same area with a quota of 75 bull moose, which was to be closed by emergency order once hunters reached the quota (Perry 2012a). During the study year of 2012, this quota was 100 bull moose (Perry 2012b). These restrictions have resulted in a very competitive moose hunt, with success rate of approximately 7% to 10% for hunters receiving a registration permit.[7] Hunters have typically reached the harvest quota within 7 to 10 days. Although there are other opportunities for residents to harvest moose in GMU 18, including a winter hunt for "any" moose in the lower Yukon River region, accessing these areas from communities of the lower Kuskokwim River area often requires long-distance travel by snowmachine. In this study, Bethel residents reported hunting moose in locations that required long-distance travel from Bethel by boat or snowmachine, indicating the relative importance of moose to subsistence hunters in Bethel despite the substantial cost incurred.

Caribou

This section is a revised excerpt from Runfola et al. (2014).

Subsistence caribou harvests by Bethel residents are influenced by caribou herds' geographic distribution and population size. Skoog (1968) summarized historical information about caribou in the lower Kuskokwim region, describing that, in general, caribou in this area have fluctuated considerably in population and distribution. Raymond (1900) reported that caribou in the Yukon-Kuskokwim Delta were abundant in the middle 1800s, but diminished greatly thereafter with the introduction of firearms to the region. Caribou were virtually absent from the area by 1890 and remained so throughout the lower Kuskokwim River region through the first half of the 20th century (Skoog 1968).

Large herds of domestic reindeer were also present in Alaska during much of the 20th century. The U.S. federal government, under the direction of Dr. Sheldon Jackson, Presbyterian missionary and U.S. General Agent of Education in Alaska, introduced reindeer to Northwest Alaska in the late 19th century (Calista Professional Services 1984). By 1903, reindeer herding had expanded into the Y-K Delta region, including a herd of approximately 1,000 animals near Bethel (McAtee 2010). During a 1927 reindeer count, a total of 51,369 reindeer were present in Western Alaska, broadly corresponding to the Y-K Delta and surrounding areas (Alaska Governor 1928). Herders in the community of Akiak maintained a reindeer herd that reached a peak of 30,000 animals until the decline of the industry throughout the region beginning in the 1930s (Alaska Governor 1928; McAtee 2010). The sale and consumption of reindeer meat for personal use represented a substantial portion of the local economy and diet for some lower Kuskokwim River communities; however, the industry was dependent upon supplying large amounts of meat to distant markets outside of Alaska. The Alaska reindeer industry was not viable without demand from those markets, and production declined when demand decreased as a result of competition with the beef industry (Simon 1998). There were a number of other factors which contributed to the decline and disappearance of reindeer herds in the Yukon-Kuskokwim Delta, including difficulty managing numerous small herds, overgrazing, predation, disease, and inconsistent government management and regulation (Calista Professional Services 1984). Following a reindeer population crash that began in the late 1930s, reindeer herding and reindeer became virtually absent from the Y-K Delta region by 1960.

In the early to mid-20th century, large reindeer herds ranged throughout the tundra of the lower Kuskokwim River and the Kuskokwim and Kilbuck mountains (Calista Professional Services 1984; McAtee 2010). Possibly due to competition with these reindeer, caribou were scarce in the Y-K Delta region following the decline of the reindeer industry (Perry 2009). Skoog (1968) estimated a population of 5,000 adults mixed

7. Phillip Perry, Area Management Biologist, Alaska Department of Fish and Game, personal communication, December 2012.

in with the Mulchatna caribou herd in 1964 and reported that the reindeer herd ranged the mountainous territory east of and distant from the lower Kuskokwim River region. Although information about the herd's distribution and movement was limited, Skoog (1968) listed Whitefish Lake in the Hoholitna River headwaters, Lake Clark, and the Taylor Mountains as places where large numbers of the reindeer herd had been observed in the 1960s.

A small group of caribou (Kilbuck Mountains caribou herd) was present in the Kilbuck Mountains southeast of Bethel and was hunted beginning at the latest in the mid-1980s (Spaeder 2005). The Mulchatna caribou herd expanded dramatically in population and geographic distribution beginning in the 1980s, and by the mid-1990s the herd was seasonally present in the vicinity of lower Kuskokwim River communities. Area management biologists assume that this expanding caribou herd eventually absorbed the smaller Kilbuck Mountains caribou herd (Perry 2009), and from the mid-1990s until 2010 harvests of caribou by lower Kuskokwim river communities primarily came from the Mulchatna herd. The Mulchatna herd rapidly expanded to over 192,000 caribou by 1996, and hunting regulations were liberalized as the herd grew in number (Woolington 2011). During the 1990s, estimated total harvests of Mulchatna herd caribou throughout its entire range in 3 game management units ranged from 2,650 caribou in 1990 to 9,770 caribou in 1998 and 9,470 in 1999 (Valkenburg et al. 2003). Between 1996 and 2008, the Mulchatna herd population steadily decreased to an estimated population of 30,000 caribou in 2008 (Woolington 2011), possibly due to lower recruitment, higher mortality influenced by disease including hoof rot, and low calf to cow ratios (Valkenburg et al. 2003).

State of Alaska caribou hunting regulations for Game Management Unit 18 have varied considerably since 1960 (Appendix A; Simon et al. 2016:35–40). The caribou bag limit for all of GMU 18 was 2 caribou per year during the 2011–2012 regulatory year (Woolington 2013). The federal subsistence hunting regulations on federal public lands in GMU 18 are the same as State of Alaska hunting regulations for the region; however, only federally qualified subsistence hunters are permitted to hunt caribou under these regulations on federal public lands in GMU 18. Federally recognized subsistence hunters residing in the lower Kuskokwim River area, which includes residents of Bethel, likely compose the majority of caribou hunters in the region and harvest a significant portion of the Mulchatna caribou herd, particularly during winter (Perry 2009). Therefore, hunter success is dependent upon snow conditions and the proximity of caribou to hunters' communities when travel by snowmachine is possible.

Bethel 2012 Results: Bethel as a Regional Center Community

Bethel's role as a regional center, or hub community, is shared by several other communities in Alaska including Barrow, Dillingham, Kotzebue, and Nome. Past studies have investigated the unique characteristics of regional centers and the role of subsistence foods in these communities (Wolfe and Ellanna 1983:268–269 ; Fall et al. 1986; Wolfe et al. 1986; Fall 2013). Results of these previous studies suggested that community-level characteristics of these regional centers likely had a strong influence on subsistence harvest and use patterns for community residents. For example, when compared to other communities within their respective regions, regional centers had residents of more diverse origins and higher rates of resident turnover (i.e., migration into or out of the community). Place of origin and length of residency in an area were found to be related to levels of household subsistence participation. Thus, average household subsistence harvest amounts in regional center communities were lower when compared to non-regional center communities within their respective regions (Langdon 1991:282). However, factors such as remote location and connection to long-standing subsistence traditions were related to substantially greater contributions to the local economy of noncommercial wild food harvests than for road system communities of similar size (Wolfe and Ellanna 1983:268).

Similar patterns are well-represented in the 2012 Bethel data. For example, estimated per capita harvests of wild foods in edible pounds for Bethel in 2012 were somewhat lower than the Western Alaska regional average, but much greater than road system communities such as those of the Kenai Peninsula (Fall 2014), even after considering Chinook salmon restrictions in place in 2012. Similar to findings from previous subsistence research in regional center communities, differences in harvest and use of subsistence resource

categories between Bethel households and households of other lower Kuskokwim River communities are likely attributable to the diversity of Bethel's population and the presence of residents who typically do not harvest wild foods. Although many residents of Bethel actively hunt, fish, and gather subsistence foods, many do not. To make subsistence a substantial part of daily life requires a great commitment of time and effort that may be difficult or impossible for some households to do. The following sections provide further descriptions of the ways that subsistence in Bethel in 2012 were influenced by Bethel's position as a regional center community.

Historical Development of Bethel as a Regional Center

Over the course of the 20th century, Bethel emerged as one of the largest off-highway rural communities in Alaska and increasingly assumed a role as the regional center for over 50 smaller communities in Western Alaska (AGNEW::BECK Consulting 2011:2-2, 2-3; Stinson 1990). Most descriptions of general subsistence patterns in the Bethel area illustrated the ways that broader socioeconomic and environmental changes had affected these patterns over time.[8] In particular, key respondents frequently described the rapid socioeconomic transformation that occurred in Bethel in the late 20th century.

> The oil boom[9] changed life here. All of a sudden, people were going up to the [North] Slope and coming back with more money...There were more expectations I think as Bethel grew…not only do we all want access to resources, but…we don't want the frontier town anymore. There was honey buckets when I moved home [i.e., back to Bethel]. You know, no flush toilets. But things have gotten more modernized here…We don't have our home-made wooden boats anymore. We have bigger boats, and bigger motors, and bigger, longer nets…We have cars that guzzle more fuel. (BET – 13)

Key respondents described how this growth had corresponded to major socioeconomic changes in the community, and also how these changes had influenced subsistence harvest and use patterns in Bethel over time. For example, Bethel residents described that over the past several decades, numerous residents of other communities migrated to the regional center as Bethel's economic infrastructure developed and because of limited economic opportunities in their home communities.

Economic disparities between Bethel and other Yukon-Kuskokwim Delta communities were likely exacerbated by a great reduction of earned income from trapping and commercial fishing over the 20th century (Ikuta et al. 2013:133). Historically, many rural Alaska households earned a significant portion of their cash income from the fur trade and, more recently in the Kuskokwim River area, from commercial salmon fishing. However, as Bethel developed as a regional transportation and service center, it became a place for residents to earn cash income at a variety of full-time and part-time jobs. Steady income from these jobs surpassed that which a person could earn through seasonal work as a trapper or commercial fisher. In addition, by the 1990s the decline of the global fur market and the near elimination of the commercial salmon fishery in the Kuskokwim River terminated these as sustaining sources of income. One key respondent offered a vivid description of the transition from commercial fishing as an important part of the local economy to its current demise.

> With fishing, you had a job. You could feel better about yourself. You could have money in your pockets to buy your kids something, and even buy a nice big boat: one of those big 20-foot Raiders with the 100 and whatever horse[power]. Nowadays you can just look at those on the beach, even on the Yukon you can go and look at them on the beach

8. Socioeconomic and environmental factors are commonly linked with subsistence harvest and use patterns throughout rural Alaska; however, the position of Bethel as a regional center has often resulted in a multiplication of particular changes relative to other communities. For example, increases in community infrastructure that took place throughout rural Alaska in the late 20th century were far more extensive in Bethel than in other communities in the Y-K Delta.

9. The term "oil boom" generally refers to the period of the 1970s and 1980s during which construction and operation of North Slope oil field services and the Trans Alaska Pipeline System significantly increased job and earned income opportunities for many Alaskans and dramatically increased private sector development and public sector infrastructure improvements.

> because they're not going to hit the water no more. Because of the rise in gas prices, and the cost of the equipment also. So if there's no fishing then there's no motors so you see these with no motors, these big boats, just sitting there. But those big boats were bought…because everybody was thinking bigger, better, more fish, more money, that kind of thing. (BET – 38)

Yukon-Kuskokwim Delta residents have faced many major economic changes since the late 20th century, including the loss of trapping and commercial fishing income. Future research investigating changes to the integration of various sources of production in the Y-K Delta economy will provide additional insight into the effects of these changes on subsistence harvest and use patterns.

Income, Employment, and the Cash Economy

Survey results indicate that because they lived in a hub community, types and availability of wage labor available to Bethel residents were greater than in the surrounding communities. For example, 2012 per capita income in Bethel was over 3 times that of other nearby communities that had participated in subsistence survey projects in recent years (Figure 3-5). Interview respondents described that many Bethel residents had moved from other lower Kuskokwim River communities due to greater availability of work opportunities.

> We saw a lot more outsiders that had moved here that were taking advantage of the fact that they're living here. Which is, I think, their right to do. I would expect them to come out and fish. But [it's an] increase in the population of Bethel going out and fishing… We've seen so many [people] move into Bethel. And although they've left their village, they still want to subsist and a lot of [them] are heavy users of subsistence too…they've

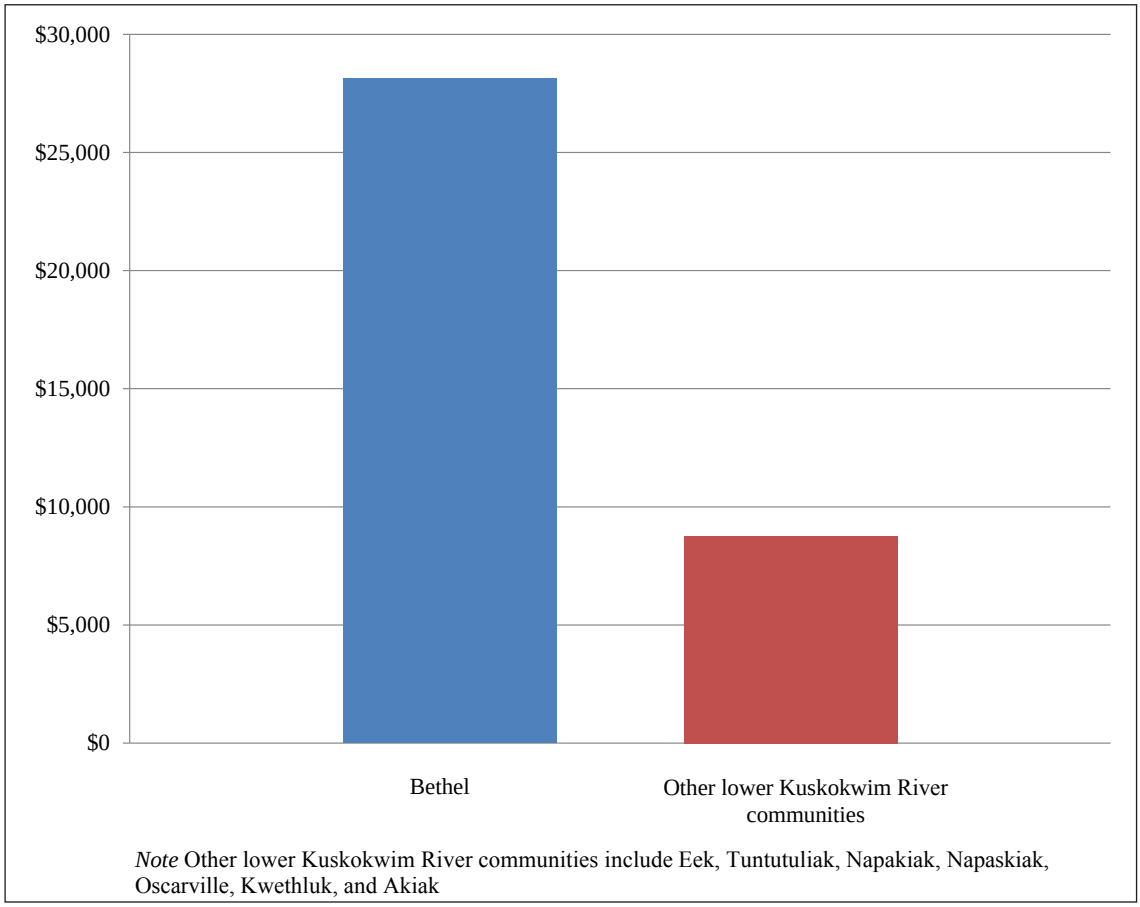


Figure 3-5.–Mean per capita earned and other income, Bethel and other lower Kuskokwim River communities, 2010–2013.

> generally moved here because they have a sustainable job. So they have the resources to go out there and subsist. (BET – 11)

Related to this greater number of job opportunities, respondents described that contemporary subsistence in Bethel as a regional center has in some ways become even more closely connected to the local cash economy than in other communities. Some Bethel residents moved to the community partly because they need money to participate in subsistence activities. However, the financial investment needed to hunt and fish while based out of Bethel can, in some respects, be greater than in smaller communities. For example, when compared to other communities in the region, relatively high levels of competition for particular subsistence resources near Bethel often influences residents to travel farther for subsistence activities.

> People are accessing places a lot further; especially in Bethel where…you have to go further if you want to find critters. And if you live in a village [where] there's not as many people, you typically don't have to go as far. (BET – 31)

Another key respondent expressed his observation of this competition when he described the challenge of hunting moose in the area adjacent to the community: "It's just very competitive. It's way too hard. You get the feeling you're in Anchorage or in Kenai" (BET – 36).

In response to such challenges, subsistence users in Bethel have adopted several strategies, including pooling financial resources to be used for subsistence harvests with other families, or providing services (e.g., temporary lodging in Bethel, shipping goods from Bethel, or direct financial assistance to family members living in smaller communities) in exchange for subsistence foods. One key respondent described his observations of the consolidation of effort and other resources that occurs among Bethel households:

> You see families pooling their money. Families who don't work but [hunt and fish] for subsistence, the provider in the family, the hunter, the gatherer, they'd pool their money for [him] to buy the gas to go out. That's what's happening. Even my brother's family would pool the money so that he could go out, because there's not very much money out there. That's what's happening and people don't talk about it. The people that have confided in me are the elders, and they said that this is what they're resorting to. So… subsistence has changed, you know. It has changed, where it's gotten even smaller and more challenging, but the…people are figuring out how to pool their money and still try to continue that lifestyle. (BET – 38)

Although such consolidation of resources and effort occurs throughout rural Alaska, it is likely that the economic realities stemming from its position as a regional hub community are related to an intensification of this pattern in Bethel. As a possible indication of the increased role of households consolidating or pooling their financial resources to support the subsistence harvests of such "provider(s) in the family," (BET – 38) specialization in subsistence harvesting among Bethel households was higher than in other communities in Western Alaska: when households were listed in order by the estimated edible weight of foods that were harvested, 30% of resident households harvested approximately 86% of Bethel's community harvest as a whole (Figure 2-21). This specialization or unequal harvest between households is higher than generally seen for other rural Alaska communities, where 30% of households typically harvest approximately 70% of the community total harvest (Wolfe et al. 2010; Magdanz et al. 2009).

Demographics

Bethel households reported more diverse origins than other lower Kuskokwim River communities. For example, 26% of surveyed Bethel household heads held Bethel as their birth community (Table E4); for other lower Kuskokwim communities, the percentage of household heads living in their birth community at the time of surveys ranged from 62% to 85% (Brown et al. 2013; Ikuta et al. 2014). Related to this, key respondents described that within Bethel, particular groups of residents continued to maintain connections with not only their communities or regions of origin, but also with other Bethel households with shared origins. As such, research results for Bethel as a single community in some ways could also be viewed as a compilation of multiple interconnected communities of subsistence users within Bethel. Related to these

characteristics, subsistence patterns in Bethel differed somewhat from other communities. For example, Bethel residents' numerous connections to other communities in Western Alaska resulted in surveyed households receiving subsistence foods from most communities in Western Alaska (Figure 2-22). The relatively high numbers of residents who are new to the community of Bethel or Western Alaska in general may also be related to the previously described high levels of household specialization in subsistence harvests, and lower per capita subsistence harvest amounts relative to other Y-K Delta communities: greater length of residency in an area has been shown to be related to higher subsistence harvests in that same area (Wolfe et al. 1986:5, 18). Such differing subsistence harvest and use patterns may be related to particular challenges faced by Bethel households, as described in the following section.

Conclusion

This study provided an overview of Bethel subsistence harvest and use characteristics for 2012 and described the nature of subsistence practices in a regional hub community. Relative to other communities in the region, Bethel residents participated in subsistence activities over a much larger geographic range, through more varied traditions that reflect the diverse origins of its population, and by integrating these activities within the structure of a more highly developed economic system. Because of Bethel's unique community structure and associated subsistence patterns, the effects of changes in resource abundance and related management actions are likely to have regionally unique effects on Bethel residents. Its population includes individuals born and raised in the community, as well as many people who have settled in Bethel from all communities along the Kuskokwim River, other Y-K Delta communities, and cities and towns throughout the United States and overseas. Because of this, hunting, fishing, and gathering wild foods reflects a continuation of long-standing family traditions for some residents, while other residents have begun participating in subsistence activities more recently. Despite the diverse origins of Bethel's contemporary population, harvesting wild foods from the surrounding lands and waters was an important aspect of life for many Bethel households in 2012.

Together with the comprehensive survey results and limited quantitative data from other years, information provided by 40 individuals during ethnographic interviews formed a key component of research findings. Although the surveys led to a relatively static description of subsistence practices in Bethel within a single year, key respondents often explained 2012 subsistence activities in the context of broad and often dynamic patterns or themes that they had observed over their lifetimes. Key respondents frequently spoke about the ways subsistence activities both influence and are influenced by connections to family and traditions, access to jobs and income, or costs and availability of purchased foods. Additionally, the numerous connections between Bethel residents and other communities likely relates to unique conditions when compared to other communities: Because some Bethel households rely on subsistence resources obtained from family members living outside the Bethel area, factors affecting subsistence harvests in distant locations could result in impacts to particular Bethel households that would not necessarily be reflected in community results when viewed as a whole.

In summary, harvest and use of wild food resources was a major part of life for many Bethel households in 2012. The community structure in Bethel is related to complex and regionally unique subsistence harvest and use patterns. Consideration of these unique patterns is essential to understanding the results of future subsistence research and management actions.

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APPENDIX A–GMU 18 MOOSE AND CARIBOU HUNTING REGULATORY HISTORY

Table A-1.–State moose hunting regulations, GMU 18, 1961–2015.

Regulatory Year	Seasons	Total days	Bag limit	Areas affected	Conditions
1961–1962	Aug. 20–Sept. 30 Nov. 10–Dec. 10	73	1 bull moose		
1962–1975	Aug. 20–Dec. 31	134	1 bull moose		
1975–1982[a]	Sept. 1–20	20	1 bull moose	Yukon River delta[b]	
	Sept. 1–Dec. 31	122	1 bull moose	Remainder of GMU 18	
1982–1985	Sept. 1–20	20	1 bull moose	Yukon River delta redefined[c]	
	Sept. 1–30	77	1 bull moose	Remainder of GMU 18	
	Nov. 15–Dec. 31		1 bull moose	Remainder of GMU 18	
1985–1988[d]	Sept. 1–20	20	1 bull moose	Yukon River delta[c]	
	Sept. 1–30	40	1 bull moose	Remainder of GMU 18	
	Feb. 1–10		1 bull moose	Remainder of GMU 18	
1988–1993[e]	Closed	0	1 bull moose	Yukon River delta[c]	
	Sept.1–30	41	1 bull moose	Remainder of GMU 18	
	Dec. 20–30		1 bull moose	Remainder of GMU 18	
1993–1994	Closed	0		Yukon River delta[c]	
	Sept.1–30	30	1 bull moose	remainder of GMU 18	
	Winter season to be announced[f]	10	1 bull moose	Remainder of GMU 18	
1994–2000	Sept. 5–25	21	1 bull moose	Remainder of GMU 18	
	Sept.1–30	30	1 bull moose	Remainder of GMU 18	
	Winter season to be announced[f]	10	1 bull moose	Remainder of GMU 18	
2000–2002	Sept. 5–25	21	1 bull moose	North and west of a line from Cape Romanzof to Kuzilvak Mountains, and then to Mountain Village, and excluding all Yukon River drainages upstream from Mountain Village	
	Sept. 1–30	30	1 bull moose	Remainder of GMU 18	
	Winter season to be announced[f]	10	1 bull moose	Remainder of GMU 18	
2002–2004	Sept. 5–25	21	1 bull moose	All Yukon River drainages north of the south banks of Kwiklauk Pass and the Yukon River, including sloughs, downstream of Mountain Village	
	Sept. 5–25	21	1 bull moose	South of the south banks of Kwiklauk Pass and the Yukon River, and north and west of a line from Cape Romanzof to Kuzilvak Mountains, and then to Mountain Village	
	Sept. 1–30	30	1 bull moose	All Yukon River drainages north of the south bank of the Yukon River, including sloughs, upstream from Mountain Village	
	Winter season to be announced[f]	10	1 bull moose	All Yukon River drainages north of the south bank of the Yukon River, including sloughs, upstream from Mountain Village	
	Sept. 1–30	30	1 bull moose	Remainder of GMU 18	
	Winter season to be announced[f]	10	1 bull moose	Remainder of GMU 18	

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Regulatory Year	Seasons	Total days	Bag limit	Areas affected	Conditions
2004–2005	Closed	0		Lower Kuskokwim Closed Area[g]	
	Sept. 1–30	30	1 bull moose	South of the Eek River drainage	
	Winter season may be announced[h]	–	1 bull moose	South of the Eek River drainage	
	Sept. 1–30	30	1 bull moose	Remainder of GMU 18	
	Winter season may be announced[h]	–	1 bull moose	Remainder of GMU 18	
2005–2006	Closed	0		Lower Kuskokwim Closed Area[g]	
	Sept. 1–30	30	1 bull moose	South of the Eek River drainage and north of Goodnews River drainage	
	Closed	0		South of and including the Goodnews River drainage	
	Sept. 1–30	30	1 bull moose	Remainder of GMU 18	
	Winter season may be announced[h]	–	1 bull moose	Remainder of GMU 18	
2006–2008	Closed	0		Lower Kuskokwim Closed Area[g]	
	Sept. 1–30	30	1 antlered bull moose	South of the Eek River drainage and north of Goodnews River drainage	
	Sept. 1–30	30	1 antlered bull moose	North and west of a line from Cape Romanzof to Kusilvak Mountains to Mountain Village and excluding all Yukon River drainages upriver from Mountain Village (Lower Yukon Area)	
	Dec. 20–Jan. 10	22	1 antlered bull moose or 1 calf[i]	Lower Yukon Area (see above)	
	Sept. 1–30	30	1 antlered bull moose	Remainder of GMU 18	
	Dec. 20–Jan. 10	22	1 antlered bull moose	Remainder of GMU 18	
2008–2009	Closed	0		Lower Kuskokwim Closed Area[g]	
	Sept. 1–30	30	1 antlered bull moose	South of the Eek River drainage and north of Goodnews River drainage	
	Aug. 25–Sept. 20	27	1 antlered bull moose by registration permit	That portion south of and including the Goodnews River drainage	Registration permits available in person in Goodnews Bay Aug. 1–20. Season will be closed by EO when 10 bulls are taken
	Aug. 10–Sept. 30	52	1 antlered bull moose	That portion north and west of a line from Cape Romanzof to Kusilvak Mountains to Mountain Village and excluding all Yukon River drainages upriver from Mountain Village (Lower Yukon Area)	
	Dec. 20–Jan. 20	31	1 antlered bull moose or 1 calf	Lower Yukon Area (see above)	
	Aug. 10–Sept. 30	52	1 antlered bull moose	Remainder of GMU 18	
	Dec. 20–Jan. 10	21	1 antlered bull moose	Remainder of GMU 18	

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Table A-1.–Page 3 of 5

Regulatory Year	Seasons	Total days	Bag limit	Areas affected	Conditions
2009–2010					
	Sept. 1–10	10	1 antlered bull moose by registration permit	Lower Kuskokwim, easterly of a line from the mouth of the Ishkowik River to the closest point of Dall Lake then to easternmost point of Takslesluk Lake then along the Kuskokwim River drainage boundary to the GMU 18 border, and north of and including the Eek River drainage	
	Sept. 1–30	30	1 antlered bull moose	That portion south of the Eek River drainage and north of the Goodnews River drainage	
	Aug. 25–Sept. 20	27	1 antlered bull moose	That portion south of and including the Goodnews River drainage	
	Aug. 10–Sept. 30	52	1 antlered bull moose	That portion north and west of a line from Cape Romanzof to Kusilvak Mountains to Mountain Village and excluding all Yukon River drainages upriver from Mountain Village (Lower Yukon Area)	
	Dec. 20–Jan. 20	31	1 moose	Lower Yukon Area (see above)	
	Aug. 10–Sept. 30	52	1 antlered bull moose	Remainder of GMU 18	
	Dec. 20–Jan. 10	21	1 antlered bull moose	Remainder of GMU 18	
2010–2012					
	Sept. 1–10	10	1 antlered bull moose by registration permit	Kuskokwim Area, east of a line from the mouth of the Ishkowik River to Dall Lake, then to the Johnson River at its entrance into Nunavakanukakslak Lake (N 60^{0} 59.41' Lat; W 162^{0} 22.14' Long), then upstream 1/2 mile south of the south bank of the Johnson River to Crooked Creek, then upstream along the creek to Arhymot Lake to the GMU 18 boundary, and north of and including the Eek River drainage	
	Sept. 1–30	30	1 antlered bull moose	That portion south of the Eek River drainage and north of the Goodnews River drainage	
	Sept. 1–30	30	1 antlered bull moose by registration permit	That portion south of and including the Goodnews River drainage	
	Aug. 10–Sept. 30	52	1 antlered bull moose	Lower Yukon Area, that portion north and west of the Kashunuk River including the north bank from the mouth of the river upstream to the old village of Chakaktolik, west of a line from Chakaktolik to Mountain Village, excluding all Yukon River drainages upriver from Mountain Village	
	Dec. 20–Feb. 28	70	1 moose	Lower Yukon Area (see above)	
	Aug. 10–Sept. 30	52	1 antlered bull moose	Remainder of GMU 18	
	Dec. 20–Jan. 10	21	1 antlered bull moose	Remainder of GMU 18	

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Table A-1.–Page 4 of 5

Regulatory Year	Seasons	Total days	Bag limit	Areas affected	Conditions
2012–2014					
	Sept. 1–10	10	1 antlered bull moose by registration permit	Kuskokwim Area, east of a line from the mouth of the Ishkowik River to Dall Lake, then to the Johnson River at its entrance into Nunavakanukakslak Lake (N 60^{0} 59.41' Lat; W 162^{0} 22.14' Long), then upstream 1/2 mile south of the south bank of the Johnson River to Crooked Creek, then upstream along the creek to Arhymot Lake to the GMU 18 boundary, and north of and including the Eek River drainage	
	Sept. 1–30	30	1 antlered bull moose	That portion south of the Eek River drainage and north of the Goodnews River drainage	
	Sept. 1–30	30	1 antlered bull moose by registration permit	That portion south of and including the Goodnews River drainage	
	Aug. 1–Sept. 30	61	2 moose, only one of which may be an antlered bull	Lower Yukon Area, that portion north and west of the Kashunuk River including the north bank from the mouth of the river upstream to the old village of Chakaktolik, west of a line from Chakaktolik to Mountain Village, excluding all Yukon River drainages upriver from Mountain Village	Taking cows accompanied by calves or calves is prohibited
	Oct. 1–Feb. 28	151	2 antlerless moose	Lower Yukon Area (see above)	
	Aug. 10–Sept. 30	52	1 antlered bull moose	Remainder of GMU 18	
	Dec. 20–Feb. 28	70	1 moose	Remainder of GMU 18	
2014–2015					
	Sept. 1–10	10	1 antlered bull moose by registration permit	Kuskokwim Area, east of a line from the mouth of the Ishkowik River to Dall Lake, then to the Johnson River at its entrance into Nunavakanukakslak Lake (N 60^{0} 59.41' Lat; W 162^{0} 22.14' Long), then upstream 1/2 mile south of the south bank of the Johnson River to Crooked Creek, then upstream along the creek to Arhymot Lake to the GMU 18 boundary, and north of and including the Eek River drainage	
	Sept. 1–30	30	1 antlered bull moose	That portion south of the Eek River drainage and north of the Goodnews River drainage	
	Sept. 1–30	30	1 antlered bull moose by registration permit	That portion south of and including the Goodnews River drainage	
	Aug. 1–Sept. 30	61	2 moose, only 1 of which may be an antlered bull	Remainder of GMU 18	Taking cows accompanied by calves or calves is prohibited
	Oct. 1–Nov. 30	61	2 antlerless moose	Remainder of GMU 18	
	Dec. 1–Mar. 15	105	2 moose	Remainder of GMU 18	

Source Alaska Department of Fish and Game. Alaska hunting regulations. ADF&G, 1961–2013.

Table A-1.–Page 5 of 5

a.The Alaska Board of Game established the Kalskag Controlled Use Area in 1977, incorporating a triangular-shaped region from Russian Mission upriver to the old Paimiut village site, south to Lower Kalskag, northwest back to Russian Mission.

b. That area north and west of a line from Cape Romanzof to Mountain Village, & west of & excluding the Andreafsky River drainage.

c. That portion north and west of a line from Cape Romanzof to Kuzilvak Mountain, to Mountain Village, and west of, but excluding the Andreafsky River drainage.

d. In 1985-1989, hunting regulations were divided into subsistence and general hunts. In 1988, residents of communities within GMU 18 and Upper Kalskag were found to have customary and traditional uses of moose in GMU 18.

e. In 1990, all Alaskan residents became eligible for subsistence hunts.

f. A 10-day winter season to be announced by Emergency Order during the period Dec. 20–Jan. 20.

g. Lower Kuskokwim Closed Area: easterly of a line from the mouth of Ishkowik River to the closest point of Dall Lake, then to the easternmost point of Takslesluk Lake, then along the Kuskokwim River drainage boundary to the GMU 18 border, and north of and including the Eek River drainage.

h. 10-day season may be announced between Dec. 1 and Feb. 28.

i. ADF&G may close some areas to taking of calves.

Table A-2.–Federal moose subsistence hunting regulations, GMU 18, 1990–2016.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
1990–1991							
	Closed	0		That portion north and west of a line from Cape Romanzof to Kuzilvak Mountain, and then to Mountain Village, and west of (but not including) the Andreafsky River drainage		N/A	Closed
	Sept. 1–30	30	1 bull moose	Remainder of GMU 18		GMU 18 and Upper Kalskag	Open
	Dec. 20–30	11	1 bull moose	Remainder of GMU 18		GMU 18 and Upper Kalskag	Open
1991–1992							
	Closed	0		That portion north and west of a line from Cape Romanzof to Kuzilvak Mountain, and then to Mountain Village, and west of (but not including) the Andreafsky River drainage; and those portions contained in the Kanektok and Goodnews drainages		N/A	Closed
	Sept. 1–30	30	1 antlered moose	Remainder of GMU 18		GMU 18 and Upper Kalskag	Open
	Winter season to be announced	10	1 antlered moose	Remainder of GMU 18	A 10-day hunt falling sometime between Dec. 1 and Feb. 28 shall be opened by announcement of the Federal Subsistence Board	GMU 18 and Upper Kalskag	Open
1992–1994							
	Closed	0		That portion north and west of a line from Cape Romanzof to Kuzilvak Mountain, and then to Mountain Village, and west of, but not including, the Andreafsky River drainage; and those portions contained in the Kanektok and Goodnews drainages		N/A	Closed
	Sept. 1–30	30	1 antlered moose	Remainder of GMU 18		GMU 18 and Upper Kalskag	Closed
	Winter season to be announced[b]	10	1 antlered moose		A 10-day hunt falling sometime between Dec. 1 and Feb. 28 shall be opened by announcement of the Federal Subsistence Board	GMU 18 and Upper Kalskag	
				Remainder of GMU 18			Closed
1994–1995							
	Sept. 5–25	21	1 antlered bull moose	That portion north and west of a line from Cape Romanzof to Kuzilvak Mountain, and then to Mountain Village, and west of, but not including, the Andreafskey River drainage.		GMU 18 and Upper Kalskag	Closed
	Closed	0		Goodnews River and Kanektok River drainages		N/A	Closed
	Aug. 25–Sept. 25	32	1 antlered bull moose	Remainder of GMU 18		GMU 18 and Upper Kalskag	Closed
	Winter season to be announced	10	1 bull moose (evidence of sex required)	Remainder of GMU 18	A 10-day hunt falling sometime between Dec. 1 and Feb. 28 shall be opened by announcement of the Federal Subsistence Board	GMU 18 and Upper Kalskag	Closed

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Table A-2.–Page 2 of 11.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
1995–1997							
	Sept. 5–25	21	1 antlered bull moose	That portion north and west of a line from Cape Romanzof to Kuzilvak Mountain, and then to Mountain Village, and west of, but not including, the Andreafskey River drainage.		GMU 18 and Upper Kalskag	Closed
	Closed	0		Goodnews River and Kanektok River drainages		N/A	Closed
	Aug. 25–Sept. 25	32	1 antlered bull moose	Kuskokwim River drainage		GMU 18 and Upper Kalskag	Closed
	Winter season to be announced	10	1 bull moose (evidence of sex required)	Kuskokwim River drainage	A 10-day hunt falling sometime between Dec. 1 and Feb. 28 shall be opened by announcement of the Federal Subsistence Board	GMU 18 and Upper Kalskag	Closed
	Sept. 1–30	30	1 antlered bull moose	Remainder of GMU 18		GMU 18 and Upper Kalskag	Closed
	Winter season to be announced	10	1 bull moose (evidence of sex required)	Remainder of GMU 18	A 10-day hunt falling sometime between Dec. 1 and Feb. 28 shall be opened by announcement of the Federal Subsistence Board	GMU 18 and Upper Kalskag	Closed
1997–2004							
	Sept. 5–25	21	1 antlered bull moose	That portion north and west of a line from Cape Romanzof to Kuzilvak Mountain, and then to Mountain Village, and west of, but not including, the Andreafskey River drainage.		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk Remainder of GMU 18:GMU 18 and Upper and Lower Kalskag	Closed
	Closed[c]	0		Goodnews River and Kanektok River drainages		N/A	Closed
	Aug. 25–Sept. 25	32	1 antlered bull moose	Kuskokwim River drainage		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Closed
	Winter season to be announced	10	1 bull moose (evidence of sex required)	Kuskokwim River drainage	A 10-day hunt falling sometime between Dec. 1 and Feb. 28 shall be opened by announcement of the Federal Subsistence Board	That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Closed

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Table A-2.–Page 3 of 11.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
1997–2004, continued							
	Sept. 1–30	30	1 antlered bull moose	Remainder of GMU 18		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Closed
	Winter season to be announced	10	1 bull moose (evidence of sex required)	Remainder of GMU 18	A 10-day hunt falling sometime between Dec. 1 and Feb. 28 shall be opened by announcement of the Federal Subsistence Board	That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Closed
2004-2006							
	Closed	0		That portion easterly of a line from the mouth of the Ishkowik River to the closest point of Dall Lake, then to the easternmost point of Takslesluk Lake, then along the Kuskokwim River drainage boundary to the Unit 18 border and north of (and including) the Eek River drainage.		N/A	Closed
	Closed	0		South of and including the Kanektok River drainage		N/A	Closed
	Sept. 1–30	30	1 antlered bull moose	Remainder of GMU 18		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Closed
	Winter season to be announced	10	1 bull moose (evidence of sex required)	Remainder of GMU 18	A 10-day hunt falling sometime between Dec. 1 and Feb. 28 shall be opened by announcement of the Federal Subsistence Board	That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Closed

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Table A-2.–Page 4 of 11.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
2006–2007							
	Closed	0		That portion easterly of a line from the mouth of the Ishkowik River to the closest point of Dall Lake, then to the easternmost point of Takslesluk Lake, then along the Kuskokwim River drainage boundary to the Unit 18 border and north of (and including) the Eek River drainage.		N/A	Closed
	Closed	0		South of and including the Kanektok River drainage		N/A	Closed
	Sept. 1–30	30	1 antlered bull moose	That portion north and west of a line from Cape Romanzof to Kusilvak Mountain to Mountain Village, and excluding all Yukon River drainages upriver from Mountain Village		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Closed
	Dec. 20–Jan. 10[d]	22	1 antlered bull moose or 1 calf	That portion north and west of a line from Cape Romanzof to Kusilvak Mountain to Mountain Village, and excluding all Yukon River drainages upriver from Mountain Village		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk; Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Closed
	Sept. 1–30	30	1 antlered bull moose	Remainder of GMU 18		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Closed
	Dec. 20–Jan. 10	22	1 antlered bull moose	Remainder of GMU 18		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Closed
2007–2008							
	Closed	0		That portion easterly of a line from the mouth of the Ishkowik River to the closest point of Dall Lake, then to the easternmost point of Takslesluk Lake, then along the Kuskokwim River drainage boundary to the Unit 18 border and north of (and including) the Eek River drainage		N/A	Closed
	Closed	0		South of and including the Kanektok River drainage		N/A	Closed

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Table A-2–Page 5 of 11.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
2007–2008, continued							
	Aug. 10–Sept. 30	52	1 antlered bull moose	That portion north and west of a line from Cape Romanzof to Kusilvak Mountain to Mountain Village, and excluding all Yukon River drainages upriver from Mountain Village		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18:GMU 18 and Upper and Lower Kalskag	Open
	Dec. 20–Jan. 20[d]	32	1 moose	That portion north and west of a line from Cape Romanzof to Kusilvak Mountain to Mountain Village, and excluding all Yukon River drainages upriver from Mountain Village		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open
	Aug. 10–Sept. 30	52	1 antlered bull moose	Remainder of GMU 18		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open

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Table A-2.–Page 6 of 11.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
2007–2008, continued						That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk	
	Dec. 20–Jan. 10	22	1 antlered bull moose	Remainder of GMU 18		That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag	Open
						Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	
2008–2010	Closed	0		That portion easterly of a line from the mouth of the Ishkowik River to the closest point of Dall Lake, then to the easternmost point of Takslesluk Lake, then along the Kuskokwim River drainage boundary to the Unit 18 border and north of (and including) the Eek River drainage		N/A	Closed
	Aug. 10–Sept. 30	52	1 antlered bull moose	That portion north and west of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and excluding all Yukon River drainages upriver from Mountain Village		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk	
						That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag	Open
						Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	
	Dec. 20–Jan. 20	32	1 moose	That portion north and west of a line from Cape Romanzof to Kusilvak Mountain to Mountain Village, and excluding all Yukon River drainages upriver from Mountain Village		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk	
						That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag	Open
						Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	

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Table A-2.–Page 7 of 11.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
2008–2010, continued	Closed	0		GMU 18, south of and including the Kanektok River drainages to the Goodnews River drainage		N/A	Closed
	Aug. 25–Sept. 20[f]	27	1 antlered bull moose by state registration permit	Goodnews River drainage and south to the Unit 18 boundary		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open
2010-2012	Closed	0		That portion east of a line running from the mouth of the Ishkowik River to the closest point of Dall Lake, then to the east bank of the Johnson River at its entrance into Nunavakanukakslak Lake (N 60°59.41' Latitude; W 162°22.14' Longitude), continuing upriver along a line 1/2 mile south and east of and paralleling a line along the southerly bank of the Johnson River to the confluence of the east bank of Crooked Creek, then continuing upriver to the outlet at Arhymot Lake, then following the south bank east of the Unit 18 border and then north of and including the Eek River drainage.		Federal public lands are closed to the harvest of moose except by residents of Tuntutuliak, Eek, Napakiak, Napaskiak, Kasigluk, Nunapitchuk, Atmautluak, Oscarville, Bethel, Kwethluk, Akiachak, Akiak, Tuluksak, Lower Kalskag, and Kalskag	Closed
	Aug. 10–Sept. 30	52	1 antlered bull moose	That portion north and west of the Kashunuk River including the north bank from the mouth of the river upstream to the old village of Chakaktolik, west of a line from Chakaktolik to Mountain Village and excluding all Yukon River drainages upriver from Mountain Village		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open

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Table A-2.–Page 8 of 11.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
2010-2012, continued							
	Dec. 20–Feb. 28[g]	71	1 moose by federal registration permit	That portion north and west of the Kashunuk River including the north bank from the mouth of the river upstream to the old village of Chakaktolik, west of a line from Chakaktolik to Mountain Village and excluding all Yukon River drainages upriver from Mountain Village	If 1 antlered bull is taken during the fall season in this area, 1 additional moose may be taken during the winter season; if no moose are taken in the fall season, 2 moose may be taken in the winter season. No more than 2 moose may be harvested in this area in a regulatory year.	That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open
	Closed	0		South of and including the Kanektok River drainages to the Goodnews River drainage		N/A	Closed
	Aug. 25–Sept. 20[f]	27	1 antlered bull moose by state registration permit	Goodnews River drainage and south to the Unit 18 boundary		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open
	Aug. 10–Sept. 30	52	1 antlered bull moose	Remainder of GMU 18		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open
	Dec. 20–Jan. 10	22	1 antlered bull moose	Remainder of GMU 18		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: residents of GMU 18 and Upper and Lower Kalskag	Open

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Table A-2.–Page 9 of 11.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
2012–2014							
	Closed	0		That portion east of a line running from the mouth of the Ishkowik River to the closest point of Dall Lake, then to the east bank of the Johnson River at its entrance into Nunavakanukakslak Lake (N 60°59.41' Latitude; W 162°22.14' Longitude), continuing upriver along a line 1/2 mile south and east of and paralleling a line along the southerly bank of the Johnson River to the confluence of the east bank of Crooked Creek, then continuing upriver to the outlet at Arhymot Lake, then following the south bank east of the Unit 18 border and then north of and including the Eek River drainage.		Federal public lands are closed to the harvst of moose except by residents of Akiachak, Akiak, Atmautluak, Bethel, Eek, Kalskag, Kasigluk, Kwethluk, Lower Kalskag, Napakiak, Napaskiak, Nunapitchuk, Oscarville, Tuluksak, and Tuntutuliak	Closed
	Aug. 1–the last day of February	212	2 moose, only 1 of which may be antlered	That portion north and west of the Kashunuk River including the north bank from the mouth of the river upstream to the old village of Chakaktolik, west of a line from Chakaktolik to Mountain Village and excluding all Yukon River drainages upriver from Mountain Village	Antlered bull may only be harvested from Aug. 1–Sept. 30	That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open
	Closed	0		South of and including the Kanektok River drainages to the Goodnews River drainage		N/A	Closed
	Sept. 1–30[f]	30	1 antlered bull moose by state registration permit	Goodnews River drainage and south to the Unit 18 boundary		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open

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Table A-2.–Page 10 of 11.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
2012–2014, continued						That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk	
	Aug. 10–Sept. 30	52	1 moose	Remainder of GMU 18		That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open
						That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk	
	Dec. 20–last day of February	81	1 moose	Remainder of GMU 18		That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open
2014–2016							
	Sept. 1–30[h]	30	1 antlered bull moose by state registration permit	That portion east of a line running from the mouth of the Ishkowik River to the closest point of Dall Lake, then to the east bank of the Johnson River at its entrance into Nunavakanukakslak Lake (N 60°59.41' W 162°22.14'), continuing upriver along a line 1/2 mile south and east of and paralleling a line along the southerly bank of the Johnson River to the confluence of the east bank of Crooked Creek, then continuing upriver to the outlet at Arhymot Lake, then following the south bank east of the Unit 18 border and then north of and including the Eek River drainage		Federal public lands are closed to the harvest of moose except by residents of Akiachak, Akiak, Atmautluak, Bethel, Eek, Kalskag, Kasigluk, Kwethluk, Lower Kalskag, Napakiak, Napaskiak, Nunapitchuk, Oscarville, Tuluksak, and Tuntutuliak	Closed
	Closed	0		South of and including the Kanektok River drainages to the Goodnews River drainage		N/A	Closed

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Table A-2.–Page 11 of 11.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:	Federal public lands closed to nonfederally qualified users?
2014–2016, continued							
	Sept. 1–30[f]	30	1 antlered bull moose by state registration permit	Goodnews River drainage and south to the Unit 18 boundary		That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18: GMU 18 and Upper and Lower Kalskag	Open
	Aug. 1–Mar. 31	243	2 moose, only one of which may be antlered	Remainder of GMU 18	Antlered bulls may not be harvested from Oct. 1 through Nov. 30	That portion of the Yukon River drainage upstream of Russian Mission and that portion of the Kuskokwim River drainage upstream of, but not including the Tuluksak River drainage: GMU 18 and Upper and Lower Kalskag, Aniak, and Chuathbaluk That portion north of a line from Cape Romanzof to Kuzilvak Mountain to Mountain Village, and all drainages north of the Yukon River downstream from Marshall: rural residents of GMU 18, St. Michael, Stebbins, and Upper Kalskag Remainder of GMU 18:GMU 18 and Upper and Lower Kalskag	Open

Source U.S. Fish and Wildlife Service Office of Subsistence Management. Subsistence management regulations for the harvest of fish and wildlife on federal public lands in Alaska. Anchorage: USFWS, 1990–2014.

a. The Federal Subsistence Board first promulgated federal subsistence hunting regulations in 1990.

b. In the winter hunt, the 1 antlered moose bag limit was changed to 1 bull moose, evidence of sex required in 1993–1994 season.

c. Beginning in 1998–1999, the hunt area was changed to "Unit 18–South of and including the Kanektok River drainages."

d. The Yukon Delta National Wildlife Refuge Manager may restrict the harvest to only antlered bulls after consultation with ADF&G.

e. The Federal Subsistence Board shifted from annual regulations to biennial regulations beginning in 2008, such that federal subsistence regulations began to cover a period of two years (e.g., July 1, 2008–June 30, 2010).

f. Any needed closures will be announced by the Togiak National Wildlife Refuge Manager after consultation with BLM, ADF&G, and the Chair of the Yukon-Kuskokwim Delta Subsistence Regional Advisory Council.

g. The Yukon Delta National Wildlife Refuge Manager may restrict the harvest in the winter season to only 1 antlered bull or only 1 moose per regulatory year after consultation with ADF&G and the Yukon-Kuskokwim Delta Subsistence Regional Advisory Council chair.

h. Quotas will be announced annually by the Yukon Delta National Wildlife Refuge Manager.

Table A-3.–State caribou hunting regulations, 1961–2015, Game Management Unit 18.

Regulatory year	Seasons	Total days	Bag limit	Areas affected	Conditions
1961–1963	No open season	0			
1963–1964	Aug. 10–Mar. 31	234	3 caribou	South of the Yukon River	
	July 1–June 30	365	No limit	North of the Yukon River	
1964–1965	Aug. 10–Mar. 31	234	4 caribou	South of the Yukon River	
	July 1–June 30	365	No limit	North of the Yukon River	
1965–1970	Aug. 10–Mar. 31	234	3 caribou	South of the Yukon River	
	July 1–June 30	365	No limit	North of the Yukon River	
1970–1974	Aug. 10–Mar. 31	234	5 caribou	South of the Yukon River	
	July 1–June 30	365	No limit	North of the Yukon River	
1974–1976	Aug. 10–Mar. 31	234	3 caribou	South of the Yukon River	
	July 1–June 30	365	No limit	North of the Yukon River	
1976–1977	Aug. 10–Mar. 31	234	3 caribou	South of the Yukon River	
	July 15–Dec. 20 Jan. 6–May 31	301	15 caribou	North of the Yukon River	No more than 5 per day; no more than 2 may be transported south of the Yukon River per regulatory year
1977–1978	Aug. 10–Sept. 30	52	1 caribou		
1978–1980	Feb. 1–Mar. 31	59	1 caribou		
1980–1985[a]	Feb. 1–Feb. 28	28	1 caribou	South of the Yukon River	
	Feb. 1–Mar. 31	59	1 caribou	North of the Yukon River	
1985–1989[b]	Closed	0		South of the Yukon River	
	Feb. 1–Mar. 31	59	1 caribou	Remainder of GMU 18	

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Table A-3.–Page 2 of 3.

Regulatory year	Seasons	Total days	Bag limit	Areas affected	Conditions
1989–1990	Closed	0		South of the Yukon River	
	Feb. 1–Mar. 31	59	1 caribou		
	Apr. 5–15	10			Emergency court-sanctioned hunt for residents of Kwethluk only; quota 50 caribou
1990–1992[c]	Closed	0		South of the Yukon River	
	Feb. 1–Mar. 31	59	1 caribou	Remainder of GMU 18	
1992–1993[d]	Feb. 1–Mar. 31	59	1 caribou	North of the Yukon River	
	Sept. 1–15	15	1 bull caribou by registration permit	South of the Kuskokwim River	Evidence of sex required
	Closed	0		Remainder of GMU 18	
1993–1995[d]	Feb. 1–Mar. 31	59	1 caribou	North of the Yukon River	
	Sept. 1–30	30	1 bull caribou by registration permit	South of the Kuskokwim River	Evidence of sex required
	Closed	0		Remainder of GMU 18	
1995–1997[e]	July 1–May 15	304	1 caribou per day	North of the Yukon River	
	May 16–June 30	45	1 bull caribou per day	North of the Yukon River	
	Sept. 1–30	30	2 caribou total, 1 bull by registration permit only	South of the Yukon River	
	TBA between Oct. 1 and Mar. 31 by EO	≤182	2 caribou total	South of the Yukon River	
1997–2002[e]	July 1–May 15	304	1 caribou per day	North of the Yukon River	
	May 16–June 30	45	1 bull caribou per day	North of the Yukon River	
	Season may be announced by EO	?	Up to 5 caribou	South of the Yukon River	

-continued-

Table A-3.–Page 3 of 3.

Regulatory year	Seasons	Total days	Bag limit	Areas affected	Conditions
2002–2004[f]	July 1–May 15	304	1 caribou per day	North of the Yukon River	
	May 16–June 30	45	1 bull caribou per day	North of the Yukon River	
	Aug. 1–Mar. 31	243	Up to 5 caribou	South of the Yukon River	
	Sept. 1–Oct. 1	31	Nonresidents: 1 bull caribou	South of the Yukon River	
2004–06[f]	Aug. 1–Apr. 15	258	5 caribou		Only 1 bull caribou may be taken Aug. 1–Nov. 30
	Sept. 1–30	30	Nonresidents: 1 bull caribou		
2006–07[f]	Aug. 1–Mar. 15	227	3 caribou		Only 1 caribou may be taken Aug. 1–Nov. 30
	Sept. 1–30	30	Nonresidents: 1 bull caribou		
2007–09[f]	Aug. 1–Mar. 15	227	2 caribou		No more than 1 bull may be taken, and only 1 caribou may be taken from Aug. 1– Jan. 31
	Sept. 1–15	15	Nonresidents: 1 caribou		
2009–13[f]	Aug. 1–Mar. 15	227	2 caribou		No more than 1 bull may be taken, and only 1 caribou may be taken from Aug. 1– Jan. 31
2013–2015[f]	Aug. 1–Mar. 15	227	2 caribou by registration permit		No more than 1 bull may be taken, and only 1 caribou may be taken from Aug. 1– Jan. 31

Source Alaska Department of Fish and Game, Division of Wildlife Conservation. Alaska hunting reguations. ADF&G, 1961–2013.

a. Required in GMU 18.

b. In 1985–1989, hunting seasons were divided into subsistence and general hunts.

c. In 1990, all Alaskan residents became eligible for subsistence hunts.

d. Under federal subsistence hunting regulations, federal public lands in Unit 18 north of the Yukon River are closed to all caribou hunting.

e. Bag limit may be increased to 5 per day by Emergency Order (EO).

f. Meat taken in GMU 18, south of the Yukon River, taken before Oct. 1 must remain on the bones of the front quarters, evidence of sex also required.

Table A-4.–Federal caribou subsistence hunting regulations, 1990–2005, Game Management Unit 18.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:
1990–1991	Closed	0		South of the Yukon River		N/A
	Feb. 1–Mar. 31	59	1 caribou	Remainder of GMU 18		Kwethluk
1991–1992	Feb. 1–Mar. 31	59	1 caribou	North of the Yukon River		Kwethluk
	Closed	0		Remainder of GMU 18		N/A
1992–1995						
	Dec. 15–Jan. 9	26	1 bull caribou by federal registration permit	South of the Yukon River	Annual state/federal bull quota of 130	For Kilbuck herd only: Tuluksak, Akiak, Akiachak, Kwethluk, Bethel, Oscarville, Napaskiak, Napakiak, Kasigluk, Atmautluak, Nunapitchuk, Tuntutuliak, Eek, Quinhagak, Goodnews Bay, Platinum, Togiak, and Twin Hills For caribou except Kilbuck herd: Kwethluk only
	Feb. 23–Mar. 15	22	1 bull caribou by federal registration permit	South of the Yukon River	Annual state/federal bull quota of 130	For Kilbuck herd only: Tuluksak, Akiak, Akiachak, Kwethluk, Bethel, Oscarville, Napaskiak, Napakiak, Kasigluk, Atmautluak, Nunapitchuk, Tuntutuliak, Eek, Quinhagak, Goodnews Bay, Platinum, Togiak, and Twin Hills For caribou except Kilbuck herd: Kwethluk only
	Closed	0	Remainder of GMU 18			N/A
1995–1997						
	Dec. 15–Jan. 9[b]	26	TBA number of caribou by federal registration permit	South of the Yukon River	Closed when total harvest reaches guidelines in Qauilnguut (Kilbuck) caribou herd cooperative management plan	For Kilbuck herd only: Tuluksak, Akiak, Akiachak, Kwethluk, Bethel, Oscarville, Napaskiak, Napakiak, Kasigluk, Atmautluak, Nunapitchuk, Tuntutuliak, Eek, Quinhagak, Goodnews Bay, Platinum, Togiak, and Twin Hills only For caribou except Kilbuck herd: Kwethluk only
	Aug. 1–Mar. 31	243	5 caribou per day by federal registration permit	North of the Yukon River		For caribou except Kilbuck herd: Alakanuk, Andreafsky, Chevak, Emmonak, Hooper Bay, Kotlik, Kwethluk, Marshall, Mountain Village, Pilot Station, Pitka's Point, Russian Mission, St. Mary's, St. Michael, Scammon Bay, Sheldon Point, and Stebbins
	Closed	0	Remainder of GMU 18	Remainder of GMU 18		N/A
1997–2000	TBA by the Yukon Delta NWR Manager between Aug. 25 and Mar. 31[b]	TBD	Up to 5 caribou	South of the Yukon River		For Kilbuck herd only: Tuluksak, Akiak, Akiachak, Kwethluk, Bethel, Oscarville, Napaskiak, Napakiak, Kasigluk, Atmautluak, Nunapitchuk, Tuntutuliak, Eek, Quinhagak, Goodnews Bay, Platinum, Togiak, and Twin Hills only For caribou except Kilbuck herd: Kwethluk only

-continued-

Table A-4.–Page 2 of 3.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:
1997–2000, continued	Aug. 1–Mar. 31	243	5 caribou per day	North of the Yukon River		For caribou other than Kilbuck herd: Alakanuk, Andreafsky, Chevak, Emmonak, Hooper Bay, Kotlik, Kwethluk, Marshall, Mountain Village, Pilot Station, Pitka's Point, Russian Mission, St. Mary's, St. Michael, Scammon Bay, Sheldon Point, and Stebbins
2000–2002	TBA by the Yukon Delta NWR Manager between Aug. 25 and Mar. 31[b]	TBD	Up to 5 caribou	South of the Yukon River		For caribou other than Kilbuck herd: Kwethluk, Akiachak, Akiak, Eek, Goodnews Bay, Mountain Village, Napaskiak, Platinum, Quinhagak, St. Marys, and Tuluksak For Kilbuck herd: Tuluksak, Akiak, Akiachak, Kwethluk, Bethel, Oscarville, Napaskiak, Napakiak, Kasigluk, Atmautluak, Nunapitchuk, Tuntutuliak, Eek, Quinhagak, Goodnews Bay, Platinum, Togiak, and Twin Hills
	Aug. 1–Mar. 31	243	5 caribou per day	North of the Yukon River		Alakanuk, Andreafsky, Chevak, Emmonak, Hooper Bay, Kotlik, Kwethluk, Marshall, Mountain Village, Nunam Iqua, Pilot Station, Pitka's Point, Russian Mission, St. Mary's, St. Michael, Scammon Bay, and Stebbins
2002–2003	Aug. 1–Mar. 31	243[c]	5 caribou	South of the Yukon River		Rural residents of GMU 18 and residents of St. Michael, Stebbins, Togiak, Twin Hills, Upper Kalskag, and Manokotak
	Aug. 1–Mar. 31	243	5 caribou per day	North of the Yukon River		Rural residents of GMU 18 and residents of St. Michael, Stebbins, Togiak, Twin Hills, Upper Kalskag, and Manokotak
2003–2004	Aug. 1–Mar. 31	243[d]	5 caribou	South of the Yukon River		Rural residents of GMU 18 and residents of St. Michael, Stebbins, Togiak, Twin Hills, Upper Kalskag, and Manokotak
	Aug. 1–Mar. 31	243	5 caribou per day	North of the Yukon River		Rural residents of GMU 18 and residents of St. Michael, Stebbins, Togiak, Twin Hills, Upper Kalskag, and Manokotak
2004–2007	Aug. 1–Apr. 15	258	5 caribou			Rural residents of GMU 18 and residents of St. Michael, Stebbins, Togiak, Twin Hills, Upper Kalskag, and Manokotak
2007–2010[e]	Aug. 1–Mar. 15	227	3 caribou		No more than 1 caribou may be taken from Aug. 1–Nov. 30	Rural residents of GMU 18 and residents of St. Michael, Stebbins, Togiak, Twin Hills, Upper Kalskag, and Manokotak
2010–2012	Aug. 1–Mar. 15	227	2 caribou		No more than 1 bull caribou may be taken; no more than 1 caribou may be taken Aug. 1–Jan. 31.	Rural residents of GMU 18 and residents of St. Michael, Stebbins, Togiak, Twin Hills, Upper Kalskag, and Manokotak
2012–2014	Aug. 1–Sept. 30	61	2 caribou	That portion to the east and south of the Kuskokwim River	No more than 1 bull caribou may be taken; no more than 1 caribou may be taken Aug. 1–Sept. 30 and Dec. 20–Jan. 31.	Rural residents of GMU 18 and residents of Manokotak, St. Michael, Stebbins, Togiak, Twin Hills, and Upper Kalskag

-continued-

Table A-4.–Page 3 of 3.

Regulatory year[a]	Seasons	Total days	Bag limit	Areas affected	Conditions	Eligible federally qualified residents of:
2012–2014, continued	Dec. 20–last day of February	71	2 caribou	That portion to the east and south of the Kuskokwim River	No more than 1 bull caribou may be taken; no more than 1 caribou may be taken Aug. 1–Sept. 30 and Dec. 20–Jan. 31.	Rural residents of GMU 18 and residents of Manokotak, St. Michael, Stebbins, Togiak, Twin Hills, and Upper Kalskag
	Aug. 1–Mar. 15	227	2 caribou	Remainder of GMU 18	No more than 1 caribou may be a bull and no more than 1 caribou may be taken Aug. 1–Jan. 31.	Rural residents of GMU 18 and residents of Manokotak, St. Michael, Stebbins, Togiak, Twin Hills, and Upper Kalskag
2014–2016	Aug. 1–Mar. 15	227	2 caribou by state registration permit			Rural residents of GMU 18 and residents of Manokotak, St. Michael, Stebbins, Togiak, Twin Hills, and Upper Kalskag

Source U.S. Fish and Wildlife Service Office of Subsistence Management. Subsistence management regulations for the harvest of fish and wildlife on federal public lands in Alaska. Anchorage: USFWS, 1990–2014.

a. The Federal Subsistence Board first promulgated federal subsistence hunting regulations in 1990.

b. The season will be closed when the total harvest reaches guidelines described in the approved Qavilnguut (Kilbuck) Caribou Herd Cooperative Management Plan.

c. Edible meat must remain on the bones of the front and hind quarters until the meat is removed from the field.

d. Edible meat of the front quarters and hind quarters from a harvested caribou may be processed and consumed in the field; however, meat may not be removed from the bones of the front quarters for purposes of transport out of the field.

e. The Federal Subsistence Board shifted from annual regulations to biennial regulations beginning in 2008, such that federal subsistence regulations began to cover a period of 2 years (e.g., July 1, 2008–June 30, 2010).

APPENDIX B–SURVEY INSTRUMENT

COMPREHENSIVE SUBSISTENCE SURVEY

BETHEL HUBS

BETHEL, ALASKA

From January 1, 2012 to December 31, 2012

PRINTED 2013-02-25

FINAL Bethel Hubs Survey 25 FEB 2013 DR.xlsx

The Division of Subsistence is conducting a household survey to estimate subsistence harvests in Bethel and to describe the community's subsistence economy.

Information from this survey will help Fish and Game and other agencies understand the importance of subsistence for people in Bethel. This can help protect fish and wildlife resources, document harvest areas, and ensure future harvest opportunities. We will publish a report of our study and send a summary to all households in Bethel.

Participation in the survey is voluntary. Even if you agree to be surveyed, you may refuse to answer any questions or stop at any time. All information you provide will remain confidential. We will NOT identify your household. We will NOT use this information for enforcement.

HOUSEHOLD ID:		
STRATUM ID:	1	1
COMMUNITY ID:	BETHEL	59
INTERVIEWER:		
INTERVIEW DATE:		
START TIME:		
STOP TIME:		
DATA CODED BY:		
DATA ENTERED BY:		
SUPERVISOR:		

COOPERATING ORGANIZATIONS

ORUTSARARMIUT NATIVE COUNCIL
P.O BOX 927
BETHEL, AK 99559

907-543-2608

ALASKA DEPTARTMENT OF FISH & GAME
DIVISION OF SUBSISTENCE
1300 COLLEGE RD
FAIRBANKS, AK 99701

907-459-7320

HOUSEHOLD MEMBERS

HOUSEHOLD ID

First, I will ask about the people living in your household. Please give information only about permanent members of your household, including college or high school students who return home every summer, or anyone else who stayed with you for at least three months during 2012. We will begin with the head of the household.

Last year, that is, between January 1, 2012 and December 31, 2012, WHO were the members of this 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 an ALASKA NATIVE?	How OLD is this person?	Where is this person's birth home?	TOTAL years lived here?
ID#	*circle*	*relation*	*circle*	*circle*	*age*	*community in AK, OR state in US, OR country*	*years*
HEAD	Y N		M F	Y N			
1							
NEXT enter spouse or partner. If household has a SINGLE HEAD, leave HEAD 2 row BLANK, and move to PERSON 3.							
HEAD	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 3			M F	Y N			
3	0						
PERSON 4			M F	Y N			
4	0						
PERSON 5			M F	Y N			
5	0						
PERSON 6			M F	Y N			
6	0						
PERSON 7			M F	Y N			
7	0						
PERSON 8			M F	Y N			
8	0						
PERSON 9			M F	Y N			
9	0						
PERSON 10			M F	Y N			
10	0						
PERSON 11			M F	Y N			
11	0						
PERSON 12			M F	Y N			
12	0						
PERSON 13			M F	Y N			
13	0						
PERSON 14			M F	Y N			
14	0						

** "BIRTH HOME" means the place this person's PARENTS WERE LIVING when this person was born.*

PERMANENT HH MEMBERS: 01 **BETHEL: 59**

RETAINED COMMERCIAL HARVESTS

HOUSEHOLD ID

1. Do you or members of your household USUALLY participate in commercial fisheries?..... Y N

2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household PARTICIPATE in a commercial fishery?..... Y N

IF the answer to QUESTION 2 is NO, go to the subsistence harvests section.

IF the answer 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* COM 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 to give to OTHERS? *number*	Units[3] *specify*	*comments*
CHINOOK SALMON *KING SALMON*	Y N	Y N	Y N				IND	
113,000,001								
SOCKEYE SALMON *RED SALMON*	Y N	Y N	Y N				IND	
115,000,001								
COHO SALMON *SILVER SALMON*	Y N	Y N	Y N				IND	
112,000,001								
CHUM SALMON *DOG SALMON*	Y N	Y N	Y N				IND	
111,000,001								
PINK SALMON *HUMPIES*	Y N	Y N	Y N				IND	
114,000,001								
HERRING	Y N	Y N	Y N				GAL	
120,200,001								
HALIBUT	Y N	Y N	Y N				LBS	
121,800,001								
CLAMS	Y N	Y N	Y N				GAL	
500,600,001								
CRABS	Y N	Y N	Y N				IND	
501,000,001								
	Y N	Y N	Y N					

RETAINED COMMERCIAL HARVESTS continued on next page…

1 *"LAST YEAR" means between JANUARY 1, 2012, and DECEMBER 31, 2012.*
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 fisher*
5 *Double counting (captains' removals for crew members and crew members' removal for own uses) is fixed in analysis. Collect both.*

RETAINED COMMERCIAL HARVESTS

HOUSEHOLD ID

Fish on this page are fished for commercial and subsistence purposes at the same time, and subsistence permits are not required.

...RETAINED COMMERCIAL HARVESTS continued from previous 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 catch?

If KEEP is "yes"

Read names below in blanks above	*A COM FISH?*	*B KEEP?*	*C INCI?*	*Report retained harvest on SUBSISTENCE HARVEST pages.* *comments*
SHEEFISH	Y N	Y N	Y N	
125,600,001				
BROAD WHITEFISH *AKAKIIK or QAURTUQ*	Y N	Y N	Y N	
126,404,001				
HUMPBPACK WHITEFISH *CINGIKEGGLIQ*	Y N	Y N	Y N	
126,408,001				
LEAST CISCO *IITULIQ*	Y N	Y N	Y N	
126,406,061				
BERING CISCO *IMARPINRAQ*	Y N	Y N	Y N	
126,406,041				
	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 fish COMMERCIALLY for any other kind of 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, 2012, and DECEMBER 31, 2012.*
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 fisher*

SUBSISTENCE HARVESTS: SALMON

HOUSEHOLD ID ____

1. Do you or members of your household USUALLY fish for salmon for subsistence?..... Y N

2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO FISH FOR salmon?..... Y N

IF the answer to QUESTION 2 is NO, go to the SALMON summary page.

IF the answer 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, community, or test fishery?
- 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 for subsistence uses during 2012. How many were...

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.

Read names below in blanks above	A USE?	B REC?	C GIVE?	D TRY?	E HAR?	Caught with a SET NET	Caught with a DRIFT NET	Caught with a Rod & Reel	Caught with OTHER GEAR *(specify type)*	Units[4]	How many of those were given to households outside of Bethel	How many of THOSE were used just for dog food?
						Amount harvested			*amount / type*	*specify*	Amount Given	*dogfood*
CHINOOK SALMON *KING SALMON*	Y N	Y N	Y N	Y N	Y N				/	IND		
113,000,000												
SOCKEYE SALMON *RED SALMON*	Y N	Y N	Y N	Y N	Y N				/	IND		
115,000,000												
CHUM SALMON *DOG SALMON*	Y N	Y N	Y N	Y N	Y N				/	IND		
111,000,000												
COHO SALMON *SILVER SALMON*	Y N	Y N	Y N	Y N	Y N				/	IND		
112,000,000												
PINK SALMON *HUMPIES*	Y N	Y N	Y N	Y N	Y N				/	IND		
114,000,000												
SALMON - UNKNOWN	Y N	Y N	Y N	Y N	Y N				/	IND		
119,000,000												
	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 salmon?..... 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *"ROD AND REEL" includes fish caught in open water with a hook and and a line attached to a rod or a pole. Jigging through the ice is "other ge*
4 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

NON-COMMERCIAL SALMON: 04 **BETHEL: 59**

SUBSISTENCE SUMMARY: CHINOOK SALMON

HOUSEHOLD ID

If this household did NOT USE or HARVEST chinook salmon last year, go to the ASSESSMENT section below.
Otherwise, continue with mapping, network, and assessment sections...

MAPPING ***Refer to data collection maps and mapping instructions to map ALL SALMON...***

NETWORKS ***…then ask the network and assessment questions below***

In 2012, how many households and from which communities…. 113,000,000

Caught the KING SALMON you used		Processed the KING SALMON you used		Gave you the KING SALMON you used		Did you give KING SALMON to?	
Community	*# Households*	*Community*	*# Households*	*Community*	*# Households*	*Community*	*# Households*

For ALL SALMON except KING SALMON, in 2012, how many households and from which communities…. 110,000,000

Caught the SALMON you used		Processed the SALMON you used		Gave you the SALMON you used		Did you give SALMON to?	
Community	*# Households*	*Community*	*# Households*	*Community*	*# Households*	*Community*	*# Households*

ASSESSMENTS: CHINOOK SALMON 113,000,000

To conclude this 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 king salmon than in recent years?..... X L S M
X = do not use

… If your households use was LESS or MORE, why was it different?
If LESS or MORE…
WHY was your use different?..... _____ 1
_____ 2

During the last year[1],
…did your household GET ENOUGH king salmon?..... Y N
…how many king salmon did you need to GET ENOUGH?..... _____

ASSESSMENTS: 113,000,000

During the last year[1],
…other than KING SALMON, did your household use LESS, SAME, or MORE salmon than in recent years?..... X L S M
X = do not use

… If your households use was LESS or MORE, why was it different?
If LESS or MORE…
WHY was your use different?..... _____ 1
_____ 2

During the last year[1],
…did your household GET ENOUGH salmon other than KING SALMON?..... Y N
…how many salmon other than KING SALMON did you need to GET ENOUGH?..... _____

NETWORKS & ASSESSMENTS OF CHINOOK SALMON: 66, 67 **BETHEL: 59**

SUBSISTENCE HARVESTS: WHITEFISH

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY fish for whitefish and sheefish for subsistence?..... Y N

2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012),
   did you or members of your household USE or TRY TO FISH FOR whitefish and sheefish?..... Y N

IF the answer to QUESTION 2 is NO, go to the next harvest page.

IF the answer 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 whitefish ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year. How many

INCLUDE whitefish that members of this household gave away, ate fresh, , including with rod and reellost to spoilage, or got by helping others. If fishing 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?	Caught with a SET NET	Caught with a DRIFT NET	Caught with a JIG	Caught with a FISH TRAP	Caught with a ROD & REEL[3]	Caught with OTHER GEAR *(specify type)*	Units[4]	How many of THOSE were used for dog food?
						number harvested by each gear type					*amount / type*	*specify*	*dogfood*
SHEEFISH	Y N	Y N	Y N	Y N	Y N						/	IND	
125,600,000													
HUMPBACK WHITEFISH *CINGIKEGGLIQ*	Y N	Y N	Y N	Y N	Y N						/	IND	
126,408,000													
BROAD WHITEFISH *AKAKIIK or QAURTUQ*	Y N	Y N	Y N	Y N	Y N						/	IND	
126,404,000													
ROUND WHITEFISH *CEV'EQ*	Y N	Y N	Y N	Y N	Y N						/	IND	
126,412,000													
BERING CISCO *IMARPINRAQ*	Y N	Y N	Y N	Y N	Y N						/	IND	
126,406,040													
LEAST CISCO *IITULIQ*	Y N	Y N	Y N	Y N	Y N						/	IND	
126,406,060													
UNKNOWN WHITEFISH	Y N	Y N	Y N	Y N	Y N						/	IND	
126,499,000													
	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 whitefish?..... 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *"ROD AND REEL" includes fish caught in open water with a hook and and a line attached to a rod or a pole. Jigging through the ice is "other ge*
4 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

NON-SALMON FINFISH: 06 **BETHEL: 59**

HARVESTS: OTHER FISH

HOUSEHOLD ID

1. Do you or members of your household USUALLY fish for other fish for subsistence, such as PIKE, BLACKFISH, or any other fish?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO FISH FOR other fish?..... Y N

IF the answer to QUESTION 2 is NO, go to the next harvest page.

IF the answer 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 other fish ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year. How many

INCLUDE other fish 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.

Read names below in blanks above	A USE?	B REC?	C GIVE?	D TRY?	E HAR?	Caught with a SET NET	Caught with a DRIFT NET	Caught with a JIG	Caught with a FISH TRAP	Caught with a ROD & REEL[3]	Caught with OTHER GEAR *(specify type)*	Units[4]	How many of THOSE were used for dog food?
						number harvested by each gear type					*amount / type*	*specify*	*dogfood*
BURBOT *LOCHE*	Y N	Y N	Y N	Y N	Y N						/	IND	
124,800,000													
NORTHERN PIKE	Y N	Y N	Y N	Y N	Y N						/	IND	
125,500,000													
SMELT	Y N	Y N	Y N	Y N	Y N						/	GAL	
120,400,000													
BLACKFISH	Y N	Y N	Y N	Y N	Y N						/	IND	
124,600,000													
GRAYLING	Y N	Y N	Y N	Y N	Y N						/	IND	
125,200,000													
DOLLY VARDEN	Y N	Y N	Y N	Y N	Y N						/	IND	
125,006,000													
RAINBOW TROUT	Y N	Y N	Y N	Y N	Y N						/	IND	
126,204,000													
LAKE TROUT	Y N	Y N	Y N	Y N	Y N						/	IND	
125,010,000													
STICKLEBACKS *NEEDLEFISH*	Y N	Y N	Y N	Y N	Y N						/	GAL	
123,800,000													
LAMPREY *EEL*	Y N	Y N	Y N	Y N	Y N						/	IND	
122,000,000													

1 *"LAST YEAR" means between JANUARY 1, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *"ROD AND REEL" includes fish caught in open water with a hook and and a line attached to a rod or a pole. Jigging through the ice is "other ge*
4 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

NON-SALMON FINFISH: 06 **BETHEL: 59**

HARVESTS: OTHER FISH

HOUSEHOLD ID

OTHER FISH 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?
- E …try[2] to harvest _____?
- E ...actually harvest any _____?

IF harvest is YES

Please estimate how many other fish ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year. How many

INCLUDE other fish 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.

Read names below in blanks above	A USE?	B REC?	C GIVE?	D TRY?	E HAR?	Caught with a SET NET	Caught with a DRIFT NET	Caught with a JIG	Caught with a FISH TRAP	Caught with a ROD & REEL[3]	Caught with OTHER GEAR *(specify type)*	Units[4]	How many of THOSE were used for dog food?
						number harvested by each gear type					*amount / type*	*specify*	*dogfood*
SAFFRON COD *TOMCOD*	Y N	Y N	Y N	Y N	Y N						/	IND	
120,200,000													
HALIBUT	Y N	Y N	Y N	Y N	Y N						/	LBS	
121,800,000													
HERRING	Y N	Y N	Y N	Y N	Y N						/	IND	
120,200,000													
HERRING ROE *HERRING EGGS*	Y N	Y N	Y N	Y N	Y N						/	GAL	
120,300,000													
LONGNOSE SUCKER *SUCKER*	Y N	Y N	Y N	Y N	Y N						/	IND	
126,000,000													
	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						/		
	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 other 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *"ROD AND REEL" includes fish caught in open water with a hook and and a line attached to a rod or a pole. Jigging through the ice is "other ge*
4 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc.*

NON-SALMON FINFISH: 06 **BETHEL: 59**

SUBSISTENCE SUMMARY: FISH OTHER THAN SALMON

HOUSEHOLD ID

If this household did NOT USE or HARVEST fish other than salmon last year, go to the ASSESSMENT section below.
Otherwise, continue with mapping, network, and assessment sections...

MAPPING ***Refer to data collection maps and mapping instructions to map fish other than salmon...***

NETWORKS ***…then ask the network and assessment questions below***

In 2012, how many households and from which communities…. 126,400,000

Caught the WHITEFISH and SHEEFISH you used		Processed the WHITEFISH and SHEEFISH you used		Gave you the WHITEFISH and SHEEFISH you used		Did you give WHITEFISH and SHEEFISH to?	
Community	*# Households*	*Community*	*# Households*	*Community*	*# Households*	*Community*	*# Households*

During last year, how many households and which communities…. 120,000,000

Caught the OTHER FISH you used		Processed the OTHER FISH you used		Gave you the OTHER FISH you used		Did you give OTHER FISH to?	
Community	*# Households*	*Community*	*# Households*	*Community*	*# Households*	*Community*	*# Households*

ASSESSMENTS: WHITEFISH 126,400,000

To conclude this section, I am going to ask a few general questions.

During the last year[1],
…did your household use LESS, SAME, or MORE whitefish and sheefish than in recent years?..... X L S M
X = do not use

… If your households use was LESS or MORE, why was it different?
If LESS or MORE…
WHY was your use different?..... _____ 1
_____ 2

During the last year[1],
…did your household GET ENOUGH whitefish and sheefish?..... Y N

ASSESSMENTS: FISH OTHER THAN SALMON 100,000,002

During the last year[1],
…did your household use LESS, SAME, or MORE fish other than salmon than in recent years?..... X L S M
X = do not use

… If your households use was LESS or MORE, why was it different?
If LESS or MORE…
WHY was your use different?..... _____ 1
_____ 2

During the last year[1],
…did your household GET ENOUGH fish other than salmon?..... Y N

NETWORKS & ASSESSMENTS OF FISH OTHER THAN SALMON: 66, 67 **BETHEL: 59**

SUBSISTENCE HARVESTS: MARINE INVERTEBRATES

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY get shellfish for subsistence, such as KING CRAB, CLAMS, or any other shellfish?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO GET shellfish?..... Y N

IF the answer to QUESTION 2 is NO, go to the MARINE INVERTEBRATES summary page.

IF the answer 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 for subsistence uses during the last year.

INCLUDE marine invertebrates that members of this household gave away, ate fresh, lost to spoilage, or got by helping others. If harvest 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?	How many did your HH get? *amount*	Units[3] *specify*	*comments*
KING CRAB	Y N	Y N	Y N	Y N	Y N		IND	
501,008,000								
TANNER CRAB	Y N	Y N	Y N	Y N	Y N		IND	
501,012,000								
MUSSELS	Y N	Y N	Y N	Y N	Y N		GAL	
502,099,000								
CLAMS	Y N	Y N	Y N	Y N	Y N		GAL	
500,600,000								
SHRIMP	Y N	Y N	Y N	Y N	Y N		LBS	
503,400,000								
OTHER SHELLFISH	Y N	Y N	Y N	Y N	Y N		GAL	
509,900,000								
	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		GAL	

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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
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 INVERTEBRATES: 08 **BETHEL: 59**

SUBSISTENCE SUMMARY: MARINE INVERTEBRATES

HOUSEHOLD ID

If this household did NOT USE or HARVEST marine invertebrates last year, go to the ASSESSMENT section below.
Otherwise, continue with mapping, network, and assessment sections...

MAPPING ***Refer to data collection maps and mapping instructions to map marine invertebrates...***

ASSESSMENTS: MARINE INVERTEBRATES 500,000,000

To conclude our shellfish section, I am going to ask a few general questions.

During the last year[1],

…did your household use LESS, SAME, or MORE shellfish than in recent years?..... X L S M

X = do not use

… If your households use was LESS or MORE, why was it different?

If LESS or MORE…

WHY was your use different?..... _____ 1

_____ 2

During the last year[1],

…did your household GET ENOUGH shellfish?..... Y N

NETWORKS & ASSESSMENTS OF MARINE INVERTEBRATES: 66, 67 **BETHEL: 59**

SUBSISTENCE HARVESTS: LARGE LAND ANIMALS

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY hunt large land animals for subsistence, such as MOOSE, CARIBOU, or any other large land animals?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO HUNT large land animals?..... Y N

IF the answer to QUESTION 2 is NO, go to the next harvest page.

IF the answer 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 animals ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.

INCLUDE large land animals 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]
							number killed in each month													specify
MOOSE	Y N	Y N	Y N	Y N	Y N	BULL														IND
						COW														IND
211,800,000						UNKNOWN														IND
211,800,001																				
211,800,002																				
211,800,009																				
CARIBOU	Y N	Y N	Y N	Y N	Y N	BULL														IND
						COW														IND
211,000,000						UNKNOWN														IND
211,000,001																				
211,000,002																				
211,000,009																				
BLACK BEAR	Y N	Y N	Y N	Y N	Y N															IND
210,600,000																				
BROWN BEAR	Y N	Y N	Y N	Y N	Y N															IND
210,800,000																				
SHEEP	Y N	Y N	Y N	Y N	Y N															IND
212,200,000																				
BISON	Y N	Y N	Y N	Y N	Y N															IND
210,400,000																				
MUSKOX	Y N	Y N	Y N	Y N	Y N															IND
212,000,000																				
	Y N	Y N	Y N	Y N	Y N															IND

During the last year, did your household use any other kind of large land animals?..... 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc*

LAND MAMMALS: 10 **BETHEL: 59**

SUBSISTENCE HARVESTS: SMALL LAND ANIMALS

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY hunt small land animals for subsistence, such as BEAVER, MUSKRAT, or any other small land animals?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO HUNT small land animals?..... Y N

IF the answer to QUESTION 2 is NO, go to the next harvest page.

IF the answer 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 animals ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.

INCLUDE small land animals 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?	January	February	March	April	May	June	July	August	September	October	November	December	Unknown	Units[3]	Number Used For Food or for Food & Fur
						number killed in each month													specify	
BEAVER	Y N	Y N	Y N	Y N	Y N														IND	
220,200,000																				
MUSKRAT	Y N	Y N	Y N	Y N	Y N														IND	
222,400,000																				
SNOWSHOE HARE	Y N	Y N	Y N	Y N	Y N														IND	
221,004,000																				
ALASKA HARE *JACKRABBIT*	Y N	Y N	Y N	Y N	Y N														IND	
221,002,000																				
PORCUPINE	Y N	Y N	Y N	Y N	Y N														IND	
222,600,000																				
PARKA SQUIRREL *GROUND SQUIRREL*	Y N	Y N	Y N	Y N	Y N														IND	
222,802,000																				
MARMOT	Y N	Y N	Y N	Y N	Y N														IND	
221,800,000																				
	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 small land animals?..... 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc*

LAND MAMMALS: 10 **BETHEL: 59**

SUBSISTENCE HARVESTS: FUR ANIMALS

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY hunt or trap for fur animals for subsistence, such as RED FOX, MINK, or any other fur animals?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO HUNT OR TRAP FOR fur animals?..... Y N

IF the answer to QUESTION 2 is NO, go to the LAND ANIMALS summary page.

IF the answer 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 fur animals ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.

INCLUDE fur animals 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	Units[3]	Number Used For Food or for Food & Fur
						number caught in each month													specify	
RED FOX	Y N	Y N	Y N	Y N	Y N														IND	
220,804,000																				
MINK	Y N	Y N	Y N	Y N	Y N														IND	
222,200,000																				
RIVER OTTER	Y N	Y N	Y N	Y N	Y N														IND	
221,200,000																				
LYNX	Y N	Y N	Y N	Y N	Y N														IND	
221,600,000																				
MARTEN	Y N	Y N	Y N	Y N	Y N														IND	
222,000,000																				
WOLF	Y N	Y N	Y N	Y N	Y N														IND	
223,200,000																				
WOLVERINE	Y N	Y N	Y N	Y N	Y N														IND	
223,400,000																				
WEASEL	Y N	Y N	Y N	Y N	Y N														IND	
223,000,000																				
ARCTIC FOX	Y N	Y N	Y N	Y N	Y N														IND	
220,802,000																				
COYOTE	Y N	Y N	Y N	Y N	Y N														IND	
220,400,000																				

During the last year, did your household use any other kind of fur animals?..... 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc*

FURBEARERS: 14 **BETHEL: 59**

SUBSISTENCE SUMMARY: LAND ANIMALS

HOUSEHOLD ID

If this household did NOT USE or HARVEST land animals last year, go to the ASSESSMENT section below.
Otherwise, continue with mapping, network, and assessment sections...

MAPPING ***Refer to data collection maps and mapping instructions to map land animals...***

ASSESSMENTS: LAND ANIMALS 200,000,000

To conclude this section, I am going to ask a few general questions about all land animals including big game, small game, and furbearers.

During the last year[1],

…did your household use LESS, SAME, or MORE land animals than in recent years?..... X L S M

X = do not use

… If your households use was LESS or MORE, why was it different?

If LESS or MORE…

WHY was your use different?..... _____ 1

_____ 2

During the last year[1],

…did your household GET ENOUGH land animals?..... Y N

NETWORKS & ASSESSMENTS OF LAND ANIMALS: 66, 67 **BETHEL: 59**

SUBSISTENCE HARVESTS: MARINE MAMMALS

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY hunt marine mammals for subsistence?..... Y N

2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012),
   did you or members of your household USE or TRY TO HUNT marine mammals?..... Y N

IF the answer to QUESTION 2 is NO, go to the MARINE MAMMALS summary page.

IF the answer 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 killed for subsistence uses 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?	January	February	March	April	May	June	July	August	September	October	November	December	Unknown	Units[3] specify	comments
						number killed in each month														
BEARDED SEAL *MAKLAK*	Y N	Y N	Y N	Y N	Y N														IND	
300,802,000																				
RINGED SEAL *NAYIQ*	Y N	Y N	Y N	Y N	Y N														IND	
300,810,000																				
SPOTTED SEAL *ISSURIQ*	Y N	Y N	Y N	Y N	Y N														IND	
300,812,000																				
SEAL OIL *UQUQ*	Y N	Y N	Y N	Y N	Y N															
300,899,000																				
BELUGA WHALE	Y N	Y N	Y N	Y N	Y N														IND	
301,602,000																				
BOWHEAD WHALE *BLACK MANGTAK*	Y N	Y N	Y N	Y N	Y N														IND	
301,606,000																				
WALRUS	Y N	Y N	Y N	Y N	Y N														IND	
301,400,000																				
	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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
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 **BETHEL: 59**

SUBSISTENCE SUMMARY: MARINE MAMMALS

HOUSEHOLD ID

If this household did NOT USE or HARVEST marine mammals last year, go to the ASSESSMENT section below.
Otherwise, continue with mapping, network, and assessment sections...

MAPPING ***Refer to data collection maps and mapping instructions to map marine mammals...***

ASSESSMENTS: MARINE MAMMALS 300,000,000

To conclude this 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 your households use was LESS or MORE, why was it different?
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

NETWORKS & ASSESSMENTS OF MARINE MAMMALS: 66, 67 **BETHEL: 59**

HARVESTS: DUCKS

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY hunt ducks for subsistence, such as AMERICAN WIGEON, BLACK SCOTER, or any other ducks?..... Y N
2. During the last year (between JANUARY 1, 2009, AND DECEMBER 31, 2009), did you or members of your household USE or TRY TO HUNT ducks?..... Y N

IF the answer to QUESTION 2 is NO, go to the next harvest page.

IF the answer 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 ducks ALL MEMBERS OF YOUR HOUSEHOLD killed for subsistence uses during the last year.

INCLUDE ducks that members of this household gave away, ate fresh, 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?	January February March November December WINTER	April May June SPRING	July August SUMMER	September October FALL	Season of harvest unknown	Units[3]
						number killed in each season				*number*	*specify*
AMERICAN WIGEON	Y N	Y N	Y N	Y N	Y N						IND
410,236,020											
GREEN WINGED TEAL	Y N	Y N	Y N	Y N	Y N						IND
410,232,060											
MALLARD	Y N	Y N	Y N	Y N	Y N						IND
410,214,000											
NORTHERN PINTAIL	Y N	Y N	Y N	Y N	Y N						IND
410,220,000											
LONG-TAILED DUCK *OLDSQUAW or AARRANGIQ*	Y N	Y N	Y N	Y N	Y N						IND
410,218,000											
NORTHERN SHOVELER	Y N	Y N	Y N	Y N	Y N						IND
410,230,000											
BLACK SCOTER *KUKUMYARAK*	Y N	Y N	Y N	Y N	Y N						IND
410,228,020											
SURF SCOTER	Y N	Y N	Y N	Y N	Y N						IND
410,228,040											
WHITE-WINGED SCOTER *AKACAKAYAK*	Y N	Y N	Y N	Y N	Y N						IND
410,228,060											
SCAUP *BLUEBILL*	Y N	Y N	Y N	Y N	Y N						IND
410,226,000											

DUCKS continued on next page…

1 *"LAST YEAR" means between JANUARY 1, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
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: DUCKS

HOUSEHOLD ID

DUCKS 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?
- E …try[2] to harvest _____?
- E ...actually harvest any _____?

IF harvest is YES

Please estimate how many ducks ALL MEMBERS OF YOUR HOUSEHOLD killed for subsistence uses during the last year.

INCLUDE ducks that members of this household gave away, ate fresh, 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?	January February March November December WINTER	April May June SPRING	July August SUMMER	September October FALL	Season of harvest unknown	Units[3]
						number killed in each season				number	specify
GOLDENEYE	Y N	Y N	Y N	Y N	Y N						IND
410,210,000											
CANVASBACK	Y N	Y N	Y N	Y N	Y N						IND
410,204,000											
MERGANSER *(unknown/any species)*	Y N	Y N	Y N	Y N	Y N						IND
410,216,000											
BUFFLEHEAD	Y N	Y N	Y N	Y N	Y N						IND
410,202,000											
HARLEQUIN	Y N	Y N	Y N	Y N	Y N						IND
410,212,000											
COMMON EIDER *METRAQ*	Y N	Y N	Y N	Y N	Y N						IND
410,206,020											
SPECTACLED EIDER	Y N	Y N	Y N	Y N	Y N						IND
410,206,060											
UNKNOWN DUCKS	Y N	Y N	Y N	Y N	Y N						IND
410,299,000											
	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 ducks?..... Y N

IF YES, enter the name in a blank row above, and answer the questions in that row.

* *"LAST YEAR" means between JANUARY 1, 2012, and DECEMBER 31, 2012.*

** *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*

*** *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc*

BIRDS AND EGGS: 15 **BETHEL: 59**

SUBSISTENCE HARVESTS: GEESE

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY hunt geese for subsistence, such as CANADA GEESE, BRANT, or any other geese?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO HUNT geese?..... Y N

IF the answer to QUESTION 2 is NO, go to the next harvest page.

IF the answer 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 geese ALL MEMBERS OF YOUR HOUSEHOLD killed for subsistence uses during the last year.

INCLUDE geese that members of this household gave away, ate fresh, 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?	January February March November December WINTER	April May June SPRING	July August SUMMER	September October FALL	Season of harvest unknown	Units[3]
						number killed in each season				*number*	*specify*
CANADA GEESE *LAGIQ LAKCAQ TUUTANGAYAK*	Y N	Y N	Y N	Y N	Y N						IND
410,404,000											
WHITE-FRONTED GEESE *LAGILUGPIAQ or NEQLEQ*	Y N	Y N	Y N	Y N	Y N						IND
410,410,000											
BRANT *NEQLERNAQ*	Y N	Y N	Y N	Y N	Y N						IND
410,402,000											
EMPEROR GEESE *NACAULLEK*	Y N	Y N	Y N	Y N	Y N						IND
410,406,000											
SNOW GEESE *KANGUQ*	Y N	Y N	Y N	Y N	Y N						IND
410,408,000											
UNKNOWN GEESE	Y N	Y N	Y N	Y N	Y N						IND
410,499,000											
	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 geese?..... 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc*

SUBSISTENCE HARVESTS: OTHER BIRDS

HOUSEHOLD ID ____

1. Do you or members of your household USUALLY hunt other birds for subsistence, such as SWAN, CRANE, or any other birds?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO HUNT other birds?..... Y N

IF the answer to QUESTION 2 is NO, go to the next harvest page.

IF the answer 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 other birds ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.

INCLUDE other birds that members of this household gave away, ate fresh, 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?	January February March November December WINTER	April May June SPRING	July August SUMMER	September October FALL	Season of harvest unknown	Units[3]
						number got in each season				*number*	*specify*
SWAN	Y N	Y N	Y N	Y N	Y N						IND
410,600,000											
SANDHILL CRANE	Y N	Y N	Y N	Y N	Y N						IND
410,802,000											
GROUSE *(any species)*	Y N	Y N	Y N	Y N	Y N						IND
421,802,000											
PTARMIGAN	Y N	Y N	Y N	Y N	Y N						IND
421,804,000											
UNKNOWN SEABIRDS	Y N	Y N	Y N	Y N	Y N						IND
411,299,000											
SHOREBIRDS	Y N	Y N	Y N	Y N	Y N						IND
411,000,000											
WHIMBREL	Y N	Y N	Y N	Y N	Y N						IND
411,009,040											
LOONS	Y N	Y N	Y N	Y N	Y N						IND
411,216,000											
	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 other 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
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 AND EGGS: 15 **BETHEL: 59**

SUBSISTENCE HARVESTS: EGGS

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY gather eggs for subsistence, such as DUCK EGGS, GEESE EGGS, or any other eggs?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO GATHER eggs?..... Y N

IF the answer to QUESTION 2 is NO, go to the BIRD & EGG summary page.

IF the answer 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 eggs ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.

INCLUDE eggs that members of this household gave away, ate fresh, 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?	How many did you gather? *amount*	Units[3] *specify*	*comments*
DUCK EGGS	Y N	Y N	Y N	Y N	Y N			
430,200,000								
GEESE EGGS	Y N	Y N	Y N	Y N	Y N			
430,400,000								
TERN EGGS	Y N	Y N	Y N	Y N	Y N			
431,226,000								
GULL EGGS	Y N	Y N	Y N	Y N	Y N			
431,212,000								
SHOREBIRD EGGS	Y N	Y N	Y N	Y N	Y N			
431,000,000								
SWAN EGGS	Y N	Y N	Y N	Y N	Y N			
430,600,000								
UNKNOWN EGGS	Y N	Y N	Y N	Y N	Y N			
439,900,000								
	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 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc*

SUBSISTENCE SUMMARY: BIRDS & EGGS

HOUSEHOLD ID

If this household did NOT USE or HARVEST birds & eggs last year, go to the ASSESSMENT section below.
Otherwise, continue with mapping, network, and assessment sections...

MAPPING ***Refer to data collection maps and mapping instructions to map birds & eggs...***

ASSESSMENTS: BIRDS & EGGS 400,000,000

To conclude this section, I am going to ask a few general questions about birds & eggs.

During the last year[1],
…did your household use LESS, SAME, or MORE birds & eggs than in recent years?..... X L S M
X = do not use

… If your households use was LESS or MORE, why was it different?
If LESS or MORE…
WHY was your use different?..... _____ 1
_____ 2

During the last year[1],
…did your household GET ENOUGH birds & eggs?..... Y N

NETWORKS & ASSESSMENTS OF BIRDS & EGGS: 66, 67 **BETHEL: 59**

SUBSISTENCE HARVESTS: BERRIES

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY pick berries for subsistence, such as BLUEBERRIES, SALMONBERRIES, or any other berries?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO PICK berries?..... Y N

IF the answer to QUESTION 2 is NO, go to the next harvest page.

IF the answer 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 berries ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.

INCLUDE berries that members of this household gave away, ate fresh, lost to spoilage, or got by helping others. If picking 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?	How many did you pick? *amount*	Units[3] *specify*	*comments*
BLUEBERRIES	Y N	Y N	Y N	Y N	Y N		GAL	
601,002,000								
SALMONBERRY *CLOUDBERRIES*	Y N	Y N	Y N	Y N	Y N		GAL	
601,022,000								
BLACKBERRIES *CROWBERRIES*	Y N	Y N	Y N	Y N	Y N		GAL	
601,007,000								
LOW-BUSH CRANBERRIES	Y N	Y N	Y N	Y N	Y N		GAL	
601,004,000								
HIGH-BUSH CRANBERRIES	Y N	Y N	Y N	Y N	Y N		GAL	
601,006,000								
RASPBERRY	Y N	Y N	Y N	Y N	Y N		GAL	
601,020,000								
NAGOONBERRY *PUYURAGAQ*	Y N	Y N	Y N	Y N	Y N		GAL	
601,018,000								
CURRANTS	Y N	Y N	Y N	Y N	Y N		GAL	
601,012,000								
	Y N	Y N	Y N	Y N	Y N		GAL	
	Y N	Y N	Y N	Y N	Y N		GAL	

During the last year, did your household use any other kind of berries?..... 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc*

PLANTS: 17 **BETHEL: 59**

SUBSISTENCE HARVESTS: GREENS

HOUSEHOLD ID _____

1. Do you or members of your household USUALLY pick greens for subsistence, such as LABRADOR TEA (AYUK), WILD RHUBARB (ANGUKAQ), or any other greens?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO PICK greens?..... Y N

IF the answer to QUESTION 2 is NO, go to the next harvest page.

IF the answer 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 greens ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.

INCLUDE greens that members of this household gave away, ate fresh, lost to spoilage, or got by helping others. If picking 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?	How many did you pick? *amount*	Units[3] *specify*	*comments*
LABRADOR TEA *AYUK*	Y N	Y N	Y N	Y N	Y N		GAL	
602,018,000								
STINKWEED *CAIGGLUK*	Y N	Y N	Y N	Y N	Y N		GAL	
602,044,000								
SOURDOCK *QUAGCIQ*	Y N	Y N	Y N	Y N	Y N		GAL	
602,028,000								
WILD RHUBARB *ANGUKAQ*	Y N	Y N	Y N	Y N	Y N		GAL	
602,006,000								
WILD CELERY *TARNAK*	Y N	Y N	Y N	Y N	Y N		GAL	
602,032,000								
FIREWEED	Y N	Y N	Y N	Y N	Y N		GAL	
602,042,000								
FIDDLEHEAD FERNS	Y N	Y N	Y N	Y N	Y N		GAL	
602,014,000								
WILLOW LEAVES	Y N	Y N	Y N	Y N	Y N		GAL	
602,031,000								
FIELD MINT	Y N	Y N	Y N	Y N	Y N		GAL	
602,022,000								
UNKNOWN GREENS	Y N	Y N	Y N	Y N	Y N		GAL	
602,048,000								

During the last year, did your household use any other kind of greens?..... 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc*

PLANTS: 17 **BETHEL: 59**

SUBSISTENCE HARVESTS: OTHER PLANTS

HOUSEHOLD ID

1. Do you or members of your household USUALLY get other plants for subsistence, such as PUNK, MOUSEFOOD, or any other plants?..... Y N
2. During the last year (between JANUARY 1, 2012, AND DECEMBER 31, 2012), did you or members of your household USE or TRY TO GET other plants?..... Y N

IF the answer to QUESTION 2 is NO, go to the next BERRIES & GREENS summary page.

IF the answer 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 other plants ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.

INCLUDE other plants that members of this household gave away, ate fresh, lost to spoilage, or got by helping others. If harvest 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?	How many did you get? *amount*	Units[3] *specify*	*comments*
PUNK	Y N	Y N	Y N	Y N	Y N		GAL	
602,046,010								
MOUSEFOOD *ANLLEK*	Y N	Y N	Y N	Y N	Y N		GAL	
602,060,000								
ESKIMO POTATO *MARALLAK*	Y N	Y N	Y N	Y N	Y N		GAL	
602,009,000								
ROSE HIPS	Y N	Y N	Y N	Y N	Y N		GAL	
602,036,000								
MUSHROOMS	Y N	Y N	Y N	Y N	Y N		GAL	
602,040,000								
PUFFBALLS	Y N	Y N	Y N	Y N	Y N		GAL	
602,046,020								
YARROW	Y N	Y N	Y N	Y N	Y N		GAL	
602,037,000								
SPRUCE TIPS	Y N	Y N	Y N	Y N	Y N		GAL	
602,030,000								
FIREWOOD	Y N	Y N	Y N	Y N	Y N			*If UNIT is sled or boat load, enter sizes per load* *N of LOGS = LENGTH= DIAMETER=*
604,000,000								*In coding, convert boat and sled loads to CORD*
	Y N	Y N	Y N	Y N	Y N		GAL	

During the last year, did your household use any other kind of other plants?..... 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, 2012, and DECEMBER 31, 2012.*
2 *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc. "TRY" includes looking, hunting, fishing, or any attempt to get.*
3 *UNITS will differ by species and situation. Units may be pounds (lbs), individuals (ind), portions of individuals (1/4), buckets, sacks, tubs, etc*

PLANTS: 17 **BETHEL: 59**

SUBSISTENCE SUMMARY: BERRIES & GREENS

HOUSEHOLD ID

If this household did NOT USE or HARVEST berries & greens last year, go to the ASSESSMENT section below.
Otherwise, continue with mapping, network, and assessment sections...

MAPPING ***Refer to data collection maps and mapping instructions to map berries & greens...***

ASSESSMENTS: BERRIES & GREENS 601,000,000

To conclude this section, I am going to ask a few general questions about berries & greens.

During the last year[1],

…did your household use LESS, SAME, or MORE berries & greens than in recent years?..... X L S M

X = do not use

… If your households use was LESS or MORE, why was it different?

If LESS or MORE…

WHY was your use different?..... _____ 1

_____ 2

During the last year[1],

…did your household GET ENOUGH berries & greens?..... Y N

ASSESSMENTS: ALL RESOURCES 0

To conclude our berries & greens section, I am going to ask a few general questions about berries & greens.

During the last year[1],

…did your household use LESS, SAME, or MORE of all resources than in recent years?..... X L S M

X = do not use

… If your households use was LESS or MORE, why was it different?

If LESS or MORE…

WHY was your use different?..... _____ 1

_____ 2

During the last year[1],

…did your household GET ENOUGH of all resources?..... Y N

NETWORKS & ASSESSMENTS OF BERRIES & GREENS: 66, 67 **BETHEL: 59**

EMPLOYMENT STATUS

HOUSEHOLD ID

The last 2 pages ask about jobs and income. We ask about these things because we are trying to understand all parts of the subsistence economy in Bethel. Many people use wages from jobs to support subsistence activities, and subsistence equipment can be very expensive.

Starting with the first head of your household, what job or jobs did he or she have last year?

INCLUDE EVERY PERSON 16 YEARS AND OLDER ON THIS PAGE, EVEN IF THEY DO NOT HAVE A JOB!

For each member of this household born before 1997, list EACH JOB held last year. For household members who did not have a job, write: RETIRED, UNEMPLOYED, STUDENT, HOMEMAKER, DISABLED, etc. There should be AT LEAST one row for each member of this household born before 1997 (this includes anyone who is 16 years old or older).

			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?	WORK SCHEDULE…** 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?
order	role	res.	00	job title*	employer	circle each month worked	circle one					gross income***
	1ST JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / Yr
1	6	910100000										
	2ND JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / Yr
2	6	910100000										
	3RD JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / Yr
3	6	910100000										
	4TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / Yr
4	6	910100000										
	5TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / Yr
5	6	910100000										
	6TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / Yr
6	6	910100000										
	7TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / Yr
7	6	910100000										
	8TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / Yr
8	6	910100000										
	9TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / Yr
9	6	910100000										
	10TH JOB					J F M A M J J A S O N D	FT	PT	SF	OC	SP	$ / Yr
10	6	910100000										

* 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+ hours/week)	1
PT - Parttime (<35 hours/week)	2
SF - Shift (2 wks on/2 off, etc.)	3
OC - On Call, Irregular	4
SP - Shift - part time	5
-- - Unemployed	0

*** GROSS INCOME is the same as TAXABLE INCOME on a W-2 form. Self-employment, enter revenue -

EMPLOYMENT: 23 **BETHEL: 59**

OTHER INCOME THIS PAGE IS ONLY FOR INCOME THAT IS NOT EARNED FROM WORKING HOUSEHOLD ID

Between JANUARY 1, 2012, and DECEMBER 31, 2012…
…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 2012?	TOTAL amount all members of your household received from _____ in 2012.
		circle one	*dollars*
DIVIDENDS	ALASKA PERMANENT FUND DIVIDEND	Y N	$ /YR
	32		
	NATIVE CORPORATION DIVIDENDS	Y N	$ /YR
	13		

Alaska PFD IN 2012	*Regional Corporations*	*Dividend*
1 PFD = $1,281	*Calista Corp.....*	*$ 3.00*
2 PFDs = $2,562	*.....*	*$ -*
3 PFDs = $3,843		
4 PFDs = $5,124		
5 PFDs = $6,405		
6 PFDs = $7,686	***Village Corporation(s)***	***Dividend***
7 PFDs = $8,967	*.....*	*$ -*
8 PFDs = $10,248		
9 PFDs = $11,529		
10 PFDs = $12,810		
11 PFDs = $14,091		
12 PFDs = $15,372		

Between JANUARY 1, 2012, and DECEMBER 31, 2012…
…Did any members of your household receive OTHER income such as SENIOR BENEFITS or UNEMPLOYMENT?..... Y N

IF NO, go to the next page.

If YES, continue below…

		Received?	Total Amount?
		circle one	*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 (QUEST CARD)	Y N	$ /YR
	11		
	ADULT PUBLIC ASSISTANCE	Y N	$ /YR
	3		
	SUPPLEMENTAL SECURITY INCOME (SSI)	Y N	$ /YR
	10		
STATE BENEFITS	HEATING ASSISTANCE	Y N	$ /YR
	9		
	ALASKA SENIOR BENEFITS (LONGEVITY)	Y N	$ /YR
	6		

		Received?	Total Amount?
		circle one	*dollars*
FAMILY & CHILD	TANF *(say"Tanif," formerly AFDC)*	Y N	$ /YR
	2		
	CHILD SUPPORT	Y N	$ /YR
	15		
	FOSTER CARE	Y N	$ /YR
	41		
OTHER	FUEL VOUCHERS	Y N	$ /YR
	MEETING HONORARIA *(not per diem*)*	Y N	$ /YR
	OTHER *(describe)*	Y N	$ /YR
	OTHER *(describe)*	Y N	$ /YR

** per diem covers travel expenses, and is not counted as income.*

Scratch paper for calculations

$ *for _____ weeks =*
for _____ months =

$ *for _____ weeks =*
for _____ months =

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

OTHER INCOME: 24 **BETHEL: 59**

COMMENTS & SUMMARY

HOUSEHOLD ID

QUESTIONS, COMMENTS, CONCERNS

Do you have any questions, comments, or concerns?

INTERVIEW SUMMARY

Use this space for interviewer's comments about survey, especially factors that might have affected the household's responses.

BE SURE TO FILL IN THE STOP TIME ON THE FIRST PAGE!!!!

INTERVIEW SUMMARY: 30 **BETHEL: 59**

APPENDIX C–ETHNOGRAPHIC INTERVIEW PROTOCOL

Bethel Hubs 2013 Comprehensive Survey Project
Ethnographic Interview Protocol

BEFORE YOU BEGIN RECODING **be sure you are in a quiet place. If not (e.g. TV or radio are on), ask respondent(s) or other people in the room to turn off anything making noises OR ask if you could conduct the interview somewhere else or at a better time when there is less activity in the room**

ALWAYS START recording by stating the following information:

- **YOUR NAME**
- **YOUR POSITION**
- **DATE**
- **TIME**
- **YOUR LOCATION**
- **NAME OF RESPONDENT(S)**
- **NAME OF PROJECT**
- **YOUR PURPOSE**
- **NAME(S) OF OTHER PERSONS IN THE ROOM (If anyone present is under the age of 18, ask their guardian if they give consent to their voice being recorded. DO NOT interview a minor or identify them on the recording.)**

If you reach a point in the interview when you need to restart the recording, state the same information once more. This will be helpful in the event that your recording device started a new mp3 file after the break.

EXAMPLE: *"This is Jane Smith, Subsistence Resource Specialist with the Alaska Department of Fish and Game Subsistence Division. It's Friday February 15, 2013 at 2 PM. I'm in Bethel, Alaska, in the home of Mary and John Williams. I'm here for the Bethel Comprehensive Subsistence Survey Project and I will be talking with them about their experiences hunting, fishing, and gathering in the area. Assisting me is our Bethel research assistant, Michael Jones."*

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

Bethel Hubs 2013 Comprehensive Survey Project
Ethnographic Interview Protocol

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. Nonsalmon 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:

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?

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)

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 big game hunting (brown bear, black bear, caribou, etc.)

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?

APPENDIX D–CONVERSION FACTORS

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 3 quarts of smelt, the quantity would be multiplied by the appropriate conversion factor (in this case 1.5) to show a harvest of 4.5 lb of smelt.

Resource name	Scientific name	Reported units	Conversion factor
Chum salmon	*Oncorhynchus keta*	ind	5.0912
Chum salmon [CF retention]	*Oncorhynchus keta*	ind	5.0912
Chum salmon [CF retention]	*Oncorhynchus keta*	lb	1.0000
Coho salmon	*Oncorhynchus kisutch*	ind	5.2900
Coho salmon	*Oncorhynchus kisutch*	lb	1.0000
Coho salmon [CF retention]	*Oncorhynchus kisutch*	ind	5.2900
Coho salmon [CF retention]	*Oncorhynchus kisutch*	lb	1.0000
Chinook salmon	*Oncorhynchus tshawytscha*	ind	9.4500
Chinook salmon	*Oncorhynchus tshawytscha*	lb	1.0000
Chinook salmon [CF retention]	*Oncorhynchus tshawytscha*	ind	9.4500
Chinook salmon [CF retention]	*Oncorhynchus tshawytscha*	lb	1.0000
Pink salmon	*Oncorhynchus gorbuscha*	ind	2.8100
Pink salmon	*Oncorhynchus gorbuscha*	lb	1.0000
Pink salmon [CF retention]	*Oncorhynchus gorbuscha*	ind	2.8100
Pink salmon [CF retention]	*Oncorhynchus gorbuscha*	lb	1.0000
Sockeye salmon	*Oncorhynchus nerka*	ind	5.0400
Sockeye salmon	*Oncorhynchus nerka*	lb	1.0000
Sockeye salmon	*Oncorhynchus nerka*	gal	6.0000
Sockeye salmon [CF retention]	*Oncorhynchus nerka*	ind	5.0400
Sockeye salmon [CF retention]	*Oncorhynchus nerka*	lb	1.0000
Unknown salmon	*Oncorhynchus spp.*	ind	5.5900
Herring	*Clupea pallasi*	gal	6.0000
Pacific herring [CF retention]	*Clupea pallasi*	lb	1.0000
Pacific herring [CF retention]	*Clupea pallasi*	gal	6.0000
Pacific herring roe	*Clupea pallasi*	ind	7.0000
Pacific herring roe	*Clupea pallasi*	gal	7.0000
Eulachon (hooligan, candlefish)	*Thaleichthys pacificus*	ind	0.0130
Eulachon (hooligan, candlefish)	*Thaleichthys pacificus*	gal	6.0000
Unknown smelt		ind	0.2500
Unknown smelt		lb	1.0000
Unknown smelt		5 gal bucket	30.0000
Unknown smelt		gal	6.0000
Unknown smelt		qt	1.5000
Pacific (gray) cod	*Gadus macrocephalus*	ind	9.0000
Pacific tomcod	*Microgadus proximus*	ind	0.5000
Saffron cod	*Eleginus gracilis*	ind	0.2100
Saffron cod	*Eleginus gracilis*	lb	1.0000
Flounder		ind	1.1000
Lingcod		ind	4.0000
Halibut	*Hippoglossus stenolepis*	ind	21.2000
Halibut	*Hippoglossus stenolepis*	lb	1.0000
Halibut [CF Retention]	*Hippoglossus stenolepis*	ind	21.2000
Halibut [CF Retention]	*Hippoglossus stenolepis*	lb	1.0000

-continued-

Resource name	Scientific name	Reported units	Conversion factor
Lamprey	*Lampetra spp.*	ind	0.6000
Lamprey	*Lampetra spp.*	lb	1.0000
Lamprey	*Lampetra spp.*	gal	6.0000
Lamprey [CF Retention]	*Lampetra spp.*	ind	0.6000
Black rockfish	*Sebastes melanops*	ind	1.5000
Yelloweye rockfish	*Sebastes ruberrimus*	ind	1.5000
Unknown rockfish		ind	1.5000
Sablefish (black cod)	*Anoplopoma fimbria*	ind	3.1000
Stickleback (needlefish)		ind	0.2000
Stickleback (needlefish)		gal	6.0000
Stickleback (needlefish)		qt	1.5000
Alaska blackfish	*Dallia pectoralis*	ind	0.7500
Alaska blackfish	*Dallia pectoralis*	lb	1.0000
Alaska blackfish	*Dallia pectoralis*	gal	6.0000
Burbot	*Lota lota*	ind	2.4000
Arctic char	*Salvelinus alpinus*	ind	0.9000
Dolly Varden	*Salvelinus malma*	ind	0.9000
Lake trout	*Salvelinus namaycush*	ind	2.0000
Arctic grayling	*Thymallus arcticus*	ind	1.5000
Northern pike	*Esox lucius*	ind	4.5000
Sheefish	*Stenodus leucichthys*	ind	6.5000
Sheefish [CF retention]	*Stenodus leucichthys*	ind	6.5000
Longnose sucker	*Catostomus catostomus*	ind	1.0000
Rainbow trout	*Oncorhynchus mykiss*	ind	1.4000
Broad whitefish	*Coregonus nasus*	ind	1.4000
Broad whitefish [CF retention]	*Coregonus nasus*	ind	1.4000
Bering cisco	*Coregonus laurettae*	ind	1.4000
Bering cisco [CF retention]	*Coregonus laurettae*	ind	1.4000
Least cisco	*Coregonus sardinella*	ind	1.0000
Least cisco [CF retention]	*Coregonus sardinella*	ind	1.0000
Unknown cisco	*Coregonus spp.*	ind	1.0870
Humpback whitefish	*Coregonus pidschian*	ind	3.0000
Humpback whitefish [CF retention]	*Coregonus pidschian*	ind	3.0000
Round whitefish	*Prosopium cylindraceum*	ind	0.5000
Unknown whitefish		ind	2.6050
Unknown nonsalmon fish		ind	3.0000
Bison	*Bison bison*	ind	450.0000
Black bear	*Ursus americanus*	ind	100.0000
Brown bear	*Ursus arctos*	ind	141.0000
Caribou	*Rangifer tarandus*	ind	130.0000
Mule deer	*Odocoileus hemionus*	ind	42.5000
Moose	*Alces alces*	ind	540.0000
Muskox	*Ovibos moschatus*	ind	295.0000
Dall sheep	*Ovis dalli*	ind	80.0000
Beaver	*Castor canadensis*	ind	15.0000
Coyote	*Canis latrans*	ind	0.0000
Arctic fox	*Vulpes lagopus*	ind	0.0000
Red fox	*Vulpes vulpes*	ind	0.0000
Red fox, cross phase	*Vulpes vulpes*	ind	0.0000

-continued-

Resource name	Scientific name	Reported units	Conversion factor
Snowshoe hare	*Lepus americanus*	ind	2.0000
Alaska hare	*Lepus othus*	ind	3.0000
River otter	*Lontra canadensis*	ind	3.0000
Lynx	*Lynx canadensis*	ind	0.0000
Marmot	*Marmota spp.*	ind	5.0000
Marten	*Martes spp.*	ind	0.0000
Mink	*Neovison vison*	ind	2.0000
Muskrat	*Ondatra zibethicus*	ind	0.7500
Porcupine	*Erethizon dorsatum*	ind	4.0000
Arctic ground squirrel	*Spermophilus parryii*	ind	0.5000
Red squirrel	*Tamiasciurus hudsonicus*	ind	0.7500
Weasel	*Mustela*	ind	0.0000
Gray wolf	*Canis lupus*	ind	0.0000
Wolverine	*Gulo gulo*	ind	0.0000
Reindeer, feral		ind	62.5000
Bearded seal	*Erignathus barbatus*	ind	140.0000
Harbor seal	*Phoca vitulina*	ind	56.0000
Ringed seal	*Histriophoca fasciata*	ind	56.0000
Spotted seal	*Phoca largha*	ind	56.0000
Unknown seal		ind	56.0000
Walrus	*Odobenus rosmarus*	ind	770.0000
Beluga	*Delphinapterus leucas*	ind	1,000.0000
Bowhead	*Balaena mysticetus*	ind	28,677.0000
Unknown whale		ind	600.0000
Bufflehead	*Bucephala albeola*	ind	0.4000
Canvasback	*Aythya valisineria*	ind	1.1000
Common eider	*Somateria mollissima*	ind	2.2100
King eider	*Somateria spectabilis*	ind	1.4300
Spectacled eider	*Somateria fischeri*	ind	2.4300
Unknown eider		ind	2.2100
Goldeneye	*Bucephala spp.*	ind	0.8000
Harlequin duck	*Histrionicus histrionticus*	ind	0.5000
Mallard	*Anas platyrhynchos*	ind	1.0000
Common merganser	*Mergus merganser*	ind	1.2700
Red-breasted merganser	*Mergus serrator*	ind	0.6200
Unknown merganser	*Mergus spp.*	ind	0.9500
Long-tailed duck	*Clangula hyemalis*	ind	0.8000
Northern pintail	*Anas acuta*	ind	0.8000
Scaup	*Aythya spp.*	ind	0.9000
Black scoter	*Melanitta nigra*	ind	0.9000
Surf scoter	*Melanitta perspicillata*	ind	0.9000
White-winged scoter	*Melanitta fusca*	ind	0.9000
Northern shoveler	*Anas clypeata*	ind	0.6000
Green-winged teal	*Anas crecca*	ind	0.3000
American wigeon	*Anas americana*	ind	0.7000
Eurasian wigeon	*Anas penelope*	ind	0.7000
Unknown duck		ind	0.8693

-continued-

Resource name	Scientific name	Reported units	Conversion factor
Brant	*Branta bernicla*	ind	1.2000
Cackling goose	*Branta hutchinsii*	ind	1.2000
Lesser Canada goose	*Branta canadensis parvipes*	ind	2.1000
Unknown Canada goose	*Branta spp.*	ind	1.2000
Emperor goose	*Chen canagica*	ind	2.5000
Snow goose	*Chen caerulescens*	ind	2.3000
White-fronted goose	*Anser albifrons*	ind	2.4000
Unknown goose		ind	1.9530
Tundra (whistling) swan	*Cygnus columbianus*	ind	10.0000
Unknown swan	*Cygnus spp.*	ind	10.0000
Sandhill crane	*Grus canadensis*	ind	8.4000
Whimbrel	*Numenius spp.*	ind	0.1000
Unknown shorebird		ind	0.1000
Unknown loon	*Gavia spp.*	ind	3.0000
Grouse		ind	1.0000
Spruce grouse	*Falcipennis canadensis*	ind	1.0000
Sharp-tailed grouse	*Tympanuchus phasianellus*	ind	1.0000
Ruffed grouse	*Bonasa umbellus*	ind	1.0000
Unknown grouse		ind	1.0000
Ptarmigan	*Lagopus spp.*	ind	1.0000
Duck eggs		ind	0.1500
Duck eggs		gal	6.0000
Goose eggs		ind	0.3000
Goose eggs		gal	6.0000
Swan eggs	*Cygnus spp.*	ind	0.6300
Swan eggs	*Cygnus spp.*	gal	6.0000
Crane eggs	*Grus spp.*	ind	0.6300
Plover eggs		ind	0.0600
Whimbrel eggs	*Numenius phaeopus*	ind	0.3000
Unknown shorebird eggs		ind	0.0500
Gull eggs		ind	0.3000
Gull eggs		gal	6.0000
Tern eggs		ind	0.0500
Tern eggs		gal	6.0000
Arctic tern eggs		ind	0.0500
Ptarmigan eggs	*Lagopus spp.*	ind	0.1000
Owl eggs		ind	0.1300
Unknown eggs		ind	0.1770
Unknown Eeggs		gal	6.0000
Freshwater clams		gal	3.0000
Unknown clams		ind	0.1000
Unknown clams		gal	3.0000
Unknown clams		qt	0.7500
Unknown clams [CF retention]		ind	0.1000
Unknown clams [CF retention]		gal	3.0000
Cockles		gal	3.0000
Dungeness crab	*Cancer magister*	ind	0.7000
King crab		ind	2.1000
Blue king crab	*Paralithodes platypus*	ind	5.0000

-continued-

Resource name	Scientific name	Reported units	Conversion factor
Tanner crab	*Chionoecetes spp.*	ind	1.6000
Tanner crab, opillio	*Chionoecetes opilio*	ind	1.6000
Unknown Tanner crab	*Chionoecetes spp.*	ind	1.6000
Unknown crab		ind	2.1000
Unknown crab [CF retention]		ind	2.1000
Unknown mussels	*Mytilus spp.*	gal	1.5000
Unknown mussels	*Mytilus spp.*	qt	0.3750
Octopus	*Octopus vulgaris*	gal	4.0000
Oyster		gal	3.0000
Scallops		lb	1.0000
Scallops		gal	1.0000
Shrimp		lb	1.0000
Shrimp		gal	2.0000
Unknown marine invertebrates		gal	2.1300
Blueberry	*Vaccinium uliginosum alpinur*	lb	1.0000
Blueberry	*Vaccinium uliginosum alpinur*	gal	4.0000
Blueberry	*Vaccinium uliginosum alpinur*	qt	1.0000
Blueberry	*Vaccinium uliginosum alpinur*	bag	2.0000
Blueberry	*Vaccinium uliginosum alpinur*	pt	0.5000
Blueberry	*Vaccinium uliginosum alpinur*	cup	0.2500
Lowbush cranberry	*Vaccinum vitis-idaea minus*	lb	1.0000
Lowbush cranberry	*Vaccinum vitis-idaea minus*	gal	4.0000
Lowbush cranberry	*Vaccinum vitis-idaea minus*	qt	1.0000
Lowbush cranberry	*Vaccinum vitis-idaea minus*	bag	2.0000
Lowbush cranberry	*Vaccinum vitis-idaea minus*	pt	0.5000
Lowbush cranberry	*Vaccinum vitis-idaea minus*	cup	0.2500
Highbush cranberry	*Viburnum edule*	lb	1.0000
Highbush cranberry	*Viburnum edule*	gal	4.0000
Highbush cranberry	*Viburnum edule*	qt	1.0000
Highbush cranberry	*Viburnum edule*	bag	2.0000
Highbush cranberry	*Viburnum edule*	pt	0.5000
Highbush cranberry	*Viburnum edule*	cup	0.2500
Crowberry	*Empetrum nigrum*	lb	1.0000
Crowberry	*Empetrum nigrum*	gal	4.0000
Crowberry	*Empetrum nigrum*	qt	1.0000
Crowberry	*Empetrum nigrum*	bag	2.0000
Crowberry	*Empetrum nigrum*	pt	0.5000
Crowberry	*Empetrum nigrum*	cup	0.2500
Gooseberry	*Ribes oxyacanthoides*	lb	1.0000
Gooseberry	*Ribes oxyacanthoides*	gal	4.0000
Gooseberry	*Ribes oxyacanthoides*	qt	1.0000
Gooseberry	*Ribes oxyacanthoides*	bag	2.0000
Gooseberry	*Ribes oxyacanthoides*	pt	0.5000
Gooseberry	*Ribes oxyacanthoides*	cup	0.2500
Currants	*Ribes spp.*	lb	1.0000
Currants	*Ribes spp.*	gal	4.0000
Currants	*Ribes spp.*	qt	1.0000
Currants	*Ribes spp.*	bag	2.0000
Currants	*Ribes spp.*	pt	0.5000
Currants	*Ribes spp.*	cup	0.2500

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Resource name	Scientific name	Reported units	Conversion factor
Huckleberry	*Vaccinium parvifolium*	lb	1.0000
Huckleberry	*Vaccinium parvifolium*	gal	4.0000
Huckleberry	*Vaccinium parvifolium*	qt	1.0000
Huckleberry	*Vaccinium parvifolium*	bag	2.0000
Huckleberry	*Vaccinium parvifolium*	pt	0.5000
Huckleberry	*Vaccinium parvifolium*	cup	0.2500
Cloudberry	*Rubus chamaemorus*	lb	1.0000
Cloudberry	*Rubus chamaemorus*	gal	4.0000
Cloudberry	*Rubus chamaemorus*	qt	1.0000
Cloudberry	*Rubus chamaemorus*	bag	2.0000
Cloudberry	*Rubus chamaemorus*	pt	0.5000
Cloudberry	*Rubus chamaemorus*	cup	0.2500
Nagoonberry	*Rubus arcticus spp.*	lb	1.0000
Nagoonberry	*Rubus arcticus spp.*	gal	4.0000
Nagoonberry	*Rubus arcticus spp.*	qt	1.0000
Nagoonberry	*Rubus arcticus spp.*	bag	2.0000
Nagoonberry	*Rubus arcticus spp.*	pt	0.5000
Nagoonberry	*Rubus arcticus spp.*	cup	0.2500
Raspberry	*Rubus idaeus*	lb	1.0000
Raspberry	*Rubus idaeus*	gal	4.0000
Raspberry	*Rubus idaeus*	qt	1.0000
Raspberry	*Rubus idaeus*	bag	2.0000
Raspberry	*Rubus idaeus*	pt	0.5000
Raspberry	*Rubus idaeus*	cup	0.2500
Salmonberry	*Rubus spectabilis*	lb	1.0000
Salmonberry	*Rubus spectabilis*	gal	4.0000
Salmonberry	*Rubus spectabilis*	qt	1.0000
Salmonberry	*Rubus spectabilis*	bag	2.0000
Salmonberry	*Rubus spectabilis*	pt	0.5000
Salmonberry	*Rubus spectabilis*	cup	0.2500
Strawberry	*Fragaria virginiana*	lb	1.0000
Strawberry	*Fragaria virginiana*	gal	4.0000
Strawberry	*Fragaria virginiana*	qt	1.0000
Strawberry	*Fragaria virginiana*	bag	2.0000
Strawberry	*Fragaria virginiana*	pt	0.5000
Strawberry	*Fragaria virginiana*	cup	0.2500
Twisted-stalk (watermelon) berry	*Streptopus amplexifolius*	lb	1.0000
Twisted-stalk (watermelon) berry	*Streptopus amplexifolius*	gal	4.0000
Twisted-stalk (watermelon) berry	*Streptopus amplexifolius*	qt	1.0000
Twisted-stalk (watermelon) berry	*Streptopus amplexifolius*	bag	2.0000
Twisted-stalk (watermelon) berry	*Streptopus amplexifolius*	pt	0.5000
Twisted-stalk (watermelon) berry	*Streptopus amplexifolius*	cup	0.2500
Other wild berry		lb	1.0000
Other wild berry		gal	4.0000
Other wild berry		qt	1.0000
Other wild berry		bag	2.0000
Other wild berry		pt	0.5000
Other wild berry		cup	0.2500
Plants/greens/mushrooms		gal	0.5000

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Resource name	Scientific name	Reported units	Conversion factor
Wild rhubarb	*Polygonum alaskanum*	ind	0.3000
Wild rhubarb	*Polygonum alaskanum*	lb	1.0000
Wild rhubarb	*Polygonum alaskanum*	gal	4.0000
Wild rhubarb	*Polygonum alaskanum*	qt	1.0000
Wild rhubarb	*Polygonum alaskanum*	bag	2.0000
Wild rhubarb	*Polygonum alaskanum*	pt	0.5000
Wild rhubarb	*Polygonum alaskanum*	cup	0.2500
Eskimo potato	*Hedysarum alpinum*	lb	1.0000
Eskimo potato	*Hedysarum alpinum*	gal	4.0000
Eskimo potato	*Hedysarum alpinum*	qt	1.0000
Eskimo potato	*Hedysarum alpinum*	bag	2.0000
Eskimo potato	*Hedysarum alpinum*	pt	0.5000
Eskimo potato	*Hedysarum alpinum*	cup	0.2500
Other beach greens		lb	1.0000
Other beach greens		gal	1.0000
Other beach greens		qt	0.2500
Other beach greens		bag	0.5000
Other beach greens		pt	0.125
Other beach greens		cup	0.0625
Devils club	*Echinopanax horridum*	lb	1.0000
Devils club	*Echinopanax horridum*	gal	1.0000
Devils club	*Echinopanax horridum*	qt	0.2500
Devils club	*Echinopanax horridum*	bag	0.5000
Devils club	*Echinopanax horridum*	pt	0.125
Devils club	*Echinopanax horridum*	cup	0.0625
Fiddlehead ferns		ind	0.1500
Fiddlehead ferns		lb	1.0000
Fiddlehead ferns		gal	1.0000
Fiddlehead ferns		qt	0.2500
Fiddlehead ferns		bag	0.5000
Fiddlehead ferns		pt	0.125
Fiddlehead ferns		cup	0.0625
Nettle	*Urtica spp.*	lb	1.0000
Nettle	*Urtica spp.*	gal	1.0000
Nettle	*Urtica spp.*	qt	0.2500
Nettle	*Urtica spp.*	bag	0.5000
Nettle	*Urtica spp.*	pt	0.125
Nettle	*Urtica spp.*	cup	0.0625
Hudson's Bay Tea	*Ledum palustre*	lb	1.0000
Hudson's Bay Tea	*Ledum palustre*	gal	1.0000
Hudson's Bay Tea	*Ledum palustre*	qt	0.2500
Hudson's Bay Tea	*Ledum palustre*	bag	0.5000
Hudson's Bay Tea	*Ledum palustre*	pt	0.125
Hudson's Bay Tea	*Ledum palustre*	cup	0.0625
Mint	*Mentha spp.*	lb	1.0000
Mint	*Mentha spp.*	gal	1.0000
Mint	*Mentha spp.*	qt	0.2500
Mint	*Mentha spp.*	bag	0.5000
Mint	*Mentha spp.*	pt	0.125
Mint	*Mentha spp.*	cup	0.0625

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Resource name	Scientific name	Reported units	Conversion factor
Dandilion greens	*Taraxacum L.*	lb	1.0000
Dandilion greens	*Taraxacum L.*	gal	1.0000
Dandilion greens	*Taraxacum L.*	qt	0.2500
Dandilion greens	*Taraxacum L.*	bag	0.5000
Dandilion greens	*Taraxacum L.*	pt	0.125
Dandilion greens	*Taraxacum L.*	cup	0.0625
Sourdock	*Rumex fenestratus*	lb	1.0000
Sourdock	*Rumex fenestratus*	gal	1.0000
Sourdock	*Rumex fenestratus*	qt	0.2500
Sourdock	*Rumex fenestratus*	bag	0.5000
Sourdock	*Rumex fenestratus*	pt	0.125
Sourdock	*Rumex fenestratus*	cup	0.0625
Pallas buttercup	*Ranunculus pallasii*	lb	1.0000
Pallas buttercup	*Ranunculus pallasii*	gal	1.0000
Pallas buttercup	*Ranunculus pallasii*	qt	0.2500
Pallas buttercup	*Ranunculus pallasii*	bag	0.5000
Pallas buttercup	*Ranunculus pallasii*	pt	0.125
Pallas buttercup	*Ranunculus pallasii*	cup	0.0625
Spruce tips	*Picea spp.*	ind	0.0100
Spruce tips	*Picea spp.*	lb	1.0000
Spruce tips	*Picea spp.*	gal	1.0000
Spruce tips	*Picea spp.*	qt	0.2500
Spruce tips	*Picea spp.*	bag	0.5000
Spruce tips	*Picea spp.*	pt	0.125
Spruce tips	*Picea spp.*	cup	0.0625
Willow leaves	*Salix spp.*	lb	1.0000
Willow leaves	*Salix spp.*	gal	1.0000
Willow leaves	*Salix spp.*	qt	0.2500
Willow leaves	*Salix spp.*	bag	0.5000
Willow leaves	*Salix spp.*	pt	0.125
Willow leaves	*Salix spp.*	cup	0.0625
Wild celery	*Angelica lucida*	lb	1.0000
Wild celery	*Angelica lucida*	gal	1.0000
Wild celery	*Angelica lucida*	qt	0.2500
Wild celery	*Angelica lucida*	bag	0.5000
Wild celery	*Angelica lucida*	pt	0.125
Wild celery	*Angelica lucida*	cup	0.0625
Wild rose hips	*Rosa acicularis*	lb	1.0000
Wild rose hips	*Rosa acicularis*	gal	4.0000
Wild rose hips	*Rosa acicularis*	qt	1.0000
Wild rose hips	*Rosa acicularis*	bag	2.0000
Wild rose hips	*Rosa acicularis*	pt	0.5000
Wild rose hips	*Rosa acicularis*	cup	0.2500
Yarrow	*Achillea spp.*	lb	1.0000
Yarrow	*Achillea spp.*	gal	1.0000
Yarrow	*Achillea spp.*	qt	0.2500
Yarrow	*Achillea spp.*	bag	0.5000
Yarrow	*Achillea spp.*	pt	0.125
Yarrow	*Achillea spp.*	cup	0.0625

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Resource name	Scientific name	Reported units	Conversion factor
Other wild greens		lb	1.0000
Other wild greens		gal	1.0000
Other wild greens		qt	0.2500
Other wild greens		bag	0.5000
Other wild greens		pt	0.125
Other wild greens		cup	0.0625
Unknown mushrooms		lb	1.0000
Unknown mushrooms		gal	1.0000
Unknown mushrooms		qt	0.2500
Unknown mushrooms		bag	0.5000
Unknown mushrooms		pt	0.125
Unknown mushrooms		cup	0.0625
Fireweed	*Epilobium angustifolium*	lb	1.0000
Fireweed	*Epilobium angustifolium*	gal	1.0000
Fireweed	*Epilobium angustifolium*	qt	0.2500
Fireweed	*Epilobium angustifolium*	bag	0.5000
Fireweed	*Epilobium angustifolium*	pt	0.125
Fireweed	*Epilobium angustifolium*	cup	0.0625
Stinkweed	*Artemisia tilesii*	lb	1.0000
Stinkweed	*Artemisia tilesii*	gal	1.0000
Stinkweed	*Artemisia tilesii*	qt	0.2500
Stinkweed	*Artemisia tilesii*	bag	0.5000
Stinkweed	*Artemisia tilesii*	pt	0.125
Stinkweed	*Artemisia tilesii*	cup	0.0625
Punk		lb	0.0000
Punk		gal	0.0000
Punk		qt	0.0000
Punk		bag	0.0000
Punk		pt	0.0000
Punk		cup	0.0000
Puffballs		lb	1.0000
Puffballs		gal	1.0000
Puffballs		qt	0.2500
Puffballs		bag	0.5000
Puffballs		pt	0.125
Puffballs		cup	0.0625
Unknown greens from land		lb	1.0000
Unknown greens from land		gal	1.0000
Unknown greens from land		qt	0.2500
Unknown greens from land		bag	0.5000
Unknown greens from land		pt	0.125
Unknown greens from land		cup	0.0625
Mousefoods		lb	1.0000
Mousefoods		gal	1.0000
Mousefoods		qt	0.2500
Mousefoods		bag	0.5000
Mousefoods		pt	0.125
Mousefoods		cup	0.0625

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Resource name	Scientific name	Reported units	Conversion factor
Wood		ind	0.0000
Wood		lb	0.0000
Wood		cord	0.0000
Bark		lb	0.0000
Bark		gal	0.0000
Willow roots	*Salix spp.*	gal	0.0000
Birch	*Betula spp.*	gal	0.0000
Cottonwood	*Populus spp.*	gal	0.0000
Other wood		cord	0.0000

Source ADF&G Division of Subsistence household surveys, 2013.

APPENDIX E–COMMUNITY SUMMARY

EXECUTIVE SUMMARY - Technical Paper No. XXX

Bethel

Subsistence Harvests in 2012

Based upon a 28% random sample of Bethel households (466), residents of the Bethel community harvested an estimated 954,525 edible pounds (±15%) of fish, wildlife, shellfish, and plants in 2012. Harvests averaged 580 pounds per household and 168 pounds per person.

In March 2013, residents of Bethel responded to a survey asking about their subsistence harvests of fish, wildlife, and plants during the calendar year 2012. Researchers asked whether the household used or tried to harvest each kind of subsistence food during the study period. If people tried to harvest something, they were asked about how much they harvested and for other harvest details.

Most Bethel households, 97%, used some kind of subsistence food, and 85% of households reported that a person in the household had harvested subsistence food. 70% of households gave away subsistence resources, while 92% received subsistence foods from another household documenting the widespread sharing that occurs among households in Bethel and with neighboring villages.

Fish were the most widely used (by 93% of households) category of subsistence food with an estimated harvest of 579,202 edible pounds, representing 61% of the total subsistence harvests in 2012. Salmon represented 67% of the total fish harvest, although management restrictions resulted in lower harvests of king salmon in 2012 (4,846 king salmon) than would typically occur. Chum salmon represented 29% of salmon harvested by Bethel residents in 2012, coho salmon represented 27%, sockeye salmon represented 25%, while Chinook salmon represented only 19% of salmon harvested by Bethel residents in 2012.

Nonsalmon fishes represented 33% of subsistence fish harvests by Bethel residents, with the largest contributions by Northern pike (57,619 pounds), smelt (31,694 pounds), humpback whitefish (31,280 pounds), and burbot (28,936 pounds). Other fish harvests are found in Table 1.

Figure 1 shows the top 10 species harvested for subsistence in Bethel. Moose contributed the most to subsistence harvests in Bethel in 2012, with an estimated harvest of 357 moose, representing 20% of the total subsistence harvest.

The next most prevalent subsistence species harvested included chum salmon (12% of total harvest), coho

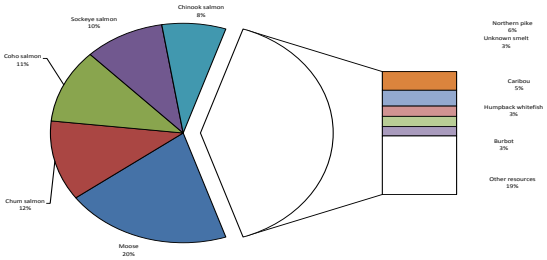

Figure 1. Top 10 subsistence foods by edible weight, 2012.

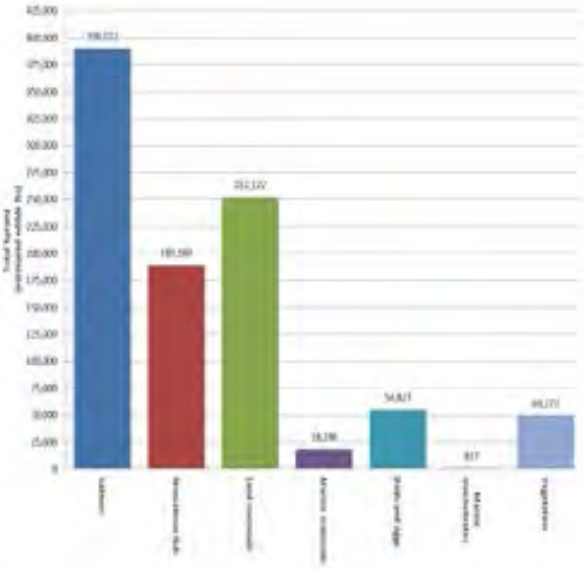

Figure 2. Estimated pounds harvested by category, 2012.

TABLE 1. ESTIMATED HARVESTS OF SUBSISTENCE FOODS, BETHEL, 2012

	Percentage of households					Estimated pounds harvested				
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita	Total estimated amount[1] harvested by community	95% conf. limit
FISH										
Salmon										
Chum salmon	54%	37%	36%	23%	20%	112,447.3 lb	68.4 lb	19.8 lb	22,086.6 ind.	± 21%
Coho salmon	60%	37%	35%	29%	21%	104,320.8 lb	63.4 lb	18.4 lb	19,720.4 ind.	± 24%
Chinook salmon	61%	40%	37%	33%	20%	74,144.6 lb	45.1 lb	13.1 lb	7,846.0 ind.	± 19%
Pink salmon	8%	6%	6%	2%	1.1%	3,227.1 lb	2.0 lb	0.6 lb	1,148.4 ind.	± 128%
Sockeye salmon	59%	39%	38%	28%	23%	92,994.9 lb	56.5 lb	16.4 lb	18,451.4 ind.	± 18%
Unknown salmon	7%	2%	2%	6%	2%	2,887.2 lb	1.8 lb	0.5 lb	516.5 ind.	± 87%
Subtotal	**90%**	**53%**	**52%**	**61%**	**39%**	**390,021.8 lb**	**237.1 lb**	**68.8 lb**	**69,769 ind.**	**± 17%**
Char										
Arctic char	0.4%	0.2%	0.2%	0.2%	0%	47.7 lb	0.0 lb	0.0 lb	53.0 ind.	± 166%
Dolly varden	7%	6%	6%	2%	1%	1,103.0 lb	0.7 lb	0.2 lb	735.4 ind.	± 51%
Lake trout	0.6%	0.6%	0.6%	0%	0%	106.1 lb	0.1 lb	0.0 lb	53.1 ind.	± 124%
Subtotal	**8%**	**6%**	**6%**	**2%**	**1%**	**1,256.8 lb**	**0.8 lb**	**0.2 lb**	**841.4**	**± 48%**
Trout										
Rainbow trout	6%	4%	4%	2%	2%	702.9 lb	0.4 lb	0.1 lb	502.1 ind.	± 47%
Unknown trout	0.2%	0%	0%	0.2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**6%**	**4%**	**4%**	**2%**	**2%**	**702.9 lb**	**0.4 lb**	**0.1 lb**	**502.1 ind.**	**± 47%**
Whitefishes										
Sheefish	25%	15%	15%	12%	6%	12,048.8 lb	7.3 lb	2.1 lb	1,853.7 ind.	± 38%
Broad whitefish	28%	13%	13%	18%	9%	7,886.0 lb	4.8 lb	1.4 lb	5,632.8 ind.	± 66%
Bering cisco	5%	2%	2%	3%	1%	652.4 lb	0.4 lb	0.1 lb	466.0 ind.	± 128%
Least cisco	8%	4%	4%	5%	2%	1,680.3 lb	1.0 lb	0.3 lb	1,680.3 ind.	± 76%
Unknown cisco	0.6%	0.4%	0.4%	0.2%	0.2%	103.6 lb	0.1 lb	0.0 lb	95.3 ind.	± 118%
Humpback whitefish	32%	19%	18%	17%	10%	31,280.0 lb	19.0 lb	5.5 lb	10,426.7 ind.	± 50%
Round whitefish	3%	2%	2%	2%	1%	716.6 lb	0.4 lb	0.1 lb	716.6 ind.	± 80%
Unknown whitefish	5%	2%	2%	4%	0.2%	1,362.3 lb	0.8 lb	0.2 lb	523.0 ind.	± 91%
Subtotal	**56%**	**32%**	**30%**	**37%**	**17%**	**55,730.0 lb**	**33.9 lb**	**9.8 lb**	**21,394.3 ind.**	**± 47%**
Anadromous/marine fish										
Herring	12%	1%	0.4%	12%	1%	254.2 lb	0.2 lb	0.0 lb	42.4 gal.	± 119%
Herring roe	11%	0.2%	0.2%	11%	1%	1,164.9 lb	0.7 lb	0.2 lb	42.4 gal.	± 166%
Eulachon (hooligan, can	0.4%	0%	0%	0.4%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown smelt	44%	33%	33%	15%	19%	31,694.5 lb	19.3 lb	5.6 lb	5,282.4 gal.	± 21%
Pacific cod (gray)	0.2%	0.2%	0.2%	0%	0%	63.5 lb	0.0 lb	0.0 lb	7.1 ind.	± 166%
Saffron cod	11%	1%	1%	10%	2%	195.9 lb	0.1 lb	0.0 lb	261.2 ind.	± 97%
Flounder	0.4%	0.2%	0.2%	0.2%	0.2%	19.4 lb	0.0 lb	0.0 lb	17.7 ind.	± 166%
Lingcod	0.4%	0.2%	0.2%	0.2%	0.2%	28.2 lb	0.0 lb	0.0 lb	7.1 ind.	± 166%
Pacific halibut	27%	5%	5%	25%	5%	6,090.9 lb	3.7 lb	1.1 lb	6,090.9 lb.	± 48%
Arctic lampreys	2%	0.4%	0.4%	2%	0.2%	213.9 lb	0.1 lb	0.0 lb	356.5 ind.	± 165%
Unknown rockfish	0.2%	0.2%	0.2%	0%	0.2%	10.6 lb	0.0 lb	0.0 lb	7.1 ind.	± 166%
Sablefish (black cod)	0.2%	0.2%	0.2%	0%	0.0%	21.9 lb	0.0 lb	0.0 lb	7.1 ind.	± 166%
Stickleback (needlefish)	1%	1%	1%	1%	0%	158.9 lb	0.1 lb	0.0 lb	26.5 gal.	± 135%
Subtotal	**58%**	**34%**	**34%**	**42%**	**22%**	**39,916.8 lb**	**24.3 lb**	**7.0 lb**		**± 20%**
Other fresh water fish										
Alaska blackfish	17%	5%	5%	14%	5%	4,175.2 lb	2.5 lb	0.7 lb	4,175.2 lb.	± 56%
Burbot	27%	19%	17%	13%	8%	28,935.9 lb	17.6 lb	5.1 lb	6,430.2 ind.	± 47%
Arctic grayling	5%	5%	5%	1%	1%	843.4 lb	0.5 lb	0.1 lb	562.3 ind.	± 44%
Northern pike	28%	22%	21%	10%	10%	57,618.9 lb	35.0 lb	10.2 lb	12,804.2 ind.	± 34%
Longnose sucker	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown non-salmon fi	1%	0%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**43%**	**32%**	**31%**	**26%**	**18%**	**91,573.4 lb**	**55.7 lb**	**16.1 lb**		**± 35%**
ALL FISH	**93%**	**67%**	**65%**	**80%**	**53%**	**579,201.7 lb**	**352.1 lb**	**102.1 lb**		**± 20%**
ALL RESOURCES	**97%**	**86%**	**85%**	**92%**	**70%**	**954,525.2 lb**	**580.3 lb**	**168.3 lb**		**± 15%**

Source : Alaska Department of Fish and Game, Division of Subsistence Household Surveys, 2012.

[1] Amount of resource harvested is individual units, unless otherwise specified.

All Resources include all species of fish, wildlife, and plants reported on the survey.

TABLE 2. ESTIMATED HARVESTS OF SUBSISTENCE FOODS, BETHEL, 2012

	Percentage of households					Estimated pounds harvested			Total estimated amount[1] harvested by community	95% conf. limit
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita		
LAND MAMMALS										
Large land mammals										
Bison	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Black bear	3.2%	2.4%	1.3%	2.4%	1.3%	2,118.0 lb	1.3 lb	0.4 lb	21.2 ind.	± 68%
Brown bear	1%	1%	0.4%	0.4%	0.2%	995.5 lb	0.6 lb	0.2 lb	7.1 ind.	± 118%
Caribou	55%	20%	13%	45%	15%	48,644.0 lb	29.6 lb	8.6 lb	374.2 ind.	± 27%
Deer	0.4%	0.4%	0%	0.4%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Moose	74%	34%	19%	60%	27%	192,528.5 lb	117.0 lb	33.9 lb	356.5 ind.	± 17%
Muskox	4.7%	0.2%	0.2%	4.5%	0.9%	1,041.4 lb	0.6 lb	0.2 lb	3.5 ind.	± 166%
Dall sheep	1.1%	0.6%	0.4%	0.6%	0.2%	564.8 lb	0.3 lb	0.1 lb	7.1 ind.	± 118%
Subtotal	**80%**	**38%**	**25%**	**68%**	**32%**	**245,892.2 lb**	**149.5 lb**	**43.3 lb**	**769.5 ind.**	**± 17%**
Small land mammals										
Beaver	9%	7%	6%	3%	3%	3,706.5 lb	2.3 lb	0.7 lb	716.6 ind.	± 55%
Coyote	0.6%	1%	0.6%	0%	0.2%	*Not usually eaten*			10.6 ind.	± 124%
Arctic fox	1%	1%	0.6%	0.2%	0.2%	*Not usually eaten*			7.1 ind.	± 117%
Red fox	4%	4%	4%	0.4%	0.6%	*Not usually eaten*			1,068.4 ind.	± 72%
Arctic hare	3%	3%	2%	1%	0.6%	466.0 lb	0.3 lb	0.1 lb	173.0 ind.	± 98%
Snowshow hare	12%	10%	9%	3%	4%	1,821.5 lb	1.1 lb	0.3 lb	1,224.0 ind.	± 46%
River otter	3%	3%	2%	0.4%	0%	*Not usually eaten*			113.2 ind.	± 62%
Lynx	2%	2%	1%	0.6%	0.4%	*Not usually eaten*			180.4 ind.	± 119%
Marmot	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Marten	1%	1%	1%	0%	0.2%	*Not usually eaten*			187.5 ind.	± 101%
Mink	2%	2%	2%	0.4%	0.0%	*Not usually eaten*			60.1 ind.	± 76%
Muskrat	2%	2%	2%	0%	0.9%	66.2 lb	0.0 lb	0.0 lb	127.1 ind.	± 111%
Porcupine	2%	2%	2%	0.6%	0.6%	169.4 lb	0.1 lb	0.0 lb	60.0 ind.	± 83%
Parka squirrel (ground)	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Weasel	1%	1%	1%	0%	0%	*Not usually eaten*			63.7 ind.	± 82%
Wolf	1%	2%	1%	0.2%	0%	*Not usually eaten*			35.4 ind.	± 122%
Wolverine	2%	2%	2%	0.2%	0%	*Not usually eaten*			67.2 ind.	± 72%
Subtotal	**20%**	**16%**	**14%**	**7%**	**7%**	**6,229.6 lb**	**3.8 lb**	**1.1 lb**	**4,094.3 ind.**	**± 40%**
Feral mammals										
Reindeer - feral	0.2%	0%	0%	0.2%	0.0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**0.2%**	**0%**	**0%**	**0.2%**	**0%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**0.0 ind.**	**± 0%**
MARINE MAMMALS										
Beard seal	11%	2%	1%	10%	3%	3,953.6 lb	2.4 lb	0.7 lb	28.2 ind.	± 83%
Harbor seal	1%	0.4%	0.2%	0.6%	0.4%	197.7 lb	0.1 lb	0.0 lb	3.5 ind.	± 166%
Ringed seal	9%	3%	2%	7%	3%	5,535.1 lb	3.4 lb	1.0 lb	98.8 ind.	± 62%
Spotted seal	8%	2%	2%	7%	3%	2,174.5 lb	1.3 lb	0.4 lb	38.8 ind.	± 58%
Unknown seal	35%	1%	0.4%	35%	7%	494.2 lb	0.3 lb	0.1 lb	7.1 ind.	± 118%
Walrus	14%	1%	0.6%	14%	4%	5,930.5 lb	3.6 lb	1.0 lb	10.6 ind.	± 96%
Beluga	13%	0.4%	0%	13%	1%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Bowhead	8%	0%	0%	8%	0.6%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Minke (bottlenose)	0.2%	0%	0%	0.2%	0.2%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**45%**	**5%**	**4%**	**44%**	**12%**	**18,285.6 lb**	**11.1 lb**	**3.2 lb**	**187.1 ind.**	**± 55%**
ALL LAND MAMMALS	**81%**	**41%**	**30%**	**70%**	**34%**	**252,121.8 lb**	**153.3 lb**	**44.4 lb**		**± 17%**
ALL MARINE MAMMALS	**45%**	**5%**	**4%**	**44%**	**12%**	**18,285.6 lb**	**11.1 lb**	**3.2 lb**		**± 55%**
ALL RESOURCES	**97%**	**86%**	**85%**	**92%**	**70%**	**954,525.2 lb**	**580.3 lb**	**168.3 lb**		**± 15%**

Source : Alaska Department of Fish and Game, Division of Subsistence Household Surveys, 2012.

[1] Amount of resource harvested is individual units, unless otherwise specified.

All Resources include all species of fish, wildlife, and plants reported on the survey.

Table 3.–Estimated use and harvest of birds and eggs, Bethel, 2012.

	Percentage of households					Estimated pounds harvested				
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita	Total estimated amount[1] harvested by community	95% conf. limit
Migratory birds										
Ducks										
Bufflehead	1%	1%	1%	0%	0.2%	32.5 lb	0.0 lb	0.0 lb	81.2 ind.	± 103%
Canvasback	2%	2%	1%	1%	1%	248.5 lb	0.2 lb	0.0 lb	225.9 ind.	± 92%
Common eider	1%	0.4%	0.2%	1%	0.2%	117.0 lb	0.1 lb	0.0 lb	53.0 ind.	± 166%
King eider	4%	1%	1%	3%	1%	797.6 lb	0.5 lb	0.1 lb	557.7 ind.	± 116%
Spectacled eider	0.4%	0.4%	0.2%	0.2%	0.2%	17.2 lb	0.0 lb	0.0 lb	7.1 ind.	± 166%
Goldeneye	2%	2%	2%	0%	1%	172.6 lb	0.1 lb	0.0 lb	215.8 ind.	± 71%
Harlequin duck	1%	1%	1%	0%	0.4%	26.5 lb	0.0 lb	0.0 lb	53.0 ind.	± 97%
Mallard	18%	14%	13%	6%	6%	1,523.9 lb	0.9 lb	0.3 lb	1,523.9 ind.	± 31%
Unknown merganser	0.4%	1%	0.4%	0%	0.4%	20.1 lb	0.0 lb	0.0 lb	21.2 ind.	± 141%
Long-Tailed duck	0.4%	1%	0.2%	0.2%	0.2%	42.4 lb	0.0 lb	0.0 lb	53.0 ind.	± 166%
Northern pintail	15%	12%	11%	4%	5%	962.8 lb	0.6 lb	0.2 lb	1,203.5 ind.	± 37%
Scaup	5%	5%	4%	1%	2%	1,339.5 lb	0.8 lb	0.2 lb	1,488.3 ind.	± 70%
Black scoter	15%	11%	10%	6%	6%	1,666.8 lb	1.0 lb	0.3 lb	1,852.0 ind.	± 35%
Surf scoter	2%	2%	2%	0.2%	1%	187.4 lb	0.1 lb	0.0 lb	208.3 ind.	± 71%
White-Winged scoter	2%	2%	2%	1%	1%	143.3 lb	0.1 lb	0.0 lb	159.2 ind.	± 76%
Northern shoveler	3%	3%	3%	0.4%	1%	301.4 lb	0.2 lb	0.1 lb	502.3 ind.	± 119%
Green-Winged teal	7%	7%	6%	1%	3%	175.9 lb	0.1 lb	0.0 lb	586.2 ind.	± 45%
American wigeon	6%	6%	6%	0.2%	2%	548.3 lb	0.3 lb	0.1 lb	783.3 ind.	± 70%
Eurasian wigeon	0.2%	0.2%	0.2%	0%	0%	4.9 lb	0.0 lb	0.0 lb	7.1 ind.	± 166%
Unknown ducks	6%	1%	1%	5%	1%	104.6 lb	0.1 lb	0.0 lb	120.3 ind.	± 110%
Subtotal	**38%**	**24%**	**23%**	**19%**	**12%**	**8,433.2 lb**	**5.1 lb**	**1.5 lb**	**9,702.2 ind.**	**± 33%**
Geese										
Brant	5%	2%	2%	4%	1%	301.4 lb	0.2 lb	0.1 lb	251.2 ind.	± 84%
Cackling goose	0.2%	0.2%	0.2%	0%	0.2%	105.9 lb	0.1 lb	0.0 lb	88.3 ind.	± 166%
Lesser canada goose	0.2%	0%	0%	0.2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Canada/Cackling goose	38%	23%	21%	20%	14%	4,937.1 lb	3.0 lb	0.9 lb	4,114.3 ind.	± 34%
Emperor goose	2%	1%	0.4%	1%	0.4%	317.7 lb	0.2 lb	0.1 lb	127.1 ind.	± 141%
Snow goose	2%	1%	1%	2%	1%	40.6 lb	0.0 lb	0.0 lb	17.7 ind.	± 88%
White-Fronted goose	35%	23%	23%	15%	12%	17,607.6 lb	10.7 lb	3.1 lb	7,336.5 ind.	± 43%
Unknown goose	3%	1%	1%	2%	1%	131.3 lb	0.1 lb	0.0 lb	67.2 ind.	± 114%
Subtotal	**48%**	**29%**	**28%**	**28%**	**17%**	**23,441.6 lb**	**14.3 lb**	**4.1 lb**	**12,002.1**	**± 38%**
Other migratory birds										
Unknown swan	14%	9%	8%	7%	3%	4,280.5 lb	2.6 lb	0.8 lb	428.1 ind.	± 53%
Sandhill crane	9%	7%	7%	3%	2%	2,193.3 lb	1.3 lb	0.4 lb	219.3 ind.	± 36%
Whimbrel	0.4%	0.4%	0.4%	0.2%	0.2%	11.3 lb	0.0 lb	0.0 lb	113.0 ind.	± 156%
Unknown shorebirds	0.2%	0.2%	0.2%	0%	0.2%	1.8 lb	0.0 lb	0.0 lb	17.7 ind.	± 166%
Pacific/Arctic loon	0.2%	0%	0%	0.2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown loon	0.2%	0%	0%	0.2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown seabirds	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Songbirds	0.2%	0.2%	0.2%	0%	0%	0.0 lb	0.0 lb	0.0 lb	10.6 ind.	± 0%
Subtotal	**19%**	**13%**	**12%**	**8%**	**5%**	**6,486.9 lb**	**3.9 lb**	**1.1 lb**	**788.6 ind.**	**± 42%**
Other birds										
Grouse	4%	3%	3%	1%	1%	744.8 lb	0.5 lb	0.1 lb	744.8 ind.	± 85%
Ptarmigan	42%	30%	29%	16%	18%	14,425.7 lb	8.8 lb	2.5 lb	14,425.7 ind.	± 23%
Unknown other birds	0.2%	0%	0%	0.2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**43%**	**30%**	**29%**	**16%**	**18%**	**15,170.5 lb**	**9.2 lb**	**2.7 lb**	**15,170.5 ind.**	**± 23%**
ALL MIGRATORY BIRDS	**54%**	**33%**	**32%**	**34%**	**22%**	**38,361.7 lb**	**23.3 lb**	**6.8 lb**		**± 32%**
ALL OTHER BIRDS	**43%**	**30%**	**29%**	**16%**	**18%**	**15,170.5 lb**	**9.2 lb**	**2.7 lb**		**± 23%**
ALL RESOURCES	**97%**	**86%**	**85%**	**92%**	**70%**	**954,525 lb**	**580 lb**	**168.3 lb**		**± 15%**

Source: Alaska Department of Fish and Game, Division of Subsistence Household Surveys, 2012.

[1] Amount of resource harvested is individual units, unless otherwise specified.

All Resources include all species of fish, wildlife, and plants reported on the survey.

salmon (11% of total harvest), sockeye salmon (10%), and Chinook salmon, with 8% of the total subsistence harvest. However, it must be noted that the poor king salmon run and resulting subsistence salmon fishing restrictions may have resulted in fewer king salmon harvested than would occur during a more typical year.

Northern pike (6%), caribou (5%), smelt (3%), humpback whitefish (3%), and burbot (3%) make up the rest of the top 10 resources harvested and used by Bethel residents in 2012. Other remaining resources contributed a combined 19% of the total subsistence harvest.

Marine mammal harvests represented 2% of total harvest by weight, consisting of 11 walrus, 99 ringed seals, 28 bearded seals, 29 spotted seals, 4 harbor seals, and 7 unknown seals.

Migratory birds, eggs, and upland game birds were also harvested by Bethel residents in 2012, representing 6% of the total subsistence harvest. An estimated total of 9,702 ducks were harvested, in addition to 12,002 geese, with the majority of harvest made up of White-Fronted geese (17,608 edible pounds) and Canada/Cackling geese (4,937 edible pounds). Approximately 5,818 bird eggs were gathered by Bethel residents in 2012. Other migratory birds harvested can be seen in Table 3.

Marine invertebrates were also reported harvested by Bethel residents in 2012; however, it is unclear how many were harvested in the Bethel area. Approximately 71 Dungeness crabs, 124 gallons of cockles, 123 gallons of unknown clams, and 28 shrimp were harvested. Based upon the species reported, it seems likely that these harvests took place away from Bethel, as only 8% of households reported using marine invertebrates, with only 2% attempting and 2% successfully harvesting.

Figure 4. Fur sealing at Bethel ADF&G Office.

Figure 5. Nels Alexie fishing through the ice near Bethel, 2012.

This survey was conducted by the Division of Subsistence of the Alaska Department of Fish and Game, in cooperation with the Orutsararmiut Native Council and the Bethel City Council. Local researchers included _____

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Source for this information: Ikuta, Hirko, D. Runfola, and A. Brenner. In Press. Subsistence harvests in Bethel, Alaska, 2012. Alaska Department of Fish and Game, Division of Subsistence, Fairbanks. Techincal Paper No. XXX.

Electronic copy of this report: http://www.subsistence.adfg.state.ak.us/TechPap/TPXXX.pdf

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APPENDIX F–ADDITIONAL TABLES

Table F-1.–Estimated harvest of salmon and nonsalmon fish for consumption by dogs, Bethel, 2012.

Resource	Amount	Pounds
Nonsalmon fish		
Rainbow trout	0.00 ind	0.00 lb
Arctic grayling	0.00 ind	0.00 lb
Dolly Varden	0.00 ind	0.00 lb
Other nonsalmon fish	0.00 ind	0.00 lb
Alaska blackfish	0.00 ind	0.00 lb
Unknown smelt	209.62 ind	739.97 lb
Pacific halibut	0.00 lb	0.00 lb
Burbot	0.00 ind	0.00 lb
Northern pike	28.36 ind	100.12 lb
Whitefishes	1,012.43 ind	3,573.91 lb
Salmon		
Unknown salmon	0.00 ind	0.00 lb
Pink salmon	45.99 ind	162.34 lb
Chinook salmon	0.00 ind	0.00 lb
Sockeye salmon	71.06 ind	250.84 lb
Coho salmon	1,286.93 ind	4,542.91 lb
Chum salmon	1,598.81 ind	5,643.88 lb
Total	**4,253.20**	**15,013.98 lb**
Whitefishes		
Unknown cisco	0.00 ind	0.00 lb
Bering cisco	0.00 ind	0.00 lb
Unknown whitefishes	0.00 ind	0.00 lb
Round whitefish	0.00 ind	0.00 lb
Least cisco	0.00 ind	0.00 lb
Sheefish	70.91 ind	250.30 lb
Broad whitefish	0.00 ind	0.00 lb
Humpback whitefish	941.52 ind	3,323.62 lb
Subtotal	*1,012.43 ind*	*3,573.91 lb*
Other nonsalmon fish		
Eulachon (hooligan, candlefish)	0.00 gal	0.00 lb
Longnose sucker	0.00 ind	0.00 lb
Unknown trout	0.00 ind	0.00 lb
Unknown nonsalmon fish	0.00 ind	0.00 lb
Pacific cod (gray)	0.00 ind	0.00 lb
Lingcod	0.00 ind	0.00 lb
Unknown rockfish	0.00 ind	0.00 lb
Sablefish (black cod)	0.00 ind	0.00 lb
Flounder	0.00 ind	0.00 lb
Stickleback (needlefish)	0.00 ind	0.00 lb
Pacific herring	0.00 gal	0.00 lb
Pacific herring roe	0.00 ind	0.00 lb
Arctic char	0.00 ind	0.00 lb
Lake trout	0.00 ind	0.00 lb
Arctic lamprey	0.00 ind	0.00 lb
Saffron cod	0.00 ind	0.00 lb
Subtotal	*0.00*	*0.00 lb*

Source ADF&G Division of Subsistence household surveys, 2013.

Table F-2.–Estimated large land mammal and gray wolf harvest by month and sex, Bethel, 2012.

	Bison	Black bear	Brown bear	Caribou			Deer	Moose			Muskox	Dall sheep	Gray wolf
Harvest month	Unknown	Unknown	Unknown	Male	Female	Unknown	Unknown	Male	Female	Unknown	Unknown	Unknown	Unknown
January	0.0	0.0	0.0	21.2	17.7	0.0	0.0	7.1	7.1	0.0	0.0	0.0	7.1
February	0.0	0.0	0.0	31.8	31.8	7.1	0.0	7.1	45.9	3.5	0.0	0.0	7.1
March	0.0	0.0	3.5	38.8	49.4	3.5	0.0	3.5	14.1	3.5	3.5	0.0	10.6
April	0.0	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
May	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
June	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
July	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0
August	0.0	3.5	0.0	0.0	0.0	0.0	0.0	10.6	0.0	0.0	0.0	7.1	0.0
September	0.0	14.1	3.5	10.6	3.5	0.0	0.0	229.5	0.0	0.0	0.0	0.0	7.1
October	0.0	0.0	0.0	7.1	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0
November	0.0	0.0	0.0	28.2	3.5	10.6	0.0	3.5	0.0	0.0	0.0	0.0	0.0
December	0.0	3.5	0.0	42.4	17.7	10.6	0.0	7.1	3.5	0.0	0.0	0.0	3.5
Unknown	0.0	0.0	0.0	21.2	7.1	3.5	0.0	0.0	0.0	3.5	0.0	0.0	0.1
Total harvest	**0.0**	**21.2**	**7.1**	**208.3**	**130.6**	**35.3**	**0.0**	**275.3**	**70.6**	**10.6**	**3.5**	**7.1**	**35.4**

Source ADF&G Division of Subsistence household surveys, 2013.

Table F-3.–Estimated small land mammal harvest by month, Bethel, 2012.

	Estimated harvest by month												
Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk
Beaver	17.7	38.8	31.8	31.8	165.9	21.2	7.1	7.1	35.3	148.3	113.0	98.8	0.0
Coyote	0.0	3.5	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arctic fox	3.5	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red fox	271.8	123.6	88.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	236.5	324.8	23.5
Alaska hare	24.7	31.8	105.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.6
Snowshow hare	183.6	257.7	130.6	49.4	0.0	0.0	10.6	0.0	148.3	14.1	180.0	173.0	76.8
River (land) otter	3.5	17.7	24.7	10.6	0.0	0.0	0.0	0.0	0.0	7.1	0.0	38.8	10.8
Lynx	38.8	60.0	67.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.6	3.9
Marmot	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
Marten	24.7	21.2	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.7	88.7
Mink	3.5	0.0	24.7	10.6	0.0	0.0	0.0	0.0	0.0	3.5	0.0	10.6	7.2
Muskrat	0.0	0.0	0.0	0.0	63.5	14.1	0.0	0.0	0.0	31.8	7.1	10.6	0.0
Porcupine	3.5	14.1	21.2	0.0	7.1	3.5	0.0	0.0	10.6	0.0	0.0	0.0	0.0
Arctic ground (parka) squirrel	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
Weasel	0.0	14.1	21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	17.7	7.2
Gray wolf	7.1	7.1	10.6	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	3.5	0.1
Wolverine	3.5	21.2	21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	17.8
Total harvest	**586.0**	**610.7**	**586.0**	**102.4**	**236.5**	**38.8**	**17.7**	**7.1**	**201.2**	**204.7**	**540.1**	**716.6**	**246.5**

Source ADF&G Division of Subsistence household surveys, 2013.

Table F-4.–Estimated marine mammal harvest by month, Bethel, 2012.

	Estimated harvest by month												
Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk
Bearded seal	0.0	0.0	10.6	3.5	7.1	0.0	0.0	0.0	3.5	3.5	0.0	0.0	0.0
Harbor seal	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ringed seal	0.0	0.0	35.3	53.0	7.1	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0
Spotted seal	0.0	0.0	14.1	7.1	3.5	0.0	7.1	0.0	3.5	3.5	0.0	0.0	0.0
Unknown seal	0.0	0.0	0.0	0.0	3.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walrus	0.0	3.5	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Beluga whale	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
Bowhead whale	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
Minke (bottlenose) whale	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 harvest	**0.0**	**3.5**	**60.0**	**67.1**	**28.2**	**3.5**	**7.1**	**0.0**	**7.1**	**10.6**	**0.0**	**0.0**	**0.0**

Source ADF&G Division of Subsistence household surveys, 2013.

Table F-5.–Estimated bird harvest by season, Bethel, 2012.

	Estimated harvest by season				
Resource	Winter	Spring	Summer	Fall	Season unknown
Bufflehead	0.0	0.0	0.0	81.2	0.0
Canvasback	0.0	84.7	35.3	0.0	105.9
Common eider	0.0	53.0	0.0	0.0	0.0
King eider	0.0	557.7	0.0	0.0	0.0
Spectacled eider	0.0	7.1	0.0	0.0	0.0
Goldeneye	0.0	70.6	17.7	127.1	0.5
Harlequin duck	0.0	53.0	0.0	0.0	0.0
Mallard	0.0	769.5	0.0	727.2	27.2
Unknown merganser	0.0	21.2	0.0	0.0	0.0
Long-tailed duck	0.0	53.0	0.0	0.0	0.0
Northern pintail	0.0	412.1	70.6	713.1	7.7
Scaup	0.0	324.4	353.0	695.4	115.5
Black scoter	0.0	1,680.7	0.0	155.3	15.9
Surf scoter	0.0	208.3	0.0	0.0	0.0
White-winged scoter	0.0	116.5	0.0	42.4	0.3
Northern shoveler	0.0	70.6	176.5	254.2	1.1
Green-winged teal	0.0	144.7	0.0	437.7	3.8
American wigeon	0.0	118.2	215.3	444.8	5.0
Eurasian wigeon	0.0	0.0	0.0	7.1	0.0
Unknown ducks	0.0	49.4	0.0	70.6	0.3
Brant	0.0	233.5	0.0	17.7	0.0
Cackling goose	0.0	70.6	0.0	17.7	0.0
Canada goose	0.0	0.0	0.0	0.0	0.0
Canada/cackling goose	0.0	3,301.5	10.6	825.2	-22.9
Emperor goose	0.0	105.9	0.0	21.2	0.0
Snow goose	0.0	3.5	0.0	14.1	0.0
White-fronted goose	0.0	5,881.6	24.7	1,414.5	15.7
Unknown goose	0.0	49.4	0.0	14.1	3.7
Unknown swan	0.0	237.4	70.6	116.5	3.5
Sandhill crane	0.0	208.7	3.5	7.1	0.0
Whimbrel	0.0	7.1	0.0	105.9	0.0
Unknown shorebirds	0.0	17.7	0.0	0.0	0.0
Pacific/Arctic loon	0.0	0.0	0.0	0.0	0.0
Unknown loon	0.0	0.0	0.0	0.0	0.0
Unknown seabirds	0.0	0.0	0.0	0.0	0.0
Songbirds	0.0	10.6	0.0	0.0	0.0
Grouse	14.1	28.2	21.2	681.3	0.0
Ptarmigan	5,704.5	8,548.9	0.0	141.2	31.0
Unknown other birds	0.0	0.0	0.0	0.0	0.0
Total harvest	**5,718.7**	**23,499.3**	**999.0**	**7,132.2**	**314.2**

Source ADF&G Division of Subsistence household surveys, 2013.

Table F-6.–Reasons use of resources was less than in recent years, Bethel, 2013.

	Reasons for less use as compared to recent years																			
	Salmon other than Chinook		Chinook salmon		Nonsalmon fish other than whitefishes		Whitefishes		Land mammals		Marine mammals		Birds and eggs		Marine invertebrates		Plants and berries		All resources	
Reason	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Family or personal	15	9.3%	18	6.1%	25	21.7%	17	16.2%	19	16.2%	8	13.3%	17	15.6%	4	17.4%	33	21.0%	39	19.7%
Resource availabilty	46	28.4%	73	24.6%	9	7.8%	8	7.6%	1	0.9%	0	0.0%	9	8.3%	0	0.0%	43	27.4%	47	23.7%
Resources too far	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
No equipment/ equipment problems	7	4.3%	22	7.4%	9	7.8%	10	9.5%	6	5.1%	0	0.0%	11	10.1%	2	8.7%	7	4.5%	18	9.1%
Did not recieve	28	17.3%	36	12.1%	24	20.9%	29	27.6%	23	19.7%	32	53.3%	18	16.5%	11	47.8%	7	4.5%	24	12.1%
Did not try/low effort	17	10.5%	15	5.1%	25	21.7%	11	10.5%	28	23.9%	7	11.7%	26	23.9%	2	8.7%	29	18.5%	16	8.1%
Unsuccessful (unlucky)	3	1.9%	7	2.4%	7	6.1%	6	5.7%	20	17.1%	2	3.3%	6	5.5%	0	0.0%	3	1.9%	8	4.0%
Weather/environment	8	4.9%	7	2.4%	8	7.0%	4	3.8%	4	3.4%	2	3.3%	7	6.4%	2	8.7%	14	8.9%	19	9.6%
Other	2	1.2%	2	0.7%	4	3.5%	5	4.8%	4	3.4%	2	3.3%	3	2.8%	2	8.7%	7	4.5%	8	4.0%
Working/not enough time	8	4.9%	6	2.0%	5	4.3%	7	6.7%	16	13.7%	3	5.0%	15	13.8%	1	4.3%	17	10.8%	18	9.1%
Regulations	35	21.6%	163	54.9%	2	1.7%	2	1.9%	2	1.7%	0	0.0%	0	0.0%	1	4.3%	2	1.3%	30	15.2%
Resources too small/diseased	1	0.6%	5	1.7%	0	0.0%	0	0.0%	1	0.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	1.0%
Did not get enough	3	1.9%	2	0.7%	2	1.7%	0	0.0%	1	0.9%	1	1.7%	1	0.9%	0	0.0%	4	2.5%	2	1.0%
Did not need	10	6.2%	5	1.7%	3	2.6%	6	5.7%	3	2.6%	2	3.3%	4	3.7%	0	0.0%	2	1.3%	3	1.5%
Did not give any away	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	0.0%
Too expensive (fuel)	4	2.5%	2	0.7%	4	3.5%	5	4.8%	1	0.9%	1	1.7%	5	4.6%	0	0.0%	7	4.5%	11	5.6%
Use other resources	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Competition	2	1.2%	3	1.0%	2	1.7%	0	0.0%	0	0.0%	0	0.0%	1	0.9%	0	0.0%	2	1.3%	1	0.5%

Source ADF&G Division of Subsistence household surveys, 2013.

Table F-7.–Reasons use of resources was more than in recent years, Bethel, 2012.

	Reasons for more use as compared to recent years																			
	Salmon other than Chinook		Chinook salmon		Nonsalmon fish other than whitefishes		Whitefishes		Land mammals		Marine mammals		Birds and eggs		Marine invertebrates		Plants and berries		All resources	
Reason	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Increased availability	4	4.0%	1	7.7%	2	5.3%	2	3.8%	6	11.5%	0	0.0%	3	10.0%	1	12.5%	8	12.3%	5	9.1%
Used other resources	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	0.0%
Good weather	0	0.0%	0	0.0%	1	2.6%	0	0.0%	1	1.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Received more	10	10.1%	3	23.1%	9	23.7%	12	23.1%	23	44.2%	12	75.0%	7	23.3%	3	37.5%	9	13.8%	11	20.0%
Needed more	9	9.1%	0	0.0%	0	0.0%	5	9.6%	2	3.8%	1	6.3%	0	0.0%	0	0.0%	8	12.3%	7	12.7%
Increased effort	9	9.1%	4	30.8%	13	34.2%	12	23.1%	3	5.8%	1	6.3%	12	40.0%	3	37.5%	27	41.5%	12	21.8%
Got more help	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	1.5%	1	1.8%
Other	10	10.1%	5	38.5%	3	7.9%	6	11.5%	4	7.7%	0	0.0%	1	3.3%	1	12.5%	8	12.3%	14	25.5%
Regulations	8	8.1%	0	0.0%	0	0.0%	1	1.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Traveled farther	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.9%	0	0.0%	2	6.7%	0	0.0%	0	0.0%	1	1.8%
Increased success	4	4.0%	1	7.7%	4	10.5%	8	15.4%	10	19.2%	2	12.5%	5	16.7%	0	0.0%	4	6.2%	3	5.5%
Needed less	1	1.0%	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%
Store bought too expensive	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	3.6%
Had access to equipment	1	1.0%	0	0.0%	0	0.0%	1	1.9%	1	1.9%	0	0.0%	0	0.0%	0	0.0%	1	1.5%	0	0.0%
Got more to compensate for lack of other resources	52	52.5%	0	0.0%	6	15.8%	6	11.5%	1	1.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.8%

Source ADF&G Division of Subsistence household surveys, 2013.

Table F-8.–Top 10 reported areas and numbers of households to which Bethel households gave a resource, 2012.

Receiving community	Resource: Salmon	Chinook salmon	Other fish	Whitefishes	**Total events**
Bethel	106	58	96	51	**311**
Anchorage	21	7	8	7	**43**
Unknown	8	8	12	5	**33**
Other U.S.	13	5	3	1	**22**
Akiachak	4	3	5	3	**15**
Kipnuk	6	2	3	4	**15**
Fairbanks	5	3	1	1	**10**
Kasigluk	3	3	1	1	**8**
Toksook Bay	3	2	2		**7**
Tuntutuliak	2	2	2	1	**7**

Source ADF&G Division of Subsistence household surveys, 2013.

Note Total number of areas/communities receiving resources from Bethel households was 51.

Table F-9.–Top 10 reported areas and numbers of households from which Bethel households received a resource, 2012.

Community	Resource: Salmon	Chinook salmon	Other fish	Whitefishes	**Total events**
Bethel	198	143	108	85	**534**
Tundra Center, Bethel	26	8			**34**
Toksook Bay	3	4	23	2	**32**
Nunapitchuk	5	3	7	10	**25**
Kasigluk	2	2	5	14	**23**
Unknown	6	2	12	3	**23**
Kipnuk			15	3	**18**
Kwethluk	7	4	2	4	**17**
Atmautluak	5	2	2	5	**14**
Kwigillingok	1	1	11	1	**14**

Source ADF&G Division of Subsistence household surveys, 2013.

Note Total number of areas/communities receiving resources from Bethel households was 89.

Table F-10.–Employment characteristics, Bethel, 2012.

Characteristic	Bethel
All adults	
Number	3982.6
Mean weeks employed	31.9
Employed adults	
Number	2815.3
Percentage	70.7%
Jobs	
Number	3161.9
Mean	1.1
Minimum	1
Maximum	4
Months employed	
Mean	10.5
Minimum	1
Maximum	12
Percentage employed year round	68.7%
Mean weeks employed	45.1
Households	
(Total) number	1645.0
Employed	
Number	1496.5
Percentage	91.0%
Jobs per employed household	
Mean	2.1
Minimum	1
Maximum	6
Employed adults	
Minimum	1
Maximum	6
Mean	
Employed households	1.9
Total households	1.7
Mean person-weeks of employment	82.5

Source ADF&G Division of Subsistence household surveys, 2013.

Table F-11.–Comparison of selected findings, Bethel, 2012.

Category	Bethel
Demography	
Population	5,672.8
Percentage of population that is Alaska Native	71.1%
Percentage of household heads born in Alaska	59.8%
Average length of residency of household heads (years)	22.2
Cash Economy	
Average number of months employed	10.5
Percentage of employed adults working year round	68.7%
Percentage of income from sources other than employment	8.1%
Average household income[a]	$96,957
Per capita income[a]	$28,116
Resource harvest and use	
Per capita harvest, pounds usable weight	165.8
Average household harvest, pounds usable weight	571.7
Number of resources used by 50% or more households	8.0
Average number of resources used per household	14.7
Average number of resources attempted to harvest per household	9.1
Average number of resources harvested per household	8.4
Average number of resources received per household	7.3
Average number of resources given away per household	4.2
Percent of total harvest harvested by top 25%	78.6%
Percent of households taking 70% of harvest	19.1%
Per capita harvest of lowest 50% of households	4.7
Percent of total harvest taken by lowest 50% of households	2.9%
Average number of resources used by lowest 50 % of households	8.7
Average number of resources used by top 25% of households	25.6

Source ADF&G Division of Subsistence household surveys, 2013.
a. Includes income from sources other than employment.

Table F-12.–Reported job schedules, Bethel, 2012.

	Jobs		Employed persons		Employed households	
Schedule	Number	Percentage	Number	Percentage	Number	Percentage
Full-time	2,672.5	84.5%	2,532.6	90.0%	1429.6	95.5%
Part-time	279.1	8.8%	263.6	9.4%	222.8	14.9%
Shift	15.3	0.5%	15.3	0.5%	14.9	1.0%
On-call (occasional)	187.3	5.9%	175.7	6.2%	144.8	9.7%
Part-time shift	3.8	0.1%	3.8	0.1%	3.7	0.2%
Schedule not reported	3.8	0.1%	3.8	0.1%	3.7	0.2%

Source ADF&G Division of Subsistence household surveys, 2013.