Technical Paper No. 379

Subsistence Harvests in 6 Communities in the Lower and Central Kuskokwim River Drainage, 2010

Edited by
Caroline L. Brown,
Hiroko Ikuta,
David S. Koster, and
James S. Magdanz

July 2013

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

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)	
centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

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

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

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

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

Measures (fisheries)	
fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

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

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Caroline L. Brown, Hiroko Ikuta
Division of Subsistence, Fairbanks

James S. Magdanz
Division of Subsistence, Kotzebue

David S. Koster
Division of Subsistence, Anchorage

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

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

Technical Paper series reports are available through the Alaska Resources Library and Information Services (ARLIS), the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/. This publication has undergone editorial and professional review.

Caroline L. Brown, Hiroko Ikuta
Alaska Department of Fish and Game, Division of Subsistence
1300 College Road, Fairbanks, AK 99701-1599 USA

James S. Magdanz
Alaska Department of Fish and Game, Division of Subsistence
Box 689, Kotzebue, AK 99752-0689 USA

David S. Koster
Alaska Department of Fish and Game, Division of Subsistence,
333 Raspberry Road, Anchorage, AK 99518-1599 USA

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Abstract

This report summarizes the results of research conducted in 2011 on the subsistence harvest and uses of wild foods in 6 Kuskokwim River communities: Akiak, Kwethluk, Oscarville, and Tuluksak of the lower river communities (estimated total population 1,617); and Georgetown and Napaimute of the central river communities (surveyed households 37). The methods used to collect data in the latter communities differ from the former. The most distinctive characteristic of the 2 central Kuskokwim River communities is that nobody lived permanently in Georgetown or Napaimute village sites during the study year. During the study year, Georgetown tribal members and Napaimute community members lived in communities throughout the Kuskokwim region, other parts of Alaska, and outside of the state.

The principal questions addressed by the Donlin Creek Subsistence Research Program were how many wild foods were harvested for subsistence, the harvest amounts, and how these foods were distributed within and between communities. Related questions addressed the role of wild foods in Alaska's economy, the role of cash in subsistence economies, the lands and waters used for subsistence practices in the central Kuskokwim area, and the impacts of competition with other users.

Between January and June 2011, residents of the 6 Kuskokwim River communities were surveyed. The 4 lower river communities, Akiak, Kwethluk, Oscarville, and Tuluksak, reported harvesting an estimated total of 693,542 edible pounds of subsistence resources, with an average estimated harvest rate of 429 lb per capita. Estimated harvest rates for each community ranged from 359 lb per person in Tuluksak to 616 lb per person in Akiak. The harvest patterns of lower river communities largely mirrored historical patterns of heavy reliance on salmon *Oncorhynchus* and moose*Alces alces*. The importance of salmon was evident, in that 4salmon species—Chinook *O. tshawytscha*, chum *O. keta*, coho *O. kisutch*, and sockeye *O. nerka*—comprised 47% of the annual subsistence harvest by weight (329,025 lb) for the region as a whole. Four nonsalmon species made up 23% of the total subsistence harvest by weight, and moose as well as caribou *Rangifer tarandus* made up the remaining top 10 resources harvested in 2010.

The 2 central river communities, Georgetown and Napaimute, on the other hand, have unique characteristics. In 2010, surveyed Georgetown and Napaimute households described higher on average rates of employment than other Kuskokwim River communities, likely due to many community members' residence in the regional or sub-regional hub communities. The level of income in a community influences subsistence harvest and use patterns in several ways. Moose and Chinook salmon comprised the majority of total community harvest by edible weight in Georgetown (72%) and Napaimute (67%); this compares to 41% of the total harvest for other Central Kuskokwim communities.

The results of the 2010 study year subsistence harvest survey are a significant step toward filling a

major data gap regarding subsistence in western Alaska. Analyses of harvest levels of specific species, demographics, harvest areas, village economies, harvest assessments, food security, and wild food networks help to characterize contemporary subsistence economies in western Alaska and contribute to our knowledge of subsistence statewide.

Key words: subsistence fishing, subsistence hunting, Akiak, Georgetown, Kwethluk, Napaimute, Oscarville, Tuluksak, Kuskokwim River, Chinook salmon, chum salmon, coho salmon, sockeye salmon, moose, social network, food security, Donlin Creek

1. Introduction

Prepared by Hiroko Ikuta and Caroline Brown

This report summarizes the results of research conducted in 2011 on the subsistence harvest and uses of wild foods in 6 Kuskokwim River communities: Akiak, Kwethluk, Oscarville, Tuluksak, Georgetown, and Napaimute (Figure 1-1). Residents of Western Alaska, and the Kuskokwim River drainage more specifically, 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 along the Kuskokwim River are taken from diverse ecosystems and habitats, including from the marine environments of the coastal regions to the boreal forests of Interior Alaska. Harvests vary from community to community and may also fluctuate through time in the amounts and species harvested in response to varied circumstances including species availability, regulations, socioeconomic factors (e.g., cost of fuel), personal tastes, and many others. The 6 Kuskokwim River communities included in this study harvested and used a variety of species, including, but not limited to, moose, caribou, salmon, whitefish, northern pike, burbot, geese, ducks, wild berries, and greens (see Appendix C for a list of scientific names for harvested species).

Despite this heavy reliance on wild foods, little historical quantitative data exist on harvest levels for these communities (Andrews and Peterson 1983); minimal data exist for the larger area. The only comprehensive subsistence harvest estimates produced for Lower Kuskokwim River region communities are reported in Coffing (1991) for Kwethluk, Andrews (1989) for Nunapitchuk, Coffing et al. (2001) for Akiachak, and comprehensive harvest data for Tununak for the 1986 harvest year are available online at the Community Subsistence Information System (CSIS[1]) website maintained by the Alaska Department of Fish and Game (ADF&G) Division of Subsistence. The Alaska Department of Fish and Game (ADF&G) has produced annual salmon harvest estimates by community, based on fish rack or household surveys, since 1960. Other harvest data, primarily for large game, exist in the hunter–harvest database maintained by ADF&G (WinfoNet[2]); however, because this is a voluntary reporting system it often fails to capture a significant component of the harvest, especially in rural Alaska (Andersen and Alexander 1992). Coffing et al. (2001), Hensel (1996), Oswalt (1963a, 1963b, 1980), and Ray et al. (2010) all contribute rich ethnographic information for the Lower Kuskokwim region. These data sources are discussed in more detail below.

This study represents a significant contribution to the available data on the harvest and uses of subsistence foods in the Lower Kuskokwim communities of Akiak, Kwethluk, Oscarville, and Tuluksak, and the Central Kuskokwim communities of Georgetown and Napaimute. Community support for

1. ADF&G Division of Subsistence, Community Subsistence Information System (CSIS): http://www.adfg.alaska.gov/sb/CSIS.
2. ADF&G, WinfoNet: http://winfonet.alaska.gov/.

this harvest documentation effort was strong; the tribal councils in each of the 6 communities were contacted and approved the research in their respective communities. Indeed, many residents had long been calling for increased data collection to corroborate their own local observations of hunting and fishing trends. This harvest documentation program relied on the public support of the residents of the Kuskokwim River region and the cooperating organizations, as well as on the continued financial support of Donlin Gold Limited Liability Company.

Background

The Lower and Central Kuskokwim River areas roughly include all the land and waters that drain into the Kuskokwim River mainstem from the mouth of the Kuskokwim River upriver to the community of Stony River. The Lower Kuskokwim stretches roughly from the mouth to the community of Tuluksak. The lower river communities in this study—Akiak, Kwethluk, Oscarville, and Tuluksak—are primarily encompassed by ADF&G Game Management Unit (GMU) 18. The Central Kuskokwim stretches roughly from the community of Lower Kalskag to the community of Stony River. Georgetown and Napaimute, the Central Kuskokwim communities included in this study, are located in GMU 19. A variety of political boundaries are also part of the Lower and Central Kuskokwim River areas, including the Calista Corporation service area (Calista Corporation is an Alaska Native corporation), the Yukon-Kuskokwim Delta Region and Western Interior Region (federal subsistence management areas), the Association of Village Council Presidents (AVCP, a nonprofit Alaska Native corporation), the Kuskokwim Management Area (a fishing regulatory area), and ADF&G GMUs 18 (Akiak, Kwethluk, Oscarville, and Tuluksak) and 19A (Georgetown and Napaimute). The project areas include both state and federal waters used for subsistence fishing, such as that portion of the Kuskokwim River between Lower Kalskag and Aniak that is adjacent to the Yukon Delta National Wildlife Refuge.

Central Yup'ik people have historically occupied the Lower Kuskokwim and part of the Central Kuskokwim River areas. Two distinct Athabascan groups, Dena'ina Athabascans who also live in the Cook Inlet and Lake Clark areas and Deg Hit'an who also live in the Yukon and Upper Kuskokwim areas, also inhabited the central and upper Kuskokwim basin in the late 1700s and early 1800s. Around 1830, Yup'ik people moved upriver from the coastal region into the Central Kuskokwim area (Hosley 1961; Oswalt 1962; Brown 1985). They maintained larger winter villages (approximately 7 residential structures each with a *qasgiq*, or men's communal house), sometimes jointly, as well as seasonal camps, which were usually occupied by a few families (Brown 1983). The joint forces of economic development, primarily commercial fishing, fur trapping, mining, and missionization, ultimately consolidated these settlements into the more permanent villages of the Kuskokwim River in the early 1900s. These seasonal settlements were characterized by a long-established pattern of moving across the land in pursuit of wild resources that is still followed today, though modified by the existence of permanent communities.

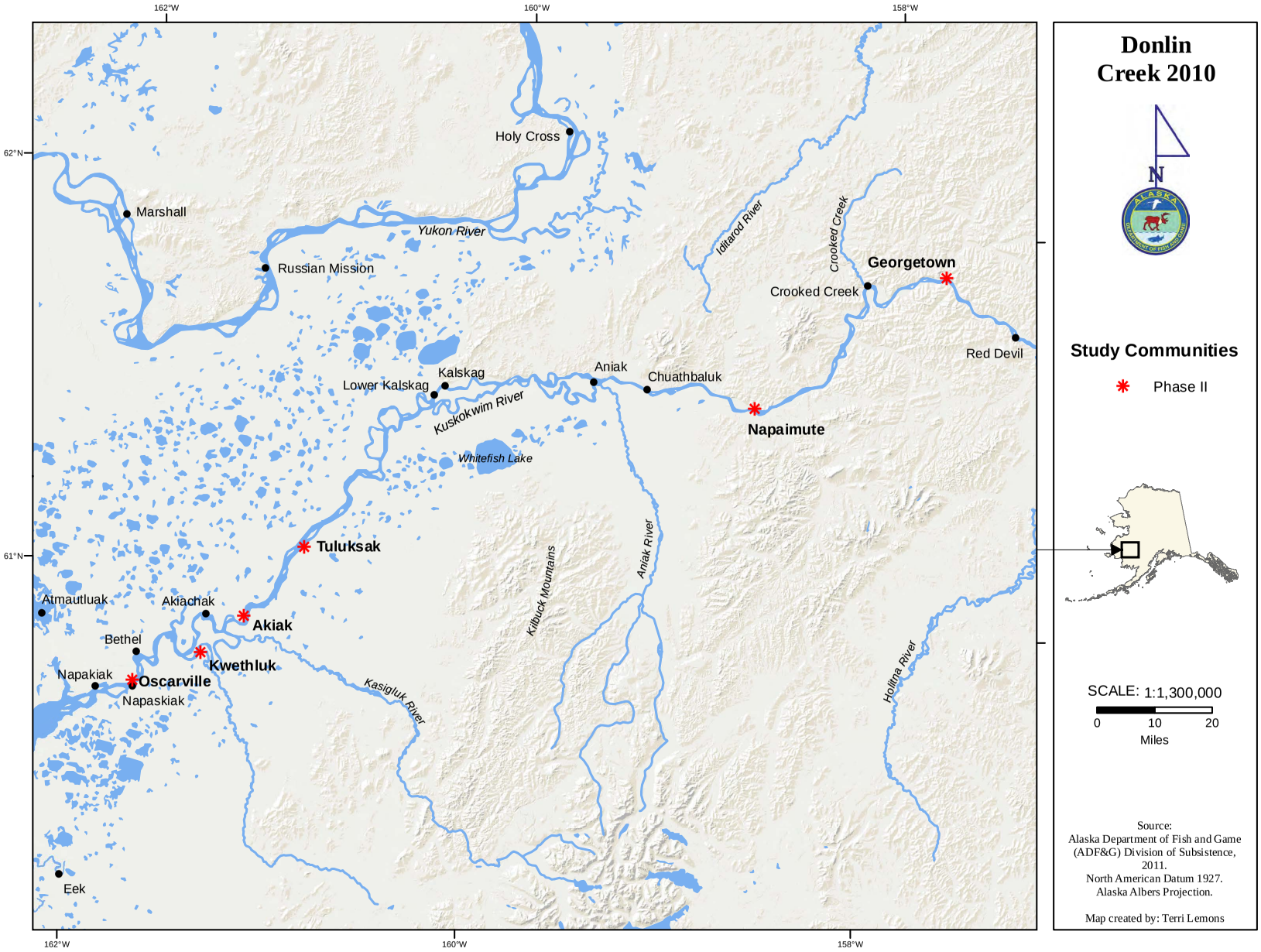

Figure 1-1.–Map of lower and central Kuskokwim River drainage, showing 6 study communities.

Historically, the seasonal round began in spring, before breakup, when families moved to spring camps to trap, fish for various nonsalmon species, and hunt migratory birds. Ice breakup on the mainstem and associated tributaries of the Kuskokwim River brought families to summer fish camps, usually on the mainstem, to process large quantities of salmon as food for both humans and dogs. In early fall, families traveled to fall camps, which were often the same sites as their spring camps, to fish for nonsalmon species and hunt ducks and geese before heading to winter villages to hunt for moose, caribou, and bears, trap small game, and fish under the ice. These seasonal activities continue, usually based out of the permanent communities, but some summer fish camps are still in operation. As a result, the residents on the Kuskokwim River continue to rely heavily on hunting, fishing, and gathering to provide for both their nutritional and their cultural needs.

The regulation of hunting and fishing for subsistence practices has a unique history in Alaska. As noted by Magdanz et al. (2007), 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, the Alaska Native Claims Settlement Act (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 the 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 similar subsistence priority in the Alaska National Interest Lands Conservation Act (ANILCA). Between 1985 and 1992, aspects of Alaska's subsistence statute—primarily those dealing with the definition of a subsistence user and the role of a priority for rural residents in times of shortage—were amended, such that state and federal subsistence laws became incongruent. Since then, the Alaska Board of Fisheries (BOF) and the Alaska Board of Game (BOG) have managed subsistence on state and private lands following procedures outlined in AS 16.05.258 "Subsistence use and allocation of fish and game," while the Federal Subsistence Board (FSB) has managed subsistence on federal public lands (about 60% of the state) for federally qualified users.

Other federal regulations provide for the subsistence harvests of specific species. In 1972, the Marine Mammal Protection Act provided that "coastal Alaska Natives" could continue to hunt marine mammals for subsistence. In 2003, the Alaska Migratory Bird Co-Management Council (AMBCC) adopted regulations establishing spring and summer subsistence hunts for migratory birds by permanent residents of villages within eligible subsistence harvest areas. Also in 2003, the North Pacific Fisheries Management Council adopted regulations recognizing subsistence harvests of Pacific halibut by eligible members of Alaska Native tribes and eligible residents of rural Alaska communities.

To support the regulatory requirements of prioritizing the customary and traditional uses of fish and

wildlife resources, the 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).

Regulatory Context of the Kuskokwim Area

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*. The federal government designates the Kuskokwim River as a rural subsistence region (50 CFR §100.22 and 50 CFR §100.23). All federal subsistence regulations apply to this region, and specify that individuals practicing subsistence harvests of fish and wildlife on federal public lands must be permanent rural residents of the area (50 CFR §100.5). State of Alaska regulations do not require subsistence harvesters to be rural residents. 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.

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. Alaska law allows a variety of gear types to be used in the Kuskokwim River for subsistence salmon fishing, and includes specifications regarding the use of gillnets (5 AAC 01.270) and hook and line gear (5 AAC 01.295). There are no federal or state bag or possession limits for subsistence salmon harvests in the Kuskokwim River, except from June 1 through August 31, when subsistence fishing with a hook and line attached to a rod or pole, in that portion of the Aniak River drainage upstream of Doestock Creek; the bag and possession limit is 2 Chinook salmon (5 AAC 01.295). Federal regulations of all subsistence fish harvests in Alaska federal public lands and waterways are administered under 50 CFR §100.27, including seasons, gear types, and bag and possession limits on all salmon and nonsalmon species. Alaska sport fish regulations within the Kuskokwim River drainage require that anglers adhere to various bag and possession limits for both salmon and nonsalmon freshwater fish species (5 AAC 71.010). General sport fishing regulations apply to the drainage upstream of the Holitna River, with slightly more restrictive regulations applying elsewhere in the drainage (5 AAC 71). This includes use of a spear or bow and arrow for harvest of longnose suckers, burbot, northern pike, and whitefishes (except sheefish) in the Kuskokwim River drainage (5 AAC 71.030). Sport fishing regulations unique to the Aniak River (a tributary of the Kuskokwim) include a bag

limit of 2 Chinook salmon per day in the Aniak River upstream of Doestock Creek; a requirement that sport anglers record harvested Chinook salmon 20 inches or longer on their harvest record; and no open season for rainbow trout (5 AAC 71.010). Under state subsistence fishing regulations, any Alaska resident is permitted to take any salmon or freshwater fish by rod and reel in the Kuskokwim River for subsistence uses (5 AAC 01.284). Management of moose populations in GMUs 18 and 19 is centered around rebuilding low-density moose populations in the Kuskokwim River region (Perry 2010b, Seavoy 2010). Because of very low moose population densities, moose hunting in the Central Kuskokwim region around the Georgetown and Napaimute village sites (GMU 19A) is managed under conservative regulations. The harvest of moose in GMU 19A East is currently prohibited; in 19A West it is permitted only under "Tier II"[3] (5 AAC 92.062, 92.070 and 85.045) and federal subsistence hunting regulations (CFR §100.26). State and federal open and closed seasons and bag and possession limits for black bears, brown bears, and caribou are relatively similar and nonrestrictive (5 AAC 85; 50 CFR §100.26). The Mulchatna caribou herd, a portion of which winters south of the Kuskokwim River, is under intensive management[4] to increase its population. Subsistence migratory waterfowl hunting and egg harvesting are permitted by federal law during the spring–summer migratory bird harvest, with defined seasons but no bag limits (50 CFR Part 92). Federal law also permits a fall season for migratory waterfowl sport hunting with defined seasons and bag and possession limits (50 CFR §20.102). Trapping of furbearers in the region is regulated under Alaska state law with designated seasons and no bag limits (5 AAC 84).

Research Questions

The principal questions addressed by the Donlin Gold Subsistence Research Program were how much wild foods were harvested for subsistence and how these foods were distributed within and between communities. The answers to these questions have provided baseline information about the contemporary subsistence uses of fish, wildlife, and plant resources in Akiak, Kwethluk, Oscarville, and Tuluksak in the Lower Kuskokwim, as well as Georgetown and Napaimute in the Central Kuskokwim region. Related questions involved the role of wild foods in the region's economy, the role of cash in subsistence economies, the lands and waters used for subsistence practices in the Kuskokwim River drainage, the impacts of competition with other users, the role of nonsubsistence uses of fish and wildlife, the sharing distribution networks for subsistence foods within and between communities, and assessments of harvests over time, and the impacts of climate or other environmental changes.

Most fish stocks and wildlife populations in the Kuskokwim region, although variable over time,

3. Tier II hunts are ways to provide limited hunting opportunities in areas where there is a traditional and customary reliance on a resource but where that resource population is so low that it cannot provide reasonable opportunities for subsistence under general hunting regulations (see Brown et al. [2012:357] for a more complete description).

4. Intensive management is a term used to describe the 1994 statute and associated regulations intended to achieve or maintain wild ungulate harvests in defined areas at elevated but sustainable levels through some combination of management practices including predation control, habitat enhancement, and others (ADF&G 2011).

were considered healthy at the time of the study. As of 2009, both the BOF and the BOG had found that harvestable surpluses of all fish and wildlife species were sufficient to provide the amounts reasonably necessary for subsistence uses and to provide for most other nonsubsistence uses, with the notable exceptions of Chinook salmon throughout the Kuskokwim River and moose in GMU 19 and part of GMU 18, which are currently managed for limited subsistence uses only (see the "Regional Discussion and Conclusion" chapter for additional details).

The management of fish and wildlife resources is a complicated calculus of factors. Supplies of and demand for fish and wildlife change over time, sometimes dramatically and rapidly. To allocate fish and wildlife sustainably, regulatory bodies need periodic harvest data over time that can account for normal variations in harvests, which for some species can mean decades of research. Matters are further complicated by climate-related changes, proposed and occurring resource extraction, and industrial development, all of which will potentially impact not only renewable natural resources through habitat alteration, but also social and economic systems by providing increased employment and dividend income to residents of the region.

The dynamic environment and economy of rural Alaska has created a need for frequently updated information about subsistence harvests, demographics, employment, and income for the region as a whole, and especially for communities adjacent to proposed developments. In order of increasing scope, research topics have included:

- Managing species where demand exceeds supply;
- Sustainably allocating species among competing uses;
- Documenting subsistence economies;
- Assessing and mitigating impacts from development; and
- Monitoring long term ecological conditions.

To improve documentation of Alaska's subsistence economy, policymakers need substantially complete estimates of harvests and better descriptions of subsistence socioeconomic systems. To assess impacts or to monitor long term changes, investigators need an initial comprehensive survey to collect baseline subsistence harvest, social, and economic data. They also need postimpact surveys to measure changes and assess impacts.

Impact assessment and ecological monitoring are more complex than harvest monitoring because the nature and scope of potential impacts and the course of human adaptations are not known in advance. For example, residents of Western Alaska might adapt to persistent and adverse changes in moose populations by increasing subsistence salmon harvests or by purchasing imported foods. The latter adaptation would imply increased reliance on wage labor or on transfer payments. Fully evaluating the impact of changes in moose populations would require information on moose populations and health, moose harvests, moose harvest locations, the harvests of other species, employment, wages, other

types of income, and perhaps household spending patterns. Thus, impact assessment and ecological monitoring require a greater range of data than basic harvest assessment.

General Study Objectives

The objectives of this harvest assessment project were to:

- Estimate subsistence harvests and uses of wild fish, game, and plant resources in a 12-month study year (2010);
- Map areas used for hunting, fishing, and gathering during the study year;
- Produce historical use area maps for subsistence hunting, fishing, and gathering;
- Collect demographic information about each community, including population size and composition, ethnicity, birthplace, and length of residency in the study community;
- Characterize each community's involvement in the cash economy, including jobs and other sources of cash income;
- Evaluate trends in subsistence harvests;
- Document traditional knowledge observations regarding resources used for subsistence purposes; and
- Document local concerns related to subsistence hunting and fishing.

Within this harvest assessment project, the Division of Subsistence and cooperating organizations selected study communities, trained community residents in administration of the survey instruments, and administered surveys to occupied households in each study community. After data collection, the researchers reviewed and interpreted survey findings, and published reports of survey findings. Study findings were shared with the communities in community review meetings held in every participating community, except Napaimute and Georgetown. In Napaimute, the community review consisted of fliers describing the results distributed to community members and an in-person meeting in Bethel with 2 community members. For Georgetown, ADF&G staff conducted a review meeting in Anchorage with 4 members of the tribal council. Summary results are published online at the CSIS website.

Rationale and Literature Review

During the past 50 years, two different methods have been used to collect subsistence data in Western Alaska. Both methods—mandatory reporting and voluntary surveys—have had substantial limitations. For big game species such as moose, ADF&G has relied on a system of mandatory harvest reports and permits since statehood. Before hunting, individual hunters must purchase a hunting license and, for

selected species, obtain a report or permit that indicates their intent to hunt that species. After hunting, or at the end of the season, hunters are required to mail a postage-paid postcard to ADF&G reporting their efforts and harvest, if any. Andersen and Alexander (1992) found that, on average, this method captured approximately 30% of the moose harvests in Interior Alaska. It is reasonable to assume that reporting rates in other rural areas of the state are similar to those in the Interior, given the factors that contributed most to these patterns, such as community population size, distance from a road system, presence of a regulatory agent, and community reliance on subsistence foods.

For comprehensive estimates of subsistence harvests, ADF&G and other researchers have relied on household surveys. However, these efforts have been minimal in Lower and Central Kuskokwim communities and are usually limited in that they represent only 1 or 2 years, rather than providing longitudinal data sets. Nonetheless, household surveys do collect a wide range of data, and are best suited to fulfill the multiple data needs of resource management agencies, user communities, and industry. Consequently, this program used survey methods.

Since the early 1980s, the Division of Subsistence has conducted limited research in study communities. In the early 1980s, the Division of Subsistence documented the subsistence uses of Tuluksak residents including the variety of species used, use areas, seasonality of harvest, and local observations of resource abundance (Andrews and Peterson 1983). This study did not, however, collect quantitative data except for Chinook, sockeye, and chum salmon harvests. In 1983, the Division of Subsistence gathered wild resource harvest and use data as well as ethnographic information in Nunapitchuk for the purpose of documenting subsistence harvest and use patterns and for mapping subsistence harvest and search areas (Andrews and Peterson 1983:9). In 1986, the division also conducted comprehensive baseline surveys and documented harvest and use patterns, search area maps, and ethnographic data for the residents in Kwethluk (Coffing 1991) and Tununak (CSIS) . However, these data are now more than 25 years old. In 1998, Coffing et al. (2001) documented subsistence harvests in Akiachak.

The AMBCC conducted migratory bird harvests in the Lower Kuskokwim, including Akiak, Kwethluk, Oscarville, and Tuluksak, in 2004–2008 (Naves 2010a, Naves 2010 [rev]). These harvests are reported on the subregional level and community-specific data are not available.

Other species- or resource category-specific studies have been conducted. ADF&G completed a subsistence food survey in the Central Kuskokwim region in 1979 that quantified moose harvests and included Georgetown as a study community (Jonrowe *n.d.* [c1980]). Only 1 Georgetown household, out of the 2 households in 1979, was surveyed in this study, and 1 moose was harvested by this household during the study year. Pete and Kreher (1986), Pete et al. (1987), and Pete (1984, 1991b, 1991a, 1992) documented the subsistence herring fishery in the Nelson Island District and Northern Kuskokwim Bay. Ray et al. (2010) documented the harvest and use of nonsalmon fish harvests in Eek, Nunapitchuk, and Tuntutuliak.

These limited efforts generally have been driven by the data needs and funding situations of individual agencies and not by a coordinated strategy. Neither mandatory harvest reporting systems nor voluntary community household surveys has provided sufficient data to estimate regionwide subsistence harvests of fish and wildlife with reasonable confidence, nor to monitor trends in subsistence harvests and use patterns. This study was designed specifically to fill data needs in Western Alaska, as well as to respond to particular policy objectives and current research directions.

One of the policy objectives in Alaska subsistence management is determining the amounts reasonably necessary for subsistence uses. This is achieved primarily through reviews of historical harvests, the assumption being that a series of harvest data through time should provide a reasonable range of harvests needed for subsistence. Historical data are not always available and sometimes harvests are limited by factors other than subsistence demand, however, so subsistence surveys have long included a series of harvest assessment questions (e.g., "Did your household get enough salmon last year for your needs?").

Extensive, comprehensive survey efforts are possible, as demonstrated in 2010 when the Division of Subsistence successfully conducted comprehensive surveys in 8 Central Kuskokwim area communities. The keys to these intensive efforts are well-designed survey instruments, efficient data entry, and standardized approaches.

Relationships with Alaska Native Communities

A majority of the residents of Western Alaska are Alaska Native who have maintained the subsistence customs and traditions practiced throughout their ancestors' history. This project was intended to encourage a collaborative, working relationship among state and federal agencies, tribes, communities, nongovernmental organizations, and industries. The ethical conduct of all researchers was guided by the principles of conduct adopted by the Alaska Federation of Natives in 1993 and the Interagency Arctic Research Policy Committee on June 28, 1990. All personnel were directed to work in a manner that developed, rather than jeopardized, relations among the cooperators, and between the cooperators and the public.

2. Methods

Prepared by Hiroko Ikuta and David S. Koster

This was the first opportunity in more than 25 years that ADF&G has had to conduct comprehensive subsistence surveys in Lower Kuskokwim River region communities; this was the first opportunity that ADF&G has had to conduct research in Georgetown and Napaimute in the Central Kuskokwim River region. In the mid-1980s, the Division of Subsistence gathered wild resource harvest and use data in Kwethluk (Coffing 1991); these data are updated by the 2010 data presented in this report. Comprehensive subsistence harvest surveys have never been conducted in the study communities of Akiak, Oscarville, Georgetown, and Napaimute. Comprehensive subsistence baseline surveys have never been administered in the other Lower Kuskokwim communities—Eek, Tuntutuliak, Bethel, Napaskiak, Napakiak, Kasigluk, Atmautluak, and Tuluksak. Older comprehensive harvest data exist for Akiachak (Coffing et al. 2001) and Nunapitchuk (Andrews 1989).

This survey asked about all species harvested for subsistence in these areas, divided into 6 large resource categories (e.g., large land mammals, vegetation, etc.). The research relied on a standard survey instrument based on a series of studies conducted by the Division of Subsistence since the 1980s. Many survey questions are the same as, or similar to, questions in prior harvest assessment tools, so recent results are comparable with past results and can be compared to results from other regions.

There is a continuing need for harvest estimates for high-demand species, particularly salmon. Several recent poor runs of salmon—especially Chinook salmon—on the Kuskokwim River have raised significant concern about this important subsistence resource.

In 2009, ADF&G learned of a specific need for subsistence information to assist in the preparation of an environmental impact statement (EIS) for the proposed Donlin Mine above Crooked Creek. In the first phase, which began in 2010, ADF&G conducted comprehensive surveys at 8 communities in the Central Kuskokwim River area: Aniak, Chuathbaluk, Crooked Creek, Lower Kalskag, Red Devil, Sleetmute, Stony River, and Upper Kalskag (Brown et al. 2012). The second phase of the study, to survey communities in 2011, focused on the Lower Kuskokwim communities of Akiak, Kwethluk, Oscarville, and Tuluksak, as well as Georgetown and Napaimute in the Central Kuskokwim River area.

General Research Design

The ADF&G Division of Subsistence utilizes a number of social science research methods to fulfill its mission, including both quantitative and qualitative methods. This study used a combination of

harvest surveys and ethnographic, semi-structured key respondent interviews to document historical and contemporary subsistence practices.

Ethnographic interviews followed a semi-structured protocol (Appendix B) designed to capture a thorough understanding of broad patterns of local harvest and use for all subsistence resources. The interviews were generally structured around a seasonal round of subsistence activities: respondents were asked about typical patterns of subsistence activities during particular times of the year, and to describe any changes in these subsistence activities that had been observed over their lifetimes. Mapping exercises during the interviews recorded locations of historical and contemporary subsistence use areas. Respondents were also asked to discuss any recent concerns in their communities related to subsistence resources, particularly those concerns related to environmental, management, or socio-economic conditions affecting patterns of subsistence harvest and use. Interviews were audio-recorded then individually transcribed and analyzed by individual chapter authors.

In addition to interviews, extensive field notes were taken during informal communications with community residents and during harvest surveys when respondents offered information not collected on the survey form. Community members provided further ethnographic information and reviewed researchers' interpretation of ethnographic data during scheduled community review meetings open to all community residents.

Quantitative harvest data were collected through harvest surveys. As characterized by Trotter II and Schensul (1998: 702–703):

> Applied projects must be designed to create the highest level of confidence in the research results. To provide this confidence, quantitative social sciences have most commonly favored probabilistic (random) sampling techniques that allow for statistical analysis of the data collected. These techniques work well when the universe from which the sample is to be drawn can be identified and where everyone in a population … has an equal chance of being chosen to express their viewpoint. It does not work for qualitative approaches, where other conditions apply.

Much of the research conducted by the Division of Subsistence is quantitative in nature and involves documenting the amount of fish and wildlife resources harvested by a community of users with the principal unit of analysis being the household. In these cases, probabilistic sampling or census approaches are used to develop estimates of harvests for an entire community or series of communities.

In small communities, sampling designs often strive for a complete census to survey each household regarding subsistence resource harvest and use activities. In larger communities, simple random samples (or stratified random samples) are used to estimate a community's harvest and use patterns. Survey results are expanded to the whole community based upon the patterns identified in the sample of surveyed households. It is essential that sampled households be representative of the study population.

Confidentiality is maintained through the use of identification codes in place of residents' names or addresses. Households and individuals are assigned numerical codes before surveys begin. The household code sheet is maintained by the principal investigators during survey administration and remains in their custody after the survey is complete. Surveyors have codes only for the households they are assigned to survey. Household code sheets do not accompany surveys when surveys are submitted for data entry and analysis.

Survey Instrument

The primary purpose of the household survey was to collect information about the harvest and uses of edible wild foods. In its simplest form, this type of survey includes a core harvest module that collects, for example, caribou or salmon harvest reports on a single sheet (Appendix A). By adding more core harvest modules, a single-species survey can evolve into a comprehensive survey, while maintaining comparability with single-species efforts. Additional modules can be added to collect demographic, economic, spatial, assessment, or social network data as needed. For this project, researchers collected information from each household about permanent household residents, amounts of wild food harvested, wages earned, and other income received by household members. Researchers also asked questions to assess household food security, networks of food sharing, and to determine whether households were able to harvest sufficient wild foods.

The demography section included questions about the gender, kin relationships, age, birthplace, education, and ethnicity of each household member. The harvest section asked which wild foods were used and harvested, and how much was harvested by the household. The employment section asked respondents to list each job held by each member of the household and, for each job, the months employed, the schedule worked, and the amount earned in the study year. Respondents were asked to estimate household income from other nonemployment sources, such as the Alaska Permanent Fund dividend, Social Security, and public assistance programs.

A "food security" section used a standard national questionnaire to assess whether or not the household had enough food to eat, whether from subsistence sources or from market sources. The protocol used in this survey was a modified version of the 12-month food security scale questionnaire developed by the U.S. Department of Agriculture (USDA). This questionnaire is administered nationwide each year as part of the annual Current Population Survey (CPS). In 2007, approximately 125,000 U.S. households were interviewed, including 1,653 in Alaska (Nord et al. 2008:20). From CPS data, the USDA prepares an annual report on food security in the United States.

Food security protocols have been extensively reviewed (Coates 2004, Webb et al. 2006; Wunderlich and Norwood 2006) and have been used around the world, including in northern Burkina Faso (Frongillo and Nanama 2007), Bangladesh (Coates et al. 2006), Bolivia and the Philippines (Melgar-Quinonez et al. 2006), and Brazil (Peréz-Escamilla et al. 2004). Although there have been efforts to develop a

universal food security measurement protocol (Swindale and Bilinsky 2006), researchers often modify the protocol slightly to respond to community social, cultural, and economic circumstances, as was done here.

For this study, the food security protocol was modified by the addition of several questions designed to determine whether food insecurities, if any, were related to subsistence foods or store-bought foods. Additionally, the wording of some questions was changed slightly. As in Brazil (Peréz-Escamilla et al. 2004), the USDA term "balanced meals" was difficult to interpret for indigenous Alaska populations, and was replaced with the term "healthy meals" to reflect unique dietary and cultural circumstances in rural Alaska.

One of the policy objectives in Alaska subsistence management is determining the amounts reasonably necessary for subsistence uses. This is achieved primarily through reviews of historical harvests, however, as described earlier, historical data are not always available and sometimes harvests are limited by factors other than subsistence demand. As a result, subsistence surveys have long included a series of harvest assessment questions (e.g., "Did your household get enough salmon last year for your needs?"). To that end, a subsistence assessments section asked whether households harvested less, more, or the same amount of particular subsistence foods, and whether they got enough of that food. In the event that harvests changed or were insufficient, respondents were asked why this occurred.

A "network" section asked households to document who harvested and processed the resources that the household used, even if household members did not harvest the resources themselves. It also asked household members to document to which households or other communities they gave resources and from which households they received resources. In this way, data analyzed from the network module provide a graphic representation of resource distribution webs by community.

To document the areas used for subsistence, the survey asked households to locate on a map the areas where they searched for and where they actually harvested selected subsistence resources. Maps were available at 3 different scales or extents to accommodate both local and distant searches and harvests.

Limitations and Assumptions

The harvest survey collected information on subsistence activities during a single year. This assumed that respondents could remember their important activities during the previous year. To minimize recall problems, surveys were conducted with household heads on the assumption that household heads were most likely to be aware of all household members' activities. Respondent recall bias was not expected to change significantly over time or from community to community. It was not expected to affect comparisons of data from this study with other studies employing similar methods.

Some respondents were reluctant to provide information about personal and household incomes, especially earned income. Some community researchers were personally reluctant to ask respondents about income. As a consequence, employment and income data are sometimes missing. However, 202

surveyed households in Akiak, Kwethluk, Oscarville, and Tuluksak (86% of all households surveyed in the 4 communities) reported income information for 376 individuals. Two hundred twenty-four (96%) surveyed households in the 4 communities reported receiving income from other sources. Due to unique features, the data from Georgetown and Napaimute are discussed later in this chapter.

Data for this project were collected for the calendar year 2010. The ADF&G Division of Commercial Fisheries also collected salmon harvest data in its annual postseason survey, conducted in fall 2010 for the summer salmon season. The estimates for salmon harvests resulting from these 2 data collection efforts differed somewhat from community to community and by salmon species. In some cases, the differences were significant. Analysts and principal investigators from the 2 projects met on several occasions to discuss the differences. In some cases, the differences were the result of sampling strategies: the Division of Subsistence attempted a census of all households in a community while the postseason salmon survey used a stratified sample in the same communities. In other cases, especially when compared on the household level, the reasons for the differences were not identifiable. For coho salmon specifically, some differences in harvest estimates were likely the result of how questions on the surveys were asked or how the answers were documented, especially when addressing particular gear types.

Standardization in data collection procedures was important because many different people gathered data. One or more principal investigators were present throughout the administration of the surveys and administered surveys themselves with additional help from local surveyors. Standardization and quality control were accomplished through an initial orientation process, daily reviews of surveys as they were completed, and a post-administration review of all surveys. ADF&G staff coded all of the surveys, and coded surveys were reviewed by principal investigators before data entry.

Procedures

In 2011, the principal investigators were Caroline Brown, James Magdanz, and Nicole Braem, all of whom were subsistence resource specialists with the Division of Subsistence based in Fairbanks and Kotzebue. They were assisted by 4 residents of Akiak, 6 residents of Kwethluk, 1 resident of Oscarville, 4 residents of Tuluksak, 1 community member of Napaimute, 1 researcher for Georgetown, and 10 Division of Subsistence employees based in Fairbanks, Bethel, Anchorage, and Dillingham (Table 2-1).

Between November 2010 and February 2011, ADF&G staff traveled to the communities to meet with tribal councils to review survey instruments (both surveys and interview protocols), prepare updated household lists, and obtain community approvals. From February through June 2011, research teams traveled to the communities to implement the surveys. Working with the ADF&G principal investigator assigned as the lead for each community, the tribal councils of each community selected local surveyors for the research in their community. These community contractors were paid for their time in orientation and survey review and by the number of surveys they completed. In Akiak,

Table 2-1. – Project study staff.

Community	Local research assistants	ADF&G staff
Akiak	James Gregory, Candice Williams, Olga Charles, Helen Ivan	Sarah Evans, Jennifer Bond, James Van Lanen, Janet Bavilla, Theodore Krieg
Oscarville	Nastasia Larson	Lisa Slayton
Kwethluk	Merna Spein, Alfred Nicolai Jr., Nick Nicolai, Raymond Guy, Roy Michael Jr., Vasily Nicolai	Seth Wilson, Ben Balivet, Danielle Ringer, Michelle Gillette, Janet Bavilla, Brittany Retherford
Tuluksak	Andrew Suskuk, Kyle Peter, Laura Kashatok, Willie Alexie	Seth Wilson, Michelle Gillette, Janet Bavilla
Georgetown	Chris Mckee	Ben Balivet
Napaimute	Bobby Kristovich	Brittany Retherford

Kwethluk, Oscarville, and Tuluksak, an ADF&G employee acted as the community lead for the data collection, and conducted an orientation and training session with community assistants. The methods of data collection for Georgetown and Napaimute were different from the other 4 communities and are discussed later in this chapter. During orientation, the group verified household lists, reviewed the survey instrument, and practiced administering the survey to one another. At the end of training, each researcher selected a group of households to survey and made appointments by phone, VHF radio, and in person to conduct surveys. Surveyors worked in teams of 2: 1 community surveyor and 1 ADF&G staff member. Surveys were conducted in person, usually at the respondent's home, at a time selected by the respondent. Community workers administered the surveys in most cases. ADF&G employees conducted all of the mapping.

Either the male or female head of each household answered questions about the household as a whole. Sometimes, both heads of the household or other family members would assist the respondent by providing information.

Researchers attempted to survey all occupied households in Oscarville, Kwethluk, Akiak, and Tuluksak. Across the region, surveys were completed for 236 of 344 households in total for Akiak, Kwethluk, Oscarville, Tuluksak (69%). The surveys in Georgetown and Napaimute are discussed in the following section (Table 2-2).

Key respondents for the ethnographic interviews were selected based on a combination of household level harvest survey results and recommendations by other community members using a snowball method. Researchers attempted to interview a representative cross-section of the community with attention to gender, age, and subsistence experience. For all communities except Georgetown, in total, researchers conducted 19 richly informative interviews with 24 key respondents. Interviews were on

Table 2-2. – Sample achievement for 4 communities on the Kuskokwim River, 2010.

	Akiak	Kwethluk	Oscarville	Tuluksak
Households in community	89	155	14	86
Sampled Households	63	93	12	68
Percent HHs Sampled	70.8%	60.0%	85.7%	79.1%
Unable to contact	18	6	1	8
Refused	8	18	1	10
Sampled population	273.0	428.0	54.0	360.0
Estimated population	385.7	713.3	63.0	455.3

Source ADF&G Division of Subsistence household surveys, 2011.

average approximately 1 hour in duration. Respondents were given an honorarium for their time and the wealth of information they shared with researchers.

At the conclusion of the survey administration and interviewing process, researchers convened again for project evaluation meetings. They discussed the performance of the instrument, subjectively assessed the quality of the data, and made suggestions to improve the survey process in the future.

Surveys were coded for data entry by ADF&G staff during fieldwork, and entered by ADF&G staff in Anchorage. Data were entered by Margaret Cunningham, Rebecca Fink, Hollie Wynne, and Garrett Zimpelman. Data analysis was conducted by ADF&G research analysts Terri Lemons and Pat Fox and ADF&G Information Management coordinator David Koster, with assistance from James Magdanz. Map data were entered into ESRI ArcGIS[1] by ADF&G research analyst Lemons, who prepared the maps of subsistence search areas and harvest locations that appear in this report.

After survey data and map data was entered, analyzed, and summarized, ADF&G community leads returned to each community between November 2011 and March 2012 to conduct community review meetings. They provided attendees with summary tables of harvest and income estimates and showed each community a Microsoft PowerPoint presentation summarizing the results, including mapped data. During these visits, community leads conducted follow-up ethnographic interviews where necessary. Any follow-up information was integrated into the overall analysis of harvest and use practices within each community

Georgetown and Napaimute

The methods used to collect data in Georgetown and Napaimute differed from the other 4 communities of Akiak, Kwethluk, Oscarville, and Tuluksak. No one lived permanently in Georgetown

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

and 1 individual lived in Napaimute permanently during the study year. Despite this unique situation, Napaimute and Georgetown were included in this study in order to document use patterns of the general area, including the changing relationship tribal and community members have with these historic village sites. Napaimute and Georgetown both had year-round permanent populations within living memory and people continue to maintain connections to the region. Documenting the historical and continual uses of and interest in the resources of the area provides a more complete picture of the subsistence patterns of the Kuskokwim River drainage. Georgetown tribal members and Napaimute community members currently live in communities throughout the Kuskokwim region, other parts of Alaska, and outside of the state. Thus, while surveys for Akiak, Kwethluk, Oscarville, and Tuluksak were conducted in person in the communities themselves, Georgetown and Napaimute surveys were conducted over the phone and in person where tribal or community members lived. Some surveys were conducted with Napaimute households in person at cabins in Napaimute.

Despite their commonalities, sample designs differed for Georgetown and Napaimute, which further defines the unique characteristics of each community from one another. For Georgetown, the sample design was based around tribal membership, whereas for Napaimute, the sample design was constructed with input from the traditional council and is based on active community involvement.

The Georgetown Tribal Council provided a list of tribal members more than 18 years old. The list assisted with the identification of many households that included at least 1 tribal member, however, this list was out-of-date and did not include tribal members under the age of 18. Because of this, researchers were unable to determine the total number of tribal members or the total number of households that included Georgetown tribal members. This made it impossible to determine an estimate of the total number of people to include in the sample design and it was determined that it would be more representative to simply survey the households that did include at least 1 tribal member and to report the harvests of these households without expanding for a community estimate. Napaimute community members were identified by the traditional council's Director of Operations and included families and individuals who had lived in Napaimute or who owned, leased, or shared a property in the Napaimute area and continued to maintain a connection to the village site. The community members were not necessarily tribal members or permanent residents of Napaimute and because the sample was complete, it was possible to expand the reported harvests for the unsurveyed households.

Surveys were completed with 21 households from Georgetown and 16 of 25 households from Napaimute (64%). Due to the fact that all known Georgetown tribal members and all Napaimute community members except for 1 individual were permanent residents of other communities during the study year, survey results from Georgetown and Napaimute are not included in the Division of Subsistence CSIS.

Data Analysis

Survey responses were coded following standardized codebook conventions used by the Division of Subsistence to facilitate data entry. Data were stored within a Microsoft SQL Server at ADF&G in Anchorage. Database structures included rules, constraints, and referential integrity to ensure that data were entered completely and accurately. Data entry screens were available on a secure Internet site. Daily incremental backups of the database occurred, and transaction logs were backed up hourly. Full backups of the database occurred twice weekly. This ensured that no more than 1 hour of data entry would be lost in the unlikely event of a failure. All survey data were entered twice and each set was compared to minimize data entry errors.

Once data were entered and confirmed, information was processed with the use of the Statistical Package for the Social Sciences (SPSS), Version 16. Initial processing included standardized logic checking 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 in units of numbers of animals, gallons, or buckets were converted to pounds usable weight using standard factors (Appendix C).

SPSS was also used 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 situationally. The Division of Subsistence has standardized practices for dealing with missing information, such as minimal value substitution or use of an average 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 is missing, the household survey is treated as a "nonresponse" and not included in community estimates.

Harvest estimates 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

$$H_i = \bar{h}_i S_i \quad (1)$$

where:

$$\bar{h}_i = \frac{h_i}{n_i} \quad (2)$$

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

$\bar{h}_i$ = the mean harvest per returned survey

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 for each community. 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 SE 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 a SD, V, and SE:

$$C.L.\%(\pm) = \frac{t_{a/2} \times \frac{s}{\sqrt{n}} \times \sqrt{\frac{N-n}{N-1}}}{\bar{x}} \quad (3)$$

where:

$S =$ sample standard deviation,

$n =$ sample size,

$N =$ population size,

$t_{a/2} =$ student's *t* statistic for alpha level (α=.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 away from the sampled mean.

Summaries of results for each community surveyed were added to the Division of Subsistence CSIS. This publicly accessible database includes community-level findings only, not household-level information. Food security responses were analyzed following USDA procedures identified in Bickel et al. (2000) to provide comparability between the Central Kuskokwim Subsistence Research Study results and USDA results for Alaska and the nation.

3. Subsistence Resources of the Lower Kuskokwim

Prepared by Andrew Brenner

Residents of the Lower Kuskokwim River subregion share a cohesive pattern of subsistence hunting and fishing, although there is some variation between communities. The following section provides a generalized overview of the subsistence resource base and associated subsistence harvest and use patterns in the Lower Kuskokwim River region. Haynes and Andrews (1985:217) define the Lower Kuskokwim River region in Western Alaska as including 12 villages (Tuluksak, Akiak, Akiachak, Kwethluk, Oscarville, Napaskiak, Napakiak, Nunapitchuk, Kasigluk, Atmautluak, Tuntutuliak, and Eek) and the regional center community of Bethel.[1] A general summary of subsistence patterns for Lower Kuskokwim communities developed as part of a summary and planning document for the Yukon Delta National Wildlife Refuge (USFWS 1987:22; see also Schroeder et al. 1987) described the subsistence pattern in the Lower Kuskokwim as being centered around salmon and freshwater fish species. Waterfowl harvests are important in the spring, late summer, and early fall. Marine mammal harvests are increasingly important the closer communities are to the Bering Sea coast, and land mammals are increasingly important the farther communities are located from the coast (USFWS 1987:22).

Kuskokwim Salmon Fisheries

Salmon forms the backbone of subsistence in the Lower Kuskokwim region. Survey data consistently document the overwhelming contribution of salmon to the subsistence harvest in the Lower Kuskokwim, and discussions about subsistence in this region regularly focus on salmon. Out of all salmon species in the Lower Kuskokwim, Chinook salmon is the most important in terms of its contribution to the diet of area residents (Andrews and Coffing 1986:1) and is emphasized relative to other salmon species in the discussion below.

Salmon has long been a primary component of the subsistence harvest in the Lower Kuskokwim (Patton and Carroll 2011:2). Before 2,400 BP, groups ancestral to the current inhabitants of the Lower Kuskokwim likely harvested salmon primarily with fish spears and traps. The development and increased use of more efficient fish nets for harvesting salmon around 2,200–2,400 BP likely

1. Bethel differs markedly from other communities in the Lower Kuskokwim River region in terms of population size, demographics, economic structure, and basic infrastructure (Brower and Opie 1996), and it is likely that these factors influence subsistence harvest and use patterns. The degree to which Bethel's subsistence harvest and use patterns differ from other communities in the region has not been quantitatively described for resources other than salmon and migratory birds at this time.

accounted for a marked increase in the human population of the Yukon–Kuskokwim Delta region (Shaw 1998:242). Predictable salmon runs, together with the development of this new and more efficient salmon harvesting technology, likely represented the key factor in the settlement of inland riverine environments (including the lower Kuskokwim River and other major river systems in Southwest Alaska) by coastal groups in ancient times (VanStone 1984:207). The importance of salmon harvested for subsistence in the Lower Kuskokwim River region has persisted into the present, and Kuskokwim area communities are heavily reliant on annual returns of salmon not only for basic nutrition, but also for maintenance of cultural identity and cultural values, in addition to economic opportunities for commercial sales (Simon et al. 2007a:1). The Lower Kuskokwim is densely populated relative to the Central and Upper Kuskokwim River regions, and Lower Kuskokwim communities typically harvest the majority of salmon within the drainage (Patton and Carroll 2011:2). In 2010, residents of communities in the Lower Kuskokwim took 79% of the overall subsistence salmon harvest[2] (Lower Kuskokwim communities harvested an estimated 151,879 salmon of all species, communities in the greater Kuskokwim area harvested 69,242 Chinook salmon, 47,885 chum salmon, 41,042 sockeye salmon, and 34,169 coho salmon), with 34% of the total Kuskokwim Management Area salmon harvest having been taken by Bethel households (Fall et al. 2013).

Salmon fishing normally occurs between May and September, targeting successive runs of Chinook, chum, sockeye, and coho salmon as the season progresses (see Appendix D for an overview of Kuskokwim River salmon regulations). The movement of families from permanent winter residences to summer salmon fishing and processing camps has historically been a major element of the annual subsistence harvest effort. While seasonal camps continue to be important for many residents into the present, it is currently also common to fish for salmon out of permanent communities or to go to fish camp during the day and return to permanent homes at night (Patton and Carroll 2011:13–15, 210311AK1, 080311OS1). Most Lower Kuskokwim River region residents use drift gillnets for subsistence salmon fishing, although setnets and rods and reels are also used (Fall et al. 2012:62). Processing and preservation of salmon through drying, freezing, salting, or smoking normally involves the participation of multiple family and extended family members and require a substantial investment of time and effort. Once processed, salmon is used throughout the year as a main food source, an important item for distribution at community or family gatherings, and sometimes as a trade good (Patton and Carroll 2011:15).

COMMERCIAL FISHING

Kuskokwim River salmon are currently harvested primarily for subsistence uses. Commercial salmon fishing formerly played a large role in the economy of the region. Barter for dried salmon was

2. Lower Kuskokwim communities harvested an estimated 151,879 salmon of all species, while communities in the greater Kuskokwim Management Area (including the entire Kuskokwim River, Kuskokwim Bay, and nearby Bering Sea Coast) harvested an estimated 193,006 salmon of all species.

important historically and regularly occurred between local people and Russian and Euro-American traders from the 1800s into the 1960s (Albrecht 1990:18). Prior to 1935, the Kuskokwim River had been closed to commercial fishing, while Kuskokwim Bay was being fished commercially as early as 1913. Some Kuskokwim River residents may also have traveled to participate in Bristol Bay commercial salmon fisheries during the early 20th century (VanStone 1984:239). Commercial fishing in the Lower Kuskokwim River region provided an important source of income to area residents for much of the 20th century, and until relatively recently represented the largest single source of non-governmental income in the Yukon–Kuskokwim Delta (USFWS 1987:20). While the commercial fishery initially focused on Chinook salmon, chum and coho salmon were also fished commercially beginning in the 1970s and by the 1980s represented a large portion of the fishery's commercial value (Albrecht 1990:24–26). Directed Chinook salmon commercial fishing in the Kuskokwim River was discontinued in 1987, by regulation, in order to reach escapement objectives (Francisco et al. 1989:13). The Kuskokwim River commercial salmon fishery was generally stable during the 1980s and mid-1990s, with chum salmon harvests accounting for the largest portion of the regional exvessel value (Buklis 1999:44). Reduced value of salmon and poor returns of Chinook and chum salmon in the late 1990s influenced a reduction in exvessel value, fishing effort, and number of fish harvested through the early 2000s. Although abundance of returning chum and Chinook salmon improved by the mid-2000s, poor market conditions and limited processing capacity continued to limit commercial fishing opportunities relative to historical levels (Bavilla et al. 2010:11). Exvessel value has rebounded somewhat in recent years from the early 2000s, partially due to an improving chum salmon market (Brazil et al. 2011:5). Coho salmon have accounted for the largest portion of the exvessel value in recent years in the Lower Kuskokwim River region, generally followed by sockeye salmon, chum salmon, and Chinook salmon (Bavilla et al. 2010:5).

NONSALMON FISHERIES

Respondents in each survey community confirmed the importance of nonsalmon fishes in their subsistence harvests in 2010. Species included whitefishes, chars, other freshwater fishes, and anadromous and marine fishes (see individual community results chapters). The use of nonsalmon fish by residents of Yukon–Kuskokwim Delta communities has traditionally represented a very important part of the total subsistence harvest in the region. Species of particular importance include sheefish and other whitefishes, northern pike, burbot, Alaska blackfish, smelts, and sticklebacks (Oswalt 1967:127; Baxter 1971; USFWS 1987:22). Historically, Yup'ik fishers harvested nonsalmon fish throughout the year using a variety of gear types including gillnets, jigging gear, hook and line gear, fish traps, dip nets, and spears. Fishers chose their gear type based upon the target fish species and season of harvest (VanStone 1984:228–233; Barker 1993:116; Fienup-Riordan 2007:269–284).

Lower Kuskokwim River fishers still employ a variety of gear types for the harvest of nonsalmon fish

(see Ray et al. 2010); however, they may prefer some techniques that differ from historical methods—at least in the choice of materials. For example, Yup'ik people traditionally crafted blackfish traps from willow roots (Fienup-Riordan 2007:280–282). Perhaps in order to save time, some contemporary fishers prefer to fashion all or part of their blackfish traps from hardware cloth and other modern materials (Figure 8-9). Historically, fishers built their dip net frames with cottonwood or willow, and wove the nets from sinew and later unraveled rope fibers (Fienup-Riordan 2007:270). Today fishers buy factory-made dip nets from a store and use them to harvest smelts during their spring spawning migration up the Kuskokwim River (Brown et al. 2012:24). Other contemporary fishing equipment includes store-bought set gillnets as well as jigging and rod and reel gear for several nonsalmon fish species, including whitefishes, northern pike, and burbot (Ray et al. 2010:34; Brown et al. 2011b:187–188).

Alaska subsistence fishing regulations permit the use of each of the gear types described above for subsistence harvests of finfish other than salmon (5 AAC 01.270). Alaska sport fish regulations require that anglers follow various bag and possession limits for nonsalmon freshwater fish species throughout the Kuskokwim River drainage (see 5 AAC Chapter 71); however, Alaska residents are permitted to take any finfish, except rainbow trout, for subsistence use at any time from the waters of the Kuskokwim Management Area except when restricted by emergency order (5 AAC 01.260).

Caribou

Subsistence caribou harvests in the Lower Kuskokwim River region are strongly influenced by caribou herds' geographic distribution and population size. Skoog (1968:239) summarized historical information on caribou in the Lower Kuskokwim; he described that, in general, caribou in this area have "fluctuated considerably in numbers and distribution." Caribou were described as being abundant in the mid-1800s but "diminishing greatly since the introduction of firearms" by the mid-19th century (Raymond 1900:32). Caribou were virtually absent from the region by 1890 and remained so throughout the Lower Kuskokwim region in the first half of the 20th century (Skoog 1968:230–232).

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 Sheldon Jackson, Presbyterian missionary and U.S. General Agent of Education in Alaska, introduced reindeer to Northwest Alaska in the late 19th century (Simon 1998:93–120). In subsequent years, reindeer herding expanded into the Yukon–Kuskokwim Delta region (Calista Professional Services 1984:5; McAtee 2010). During a 1927 reindeer count, a total of 51,369 reindeer were present in Western Alaska, broadly corresponding to the Yukon–Kuskokwim Delta and surrounding areas (U.S. Department of the Interior 1928). The sale and consumption of reindeer for personal use represented a substantial portion of the local economy and diet for some Lower Kuskokwim communities, including Akiak, which maintained a reindeer herd of 30,000 animals until the decline of reindeer herding throughout the region beginning in the 1930s (U.S. Department of the Interior 1928; McAtee 2010). There were a number of factors that accounted for the decline

and disappearance of reindeer herds in the Yukon–Kuskokwim Delta including difficulty managing numerous small herds, decreasing demand for reindeer meat, overgrazing, predation, disease, and fluctuating government policies (VanStone 1967:87; Calista Professional Services 1984:7–8). Following a reindeer population crash that began in the late 1930s, reindeer herding was virtually absent from the Yukon–Kuskokwim Delta region by 1960 (Calista Professional Services 1984:9).

Caribou were scarce in the Yukon–Kuskokwim Delta region both while reindeer were present in the region and also for most of the second half of the 20th century (Perry 2009:99). The Mulchatna herd is currently the primary caribou herd available to Lower Kuskokwim residents, although in the past at least 1 smaller herd, the Kilbuck mountain herd, was hunted in the Kilbuck Mountains south of the lower Kuskokwim River. Skoog (1968) estimated that the Mulchatna caribou herd population in the 1960s was 5,000 animals and located northeast of and distant from the Lower Kuskokwim River region. While information about the herd's distribution and movement was limited, Skoog (1968:300–301) lists Whitefish Lake, Lake Clark, and the Taylor Mountains as places where large numbers of the herd had been observed in the 1960s. 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 communities. It is assumed that this expanding caribou herd, which reached 192,000 caribou by 1996, eventually absorbed the smaller Kilbuck mountains caribou herd (Perry 2009).

During the 1990s, estimated total harvests of Mulchatna herd caribou throughout its entire range, including game management units (GMUs) 17, 18, and 19, 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 (Demma 2011), possibly due to lower recruitment, higher mortality influenced by disease, including hoof rot, and low calf-to-cow ratios (Valkenburg et al. 2003).

The BOG has made a customary and traditional use finding for the Mulchatna caribou herd with an amount reasonably necessary for subsistence uses (ANS) of 2,100–2400 caribou annually. In addition, the Alaska BOG has made a customary and traditional use finding for the Kilbuck and Andreafsky[3] caribou herds with an ANS of 350–500 individual caribou from both herds combined annually (5 AAC 99.025).

State of Alaska caribou hunting regulations for GMU 18 have varied considerably since 1960. The first Alaska regulations permitting caribou hunting in GMU 18 occurred in the 1964–1965 regulatory year, at which time the bag limit was 4 caribou. Bag limits ranged from 3 to 5 caribou per year in GMU 18 for the area south of the Yukon River, until the 1977–1978 regulatory year when the bag limit was 1 caribou. In the 1985–1986 regulatory year, the caribou hunting season was closed in GMU 18 south of the Yukon River and remained closed until 1992–1993 when hunters were permitted to take 1 bull per year south of the Kuskokwim River in GMU 18. During the 1995–1996 and 1996–1997

3. A small caribou herd that was historically located north of the Yukon Delta in the Andreafsky Mountains.

regulatory years, ADF&G established a registration permit hunt in GMU 18 south of the Yukon River with a bag limit of 2 caribou. From the 1997–1998 through the 2005–2006 regulatory years, ADF&G ended the registration permit hunt and allowed hunters to harvest 5 caribou per year in GMU 18 south of the Yukon River under general harvest regulations. The caribou bag limit for all of GMU 18 was decreased to 3 caribou per year in the 2006–2007 regulatory year and to 2 caribou per year the following season, where it has remained through the 2011–2012 regulatory year. 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 qualified subsistence hunters residing in the Lower Kuskokwim area likely comprise the majority of caribou hunters in the region. Hunters typically harvest Mulchatna herd caribou during winter or early spring months, and hunter success is therefore dependent upon snow conditions and the proximity of caribou to hunters' communities when travel by snowmachine is possible (Perry 2009).

Moose

Moose have historically occurred at low densities in the Lower Kuskokwim River region and were virtually absent from the region prior to 1940 (Andrews 1989:329; Charnley 1983:3, Perry 2010b). Moose gradually colonized the region throughout the latter 20th century and became a major component of subsistence. Of all subsistence resources other than fish, moose contributed the most by edible weight in 2010. Relatively low local abundance of moose has resulted in a history of extensive travel outside of the region by local residents to hunt moose, as well as intensive hunting and corresponding management challenges within the region.

While moose were virtually absent from the Lower Kuskokwim prior to the 1940s, residents of Kwethluk and Tuluksak, and likely residents from other Lower Kuskokwim communities, seasonally harvested moose as they traveled by dog team or on foot throughout mountains south and east of the area. Hunters traveled up tributary rivers, including the Kwethluk, Kisaralik, Tuluksak, Holitna, and Aniak rivers, and into the Kilbuck and Kuskokwim mountains (Coffing 1991:144–145; Fienup-Riordan 2007:159). During the early 1940s, some Lower Kuskokwim residents began traveling by boat up the mainstem Kuskokwim River to hunt relatively abundant moose in tributaries of the Central Kuskokwim (Coffing 1991:145). This practice became increasingly important to residents' moose hunting patterns as faster and more fuel-efficient boats and motors became available throughout the second half of the 20th century. Kwethluk hunters also harvested moose opportunistically in the Lower Kuskokwim region in the 1950s through the 1970s, from mid-August through April (Coffing 1991:145), and this pattern was likely representative of nearby communities' hunting practices during this time period.

Tuluksak residents described that moose near Tuluksak had become increasingly scarce in the 1980s (Andrews and Peterson 1983:35–36), and prime moose hunting areas in the 1980s and 1990s remained

upriver from the Lower Kuskokwim River region (Coffing 1991:145). Although hunters harvested some moose in the vicinity of their own communities, subsistence studies in the 1980s documented extensive travel outside of the Lower Kuskokwim to harvest moose. For example Nunapitchuk hunters traveled to headwaters of the Johnson, Pikmiktalik, and Kvichavak rivers up to 100 miles from Nunapitchuk, as well as on the mainstem Kuskokwim River as far as Stony River (Andrews 1989:327–329); Kwethluk hunters traveled nearly to McGrath and into the Yukon River drainage near Russian Mission to hunt moose (Coffing 1991:146–147). Because residents of the Lower and Central Kuskokwim regions both accessed tributaries of the central Kuskokwim River in GMU 19 for moose hunting, user conflicts began to develop. Charnley (1983:20) describes a disruption of customary laws of land tenure in the Central Kuskokwim, exemplified by "the extensive amount of use the Holitna receives during the fall moose season by residents of the Lower Kuskokwim River villages who do not have ties of kinship or friendship with Sleetmute residents." In 1998, an estimated 43% of successful Akiachak moose hunters harvested their moose outside of the Lower Kuskokwim, with the majority of these harvests being in the Central Kuskokwim region (Coffing et al. 2001:94). Beginning in the 1992–1993 regulatory year, as a response to growing user conflicts, particularly within the Holitna drainage, the Alaska BOG established the Holitna–Hoholitna Controlled Use Area that is closed to big game hunting with use of any boat equipped with motors that exceed 40 horsepower.

Due to the declining moose population in GMU 19A and following the development of the Central Kuskokwim Moose Management Plan, the Alaska 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 and downstream to Upper Kalskag. In the same regulatory year the BOG closed moose hunting in the remainder of 19A. Both of these changes have continued through the 2011–2012 regulatory year. Because Lower Kuskokwim residents have historically traveled into GMU 19A to hunt moose, these regulatory changes have affected many hunters residing in GMU 18. The Tier II permit requirements allow hunting only by a limited number of hunters who complete an application ranking their customary and direct dependence on moose of western GMU 19A. Furthermore, eastern GMU 19A, particularly the Holitna and Hoholitna river drainages, has historically been very popular among Lower Kuskokwim moose hunters. Its closure to moose hunting has further restricted access to an important subsistence resource. (See Brown et al. 2012] for a more detailed discussion of these regulatory changes)

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. 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 area. Heavy hunting pressure from residents of Lower Kuskokwim communities has limited moose population growth in

the area, and moose population growth in the Lower Kuskokwim area was a primary management goal in 2010 and for some years before that (Perry 2010b). 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. In the following regulatory years, ADF&G has increased this quota to 100 bull moose. These restrictions have resulted in a very competitive moose hunt, with approximately 1,000 hunters registering for permits. Hunters have typically reached the harvest quota within 1 week to 10 days. While 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 often requires long-distance travel by snowmachine. Related to this, residents of all communities in this study, other than Oscarville, described extensive travel outside of the Lower Kuskokwim in 2010 for moose hunting. Also, moose hunting success rates by households in this study were low relative to other resources, ranging between 37% and 52% success rates for the 4 study communities.

The Alaska BOG has determined amounts reasonable necessary for subsistence uses of moose in the GMUs used by residents of the Lower Kuskokwim River region. In 2010, these ANS values were 100–200 moose annually in GMU 18, 400–700 moose in GMU 19, and 600–800 moose in GMU 21 (5 AAC 99.025). In 2011, the Alaska BOG increased the ANS for moose in GMU 18 to 200–400 moose annually.

Small Land Mammals

Following the purchase of Alaska by the United States in 1867, and to a lesser extent before that date, furbearers have been an important component of the economy in the Lower Kuskokwim (Schroeder et al. 1987). Harvests of furbearers in the Yukon–Kuskokwim Delta region historically made up approximately one-third of total annual fur harvests for the entire state of Alaska and provided winter cash income for many Lower Kuskokwim residents (Seavoy 2004:229). While trapping continues in the Lower Kuskokwim River region, it occurs on a much smaller scale than in the past and probably did not represent a substantial source of cash income for surveyed communities in the study year.

Marine Mammals

Residents of the Yukon–Kuskokwim Delta region have used marine mammals for thousands of years, and marine mammals have long been a key component of subsistence throughout the region

(Shaw 1998:241). While the contribution of marine mammals to the total subsistence harvest in Lower Kuskokwim River region communities is generally lower than that of coastal communities of the Yukon–Kuskokwim Delta, residents do hunt marine mammals, and many residents obtain marine mammal products through trading. Within the Lower and Central Kuskokwim River regions, recent as well as historical trade of marine mammal resources occurred regularly between Kuskokwim River and coastal communities of the Yukon–Kuskokwim Delta and Nunivak Island. Residents of coastal communities typically traveled upriver by boat to trade marine mammal products for resources available to riverine communities, such as arctic ground squirrel skins and alder bark used for dying skins (Langdon and Worl 1981; Coffing 1991:189). Akiak respondents described especially strong marine mammal trading relationships with Kipnuk and Mekoryuk historically; Akiak residents regularly traded dried fish for coastal resources such as seal pokes, walrus, and beluga whale. Some respondents from communities in the Lower Kuskokwim region travel to coastal communities and hunt seals in Kuskokwim Bay, and will also harvest seals that are found in the Kuskokwim River, rarely as far upriver as Kwethluk (032511KW8; Coffing 1991:191).

Since the passage of the Marine Mammal Protection Act in 1972, seals and beluga whales have been managed by the U.S. Department of Commerce, and walruses by the U.S. Department of the Interior. Currently, only Alaska Natives residing on or near the coast are permitted to harvest marine mammals, with no restrictions on the seasons, harvest levels, harvest areas, or methods of harvesting beluga whales, seals, and walruses (Coffing 1991:195; National Oceanic and Atmospheric Administration 1980).

Migratory Birds

Migratory birds have long been an important component of the subsistence harvest in the Lower Kuskokwim River region. Shaw (1998) suggests that migratory birds have been extensively used for subsistence in the Yukon–Kuskokwim Delta region beginning at least 2,000 years ago, when flightless (molting) waterfowl began to be harvested in large quantities in nets. In some locations, this harvest may have been comparable in importance to the salmon harvest (Shaw 1998:242–243). This practice continued into the recent past (Morrow 2000) (and possibly the present), along with gathering eggs by hand and hunting birds with bolas, bird spears, and eventually firearms (Klein 1966:319). Bird harvests in the historical period were not restricted to specific seasons but generally occurred in 2 general hunting periods during spring (April through early June) and during late summer and early fall (August through early October) (Wolfe et al. 1990:53, 60). With the 1916 United States–Canada convention governing waterfowl use, harvests were restricted by regulation to a fall season beginning in September. Throughout the remainder of the 20th century, residents of the Lower Kuskokwim generally continued traditional spring and fall hunting practices in non-compliance with these regulations (Wolfe et al. 1990:4). It was not until 2003 that federal hunting regulations established legal harvest seasons that aligned with spring and summer traditional hunting patterns; the change in

regulations permitted long-standing hunting practices in rural Alaska.[4] Currently, federal regulations permit subsistence harvests by permanent residents of rural Alaska from April 2–August 31, with no limits other than a temporary closure during critical bird nesting periods and harvest restrictions of species with particular conservation concerns (U.S. Fish and Wildlife Service 2012). Beginning September 1, Lower Kuskokwim residents must follow the Alaska migratory bird hunting regulations open to all Alaska residents and with set harvest limits.[5]

Several species of migratory birds used for subsistence in the Lower Kuskokwim have low populations relative to historical levels, and hunting for these species is currently prohibited. Steller's and spectacled eiders are federally declared threatened species that were formerly harvested regularly for subsistence.[6,7] Yellow-billed loons hold candidate status as an endangered species, and emperor geese have declined dramatically over the past 50 years.[8,9]

Some residents of the Lower Kuskokwim have raised opposition to recent enforcement actions toward migratory bird hunters who have not complied with state and federal requirements to purchase a state hunting license in addition to federal and state duck stamps prior to hunting migratory birds[10] (Naneng Sr. 2007)—describing that gaining access to limited locations where stamps can be purchased, as well as the additional cost of stamps, places an unfair burden on subsistence waterfowl hunters (DeMarban 2010).

4. Alaska Migratory Bird Co-Management Council (AMBCC). 2012. Historical timeline leading to establishment of the Alaska subsistence spring/summer migratory bird harvest, http://alaska.fws.gov/ambcc/ambcc/Historical%20Timeline.pdf (Accessed June 2012).
5. ADF&G. 2011. Migratory bird hunting regulations summary. (Accessed June 2012).
6. U.S. Fish and Wildlife Service (USFWS). 2012. Species profile: Steller's eider. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B090 (Accessed June 2012).
7. U.S. Fish and Wildlife Service (USFWS). 2012. Species profile: spectacled eider. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B08Z (Accessed June 2012).
8. U.S. Fish and Wildlife Service (USFWS). 2012. Species profile: yellow-billed loon. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0DQ (Accessed June 2012).
9. U.S. Fish and Wildlife Service (USFWS). 2002. Alaska's emperor goose. http://yukondelta.fws.gov/pdf/Emperor%20Goose.PDF (Accessed June 2012).
10. U.S. Fish and Wildlife Service (USFWS). 2012. Alaska Region: Alaska waterfowl hunters. http://alaska.fws.gov/duckstamps/ (Accessed June 2012).

4. Comprehensive Survey Results Akiak, 2010

Prepared by Theodore M. Krieg and Elizabeth Mikow

In March 2011, researchers surveyed 63 of 89 households (71%) in Akiak. Expanding for 26 unsurveyed households, the residents of Akiak's estimated total harvest of edible pounds of wild foods between January and December 2010 was 237,441 lb (±30%). The average harvest per household was 2,668 lb; the average harvest per person was 616 lb.

Fish composed a far larger percentage of Akiak's annual harvest than any other resource category, with 81% (193,091 lb) of the estimated total edible pounds of wild food harvested in the study year coming from salmon and nonsalmon fish species. Underscoring the importance of subsistence fish harvests to Akiak, Figure 4-1 shows the top 10 species harvested by edible weight. Eight of the top 10 species are fishes; listed from greatest number of pounds harvested to least, they are: Chinook salmon; chum salmon; burbot; humpback whitefish; sockeye salmon; sheefish; northern pike; and coho salmon. Moose and caribou together contributed 9% of the total edible weight harvested. Vegetation, both berries and edible plants, and birds and eggs each composed about 3% of the total pounds of edible harvest, and marine mammals contributed less than 1% of the total annual subsistence harvest.

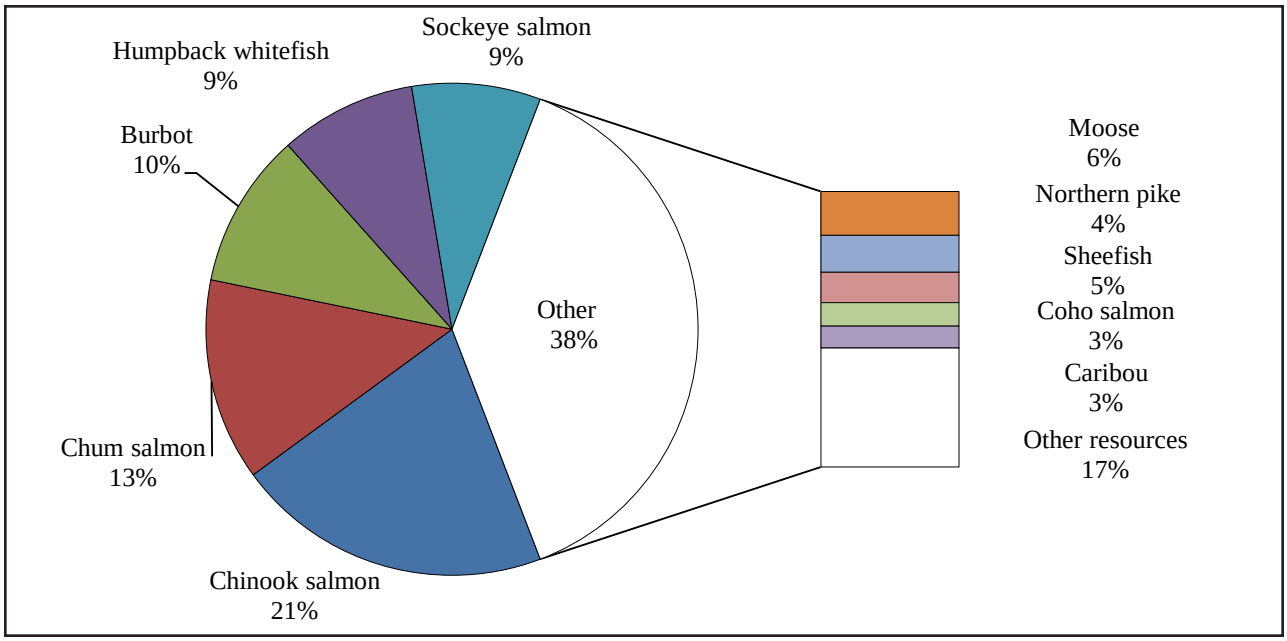

Figure 4-1.–Top 10 species harvests ranked by estimated edible weight, Akiak, 2010.

This chapter summarizes findings from the household surveys, including demographic characteristics, responses to harvest assessment questions, harvest estimates, reported employment and income, responses to food security questions, and ethnographic data gathered through interviews with knowledgeable key respondents in the community. Harvest numbers are expanded estimates. Results from this survey are available online as part of the CSIS.

ADF&G staff conducted 3 ethnographic interviews—2 of which involved multiple respondents—with knowledgeable, active Akiak subsistence harvesters and elders who ranged from 40 to 80 years of age. Three men and 5 women were asked about their past and current subsistence practices, including species targeted, gear types used, timing of harvests, intergenerational sharing of knowledge, distribution and sharing, processing and preservation, and harvest and use areas. They were also asked about changes to their own household's and the community's subsistence practices, fish and game populations, and the environment (Appendix B).

About Akiak

Akiak is located on the west bank of the Kuskokwim River, about 380 miles west of Anchorage and 20 air miles northeast of the regional hub Bethel. The standard English spelling of the community name *Akiak* is published by U.S. Geological Survey (Baker 1906), while *Akiaq* is the standard Yup'ik orthography spelling for the community (Jacobson 1984:51). Wendell Oswalt (1980), in his historical overview of the Kuskokwim River region, lists a number of alternate spellings that he encountered during the course of his research: *Ackiagmut, Akiagamiut, Akiagamut, Akiagamute*, and *Akkiagmute*. The standard Yup'ik orthography base *aki* means "other side" (Jacobson 1984:51); the standard Yup'ik orthography postbase *miu* indicates inhabitant or resident (Jacobson 1984:499) and is variously spelled mut, miut, or mute in historical references. According to Orth (1967:56), the name Akiak means "crossing over" and refers to people traveling from the village location to the Yukon River in the winter months, while Oswalt (Oswalt 1980:21 citing Pratt *n.d.*), describes the meaning as "village on the opposite bank."

Although the village can be presumed to have existed at its present location as early as 1880 according to Petroff (1884), the history of habitation of contemporary Akiak can be traced back into the Russian–American period, which spanned the years 1732–1867. Oswalt (1980:17), who extensively researched the history and ethnohistory of the Kuskokwim River region, identified Akiak, Kwethluk, and possibly Tuluksak as the only villages on the Kuskokwim River between the Johnson River mouth and the headwaters of the Kuskokwim River that have been occupied continuously from the Russian–American era to the present. The earliest historical reference to Akiak is the 1818 travel journal of Russian explorer Petr Korsakovskiy, who left Kodiak with the intent of exploring the area north of Bristol Bay for potential fur trade (VanStone 1988). During this exploration, Korsakovskiy sent his crew, mostly comprised of knowledgeable Alaska Natives, to travel along the Kuskokwim River at the

suggestion of a Dena'ina settlement leader (VanStone 1988:57). An appendix to the expedition journal included a list of communities that Korsakovskiy and his team visited during their exploration, one of which was *Akhiagmiut*, believed to be present-day Akiak (VanStone 1988:63). Although Akiak is not mentioned in great detail in this work, the travel journal does give some insight into the interactions between Russian settlers and Native groups in the region, as well as the fact that the routes chosen by the Russians in their exploration were influenced by the advice of Native individuals who had a geographic knowledge of the surrounding area. This knowledge may have been formed by the fact that travel between Bristol Bay and the Kuskokwim River area by various routes was common in the past. Traditionally the residents of Akiak had ties to the Upper Wood–Tikchik Lake area of the Bristol Bay area through the Kilbuck and Kuskokwim mountains (210311AK1, 260311AK3).

The contact between Russian explorers and the community of Akiak and other communities in the surrounding area did not end with the Korsakovskiy expedition. O'Leary, in research for ANCSA 14 (h) (1) historical and cemetery site applications, produced a *Kuskokwim Concordance* (M. O'Leary, Archaeologist, Bureau of Indian Affairs ANCSA Office, October 5, 2011, Anchorage, personal communication). This index correlates names of historical human occupation sites, gathered from a number of historical maps and texts, along the Kuskokwim River. The data for the Russian–American period begins at the mouth with *Agulikmiut* near Quinhagak and ends upstream at *Ugnilnuk* (contemporary name is Georgetown). Akiak is included in the concordance and was documented by Korsakovskiy in 1818, Netsvetov and Kashevarov in 1862, and Illarion in 1863, which is the last source listed in the concordance for the Russian–American period in Alaska. A number of other events during this period likely had a significant effect on Natives in the Kuskokwim River region, including a smallpox epidemic in 1838–1839, which is estimated to have decimated one-half of the indigenous residents of the region, as well as the construction of a number of Russian outposts along the Kuskokwim River between 1819 and 1841 (Oswalt 1980:10–11).

Moving into the period following the 1867 purchase of Alaska by the United States, Akiak is first mentioned in a census entry by Petroff in 1880 that counted 175 individuals living there (Orth 1967:56). According to Oswalt (1980), local oral tradition tells of people who lived on the north side of the Kuskokwim River at a slough just upstream from Akiachak, and that one spring the residents of this site were in a state of near starvation. When the smelt run began, they ate such a large number of fish that many of the people died. The survivors abandoned this village and moved to the area in which they founded Akiak (Oswalt 1980).

The community of Akiak faced a number of colonial forces during the early days following the American purchase of Alaska, including missionization, the creation of schools in the region, the introduction of reindeer herding, and the presence of non-Native settlers in the area. Akiak became the most important settler community along the Kuskokwim during this time frame partially because it was the farthest point upriver that could be reached by shallow-draft, ocean-faring vessels (Oswalt

1980); this feature allowed for the transportation of mining equipment. The discovery of gold in 1907 along the creeks of the upper Tuluksak River led to the creation of the Nyac mining camp by the New York–Alaska Gold Dredging Company. This camp, which provided employment for Akiak residents, was partially supplied with equipment delivered to the community (Buzzell and Chambers 2010). A post office was established in the community in 1916, and the arrival of the 1918 influenza epidemic led to the creation of an Alaska Native Medical Service hospital that same year. The influx of non-Native settlers certainly contributed to the growth of the community in the early 20th century, although it was noted that Akiak actually consisted of 2 separate, but interconnected, villages. A traveling physician in the region noted that in 1936 there was a "White Akiak" on the east bank of the river and a "Native Akiak" on the west bank. Natives who worked for non-Native settlers lived on the east bank with them, while the non-Native doctor and school teacher lived on the west bank (Oswalt 1980:23). Despite this, residency in the "Village of Akiak" on the west bank was restricted to Natives with the notable exceptions of church and school workers, and the non-Native village on the other side of the river was largely begun by Saami reindeer herders from Norway brought into the territory in order to instruct Yup'ik residents in this industry (McAtee 2010:27).

As non-Native settlement increased in the Alaskan territory, so did federal oversight. The Organic Act of 1884 affected communities all over the territory, including Akiak, with the establishment of a school system designed principally for Alaska Natives. This system had close ties to missionary activity under the general agent of education in Alaska, Sheldon Jackson, and educational efforts were often contracted out to missionaries by the territorial government (Haycox 2002). In Akiak, the Moravian Church was influential in the educational system. John Kilbuck, who founded a Morovian mission in Bethel, also founded the Bureau of Education school in Akiak in 1911. The apparent segregation of the 2 villages continued in the realm of education, when an additional territorial school was created in the late 1920s in "White Akiak" for the children of an increasing number of non-Native settlers and continued to run until 1942 (Oswalt 1980: 23). Figure 4-2 shows Akiak students in the early 1940s.

Much as the school system was tied to missionary efforts, reindeer herding was also brought to region by the territorial government in cooperation with Moravian missionaries. In 1901, the mission at Bethel received 175 reindeer, and this number increased to 43,000 by the early 1930s (Oswalt 1980:13). The boom of reindeer herding was another major factor contributing to the prominence of Akiak, and the industry was brought to the region specifically for the benefit of the Native population. Although Alaska Native involvement in herding increased after the initial introduction, many of the larger herds were slowly taken over by non-Native businessmen or the Saami herders. Although there were 35,000 reindeer in the Akiak area in 1932 (more than any other area of Alaska), the number plummeted to only 600 by 1946 (Oswalt 1980:22) The reasons for the declining numbers were likely due to a multitude of factors that have been similarly noted in other areas of Alaska: poor herding techniques, predation, disease, and changing government policies (VanStone 1967).

Photograph courtesy of Alaska State Library.

Figure 4-2.–Akiak students in winter fur parkas, 1940–1941.

During World War II, non-Native settlers began to migrate out of the community of Akiak to nearby Bethel or elsewhere. In 1943, the Bureau of Indian Affairs began administering the remaining school in Akiak. In 1949, Akiak residents organized a tribal government under the Indian Reorganization Act, and further changes to the community occurred with the construction of the airport in 1958 and a National Guard Armory in 1960 (Oswalt 1980). The community was officially incorporated in 1970 as a second class city (ADCCED 2011a).

According to U.S. Census population data for 2010, Akiak is home to 346 residents, 93% of whom are American Indian or Alaska Native (ADCCED 2011a). Akiak is also home to 1 of 3 schools in the Yupiit School District, which was officially recognized by the State of Alaska as an independent school district in 1985 and also includes schools located in Akiachak and Tuluksak (Kawagley 2006). The Akiak Native community is a federally recognized tribe and is administered by the Akiak Traditional Council. The traditional council operates Bingo games and a laundry and shower facility, or "washeteria," in its building. There are 2 stores in the community—Stephen Ivan and Sons store and the Kokarmuit Corporation store. Kokarmuit is the village corporation and operates the store to sell groceries, hardware, fuel, and other goods in the community. Akiak has daily air service to and from Bethel. A majority of year-round employment in Akiak is in the public sector, while the majority of seasonal work is provided by Bureau of Land Management to perform firefighting and commercial fishing (ADCCED 2011a).

Seasonal Round

Subsistence activities and the resources harvested by individuals and groups vary with the seasons, and the following description of the seasonal round followed by subsistence users in Akiak comes largely from key respondent interviews conducted within the community. Both contemporary and historical information from these interviews are incorporated in order to highlight how and when resources are harvested, and any changes that have taken place in these practices.

In the spring, migratory birds are hunted, beginning with geese and swans in April and May. Ducks are hunted in May and June, with harvests continuing until they begin pairing with mates prior to laying eggs. Cackling Canada geese, white-fronted geese, and tundra swans were the most harvested species of the bigger birds. One hunter described 2010 as "the year of the swan" because so many migrated to the area. Migratory birds are also hunted in the fall but are more important as food in the spring. In addition to migratory birds, ptarmigan (an upland game bird) are hunted, mostly with the use of snowmachines, in the winter and spring through the month of March. According to one respondent, eggs are rarely harvested because finding nests and eggs is difficult so far from the coast. He explained that his mother used to gather eggs along the Kisaralik River. She would gather "maybe one pot" and leave the rest. He also said that before the use of outboard motors and jet boats, birds used to lay eggs on the islands and sand bars of the Kisaralik River, which is where people would typically gather eggs. Due to increased boat traffic on the rivers, nesting areas are now in more inaccessible areas farther away from human disturbance (210311AK1).

From May to September or October, fishing is a major subsistence activity, especially in the summer for salmon. Rainbow smelt are the first species of fish to run following breakup; smelt usually run in May. Akiak fishers use dip nets to harvest the smelt and then hang them to dry. Smelt are used both as human food and dog food. Chinook salmon arrive next, usually in June, and are caught by drift or set gillnets. One family stated that drifting was the preferred method for salmon fishing; however, they might also use a setnet to supplement their drift gillnet catch or to increase their fishing efficiency. Chum salmon, sockeye salmon, and coho salmon are also caught throughout the summer with subsistence drift and set gillnets. Some coho salmon are caught by rod and reel. Pink salmon were reported to return only every 4 years with a very small amount harvested in 2010. It was stated that "they [the pinks] belong to the brown bears" (210311AK1).

According to local respondents, sheefish and other whitefishes begin migrating upriver in late June and are caught incidentally while commercial fishing for salmon. They are harvested primarily with set gillnets during late summer in open water as well as under the ice after freeze-up. Humpback whitefish are caught throughout the summer from the riverbank near Akiak with rod and reel or with hooks attached to lines and thrown offshore into the river. Apparently this is a favorite activity for children and adults throughout the summer. Dolly Varden, rainbow trout, and Arctic grayling are caught in the

summer and occasionally at times throughout the year while fishing for other fish with rod and reel (210311AK1; 260311AK3).

Plants and greens are also gathered during the summer months. Wild rhubarb is a favorite green plant harvested in June. Other wild plants are harvested at that time also, but less intensively. Common wormwood, commonly known as stinkweed and known in Yup'ik as *caigglluk*, is harvested throughout the summer for various medicinal purposes. Hudson's Bay (Labrador) tea, known locally as tundra tea or in Yup'ik as *ayuq*, is also harvested through the season. Berry harvesting is an important subsistence activity in the late summer. Harvesters value salmonberries the most, and they are the first berries harvested in late July and August. Blueberries, lowbush cranberries, blackberries, and highbush cranberries are harvested in August and into September. Respondents described that blueberries are better if eaten soon after picking, as they tend to become watery if frozen. However, frozen blueberries are suitable for making *akutaq* or "Eskimo ice cream." Freezing is a useful method of preserving other kinds of berries (210311AK1).

Moving into fall subsistence activities, moose hunting takes place in September. In the past, before freezers became an option, moose was processed by caking the meat with blood and not fully removing the hide. This practice prevented flies and maggots from contaminating the meat, which was then hung to dry until the weather cooled enough to freeze it. Presently, moose meat is frozen in household freezers and can be processed in different ways, such as making jerky.

Black bears are also hunted in the fall; one key respondent explained that contemporary harvests of black bears have declined because traditional hunting locations are too distant from Akiak, and many people are now limited in their time due to responsibilities related to wage employment. The preferred timing of black bear harvests relates to the berry-rich diet of the animals in the fall—respondents explained that the meat has a less appealing taste when the bears are principally consuming fish. Brown bears, although hunted in the past, appear to be targeted less than they once were. One respondent explained that it was due to how far away the brown bears are from the community, although they also explained that brown bears are "highly respected" for being strong animals (210311AK1). Elder respondents did remember brown bears being harvested by members of the community, and recalled eating the dried meat as children (260311AK2).

Caribou are also hunted beginning in the fall months, and hunting efforts continue from September through March. In recent years, the Mulchatna caribou herd has moved into the Akiak hunting area where animals can be accessed with snowmachines and all-terrain vehicles (ATVs), especially after freeze-up (260311AK3).

Fishing efforts also continue through the fall months into the winter. Dolly Varden, rainbow trout, and Arctic grayling, while important species targeted in the summer months, are also caught while moose hunting in September. Burbot, locally known as lush (loche), are caught with fyke nets, commonly known as fish traps, beginning in October and through December as ice freezes on the Kuskokwim

River. A few families put out traps, and respondents described a community fish trap. Burbot caught in the community fish trap are shared throughout the community (210311AK1). Northern pike are caught with set gillnets under the ice, while jigging, and with rod and reel. They are especially targeted by ice fishing with a hook and line from February through April, although they are harvested year-round. Sheefish and whitefishes are also caught in nets set under the ice after freeze-up.

Beavers are snared in the winter for the pelts and for food, and hunted throughout most of the year for food. Trapping or hunting for other furbearers, such as red foxes, lynx, and marten, occurs in late fall and winter. Hunters also harvest muskrat in the winter, though they are more popular for food in the spring. Snowshoe hares are hunted and snared beginning in September through the winter until April and are a consistent food source easily accessible by foot near the village. Arctic hares sparsely populate the area and are hunted in the winter when they are encountered.

Demographics

The estimated population of Akiak at the time of the survey was 386 individuals. There was an average of more than 4 occupants per dwelling, and the largest household had 11 occupants. The mean age in Akiak was 28.5 years, and the eldest resident was 86 years of age. The average length of residency was 13.2 years, with a maximum of 63 years. An estimated 89% of the residents were Alaska Native. Figure 4-3 is a population profile based on this study that reflects a fairly young population evenly distributed between the sexes. According to the profile, 51% of the population was male and 49% was female.

Figure 4-4 illustrates the population history of Akiak from 1960 to 2010. This study's estimate of 386 residents is portrayed by the red dot. As a comparison, the U.S. Census Bureau, whose decennial estimates are portrayed as blue dots, reported 346 individuals living in Akiak in 2010. Yearly estimates are also provided by the Alaska Department of Labor (white dots) and are based on adjusted Alaska Permanent Fund Dividend applications data and U.S. Census Bureau data. The Alaska Department of Labor population estimate for Akiak in 2010 was 346, a difference of slightly more than 10% from this project's estimate of 386 individuals. There are a number of factors that could explain this difference, including differences in season of survey, definitions of residency, and sampling methodology.

Wild Food Uses and Harvests

The primary purpose of the household survey was to collect information about the harvest and uses of edible wild foods. Tables and figures in this section summarize responses to the harvest and uses questions; data are expanded to provide community estimates. Respondents were asked whether their household used or tried to harvest each resource during the study year. If they tried to harvest a resource, they were asked how much they harvested and for other details of the harvest, such as gear

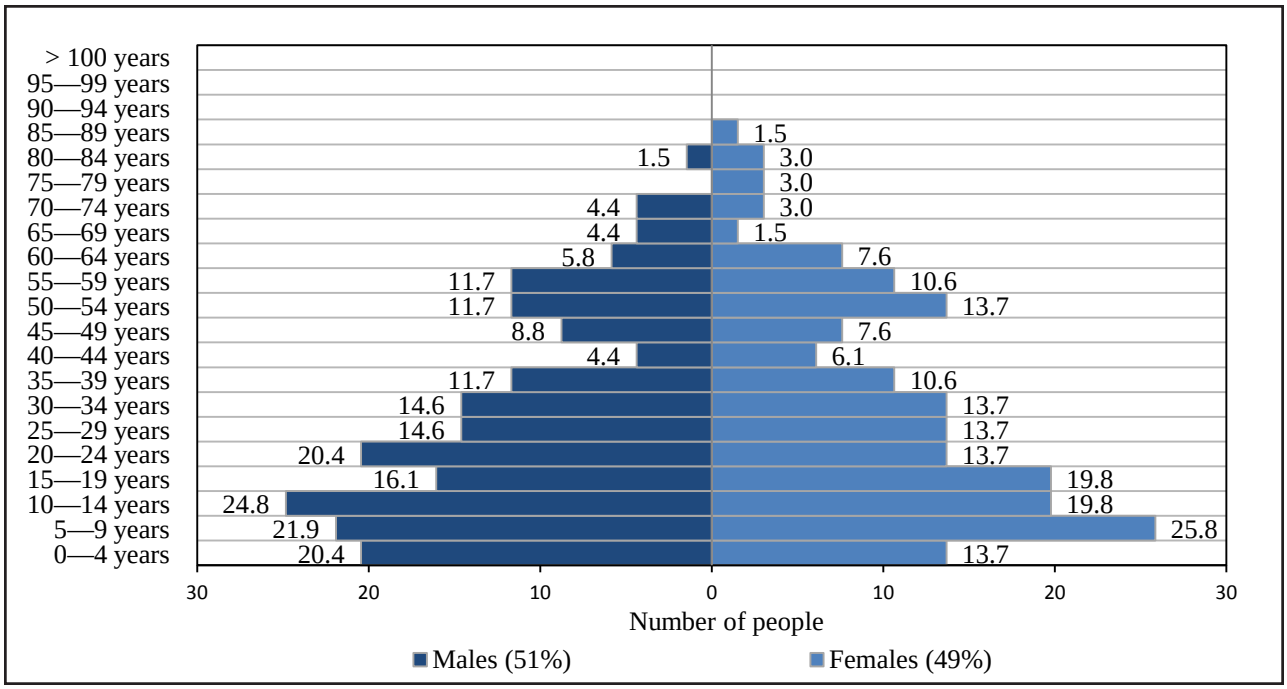

Figure 4-3.–Population profile, Akiak, 2010.

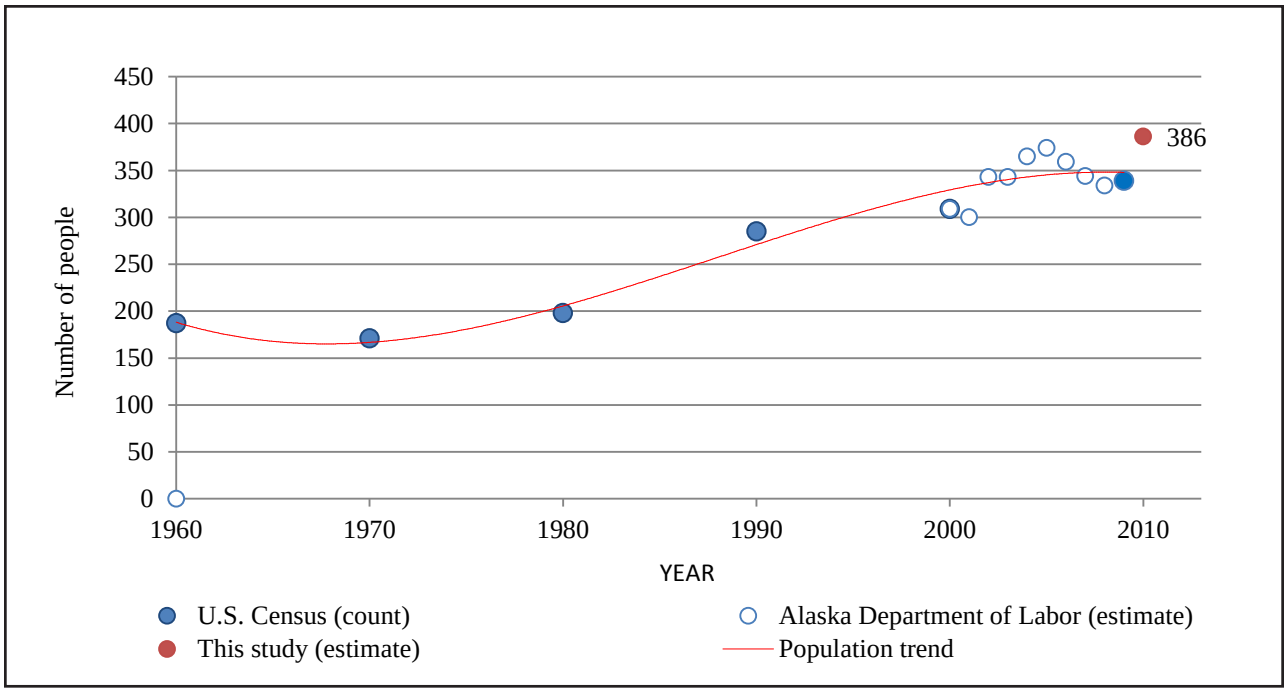

Figure 4-4.–Population history, Akiak, 1960–2010.

type, sex of the animal, or month of harvest. Households were also asked if they received or gave away any wild foods. Figures 4-5 and 4-6 show the results of these survey questions in the amount of estimated edible pounds harvested for each resource category in addition to the percentages of households reporting harvesting activities, receiving wild foods, or giving them away.

Every surveyed household in Akiak used at least 1 wild resource and 92% of households reported successful harvesting activities; they harvested 86 different types of resources in the study year. One key respondent summarized the importance of Akiak's harvest and use of wild foods by saying, "To our subsistence way of life style, we survive from the resources around us" (210311AK1). The most widely used resources in Akiak were fish, including both salmon and nonsalmon species, and land mammals, used by 97% and 94% of Akiak households respectively. In total, Akiak households harvested an estimated 237,441 lb of wild foods during the 2010 study year. Of that, 112,606 lb (47%) came from salmon harvests, the highest amount for any resource category.

Figure 4-1 shows that 10 resources composed 83% of the total wild food harvest by edible weight; Chinook salmon (5,229 individual fish) contributed the most subsistence food by edible weight, an estimated 49,358 lb (21%). The edible per capita pounds for Chinook salmon exceed all other resources, including caribou or moose. Eight out of the 10 top resources harvested were fish species. Chum salmon composed 13% of the total estimated harvest with 31,532 lb (6,203 fish) harvested; burbot composed 10% of the harvest with 24,184 lb (10,077 fish) harvested; humpback whitefish composed 9% of the harvest with 21,267 lb (7,089 fish) harvested; sockeye salmon composed 9% of the harvest with 20,132 lb (3,995 fish); moose harvests composed 6% of the total harvest with 14,494 lb (27 moose) harvested; sheefish composed 5% of the harvest with 12,214 lb (2,036 fish) harvested; northern pike composed 4% with 9,990 lb (2,220 fish) harvested; coho salmon composed 3% with 7,799 lb (1,475 fish) harvested; and caribou composed 3% of the total harvest with 7,162 lb (55 caribou) harvested.

Chinook salmon, in addition to providing the most edible pounds of food of any other resource, are also one of the most widely shared. Chinook salmon were received by 37% of households (given away by 44%); only caribou and moose were shared by more households (Table 4-1; Table 4-3). Key respondent comments confirmed the importance of Chinook salmon in community life: "Most of our diet is king salmon" (210311AK1). Another respondent elaborated, "The fish, the first king salmon catch … yummy, we split with people" (260311AK2). More than all other species of salmon, Chinook salmon were preferred for their size and oil content. Respondents described a variety of preservation methods for Chinook salmon. Chinook salmon fillets, or "slabs," are a favorite among residents. Slabs are made by cutting the backbone out of the middle of the salmon while leaving the 2 sides connected together at the belly; the slabs are later hung and dried. Another way Akiak residents dry their fish is by making a "kite." This method of cutting involves filleting the fish and leaving the backbone hanging in place. A stick is then used "to keep it open" (210311AK1). Some key respondents reported harvesting 200 to 300 Chinook salmon to make Chinook salmon slabs. (210311AK1). Some Chinook salmon

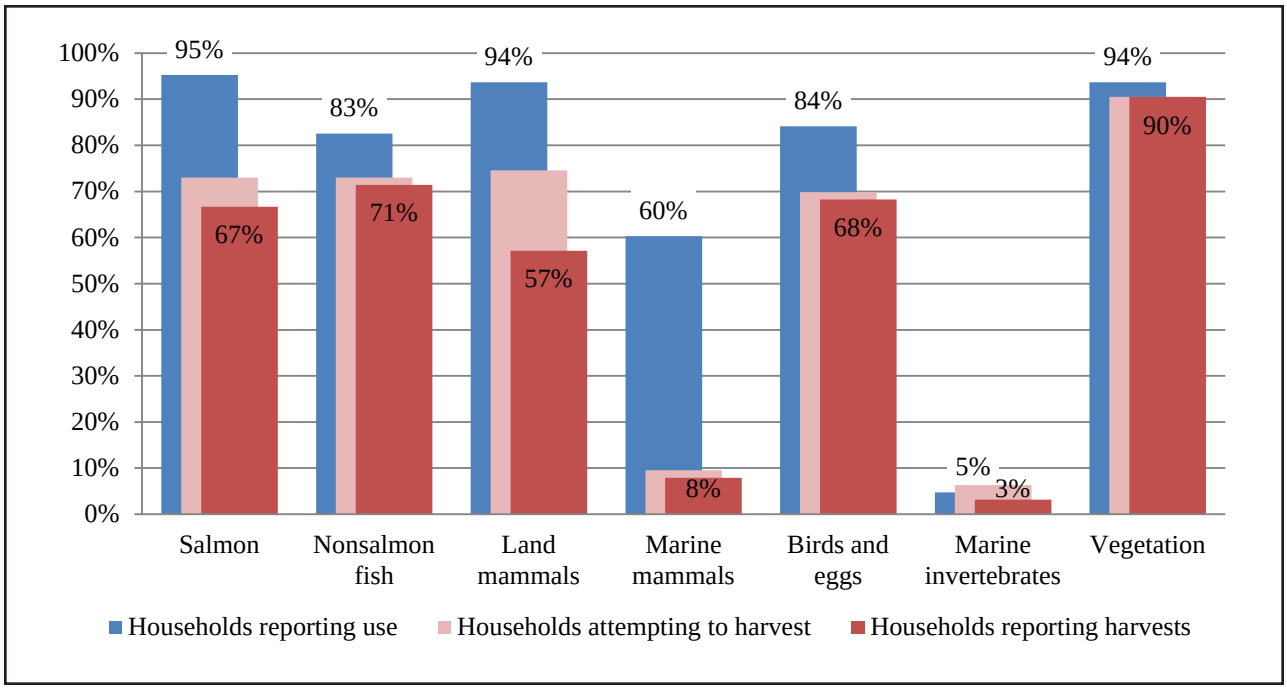

Figure 4-5.–Percentages of households using, attempting to harvest, or harvesting subsistence resources by category, Akiak, 2010.

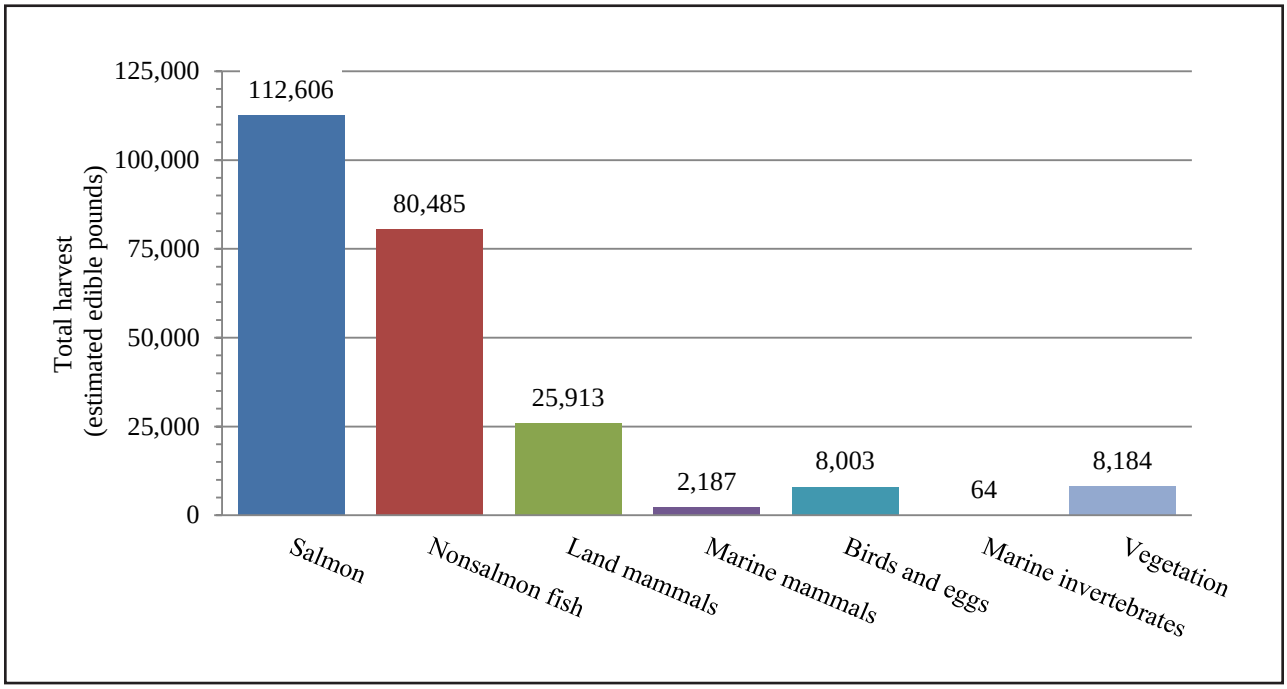

Figure 4-6.–Total estimated edible pounds harvested by the community by resource category, Akiak, 2010.

are brined in buckets, especially the heads, and stored for later consumption. One family reported kippering Chinook salmon when they have the opportunity. The backbones and the meat remaining on the bone of the Chinook salmon are hung and dried for dog food. This is done with other salmon species as well (210311AK1). Harvesting and processing Chinook salmon earlier in the season is preferred because the flies are less active, laying fewer eggs on the drying meat.

Drying fish and fermenting fish are popular in Akiak. Elder respondents detailed the preservation of fish and the use of roe:

> They dry the fish, the roe eggs away from the sun, dried them, and toward the summer when they are dry, you mix them with salt and you make sure there is no air. Then you press 'em and you pack 'em really hard, put them in the ground and about this time of year [spring] you take them out, you take the top off and then they are so much like peanut butter … yummy, yummy, yummy. (2600322AK2)

Other times, the fish eggs are fermented and later cooked with potatoes or cabbage.

When fish eggs are eaten, the respondent continued, "You don't get hungry all day … and you sleep hard." In all interviews, Akiak respondents emphasized that Yup'ik food is never wasted. In addition to the use of roe, respondents described the local love for fish hearts and other organs. "Some people eat them, and those kids love to eat the fish hearts," said one respondent (260311AK2). An elder described how, in the summer, her grandchildren skewer fish hearts with sticks and roast them "like marshmallows" (260311AK2). Aside from the guts and gills, respondents agreed that nothing in a fish, particularly in salmon, goes unused. When asked to elaborate, an elderly woman explained that "… the king salmon has lots of stuff in it you can make. You can dry the stomach, salt the head, or do whatever you want, hang it up to dry" (260311AK2). The practices of drying and fermenting were historical methods of preservation, especially prior to the use of electric freezers. An elder respondent confirmed the practicality of using the frozen earth for storage and as a place for fermentation:

> It works. Anybody can make a refrigerator underground right now, too, I'm sure. The ground temperature is naturally good for all those fish and wildlife preservation, even plants. It's perfect. God made temperature, not a refrigerator or the freezer. (260311AK2)

Family members teach young children to respect fish and wildlife resources, and they learn how to take care of and process food so it does not spoil. For example, while on a drying rack, salmon are sheltered from sunlight so they do not "cook" or spoil. During fish processing activities, salmon are cut and hung on fish drying racks in the early morning, when temperatures are generally cooler and before sunlight becomes more intense. During the remainder of the day, work focuses on drying and smoking the fish. When temperatures fall in the evening, people cut fish caught during the day, and prepare them for the next day's work. When this work is taking place, everyone in the family, even

Table 4-1. – Estimated uses and harvests of fish, Akiak, 2010.

	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		
Fish										
Fish										
Chum salmon	57%	52%	44%	16%	25%	31,532.0 lb	354.3 lb	81.8 lb	6,202.5 ind.	± 51%
Coho salmon	63%	51%	48%	25%	24%	7,798.8 lb	87.6 lb	20.2 lb	1,474.9 ind.	± 29%
Chinook salmon	86%	63%	57%	37%	44%	49,357.9 lb	554.6 lb	128.0 lb	5,229.0 ind.	± 21%
Pink salmon	8%	6%	5%	3%	3%	155.4 lb	1.7 lb	0.4 lb	66.4 ind.	± 63%
Sockeye salmon	68%	57%	52%	19%	30%	20,131.9 lb	226.2 lb	52.2 lb	3,994.9 ind.	± 26%
Unknown salmon	2%	2%	2%	0%	0%	3,629.7 lb	40.8 lb	9.4 lb	565.1 ind.	± 108%
Subtotal	**95%**	**73%**	**67%**	**46%**	**51%**	**112,605.6 lb**	**1,265.2 lb**	**292.0 lb**	**17,533 ind.**	**± 25%**
Char										
Dolly Varden	19%	19%	14%	5%	5%	155.1 lb	1.7 lb	0.4 lb	172.3 ind.	± 50%
Lake trout	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**19%**	**19%**	**14%**	**5%**	**5%**	**155.1 lb**	**1.7 lb**	**0.4 lb**	**172 ind.**	**± 49%**
Trout										
Rainbow trout	21%	19%	17%	5%	8%	184.0 lb	2.1 lb	0.5 lb	131.4 ind.	± 38%
Subtotal	**21%**	**19%**	**17%**	**5%**	**8%**	**184.0 lb**	**2.1 lb**	**0.5 lb**	**131 ind.**	**± 38%**
Whitefishes										
Sheefish	35%	32%	30%	6%	14%	12,214.2 lb	137.2 lb	31.7 lb	2,035.7 ind.	± 64%
Broad whitefish	52%	43%	38%	16%	11%	1,724.6 lb	19.4 lb	4.5 lb	1,231.9 ind.	± 41%
Bering cisco	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Least cisco	10%	10%	10%	2%	2%	2,949.7 lb	33.1 lb	7.6 lb	2,949.7 ind.	± 103%
Humpback whitefish	40%	35%	33%	11%	14%	21,266.8 lb	239.0 lb	55.1 lb	7,088.9 ind.	± 86%
Round whitefish	21%	14%	13%	10%	5%	137.7 lb	1.5 lb	0.4 lb	275.5 ind.	± 58%
Unknown whitefish	5%	2%	2%	3%	0%	1,977.8 lb	22.2 lb	5.1 lb	1,412.7 ind.	± 108%
Subtotal	**73%**	**60%**	**57%**	**25%**	**25%**	**40,270.8 lb**	**452.5 lb**	**104.4 lb**	**14,994 ind.**	**± 66%**
Anadromous/marine fishes										
Pacific herring	5%	0%	0%	5%	2%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Smelt	33%	30%	27%	6%	16%	5,171.9 lb	58.1 lb	13.4 lb	862.0 gal.	± 55%
Cod	2%	0%	0%	2%	2%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Saffron cod	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Pacific halibut	6%	0%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 lb	± 0%
Arctic lamprey	2%	0%	0%	2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Stickleback (needlefish)	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Subtotal	**38%**	**30%**	**27%**	**16%**	**16%**	**5,171.9 lb**	**58.1 lb**	**13.4 lb**		**± 55%**
Other freshwater fishes										
Alaska blackfish	25%	11%	11%	16%	5%	447.3 lb	5.0 lb	1.2 lb	447.3 lb	± 59%
Burbot	57%	54%	46%	22%	24%	24,183.5 lb	271.7 lb	62.7 lb	10,076.5 ind.	± 56%
Arctic grayling	22%	22%	21%	5%	6%	82.3 lb	0.9 lb	0.2 lb	117.5 ind.	± 37%
Northern pike	43%	40%	37%	8%	16%	9,990.0 lb	112.2 lb	25.9 lb	2,220.0 ind.	± 29%
Longnose sucker	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**67%**	**62%**	**60%**	**27%**	**32%**	**34,703.2 lb**	**389.9 lb**	**90.0 lb**		**± 43%**
All fish	**97%**	**81%**	**79%**	**67%**	**63%**	**193,090.6 lb**	**2,169.6 lb**	**500.7 lb**		**± 35%**
All resources[b]	**100%**	**94%**	**92%**	**95%**	**78%**	**237,441.0 lb**	**2,667.9 lb**	**615.7 lb**		**± 30%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

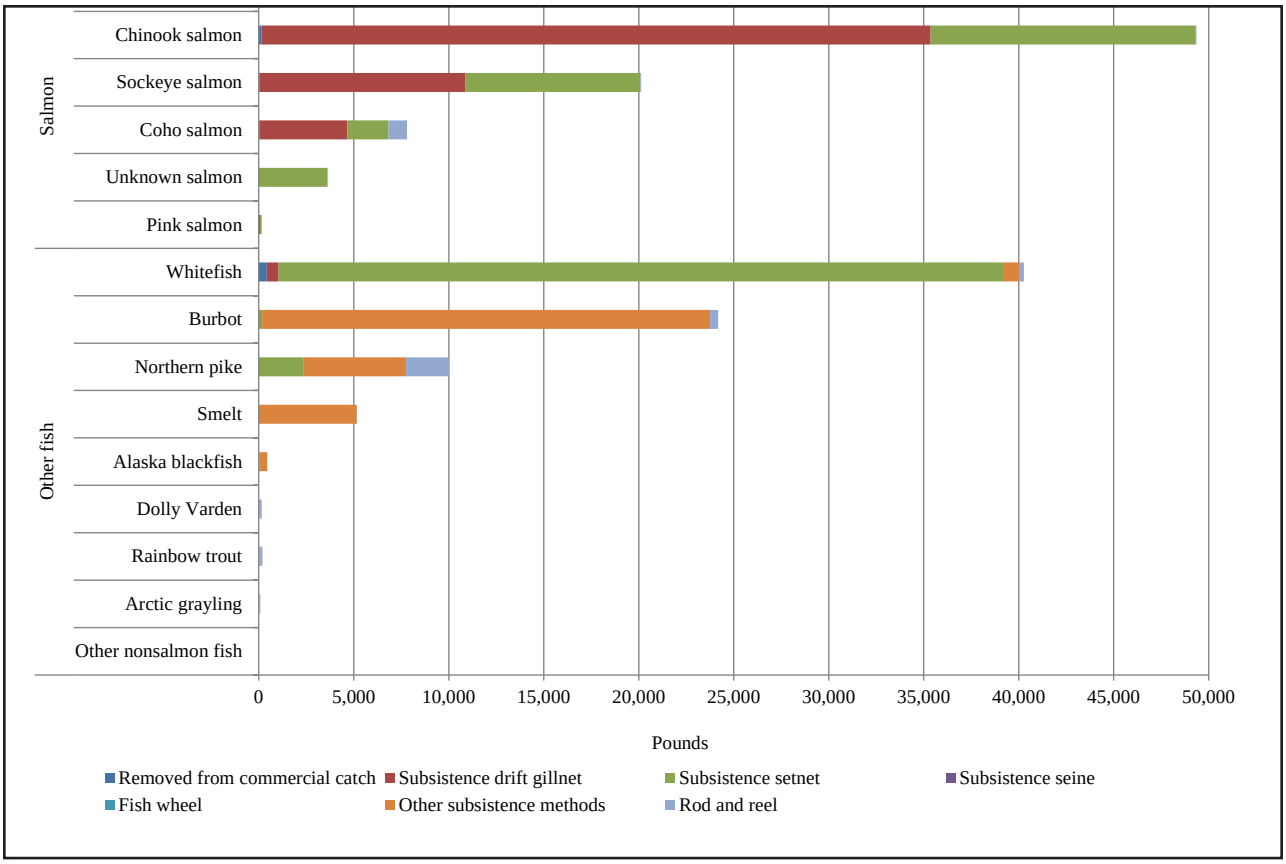

Figure 4-7.–Fish harvests by gear type, Akiak, 2010.

the grandchildren, gets little sleep and no one is idle. Everyone helps at the fish processing location (210311AK1).

Households that expend greater effort harvesting salmon generally bear additional costs. They make more trips to summer fish camps and use boats more often for drifting, and they spend more money on gasoline during a time of record high gas prices. Subsistence drift and setnets were the primary gear types used to catch salmon of all species. Akiak residents used subsistence driftnets to harvest an estimated 35,215 lb of Chinook salmon, more than twice the number of Chinook salmon caught in setnets (Figure 4-7).

In light of subsistence salmon fishing closures on the Kuskokwim River in recent years, one key respondent highlighted the importance of salmon and all subsistence foods to people living in Akiak during times of hunger, poverty, or starvation:

> Like my mother tells me … [people], when they [have] empty stomachs during salmon [runs], you go after that, go after what you want to eat … this doesn't know any rules or regulations versus hungry. They wanna live. Whatever's in the way, they ask, "Please move, I gotta have it." And this has no laws. (210311AK1)

With the decline of Chinook salmon in the Kuskokwim River (Linderman and Bergstrom 2006), other salmon species are targeted more heavily than in prior years. But for some respondents, the substitution of one species for another is not an ideal scenario. One respondent expressed his worry surrounding Chinook salmon fishing closures and mesh size restrictions:

> The biggest concern, I'll repeat it again, is the restriction on the king salmon fish. Subsistence fishing. Please, do everything in your power, to not go through that again to lower [the amount of fishing]. (210311AK1)

Other species of salmon are harvested for human consumption, notably sockeye and coho salmon, but harvests of some salmon species were used for feeding dogs. An estimated 3,217 chum salmon were harvested specifically to feed dog teams, and lesser amounts of pink (27 fish) and coho (21 fish) salmon were also used for dog food. One key respondent noted that "Always the men make up soup for the dogs" (260311AK2). Nonsalmon species are also important resources for feeding dogs—Akiak households harvested an estimated 9,513 whitefishes, 6,788 burbot, 1,399 sheefish, and 268 northern pike for this purpose. While there were no reports of whole Chinook salmon being fed to dogs, one household that harvested over 200 Chinook salmon made use of the meat themselves and fed the backbones to the dogs (210311AK1).

Nonsalmon species have always been part of Akiak subsistence harvests, including Dolly Varden, rainbow trout, sheefish, broad whitefish, humpback whitefish, smelt, burbot (locally known as lush [loche]), and northern pike. Elder respondents discussed the run timing of loche and the importance of winter fish species. "Loche will start going up from the sea in September. I set fish traps, I got 30 I think in September … [but] in December their liver gets black, they start to be long and thin," and are no longer edible (260311AK2). Once burbot "go bad," they go into hibernation for the winter. In the spring, they "come up again and start swimming around when the birds come … in March." Fish caught in the winter can be stored frozen for many months. One elder respondent explained that in the case of fish, the length of preservation time does not matter because "they're tastier when they are old" (260311AK2).

Springtime can be difficult for many Akiak residents who are waiting for the salmon runs and are feeling the pinch of dwindling food supplies. When asked about subsistence shortages in spring, one resident explained why the increased daylight in spring accentuates food scarcity:

> May is a dreaded month. Longer days, you require, we require 4 meals a day, with 20 longer days. In October, November, December, we [only] require 3 meals because of the daylight. We're out here more in the springtime, daylight. We don't come home until six o'clock; eat at seven and still go out, still enough daylight to hunt more. (210311AK1)

To compensate for low salmon stores in the spring, Akiak residents rely more heavily on nonsalmon

Table 4-2. – Estimated uses and harvests of marine invertebrates, Akiak, 2010.

	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										
Clams	3%	6%	3%	0%	3%	63.6 lb	0.7 lb	0.2 lb	21.2 gal.	± 80%
King crab	2%	0%	0%	2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Tanner crab	2%	0%	0%	2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown crab	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Shrimp	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown marine invertebrates	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Subtotal	**5%**	**6%**	**3%**	**2%**	**3%**	**63.6 lb**	**0.7 lb**	**0.2 lb**		**± 80%**
All marine invertebrates	**5%**	**6%**	**3%**	**2%**	**3%**	**63.6 lb**	**0.7 lb**	**0.2 lb**		**± 80%**
All resources[b]	**100%**	**94%**	**92%**	**95%**	**78%**	**237,441.0 lb**	**2,667.9 lb**	**615.7 lb**		**± 30%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

species, especially whitefishes. In the spring, sheefish are harvested by setnet. Some respondents reported harvesting whitefishes year-round: "Whitefish all year, can gather with net in ice, pikes and little whitefish" (260311AK2). Prepared in a variety of ways, whitefishes can add variety to the diets of residents who rely on them. Whitefishes not only supplement a diet dominated by salmon but are also used to "fatten" dogs (260311AK2, Brown et al. 2011a). In total, 38,123 lb of whitefishes, the most heavily harvested nonsalmon fish, were harvested by setnets, mostly under the ice in winter. The species with the highest percentage of harvest by rod and reel was northern pike. Burbot, northern pike, and Alaska blackfish were primarily harvested through the use of "other subsistence" gear including fish traps and jigging (also known as ice fishing). Nearly all smelt (5,163 lb out of 5,172 lb) were taken by "dipping" for them using small hand-held nets.

Akiak respondents harvested and used very few marine invertebrates in 2010 (Table 4-2). Only 3% of households in Akiak harvested freshwater clams and no household harvested any other type of shellfish. Some households (2%) reported receiving king and tanner crabs. It is likely that the Akiak households who received king and tanner crabs were given these resources by households in other communities. No other marine invertebrates were used in Akiak.

While salmon and nonsalmon species dominated Akiak's list of most heavily used resources, respondents often discussed the significance of large land mammals. Akiak respondents emphasized the superiority of wild meat compared to store-bought meat. One elder noted that "If old people in the village ate store-bought meat, that's not good for their health so they should let somebody hunt for them so they can eat their traditional food" (260311AK2).

Unlike fish, however, a much lower rate of harvest occurred for large land mammals, in comparison to use (Figure 4-5). While 94% of households used large land mammals in 2010, only 48% of the 71% that attempted the endeavor were successful. The lower levels of harvest success compared to

the percentage of households that used land mammals indicate that these resources were being widely shared. For example, the most heavily relied upon species in the large land mammals category was moose, which was used by 94% of households—62% of households attempted to harvest moose, while only 27% were successful. In contrast, out of the 81% of households attempting to harvest fish species, 79% were successful.

Large land mammals made up an estimated 9% of Akiak's 2010 subsistence harvest by edible weight (Table 4-3). Most of the large land mammal harvests by edible weight were moose (66%), followed by caribou (32%) and black bears (2%). Akiak households harvested an estimated 27 moose, 55 caribou, and 4 black bears in 2010. Elder respondents remember a time when caribou herds did not pass through the Akiak area. Instead, people in the region relied upon commercial reindeer herds. Respondents noted that only in the last 20–30 years have migrating caribou come close enough to Akiak to hunt (260311AK3). The increased availability of caribou has led to more harvests in recent years.

Respect for brown bears is ever-present in Akiak, and while not targeted now as much as in past, this animal is considered to be "good, traditional food." One respondent explained the cultural significance and reverence given to the animal:

> Number one, it made our people survive. Number two, it's a strong animal and it's gotta be respected. There's some, you just don't cut the head and throw it off anywhere. You put it away, facing the east. (210311AK1)

As mentioned earlier, another respondent also noted that despite their availability, personal taste dissuades early summer black bear harvest.

> Our fish camp is right across the river and our fish are being eaten by bears …. The summer when they are eating fish they don't taste as good. Only when they start eating berries. (260311AK3)

Small game species, such as snowshoe and Arctic hares, porcupines, and lynx, were also harvested by hunters and trappers. Beavers were of particular importance to Akiak residents in 2010 and accounted for 62%, or 2,373 lb, of harvested meat in the small land mammal resource category (Table 4-3). One elder respondent related that beavers were trapped in the past by his grandfathers for income. They sold the pelts to the fur traders and took as many of the animals as possible because there was originally no limit. They trapped for beavers in the hills as far away as Nushagak because beavers were not plentiful near the community in the past (210311AK1). He went on to state:

> Beaver are eaten now in March, April, and May when they are tasty and fat from all their eating. When the ice gets that thick, they get tasty and that's when we go after them …. Okay, traditionally that beaver, they know how to carry it in their sled, the meat. They throw the bone to the dogs, they debone it in a way. They open it up take the bone out, the meat is still there,

Table 4-3. – Estimated uses and harvests of land and marine mammals, Akiak, 2010.

	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										
Black bear	11%	5%	5%	6%	3%	423.8 lb	4.8 lb	1.1 lb	4.2 ind.	± 61%
Brown bear	3%	2%	0%	3%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Caribou	78%	52%	37%	56%	33%	7,162.4 lb	80.5 lb	18.6 lb	55.1 ind.	± 21%
Moose	94%	62%	27%	78%	27%	14,494.3 lb	162.9 lb	37.6 lb	27 ind.	± 24%
Subtotal	**94%**	**71%**	**48%**	**83%**	**43%**	**22,080.5 lb**	**248.1 lb**	**57.3 lb**	**86.2 ind.**	**± 19%**
Small land mammals										
Beaver	43%	29%	27%	19%	19%	2,373.3 lb	26.7 lb	6.2 lb	158.2 ind.	± 29%
Red fox	5%	5%	3%	2%	5%	0.0 lb	0.0 lb	0.0 lb	2.8 ind.	± 0%
Arctic hare	3%	3%	3%	2%	0%	42.4 lb	0.5 lb	0.1 lb	17.0 ind.	± 92%
Snowshoe hare	51%	41%	41%	13%	17%	1,264.4 lb	14.2 lb	3.3 lb	505.7 ind.	± 21%
River (land) otter	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Lynx	2%	2%	2%	0%	0%	11.3 lb	0.1 lb	0.0 lb	2.8 ind.	± 108%
Marmot	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Marten	2%	2%	2%	0%	0%	*Not usually eaten*			1.4 ind.	± 108%
Mink	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Muskrat	14%	11%	11%	3%	5%	39.2 lb	0.4 lb	0.1 lb	52.3 ind.	± 46%
Porcupine	11%	10%	10%	2%	6%	101.7 lb	1.1 lb	0.3 lb	25.4 ind.	± 63%
Arctic ground (parka) squirrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Red (tree) squirrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Weasel	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Gray wolf	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Wolverine	2%	2%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Subtotal	**59%**	**46%**	**46%**	**25%**	**27%**	**3,832.3 lb**	**43.1 lb**	**9.9 lb**	**765.7 ind.**	**± 24%**
Marine mammals										
Bearded seal	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Ringed seal	6%	3%	3%	5%	2%	237.3 lb	2.7 lb	0.6 lb	4.2 ind.	± 80%
Spotted seal	22%	8%	6%	16%	3%	395.6 lb	4.4 lb	1.0 lb	7.1 ind.	± 56%
Unknown seal	48%	0%	0%	48%	3%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Walrus	5%	2%	2%	3%	2%	1,554.0 lb	17.5 lb	4.0 lb	1.4 ind.	± 108%
Beluga	3%	0%	0%	3%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Bowhead	13%	0%	0%	13%	2%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**60%**	**10%**	**8%**	**56%**	**8%**	**2,186.9 lb**	**24.6 lb**	**5.7 lb**	**12.7 ind.**	**± 89%**
All land mammals	**94%**	**75%**	**57%**	**83%**	**51%**	**25,912.8 lb**	**291.2 lb**	**67.2 lb**		**± 18%**
All marine mammals	**60%**	**10%**	**8%**	**56%**	**8%**	**2,186.9 lb**	**24.6 lb**	**5.7 lb**		**± 89%**
All resources[b]	**100%**	**94%**	**92%**	**95%**	**78%**	**237,441.0 lb**	**2,667.9 lb**	**615.7 lb**		**± 30%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

all over the body. And give the bone to the dogs. It's very rich and nutritious to the dogs. It's just not any bone. (210311AK1)

Other species of small game animals are important for residents of Akiak as well. Snowshoe hare accounted for 1,264 lb, or 32%, of the small land animals harvest in Akiak by weight. Fifty-two muskrats were harvested in the community, and elder respondents explained that the price of muskrat fur had gone down over the years (260311AK2). Despite this, one respondent explained that the population of muskrats had increased following a decline, and people have begun to harvest them more in recent years:

> Muskrat are good to eat—caught in the springtime. Because we quit hunting them they are going away. But now they are coming back. They are shot and the fur is used. They aren't sold because they don't get very many. The fur is used for hats and gloves. (210311AK1)

Trapping does not appear to be a major focus of subsistence activities in Akiak at present, and key respondents explained that this is due to the fact that the price of fur has declined (210311AK1, 260311AK3).

Although harvest rates were quite low, 60% of households reported using marine mammals during the study year (Table 4-3). Akiak's location, which is more than 80 miles upstream from the mouth of the Kuskokwim River, makes marine mammal harvests uncommon. One respondent summed it up: "A little too far [for marine mammals], I could if I had to, but I'll let the coastal people take care of it" (210311AK1). In fact, marine mammals make up less than 1% of the total harvest by weight for Akiak, with 6% of households harvesting spotted seal (7 individual animals) and 3% harvesting ringed seal (4 individual animals). Residents reported harvesting 1 walrus. Forty-eight percent of Akiak households received seal meat of unknown species. Seal oil is included in this category and is commonly shared, bartered, and traded by people throughout the state (Magdanz and Wolfe 1988). Dry or half-dried fish is a common medium of exchange for seal oil. An elder respondent described summer trade with people from Mekoryuk, a small village on Nunivak Island. "I used to be a little girl, I used to see them. Summertime, they come around, you know, they used to come from Mekoryuk with the boats. Lots of [seal oil] poke" (260311AK2). In trade, Akiak residents would exchange 2–6 slabs of salmon for 1 poke of seal oil. Today not much has changed. Seal oil remains an important part of the diet of Akiak residents and Chinook salmon continues to be a valuable commodity for exchange. "When we were small we don't give them money all the time, but dried fish, king fish, it's the way we used to do" (260311AK2). Akiak households also reported receiving bowhead whale (13%). Respondents reported trading dry fish for walrus skins and flippers (260311AK2).

Unlike large land mammals that have high use rates but relatively low harvest levels, vegetation, as a category, had high harvest and use levels but composed a relatively small percentage of the total annual harvest. Vegetation, both berries and edible plants, composed a small percentage of total harvest

by pounds (3%) but was equal to moose as the second most widely used subsistence resource category (94% of households reporting use) (Table 4-4). Ninety percent of households reported harvesting berries, greens, and wood, making vegetation the category with the highest successful harvest rate.

> After fishing season, we gather berries … salmonberries then blueberries then red berries. Those three main berries. We used to go up to Napaimute up in the mountains to pick red berries. It was fun. Until they put the land use stuff over there. Now it is too expensive. 400 dollars blind permit just to go up there. Native Corporation from Aniak. They have this whole thing kind of blocked off on the Stony River. (260311AK3)

Created in 1977, following the merger of 10 ANCSA village corporations, the Kuskokwim Native Corporation can charge non-shareholders a fee for using their private land.[1] This has made berry picking for some residents in Akiak challenging and has resulted in extended search areas. The respondent continued, "We kind of stopped doing that and now we go up the Kisaralik [River] to pick red berries. We gather our blackberries, too, from Nelson Island. Once in a while, not all of the time" (260311AK3).

In general, households reported use of blueberries, blackberries (crowberries), salmonberries, cranberries, and raspberries. Edible plants included wild rhubarb, Eskimo potatoes, Hudson's Bay (Labrador) tea, wild rose hips, and stinkweed. Small quantities of other edible plants were also harvested. One elder respondent described her fondness for pussy willows. She remembers taking "pussy willow with little red things on it … it was sweet … and eat it with that … fermented fish eggs" (260311AK2). Finally, many households (70%) reported using firewood.

In Akiak, 84% of the households used birds and eggs in 2010, although as a category it only composed 3% of the total community harvest by weight (Table 4-5). Geese and ducks made up just more than one-half of this harvest (59%). Tundra swans accounted for 32% of the migratory bird harvest by weight. One respondent who heavily relies on black ducks (scoters) explained his method of predicting their arrival:

> When they [black ducks] start flying here, when smelts are just coming in. So we know that when we hear [that] smelts [are] coming up the river, we start to hear about them from Napakiak, so down there, we ask, "Where are the smelts?" Maybe they are in Bethel, then we start looking, they start migrating. That's when we leave [to hunt] .... (260311AK3)

Of the total harvest of birds and eggs, mallards were the most commonly harvested species of duck, followed by black scoters, northern pintails, wigeons, scaups, and white-winged scoters (Table 4-5).

1. The 10 villages whose corporations merged are Lower Kalskag, Upper Kalskag, Aniak, Chuathbaluk, Napaimute, Crooked Creek, Georgetown, Red Devil, Sleetmute, and Stony River. The Kuskokwim Native Corporation owns more than 950,000 acres of surface estate land, much of it along the Kuskokwim River, from approximately 20 miles downstream of Lower Kalskag to about 20 miles upstream from Stony River. Land use permits are required for non-shareholders, which includes Akiak residents. There are a few sections along the Kuskokwim River that are state or federally owned and allow for open public access (Kuskokwim Native Corporation. 2010. Land ownership. http://www.kuskokwim.com/content/land-ownership).

Table 4-4. – Estimated uses and harvests of vegetation, Akiak, 2010.

	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		
Berries										
Blueberry	71%	68%	68%	5%	14%	975.5 lb	11.0 lb	2.5 lb	243.9 gal.	± 22%
Lowbush cranberry	51%	43%	41%	11%	11%	793.2 lb	8.9 lb	2.1 lb	198.3 gal.	± 27%
Highbush cranberry	54%	51%	49%	10%	13%	554.7 lb	6.2 lb	1.4 lb	138.7 gal.	± 28%
Gooseberry	2%	2%	0%	2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Currants	3%	3%	2%	2%	2%	22.6 lb	0.3 lb	0.1 lb	5.7 gal.	± 108%
Nagoonberry	2%	2%	2%	0%	0%	1.4 lb	0.0 lb	0.0 lb	0.4 gal.	± 108%
Raspberry	21%	19%	19%	2%	5%	55.1 lb	0.6 lb	0.1 lb	13.8 gal.	± 46%
Salmonberry	75%	68%	65%	13%	21%	3,658.3 lb	41.1 lb	9.5 lb	914.6 gal.	± 18%
Crowberry (blackberry)	40%	33%	29%	13%	8%	507.9 lb	5.7 lb	1.3 lb	127.0 gal.	± 34%
Berries	**86%**	**81%**	**81%**	**17%**	**27%**	**6,568.7 lb**	**73.8 lb**	**17.0 lb**	**1,642.2 gal.**	**± 16%**
Plants/greens/mushrooms										
Wild rhubarb	43%	40%	38%	5%	8%	1,263.0 lb	14.2 lb	3.3 lb	315.7 gal.	± 39%
Eskimo potato	2%	2%	2%	0%	2%	70.6 lb	0.8 lb	0.2 lb	17.7 gal.	± 108%
Fiddlehead ferns	10%	8%	6%	3%	2%	7.8 lb	0.1 lb	0.0 lb	7.8 gal.	± 59%
Nettle	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Hudson's Bay tea	32%	29%	27%	5%	2%	25.7 lb	0.3 lb	0.1 lb	25.7 gal.	± 28%
Mint	8%	8%	6%	2%	3%	5.7 lb	0.1 lb	0.0 lb	5.7 gal.	± 62%
Sour dock	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Spruce tips	3%	3%	3%	0%	0%	1.5 lb	0.0 lb	0.0 lb	1.5 gal.	± 102%
Cow parsnip (wild celery)	2%	0%	0%	2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Wild rose hips	19%	17%	17%	2%	3%	110.8 lb	1.2 lb	0.3 lb	27.7 gal.	± 60%
Yarrow	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown mushrooms	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Fireweed	5%	5%	5%	0%	0%	2.8 lb	0.0 lb	0.0 lb	2.8 gal.	± 65%
Stinkweed	32%	32%	29%	3%	2%	119.7 lb	1.3 lb	0.3 lb	119.7 gal.	± 71%
Punk	29%	27%	25%	5%	6%	0.0 lb	0.0 lb	0.0 lb	3,502.1 gal.	± 0%
Puffballs	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown greens from land	2%	2%	2%	0%	0%	0.7 lb	0.0 lb	0.0 lb	0.7 gal.	± 108%
Mousefoods[c]	2%	2%	2%	0%	0%	2.8 lb	0.0 lb	0.0 lb	2.8 gal.	± 108%
Unknown vegetation	3%	3%	3%	0%	2%	4.2 lb	0.0 lb	0.0 lb	4.2 gal.	± 80%
Subtotal	**68%**	**65%**	**63%**	**10%**	**16%**	**1,615.3 lb**	**18.1 lb**	**4.2 lb**	**4,034.1 gal.**	± 35%
Wood										
Other wood	70%	68%	68%	6%	13%	0.0 lb	0.0 lb	0.0 lb	369.0 cord	± 27%
Subtotal	**70%**	**68%**	**68%**	**6%**	**13%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**369.0 cord**	± 27%
All vegetation	**94%**	**90%**	**90%**	**24%**	**38%**	**8,184.0 lb**	**92.0 lb**	**21.2 lb**		**± 18%**
All resources[b]	**100%**	**94%**	**92%**	**95%**	**78%**	**237,441.0 lb**	**2,667.9 lb**	**615.7 lb**		**± 30%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

c. "Mousefoods" = various plant roots obtained from mouse caches.

Table 4-5. – Estimated uses and harvests of birds, Akiak, 2010.

	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	2%	3%	2%	0%	0%	2.3 lb	0.0 lb	0.0 lb	5.7 ind.	± 108%
Canvasback	16%	14%	14%	2%	8%	118.4 lb	1.3 lb	0.3 lb	107.7 ind.	± 42%
Common eider	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown eider	2%	2%	2%	0%	2%	62.4 lb	0.7 lb	0.2 lb	28.3 ind.	± 108%
Goldeneye	21%	17%	16%	5%	10%	166.5 lb	1.9 lb	0.4 lb	208.1 ind.	± 49%
Harlequin	10%	8%	8%	2%	3%	15.5 lb	0.2 lb	0.0 lb	31.1 ind.	± 57%
Mallard	54%	49%	48%	8%	21%	463.7 lb	5.2 lb	1.2 lb	463.7 ind.	± 23%
Common merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Red-breasted merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Long-tailed duck (oldsquaw)	19%	21%	17%	2%	6%	73.5 lb	0.8 lb	0.2 lb	91.9 ind.	± 41%
Northern pintail	37%	33%	33%	3%	13%	221.6 lb	2.5 lb	0.6 lb	277.0 ind.	± 26%
Scaup	27%	24%	24%	3%	16%	248.1 lb	2.8 lb	0.6 lb	275.6 ind.	± 31%
Black scoter	52%	46%	46%	10%	19%	652.4 lb	7.3 lb	1.7 lb	724.9 ind.	± 21%
Surf scoter	13%	13%	13%	2%	5%	115.7 lb	1.3 lb	0.3 lb	128.6 ind.	± 43%
White-winged scoter	21%	21%	21%	2%	10%	253.2 lb	2.8 lb	0.7 lb	281.4 ind.	± 47%
Northern shoveler	10%	10%	8%	2%	2%	14.6 lb	0.2 lb	0.0 lb	24.4 ind.	± 57%
Green-winged teal	17%	19%	16%	2%	6%	39.6 lb	0.4 lb	0.1 lb	132.1 ind.	± 40%
Wigeon	27%	27%	27%	0%	11%	181.9 lb	2.0 lb	0.5 lb	259.8 ind.	± 32%
Unknown ducks	10%	5%	5%	6%	2%	7.5 lb	0.1 lb	0.0 lb	8.8 ind.	± 106%
Subtotal	**76%**	**63%**	**62%**	**24%**	**33%**	**2,637.0 lb**	**29.6 lb**	**6.8 lb**	**3,049 ind.**	**± 20%**
Geese										
Brant	3%	3%	3%	0%	2%	18.6 lb	0.2 lb	0.0 lb	15.5 ind.	± 99%
Cackling goose	67%	57%	56%	16%	17%	625.3 lb	7.0 lb	1.6 lb	521.1 ind.	± 18%
Lesser Canada goose	10%	8%	8%	2%	3%	160.2 lb	1.8 lb	0.4 lb	133.5 ind.	± 64%
Unknown Canada goose	3%	2%	2%	2%	0%	25.4 lb	0.3 lb	0.1 lb	21.2 ind.	± 108%
Emporer goose	3%	2%	2%	2%	0%	7.1 lb	0.1 lb	0.0 lb	2.8 ind.	± 108%
Snow goose	8%	6%	6%	2%	2%	104.0 lb	1.2 lb	0.3 lb	45.2 ind.	± 85%
White-fronted goose	52%	44%	43%	14%	16%	1,123.1 lb	12.6 lb	2.9 lb	468.0 ind.	± 22%
Unknown geese	2%	0%	0%	2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**75%**	**62%**	**60%**	**19%**	**21%**	**2,063.7 lb**	**23.2 lb**	**5.4 lb**	**1,207 ind.**	**± 20%**
Other migratory birds										
Tundra swan (whistling)	60%	54%	52%	8%	22%	2,316.8 lb	26.0 lb	6.0 lb	231.7 ind.	± 18%
Sandhill crane	13%	11%	10%	3%	2%	166.1 lb	1.9 lb	0.4 lb	19.8 ind.	± 59%
Whimbrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Grebe	2%	2%	2%	0%	2%	4.2 lb	0.0 lb	0.0 lb	2.8 ind.	± 108%
Arctic (pacific) loon	2%	2%	2%	0%	2%	8.5 lb	0.1 lb	0.0 lb	2.8 ind.	± 108%
Common loon	2%	2%	2%	0%	0%	15.4 lb	0.2 lb	0.0 lb	2.8 ind.	± 108%
Subtotal	**62%**	**56%**	**54%**	**8%**	**24%**	**2,511.0 lb**	**28.2 lb**	**6.5 lb**	**260 ind.**	**± 17%**
Other birds										
Spruce grouse	22%	21%	21%	2%	10%	66.3 lb	0.7 lb	0.2 lb	94.7 ind.	± 37%
Ruffed grouse	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Ptarmigan	60%	48%	46%	17%	19%	725.1 lb	8.1 lb	1.9 lb	725.1 ind.	± 23%
Subtotal	**60%**	**48%**	**46%**	**17%**	**21%**	**791.5 lb**	**8.9 lb**	**2.1 lb**	**820 ind.**	**± 22%**
All migratory birds	**79%**	**68%**	**67%**	**29%**	**38%**	**7,211.8 lb**	**81.0 lb**	**18.7 lb**	**4,516.1 ind.**	**± 17%**
All other birds	**60%**	**48%**	**46%**	**17%**	**21%**	**791.5 lb**	**8.9 lb**	**2.1 lb**	**819.9 ind.**	**± 22%**
All resources[b]	**100%**	**94%**	**92%**	**95%**	**78%**	**237,441.0 lb**	**2,667.9 lb**	**615.7 lb**		**± 30%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

Table 4-6. – Estimated uses and harvests of eggs, Akiak, 2010.

	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	0%	2%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0 ind.	± 0%
Geese eggs	0%	2%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0 ind.	± 0%
Swan eggs	0%	2%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0 ind.	± 0%
Shorebird eggs	0%	2%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0 ind.	± 0%
Gull eggs	0%	2%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0 ind.	± 0%
Murre eggs	2%	0%	0%	2%	0%	0.0 lb	0.0 lb	0.0 lb	0 ind.	± 0%
Unknown eggs	0%	2%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0 ind.	± 0%
Subtotal	**0%**	**2%**	**0%**	**0%**	**0%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**0 ind.**	± 0%
All birds and eggs	**84%**	**70%**	**68%**	**35%**	**40%**	**8,003.2 lb**	**89.9 lb**	**20.8 lb**	**5,336 ind.**	**± 16%**
All resources[b]	**100%**	**94%**	**92%**	**95%**	**78%**	**237,441.0 lb**	**2,667.9 lb**	**615.7 lb**		**± 30%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

Surveyed households reported harvests of 6 species of geese: brants, cackling Canada geese (cacklers), lesser Canada geese, emperor geese, snow geese, and white-fronted geese. Akiak hunters also harvested 820 nonmigratory birds, such as grouses and ptarmigan. Ptarmigan were the most commonly hunted nonmigratory bird species overall, with 46% of households harvesting an estimated 725 birds. Eggs were rarely used in Akiak in 2010. While 2% of households attempted to harvest duck, geese, swan, and shorebird eggs, none were successful (Table 4-6). However, 2% of households received murre eggs.

Sharing, measured by instances of giving and receiving subsistence foods between households and other communities, was highest for fish and land mammals. An estimated 67% of Akiak households received fish and 63% gave fish away. Eighty-three percent of households received land mammals while 51% gave some away (tables 4-1 and 4-3). While harvest and use patterns varied between households, sharing occurred in all resource categories. Sharing is an important component of subsistence activities in Akiak.

Today, as in the past, extended families work together to provide the subsistence food they need for the year. Typically anyone helping to hunt, fish, gather, or process resources receives some of the food. Planning for sharing is factored into the amount of food needed to get through the year. Subsistence food was and is often given to widows, orphans, and elders, or to those who cannot provide for themselves. Needy families or those who want to help those who are in need of subsistence resources are invited to take gifts of food as well, particularly those resources which the giving household has in surplus. It is generally accepted that the person who receives the food will provide something in return, for example, sewing an article of clothing that is in need of mending in exchange for fish. Some might provide gas or other services in trade for receiving fish. Food is shared in the community within

households and amongst those who need it, although it is understood that those who can contribute should do so (210311AK1).

Harvest Areas

As part of the survey, households were asked to mark on a map the areas where they harvested or searched for resources. From these data, maps were produced for each community depicting the harvest areas for 2 subsistence resources (moose and caribou) and 5 resource categories (salmon, trout and whitefishes, small land mammals, ducks and geese, and berries and greens). Figure 4-8 summarizes all the mapped data collected from Akiak for 2010.

For 2010, Akiak respondents reported using a total of 3,205 square miles for subsistence. Referring to the map of all resources (Figure 4-8), Akiak respondents identified 2 major concentrations of harvest and search areas. Upstream from Bethel, one entire area used for subsistence in 2010 radiated south and east from Akiak and north and east along the Kuskokwim River. The other area was downstream from Bethel starting at Napakiak and extending north along the Johnson River and from Napakiak south along the north and south sides of the Kuskokwim River to the mouth. Both areas extending from Napakiak were berries and greens subsistence harvest areas, and the area bordering the Kuskokwim mainly to the east were duck and geese hunting areas. Travel to the Johnson River occurred occasionally to harvest northern pike, and some individuals traveled to Kipnuk to harvest walrus.

Salmon harvest and search areas are shown in Figure 4-9. Driftnet fishing areas for salmon are indicated by a continuous line on the rivers. Setnet fishing areas are indicated by a dot. Drifting areas for Akiak households in 2010 on the Kuskokwim River extended from about 4.5 miles upstream of Akiak to about 10 miles downstream from Akiak—most of the drifting for salmon occurred in this area. Other drifting areas on the Kuskokwim River included a 6-mile section of the river starting just upstream from Tuluksak and a 1-mile drift section at the first bend of the river upstream from Bethel. Drifting for salmon also took place on the Tuluksak, Kisaralik and Kasigluk rivers, Mishevik Slough, and a little section of the lower end of Reindeer Slough. Setnet sites were concentrated at Akiak and various locations within 5 miles upstream and 5 miles downstream from Akiak and near the confluences of the Kisaralik and Kasigluk rivers with the Kuskokwim River. Setnets sites were also located on the Kisaralik River at the mouth of Reindeer Slough about 3 miles upstream from the Kuskokwim River and at 3 other locations on the Kisaralik River within about 3 miles upstream from the mouth of Reindeer Slough.

Harvest and search areas for whitefishes, burbot, sheefish, and northern pike are indicated on map Figure 4-10. Whitefishes are by far the most desired fish in this category and are mainly caught with setnets in the fall and under the ice after freeze-up. The Kuskokwim River directly adjacent to Akiak was the most heavily fished area for whitefishes, but other locations along the Kuskokwim River were identified. Subsistence driftnet areas were also identified along the Kuskokwim River, mostly

downstream from Tuluksak and an adjacent slough. Some drifting for whitefishes took place in Mishevik Slough. The driftnet harvest of whitefishes was a very small portion of the total harvest. Other harvest locations, including setnet harvesting and winter ice fishing locations, were on the Kisaralik River and isolated locations off of the Kuskokwim River. Whitefishes were also caught with rod and reel and hook and line in the summer, fishing from the bank of the Kuskokwim River at Akiak. Whitefishes were also incidentally harvested in nets that were targeting salmon in June. Lastly, some respondents used rod and reel to fish for Dolly Varden along the Kisarlik River and some individuals reported harvesting Dolly Varden, rainbow trout, and Arctic grayling along the upper reaches of the Kisaralik River in the fall while hunting for moose and caribou. These last 3 species of nonsalmon fish were also caught incidentally while ice fishing for whitefishes, northern pike, or burbot (lush). Most burbot were caught just upstream from Akiak with traps. Northern pike, in addition to setnet and rod and reel, were caught most frequently while ice fishing in lakes, sloughs, the Kisaralik River, and areas along the Kuskokwim River accessible from Akiak.

The large land mammal map (Figure 4-11) includes search and harvest areas for moose and caribou. Moose search areas on the Kuskokwim River in 2010 extended upstream from Akiak to the central Kuskokwim community of Georgetown. In the Lower Kalskag and Kalskag areas, other waterways off of the Kuskokwim River were also searched for moose. In the Akiak area, numerous waterways east and west of the Kuskokwim River were searched for moose, although the hunting area in 2010 did not extend downstream on the Kuskokwim River as far as Akiachak, a distance of fewer than 8 miles. In the fall, hunters traveled the Kisaralik River in search of moose and caribou for approximately 50 miles upstream. Caribou search areas were focused to the east of Akiak and the Kuskokwim River from Tuluksak almost to Kwethluk. The eastern extent of the caribou search area was bounded by the Kilbuck Mountains and the southern extent of the search area included the area adjacent to Nukluk, Spein, and Three Step mountains, and Shining Dome. Most of the caribou harvest area was accessed by snowmachines during the late fall and winter months of November through March.

Small land mammal search areas (Figure 4-12)—primarily for beavers, snowshoe hares, and to a lesser extent, porcupines—extended northeast almost to Tuluksak on the east and west sides of the Kuskokwim River. The other search area was centered on the Kasigluk River and encompassed areas north to the Kisaralik River and south of the river approximately 2.5 miles.

Search and harvest areas for marine mammals include only one identified location, near the mouth of the Kuguklik River near the community of Kipnuk. This reported location was an area used in the search and harvest of spotted seals. Respondents also indicated the harvest of ringed seal and walrus, but the search and harvest areas for these species were unfortunately not mapped.

The search area for ducks and geese was large and far reaching (Figure 4-13). Four distinct areas were identified. One area encompassed Akiak and Tuluksak and extended upstream from Tuluksak for approximately 18 miles on the Kuskokwim River. Located south and east of Akiak, this area included

an extension upstream on the north and south sides of the Kisaralik River. Another area encompassed approximately 32 miles of the Kisaralik River. The entire area of Whitefish Lake, which is a popular place to harvest black scoters, was another distinct harvest and use area. The largest search and harvest area extends south from the mouth of the Johnson River nearly to the mouth of the Kuskokwim River. It encompasses a corridor east of the Kuskokwim River except at the mouth where it includes harvest and use area on the east and west sides of the Kuskokwim River.

Berries and greens harvesting areas in 2010 were extensive, far reaching, and scattered (Figure 4-14). This was due to the nature of berry picking, which relies on timing and location for the most productive harvest of berries. Berries mature in different areas at different times and in some areas the habitat is optimal for the production of a certain species of berry. This is also true of plants, but in most cases these plants can be harvested close to Akiak. Berry picking areas are more easily accessed on waterways for primary transportation to the area. In the Akiak region, the berry picking areas extended from Akiak approximately 40 miles to the northeast, which is north of Bogus Creek, 26 miles to the southeast along the Kasigluk and Kisarlik rivers, and 12 miles to the north and 12 miles to the east to the Gweek River. Near Chuathbaluk on the south side of the Kuskokwim River, a berry picking area extended for approximately 15 miles along the river. From Napakiak, berry picking areas extended south and east of the Kuskokwim River nearly to the mouth of the Eek River and from Napakiak south and west to the mouth of the Tagayarak River. Berry picking areas also extended north along the Johnson River past the tundra villages up to and including Kayigyalik Lake.

Harvest Assessments

The survey asked respondents to assess their own harvests in 2 ways: whether they used more, less, or about the same amount of 7 resource categories in 2010 as in past years, and whether they got "enough" of each of the 7 resource categories. If households reported using less or more of a resource, they were asked why. When a household said they did not get enough of a resource category, they were asked in a follow-up question what kind of resource within that category they needed; their responses could include multiple resources. They were asked why they did not get enough of the resource and the impact to the household. These households were also asked if they did anything differently because they did not get enough; if so, what that was. This section discusses responses to those questions. Percentages do not include households that did not respond to the question or that reported they never harvested the resource. Subsistence harvest success also can be assessed by comparing current harvest estimates with past harvest estimates, which will be discussed in a later section.

For all resource categories except marine invertebrates, the majority of Akiak respondents who reported using the resource and provided responses, said they got enough in 2010 (Figure 4-15). For marine invertebrates, 92% of surveyed households said that they do not use this resource category, while 5% of surveyed Akiak households felt they were not able to get enough. For salmon, other fishes,

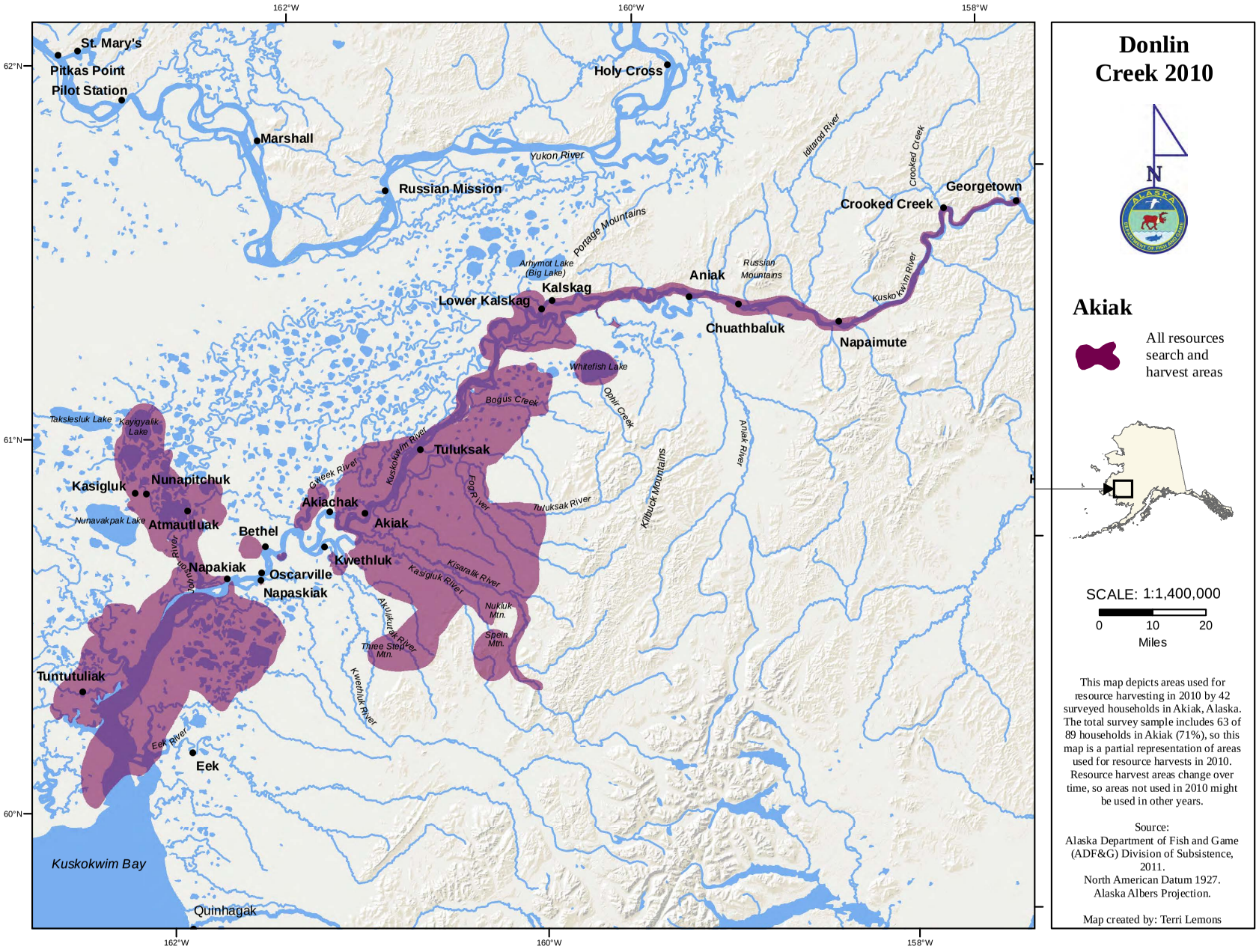

Figure 4-8.–Harvest locations and search areas, all resources, Akiak, 2010.

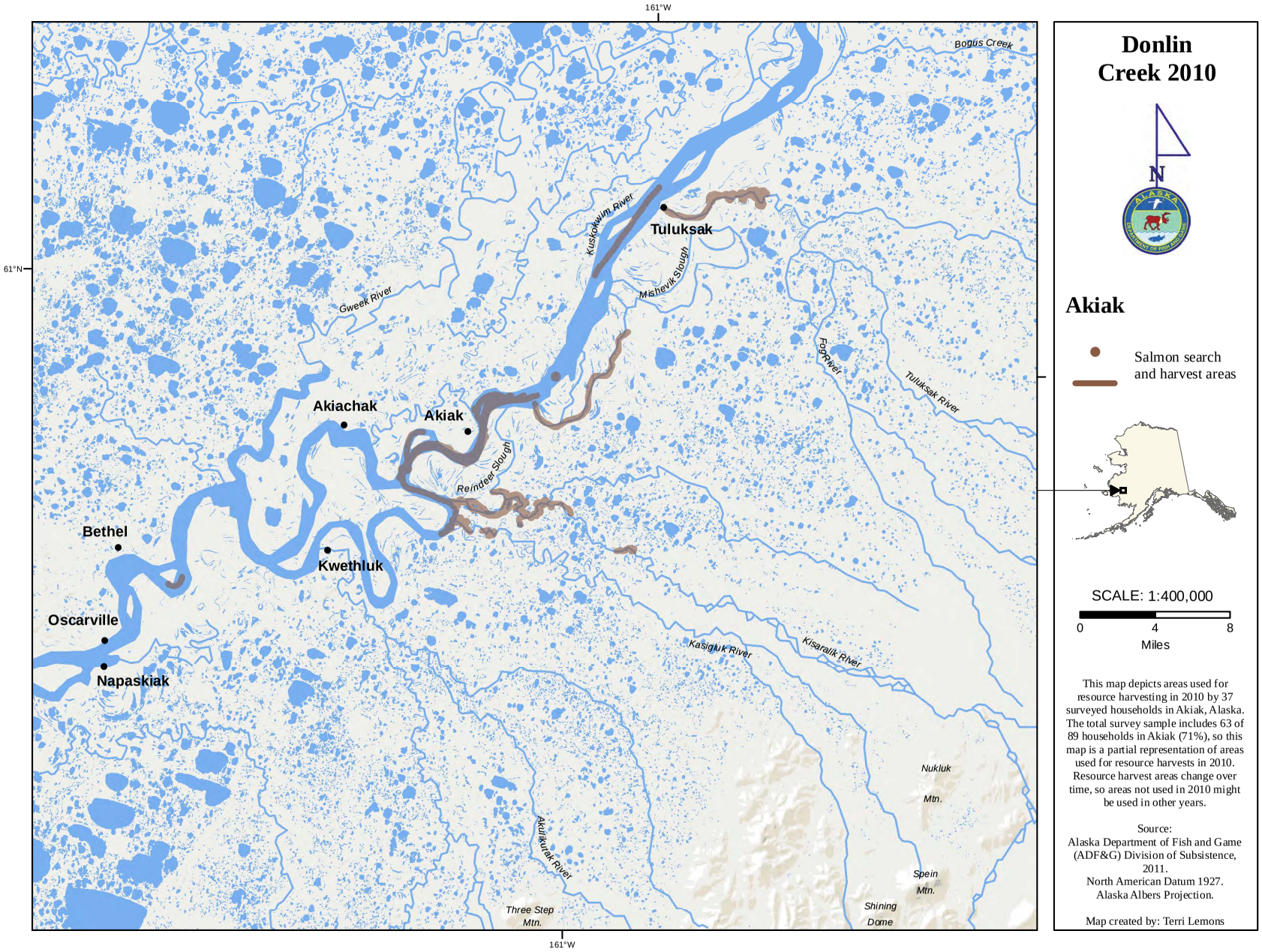

Figure 4-9.–Harvest locations and search areas, salmon, Akiak, 2010.

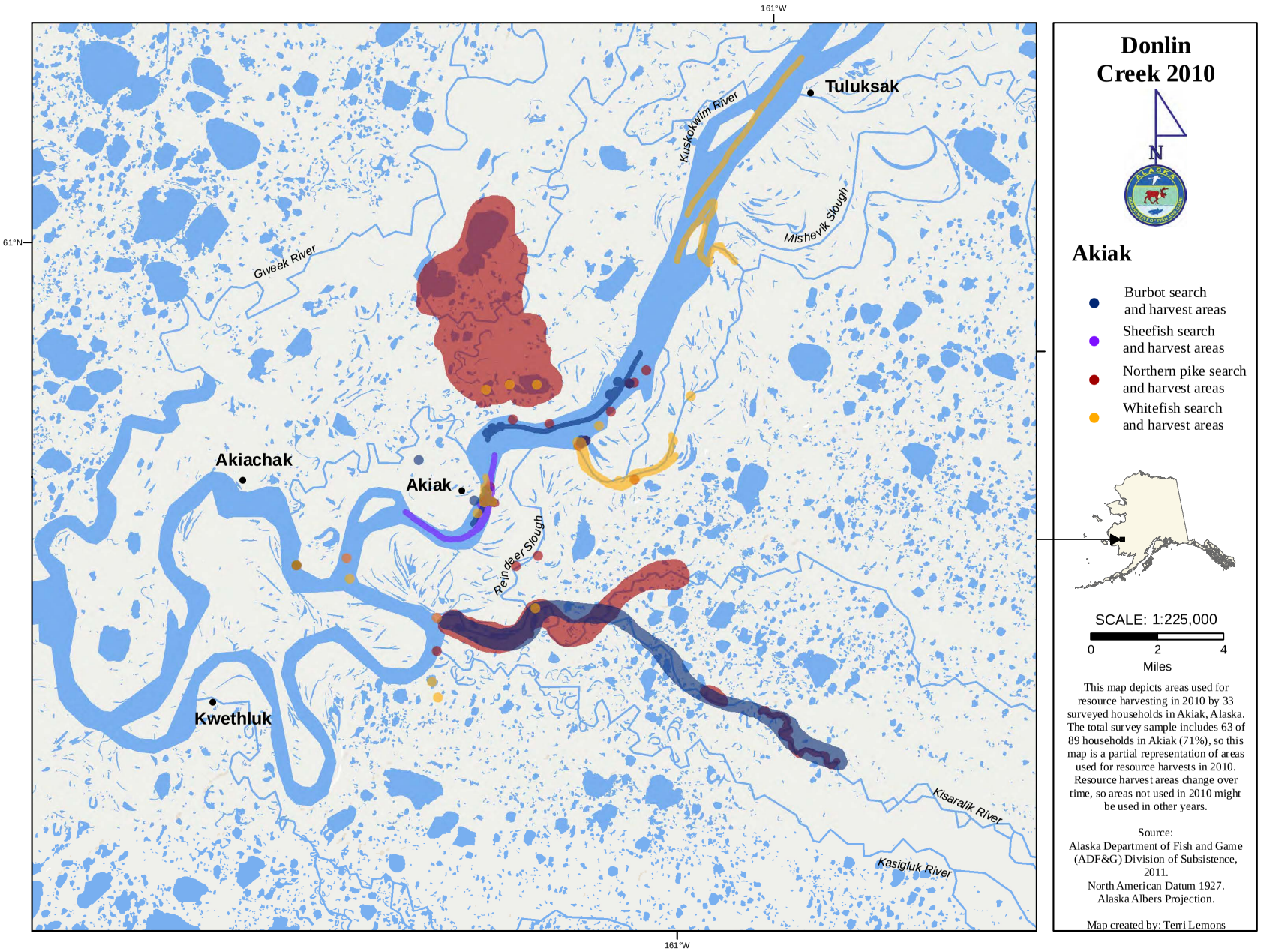

Figure 4-10.–Harvest locations and search areas, whitefish, sheefish, northern pike, and burbot, Akiak, 2010.

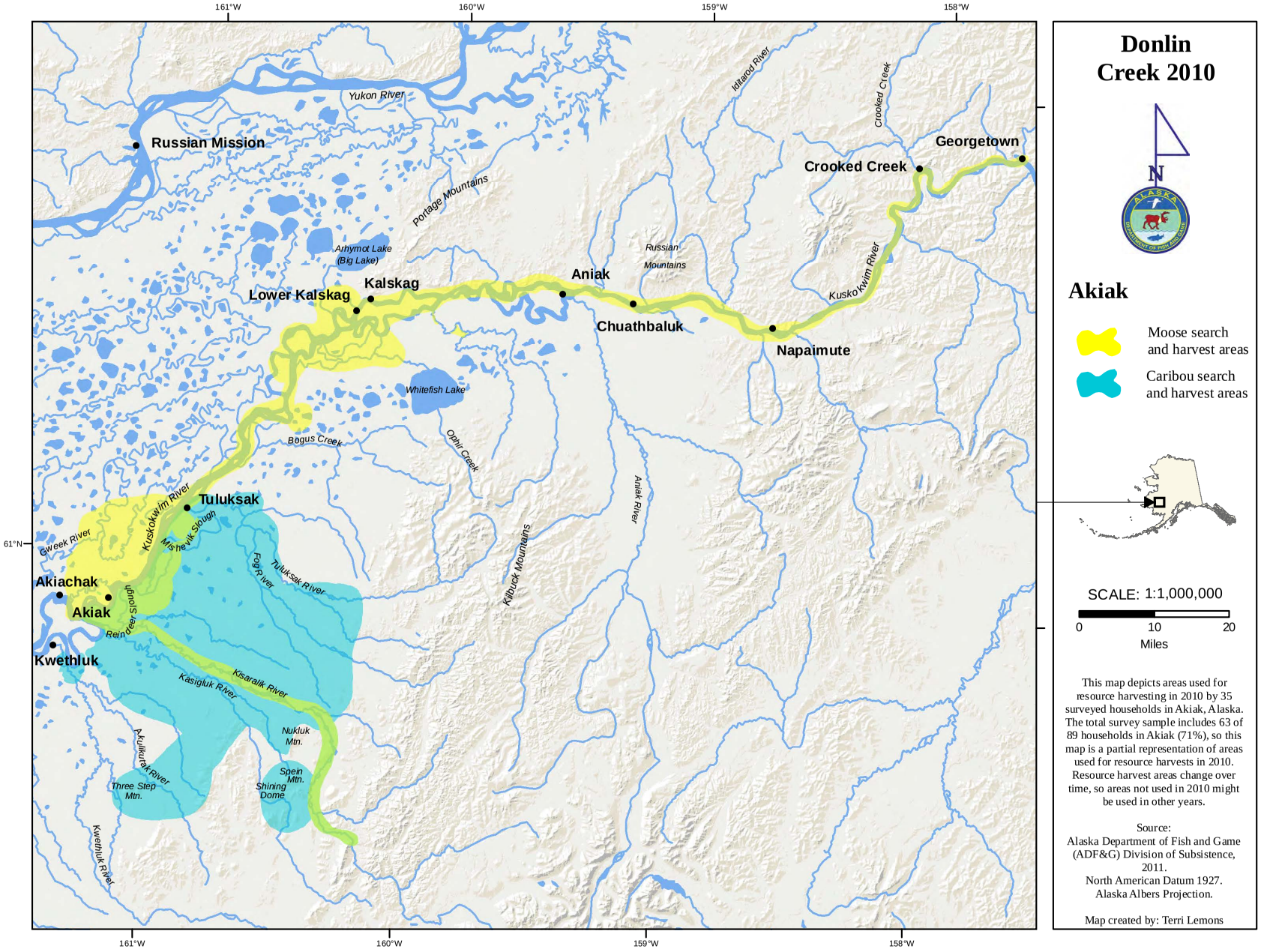

Figure 4-11.–Harvest locations and search areas, large land mammals, Akiak, 2010.

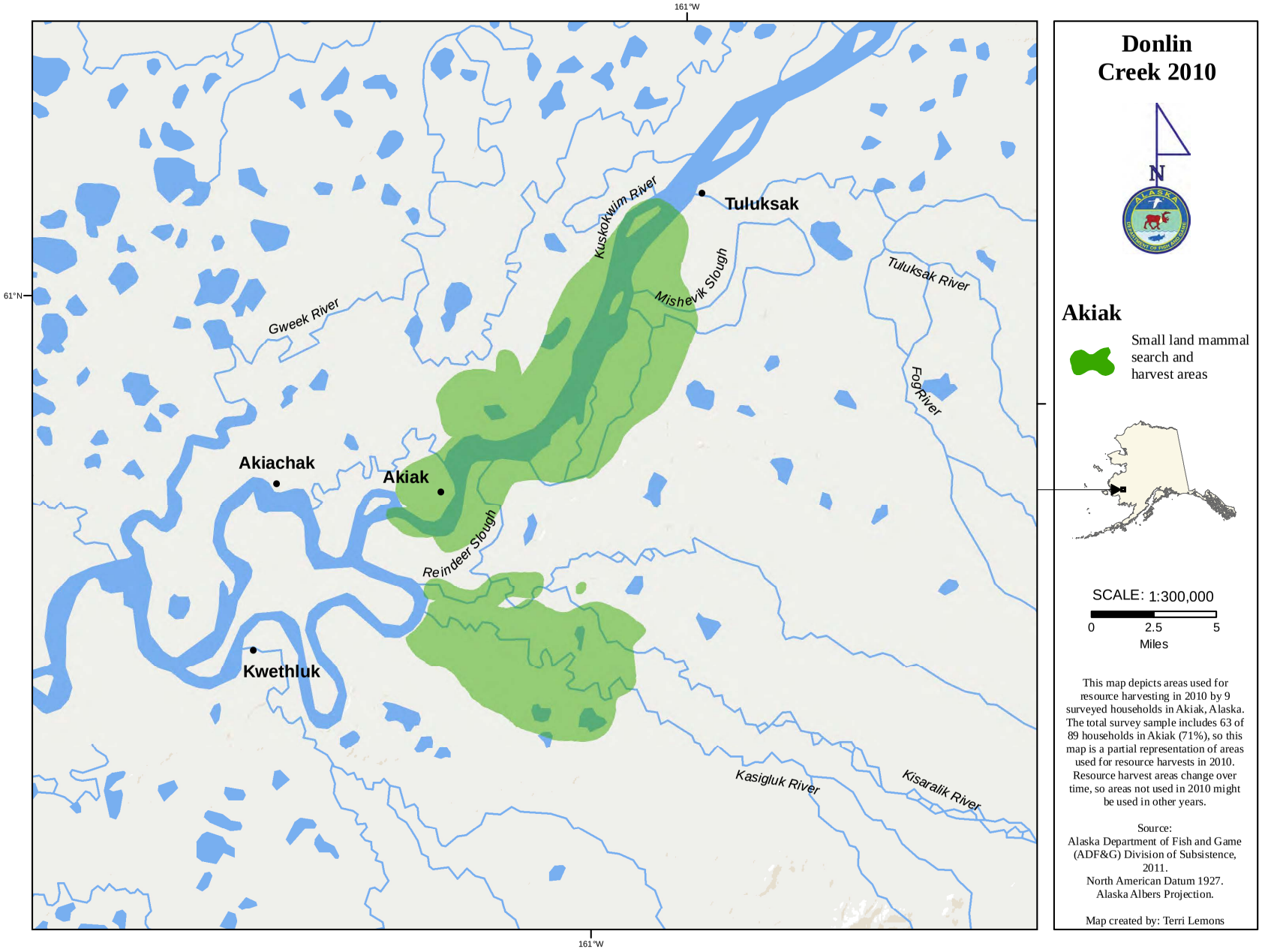

Figure 4-12.–Harvest locations and search areas, small land mammals, Akiak, 2010.

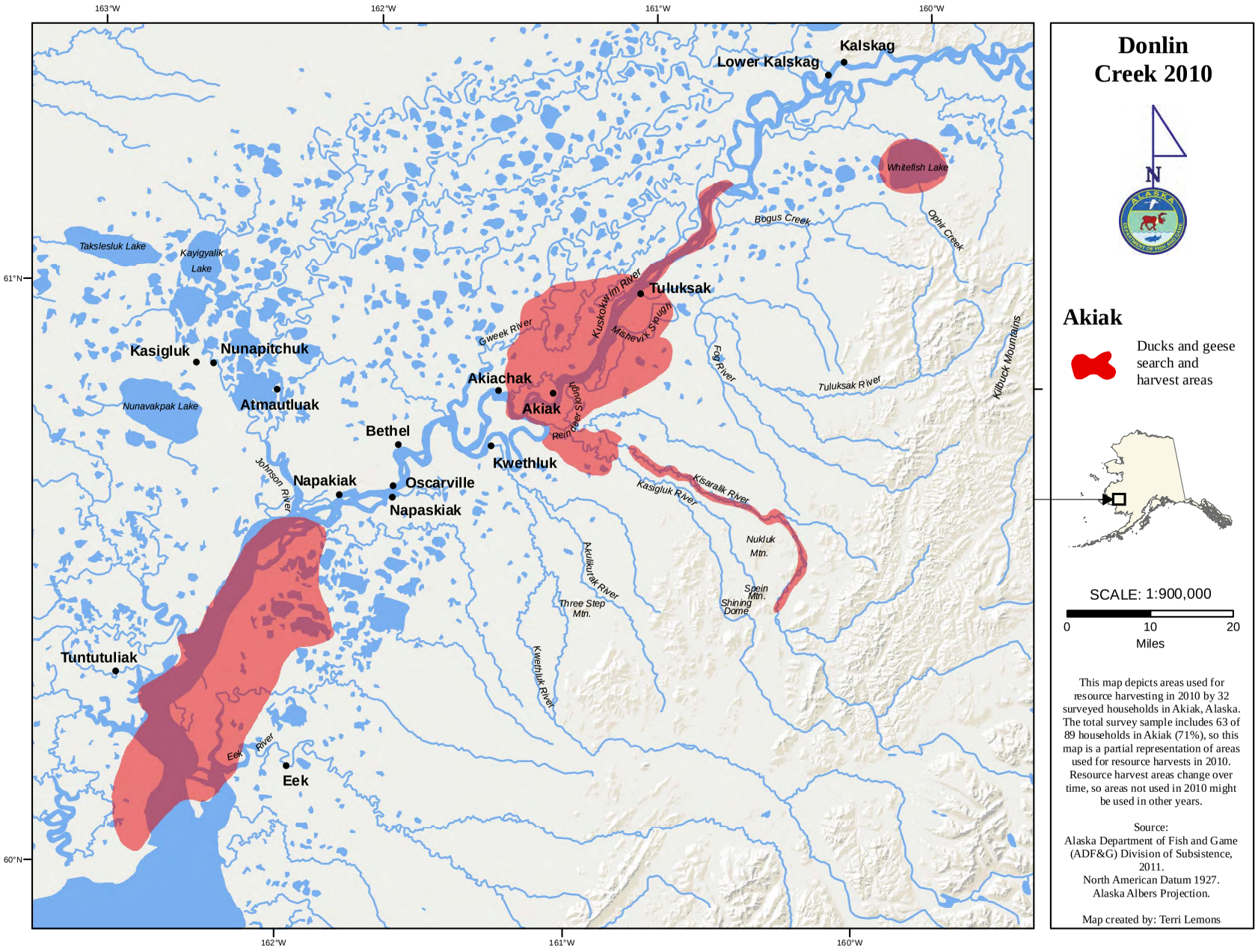

Figure 4-13.–Harvest locations and search areas, ducks and geese, Akiak, 2010.

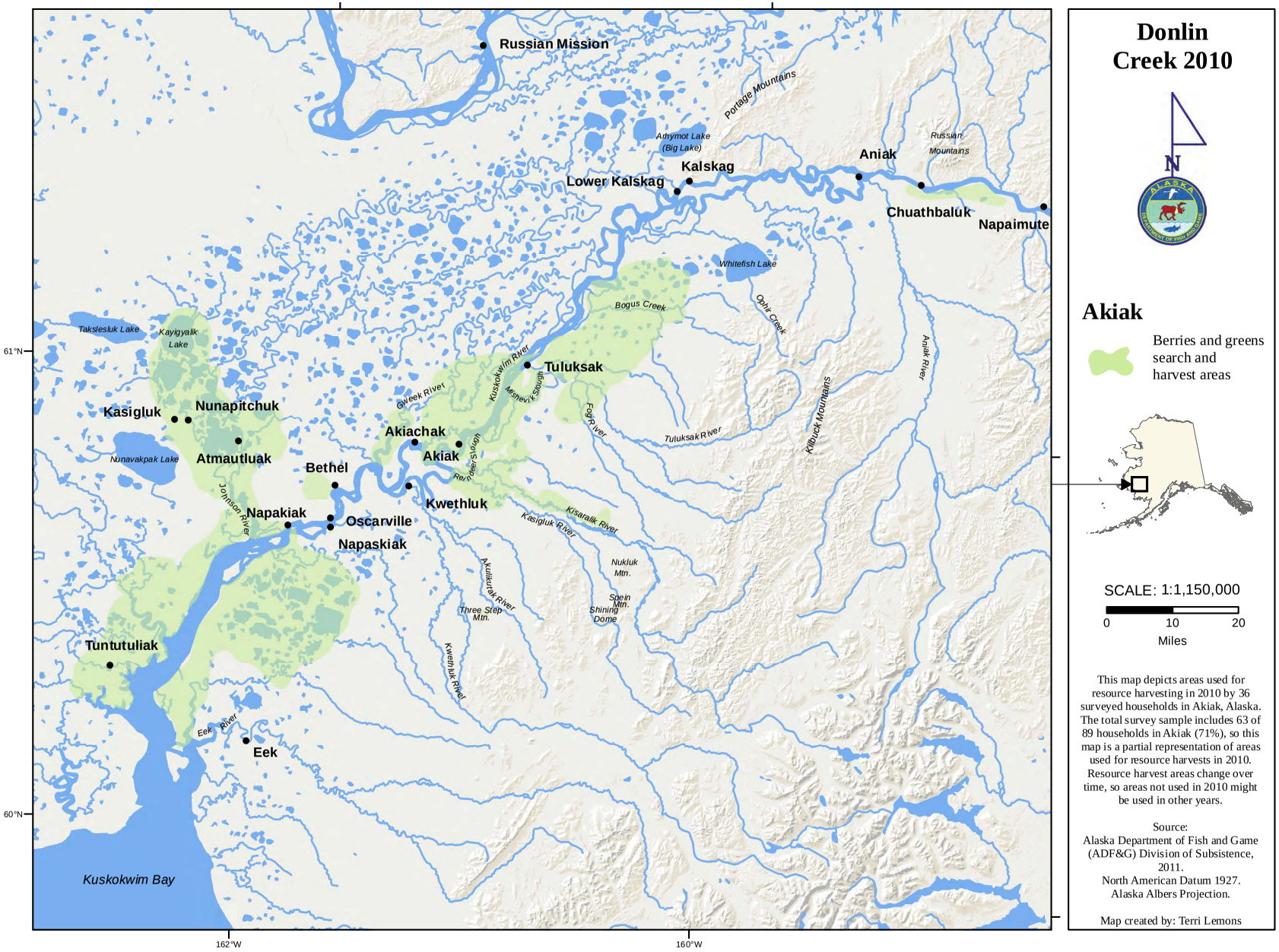

Figure 4-14.–Harvest locations and search areas, berries and greens, Akiak, 2010.

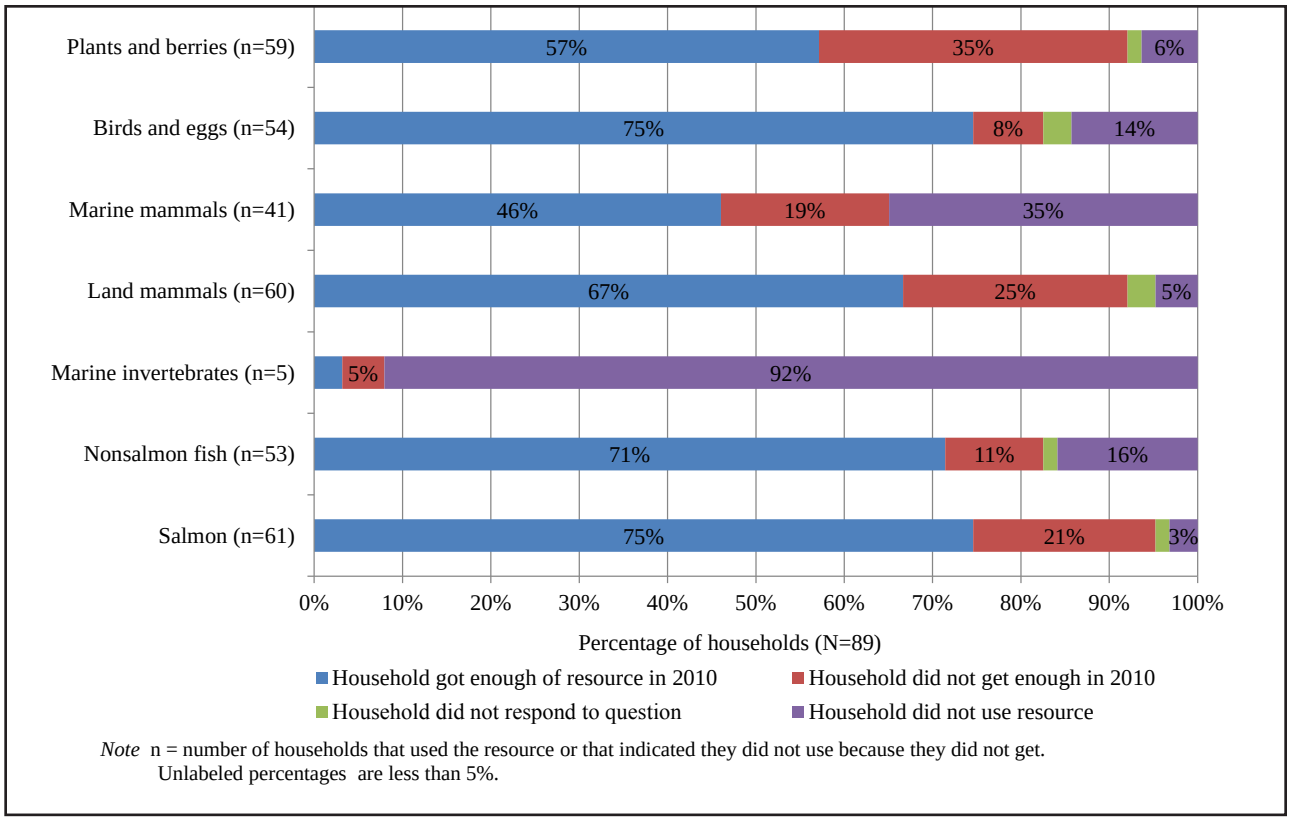

Figure 4-15.–Harvest assessments, Akiak, 2010. Responses to the question: "Did your household get enough in 2010?"

land mammals, and birds and eggs, between 67% and 75% of households reported they got enough. For vegetation, slightly fewer households (57%) reported getting enough plants and berries, and 46% reported getting enough marine mammals (35% of households reported not using the resource). Of the households that said they did not get enough marine mammals and noted what kind they needed, half reported that they needed seal oil and the remaining half reported a need for seals, with almost all indicating a preference for spotted seal. When asked why they did not get enough marine mammals, about half did not give a reason; for those who did respond, the most common reason given for a lack of seal oil was that they were not given any. Other reasons given included unsuccessful hunting and personal/family responsibilities. The most common reason provided for not getting enough seal was the high price of gasoline. Of the households that said they did not get enough land mammals and provided a response to what kind they needed, the majority said they wanted more moose. Reasons for not getting enough moose were diverse, with the most common answer being that households were not given any, followed by unsuccessful or unlucky hunting, resource availability, distance, gas prices, and lack of time to hunt due to work responsibilities. Eleven percent of Akiak households also said that they needed more caribou. Beavers and black bears were the only other land mammals of which households reported needing more. Of the 22 households who said they did not get enough

berries and greens, about 36% reported that they needed more unspecified berries and about one-third of them said they needed blueberries. Households provided a variety of reasons for not getting enough berries: gas prices, low effort, weather/environment, and personal/family.

The impacts to households that did not get enough of a particular resource varied by resource category. Akiak households reported insufficient harvests of salmon and large land mammals as having the most severe impact on their subsistence. Twenty-one percent of Akiak households said they did not get enough salmon, and the consequences were dramatic: 69% described the impact as major, and the remaining 31% said it was minor. For land mammals, 13% said the impact of not getting enough was severe, 31% said major, and 44% said it was minor. Thirteen percent said the impact was not noticeable. For berries and edible plants, 9% said that not getting enough had a severe impact on them, 18% described the impact as major, and 50% described it as minor. Twenty-three percent said the impact was not noticeable. Nineteen percent of Akiak households said they did not get enough marine mammals; 50% of those households reported that the impact was minor, and 8% said it was major. Thirteen percent of Akiak households said they did not get enough nonsalmon fish; 14% said the impact was severe, and 14% reported a major impact to their household. Fifty-seven percent said the impact was minor. The impacts to households of not getting enough birds and eggs and marine invertebrates were less pronounced. A small minority of households did not get enough marine invertebrates and none indicated a noticeable impact to their household. Five households did not get enough birds and eggs and 4 said it had a minor impact. One respondent explained the changes of bird migration patterns that affect harvest, and that the numbers of birds in the area have begun to increase in recent years after a noticeable decline:

> Black ducks, scoters, old squaw[2], goldeneye. That's what we hunt, mainly in the spring. [The] main ducks we hunt here, and geese, swans and crane. But like, they aren't as many as they used to be. Like in the 1950s there were lots more ducks and geese but now they aren't as many as they used to. But they are starting to come back. They are starting to come back. (260311AK3)

Respondents were asked if their households did anything differently if they were not able to get enough subsistence foods. More than one-half of those who did not get enough subsistence foods said their household did things differently as a result. The most common response for all resource categories was that households used more commercial foods, followed by making do without subsistence foods. Looking specifically at households' responses to these questions about land mammals, 50% of households reported using more store-bought food, 37% made do without, and 25% of households increased their harvest effort. Less than one-half of those who did not get enough berries and greens did things differently: 60% indicated using more store-bought food, 30% did without, 10% bought or bartered for berries or greens, and 10% replaced berries or greens with other subsistence foods.

2. Now referred to as long-tailed ducks.

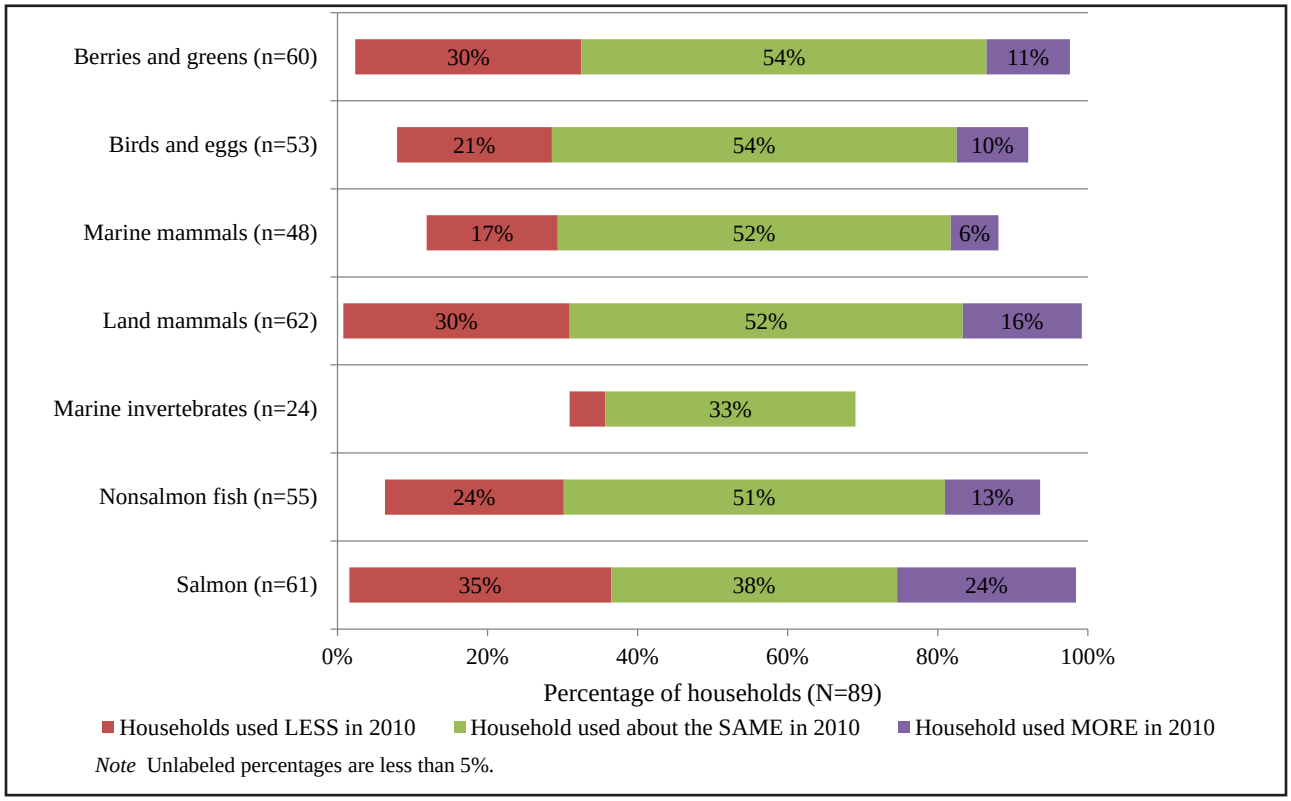

Figure 4-16.–Harvest assessments, Akiak, 2010. Responses to the question: "Did your household use less, more, or about the same amount in 2010 as in the past?"

About 69% of the households who did not get enough salmon did things differently in 2010: 44% indicated using more store-bought food, 22% made do without, and there was 1 response for each of the following: replaced salmon with other subsistence foods, increased effort to harvest, obtained food from other sources, and got public assistance. The percentage of households that did not get enough nonsalmon fishes and birds and eggs was low. Of the households that said they did things differently to compensate for not getting enough nonsalmon fish, there was 1 response each for: used more commercial foods, replaced with other subsistence foods, made do without, and got public assistance. For birds and eggs, few households reported doing anything differently, and these included: asked others for help, made do without, and increased harvest effort. For marine mammals and marine invertebrates, no one indicated doing anything different in response to not getting enough.

Corresponding to these responses, salmon, land mammals, and vegetation were the categories with the highest percentage of respondents reporting that they used less in 2010 than previous years (Figure 4-16). Almost 35% of households said they used less salmon, and about 30% each said they used less land mammals and berries and greens. About 24% of households said they used less nonsalmon fish, almost 21% said they used less birds and eggs, and just more than 17% said they used less marine mammals. Over 50% of households for all resource categories except salmon (38%) and marine

invertebrates (33%) indicated using about the same amount of the resource in 2010 as they did in previous years. Twenty-four percent of households reported using more salmon in 2010 compared to previous years and 16% reported using more land mammals. One respondent discussed an increase in certain species of land mammals over the course of his/her lifetime:

> When I was growing up I used to go with my dad and hunt beavers somewhere further down this way, around here, Birch Creek area—and then now you just go to your backyard now! We didn't have any beavers here. From what I heard from those old people we never have beavers here; we didn't have moose here. People used to go way down here to get their moose. From over by Scammon, the mouth of the Yukon, they are all over. We didn't have those like until maybe the 1930s or '40s—'20s, '30s now there are beavers everywhere, damming rivers, blocking fish that go up to spawn like pike, lush fish, black fish, some of where I used to trap black fish around here—some of these I can't even put any more black fish traps because of beaver dams. Now what we do is go down to Johnson River to jig for pike, every year we go down here to jig pike. You know, wherever we go we hunt. If we need to hunt we will go as far as we need to to hunt. (260311AK3)

In the remainder of the resource categories, less than 15% of households reported using more in 2010. No one reported using more marine invertebrates in 2010.

Jobs and Income

Respondents were asked about both earned income (jobs held and wages earned by all household members 16 years old and older) and unearned income (Alaska Permanent Fund Dividend, Social Security, public assistance, etc.). For 2010, Akiak households earned or received an estimated $3.3 million, of which $2.3 million (68%) was from earned income and $1 million (32%) was from other sources (Table 4-7).

Figure 4-17 shows the percentages of the top 10 estimated sources of income. The primary source of income was local government jobs, which included occupations such as teachers, administrators, managers, and service workers. This category encompassed one-half of all income in Akiak, an estimated $1,657,871 in wages. The Alaska Permanent Fund Dividend was the second largest income source, and encompassed 12% of the cash flow into Akiak for an estimated $394,507. Unearned income from entitlements and state benefits contributed a combined total of $351,244 (11%) to the community. Services, which in Akiak included health and social services, provided the fourth largest amount of income in the community.

Approximately 166 of the community's estimated 256 adults had some form of cash employment (65%). The survey recorded a total of 213 jobs in Akiak. Employed respondents reported as few as 1 job and as many 3; working adults held, on average, 1.3 jobs.

Table 4-7. – Estimated earned and other income, Akiak, 2010.

Income source	Number of people	Number of households	Total for community	Mean per household[a]	Percentage of total
Earned income					
Local government	120.1	74.6	$1,657,871	$18,628	49.7%
Services	22.6	20.1	$246,535	$2,770	7.4%
Retail trade	18.4	18.7	$204,216	$2,295	6.1%
Transportation, communication, and utilities	7.1	7.2	$81,624	$917	2.4%
Federal government	2.8	2.9	$47,292	$531	1.4%
Agriculture, forestry, and fishing	12.7	12.9	$24,432	$275	0.7%
State government	2.8	2.9	$12,906	$145	0.4%
Earned income subtotal	**165.9**	**81.8**	**$2,274,875**	**$25,560**	**68.2%**
Other income					
Alaska Permanent Fund Dividend		77.7	$394,507	$4,433	11.8%
Food stamps		35.3	$323,540	$3,635	9.7%
Social Security		14.1	$94,239	$1,059	2.8%
Unemployment		22.6	$51,196	$575	1.5%
Citgo fuel voucher		52.3	$27,717	$311	0.8%
Foster care		2.8	$22,388	$252	0.7%
Supplemental Security Income		8.5	$20,870	$234	0.6%
Native corporation dividend		46.6	$20,239	$227	0.6%
Energy assistance		33.9	$20,179	$227	0.6%
Disability		2.8	$18,874	$212	0.6%
Veterans assistance		4.2	$15,427	$173	0.5%
Other		4.2	$14,863	$167	0.4%
Pension/retirement		8.5	$13,746	$154	0.4%
Longevity bonus		4.2	$11,690	$131	0.4%
Adult public assistance		4.2	$6,835	$77	0.2%
Child support		2.8	$1,838	$21	0.1%
Meeting honoraria		2.8	$646	$7	0.0%
Workers' compensation/insurance		0.0	$0	$0	0.0%
Other income subtotal		**35.3**	**$1,058,792**	**$11,897**	**31.8%**
Community income total			**$3,333,667**	**$37,457**	**100.0%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. For confidentiality, income amounts are not listed for sources reported by fewer than 4 households.

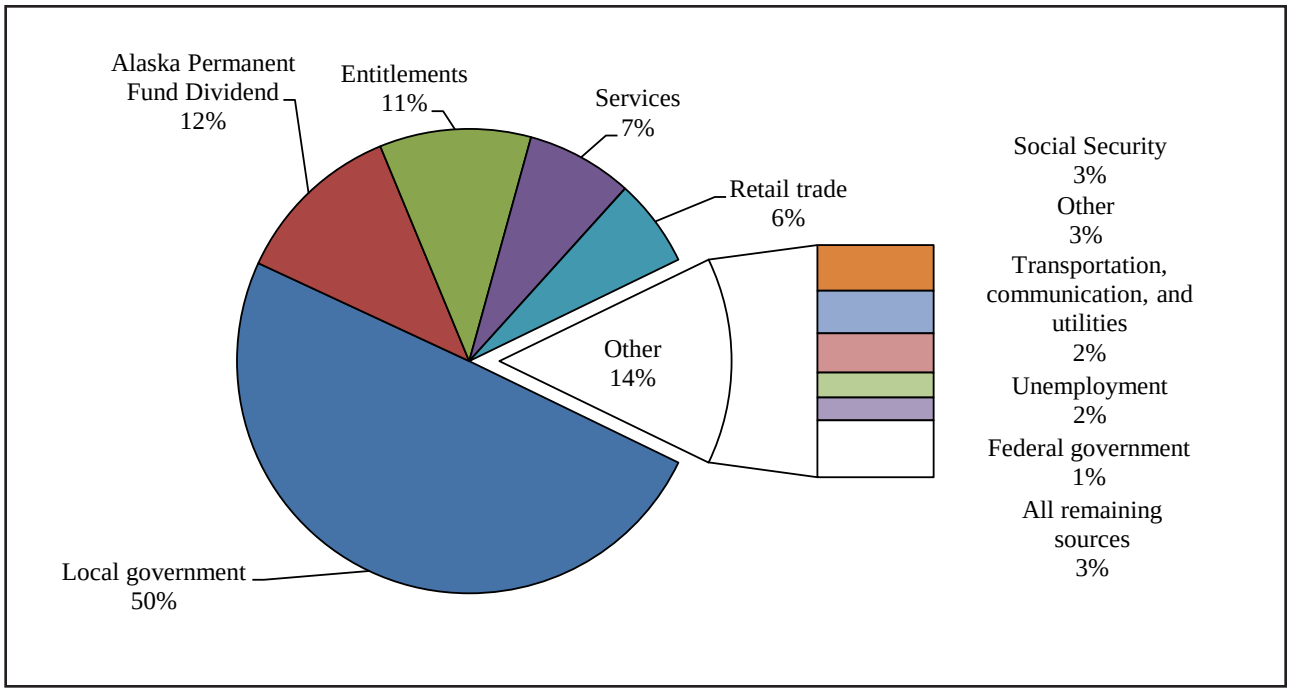

Figure 4-17.–Top 10 income sources ranked by estimated amount, Akiak, 2010.

Jobs and income reporting in Akiak presented sampling challenges, as they did in all of the study communities. Many respondents declined to volunteer information on the length or hours of their jobs but did report overall earnings for the study year. Consequently, this expanded the confidence interval around job statistics.

Lastly, while community residents reported a 65% employment rate and an average of 1.3 jobs per employed adult, employment and income remained limited in Akiak. The mean number of months employed was 8.6, suggesting a prevalence of seasonal work. Furthermore, of employed residents in the community age 16 and over, only 39% were employed year-round.

Food Security

Respondents were asked a short series of questions intended to assess their household's food security; that is, "access by all people at all times to enough food for an active, healthy life" (Nord et al. 2009:2). The food security questions were modeled on questions developed by the USDA and modified by ADF&G to account for differences in access to subsistence and store bought foods. The severity of food insecure conditions increases as the food security questions are read in descending order on the left hand side of Figure 4-18. The questions are ordered to ask about increasing levels of food insecurity. Questions and Akiak residents' responses are summarized in Figure 4-18A.

Based on their responses to these questions, households were generally categorized as being food secure or food insecure following a USDA protocol (Bickel et al. 2000). In this analysis, households

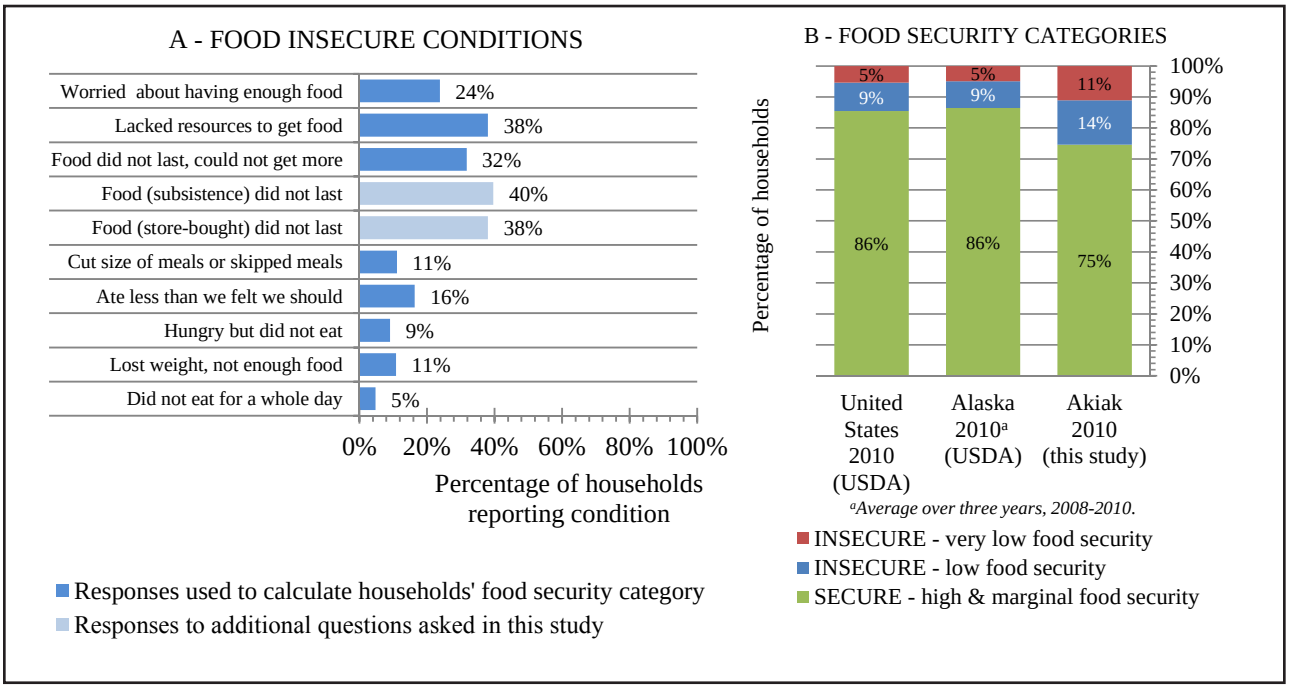

Figure 4-18.–Food security results, Akiak, 2010.

that reported high or marginal food security were considered food secure. These households expressed no more than 2 limitations in obtaining food, but did not reduce the quality or quantity of their food intake. The limitations expressed by food secure households were less severe and manifested as anxiety or worry about having enough food. Food insecure households were classified as having either low food security or very low food security. Households with low food security reduced the quality, variety, or desirability of their food, but the quantity remained the same. Households characterized as having very low food security were those that reported multiple instances of disrupted eating patterns and reduced food intake (USDA 2011).

In Akiak in 2010, 54% of the surveyed households had high food security and 21% had marginal food security. Of the remaining households, 14% reported low food security and 11% reported very low food security. Figure 4-18B compares Akiak's food security status with that of Alaska and the United States. Akiak households reported slightly lower rates of food security and slightly higher rates of food insecurity than either the state or national averages. One-quarter of households in the community can be described as food insecure, indicated by the blue and red in Figure 4-18B.

An estimated 38% of households in Akiak said that they could not get the kinds of foods they wanted to because of a lack of resources; i.e., a household did not have what they needed to hunt, fish, gather, or buy goods (Figure 4-18A). The food insecurity conditions with the greatest effects across the community appeared to revolve around the situation in which food did not last for households, and they could not get more. Thirty-two percent of households reported that food in general did not last; 40% of households reported that subsistence foods in particular were not adequate, while 38%

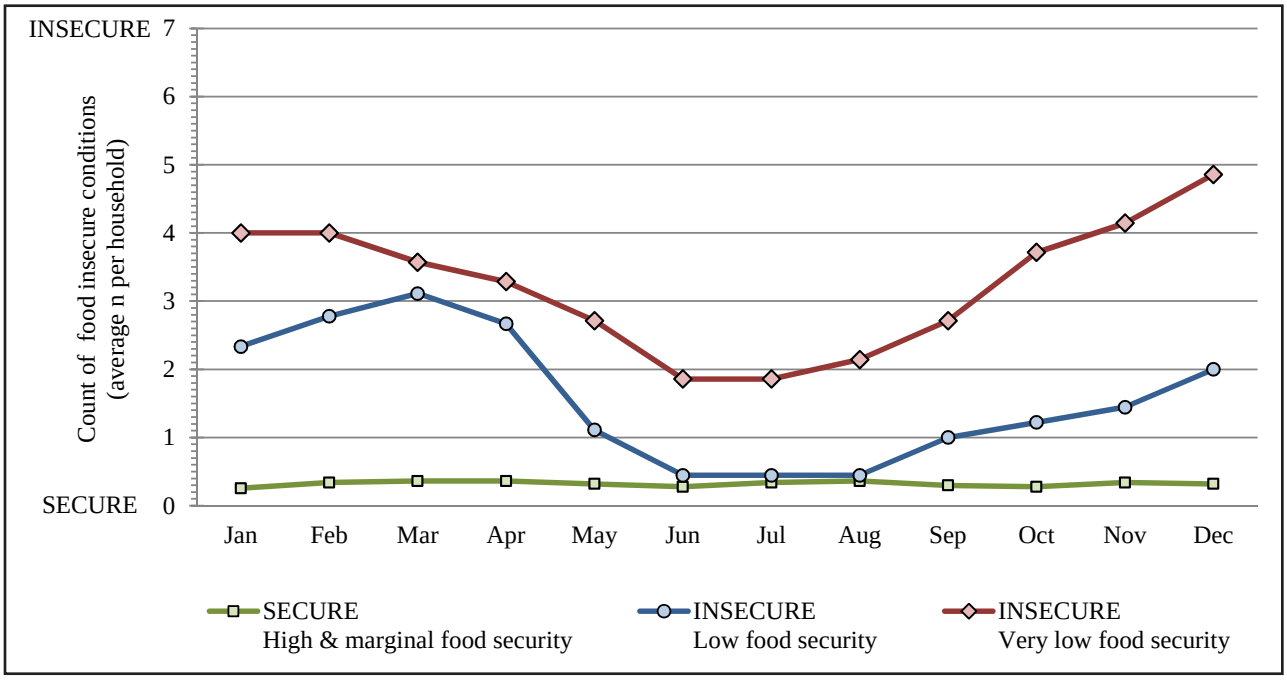

Figure 4-19.–Food insecure conditions by month and by household category, Akiak, 2010.

percent responded that store-bought foods did not last. One respondent weighed in on food security issues in the community:

> The biggest problem was fish and game regulations preventing us. Preventing us. Our homeland security food. Food security. Families, poor families, not being able to, like a grandmother that was cited for getting a beaver last fall. That's inhumane. Look at these beavers, there's so many, they are destroying the creeks, lakes. (210311AK1)

Food security conditions did appear to be influenced by the time of year for Akiak residents. In 2010, households with very low or low food security reported greater issues with obtaining food in the winter months of October through December, as indicated by Figure 4-19. This concern over food availability appeared marked for both store-bought foods and subsistence harvests. In contrast, a majority of Akiak households reported relatively low levels of food insecurity, regardless of under which general food security category they fell, during the summer months. In both cases of subsistence and store-bought foods, incidences of food insecure conditions were lower from May through September; although, food insecure conditions involving store-bought foods affected a larger number of households during that time frame.

One explanation for the seasonal pattern of higher food security during the summer may be that the greatest amount of effort and harvest of subsistence foods occurs during these months. With more subsistence resources available (primarily salmon), store-bought supplies can be supplemented by these resources. The rapid decrease of food security in the winter months for low and very low food

secure households, in contrast, may be influenced by a number of factors. In the winter months when subsistence resources are scarcer and stores of subsistence foods are declining, households may have to purchase more store-bought foods to supplement their diet. The least food secure households in the community may be facing the added difficulty of having to split income between store-bought foods and heating oil. One key respondent explained one way in which Akiak residents dealt with food shortages in the past and the difficulties in having restrictions on these practices today:

> Sometimes I feel like an outlaw in my homeland. Because of my diet. I was born [before the] state of Alaska. Once in a great while, summer time, adult member kill a moose, and equally spread it, give it away to all the people in the community. That's tradition. No man, no person should be hungry in their environment, we don't put a guarder around Costco, and grocery stores saying you can't go there, like this. (210311AK1)

Sharing of subsistence foods amongst community members in Akiak is not simply a feature of the past. As the next section will illustrate, these networks of distribution are still operating in the community today.

Wild Food Networks

In rural Alaska, few households are without connections to networks of sharing, barter, and trade, which serve to distribute subsistence foods across Alaska. Networks between villages, especially those in which a majority of residents are Alaska Native, are common, and these networks of sharing are equally important within individual communities. The traditional redistribution of subsistence resources among community members, and between different communities, through kinship ties and other social connections is an important practice for Kuskokwim communities (Jonrowe *n.d.* [c1980]; Stickney 1981; Charnley 1983). Cooperation between households includes the sharing of wild foods and joint harvesting and processing ventures, often organized between related families.

As mentioned in ethnographic interviews, giving resources to others in need is an important part of life in Akiak, although some level of reciprocity is considered appropriate. Modes of reciprocity allow successful hunters to distribute meat, for example, to unsuccessful harvesters with the knowledge that they will receive a portion of the receiver's harvest following their own hunting success (Stickney 1981). Respondents in interviews mentioned that repayment for subsistence resources can come in various forms, including mending garments, monetary contributions for gas, store-bought foods, and labor for the actual harvesting effort or the processing of subsistence resources. Cooperative ventures can include households with a number of resources or skill sets that aid the subsistence effort; for example, those with necessary equipment, those able to provide manpower for the harvest, those with expertise in processing, and those with the financial ability to provides resources such as gasoline.

Figure 4-20 depicts the collaborative pattern of sharing between respondent households in Akiak.

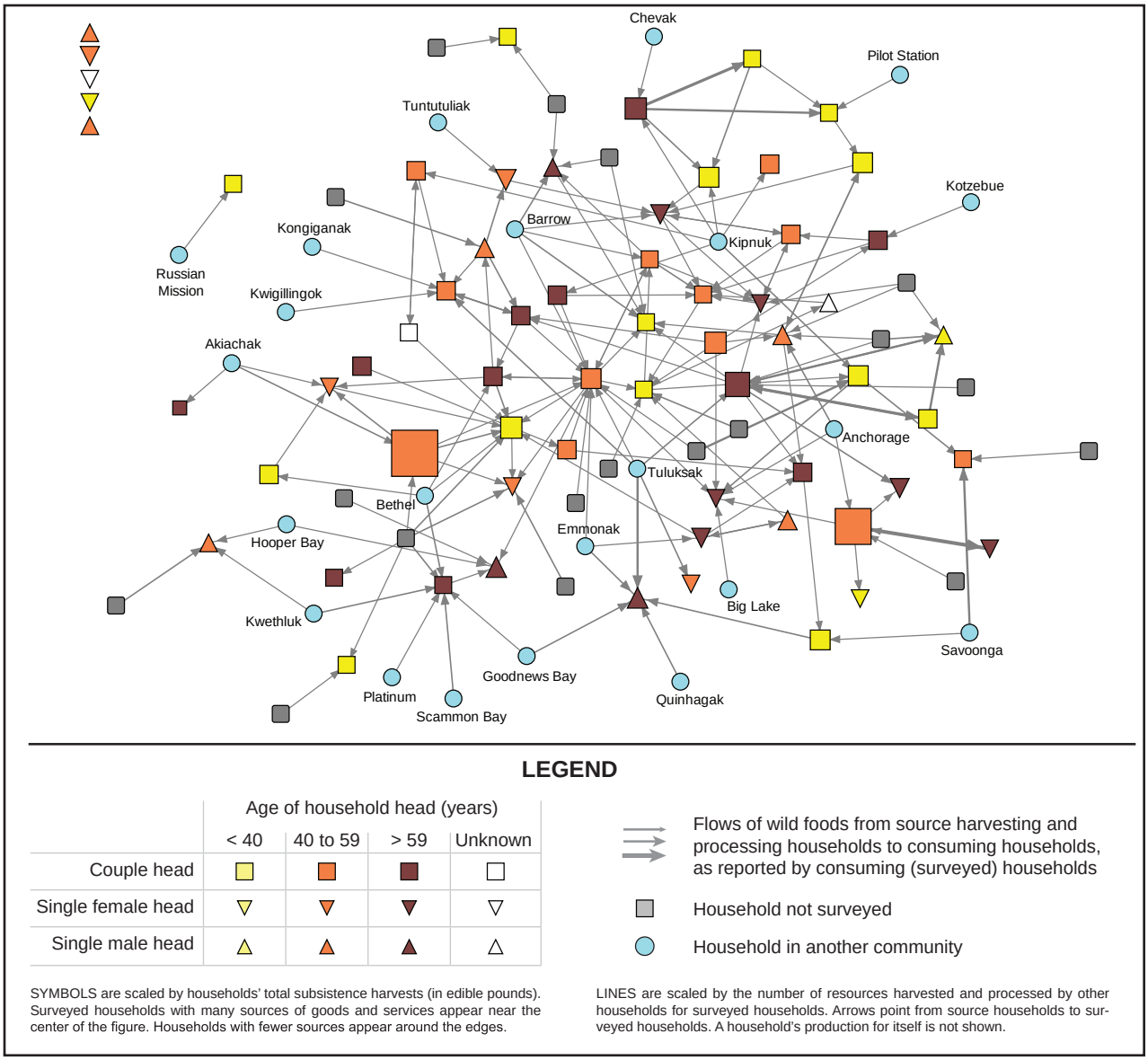

Figure 4-20.–Wild food harvesting and processing network, Akiak, 2010.

During the survey, households were asked who harvested and processed the subsistence foods they used. While reciprocity was clearly an important feature of sharing and cooperation in discussions with community residents, the survey only described unidirectional relationships and did not track patterns of exchange. Likewise, another limitation of Figure 4-20 is that it cannot illustrate the more indirect, although no less important, relationships or services within subsistence networks, such as those providing financial backing for harvest efforts, or those receiving food from an intermediate source instead of directly from the harvester or processor.

In Akiak in 2010, an estimated 22% of the households harvested 70% of the reported subsistence resources, similar to the "30-70 rule" first analyzed by Wolfe (1987), where approximately 30% of all community households harvest 70% of the subsistence resources used by the community. Statistically, these high producing households are generally headed by active elders, mature (40 to 59 years of age) couples, and single active males (Magdanz et al. 2002, Wolfe et al. *n.d.* [2009]). While the most extensive research into sharing networks undertaken by the Division of Subsistence has occurred in Northwest Alaska, the patterns identified in that research are similar in the case of Akiak. In Akiak, as in many other predominately Alaska Native communities, it appears that there are relatively few specialized harvesting households that redistribute the foods they harvest throughout the community.

Figure 4-20 shows the pattern of sharing among households in Akiak. The different symbols used to portray households illustrate the heads of households; boxes indicate that the household is headed by a couple, triangles indicate a single male head of household, and downward facing triangles indicate that the household is headed by a single female. The different colors of the symbols show the age of the head(s) of households; yellow nodes indicate that the head(s) of the household are younger than 40 years of age (developing household), the orange nodes indicate that household heads are between the ages of 40 to 59 (mature household), and the maroon nodes indicate that the heads of these households are older than 59 (elder household). Several households are located in the center of the network diagram, which indicates a greater level of connection to sharing networks in Akiak. Several of these households are headed by elders, either couples or a single male or female head. Other households, both developing and mature, are also located in the center of the diagram, and are clearly connected through both receiving and giving of subsistence resources. There are several communities that share resources with households in Akiak, and the most connected communities in this network are Barrow (surprising given the geographic distance between the 2 communities), Tuluksak, and Emmonak, as illustrated by Figure 4-20.

As illustrated by Figure 4-20, there are 2 heavy harvesting households (indicated by the 2 large orange boxes in the lower half of the diagram), both headed by a mature couple. These 2 largest harvesting households in the village have multiple members and a stable base of income. They both provide services to several other households, and receive harvest products from others, including those located in nearby communities. The next 3 largest producers were also headed by a couple, although

these couples were of varying ages: one mature, one elder, and one developing. Of the top 5 producing households, most had higher incomes and all had larger household sizes. These themes were identified in Magdanz et al. (2002), and size and maturity of households tends to be more statistically significant than income levels. Interestingly, the 2 largest producers are located closer to the periphery of the graph, which indicates they have fewer ties to other households in the community in comparison to those in the center of the figure. Akiak includes 5 isolate households, or those that are not connected to other households in terms of food distribution, and so are not involved in the sharing network of the community. These 5 households represent 8% of the village population, the largest percentage of isolates for any community in this report. There is no distinct pattern of characteristics in common among the 5 isolate households, although a few were recent arrivals to the community.

As was mentioned earlier, while network data illustrate important sharing relationships, they do not illustrate indirect patterns of exchange and reciprocity (e.g. monetary contributions for gas, loaning equipment, etc.) occurring in Akiak. Key respondent interviews help to illuminate these important elements of networks of sharing wild foods:

> It's our tradition. It's if we give you something, like widow, you're a widow, or widower, or orphan, our elders' rule is if you don't give back, if you can't, pay back, they let you go the first time. Next time you receive and don't do nothing, they go there and counsel you … tell that person, "Look, it's not in our culture to eat without paying back some way." Paying back someway is you mend their mukluks, so you can go further. (210311AK1)

There is a responsibility to share with those in need, especially when extra harvest is available. Similarly, there is a duty to give back and show thanks. Today store-bought foods, in addition to wild foods, act as reimbursement.

> Pork and beans sometime. Canned item payback. Anything that they feel we need, it's a culture. You don't give nothing for free for that person. They gotta work, give it back some way, pay for that. (210311AK1)

Clearly, complex sharing networks in Akiak, as in other places in rural Alaska, are important means for distributing wild foods throughout and between communities.

Comparisons with Prior Results

This was the first comprehensive subsistence harvest survey conducted by ADF&G in Akiak, but ADF&G has conducted subsistence salmon surveys in Akiak in most years from 1960 to 2010. ADF&G also recorded brown bear harvests in 1991 (CSIS), and migratory bird surveys were conducted by ADF&G from 2004 to 2008 (Naves 2010). This section discusses the current results of this survey and compares them with prior results.

Figure 4-21 shows the total estimated harvest of 4 species of salmon from 2000 to 2010, although 2009 harvests were not yet available from the Division of Subsistence database at the time the figure was created. The lower numbers for salmon harvests displayed in these figures until 2006 were the impetus for the modification of *The Kuskokwim River Salmon Rebuilding Management Plan* (5 AAC 07.365), which limited subsistence fishing to a 4-day per week schedule for various time periods in June and July depending upon the progress in achieving escapement goals (Linderman and Bergstrom 2006:5–6). According to ADF&G Division of Commercial Fisheries, for the years 2007 to 2010, these schedules were not implemented due to a determination that runs were adequate to provide for subsistence. Salmon harvests over the last 10 years have generally been increasing, with the 2010 study year data indicating the highest harvests during that time.

Combined harvest for all salmon in 2010 was the highest that it had been since the late 1980s and early 1990s; in 2010, the community as a whole harvested 112,606 lb of edible weight, or 292 lb per person. Despite this finding, the ADF&G Division of Commercial Fisheries also noted that 2010 was a year in which Chinook salmon abundance was poor (C. Brazil, Area Management Biologist, ADF&G Division of Commercial Fisheries, Kuskokwim Area Office, personal communication). One respondent expressed concern about future subsistence restrictions on harvesting Chinook salmon, indicating that this species is a source of "security and well-being" for the community. In terms of incidental harvest issues and concerns related to a commercial fishery in the lower Kuskokwim River, this individual stated:

> All the time, especially the king salmon fish with the Department of Fish and Game, trying to manage it, they're not doing a good job of it, letting the trollers take and throw away kings. That's what scares us, that's homeland security to us …. .It's unhuman, it's inhumane to [prevent] people to go after the fish they live from. That shouldn't happen at all. They should have the first crack at that fish. Never mind the troller, multibillion dollar operation, this is, Bering Sea is the last fish garden. Go from Atlantic, there's nothing over there, maybe a few lobsters. Go to West Coast, California area, Pacific, I don't know what they got over there anymore. Go to Gulf of Alaska, it's all fished out. This is the last garden of fish for any species in the United States, and that's their concern. (210311AK1)

Chinook salmon are clearly considered to be one of the most important subsistence resources for the community of Akiak, and there is concern amongst respondents that commercial fishing of this species will result in hardship for residents should it negatively affect subsistence harvests.

The last 2 graphs in Figure 4-22 portray a historical comparison of large mammal harvest estimates gathered from ADF&G Division of Wildlife Conservation data. Data for moose harvests were compiled by determining how many individuals hunted moose and their reported harvests, although this task was complicated due to the fact that some individuals received as many as 3 permits and, in some cases,

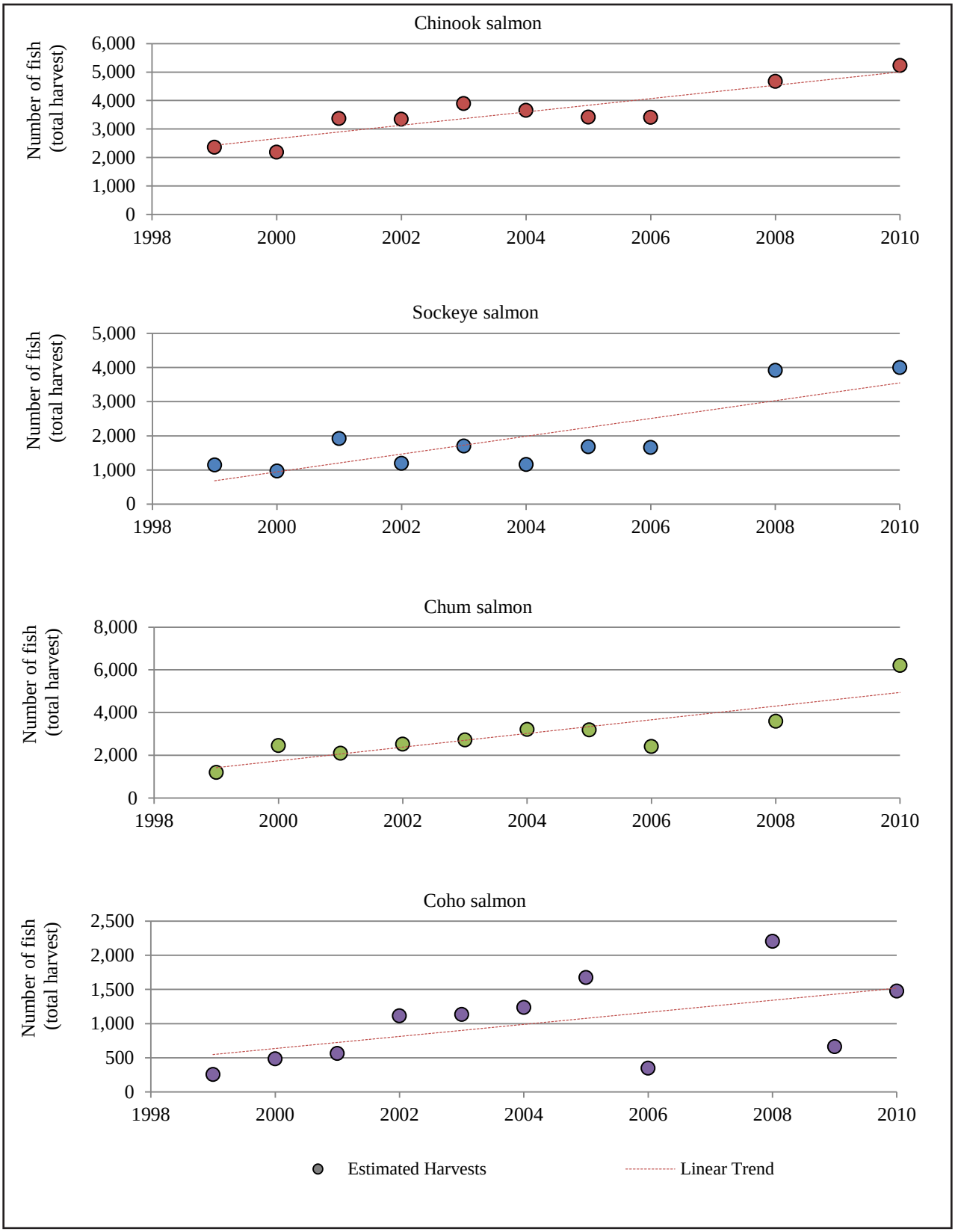

Figure 4-21.–Estimated numbers of Chinook, sockeye, coho and chum salmon harvested by residents of Akiak, 1998–2010.

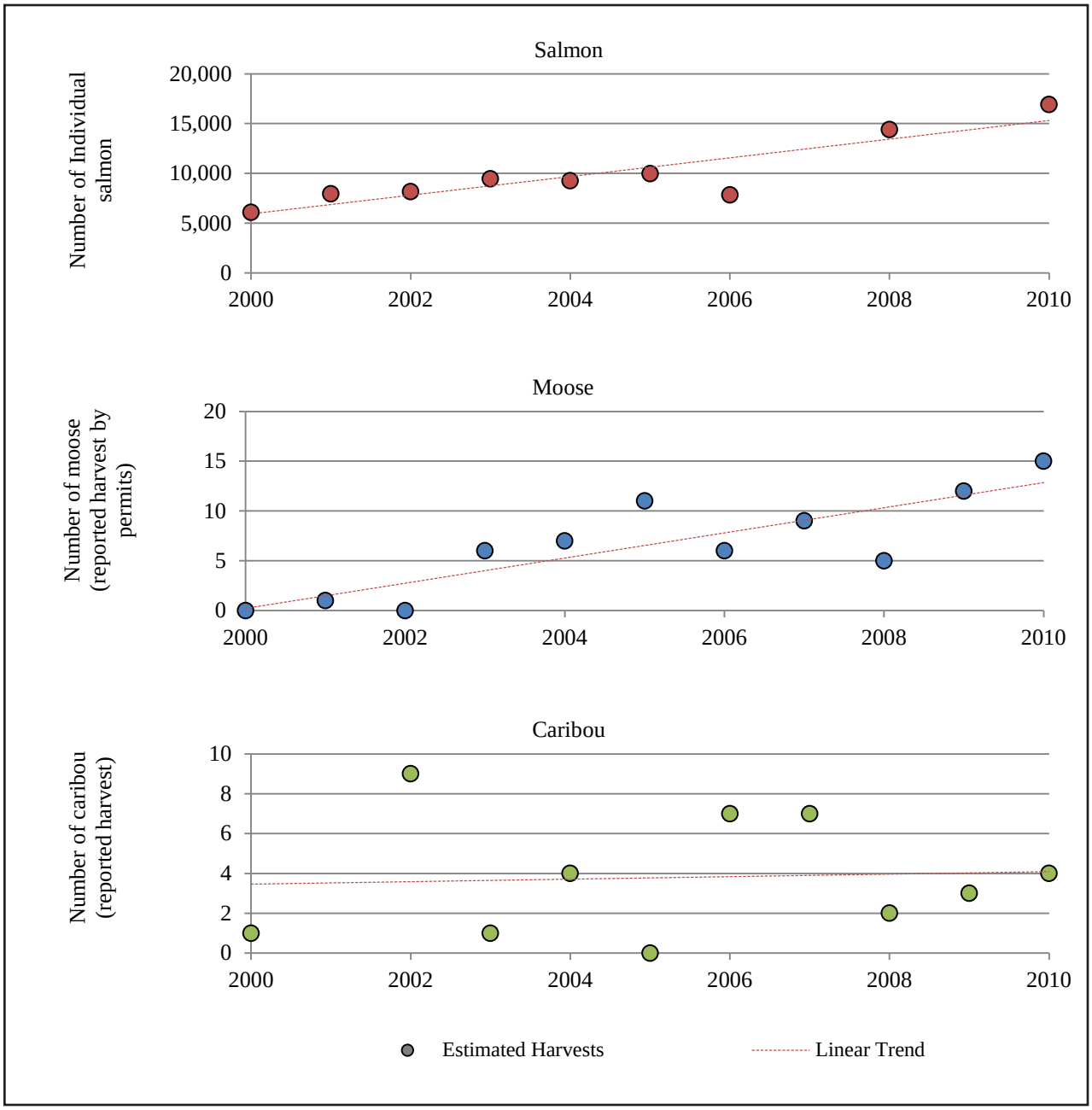

Figure 4-22.–Estimated numbers of sockeye, moose, and caribou harvested by residents of Akiak, 2000–2010.

double or triple reported their hunting activities. Careful examination of the data attempted to correct for this. In the case of caribou, only reported harvests were used to create the figure. The limitation of these data in both the cases of moose and caribou is that reported harvests and actual harvest numbers may not be equivalent. For example, in 2010, ADF&G produced an estimated harvest of 55 caribou, while 49 harvest tickets were issued for Akiak—11 of these harvest tickets were returned, while 38 were not. Of the 11 returned tickets, 4 harvested caribou were accounted for (J. D. Woolington, ADF&G Wildlife Biologist, personal communication, December 5, 2010). Likewise, the 2010 survey estimated a harvest of 27 (±6) moose in Akiak, while tickets and permits indicated a reported harvest of 15 moose in 2010.

Moose harvest numbers based on these data have generally increased over the last 10 years, although from 1999–2003 harvests were minimal to nonexistent. According to search areas provided by residents of Akiak during the 2010 survey, a majority of the effort in harvesting moose occurs in game management units (GMUs) 18 and 19. The community of Akiak is itself located in GMU 18. Moose began moving into the Yukon–Kuskokwim Delta in the 1940s. Moose populations in the western Interior peaked during the 1970s, but began to decline in the early 1990s due to hunting pressure and predation; this led to the creation of the *Central Kuskokwim Moose Management Plan* for GMU 19 in 2004 (Harper 2010). Also in 2004, a 5-year moratorium on moose hunting for the Lower Kuskokwim region of GMU 18 was enacted, which may also have served to keep harvest numbers low for Akiak until 2009. According to survey data, the total estimated number of moose harvested by the community was 27 moose for 2010. Respondents have noted that moose numbers have increased in the area around the community, and that the harvest quota for the first hunt following the moratorium was met well before the 10-day opening was concluded. It was further suggested that the population of moose in the region was significantly higher than ADF&G estimates indicated, and that the open season for hunting should be extended. It was also explained that residents of surrounding communities have noted a greater amount of predation by wolves of growing moose populations (260311AK3, 210311AK1).

Caribou harvest numbers, in contrast, have generally decreased, according to hunter-reported harvest data. It is difficult to pinpoint if this decrease is a trend, however, because harvest reporting has remained poor. Since the decline of reindeer herding in the 1940s, GMU 18 remained only lightly used by caribou until the early 1990s. Beginning in 1994, a large portion of the Mulchatna caribou herd began to populate the unit between September and April annually. The smaller, discrete Kilbuck caribou herd was likely absorbed by the Mulchatna herd during this time frame (Harper 2009). The large harvest in 2002 was likely from a large group of this herd that wintered south of the Kuskokwim River, although they have become more scarce in the central Kuskokwim River valley in recent years (Woolington 2005). One respondent explained that caribou hunting in the area became more prevalent approximately 20 years ago, and prior to that, hunting areas were considerably farther from the community; residents used to hunt for caribou on the other side of the Kilbuck Mountains closer

to the Bristol Bay area (260311AK3). In 2010, the community as a whole harvested approximately 55 caribou which resulted in 7,162 lb, or 18.6 lb per person. This documented harvest is much higher than the other years for which data exists, with the second highest harvest being 9 animals in 2002. Again, comparison is difficult because the other data points for caribou come from reported harvests, and there are likely unreported harvests in each of these years.

Migratory bird harvests are documented annually in various regions of the State by the Alaska Migratory Bird Co-Management Council (AMBCC) (Naves 2010). These reported harvests, however, are reported on the subregional level and community specific figures are not available. Akiak was surveyed in 2005–2007. Although Akiak's specific harvest of migratory birds cannot be readily distinguished in the AMBCC findings, the Lower Kuskokwim region, of which Akiak is a part, experienced exceptionally low bird harvests in 2005 and 2008. In 2009, however, harvests were significantly higher for the region compared to the lower numbers noted the prior year.

Overall, respondents in Akiak reported some changes to subsistence harvests and concerns over the availability of particular resources, especially Chinook salmon. Concern over population abundance of this resource was a common theme of discussion among key respondents. Regulatory issues, especially in terms of subsistence salmon restrictions and moose openings, were mentioned as being threats to food security in the community. Despite this, residents continue to adapt to changing circumstances that affect their uses and harvests of wild foods, and subsistence activities remain of vital importance to the community of Akiak.

5. Comprehensive Survey Results Georgetown, 2010

Prepared by Andrew Brenner

In June 2011, researchers surveyed 21 households that each included at least 1 member of the Native Village of Georgetown. This survey was unique in several ways. First, no one lived permanently in Georgetown at the time of this study. Current residencies of Georgetown tribal members were distributed in communities throughout the Kuskokwim region, other areas of the state of Alaska, and outside of the state.[1] Second, researchers contacted tribal members from a list, provided by the Georgetown Tribal Council, of 89 tribal members over 18 years old. While this list allowed researchers to identify many households and household heads, it did not enable researchers to make a precise determination of the total population of tribal members including those members under the age of 18. Additionally, much of the contact information on the list was out of date; as a result, researchers could not be certain of the completeness of the list and could not confirm a total number of households represented by Georgetown tribal members. Third, researchers conducted surveys in person with several tribal members living in Aniak and McGrath and by telephone with other tribal members living in Bethel and other locations. These factors must be taken into consideration when comparing the following subsistence information for Georgetown with other communities in the Central Kuskokwim River region.

This chapter summarizes findings from the household surveys, including demographic characteristics, responses to harvest assessment questions, reported employment and income, and responses to food security questions. In contrast to other communities, the harvest values in the Georgetown survey are not expanded to community estimates; the failure to accurately determine the number of households represented by the community of Georgetown as well as the small sample size precluded researchers from estimating harvests for unsurveyed households. Researchers attempted but were unable to conduct ethnographic interviews with community members. Historical and ethnographic information on Georgetown that is presented in this chapter is derived largely from previously available literature.

Georgetown tribal members were asked whether their subsistence harvests occurred in the Georgetown area, elsewhere in the Kuskokwim River drainage, or elsewhere in Alaska. Surveyed households cumulatively reported harvesting 32% of all subsistence resources by edible weight within the Georgetown area, 61% in other areas of the Kuskokwim River drainage, and 7% in other areas of Alaska outside of the Kuskokwim River drainage.

1. At the time of data collection, surveyed Georgetown households lived in the Anchorage/Mat-Su area (6 households), Bethel (6), McGrath (4), Aniak (3), Sleetmute (1). In an effort to contact all households on the tribal list with ties to Georgetown, researchers did contact 1 household physically located in another state at the time of the survey.

The total, edible wild food harvest reported by surveyed Georgetown households by weight was 10,870 lb. The average harvest per household was 518 lb; the average harvest per person was 173 lb. Moose, 7 species of fish, caribou, and blueberries made up the top 10 resources harvested and represented 96% of all harvested wild foods by edible weight in 2010 (Figure 5-1). Eight individual moose contributed the most subsistence food by edible weight of any one species, at an estimated 4,343 lb (40% of total edible lb). Three hundred thirty-four individual Chinook salmon, 151 sockeye salmon, and 100 coho salmon contributed 3,153 lb (29%), 761 lb (7%), and 529 lb (5%) respectively. Georgetown tribal members also reported harvesting 82 sheefish (492 lb, 5% of all resources by edible weight), 69 chum salmon (351 lb, 3%), 2 caribou (260 lb, 2%), 71 gallons of blueberries (283 lb, 3%), 31 gallons of smelt (183 lb, 2 %), and 25 northern pike (113 lb, 1%).

Because of the unique status of Georgetown, and the fact that all known Georgetown tribal members were permanent residents of other communities during the study year, results from this survey are not included in the Division of Subsistence Community Subsistence Information System (CSIS).

About Georgetown

Georgetown is located in the Central Kuskokwim River region, alongside the bank of the Kuskokwim River at the outlet of the George River, between the communities of Red Devil and Crooked Creek. Historical records show that people have lived in the current location of Georgetown since 1909, though the number of residents has fluctuated. An estimated 3 residents lived permanently in Georgetown in 2009 (ADLWD 2011), although at the time of this study (surveys conducted in 2011), no one was known

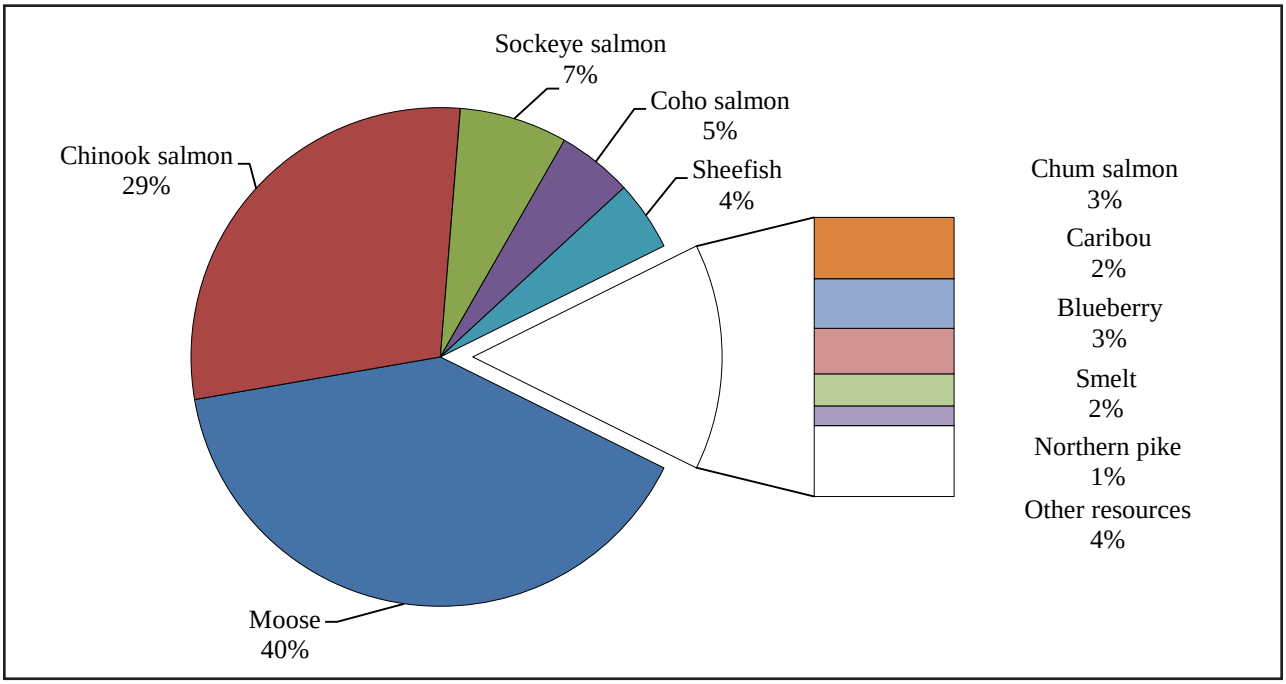

Figure 5-1.–Top 10 species harvests ranked by estimated edible weight, Georgetown, 2010.

to be living in Georgetown on a year-round basis. The Native Village of Georgetown is a federally recognized tribe, and tribal members maintain a strong connection to Georgetown and the surrounding land (Georgetown Tribal Council *n.d.*). The majority of Georgetown tribal members live within the Kuskokwim River drainage; many of them live in the several villages surrounding Georgetown as well as in Bethel, the regional hub community for the Kuskokwim region. Other Georgetown tribal members live outside of the Kuskokwim region, both in other regions of Alaska as well as outside of Alaska. Georgetown tribal members visited Georgetown for various periods of time in 2010, and some residents used Georgetown as a base for their subsistence harvest activities. At least 7 of the 21 surveyed households (33%) spent time in the immediate vicinity of Georgetown during 2010, and the majority of surveyed households included individuals who had spent time in Georgetown at some point in their lives. For the purposes of this report, "Georgetown respondents" refers to surveyed Georgetown tribal members and those who share a household with them.

Georgetown is generally recognized as being founded in the early 20th century as a trading post by George Fredericks, from whom Georgetown received its name (Smith 1917:37). However, the area has a long history of use prior to this, with documentation dating to the mid-18th century. The Russian explorer Lavrentiy Zagoskin described use of the Georgetown area in 1844 as a summer fish camp by families from "Kwigiumpainukamiut," a now abandoned village site located between Chuathbaluk and Napaimute (Brown 1983:192). Such seasonal use of the area for subsistence purposes was probably the typical pattern until 1907, when a trading post was established on the west bank of the George River at its confluence with the Kuskokwim River (Brown 1983:192). In 1909, gold was found on the George River, and the mining town of Georgetown quickly grew to a population of 300–500 (Brown 1983:192; Georgetown Tribal Council *n.d.*). According to Brown (1983:107, 192), this small gold rush was "unwarranted and short-lived," and the lack of available gold, together with a fire that destroyed much of the town in 1911, resulted in many residents leaving the Georgetown area. Many men also left Alaska around this time to take part in World War I, and the population at Georgetown in 1912 was reduced to fewer than 15 people (Brown 1983:107). Mining, primarily for gold and mercury, occurred sporadically throughout the remainder of the first half of the 20th century in the area around Georgetown and especially at nearby Red Devil, although the population of Georgetown during this period of time is unclear (Brown 1983:108, 119).

In the 1950s, a new town site located on the east bank of the George River developed, and the group of buildings at this location as well as at the older location are both currently referred to as Georgetown (RIM Architects et al. 2001:3). Cady, et al. (1955) described Georgetown as a "more or less permanent settlement" that in the mid-1950s was occupied by 1 family. A state school operated in Georgetown from 1964 until it closed in 1970 (Barnhardt 1985). Families were economically forced to leave the area around the time of the school closure because mining virtually ceased in the Georgetown area

and in neighboring Red Devil with the closure of the Red Devil Mine in 1971 (Georgetown Tribal Council *n.d.*; Ecology and Environment Inc. 2011).

With the passage of ANCSA in 1971, Georgetown tribal members' formal ownership of certain lands in the Georgetown area was recognized, and the village corporation of Georgetown was entitled to 69,120 acres of surface estate in the Georgetown area (RIM Architects et al. 2001:1). U.S. Census data indicated that Georgetown had 6 residents in 1980 (AANHS 1981), and Brown (1983:192) described that in the early 1980s several families lived at Georgetown. Since then, a few people have periodically lived year-round in the Georgetown area, and others have travelled seasonally to Georgetown from their primary residences in other communities. Currently, Georgetown tribal members are interested in exploring the feasibility of reestablishing Georgetown as a permanent community at an entirely new town site across the Kuskokwim River from the older Georgetown structures (RIM Architects et al. 2001:1, 9).

Georgetown tribal members receive services through the Kuskokwim Native Association, the ANCSA regional nonprofit corporation, and Calista Corporation, the ANCSA regional for-profit corporation for much of the Kuskokwim and lower Yukon regions. In 1977, Georgetown's ANCSA village corporation merged with those of 9 other Central Kuskokwim villages to form the Kuskokwim Corporation. The Georgetown Tribal Council office is currently located in Anchorage.

Georgetown tribal members share a historical and cultural connection to the Central Kuskokwim region. Oswalt (1967:190) described interactions between Kuskokwim River Yup'ik and Athabascan peoples as a joint occupancy of the area around Georgetown in early historical times. Historical and archeological sources show that until the early 20th century, people in the Georgetown area followed a harvest pattern where caribou, moose, and beaver were primary food sources and fish were secondary sources of food (Redding-Gubitosa 1992:63). In the early 20th century, because of the development of highly efficient fishing technologies, including fish wheels and commercially available nets, salmon became the greater portion of the subsistence harvest rather than large game (Redding-Gubitosa 1992:156-157). Additionally, mining activity in the first half of the 20th century was supported by dog teams for winter transportation in many parts of Alaska (Andersen 1992:8), and relatively high harvests of chum salmon to feed dogs probably occurred during much of the mining operations period in the Georgetown area.

Contemporary subsistence practices in Georgetown are likely influenced by long-term shifts related to the reduced need for high chum salmon harvests as snowmachines replaced dog teams beginning in the 1960s, and the reduced availability of caribou since the early 20th century and of moose more recently in the Central Kuskokwim region (Andersen 1992:12; Charnley 1983:5; ADF&G 2004:45–46). This study shows that Georgetown respondents' subsistence harvests during 2010 were dominated by moose and Chinook salmon, but also included other salmon species, nonsalmon fish species, caribou, berries, and other resources. Subsistence also remains a part of life for surveyed Georgetown tribal members

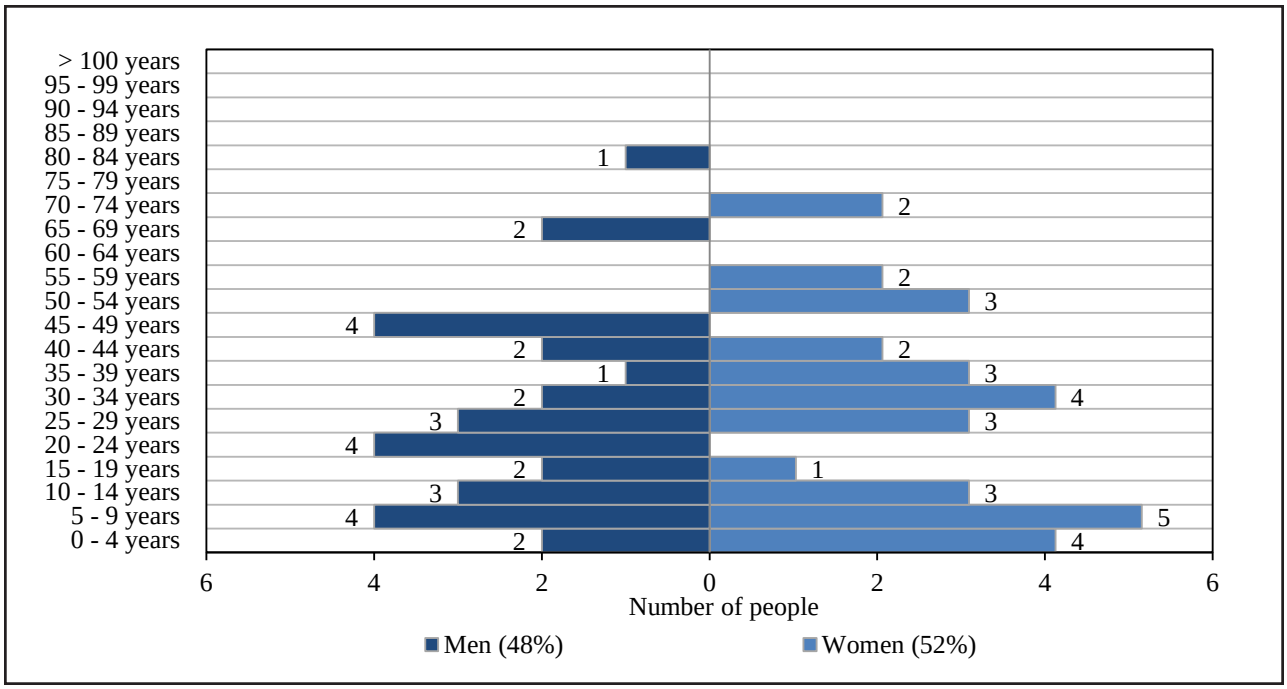

Figure 5-2.–Population profile, Georgetown, 2010.

living in urban Alaska, and even tribal members living outside the state received wild resources from other households. One urban Alaska resident commented during the survey that subsistence living can be done in urban environments and that he received wild food resources from rural Alaska as well as gathered berries near urban Alaska centers.

Demographics

The 21 surveyed households included 63 individuals, 48% of whom were female and 52% male (Figure 5-2). Information from the Georgetown Tribal Council indicated that in 2010 there were 87 tribal members over 18 years of age living in an unknown number of households. Surveyed households each included at least 1 Georgetown tribal member, and household sizes ranged from 1 to 6 people with an average of 3 people per household. The average age was 29 years; the oldest person was 82. Nearly all (87%) individuals in surveyed households self identified their race as Alaska Native. All Georgetown tribal members at the time of this study held permanent residence in locations other than Georgetown, although many had spent time in Georgetown seasonally for various purposes, including participating in subsistence activities. Individuals in surveyed households spent an average of 1 week in the Georgetown area in 2010, with a minimum of no time spent in the area and a maximum of 11 weeks. Respondents were asked about their parents' place of residence at the time of his or her (respondent's) birth. The largest number (44%) reported Anchorage, followed by Bethel (13%), Georgetown (9%), Sleetmute, Unalakleet, or other states, (each 6%), and Red Devil and Saint Mary's (3% each).

Wild Food Uses and Harvests

The primary purpose of the household survey was to collect information about the harvests and uses of edible wild foods. Respondents were asked whether their household used, tried to harvest, received, or gave away each resource during the study year. If they tried to harvest a resource, they were asked how much they harvested and for other details such as gear type used, sex of the animal, search areas, and month of harvest. Tables and figures in this section summarize responses to the harvest and use questions and include percentages of resources by edible weight harvested in the Georgetown area, in other areas of the Kuskokwim River drainage, and in other areas of Alaska outside of the Kuskokwim River drainage.

Of the surveyed households, 90% used at least 1 wild resource (Table 5-1). Georgetown households used an average of 9 wild food resources during the study year. The most widely used resource categories by surveyed Georgetown households in 2010 were salmon (used by 86% of households), vegetation (86%), and land mammals (76%) (Figure 5-3). Surveyed households attempted to harvest an average of 5 resources during 2010, and 71% of households reported that a household member actually harvested some type of wild food in 2010. Some households did not try to harvest any wild

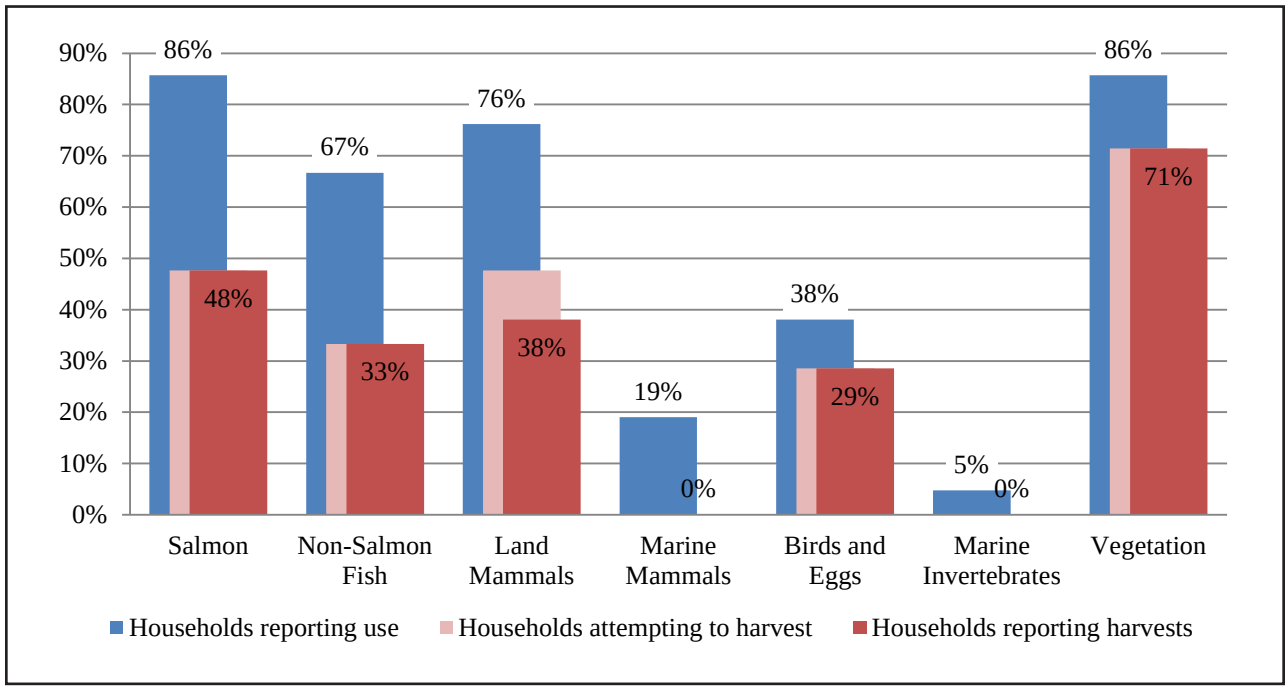

Figure 5-3.–Percentages of households using, attempting to harvest, or harvesting subsistence resources by category, Georgetown, 2010.

Table 5-1. – Estimated uses and harvests of fish, Georgetown, 2010.

	Percentage of households					Estimated pounds harvested			Total estimated amount[1] harvested by community	95% conf. limit	% From	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Georgetown Area	Other Kuskokwim
FISH												
Salmon												
Chum salmon	24%	19%	19%	5%	19%	350.8 lb	16.7 lb	5.6 lb	69.0 ind.	± 0%	36%	59%
Coho salmon	43%	29%	29%	14%	24%	528.8 lb	25.2 lb	8.4 lb	100.0 ind.	± 0%	21%	76%
Chinook salmon	71%	38%	38%	38%	29%	3,152.7 lb	150.1 lb	50.0 lb	334.0 ind.	± 0%	37%	62%
Pink salmon	5%	0%	0%	5%	5%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Sockeye salmon	52%	38%	38%	24%	19%	760.9 lb	36.2 lb	12.1 lb	151.0 ind.	± 0%	45%	53%
Unknown salmon	10%	0%	0%	10%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**86%**	**48%**	**48%**	**52%**	**38%**	**4,793 lb**	**228.2 lb**	**76.1 lb**	**654 ind.**	**± 0%**	**37%**	**62%**
Char												
Dolly varden	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Lake trout	10%	5%	5%	5%	5%	1.4 lb	0.1 lb	0.0 lb	1.0 ind.	± 0%	0%	100%
Subtotal	**10%**	**5%**	**5%**	**5%**	**5%**	**1 lb**	**0.1 lb**	**0.0 lb**	**1 ind.**	**± 0%**	**0%**	**100%**
Trout												
Rainbow trout	5%	0%	0%	5%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**5%**	**0%**	**0%**	**5%**	**0%**	**0 lb**	**0.0 lb**	**0.0 lb**	**0 ind.**	**± 0%**	**0%**	**0%**
Whitefish												
Sheefish	24%	19%	19%	10%	14%	492.0 lb	23.4 lb	7.8 lb	82.0 ind.	± 0%	55%	45%
Broad whitefish	14%	10%	10%	5%	5%	50.4 lb	2.4 lb	0.8 lb	36.0 ind.	± 0%	17%	83%
Bering cisco	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Least cisco	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Humpback whitefish	5%	0%	0%	5%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Round whitefish	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown whitefish	43%	5%	5%	43%	5%	21.0 lb	1.0 lb	0.3 lb	15.0 ind.	± 0%	100%	0%
Subtotal	**57%**	**24%**	**24%**	**52%**	**24%**	**563 lb**	**26.8 lb**	**8.9 lb**	**133 ind.**	**± 0%**	**53%**	**47%**
Anadromous/marine fish												
Herring	10%	0%	0%	10%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Smelt	19%	10%	10%	14%	0%	182.9 lb	8.7 lb	2.9 lb	30.5 gal.	± 0%	98%	0%
Cod	5%	5%	0%	5%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Saffron cod	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Halibut	29%	0%	0%	29%	5%	0.0 lb	0.0 lb	0.0 lb	0.0 lbs.	± 0%	0%	0%
Lamprey	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Stickleback (needlefish)	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Subtotal	**38%**	**10%**	**10%**	**38%**	**5%**	**183 lb**	**8.7 lb**	**2.9 lb**		**± 0%**	**98%**	**0%**

Table 5-1. – Page 2 of 2.

	Percentage of households					Estimated pounds harvested			Total estimated amount[1] harvested by community	95% conf. limit	% From	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Georgetown Area	Other Kuskokwim
Other fresh water fish												
Blackfish	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 lbs.	± 0%	0%	0%
Burbot	5%	0%	0%	5%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Grayling	14%	10%	10%	5%	0%	38.5 lb	1.8 lb	0.6 lb	55.0 ind.	± 0%	0%	9%
Northern pike	14%	10%	10%	5%	5%	112.5 lb	5.4 lb	1.8 lb	25.0 ind.	± 0%	80%	20%
Sucker	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**24%**	**14%**	**14%**	**10%**	**5%**	**151 lb**	**7.2 lb**	**2.4 lb**		**± 0%**	**60%**	**17%**
ALL FISH	**90%**	**52%**	**52%**	**71%**	**48%**	**5,691.9 lb**	**271.0 lb**	**90.3 lb**		**± 0%**	**41%**	**57%**
ALL RESOURCES	**90%**	**71%**	**71%**	**86%**	**62%**	**10,870.3 lb**	**517.6 lb**	**172.5 lb**		**± 0%**	**32%**	**61%**

Source : Alaska Department of Fish and Game, Division of Subsistence Household Surveys, 2011.

[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.

foods, while the maximum number of resources that any 1 household reported trying to harvest was 19. On average, Georgetown households harvested 4 resources, with harvests by individual households ranging from 0 to 15 different resources.

In addition to documenting percentages of Georgetown households using and harvesting wild food resources, surveyors asked respondents to describe the quantity (typically recorded as individual animals or gallons of vegetation, for example) of each resource their household harvested in 2010. These quantities were then converted to estimated edible weights for each species and resource category, and compiled to give estimates of the total edible weight of wild foods harvested by Georgetown respondents. The estimated edible weights of wild food harvests for 7 resource categories—salmon, nonsalmon fish, land mammals, vegetation, birds and eggs, marine mammals, and marine invertebrates—are summarized in the "all resources" row of Table 5-1. For all resources, the average per household total harvest was 518 edible pounds, and the average per capita harvest was 173 edible pounds.

Georgetown respondents' reported subsistence harvest of salmon totaled 4,793 lb in 2010 (Figure 5-4). Salmon formed the majority (84%) of the fish harvest, and constituted 44% of the total subsistence harvest for all resources by edible weight. Georgetown fishers harvested 334 Chinook salmon, which formed the largest portion of the salmon harvest by species and contributed an estimated 3,153 edible pounds to Georgetown's total wild food harvest. Other salmon harvested by Georgetown respondents included 151 sockeye salmon, 100 coho salmon, and 69 chum salmon. Georgetown respondents

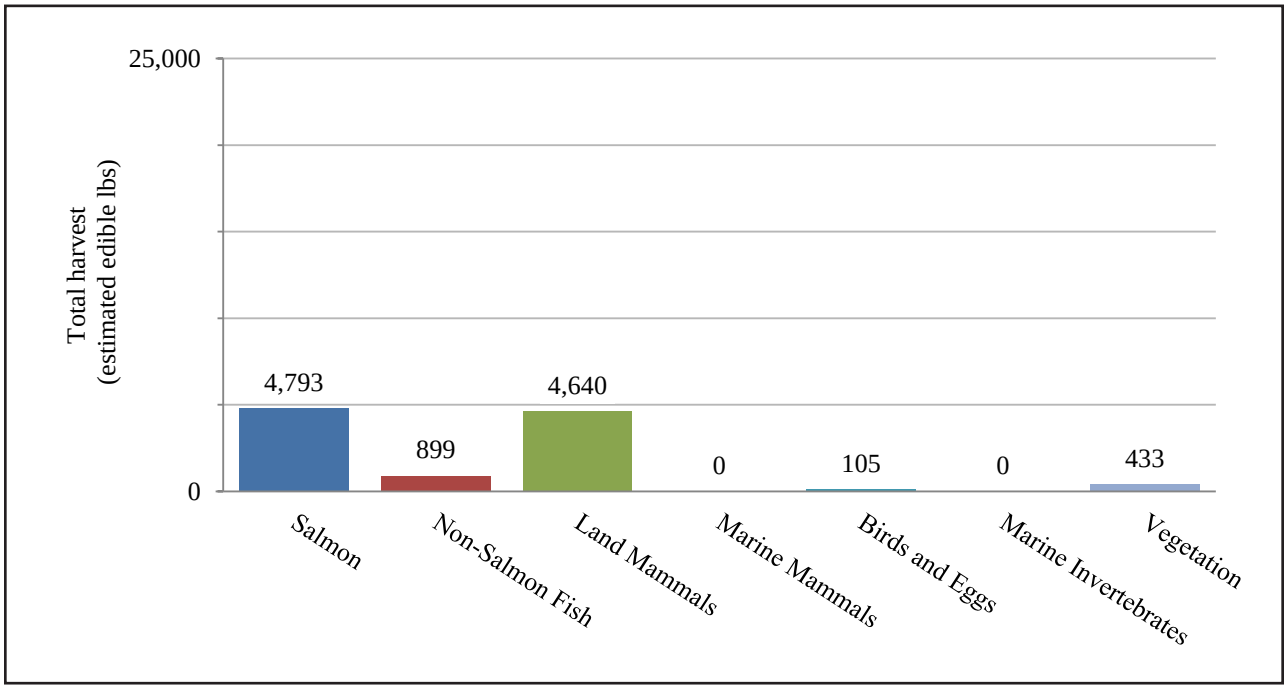

Figure 5-4.–Total estimated edible pounds harvested by the community by resource category, Georgetown, 2010.

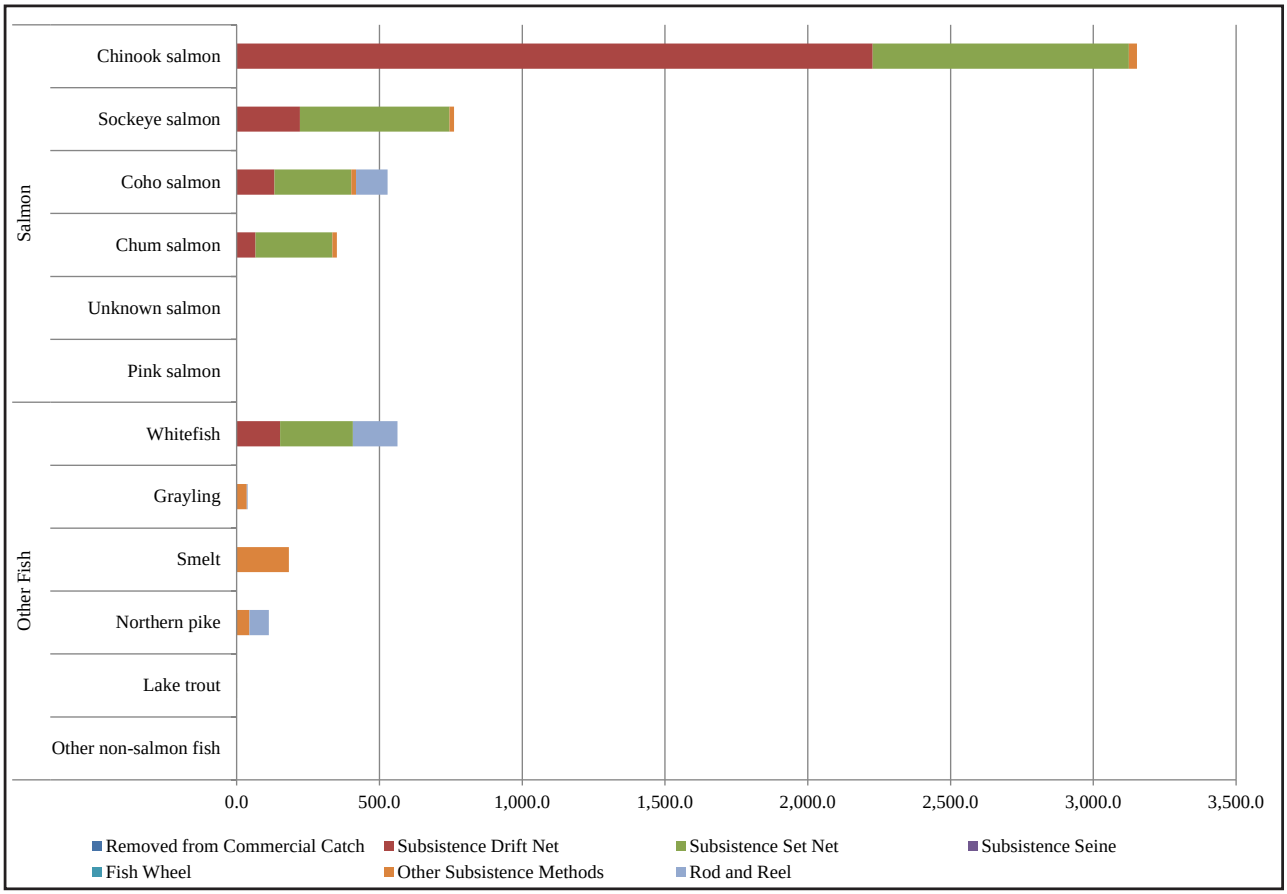

Figure 5-5.–Fish harvests by gear type, Georgetown, 2010.

harvested nearly all of their salmon with drift (55%) or set (41%) gillnets, 2% was harvested with other subsistence gear, and the remaining 2%, which consisted solely of coho salmon, were harvested with rod and reel (Figure 5-5).

Respondents reported harvesting at least 6 species of nonsalmon fish that cumulatively contributed 898 lb (8%) to Georgetown's total wild food harvest in 2010. Harvested species included (ranked in descending order based on edible weight contribution to total harvest) sheefish, rainbow smelt, northern pike, broad whitefish, unknown whitefishes, Arctic grayling, and lake trout. Gear used to harvest nonsalmon fish species included drift and set gillnets for whitefishes and sheefish, as well as rod and reel for sheefish, northern pike, unknown whitefishes, and Arctic grayling. Fish caught with other gear during the study year included northern pike (likely caught by jigging) and smelt (likely harvested with dip nets). Households were also asked how many fish were used exclusively to feed dogs: respondents reported using a total of 20 sheefish (14% of the total nonsalmon fish harvest by edible weight) for dog food (Table 5-1).

Land mammals composed an estimated 43% of Georgetown respondents' wild food harvest in 2010 (Table 5-2). Moose formed the majority (94%) of Georgetown respondents' land mammal harvest by edible weight, contributing 4,343 total edible pounds (or 69 lb per capita). Moose was also the most

widely harvested and used large land mammal species in 2010, with a reported 8 individual moose harvested by 38% of households and used by 71% of households. Caribou composed 6% of Georgetown respondents' land mammal harvest; caribou contributed a total of 260 edible pounds and 4 lb per capita. Five percent of households reported harvesting the community's total harvest of 2 caribou, and 24% of households reported using caribou. Three snowshoe hares, 2 beavers, 1 wolf, and 1 red fox formed the remainder of Georgetown respondents' reported land mammal harvest in 2010. Marine mammals, consisting of unknown seal, walrus, and bowhead whale, were used by 19% of surveyed households, but there was no reported harvest of marine mammals by Georgetown households during the study year (Table 5-2).

Georgetown respondents' harvest of birds composed a small portion (1%) of the total harvest by edible weight, at 105 total edible pounds (Table 5-3). Thirty-eight percent of surveyed households used birds during the study year (Table 5-3). Sixty-five ptarmigan and 52 spruce grouse composed the majority (99%) of harvested birds during 2010. Migratory birds represented a negligible portion of Georgetown households' bird harvest: the entire harvest of migratory birds during the study year consisted of 1 mallard and 1 duck of undetermined species. No households reported harvesting wild bird eggs during the study year.

The survey asked about the harvest and use of vegetation including berries and edible or medicinal greens by Georgetown households. Most households (86%) used and 71% harvested at least 1 vegetation resource (Table 5-4). Blueberries were the most commonly harvested (57% of households) and used (67%) food resource in this category and the vegetation resource with the highest total harvest by edible pounds (283 lb). Other berries harvested included salmonberries (42 lb); lowbush cranberries (40 lb); crowberries, or "blackberries" as they are referred to locally (28 lb); highbush cranberries (16 lb); raspberries (8 lb); and gooseberries (8 lb). Households also reported harvesting 82 cords of firewood, one-half gallon of "punk" (a polypore fungus commonly used as a chewing tobacco additive or as a mosquito repellent), 2 gallons (8 edible pounds) of wild rose hips, and a small amount of Hudson's Bay tea. One household reported receiving but not harvesting wild rhubarb.

Finally, the survey asked respondents about their harvest and use of shellfish in 2010. No households reported subsistence harvests of invertebrates, although 1 household reported use of unknown marine invertebrates (Table 5-5).

Sharing, roughly measured by instances of households giving away and receiving subsistence foods, was highest for fish and land mammals, with an estimated 71% of Georgetown households receiving fish and 57% receiving land mammals. The most commonly given away resource was fish (48% of surveyed households), followed by land mammals (38%).

Table 5-2. – Estimated uses and harvests of land and marine mammals, Georgetown, 2010.

	Percentage of households					Estimated pounds harvested			Total estimated amount[1] harvested by community	95% conf. limit	% From	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Georgetown Area	Other Kuskokwim
LAND MAMMALS												
Large land mammals												
Black bear	5%	0%	0%	5%	5%	0.0 lb	0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Brown bear	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Caribou	24%	5%	5%	19%	10%	260.0 lb	12 lb	4.1 lb	2.0 ind.	± 0%	0%	100%
Moose	71%	48%	38%	48%	33%	4,343.0 lb	207 lb	68.9 lb	8.0 ind.	± 0%	25%	63%
Subtotal	**76%**	**48%**	**38%**	**57%**	**38%**	**4,603.0 lb**	**219.2 lb**	**73.1 lb**	**10.0 ind.**	**± 0%**	**23%**	**65%**
Small land mammals												
Beaver	14%	10%	10%	5%	10%	30.0 lb	1.4 lb	0.5 lb	2.0 ind.	± 0%	50%	50%
Red fox	5%	5%	5%	0%	5%	0.0 lb	0.0 lb	0.0 lb	1.0 ind.	± 0%	0%	0%
Snowshoe hare	10%	5%	5%	5%	10%	7.5 lb	0.4 lb	0.1 lb	3.0 ind.	± 0%	0%	100%
Jackrabbit	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Land otter	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Lynx	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Marmot	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Marten	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Mink	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%	0%	0%
Muskrat	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Porcupine	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Parka squirrel (ground)	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Tree squirrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Weasel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Wolf	5%	5%	5%	0%	0%	*Not usually eaten*			1.0 ind.	± 0%	0%	100%
Wolverine	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%	0%	0%
Subtotal	**19%**	**14%**	**14%**	**5%**	**14%**	**37.5 lb**	**1.8 lb**	**0.6 lb**	**7.0 ind.**	**± 0%**	**40%**	**60%**

Table 5-2. – Page 2 of 2.

	Percentage of households					Estimated pounds harvested			Total estimated amount[1] harvested by community	95% conf. limit	% From	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Georgetown Area	Other Kuskokwim
MARINE MAMMALS												
Bearded seal	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Ringed seal	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Spotted seal	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown seal	14%	0%	0%	14%	5%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Walrus	5%	0%	0%	5%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Belukha	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Bowhead	14%	0%	0%	14%	5%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**19%**	**0%**	**0%**	**19%**	**10%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**0.0 ind.**	**± 0%**	**0%**	**0%**
ALL LAND MAMMALS	**76%**	**48%**	**38%**	**57%**	**38%**	**4,640.5 lb**	**221 lb**	**73.7 lb**		**± 0%**	24%	65%
ALL MARINE MAMMALS	**19%**	**0%**	**0%**	**19%**	**10%**	**0.0 lb**	**0 lb**	**0.0 lb**		**± 0%**	0%	0%
ALL RESOURCES	**90%**	**71%**	**71%**	**86%**	**62%**	**10,870.3 lb**	**518 lb**	**172.5 lb**		**± 0%**	**32%**	**61%**

Source : Alaska Department of Fish and Game, Division of Subsistence Household Surveys, 2011.

[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 5-3. – Estimated uses and harvests of birds, Georgetown, 2010.

	Percentage of households					Estimated pounds harvested			Total estimated amount[1] harvested by community	95% conf. limit	% From	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Georgetown Area	Other Kuskokwim
Migratory birds												
Ducks												
Bufflehead	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Canvasback	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Common eider	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown eider	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Goldeneye	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Mallard	14%	5%	5%	10%	10%	1.0 lb	0.0 lb	0.0 lb	1.0 ind.	± 0%	0%	100%
Common merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Red-Breasted merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Long-Tailed duck (oldsc	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Northern pintail	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Scaup	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Black scoter	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Surf scoter	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
White-Winged scoter	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Northern shoveler	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Green winged teal	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Wigeon	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown ducks	5%	5%	5%	0%	5%	0.9 lb	0.0 lb	0.0 lb	1.0 ind.	± 0%	0%	0%
Subtotal	**19%**	**10%**	**10%**	**10%**	**14%**	**1.9 lb**	**0.1 lb**	**0.0 lb**	**2.0 ind.**	**± 0%**	**0%**	**54%**
Geese												
Brant	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Cacklers	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Lesser canada geese (tav	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown canada geese	5%	0%	0%	5%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Emperor geese	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Snow geese	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
White-Fronted geese	5%	0%	0%	5%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown geese	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**10%**	**0%**	**0%**	**10%**	**0%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**0.0 ind.**	**± 0%**	**0%**	**0%**

Table 5-3. – Page 2 of 2.

	Percentage of households					Estimated pounds harvested			Total estimated amount[1] harvested by community	95% conf. limit	% From	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Georgetown Area	Other Kuskokwim
Other migratory birds												
Tundra swan (whistling)	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Sandhill crane	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Whimbrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**0%**	**0%**	**0%**	**0%**	**0%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**0.0 ind.**	**± 0%**	**0%**	**0%**
Other birds												
Spruce grouse	10%	10%	10%	0%	5%	36.4 lb	1.7 lb	0.6 lb	52.0 ind.	± 0%	0%	100%
Ruffed grouse	5%	5%	5%	0%	0%	1.4 lb	0.1 lb	0.0 lb	2.0 ind.	± 0%	0%	100%
Ptarmigan	19%	19%	19%	0%	19%	65.0 lb	3.1 lb	1.0 lb	65.0 ind.	± 0%	0%	100%
Subtotal	**29%**	**29%**	**29%**	**0%**	**19%**	**102.8 lb**	**4.9 lb**	**1.6 lb**	**119.0 ind.**	**± 0%**	**0%**	**100%**
ALL MIGRATORY BIRDS	**19%**	**10%**	**10%**	**10%**	**14%**	**1.9 lb**	**0 lb**	**0.0 lb**	**2.0 ind.**	**± 0%**	**0%**	**54%**
ALL OTHER BIRDS	**29%**	**29%**	**29%**	**0%**	**19%**	**102.8 lb**	**5 lb**	**1.6 lb**	**119.0 ind.**	**± 0%**	**0%**	**100%**
ALL RESOURCES	**90%**	**71%**	**71%**	**86%**	**62%**	**10,870 lb**	**518 lb**	**172.5 lb**		**± 0%**	**32%**	**61%**

Source: Alaska Department of Fish and Game, Division of Subsistence Household Surveys, 2011.

[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 5-4. – Estimated uses and harvests of vegetation, Georgetown, 2010.

	Percentage of households					Estimated pounds harvested			Total estimated amount[1] harvested by community	95% conf. limit	% From	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Georgetown Area	Other Kuskokwim
Berries												
Blueberry	67%	57%	57%	19%	38%	283.0 lb	13 lb	4.5 lb	70.8 gal.	± 0%	7%	59%
Low bush cranberry	19%	14%	14%	5%	14%	40.0 lb	2 lb	0.6 lb	10.0 gal.	± 0%	40%	50%
High bush cranberry	14%	10%	10%	5%	5%	16.0 lb	1 lb	0.3 lb	4.0 gal.	± 0%	0%	50%
Gooseberry	5%	5%	5%	0%	0%	8.0 lb	0 lb	0.1 lb	2.0 gal.	± 0%	0%	0%
Currants	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Raspberry	10%	5%	5%	5%	5%	8.0 lb	0 lb	0.1 lb	2.0 gal.	± 0%	0%	0%
Salmonberry	14%	10%	10%	10%	10%	42.0 lb	2 lb	0.7 lb	10.5 gal.	± 0%	0%	100%
Blackberry	19%	10%	10%	10%	14%	28.0 lb	1 lb	0.4 lb	7.0 gal.	± 0%	57%	0%
Berries	**76%**	**62%**	**62%**	**24%**	**38%**	**425.0 lb**	**20.2 lb**	**6.7 lb**	**106.3 gal.**	**± 0%**	**12%**	**56%**
Plants/greens/mushrooms												
Wild rhubarb	5%	0%	0%	5%	0%	0.0 lb	0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Eskimo potato	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Fiddlehead ferns	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Hudson bay tea	10%	5%	5%	5%	0%	0.3 lb	0 lb	0.0 lb	0.3 gal.	± 0%	0%	100%
Mint	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Sourdock	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Willow leaves	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Wild celery	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Wild rose hips	5%	5%	5%	0%	0%	8.0 lb	0 lb	0.1 lb	2.0 gal.	± 0%	0%	0%
Fireweed	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Stinkweed	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Punk	10%	5%	5%	5%	5%	0.0 lb	0 lb	0.0 lb	0.5 gal.	± 0%	0%	0%
Subtotal	**14%**	**10%**	**10%**	**5%**	**5%**	**8.3 lb**	**0.4 lb**	**0.1 lb**	**2.8 gal.**	**± 0%**	**0%**	**3%**
Wood	67%	52%	52%	24%	10%	0.0 lb	0 lb	0.0 lb	81.5 Cord.	± 0%	0%	0%
Subtotal	**67%**	**52%**	**52%**	**24%**	**10%**	**0.0 lb**	**0 lb**	**0.0 lb**	**81.5 Cord.**	**± 0%**	**0%**	**0%**
ALL VEGETATION	**86%**	**71%**	**71%**	**38%**	**43%**	**433.3 lb**	**21 lb**	**6.9 lb**		**± 0%**	**12%**	**55%**
ALL RESOURCES	**90%**	**71%**	**71%**	**86%**	**62%**	**10,870 lb**	**518 lb**	**172.5 lb**		**± 0%**	**32%**	**61%**

Source : Alaska Department of Fish and Game, Division of Subsistence Household Surveys, 2011.

[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 5-5. – Estimated uses and harvests of marine invertebrates, Georgetown, 2010.

	Percentage of households					Estimated pounds harvested			Total estimated amount[1] harvested by community	95% conf. limit	% From	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Georgetown Area	Other Kuskokwim
MARINE INVERTEBRATES												
Clams	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
King crab	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Tanner crab	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Shrimp	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown marine invert	5%	0%	0%	5%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Subtotal	**5%**	**0%**	**0%**	**5%**	**0%**	**0.0 lb**	**0.0 lb**	**0.0 lb**		**± 0%**	**0%**	**0%**
ALL MARINE INVERT.	**5%**	**0%**	**0%**	**5%**	**0%**	**0.0 lb**	**0.0 lb**	**0.0 lb**		**± 0%**	**0%**	**0%**
ALL RESOURCES	**90%**	**71%**	**71%**	**86%**	**62%**	**10,870 lb**	**517.6 lb**	**172.5 lb**		**± 0%**	**32%**	**61%**

Source: Alaska Department of Fish and Game, Division of Subsistence Household Surveys, 2011.

[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.

Harvest Areas

For 6 different subsistence resource categories (salmon, nonsalmon fish species such as whitefishes and northern pike, large land mammals, small land mammals, ducks and geese, and berries and greens), households were asked to locate on a map the areas where they hunted, fished for, or gathered the resource, and the locations where they actually harvested the resource in 2010. Figure 5-6 summarizes the mapped data collected from Georgetown for 2010. For each resource and resource category, all households' search areas and harvest locations were combined to create a series of maps depicting Georgetown respondents' subsistence use areas in 2010 (figures 5-7 through 5-11).

There are some limitations to the mapped data in this chapter. For the purposes of this study, mapping was only completed for subsistence activities taking place within the study year, and occurring within the Kuskokwim River drainage and surrounding area. Researchers were able to document harvest areas on maps while surveying in person in Aniak and McGrath and unable to do so with most of the surveys conducted by telephone.

For 2010, Georgetown respondents reported using a total of 199 square miles for subsistence within the Kuskokwim River drainage. The wide distribution of primary residences of Georgetown tribal members throughout the Kuskokwim River drainage is reflected in mapped subsistence areas—search and harvest areas include locations on and near the Kuskokwim River and its tributaries ranging from below Bethel to above McGrath. In spite of this wide distribution, portions of harvests for most resource categories occurred in the immediate vicinity of Georgetown. Surveyed Georgetown respondents generally mapped their subsistence search and harvest areas within 15 miles of permanently occupied Kuskokwim River communities, suggesting that Georgetown respondents often based their subsistence activities directly out of established settlements rather than out of seasonal or short-term remote camps. Searching for and harvesting subsistence resources in 2010 occurred in the immediate vicinity of permanently occupied communities including Napakiak, Bethel, Kwethluk, Tuluksak, Aniak, Stony River, Lime Village, and McGrath. Harvest areas for each resource category were distributed around several individual communities, although caribou hunting was limited to an area near Lime Village (Figure 5-9), and hunting for ducks and geese only took place in a small area near Kwethluk.

Subsistence activities that took place near Georgetown itself provide an exception to this pattern of subsistence in the immediate vicinity of permanently inhabited communities because Georgetown was not continuously occupied during the study year. Mapped data suggest that the area around Georgetown provided a seasonal subsistence harvesting base for Georgetown respondents, primarily in the summer and fall seasons. Searches and harvests for moose, salmon, nonsalmon fish, and berries took place near Georgetown in 2010 (figures 5-7, 5-8, 5-9, and 5-11). Moose search and harvest areas on the Aniak River, Iditarod River, and an area south of McGrath also reflected more remote subsistence activities (Figure 5-9).

No attempt has been made to extrapolate the harvest areas depicted in this report to the use patterns

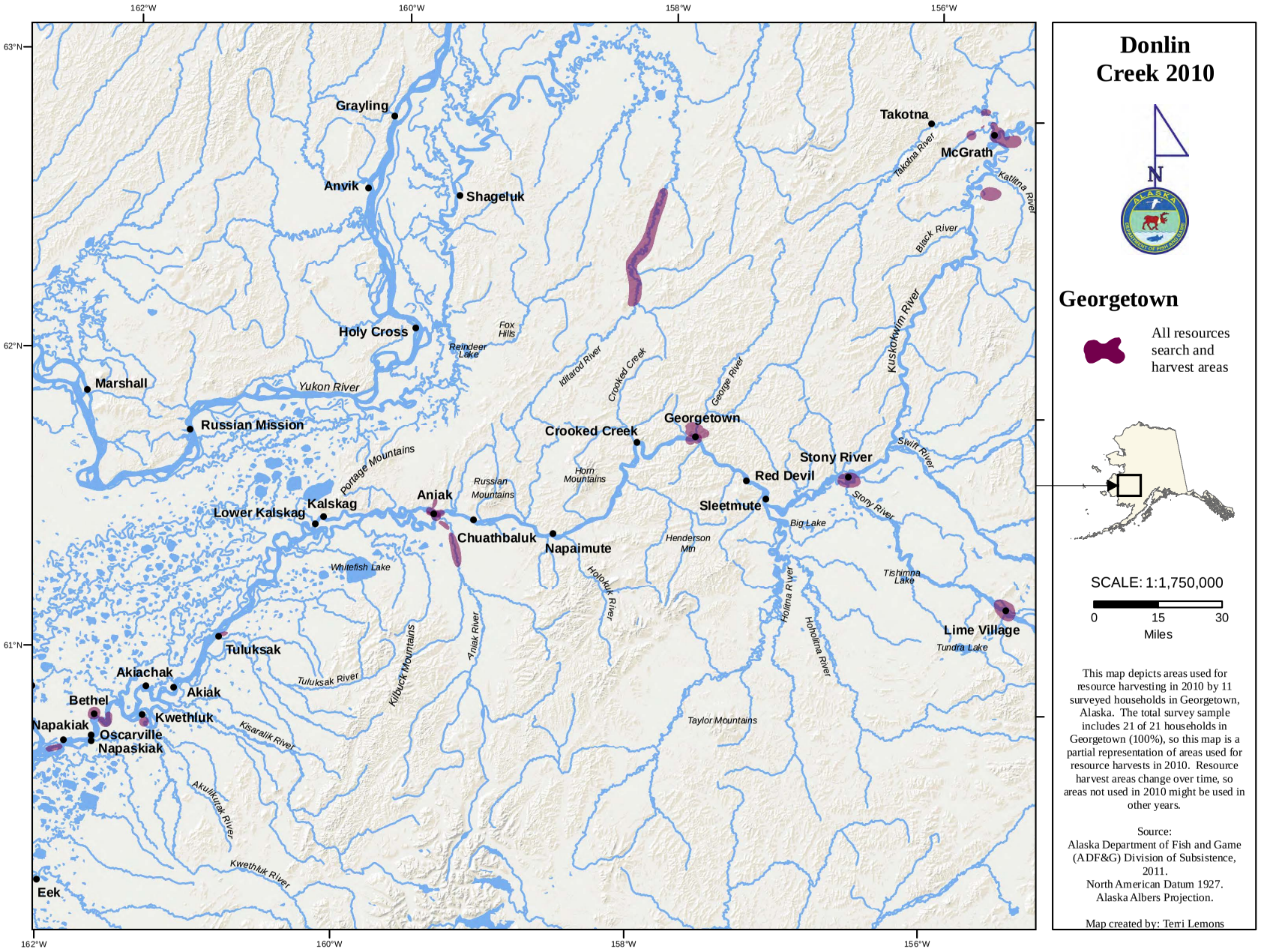

Figure 5-6.–Harvest locations and search areas, all resources, Georgetown, 2010.

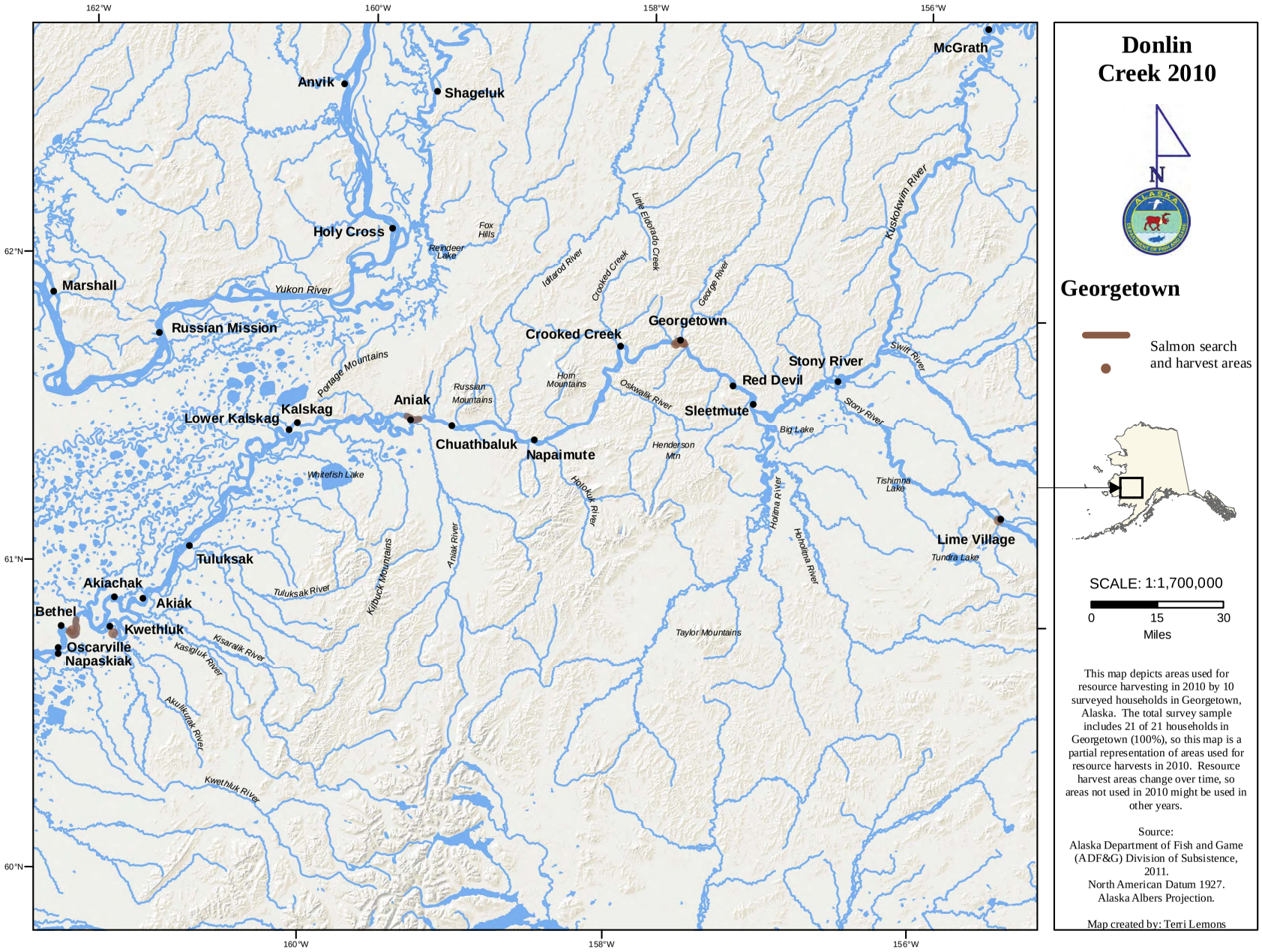

Figure 5-7.–Harvest locations and search areas, salmon, Georgetown, 2010.

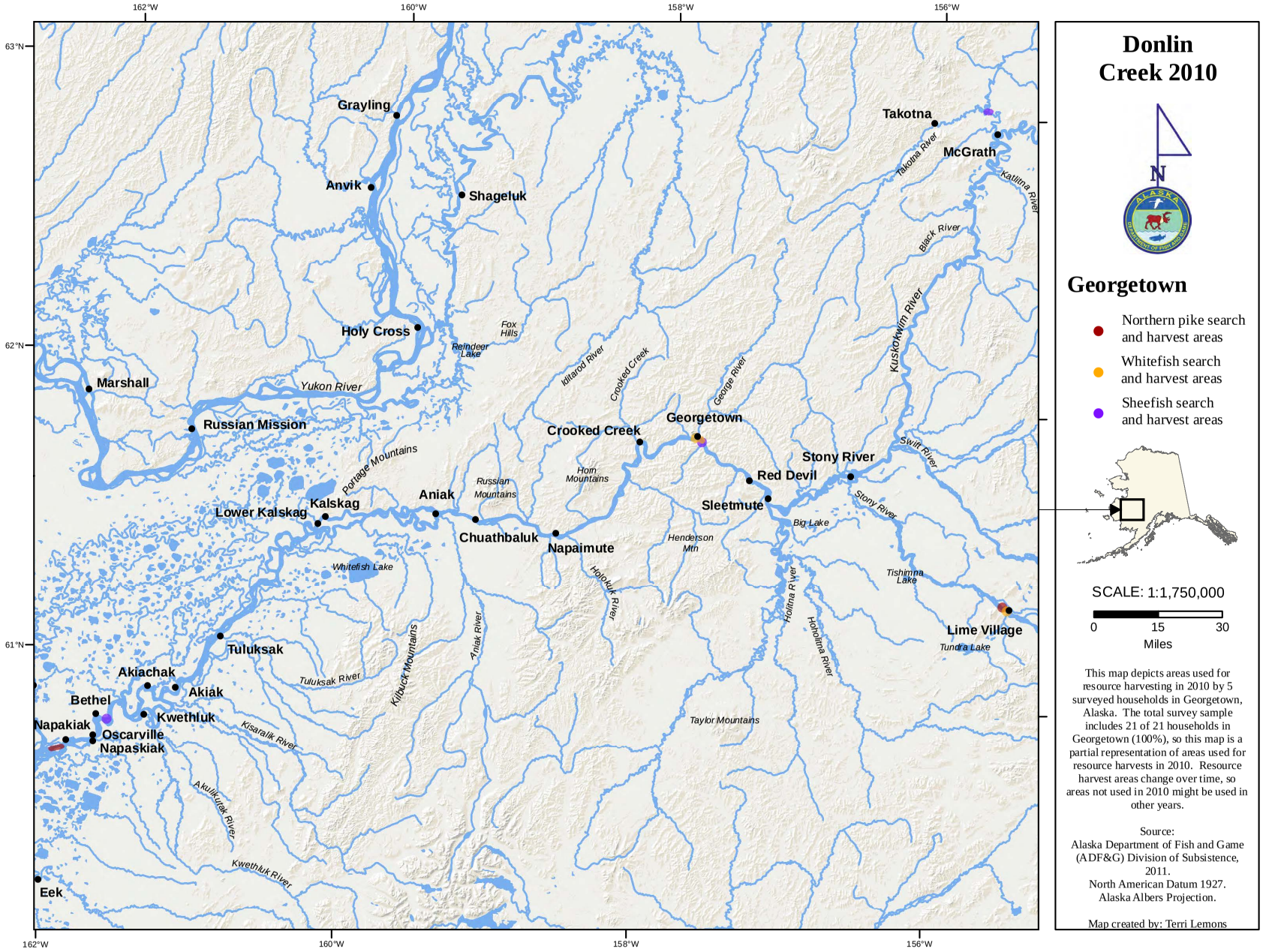

Figure 5-8.–Harvest locations and search areas, northern pike, whitefish, and sheefish, Georgetown, 2010.

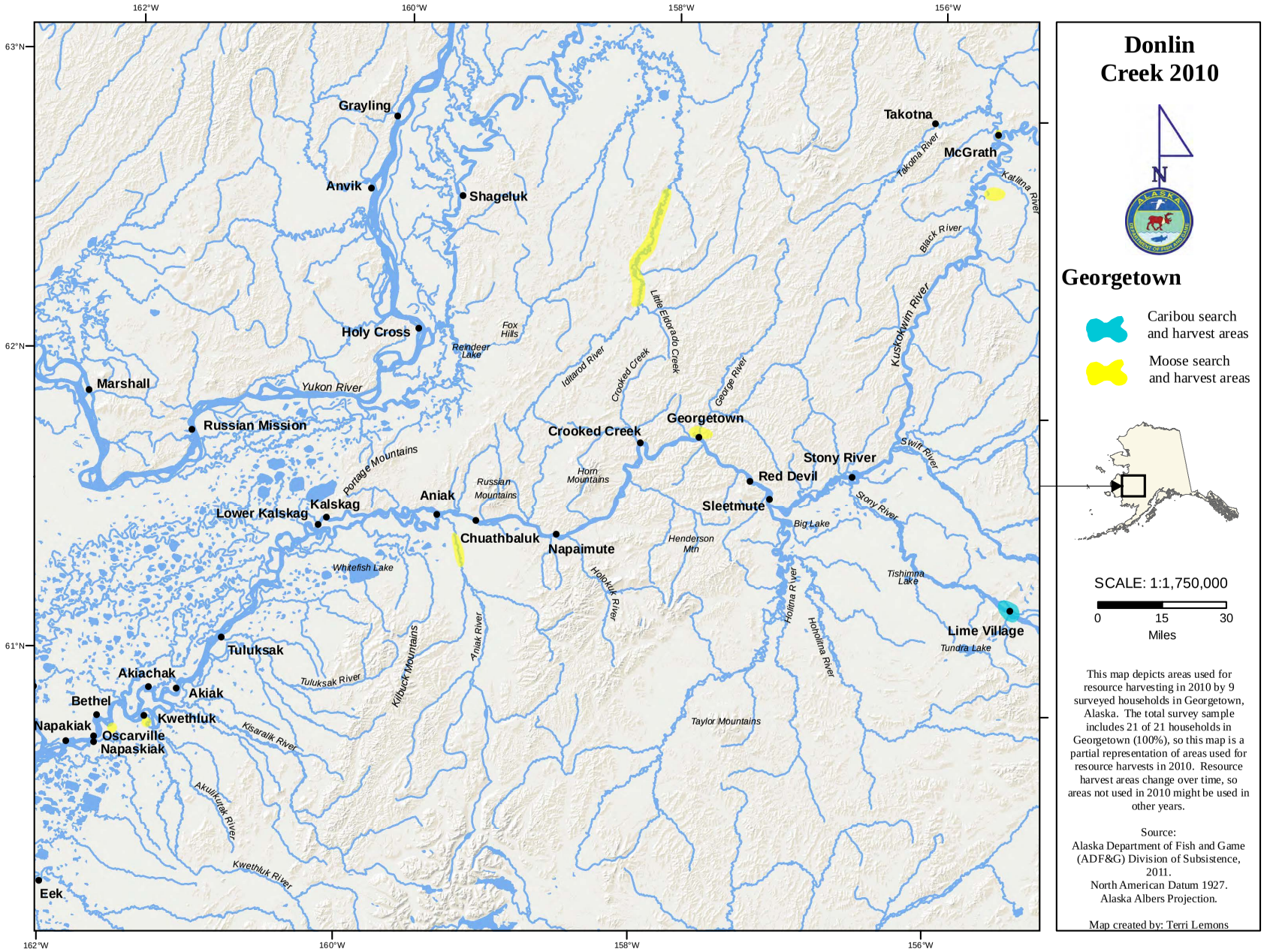

Figure 5-9.–Harvest locations and search areas, large land mammals, Georgetown, 2010.

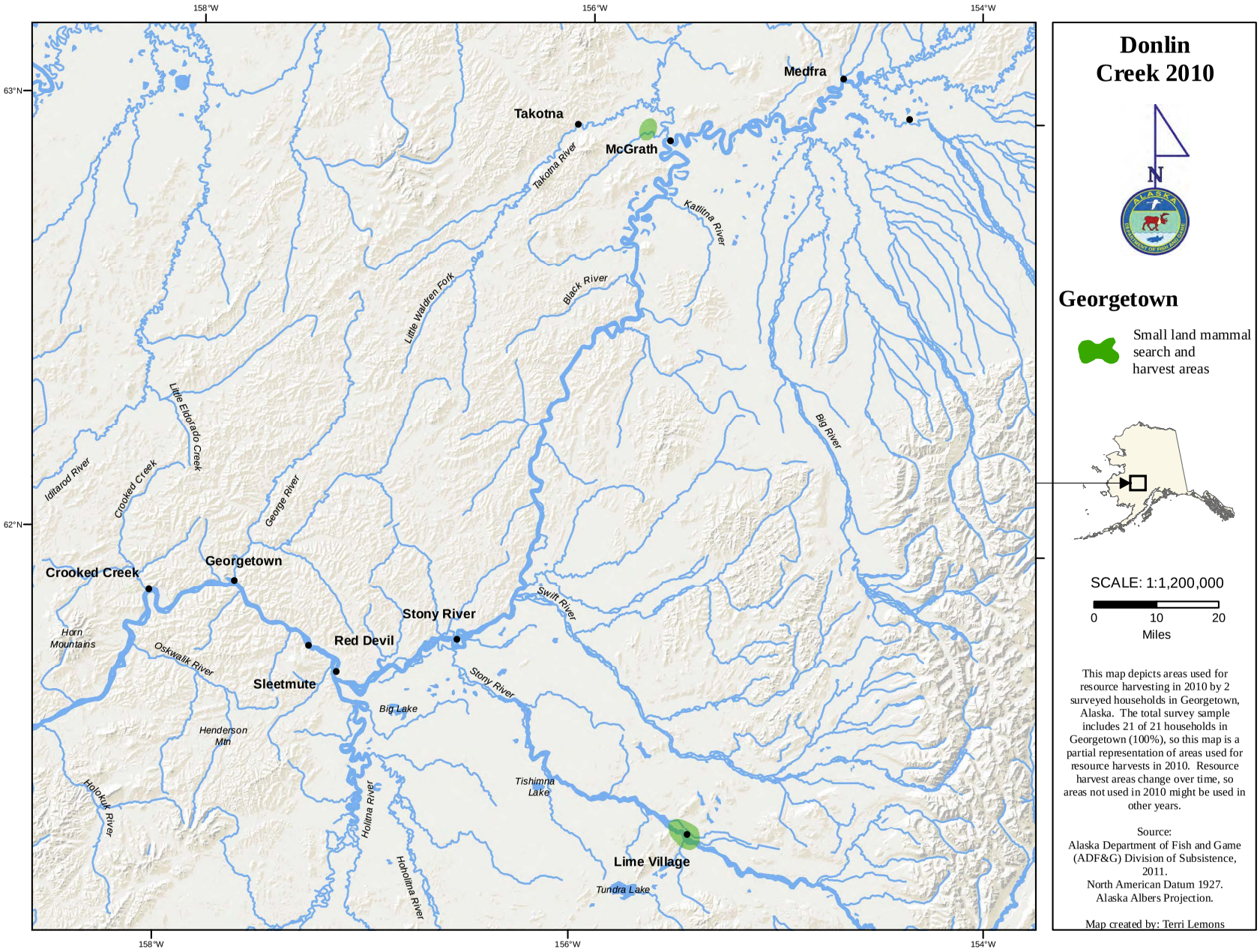

Figure 5-10.–Harvest locations and search areas, small land mammals, Georgetown, 2010.

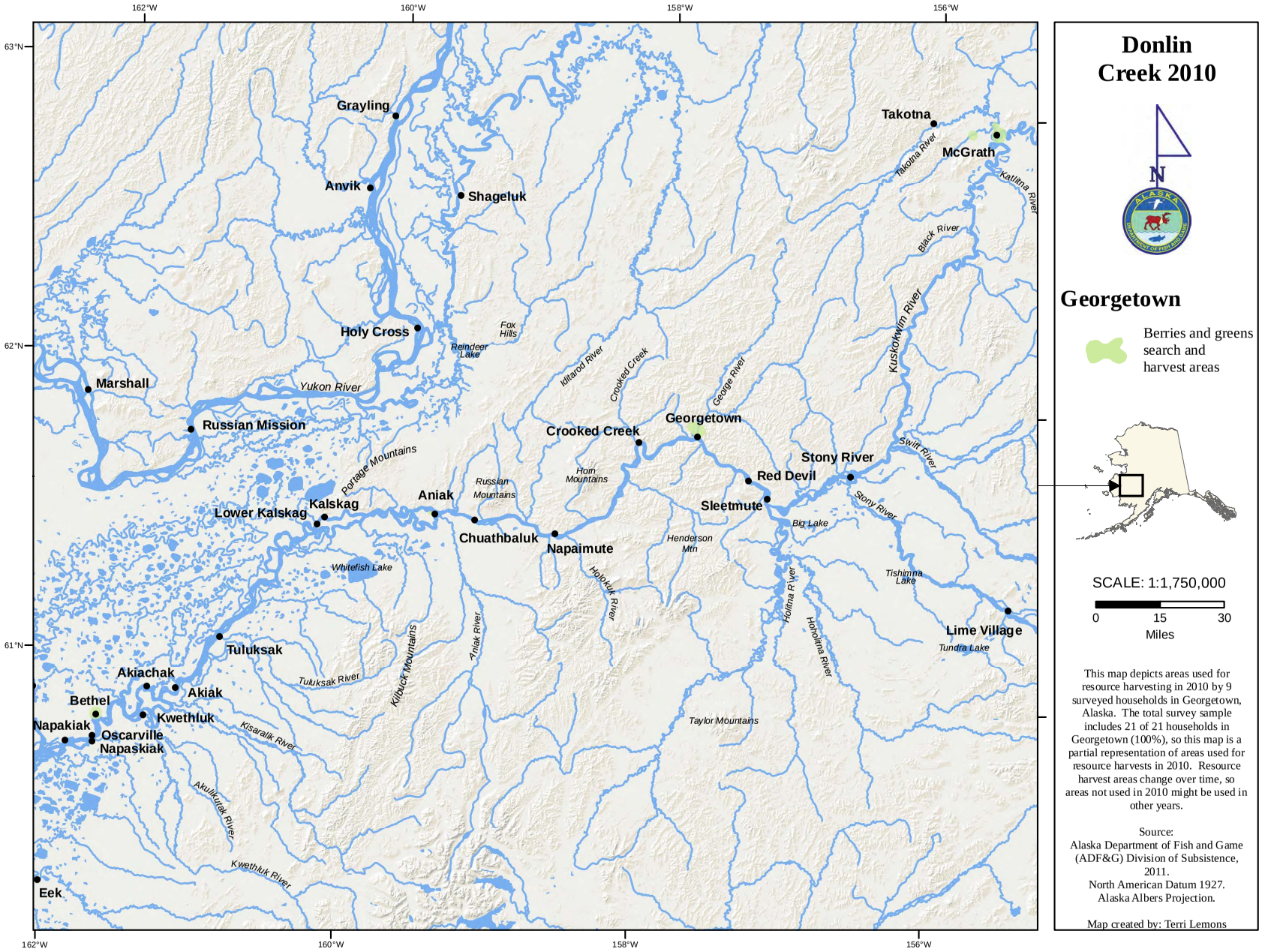

Figure 5-11.–Harvest locations and search areas, berries and greens, Georgetown, 2010.

of Georgetown tribal members who were not surveyed or were surveyed via telephone and did not indicate search and harvest areas. As such, harvest areas should only be viewed as a partial representation of Georgetown tribal members' subsistence use areas for 2010. Also, Georgetown tribal members' use of the area surrounding Georgetown is not exclusive—residents of 4 other Central Kuskokwim communities (Aniak, Crooked Creek, Red Devil, and Sleetmute) described using much of the area around Georgetown as part of their subsistence resource search and harvest areas in 2009 (Brown et al. 2012), and these data should be included in any comprehensive analysis of subsistence use areas in the vicinity of Georgetown.

Harvest Assessments

The survey asked respondents to assess their own harvests in two ways: whether they used more, less, or about the same amount of 7 resource categories in 2010 as in past years, and whether they got "enough" of each of the 7 resource categories. This section discusses responses to those questions.

For each resource category other than marine invertebrates, there was diversity in households' responses to questions that asked about more, less, or the same amount of use of resources in 2010, with at least 1 household describing less, same, and more use for each subsistence resource category (Figure 5-12). The category of salmon had the highest percentage (24%) of households describing less use in 2010 than in previous years, followed by vegetation (19%), and birds and eggs and land mammals (14% each). For vegetation, salmon, and nonsalmon fish the majority of responding households indicated that their use of the resource category was about the same in 2010 relative to previous years. Nearly one-third (29%) of households reported using more land mammals in 2010, 14% reported using more salmon and nonsalmon fish, and 10 % reported using more vegetation and marine mammals.

In addition to being asked about whether households used less, same, or more of a resource category, surveys asked respondents to assess whether they got enough of individual subsistence resource categories. For most resource categories, the majority of households that used a particular resource category indicated that they got enough of the resource category in 2010. There was, however, a smaller portion of households that indicated they did not get enough for each resource category other than marine mammals in 2010: these resource categories included salmon (19% of all surveyed households did not get enough salmon in 2010), plants and berries (14%), nonsalmon fish (10%), birds and eggs (5%), and land mammals (5%) (Figure 5-13). No Georgetown household indicated that they did not get enough marine mammals in 2010, and the majority (81%) of households indicated that they did not use marine mammals for subsistence. Similarly, 95% of surveyed households did not use marine invertebrates for subsistence, although the 5% of households that did use marine invertebrates indicated that they did not get enough in 2010.

Households that indicated that they did not get enough of a resource category were asked to describe

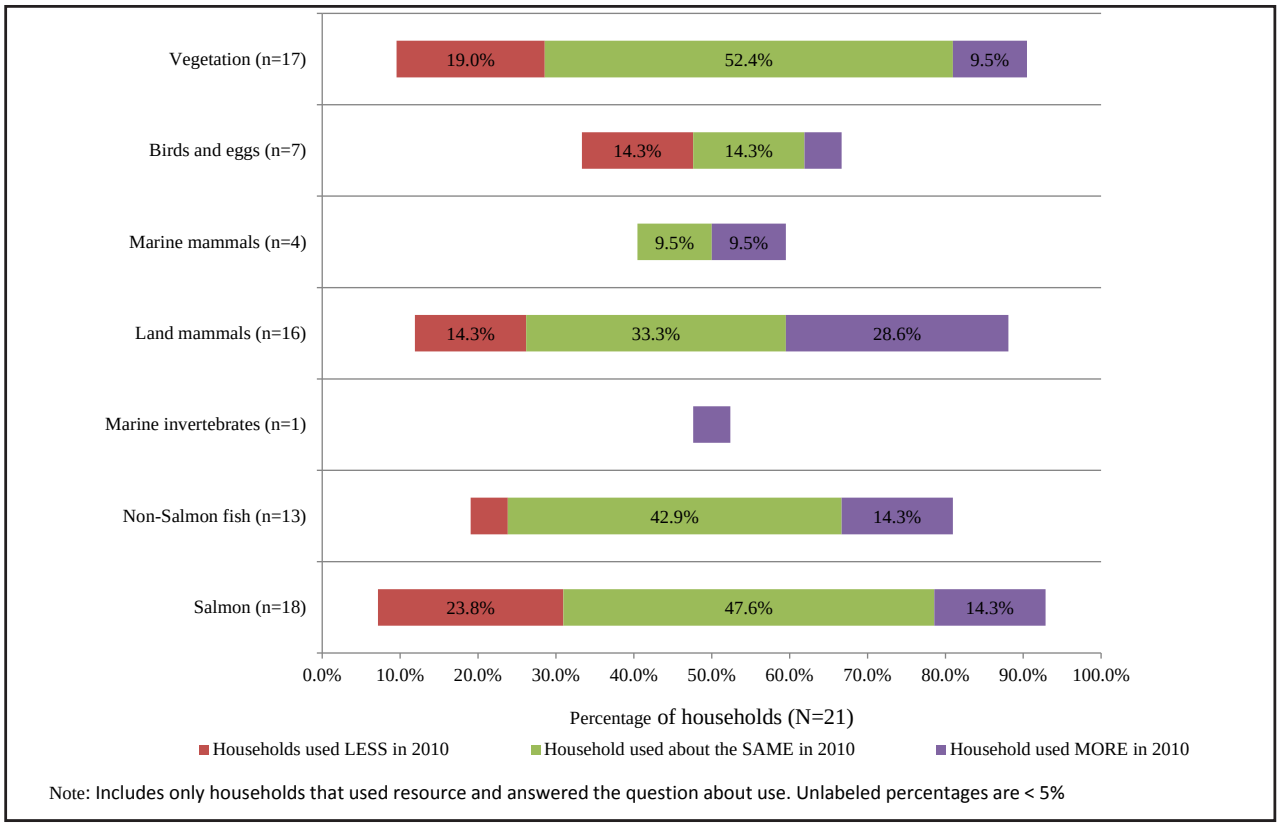

Figure 5-12.–Harvest assessments, Georgetown, 2010. Responses to the question: "Did your household use less, more, or about the same amount in 2010 as in the past?"

the impact of this insufficiency. Salmon was the resource category for which the most households (19%) reported that they did not get enough; three-quarters of these households described that not getting enough salmon had a minor impact, while 1 household indicated that not getting enough salmon had a major impact. Of those households who reported not getting enough berries and greens, about two-thirds described the impact as minor and the remaining one-third described it as major. Of those households reporting not getting enough nonsalmon fish, one-half of them described that not getting enough nonsalmon fish had a minor impact and the remaining one-half did not respond. All households that described not getting enough land mammals as well as all households not getting enough birds and eggs described the impact of these insufficiencies as minor. The impact of not getting enough marine invertebrates was described as not noticeable.

In addition to asking about individual resource categories, surveys asked whether households got enough of all subsistence resources as a separate category; 38% of Georgetown households reported that they did not get enough of all subsistence resources. However, not getting enough resources had varying effects on households—12.5% of households who answered this question described the impact as not noticeable, 75% described the impact as minor, and 12.5% described the impact as major.

Some households provided specific explanations for why they did not get enough of a resource. The

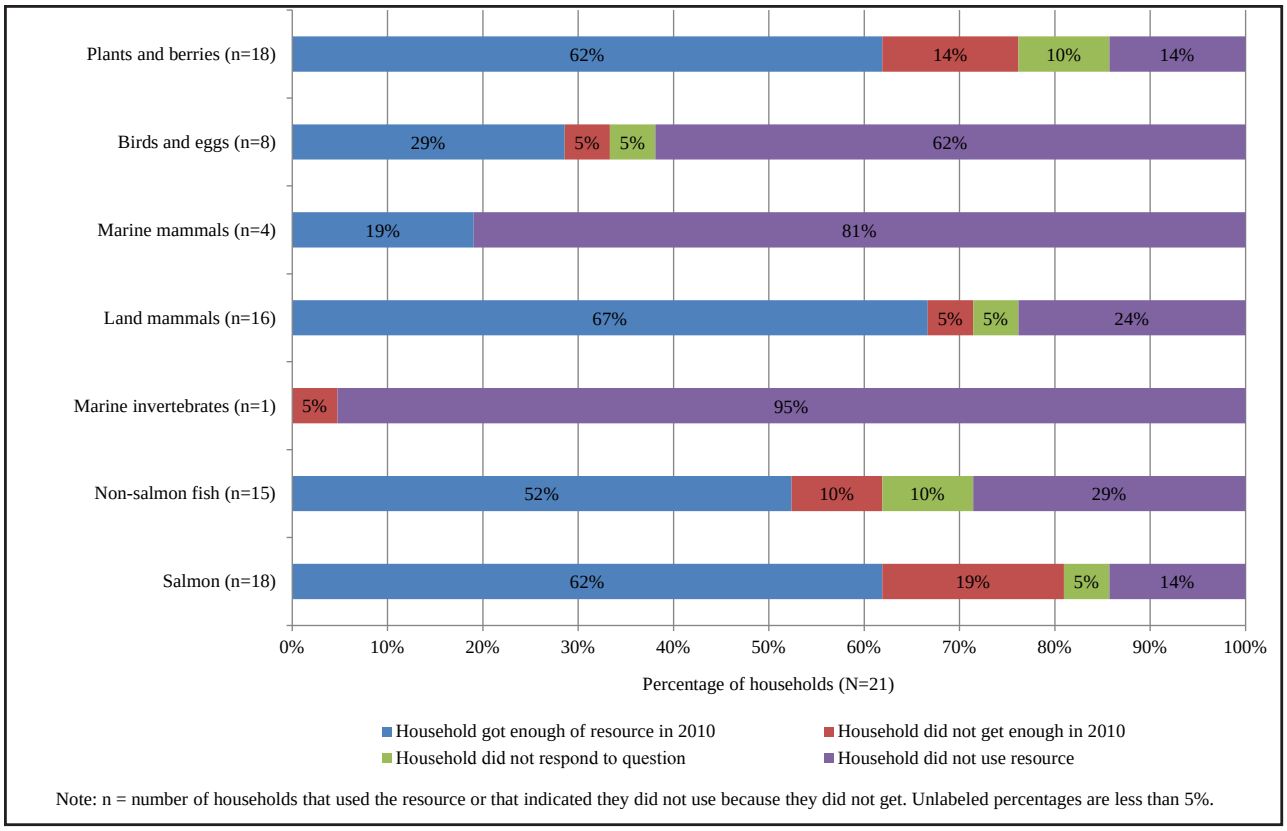

Figure 5-13.–Harvest assessments, Georgetown, 2010. Responses to the question: "Did your household get enough in 2010?"

most frequently cited reason (5 responses) was that the respondent was not given any of a particular resource by another household. A few households reported that they did not have enough time to harvest salmon or blueberries due to other obligations. Other reasons for not getting enough of a resource included a described unavailability of salmon in 2010, long distance to harvest marine invertebrates, the absence of luck in moose hunting, adverse weather conditions, and high gasoline prices.

Jobs and Income

Respondents were asked about both earned income (jobs held and wages earned by all household members 16 years old and older) and income from other sources (the Alaska Permanent Fund Dividend, Social Security, public assistance, etc.). This included all jobs regardless of location. For 2010, surveyed households earned and received an estimated $1.3 million, of which $1.1 million (89%) was from wage employment and $150,000 (11%) was from other sources (Table 5-6).

Average reported household income in 2010, including income from both employment and other sources was $61,451. The top 3 categories of income were local government, services, and transportation, communication, and utilities (Figure 5-14). Local government included work for city

Table 5-6. – Estimated earned and other income, Georgetown, 2010.

Income source	Number of people	Number of households	Total for community	Mean per household[a]	Percentage of total
Earned income					
Local government	17	11.1	$510,000	$24,286	39.5%
Services	10	6.2	$355,284	$16,918	27.5%
Transportation, communication, and utilities	5	3.7	$150,944	$7,188	11.7%
Federal government	2	1.2	$60,000	$2,857	4.6%
Retail trade	2	1.2	$55,944	$2,664	4.3%
Construction	2	1.2	$10,417	$496	0.8%
Earned income subtotal	**37.4**	**17.3**	**$1,142,590**	**$54,409**	**88.5%**
Other income					
Alaska Permanent Fund Dividend		19.0	$70,455	$3,355	5.5%
Food stamps		5.0	$22,377	$1,066	1.7%
Unemployment		2.0	$14,400	$686	1.1%
Native corporation dividend		20.0	$14,212	$677	1.1%
Social Security		4.0	$12,847	$612	1.0%
Longevity bonus		2.0	$4,591	$219	0.4%
Adult public assistance		1.0	$2,568	$122	0.2%
Energy assistance		2.0	$2,300	$110	0.2%
Citgo fuel voucher		4.0	$2,230	$106	0.2%
Disability		2.0	$1,091	$52	0.1%
Pension/retirement		1.0	$800	$38	0.1%
Supplemental Security Income		0.0	$0	$0	0.0%
Worker's compensation/insurance		0.0	$0	$0	0.0%
Veterans assistance		0.0	$0	$0	0.0%
Child support		0.0	$0	$0	0.0%
Other		0.0	$0	$0	0.0%
Foster care		0.0	$0	$0	0.0%
Meeting honoraria		0.0	$0	$0	0.0%
Other income subtotal		**2.0**	**$147,872**	**$7,042**	**11.5%**
Community income total			**$1,290,462**	**$61,451**	**100.0%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. For confidentiality, income amounts are not listed for sources reported by fewer than 4 households.

and tribal organizations. Service occupations included health care, social services, education, and tourism or guiding-related businesses.

An estimated 37 of 42 surveyed adults (90%) held at least 1 job in 2010; 82% of these were full-time positions, and 18% were part-time (less than 35 hours per week). On average, those with jobs worked 11 months of the year; the average number of weeks employed was 47. Seventy-seven percent of employed adults worked year-round. No employed adults reported having more than 1 job during 2010.

The main contributor of other income to Georgetown households was the Alaska Permanent Fund Dividend, 5% of total community income, which paid $1,281 to eligible Alaska residents in 2010

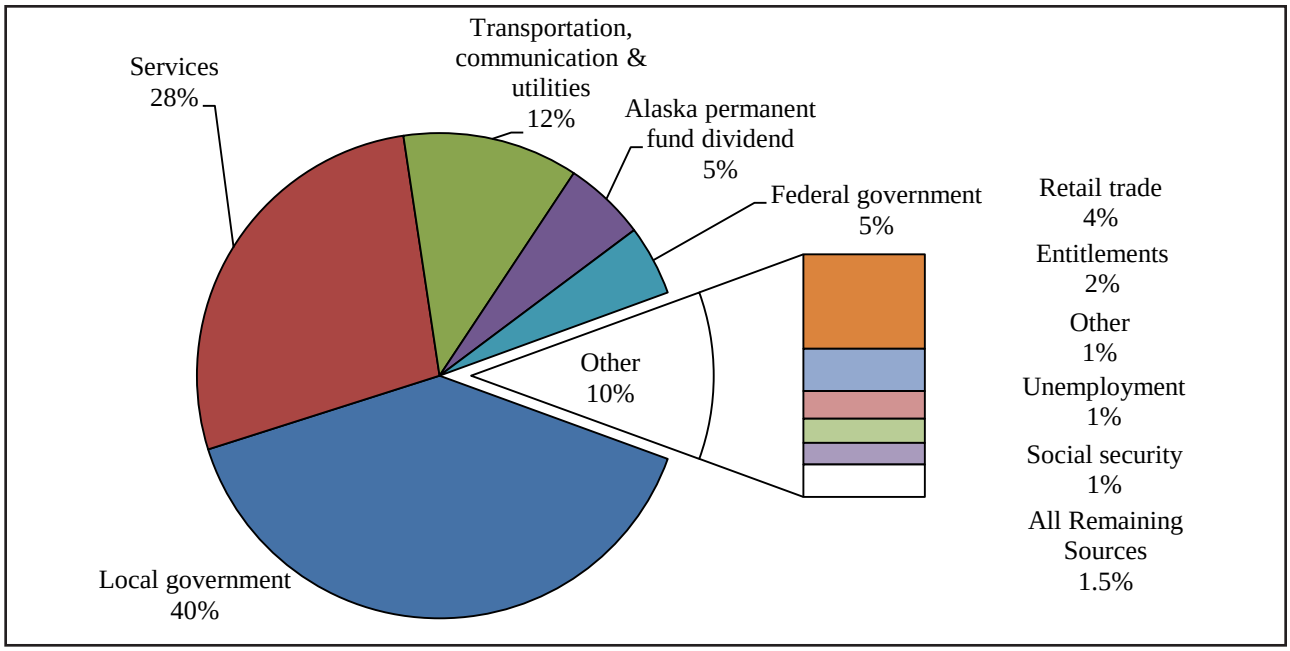

Figure 5-14.–Top 10 income sources ranked by estimated amount, Georgetown, 2010.

(Table 5-6). Food stamps (Qwest Card) made up just 2%, and unemployment, social security, and Native corporation dividends each contributed around 1% to total community income.

Food Security

Respondents were asked a short series of questions intended to assess their household's food security, that is, "access by all people at all times to enough food for an active, healthy life" (Nord et al. 2009:2). The food security questions were modeled on questions developed by the USDA, modified by ADF&G to account for differences in access to subsistence and store-bought foods. Core questions and Georgetown responses are summarized in Figure 5-15A.

Based on their responses to these questions, households were categorized as having high, marginal, low, or very low food security following a USDA protocol (Bickel et al. 2000). Eighty-six percent of surveyed Georgetown households in 2010 had high or marginal food security; USDA considers households in both categories to be "food secure." Of the remaining households, 10% had low food security and 5% had very low food security, closely reflecting reported food security levels from across Alaska and the United States in 2010 (Figure 5-15B). The most frequent food insecurity condition in Georgetown involved subsistence foods: 38% of households indicated that their subsistence foods did not last in 2010 (Figure 5-15A).

Households with high food security did not report any indications of food access problems or limitations. Households with marginal food security were those that reported 1 or 2 instances of food access problems or limitations, typically anxiety over food sufficiency or shortage of food in the

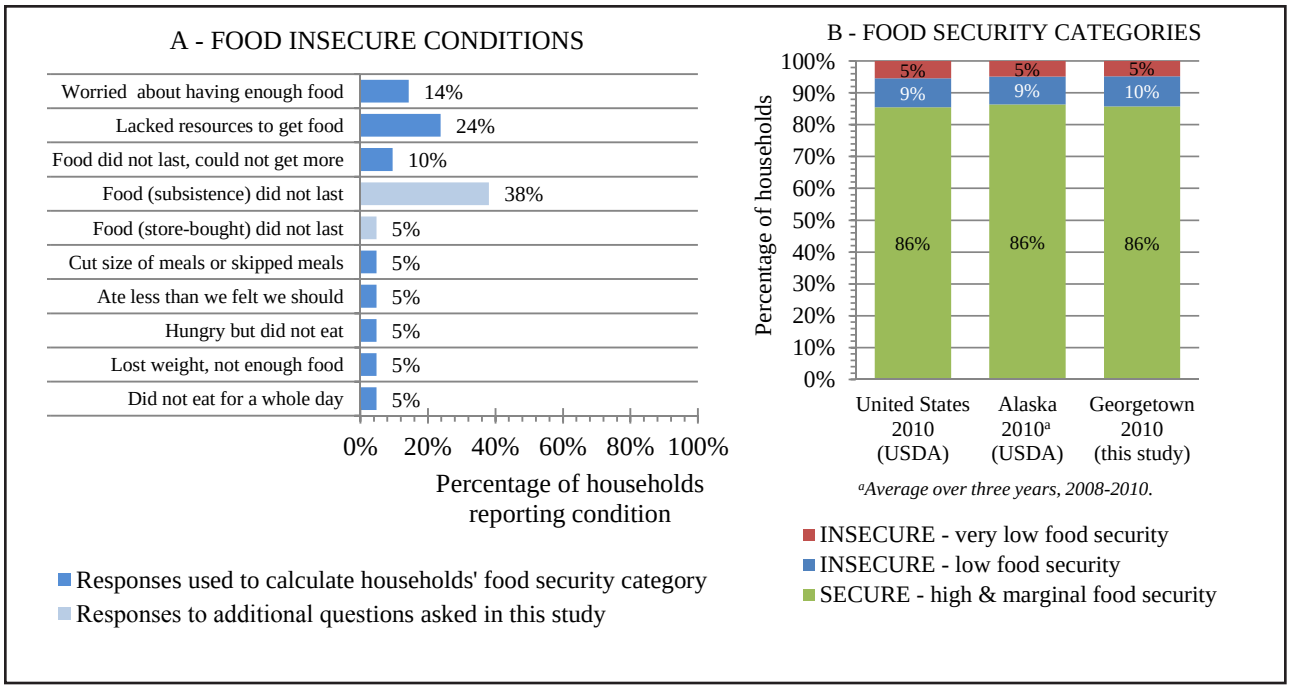

Figure 5-15.–Food security results, Georgetown, 2010.

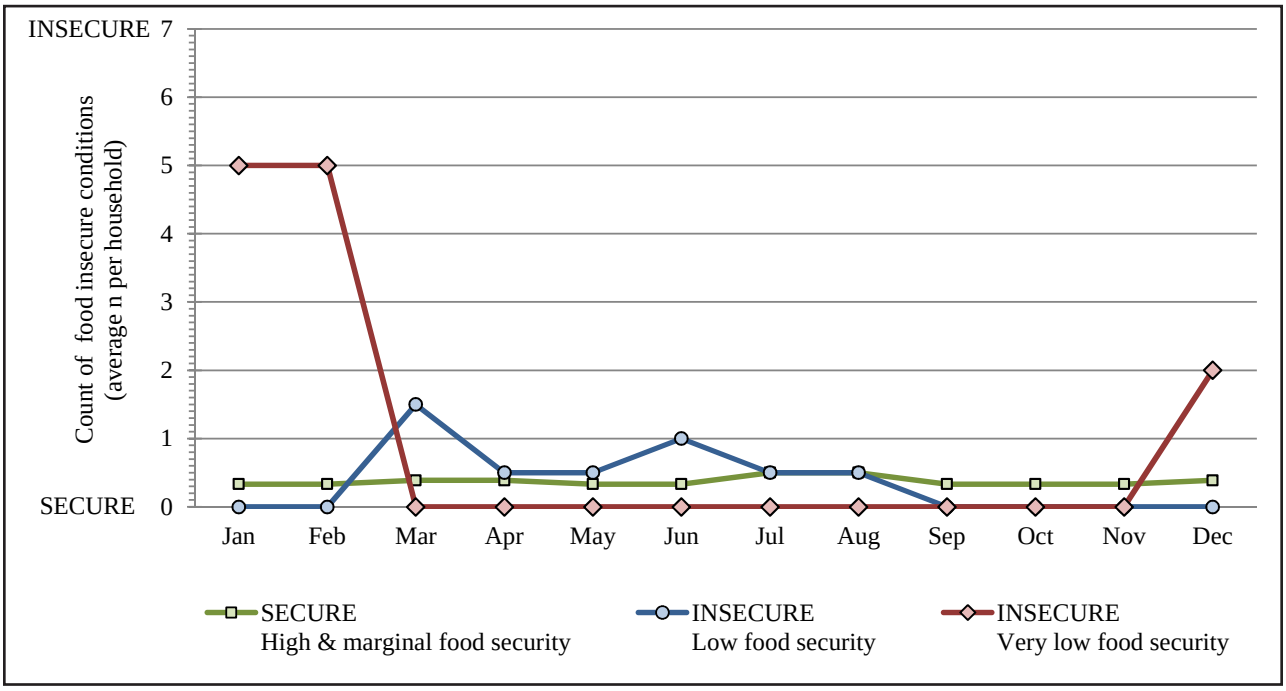

Figure 5-16.–Food insecure conditions by month and by household category, Georgetown, 2010.

house; they gave little or no indication of changes in diets or food intake. Households with low food security were those that reported reduced quality, variety or desirability of their diet; they, too, gave little indication of reduced food intake. Households characterized as having very low food security were those that reported multiple instances of disrupted eating patterns and reduced food intake (USDA 2011).

Food insecurity for some Georgetown households may be linked to time of year. The most food insecure households (those characterized as having very low food security) reported more food insecure conditions in winter months (December, January, and February) of 2010 than other months (Figure 5-16). Households characterized as having low food security showed a different pattern from those with very low food security, indicating more food insecure conditions throughout spring and summer months from March through August. Households having high or marginal food security showed very little variation between months in number of food insecure conditions.

Wild Food Networks

For each resource category on the survey form, respondents were asked, "Last year, who caught the (resources) your households used?" and "Last year, who processed the (resources) your household used?" For each response to these questions, respondents were asked to indicate whether their own household, another household living in Georgetown, or a household living in another community helped process or gave the resource to their household. Although one of the original goals of the survey was to describe sharing of subsistence resources among Georgetown respondents, limitations of the survey design (i.e., surveys asked respondents to describe receiving of resources from households living in Georgetown rather than from Georgetown tribal members, although no one lived permanently in Georgetown during the study year) probably resulted in limitations to capturing more comprehensive patterns of sharing between widely distributed Georgetown tribal members.

Altogether, Georgetown households received subsistence resources or helped process subsistence resources from at least 18 different communities located throughout Alaska, and 90% of surveyed households received resources or helped process subsistence resources from other households in and outside of their residence communities. Due to the small population of Georgetown tribal members in several communities and the potential for such households to be readily identifiable within these communities, confidentiality concerns prevent the inclusion of a figure displaying sharing of subsistence resources in this report. Generally, the highest harvesting Georgetown households were represented by individuals or couples between 30 and 59 years old. High harvesting, mature households tend to be central to food distribution networks in communities defined by a shared permanent residence (Magdanz et al. 2002:60). The fact that this typical pattern was not represented in the network data for Georgetown provides another indication that the survey design perhaps did not accurately capture complex or less common food sharing patterns of this unique community.

Comparisons with Prior Results

This was the first comprehensive subsistence harvest survey conducted by ADF&G for Georgetown as a community. Georgetown respondents' subsistence harvest patterns in 2010 can be compared to some extent with limited harvest data collected in the Central Kuskokwim region in the 1980s as well as to subsistence harvest data from communities neighboring Georgetown collected in 2009 by ADF&G (Brown et al. 2012). However, Georgetown's unique status as a seasonally occupied community in 2010, with respondents distributed throughout numerous communities in the Kuskokwim River drainage and elsewhere in the state of Alaska, requires that the data presented in this report be interpreted as only a partial representation of the subsistence harvests from the Georgetown area and use of subsistence resources by respondents belonging to the tribal council.

The Alaska Department of Fish and Game completed a subsistence food survey in the Central Kuskokwim region in 1979 that quantified moose harvests and included Georgetown as a study community (Jonrowe *n.d.* [c1980]). Only 1 Georgetown household, out of the 2 households in 1979, was surveyed in this study, and 1 moose was harvested by this household during the study year. A follow-up study was completed 2 years later, and although Georgetown was not surveyed as a separate community, 2 Georgetown households (respondents lived in Georgetown) were surveyed incidentally to surveying efforts in nearby Red Devil (Stickney 1981:6). This study described percentages of households using resources for the community of Red Devil (with the 2 Georgetown households' harvest information incorporated into Red Devil's community harvest information): Red Devil households used moose (80% of households), caribou (40%), bear (60%), salmon (100%), other fish (40%), beaver (50%), furbearers (60%), small game (100%), waterfowl (40%), berries (40%), and wood (70%).

While these community use data are not directly comparable with community use data collected specifically for Georgetown for 2010, moose and salmon were described as the "most important items in the food supply of most middle Kuskokwim village households," (Stickney 1981:22) and these results are consistent with Georgetown households' use levels of moose (71%) and salmon (86%) in 2010. To the extent that Georgetown respondents' subsistence harvests in the Georgetown area are determined by resource availability and local use patterns, Georgetown respondents' subsistence harvests probably reflect those of neighboring Red Devil and Crooked Creek (see Brown et al. 2012).

However, Georgetown's status in 2010 as a community with no permanent residents probably influenced several differences in the harvest data between Georgetown and neighboring communities. Permanently occupied communities generally show more regular harvest of subsistence resources throughout the year while Georgetown respondents' harvests of subsistence resources in the Georgetown area occurred primarily in summer and fall months. Permanently occupied communities also generally have extensive search and harvest areas located around that community. Georgetown in 2010 showed relatively restricted use of the area surrounding Georgetown, as well as use of areas surrounding a relatively high number of other communities. Consequently, permanent residency

of the Georgetown area in the past (as well as potential resettlement of the Georgetown area in the future) would likely be related to more extensive land use areas around Georgetown for subsistence. Additionally, permanent resettlement in the Georgetown area could potentially lead to higher harvest and use levels of resources generally more abundant in winter and spring months (e.g., furbearers in winter and waterfowl in spring); Georgetown tribal members in 2010 were mostly living outside of the Georgetown area during these seasons.

The harvest data in this report must be viewed within the contexts of Georgetown tribal members' complex patterns of occupancy of the Georgetown area in the past and potential future changes in occupancy. The 2010 subsistence harvest data presented in this report capture interannual variability in harvest levels and species composition; variability that may be considerable in this area given fluctuations not only in the population of permanent residents, but in accessibility, fuel prices, and local economic opportunity. In spite of these fluctuations in the Georgetown area during the past century, the harvest and use of subsistence resources in this area by Georgetown residents has persisted.

6. Comprehensive Survey Results Kwethluk, 2010

Prepared by Seth Wilson

In April 2011, researchers surveyed 93 of 155 households (60%) in Kwethluk. The surveyed households reported harvesting 152,179 edible pounds of wild foods between January and December 2010. Expanding for 62 unsurveyed households, Kwethluk's estimated total harvest of wild foods in 2010 was 259,699 lb (±17%). The average harvest per household was 1,676 lb; the average harvest per person was 364 lb.

In 2010, the top 10 harvested species were diverse, although one harvest category—salmon—encompassed the top 3 harvested species (Figure 6-1). Chinook salmon composed 20% of the community's harvest with 5,459 salmon taken by resident fishers. Sockeye and chum salmon equaled 10% each of the community's edible harvest. The next 2 largest harvests by weight were humpback whitefish (10%) and northern pike (9%), both of which were commonly used for human and dog consumption. Three mammals—moose (7%), caribou (6%), and bearded seal (3%)—were also among the top 10 most harvested resources. Salmonberries composed 2% of the total edible pounds harvested.

This chapter summarizes findings from the household surveys, including demographic characteristics, responses to harvest assessment questions, harvest estimates, and employment, income, and food

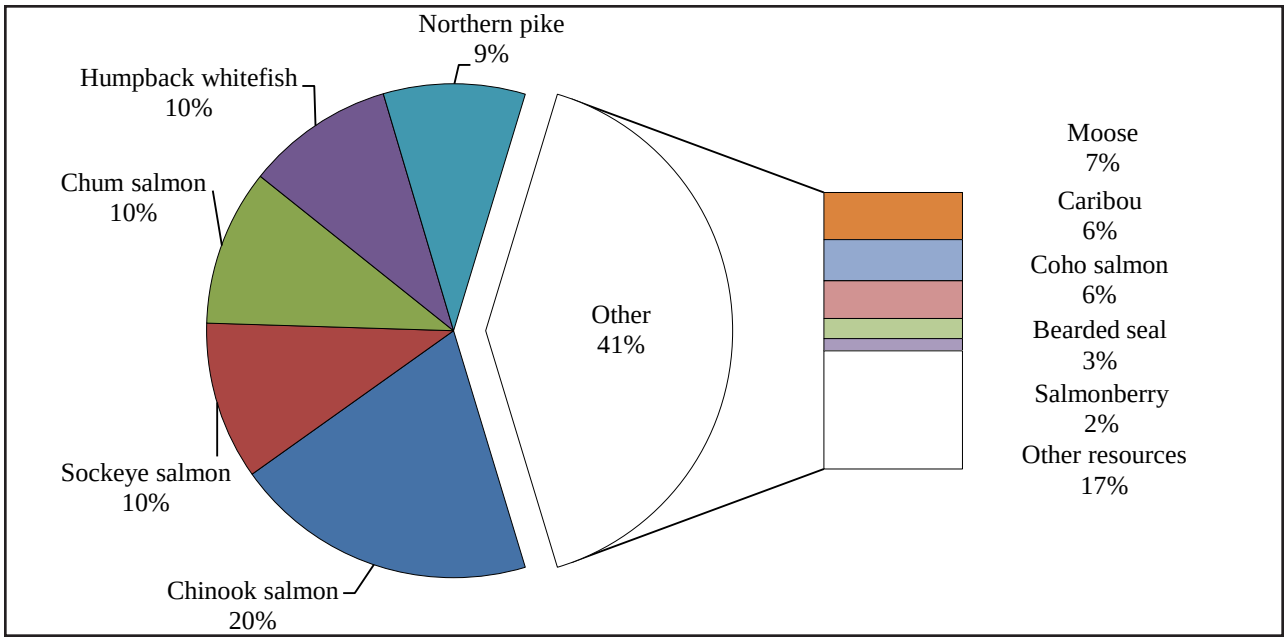

Figure 6-1.–Top 10 species harvests ranked by estimated edible weight, Kwethluk, 2010.

security data. Harvest numbers are expanded estimates. Results from this survey are available online in the Division of Subsistence CSIS.

This chapter also describes results from households' land use mapping and the ethnographic component of the study. During the household surveys, surveyors created 88 maps depicting the search areas and fishing locations of all resources pursued by individual households. These maps were amalgamated to create the community use maps in figures 6-10 through 6-17. Furthermore, 8 ethnographic interviews were conducted (2 women and 6 men) discussing historical land use and occupancy mapping to create a contemporary and historical context for the harvest estimates and subsistence practices in the Kwethluk area more generally. All interviewed respondents were active subsistence harvesters, community leaders, and knowledgeable elders speaking about community history, resource use changes and continuity, and contemporary concerns.

About Kwethluk

The current town site of Kwethluk is located 11 air-miles east of Bethel and 390 miles west of Anchorage, on the south side of the Kwethluk River and adjacent to the Kuskokuak Slough. The traditional community name derives from the original Yup'ik name, *Kuiggluk*, for the Kwethluk River, meaning "bad river." Respondents said the name refers to the difficulty and dangers in navigating the river.

The community has a strategically central location among the Lower Kuskokwim River region communities and has experienced rapid, albeit sporadic, population growth since the late 19th century. In the 1940s, the community reorganized under the Indian Reorganization Act (IRA) (Oswalt 1980). The 6-member IRA council, referred to as the Organized Village of Kwethluk, continues to meet regularly to oversee the tribe's interests. Kwethluk was incorporated as a second class city in 1975 with a mayor and a 6-member city council responsible for administering the washeteria and refuse services, a city police force, and a library. Health services are provided by the Betty Guy Memorial Clinic and K–12 public education is provided at the Ket'acik Aap'alluk Memorial School (ADCCED 2011b). Kwethluk Incorporated, the village corporation established through ANCSA, administers the 12(a) lands selections and also operates an electric generator that provides electricity to the village (Coffing 1991). Kwethluk is not on the state highway system and relies on air transportation year-round. Fuel and supplies are transported via barge in the summer months, and there is a regularly maintained ice road along the Kuskokwim River during the winter.

Kwethluk, sandwiched between the Kuskokuak Slough and the Kwethluk River at an elevation of 30 feet, is bordered by a forest of alders, willows, and cottonwood trees. Immediately surrounding the village are wetlands, typical of the Yukon–Kuskokwim Delta, and rolling tundra that gives way to the foothills of the Kilbuck Mountain Range. The closest prominent geographic feature is Three Step Mountain, which is located approximately 22 miles south of the community. The Kilbuck Mountains

Photograph courtesy of Anchorage Museum, Ickes Collection.

Figure 6-2.–Historical aerial view of the original portion of Kwethluk with the Kwethluk River in the foreground and the foothills of the Kilbuck Mountains visible in the distance, 1938.

are distant and relatively low—elevation does not exceed 5,000 feet—but they are an important component of the history and identity of Kwethluk's people, which will be discussed in the "Seasonal Round" section below. Figure 6-2 portrays a historical aerial view of Kwethluk.

Human occupation extending into the prehistoric era has been well established in the Kwethluk and Kisaralik River drainages (Ackerman 1980). Field surveys, funded by the National Geographic Society, were conducted in 1979 and again in 1992 in an attempt to determine a pattern of resource use during the last 10,000 to 15,000 years. Researchers' primary assumption was that prehistoric sites would be located along broad valleys and interior lakes favorable to caribou migration and prehistoric travel. Lithic scatterings were discovered on the previously unglaciated lower reaches of the Kisaralik and Kwethluk rivers, which could have supported occupations as early as 10,000 years ago. A significant fall hunting camp and lookout site consisting of 4 separate areas was detected on a long ridge of Spein

Mountain southeast of Kwethluk. The Spein Mountain complex produced lithic technology (i.e., stone tools) found in similar sites in northern Alaska dated between 11,660 BP and 9,730 BP (Ackerman 1996). Further archeological sites were found near Heart Lake, Canyon Creek, and Crooked Creek of the upper Kwethluk River drainage.

Reconstructing the history of the Kwethluk area and the Lower Kuskokwim River region in general is complicated by the lack of early, professional ethnographic data, numerous population fluctuations over time, and infrequently conducted population censuses. The contemporary community is located in the area historically inhabited by the *Kusquqvagmiut*. Early ethnographic literature (Zagoskin 1967; Nelson 1983) focuses a great deal on cultural designations, implying that each identity group is an independent sociopolitical group with well-defined territorial boundaries. However, in her article concerning the regional groupings of the Yukon–Kuskokwim Delta, Ann Fienup-Riordan (1984) reconceived distinct cultural groups as territorially centered confederations, rather than discretely bounded tribes, dispersed through a number of small, seasonal settlements of 50 to 250 people.

Unlike Central Kuskokwim River region communities, whose contact with Euro-American people was precipitated by the Russian fur industry, and later the Orthodox Church as early as 1842, the Lower Kuskokwim River settlements did not experience sustained outside contact until the arrival of Moravian missionaries in the late 19th century. Competing interests from the Russian Orthodox Church sent Deacon Vasilii Orlov to scout for a suitable mission site in 1886. He suggested Kwethluk for its close proximity to the Kuskokwim Bay and its timbered land. Church leadership chose, instead, to establish the first Kuskokwim Mission in the present-day community of Chuathbaluk (Brown 1983). John Kilbuck, the leading Moravian missionary, stationed lay helpers in Kwethluk beginning in 1890 and built a small chapel in 1896 (Oswalt 1980). The first Russian Orthodox chapel was constructed in 1912. The last brief phase of outside exploration occurred from placer mining interests that had very little enduring influence on local history (Brown 1983).

The first school in Kwethluk was opened in 1922 and was operated by the Alaska Native Services. The Moravian mission opened a children's school in 1939. The site, referred to in historical texts as *Nunapitsinchak*, was selected to house orphaned and unruly children, and was selected for its location away from Bethel and for its source of fresh water (Oswalt 1980:66). The school was phased out in 1973, but the chapel, dormitories, and superintendent's house still remain.

In 1920, Yup'ik herders formed the Kuskokwim Reindeer company that managed herds such as the one near Kwethluk (Skinner 2009). Ownership of the herd was issued to local residents in the form of stock certificates. Bureau of Indian Affairs (BIA) records indicate that Kwethluk villagers owned approximately 31,000 reindeer by 1939 (Oswalt 1980:49). Reindeer herding was an important part of the Lower Kuskokwim River region economy. Figure 6-3 shows reindeer that are gathered in a corral near Akulikutak River in the late 1930s; reindeer skins are stretched out for drying in the bottom center of the photograph. Many respondents still own original stock certificates, and have ancestors

Photograph courtesy of Anchorage Museum, Ickes Collection.

Figure 6-3.–Reindeer herded into a corral possibly near Akulikutak River, 1938.

that were reindeer herders in the tundra south of Kwethluk. Mismanagement and the difficult lifestyle of reindeer herding led to the dissipation of the herds; however, respondents noted that the corrals still exist south of Three Step Mountain and along the Akulikutak River.

The history and development of Kwethluk has led to a diverse population that will be discussed in depth in the "Demographics" section. In 1953, BIA records indicated that, in addition to the use of seasonal camps in the area, early residents moved to Kwethluk from as many as 5 permanent Kuskokwim communities (Oswalt 1980). In 1986, Kwethluk residents hailed from as many as 10 Kuskokwim River and coastal communities (Coffing 1991). This study documented that as many as 17% of the residents currently living in Kwethluk came from Kuskokwim River, Yukon River, and Arctic region communities, in addition to major metropolitan centers in Alaska and outside of the state and the United States.

Seasonal Round

The following is an account of the historical and contemporary seasonal harvests and activities, beginning with late winter and continuing the entire round of seasons, until the end of the year. The seasonal round in Kwethluk is diverse and varies among the different inhabitants that moved there to herd reindeer or moved from smaller mountain communities or other Yukon–Kuskokwim Delta villages. This section is based largely on the 8 ethnographic interviews conducted with Kwethluk residents.

In late January and early February, after daylight increases but before the snow softens, respondents recounted that their parents and grandparents would make the overland journey to the Kilbuck Mountains to harvest Arctic ground squirrels. This had been a long tradition, and respondents recalled that their parents made the trip by dogsled or foot, ascending the Kwethluk River to campsites near the headwaters of the Togiak, Eek, Kwethluk, and Nushagak rivers. One respondent recalled first making the trip with a dogsled from Kwethluk to his family's camp in Heart Lake, a straight-line distance of 77 miles (032211KW1). His parents were reluctant to take him out of school so they would leave in March and stay in the mountains until the rivers were free of ice.

> This is pretty sacred to them. That was their hunting ground. They used to take care of that you know. That's our garden back there. Like the ocean, people from the coast, the ocean is their garden. Our elders that used to go up there … beavers and moose and mountain squirrels. Whatever they catch has to last until the fish come. (032211KW4)

Respondents expressed that the principal aim of this trip was to harvest Arctic ground squirrels for use in parkas. Squirrels were harvested in large quantities—the meat salted and dried for storage. Respondents reported bundling 40 squirrel skins, the amount to make one parka, in a bundle for transport back to Kwethluk. When asked if Arctic ground squirrel pelts were a trade item, one respondent said no, that they were mostly used by the people of Kwethluk (032111KW2).

While in the mountains, families also took the opportunity to harvest resources that were not available near Kwethluk. Respondents described how their childhood chores often included harvesting squirrels and trapping other furbearers, provided that they remained close to camp for safety (032211KW4). Their fathers would travel farther, even as far as the Holitna River, in search of furbearers such as minks, wolverines, and martens. Respondents reported that near breakup, families migrated from their individual camps to a location called *Kassugllaq,* meaning where the rivers join, before they made the journey home (032111KW2). This river fork, at the confluence of the Kwethluk and Crooked rivers, was reportedly special for an alder wood patch—trees were harvested to construct skin boat frames used to float down the Kwethluk River. Using the skins from bears, moose, or later canvas when large game became scarce, skin boats were made large enough to float multiple families, their dogs, their harvests of squirrel pelts, and their belongings all the way to Kwethluk.

These winter trapping trips to the Kilbuck Mountains continued into the 1950s and 1960s, according to respondents, until travel technology began to change. After snowmachines replaced dogsleds, trips became less frequent and some families chartered aircraft, until that became prohibitively expensive, to go to the high mountain lakes (032211KW1). Some residents still use snowmachines to make the journey, but only for trips of short duration in the late winter months. In contemporary Kwethluk, the late winter months are reserved for "hooking" northern pike, whitefishes, and burbot through the ice near the community and making short trips to harvest ptarmigans.

As the lakes and sloughs open up in April, warmer air brings migrating waterfowl and geese to the wetlands south of Kwethluk. Residents take this opportunity for a change in diet and make short boat trips up the Kwethluk River to harvest various species of geese and ducks. Respondents reported mostly making the short hunting trips with family, primarily young children, and staying out from 1 to 3 days (031911KW5). An elder described spring geese hunting as an opportunity to get out when he feels restless after a long winter (032411KW7). Also, in April, some men make longer boat trips to Kuskokwim Bay to harvest ringed and spotted seals and visit kin. Seals are hunted close to where the ice shelf meets the open ocean. The meat is brought back and is widely distributed in the community.

Summers in Kwethluk revolve around salmon fishing. In May, just before the salmon return, Kwethluk residents fan out to camps along the Kuskokwim River, Kuskokuak Slough, and Kisaralik and Kwethluk tributaries to harvest and process salmon. Elder respondents recalled that salmon fishing has changed through the course of their lives. In their youth, there were camps large enough to support an extended family of multiple households and as many as 3 smokehouses. Now, while fish camps continue to flourish along the Kwethluk River and Kuskokuak Slough, they generally support only one nuclear family each. Then as now, fish camps are cleaned and any improvements made in May before the salmon return. Fishers make short trips to harvest smelts with dip nets, which precede the salmon run. Nets are set at the beginning of June and the first catches alert community fishers to the arrival of Chinook salmon. Many fish species such as northern pike, whitefishes, and sheefish

are incidentally taken at this time as the salmon runs increase in intensity. Many fishing groups have switched to driftnetting to increase their harvest of salmon. According to respondents, chum salmon run congruently with Chinook salmon, followed by sockeye salmon and then coho salmon. Respondents recalled fishing with wooden boats and small motors, often motoring up the Kuskokwim River and using oars to drift down, until about the 1980s (032111KW2). In Kwethluk, families endeavor to attain their harvest goal of salmon by early July to take advantage of better drying conditions.

From the singular focus of salmon fishing in the summer, attention then turns to the myriad of harvest opportunities in the fall—chief among them being large land mammal hunting. All key respondents reported that their parents used to travel upriver, to places including the Aniak River, the Holitna River drainage and the community of McGrath, in search of moose. Though found locally, moose are scarce and very difficult to access in the Kwethluk and Kisaralik drainages. Many residents make the long trip upriver, leaving GMU 18 in which Kwethluk is located, to search for moose, while opportunistically harvesting black bears, visiting family, and picking berries. Federal and state regulations have affected this practice because of conservative moose management practices in GMU 19A (see Brown et al. 2012). Restrictions on private land access, conservative management, and the prohibitive cost of gas have led to less travel upriver. Only one respondent was able to hunt in GMU 19A through a Tier II permit.[1]

Local opportunities exist for moose hunting through federal and state registration hunts; however, respondents indicated that hunting pressure is high close to Bethel and that the season is limited in length. One respondent took advantage of the winter hunt in GMU 21E because he had been unsuccessful in the local registration hunt the previous years (032411KW6). The importance of fall hunting opportunities is illustrated through other resources taken opportunistically during the moose hunting seasons. Respondents said that even if they did not harvest a moose, they were usually lucky in harvesting other resources on hunting trips such as migrating geese, bears, reindeer, and trout (031911KW5, 032211KW4, 032411KW6).

October and November bring colder temperatures and river freeze-up. The pace of activity slows down from the previous months except for a few select activities. Some residents set traps under the ice for blackfish, and others set nets under the ice to harvest whitefish.

Demographics

The 93 surveyed households included 428 people. Expanded for the 62 unsurveyed households, this study estimates the population of Kwethluk to be 713 individuals (Figure 6-4). The mean household size was recorded as 4.6 occupants per dwelling with a maximum number of 10 individuals. The mean age in Kwethluk was 28 years old, the eldest resident being 88 years of age, and the average length

1. Tier I and II subsistence permits are available to Alaska residents only and may be issued when there is not enough game for a general season and the population of animals has been found by the Board of Game to support customary and traditional uses.

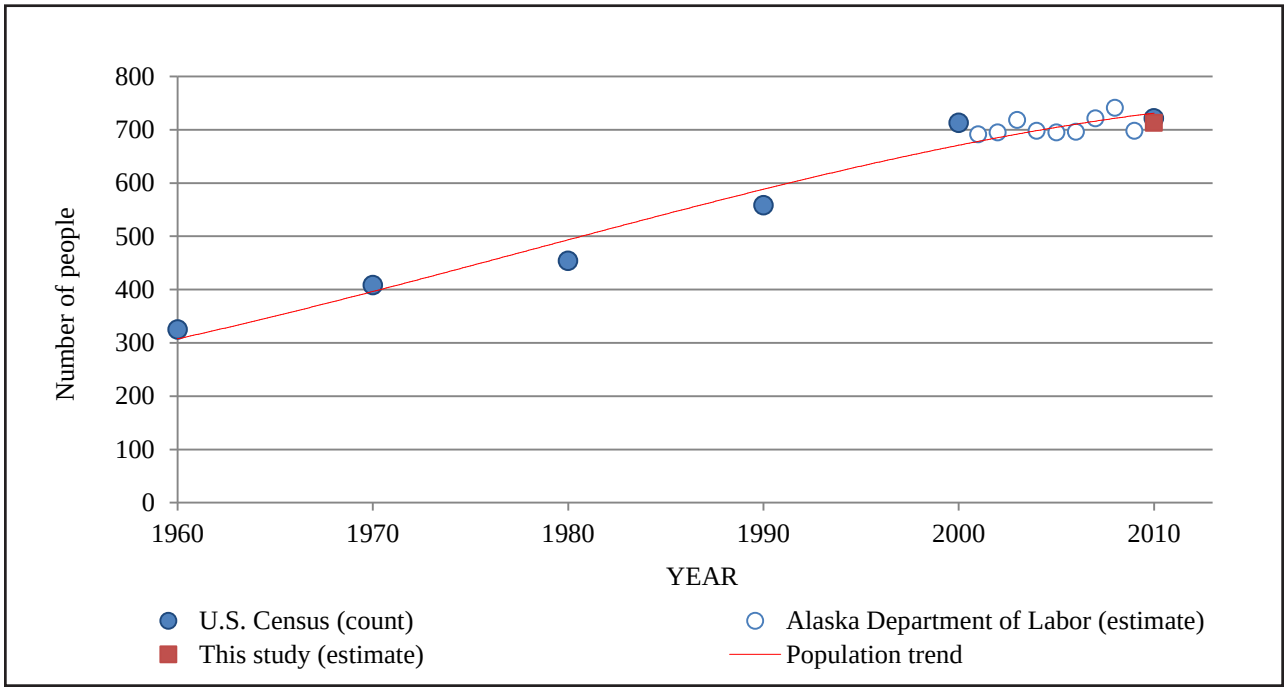

Figure 6-4.–Population history, Kwethluk, 1960–2010.

of residency of heads of households was 24 years. This study estimated the population of Kwethluk to be 98% Alaska Native. For comparison, the United States Census Bureau's decennial estimate for 2010, portrayed as blue dots in Figure 6-4, was 721 individuals in Kwethluk.

Figure 6-5 is a population profile expanded from the respondent households that reflects a young, growing population with the majority of its residents in the 0–24 age cohorts. The genders are fairly balanced with 52% of the population male and 48% female. Forty-eight percent of the entire population is below the age of 20. This estimate is consistent with a 1986 estimate of 45% of the population being 20 years of age or younger (Coffing 1991:39).

Wild Food Use and Harvests

The primary purpose of the household survey was to collect information about the harvest and use of edible wild foods. Respondents were asked whether their household used or tried to harvest each resource during the study year. If they tried to harvest a resource, they were asked how much they caught and for other details of the harvest such as gear type, sex of the animal, or month of harvest. Figure 6-6 shows an ADF&G researcher collecting harvest and use information.

Tables and figures in this section summarize responses to the harvest questions. The importance of subsistence in Kwethluk is reflected in the high harvest and use levels of subsistence resources; every household in Kwethluk used and 97% of households harvested at least one wild food resource in 2010. Kwethluk households collectively harvested 106 different species and 97% of households

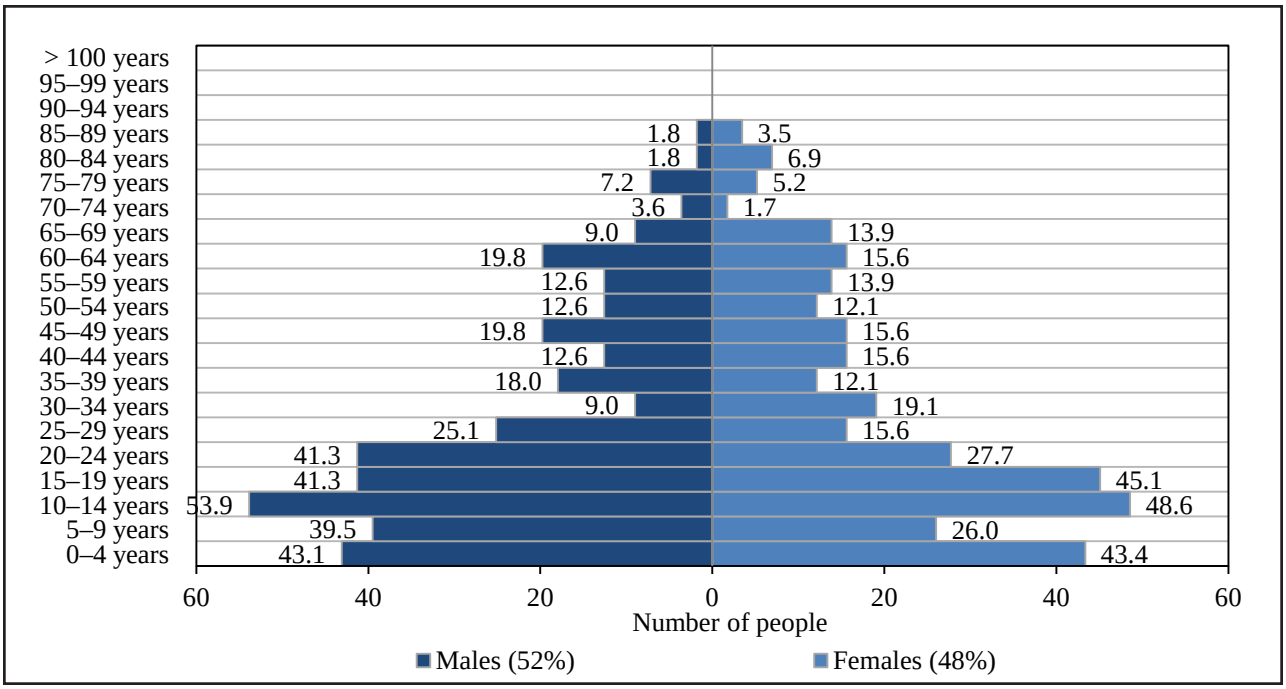

Figure 6-5.–Population profile, Kwethluk, 2010.

participated in at least one harvesting activity. Owing to some households' specialization in the subsistence economy, a relatively small proportion of the households (27%) harvested most (70%) of the subsistence harvest.

Figure 6-7 portrays household use, harvest, and attempted harvest for all wild resources. The most widely used resources were salmon and land mammals, both of which were used by 98% of Kwethluk households. Vegetation had the third highest use levels of all resource categories with 95% of households using some type of vegetation, and the highest harvest rate with 94% of households harvesting vegetation. Harvest rates were also high for nonsalmon fish species (75% of households) and salmon (70%). Reflecting these high use and harvest rates, fish formed the bulk (70%) of Kwethluk's wild food harvest by edible weight in 2010. Participation, conservatively defined as those households that attempted to harvest a resource, is shown by the peach-colored middle column, and is generally less for specialized harvesting activities such as large game hunting. A sizable difference between the number of households attempting to harvest a species and the number of households reporting a successful harvest can indicate the presence of regulatory, ecological, or economic obstacles. This is especially true for moose. Specific examples will be explored in the "Harvests Assessments" section below. Although land mammals and vegetation were used by nearly all households during the study year, they contributed relatively smaller percentages (15% and 4% respectively) to the total 2010 wild food harvest by edible weight. This illustrates the difference between the percentage of households participating in harvesting activity or using a resource and how much that resource contributes to the

Figure 6-6.–An ADF&G researcher surveys a Kwethluk community member, 2010.

overall diet. Due to this difference, Figure 6-7 should be considered alongside Figure 6-8 in order to keep the use of a resource versus its contribution in edible weight in perspective. Other important resources harvested and used in 2010 included marine mammals (61% use, 17,747 edible pounds harvested) and birds and eggs (90% use, 9,097 edible pounds).

Kwethluk fishers harvested a total of 121,514 edible pounds of salmon in the summer of 2010, which was 47% of the 2010 harvest of all wild resources (Table 6-1). The subsistence salmon fishery is highly focused on Chinook salmon; residents harvested 51,525 lb of Chinook (5,459 individual fish, or 42% of all salmon by weight). Sixty-six percent of households reported attempting to harvest Chinook salmon, and all of these were successful in harvesting at least 1 Chinook salmon, though their ability to reach their household harvest goal varied among families. The next most frequently harvested salmon species—sockeye salmon—totaled approximately 26,871 lb harvested (22% of all salmon by edible weight), or about half of the Chinook salmon harvest. Key respondents discussed their personal and familial salmon preferences and the specific uses they have for each salmon species.

> Most of that was dog salmon. We feed that to the dogs. Most of what our parents use for consumption was the kings and they like, most of the people, especially the elders, really prefer the chums instead of the reds and kings. They get some kind of allergic reaction or

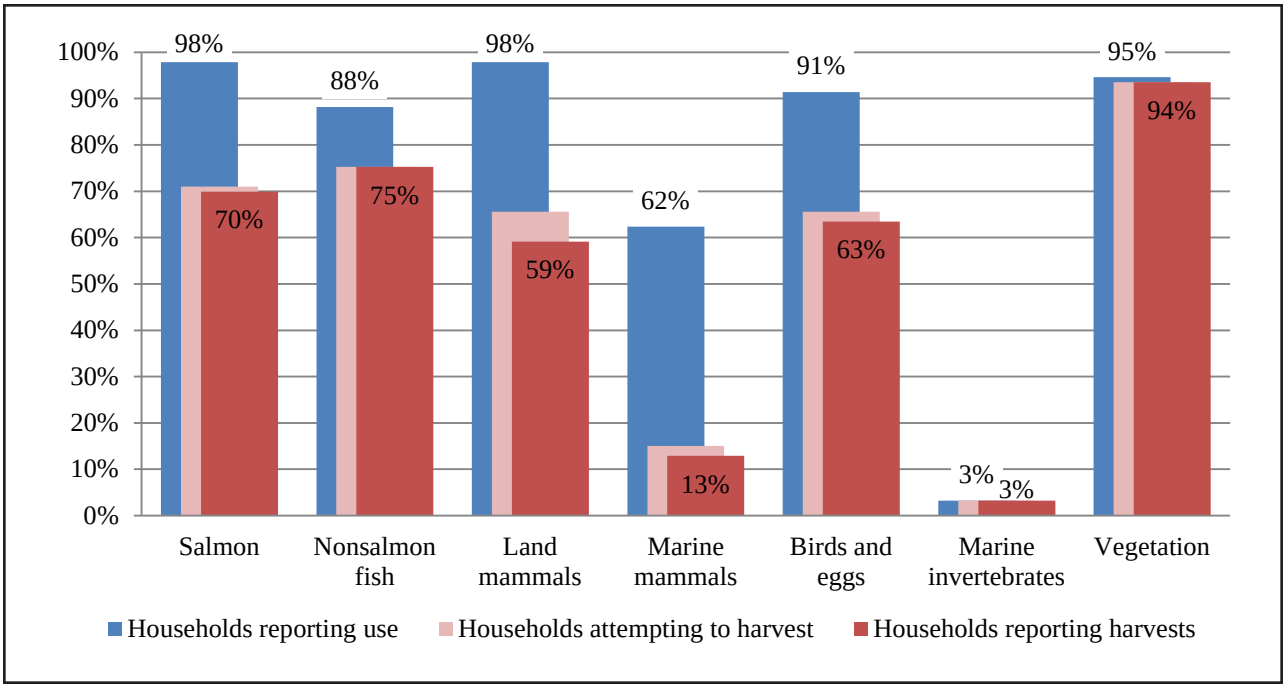

Figure 6-7.–Percentages of households using, attempting to harvest, or harvesting subsistence resources by category, Kwethluk, 2010.

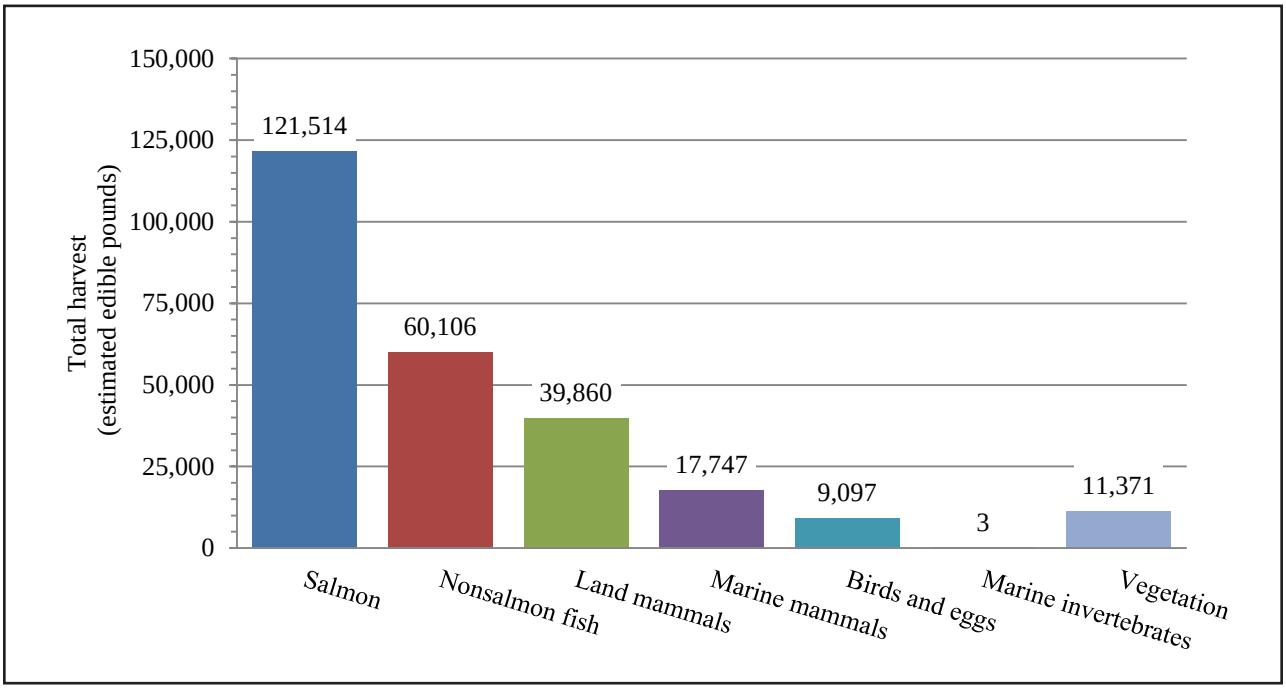

Figure 6-8.–Total estimated edible pounds harvested by the community by resource category, Kwethluk, 2010

Table 6-1. – Estimated uses and harvests of fish, Kwethluk, 2010.

	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		
Fish										
Salmon										
Chum salmon	72%	54%	52%	35%	34%	26,590.0 lb	171.5 lb	37.3 lb	5,230.3 ind.	± 30%
Coho salmon	57%	42%	41%	30%	24%	15,688.9 lb	101.2 lb	22.0 lb	2,967.2 ind.	± 35%
Chinook salmon	95%	66%	66%	51%	43%	51,525.4 lb	332.4 lb	72.2 lb	5,458.7 ind.	± 20%
Pink salmon	13%	11%	11%	5%	2%	838.5 lb	5.4 lb	1.2 lb	358.3 ind.	± 56%
Sockeye salmon	67%	52%	49%	28%	31%	26,870.8 lb	173.4 lb	37.7 lb	5,332.2 ind.	± 35%
Unknown salmon	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**98%**	**71%**	**70%**	**56%**	**48%**	**121,514 lb**	**784.0 lb**	**170.3 lb**	**19,347 ind.**	**± 22%**
Char										
Dolly Varden	14%	11%	11%	4%	3%	146.6 lb	0.9 lb	0.2 lb	162.9 ind.	± 71%
Lake trout	2%	1%	1%	2%	1%	140.0 lb	0.9 lb	0.2 lb	100.0 ind.	± 126%
Subtotal	**14%**	**11%**	**11%**	**4%**	**3%**	**287 lb**	**1.8 lb**	**0.4 lb**	**263 ind.**	**± 76%**
Trout										
Rainbow trout	12%	9%	9%	4%	2%	257.1 lb	1.7 lb	0.4 lb	183.6 ind.	± 69%
Unknown trout	1%	1%	1%	0%	1%	93.3 lb	0.6 lb	0.1 lb	66.7 ind.	± 126%
Subtotal	**13%**	**10%**	**10%**	**4%**	**3%**	**350 lb**	**2.3 lb**	**0.5 lb**	**250 ind.**	**± 60%**
Whitefish										
Sheefish	26%	17%	16%	12%	8%	1,520.0 lb	9.8 lb	2.1 lb	253.3 ind.	± 52%
Broad whitefish	43%	28%	28%	25%	13%	1,210.9 lb	7.8 lb	1.7 lb	864.9 ind.	± 38%
Bering cisco	5%	4%	3%	2%	1%	70.5 lb	0.5 lb	0.1 lb	50.4 ind.	± 93%
Least cisco	14%	12%	10%	6%	4%	81.1 lb	0.5 lb	0.1 lb	81.1 ind.	± 62%
Humpback whitefish	74%	48%	47%	41%	16%	25,123.7 lb	162.1 lb	35.2 lb	8,374.6 ind.	± 76%
Round whitefish	8%	5%	5%	3%	3%	740.0 lb	4.8 lb	1.0 lb	1,480.0 ind.	± 90%
Unknown whitefish	2%	1%	1%	2%	0%	2.3 lb	0.0 lb	0.0 lb	1.7 ind.	± 126%
Subtotal	**81%**	**55%**	**53%**	**48%**	**22%**	**28,749 lb**	**185.5 lb**	**40.3 lb**	**11,106 ind.**	**± 67%**
Anadromous/marine fishes										
Herring	13%	0%	0%	13%	1%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Smelt	25%	17%	17%	9%	5%	3,701.1 lb	23.9 lb	5.2 lb	616.8 gal.	± 49%
Cod	10%	0%	0%	10%	1%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Saffron cod	2%	0%	0%	2%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Pacific halibut	20%	3%	3%	18%	3%	21.7 lb	0.1 lb	0.0 lb	21.7 lbs.	± 99%
Arctic lamprey	0%	1%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Stickleback (needlefish)	2%	1%	1%	2%	0%	0.3 lb	0.0 lb	0.0 lb	0.1 gal.	± 126%
Sturgeon	1%	1%	1%	0%	0%	56.7 lb	0.4 lb	0.1 lb	1.7 ind.	± 126%
Subtotal	**41%**	**20%**	**20%**	**29%**	**9%**	**3,780 lb**	**24.4 lb**	**5.3 lb**		**± 47%**
Other fish										
Alaska blackfish	18%	9%	9%	13%	6%	731.7 lb	4.7 lb	1.0 lb	731.7 lbs.	± 87%
Burbot	42%	33%	32%	19%	13%	1,938.4 lb	12.5 lb	2.7 lb	807.7 ind.	± 27%
Arctic grayling	15%	13%	13%	4%	4%	144.4 lb	0.9 lb	0.2 lb	206.3 ind.	± 58%
Northern pike	59%	55%	55%	16%	24%	24,125.4 lb	155.6 lb	33.8 lb	5,361.2 ind.	± 29%
Longnose sucker	1%	1%	1%	0%	0%	1.2 lb	0.0 lb	0.0 lb	1.7 ind.	± 126%
Subtotal	**72%**	**65%**	**63%**	**29%**	**31%**	**26,941 lb**	**173.8 lb**	**37.8 lb**		**± 27%**
All fish	**98%**	**85%**	**85%**	**73%**	**58%**	**181,620.0 lb**	**1,171.7 lb**	**254.6 lb**		**± 20%**
All resources[b]	**100%**	**97%**	**97%**	**99%**	**77%**	**259,698.5 lb**	**1,675.5 lb**	**364.1 lb**		**± 17%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

> something. Too rich, they say it's the oil. Most of the time, some of the reds, they want it for cooking. It's better cooked than dried. It's better than that when it's cooked. When they get molds on them, they usually rather make dog food and give it to the dogs. Along with the chum. We have to really save it for the elderly people for the chum. (032111KW2)

Chum salmon was the third most harvested species of salmon (26,590 lb), followed by coho (15,689 lb) and pink salmon (839 lb).

Although the use of dogs for transportation has generally declined, ethnographic interviews documented a strong reliance on fish heads and backbones for use as dog food. Both coho and chum salmon were harvested in limited amounts for dog food (312 and 245 individual fish, respectively). Approximately 23% of the pink salmon harvested were given to dogs, the highest proportion of any salmon harvest. With declining salmon returns, one respondent described his increased reliance on other community members to meet his needs for dog food. "Since we are limiting fish [harvests], I have to rely on [my] brother-in-law and other people who don't have dogs." He asks, "Can I have your backbones?" (032211KW4). A small number of Chinook salmon (47 individual fish) were reportedly given to dogs as well.[2] These were likely not suitable for human consumption.

The importance and widespread use of salmon (98% of households) is reflected in the myriad ways in which Kwethluk residents prepare salmon. The passage above partly indicates that the diversity in the quality of salmon serve a wide spectrum of dietary needs and culinary preferences. Many traditional methods of salmon preparation are practiced in Kwethluk, in addition to contemporary methods such as freezing with commercially available freezers. The early-run timing and size of Chinook salmon make them ideal for cold smoke preservation—they are cut into uniform-size strips, hung to dry during the relatively sunny and bugless month of June, and smoked at a low temperature until dry. The resulting strips, one the most common forms of processed salmon in Kwethluk, are used as everyday table fare, snacks, and travel food. Sockeye salmon is generally too oily and arrives too late in the summer to dry in the manner described above. Because commercially available freezers are now widely available, sockeye salmon is often frozen and later thawed and baked (032111KW2). Many households still ferment whole fish and egg sacs by burying them in sandy, porous earth. One respondent noted that this was traditionally done with coho salmon, the late running fish, when near freezing temperatures aid the fermentation process. Today chum salmon are fermented and eaten by elders who still favor this traditional food (032211KW1).

The nonsalmon fish harvest centered around humpback whitefish at 25,124 lb (42% of nonsalmon harvest) and northern pike at 24,126 lb (40% of nonsalmon harvest). Other notable harvests of nonsalmon fish were smelt (3,701 lb), burbot (1,938 lb), sheefish (1,520 lb), and broad whitefish (1,211 lb). Approximately 6,500 whitefishes (55% of the whitefish harvest by weight) and 575 northern pike (11% of the Northern pike harvest) were used exclusively for dog food.

2. The use of all salmon species for feeding dog sled teams is permitted under AS 16.05.940 (33). This is not to be confused with the specific prohibition of targeting Chinook salmon for dog food in the Yukon Drainage following 5 AAC 01.240.

The primary means of harvesting fish in 2010 was by gillnet (Figure 6-9). Drift gillnets, presented in red, caught the most fish by weight, and notably the largest proportions of Chinook, sockeye, and chum salmon. The "setnet" bar in Figure 6-9 includes harvests by setnets both in open water as well as under ice, the latter of which accounts for a large portion of the whitefish harvests. Key respondents often fished for whitefishes in winter and discussed the importance of this resource. One respondent emphatically stated, "You gotta have it. For dogs and myself. Gotta have whitefish in wintertime" (032211KW4).

One respondent explained the benefit of a setnet for catching whitefish. "I like to setnet whitefish … they are kind of slower to catch them with hook, so I would rather use a net to fish for whitefish" (031911KW5). Unlike jigging, which requires the continual presence of the fisher, using a setnet can be a convenient method because a fisher can leave it unattended for extended periods. Under the ice setnet sites depend heavily on water levels. While Kwethluk is not at the mouth of the Kuskokwim River, it is still close enough to be affected by ocean tides. Explaining this principle, one respondent stated that in order to maximize the harvest, "I set [the net] where high and low tide gets it … tide comes in, tide goes out" (032211KW1). Whitefishes, which move with tidal movements, have a higher chance of being caught this way.

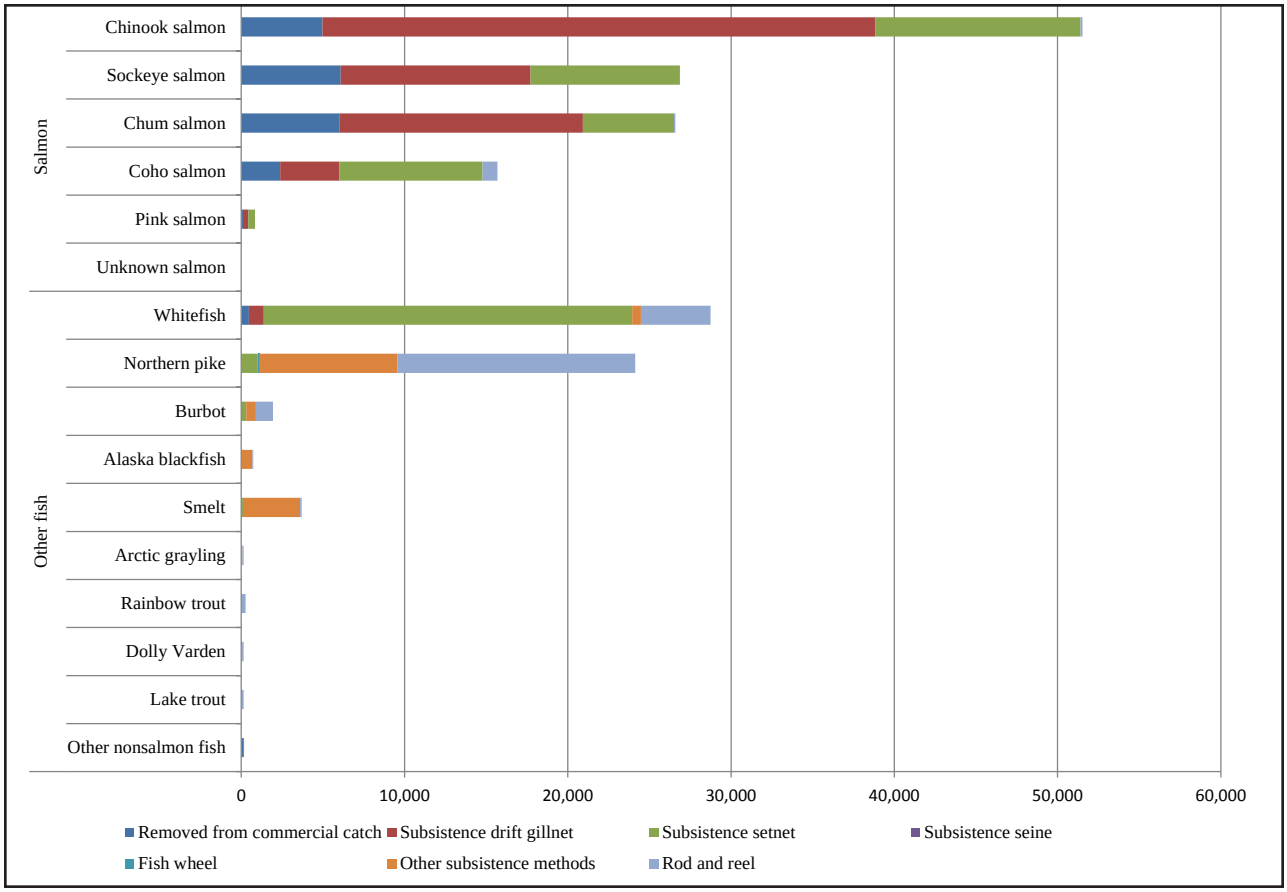

Figure 6-9.–Fish harvests by gear type, Kwethluk, 2010.

Table 6-2. – Estimated uses and harvests of marine invertebrates, Kwethluk, 2010.

	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										
Clams	2%	2%	2%	1%	0%	0.8 lb	0.0 lb	0.0 lb	0.3 gal.	± 63%
King crab	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Tanner crab	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown crab	1%	1%	1%	0%	0%	2.6 lb	0.0 lb	0.0 lb	1.7 ind	± 126%
Shrimp	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown marine invertebrates	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Subtotal	**3%**	**3%**	**3%**	**1%**	**0%**	**3.4 lb**	**0.0 lb**	**0.0 lb**		**± 97%**
All marine invertebrates	**3%**	**3%**	**3%**	**1%**	**0%**	**3.4 lb**	**0.0 lb**	**0.0 lb**		**± 97%**
All resources[b]	**100%**	**97%**	**97%**	**99%**	**77%**	**259,698.5 lb**	**1,675.5 lb**	**364.1 lb**		**± 17%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

Residents commented that the larger whitefish species in the area spawn in nearby lakes, but during spring flooding, they migrate down rivers. During late winter months, in an attempt to return to the lakes, whitefishes travel back upriver (031911KW5). As noted above, it is during this time that Kwethluk fishers set their nets. Whitefish harvests have always been reliable during this time of year, but there has been a recent increase in size and quantity, as one respondent noted, due to wetter than average years (032211KW1). Some respondents attributed this to particularly high water and increased flooding that allows fish to stay in the lakes longer.

Other fishing gear used in 2010 in Kwethluk included jigging through the ice for northern pike and burbot, setting fish traps for blackfish, and using dip nets for smelt. Respondents described fish traps frequently. In the past, fish traps were made from one-quarter inch "timber strips," tied together with spruce roots. The advantage was that if a fisher was unable to reach his or her trap, then the spruce roots would rot and break open, releasing the fish. Today, however, fish traps are most often made with wire mesh, which is favored, in part, because it is more durable. However, one respondent described that if a fish trap was not checked and continued to entrap fish that were not gathered and used, these same fish species would avoid this area in following seasons (032211KW1). Lastly, rod and reel fishing accounted for much of the northern pike and coho salmon harvest. Small fish, such as rainbow trout and Arctic grayling, were harvested in the clear water areas of the Kwethluk River using rod and reel with brightly colored artificial lures.

Kwethluk residents harvested very few shellfish in 2010 (Table 6-2). One household reported harvesting fresh water clams (0.3 gallons) upriver on the Kuskokwim River. Another resident reported opportunistically harvesting crab while fishing with family members in the Kuskokwim Bay (032411KW6).

Land and marine mammal harvests (Table 6-3) made up approximately 22% of Kwethluk's

subsistence harvest by edible weight. This category includes large land mammals (59% of mammal harvest by weight), small land mammals (10%), and marine mammals (31%). Kwethluk's estimated harvest of 33 individual moose provided 18,000 edible pounds, the largest harvest of any mammal species by edible weight. The largest discrepancy for any resource between households that attempted to harvest (51% of all households) and households that actually harvested (22%) was for moose. Hunters cited a number of obstacles to harvesting moose; the most often cited reason was the short hunting season. The majority of the moose (27 individual animals) were harvested in the September registration hunt, while 4 were harvested in a winter hunt and 2 were harvested during an unknown time. All but 1 moose, a cow harvested in February, were bulls.

Though very important today, moose have not always populated the Kuskokwim River drainage near Kwethluk. Middle-age respondents recall that their families would opportunistically harvest moose high in the mountains and use the hide to build a skin boat (032111KW2, 032211KW1). Other respondents recalled their parents making the lengthy trip to the central Kuskokwim River to harvest moose with other households (032211KW4). None could recall when their parents began making these trips but respondents did remember that they stopped hunting this area when moose scarcity led to user conflicts in the 1980s. In general, discussions involving moose tended to focus on recent regulatory issues rather than historical use patterns. Respondents described the close relationship between personal conduct and wildlife abundance in their culture. Hunter behavior can influence the habits of animals, according to this belief system.

> … and like [in GMU] 21E, those guys were complaining, "We don't want the guys from Kuskokwim coming up here and hunting." That year I went to Pilot Station [GMU 18], the moose were like rabbits. They [moose] left them [GMU 21E] and the moose went down [river], [as if they had said], "You be stingy, we ain't going to stay there." (032411KW6)

Caribou harvests were also notable, providing 14,403 lb (111 individual caribou). The caribou harvests occurred from September to April, but most were concentrated in November and December when they occurred close to the community. Hunters harvested 72 bulls, 25 cows, and 14 caribou of unknown sex. All respondents noted that today the number of caribou in the Kwethluk area is much higher than it used to be, and in the winter of 2009, a group from the Mulchatna herd overwintered directly south of the community. The proximity of the herd all winter was unusual, but it did facilitate access to the herd and increase harvest numbers.

Since community members were actively harvesting caribou, many discussed current caribou hunting regulations. One resident noticed that female caribou return to the mountains earlier than males for calving, usually in late April. He advised that caribou hunting be shortened in the fall so that it could be opened in April, after the cows have left, to allow residents to harvest only bulls as they begin to fatten in the spring (032411KW6). Another resident wondered why the USFWS opened a 14-day winter

Table 6-3. – Estimated uses and harvests of land and marine mammals, Kwethluk, 2010.

	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										
Black bear	16%	9%	5%	12%	6%	833.3 lb	5.4 lb	1.2 lb	8.3 ind.	± 55%
Brown bear	15%	5%	4%	12%	5%	940.0 lb	6.1 lb	1.3 lb	6.7 ind.	± 62%
Caribou	87%	49%	39%	65%	32%	14,403.2 lb	92.9 lb	20.2 lb	110.8 ind.	± 21%
Moose	84%	51%	22%	67%	22%	18,000.0 lb	116.1 lb	25.2 lb	33.3 ind.	± 25%
Subtotal	**98%**	**59%**	**47%**	**87%**	**44%**	**34,176.6 lb**	**220.5 lb**	**47.9 lb**	**159.1 ind.**	**± 18%**
Small land mammals										
Beaver	48%	33%	32%	25%	14%	4,624.7 lb	29.8 lb	6.5 lb	308.3 ind.	± 29%
Red fox	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Arctic hare	8%	5%	4%	3%	3%	130.6 lb	0.8 lb	0.2 lb	52.2 ind.	± 90%
Snowshoe hare	19%	13%	13%	8%	5%	442.3 lb	2.9 lb	0.6 lb	176.9 ind.	± 45%
River (land) otter	4%	3%	3%	1%	2%	55.0 lb	0.4 lb	0.1 lb	18.3 ind.	± 87%
Lynx	6%	5%	5%	3%	1%	47.2 lb	0.3 lb	0.1 lb	11.8 ind.	± 77%
Marmot	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Marten	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Mink	1%	1%	1%	0%	0%	3.3 lb	0.0 lb	0.0 lb	1.7 ind.	± 126%
Muskrat	12%	8%	8%	6%	5%	127.5 lb	0.8 lb	0.2 lb	170.0 ind.	± 53%
Porcupine	14%	10%	10%	5%	6%	253.3 lb	1.6 lb	0.4 lb	63.3 ind.	± 56%
Arctic ground (parka) squirrel	1%	0%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Red (tree) squirrel	1%	0%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Weasel	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Gray wolf	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Wolverine	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Subtotal	**56%**	**42%**	**41%**	**26%**	**19%**	**5,683.9 lb**	**36.7 lb**	**8.0 lb**	**802.6 ind.**	**± 27%**
Marine mammals										
Bearded seal	10%	6%	6%	4%	4%	7,700.0 lb	49.7 lb	10.8 lb	18.3 ind.	± 58%
Ringed seal	5%	5%	3%	2%	3%	2,800.0 lb	18.1 lb	3.9 lb	50.0 ind.	± 89%
Spotted seal	30%	10%	10%	22%	8%	1,680.0 lb	10.8 lb	2.4 lb	30.0 ind.	± 52%
Unknown seal	38%	3%	2%	37%	4%	233.3 lb	1.5 lb	0.3 lb	4.2 ind.	± 103%
Walrus	12%	4%	2%	11%	2%	3,666.7 lb	23.7 lb	5.1 lb	3.3 ind.	± 88%
Beluga	11%	1%	1%	10%	1%	1,666.7 lb	10.8 lb	2.3 lb	1.7 ind.	± 126%
Bowhead	3%	0%	0%	3%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**61%**	**15%**	**13%**	**54%**	**13%**	**17,746.7 lb**	**114.5 lb**	**24.9 lb**	**107.5 ind.**	**± 45%**
All land mammals	**98%**	**66%**	**59%**	**88%**	**48%**	**39,860.5 lb**	**257.2 lb**	**55.9 lb**	**961.7 ind.**	**± 18%**
All marine mammals	**61%**	**15%**	**13%**	**54%**	**13%**	**17,746.7 lb**	**114.5 lb**	**24.9 lb**	**107.5 ind.**	**± 45%**
All resources	**100%**	**97%**	**97%**	**99%**	**77%**	**259,698.5 lb**	**1,675 lb**	**364.1 lb**		**± 17%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

hunt in GMU 17A, an area formerly used for spring hunting, when the snow is too deep and daylight too short to make the long trip. He also protested federal registration hunts in GMU 17 in which the hunter has to register in person, in communities as far away as Dillingham or Togiak (032211KW4).

Kwethluk hunters harvested 7 brown bears and 8 black bears in 2010. Most of the harvests were in September; presumably by moose hunters that opportunistically harvested bears while moose hunting. There was no wolf harvest in 2010 reported by any respondent. However, residents believed that wolves and coyotes began to appear with the arrival of caribou near the community in the 1990s (032411KW6).

Small land mammal harvests included animals taken for fur, for human consumption, or for both. Participation in harvesting small land mammals for food was generally higher than those who trapped for fur. Small mammals contributed an estimated 5,684 lb of edible food. Kwethluk hunters harvested 308 individual beavers (4,625 lb) throughout the year but especially in September and May. Snowshoe hares (442 lb) were harvested mostly in March and April, and porcupines (253 lb) were harvested in September. Trapping effort, though minimal, targeted river (land) otters, lynx, and minks from November through March. There were no reported harvests of Arctic ground squirrels (also known as parka squirrels), although one individual reported receiving 1 from outside the community.

Though located some 50 miles from the ocean, marine mammal harvests contributed a substantial amount (17,747 lb, 7% of total harvest by edible weight) to Kwethluk residents' harvest of wild food (Table 6-3). Kwethluk hunters' harvest of 18 bearded seals amounted to 7,700 edible pounds, or 43% of Kwethluk's marine mammal harvest by edible weight, and formed the largest contribution to the total community harvest of any marine mammal species.

Kwethluk marine mammal hunters also harvested an estimated 50 ringed seals (2,800 edible pounds), 30 spotted seals (1,680 lb), 3 walruses (3,667 lb), 2 beluga whales (1,667 lb), and 4 unknown seals (233 lb). Nearly all marine mammal harvests (97%) occurred in April and May. Participation in marine mammal hunting was relatively low; only about 15% of households hunted marine mammals but distributed them widely throughout the community, as indicated by the estimated 54% of households that received marine mammals during 2010. Unknown seal, likely referring to seal oil, was received by 37% of households. Bowhead whale from outside the community was received by 3% of the households.

One respondent described how he and his brother often travel downriver to the Tuntutuliak area where "people we know that would take us out with boat. We would take the boat where the ocean is …. From the village, we travel with snowmachine. We take out the boat …. As far as we go out is 20 to 18 miles from the land. And when we get carried away, I don't know how far we go out … [but] every man goes down. They are excited about seals" (032511KW8). The same respondent successfully harvested a walrus and some spotted seals during the study year. He and his hunting partners typically use a "small rifle or shotgun, like 22 mag" and look for seals that are sleeping or resting on the ice.

Approximately 91% of Kwethluk households used birds and eggs, although as a category they

contributed the lowest percentage (4%) by edible weight to Kwethluk's total harvest (Tables 6-4 and 6-5). Geese of various species formed the largest harvest by weight of the bird harvest (4,154 lb), particularly a harvest of 1,163 individual white-fronted geese.

One respondent explained that in order to maintain healthy and reliable geese populations, it is important for hunters to respect hunting areas by keeping them clean.

> If you do not pick up your trash, by 20 years, this lake would be full of plastic. If you want to hunt this area, you have to keep it clean. As long as you keep your goose lake clean, the geese will come and never stop. I'm passing it along to my boys. You keep your hunting spot clean. But once you litter, pretty soon the geese will just fly by. (031911KW5)

Several Kwethluk respondents described the way geese are preserved. Oftentimes, after geese are harvested they are either gutted and hung to dry or gutted and buried in frozen ground. Proper preservation of geese can ensure the maximum amount of consumable meat.

> If we catch some geese, if you don't take care of the guts, you spoil them. You waste your geese. Before I even caught my first goose, we went out back to camp, and my dad told me how to take care of the bird, if I don't take it to the camp. If you don't gut your bird, the next day the stomach will be purple and you waste that … no matter how many birds I get out there, nothing will go to waste because of how I was taught to take care of the meat. (031911KW5)

While geese provided the most edible pounds from the bird resource category, Kwethluk hunters harvested a higher number of ducks (2,911 individuals), which contributed an estimated 2,441 lb to the wild food harvest in 2010. Kwethluk hunters specifically targeted black scoter (672 individuals) for their flavor and fat. Scaup (472 individuals) and mallards (356 individuals) were harvested close to town. Kwethluk hunters also harvested 112 tundra swans, which provided 1,124 lb of wild food; 34 cranes provided another 297 lb. Ptarmigans were also an important quarry with an estimated harvest of 809 individual birds. The most popular season to harvest migratory birds was springtime when 4,550 individuals were harvested as opposed to 1,145 individual birds harvested in the fall. Hunters harvested only ptarmigans in winter. Grouse were harvested in the fall.

Bird eggs were harvested by 9% of Kwethluk households (Table 6-5), and used by 17% of the households. The combined harvest of eggs provided 182 lb, 2% of the entire harvest of birds and eggs by edible weight, and less than 0.1% of the entire subsistence harvest. The largest harvest by weight were gull eggs (91 lb), followed by geese eggs (56 lb) and swan eggs (17 lb). Very little local knowledge was shared regarding egg harvesting, save that fewer people search for bird eggs than in the past. Although the area around Kwethluk has plenty of nesting birds, finding the nests is difficult according to one respondent, who sometimes came home empty-handed (032411KW7).

While vegetation constituted only 4% of the entire Kwethluk subsistence harvest by edible weight,

Table 6-4. – Estimated uses and harvests of birds, Kwethluk, 2010.

	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	4%	6%	3%	1%	1%	8.1 lb	0.1 lb	0.0 lb	20.2 ind.	± 106%
Canvasback	12%	13%	9%	5%	5%	76.8 lb	0.5 lb	0.1 lb	69.8 ind.	± 55%
Common eider	1%	1%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
King eider	1%	1%	1%	0%	0%	11.9 lb	0.1 lb	0.0 lb	8.3 ind.	± 126%
Unknown eider	1%	1%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Goldeneye	16%	17%	13%	8%	8%	78.0 lb	0.5 lb	0.1 lb	97.5 ind.	± 49%
Harlequin	1%	1%	1%	0%	1%	25.0 lb	0.2 lb	0.0 lb	50.0 ind.	± 126%
Mallard	51%	38%	34%	19%	20%	355.6 lb	2.3 lb	0.5 lb	355.6 ind.	± 26%
Common merganser	2%	1%	0%	2%	1%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Red-breasted merganser	1%	0%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Long-tailed duck (oldsquaw)	14%	13%	11%	5%	6%	121.3 lb	0.8 lb	0.2 lb	151.6 ind.	± 85%
Northern pintail	39%	32%	29%	13%	22%	205.2 lb	1.3 lb	0.3 lb	256.6 ind.	± 28%
Scaup	37%	29%	26%	14%	18%	424.8 lb	2.7 lb	0.6 lb	472.0 ind.	± 34%
Black scoter	51%	39%	35%	19%	18%	605.0 lb	3.9 lb	0.8 lb	672.3 ind.	± 27%
Surf scoter	8%	6%	5%	4%	4%	59.1 lb	0.4 lb	0.1 lb	65.7 ind.	± 65%
White-winged scoter	17%	14%	13%	5%	8%	239.1 lb	1.5 lb	0.3 lb	265.7 ind.	± 43%
Northern shoveler	13%	11%	8%	8%	8%	17.6 lb	0.1 lb	0.0 lb	29.3 ind.	± 79%
Green-winged teal	16%	17%	13%	8%	9%	59.0 lb	0.4 lb	0.1 lb	196.8 ind.	± 60%
Wigeon	19%	20%	15%	8%	13%	76.8 lb	0.5 lb	0.1 lb	109.7 ind.	± 43%
Unknown ducks	8%	5%	4%	5%	2%	77.0 lb	0.5 lb	0.1 lb	90.0 ind.	± 77%
Subtotal	**84%**	**60%**	**58%**	**37%**	**35%**	**2,440.5 lb**	**15.7 lb**	**3.4 lb**	**2,911.2 ind.**	**± 21%**
Geese										
Brant	6%	5%	4%	3%	1%	34.4 lb	0.2 lb	0.0 lb	28.6 ind.	± 82%
Cacklers	37%	26%	25%	18%	14%	624.7 lb	4.0 lb	0.9 lb	520.6 ind.	± 32%
Lesser Canada goose	13%	9%	8%	5%	4%	92.0 lb	0.6 lb	0.1 lb	76.7 ind.	± 57%
Unknown Canada goose	26%	18%	17%	11%	5%	526.7 lb	3.4 lb	0.7 lb	438.9 ind.	± 55%
Emperor goose	2%	1%	1%	1%	0%	4.2 lb	0.0 lb	0.0 lb	1.7 ind.	± 126%
Snow goose	2%	0%	0%	2%	1%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
White-fronted goose	63%	49%	49%	24%	24%	2,792.1 lb	18.0 lb	3.9 lb	1,163.4 ind.	± 32%
Unknown geese	3%	3%	2%	2%	2%	80.0 lb	0.5 lb	0.1 lb	33.3 ind.	± 88%
Subtotal	**78%**	**57%**	**56%**	**37%**	**28%**	**4,154.0 lb**	**26.8 lb**	**5.8 lb**	**2,263.2 ind.**	**± 26%**
Other migratory birds										
Trumpeter swan	1%	1%	1%	0%	0%	16.7 lb	0.1 lb	0.0 lb	1.7 ind.	± 126%
Tundra swan (whistling)	41%	31%	31%	14%	14%	1,124.2 lb	7.3 lb	1.6 lb	112.4 ind.	± 30%
Sandhill crane	20%	12%	12%	12%	6%	297.2 lb	1.9 lb	0.4 lb	35.4 ind.	± 49%
Unknown crane	1%	1%	0%	0%	1%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Whimbrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Grebe	1%	1%	1%	0%	1%	50.0 lb	0.3 lb	0.1 lb	33.3 ind.	± 126%
Subtotal	**48%**	**34%**	**34%**	**22%**	**15%**	**1,488.0 lb**	**9.6 lb**	**2.1 lb**	**182.8 ind.**	**± 30%**
Other birds										
Spruce grouse	1%	1%	1%	0%	1%	11.7 lb	0.1 lb	0.0 lb	16.7 ind.	± 126%
Ruffed grouse	3%	1%	1%	2%	1%	11.7 lb	0.1 lb	0.0 lb	16.7 ind.	± 126%
Ptarmigan	26%	24%	22%	6%	11%	808.7 lb	5.2 lb	1.1 lb	808.7 ind.	± 33%
Subtotal	**28%**	**25%**	**23%**	**8%**	**12%**	**832.0 lb**	**5.4 lb**	**1.2 lb**	**842.0 ind.**	**± 33%**
All migratory birds	**90%**	**63%**	**61%**	**52%**	**40%**	**8,082.6 lb**	**52.1 lb**	**11.3 lb**	**5,357.1 ind.**	**± 21%**
All other birds	**28%**	**25%**	**23%**	**8%**	**12%**	**832.0 lb**	**5.4 lb**	**1.2 lb**	**842.0 ind.**	**± 33%**
All resources[b]	**100%**	**97%**	**97%**	**99%**	**77%**	**259,698.5 lb**	**1,675.5 lb**	**364.1 lb**		**± 17%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

Table 6-5. – Estimated uses and harvests of eggs, Kwethluk, 2010.

	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	9%	9%	3%	4%	4%	10.0 lb	0.1 lb	0.0 lb	66.7 ind.	± 85%
Geese eggs	13%	10%	5%	8%	5%	55.5 lb	0.4 lb	0.1 lb	185.0 ind.	± 92%
Swan eggs	6%	6%	3%	3%	4%	16.8 lb	0.1 lb	0.0 lb	26.7 ind.	± 79%
Shorebird eggs	2%	2%	2%	0%	1%	1.9 lb	0.0 lb	0.0 lb	38.3 ind.	± 92%
Gull eggs	5%	4%	3%	3%	3%	90.8 lb	0.6 lb	0.1 lb	275.0 ind.	± 84%
Unknown eggs	2%	1%	1%	2%	0%	7.3 lb	0.0 lb	0.0 lb	33.3 ind.	± 126%
Subtotal	**17%**	**12%**	**9%**	**11%**	**6%**	**182.3 lb**	**1.2 lb**	**0.3 lb**	**625.0 ind.**	**± 60%**
All birds and eggs	**91%**	**66%**	**63%**	**53%**	**40%**	**9,096.9 lb**	**58.7 lb**	**12.8 lb**	**6,824.2 ind.**	**± 21%**
All resources[b]	**100%**	**97%**	**97%**	**99%**	**77%**	**259,698.5 lb**	**1,675.5 lb**	**364.1 lb**		**± 17%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

almost all (94%) households gathered berries, greens, or wood in 2010 (Table 6-6). In the resource category, berries were the most heavily harvested by weight, totaling 10,190 lb (90% of the vegetation resource category). Highly popular for their size and taste, salmonberries in the Kwethluk area draw residents from upriver and neighboring communities and are commonly harvested. Kwethluk residents alone gathered an estimated 1,160 gallons. Key respondents often picked berries in the same areas frequented for bird or moose hunting. One woman reported that her household goes "way up [the Kuskokwim River] above Aniak. I go pick berries and my husband goes hunting while the moose [season is] open" (032311KW3). Other notable berry harvests included lowbush cranberries (417 gallons), blueberries (405 gallons), and blackberries or crowberries (391 gallons). Edible plants, greens, and mushroom harvests totaled 1,181 edible pounds and included wild rhubarb (153 gallons), cow parsnip (wild celery) (145 gallons), and fiddlehead ferns (142 gallons). This survey documented the harvest of 2 inedible resources, wood and punk; the harvests totaled 3,717 gallons and 301 cords, respectively.

Harvest Areas

Surveyed households assisted researchers in preparing maps for locations where individual households hunted, fished, and gathered subsistence resources in 2010. The resulting maps depict search and harvest areas for 6 different resource categories (salmon, trout and whitefish, large land mammals, small land mammals, ducks and geese, and berries and greens). For each resource category, all households' search areas and harvest locations were combined to create a series of maps depicting

Table 6-6. – Estimated uses and harvests of vegetation, Kwethluk, 2010.

	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		
Berries										
Blueberry	69%	60%	59%	16%	23%	1,618.1 lb	10.4 lb	2.3 lb	404.5 gal.	± 17%
Lowbush cranberry	47%	43%	43%	11%	17%	1,667.9 lb	10.8 lb	2.3 lb	417.0 gal.	± 22%
Highbush cranberry	25%	23%	23%	3%	9%	448.3 lb	2.9 lb	0.6 lb	112.1 gal.	± 32%
Gooseberry	1%	0%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Currants	5%	4%	4%	1%	1%	50.0 lb	0.3 lb	0.1 lb	12.5 gal.	± 69%
Raspberry	8%	6%	6%	1%	0%	47.1 lb	0.3 lb	0.1 lb	11.8 gal.	± 76%
Salmonberry	77%	71%	71%	20%	33%	4,637.8 lb	29.9 lb	6.5 lb	1,159.5 gal.	± 15%
Crowberry (blackberry)	46%	35%	34%	23%	16%	1,563.8 lb	10.1 lb	2.2 lb	390.9 gal.	± 31%
Other wild berry	11%	11%	11%	0%	0%	156.7 lb	1.0 lb	0.2 lb	39.2 gal.	± 44%
Berries	**88%**	**83%**	**83%**	**32%**	**37%**	**10,189.7 lb**	**65.7 lb**	**14.3 lb**	**2,547.4 gal.**	**± 14%**
Plants/greens/mushrooms										
Wild rhubarb	25%	22%	22%	6%	10%	613.1 lb	4.0 lb	0.9 lb	153.3 gal.	± 53%
Eskimo potato	2%	2%	1%	1%	1%	13.3 lb	0.1 lb	0.0 lb	3.3 gal.	± 126%
Fiddlehead ferns	32%	29%	29%	6%	10%	141.9 lb	0.9 lb	0.2 lb	141.9 gal.	± 38%
Nettle	1%	1%	1%	0%	0%	1.7 lb	0.0 lb	0.0 lb	1.7 gal.	± 126%
Hudson's Bay tea	16%	14%	14%	2%	3%	19.1 lb	0.1 lb	0.0 lb	19.1 gal.	± 41%
Mint	6%	6%	6%	0%	1%	14.4 lb	0.1 lb	0.0 lb	14.4 gal.	± 61%
Sour dock	8%	6%	6%	3%	3%	60.0 lb	0.4 lb	0.1 lb	60.0 gal.	± 75%
Spruce tips	2%	2%	2%	0%	2%	16.7 lb	0.1 lb	0.0 lb	16.7 gal.	± 88%
Cow parsnip (wild celery)	10%	9%	9%	2%	3%	144.7 lb	0.9 lb	0.2 lb	144.7 gal.	± 69%
Wild rose hips	13%	13%	13%	3%	3%	96.0 lb	0.6 lb	0.1 lb	24.0 gal.	± 44%
Yarrow	1%	0%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Other wild greens	1%	1%	1%	0%	1%	16.7 lb	0.1 lb	0.0 lb	16.7 gal.	± 126%
Unknown mushrooms	2%	2%	2%	0%	0%	0.2 lb	0.0 lb	0.0 lb	0.2 gal.	± 125%
Fireweed	2%	2%	2%	1%	1%	10.0 lb	0.1 lb	0.0 lb	10.0 gal.	± 107%
Stinkweed	22%	20%	20%	3%	4%	30.1 lb	0.2 lb	0.0 lb	30.1 gal.	± 41%
Punk	38%	35%	33%	12%	12%	0.0 lb	0.0 lb	0.0 lb	3,716.9 gal.	± 0%
Puffballs	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown greens from land	6%	6%	6%	0%	1%	3.5 lb	0.0 lb	0.0 lb	3.5 gal.	± 68%
Subtotal	**70%**	**63%**	**63%**	**22%**	**22%**	**1,181.4 lb**	**7.6 lb**	**1.7 lb**	**4,356.5 gal.**	**± 38%**
Wood										
Firewood	66%	58%	57%	15%	12%	0.0 lb	0.0 lb	0.0 lb	301.2 crd.	± 25%
Subtotal	**66%**	**58%**	**57%**	**15%**	**12%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**301.2 crd.**	**± 25%**
All vegetation	**95%**	**94%**	**94%**	**44%**	**46%**	**11,371.1 lb**	**73.4 lb**	**15.9 lb**	**7,205.1 gal.**	**± 15%**
All resources[b]	**100%**	**97%**	**97%**	**99%**	**77%**	**259,698.5 lb**	**1,675 lb**	**364.1 lb**		**± 17%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

Kwethluk's subsistence use areas in 2010. Figure 6-10 summarizes spatial data for 2010 collected from Kwethluk households.

For 2010, Kwethluk residents reported using a total of 6,379 square miles for subsistence, representing diverse marine, tundra, and boreal forest environments. Kwethluk hunters traveled to access resources in 3 distinct biomes. Seal hunters and berry pickers traveled by boat to the marine environment in the Kuskokwim Bay. Bird hunters and fishers accessed the tundra and wetland areas adjacent to the community. Large mammal hunters, using boats and snowmachines, ranged as far as the mountainous forests of the Holitna and Yukon River drainages in search of large game. The area that experienced the most concentrated use was a 40-mile radius of land southeast of Kwethluk encompassing the Kisaralik, Akulikutak, and Kwethluk tributaries. Residents accessed land in this area by boating up these clearwater tributaries of the Kuskokwim River as far as possible and walking the remaining distance to known subsistence harvest areas, or by overland travel using snowmachines or ATVs.

Salmon fishing areas (Figure 6-11) were concentrated along the Kuskokuak Slough and the Kwethluk and Kuskokwim rivers. Families also reported traveling to harvest salmon near the communities of Napaskiak, Tuntutuliak, and Quinhagak. The areas depicted in Figure 6-11 indicate drifting locations, setnet sites, and rod and reel harvest areas. Respondents also reported rod and reel fishing for coho in several clearwater tributaries of the Kuskokwim River beyond Three Step Mountain.

Nonsalmon search and harvest areas (Figure 6-12) were similar to those described above for salmon, but also included the clearwater areas of the Kwethluk River. The mapped area for trout and whitefish represents whitefish winter setnet locations, as well as areas where fishers experienced incidental harvests of whitefish while targeting salmon. Trout, which includes rainbow trout and lake trout, were commonly harvested in clear water with a bright-colored lure or bait attached to a rod and reel. Northern pike were sought at the confluence of the Johnson and Kuskokwim rivers, the Gweek River, and waters adjacent to the community. Burbot were harvested primarily in the Kuskokuak Slough.

Hunters ranged farther for large land mammals than any other resource (Figure 6-13). Moose hunters were concentrated in the Kisaralik, Kwethluk, and Akulikutak river drainages during a 10-day registration hunt in September. A limited number of other hunters traveled to the central Kuskokwim GMU 19A with a Tier II permit and to the Lower Yukon River region to hunt for moose in December. Commenting on the winter hunting opportunities in GMU 18 and 21E, one hunter said:

> That's what is saving the moose around here. We have a chance to go hunt at the Yukon. If it wasn't for that, I don't think this moratorium would work. If they tried to limit that hunt somehow, that would be no good …. … in 21E I wish they would open it up to anyone on the Kuskokwim. We used to go over there too, above Kalskag. (032411KW6)

Caribou were hunted in the vicinity of Kwethluk during the winter months when overland travel by snowmachine was possible. In 2009, a herd of caribou overwintered closer to the community than

in other years. One respondent said his sons did not even have to travel farther than the hills behind the airport to harvest caribou (031911KW5). Caribou were also hunted near the Kilbuck Mountains and around the mouth of the Johnson River, next to Napaskiak.

Mapped small land mammal search areas were confined to an area no more than 35 miles from Kwethluk (Figure 6-14). Beavers, the largest harvest of small mammals by total edible weight, were harvested in each month with the largest harvest concentrated in September. Snowshoe hares were the second largest small mammal harvest for human consumption with a search area concentrated close the community, which has abundant habitat of brush. There were no reported traplines in 2010.

Marine mammals were sought in the mainstem of the Kuskokwim River, downriver from Kwethluk, and in the Kuskokwim Bay (Figure 6-12). Seals were sought in the spring, primarily in Kuskokwim Bay when shorefast ice is still present, so the search areas in the bay encompassed both frozen and open water. Walruses were hunted by fewer households in areas adjacent to Kwigillingok and Kongiganak. Hunters also searched for seals as they travelled downriver to hunt in the bay.

Duck and geese search and harvest areas were primarily along the main Kuskokwim River corridor; hunters used a combination of boats and overland travel. Interviewed hunters described some of the ways that traditional knowledge of particular species' seasonal distribution influenced the mapped search and harvest areas for ducks and geese (Figure 6-16). Hunters described that around several lakes south of Kwethluk there is an abundance of blueberries and sweet grass that geese eat before the fall migration, and those lakes are therefore used as search and harvest locations. Hunters described that scoters can be harvested on the mainstem of the Kuskokwim River, upriver of Akiak, in the spring when they return inland and are fat from the ocean.

Kwethluk residents harvested berries and edible plants opportunistically while engaged in other subsistence or social activities farther from Kwethluk. Berry and plant harvesting also occurred as a social activity adjacent to Kwethluk (Figure 6-17). The shape of the berries and greens search area matched those of fall subsistence activities, like bird hunting or nonsalmon fishing, with the most concentrated searches occurring near the community of Kwethluk. Additional search areas for berries were along the Johnson River to areas near the communities of Kasigluk and Nunapitchuk, at the mouth of the Johnson River, and on the tundra north of Bethel.

Harvest Assessments

The survey asked respondents to assess their own harvests in 2 ways: whether they used more, less, or the same amount of 7 resource categories in 2011 as in past years, and whether they got "enough" of each of the 7 resource categories. This section discusses responses to those questions. Percentages are based on the total number of sampled households, including households that did not respond to the questions or indicated that they do not typically use the resource. Subsistence harvest success also

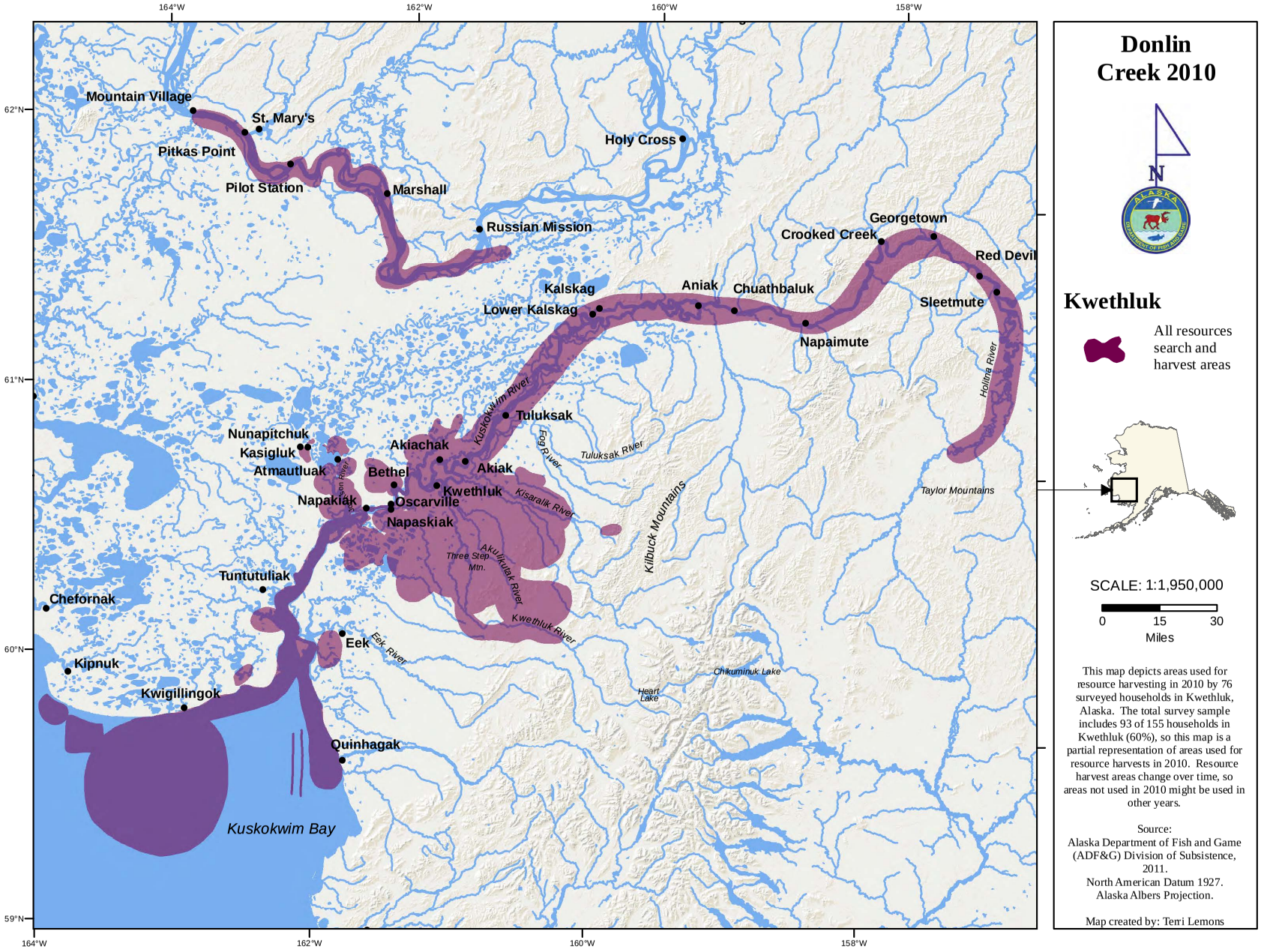

Figure 6-10.–Harvest locations and search areas, all resources, Kwethluk, 2010.

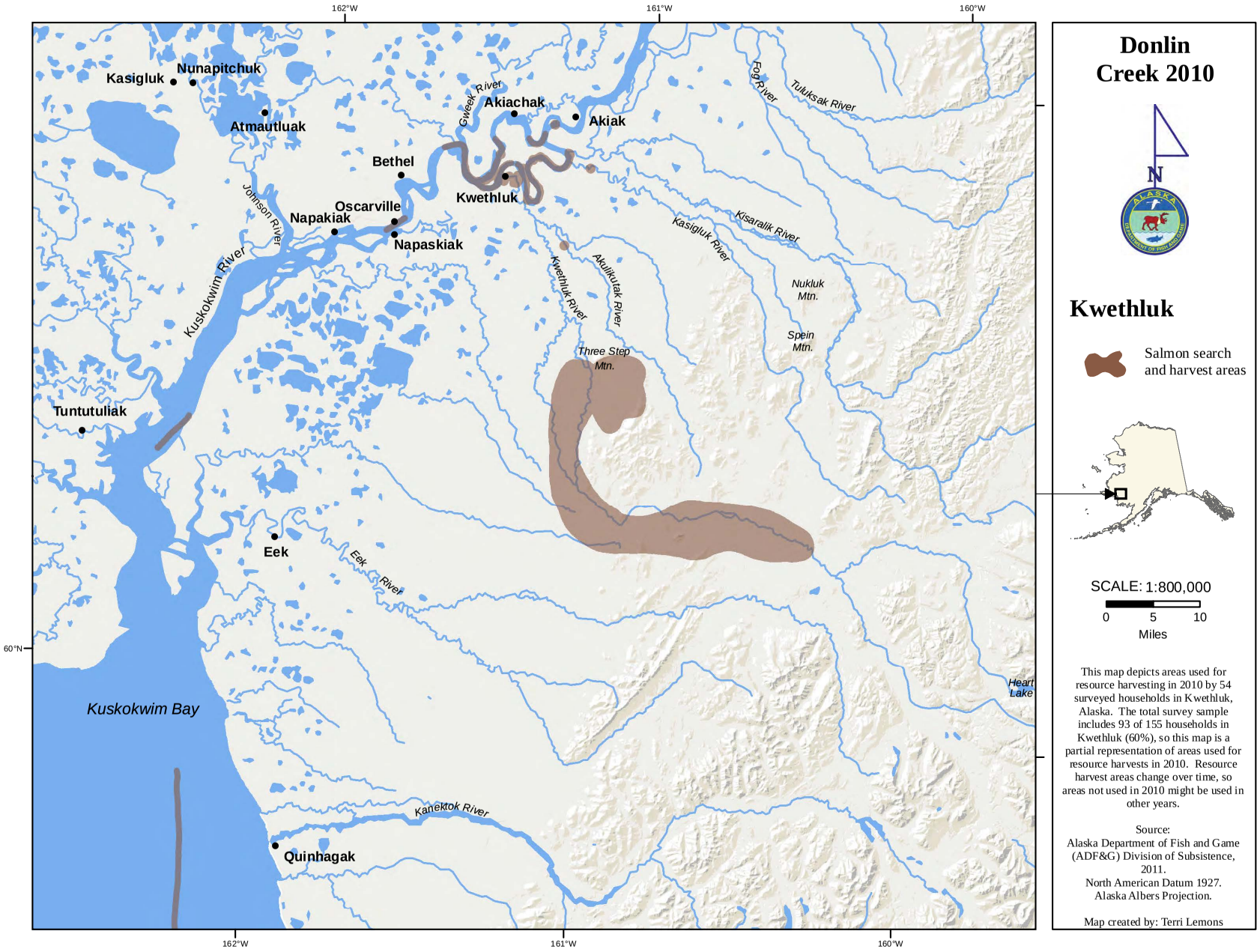

Figure 6-11.–Harvest locations and search areas, salmon, Kwethluk, 2010.

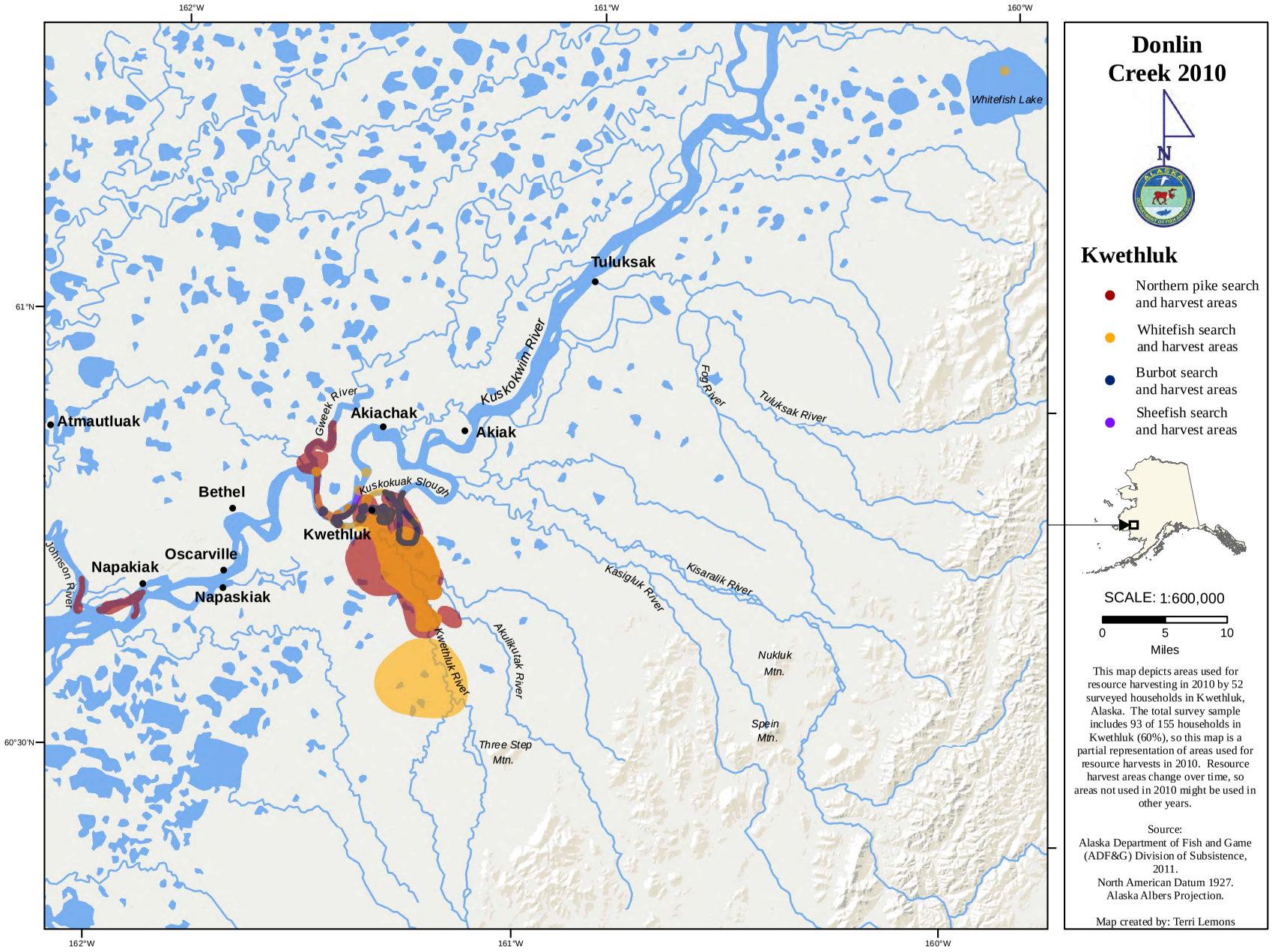

Figure 6-12.–Harvest locations and search areas, northern pike, whitefish, burbot, and sheefish, Kwethluk, 2010.

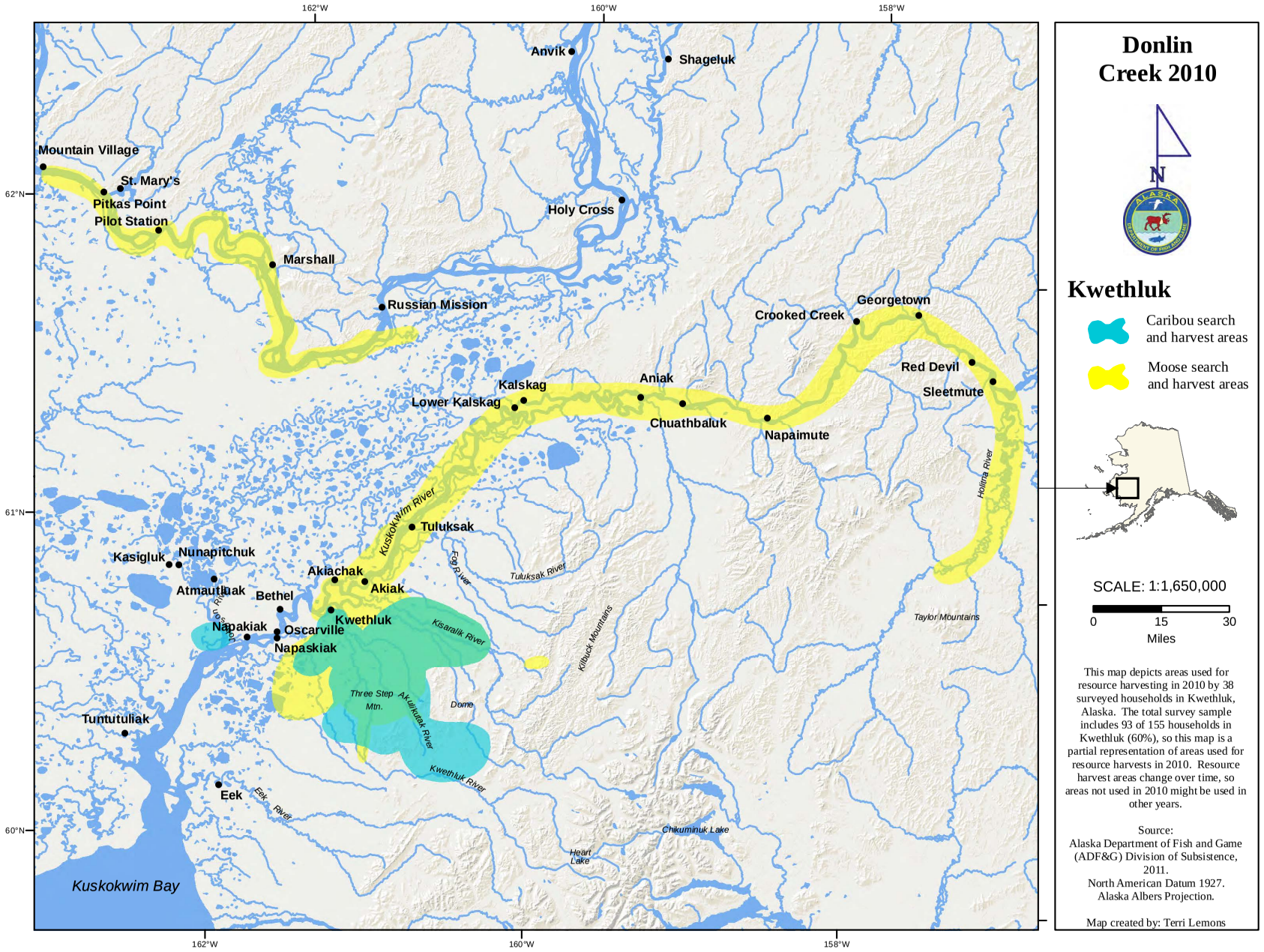

Figure 6-13.–Harvest locations and search areas, large land mammals,Kwethluk, 2010.

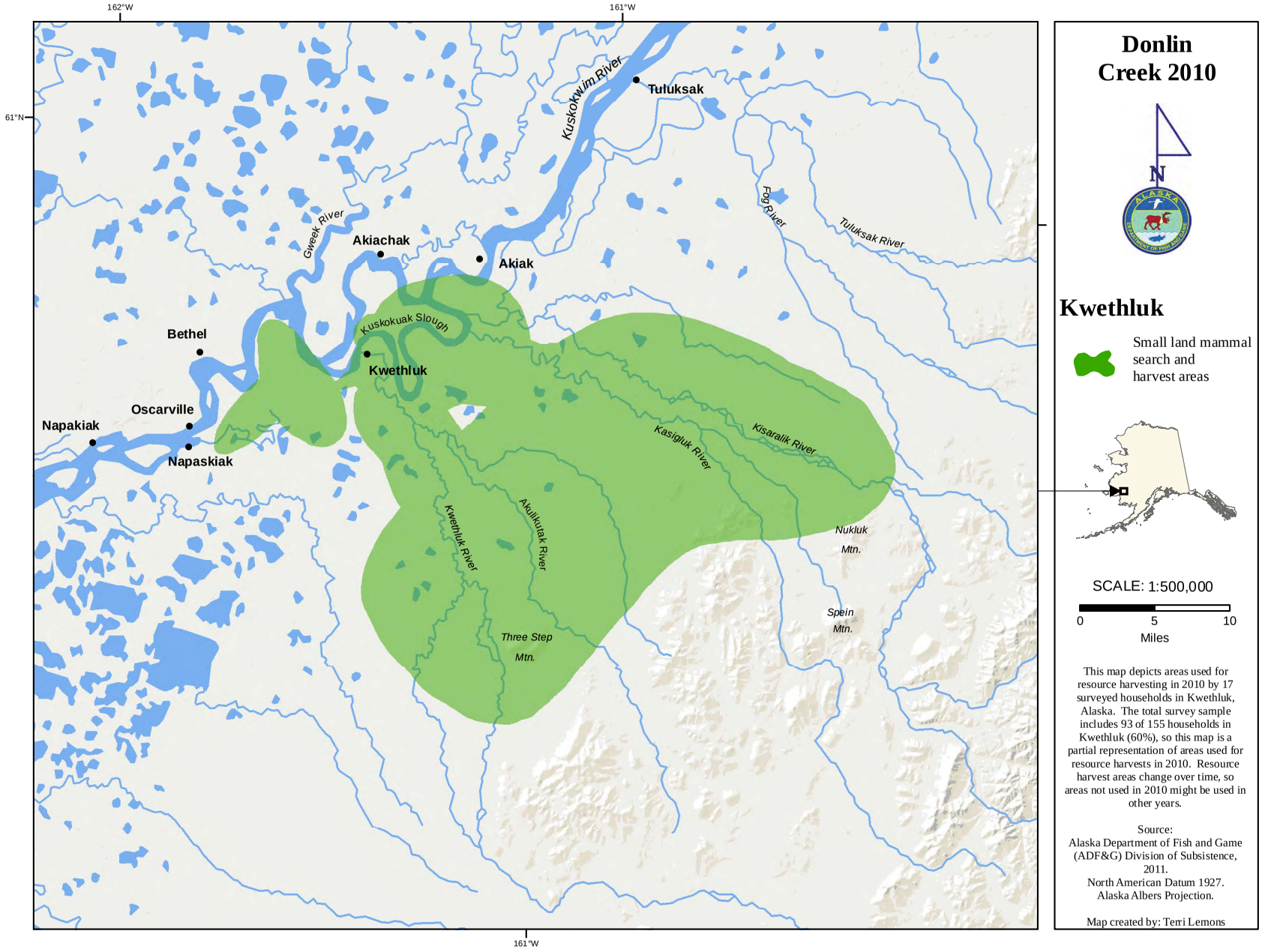

Figure 6-14.–Harvest locations and search areas, small land mammals, Kwethluk, 2010.

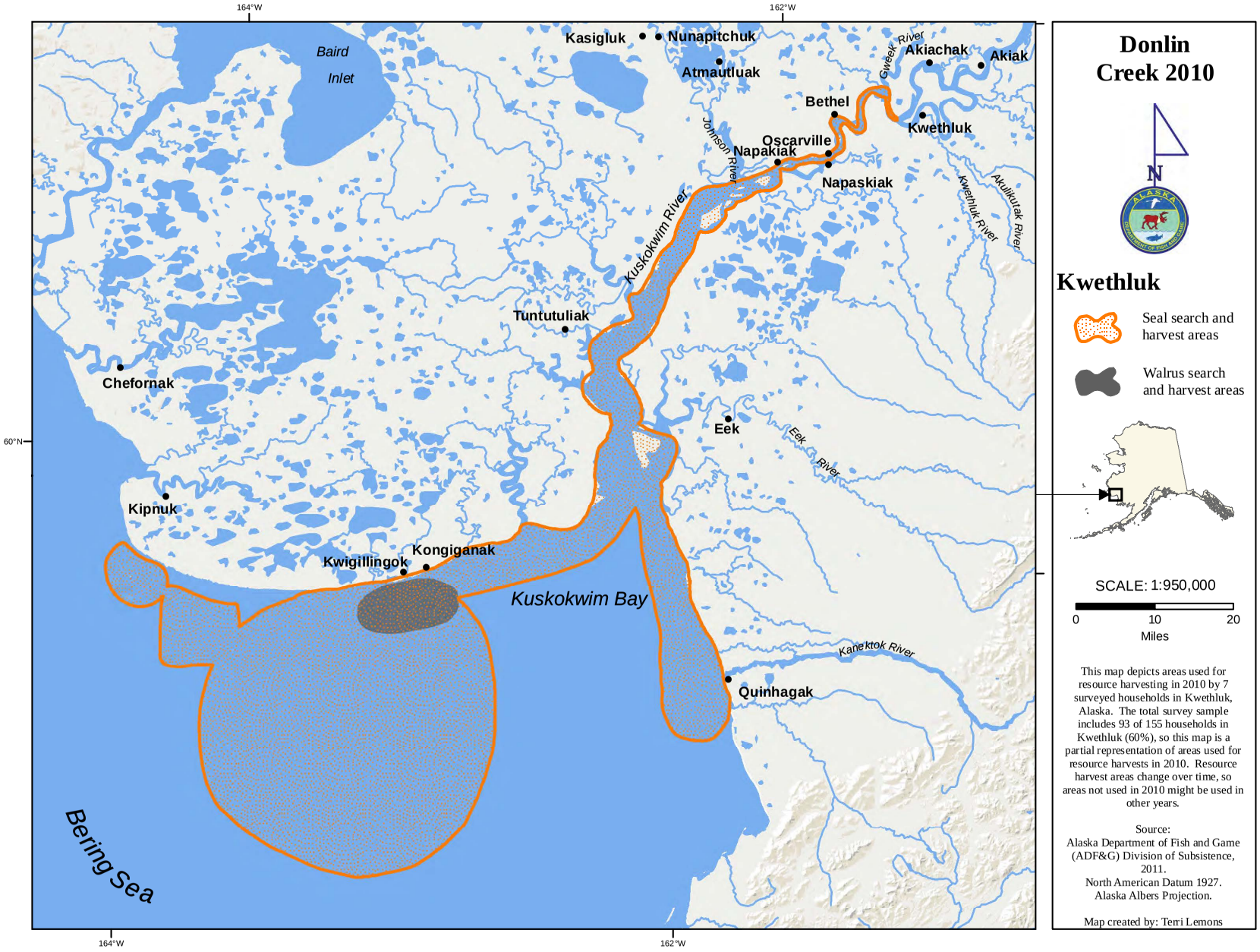

Figure 6-15.–Harvest locations and search areas, seals and walrus, Kwethluk, 2010.

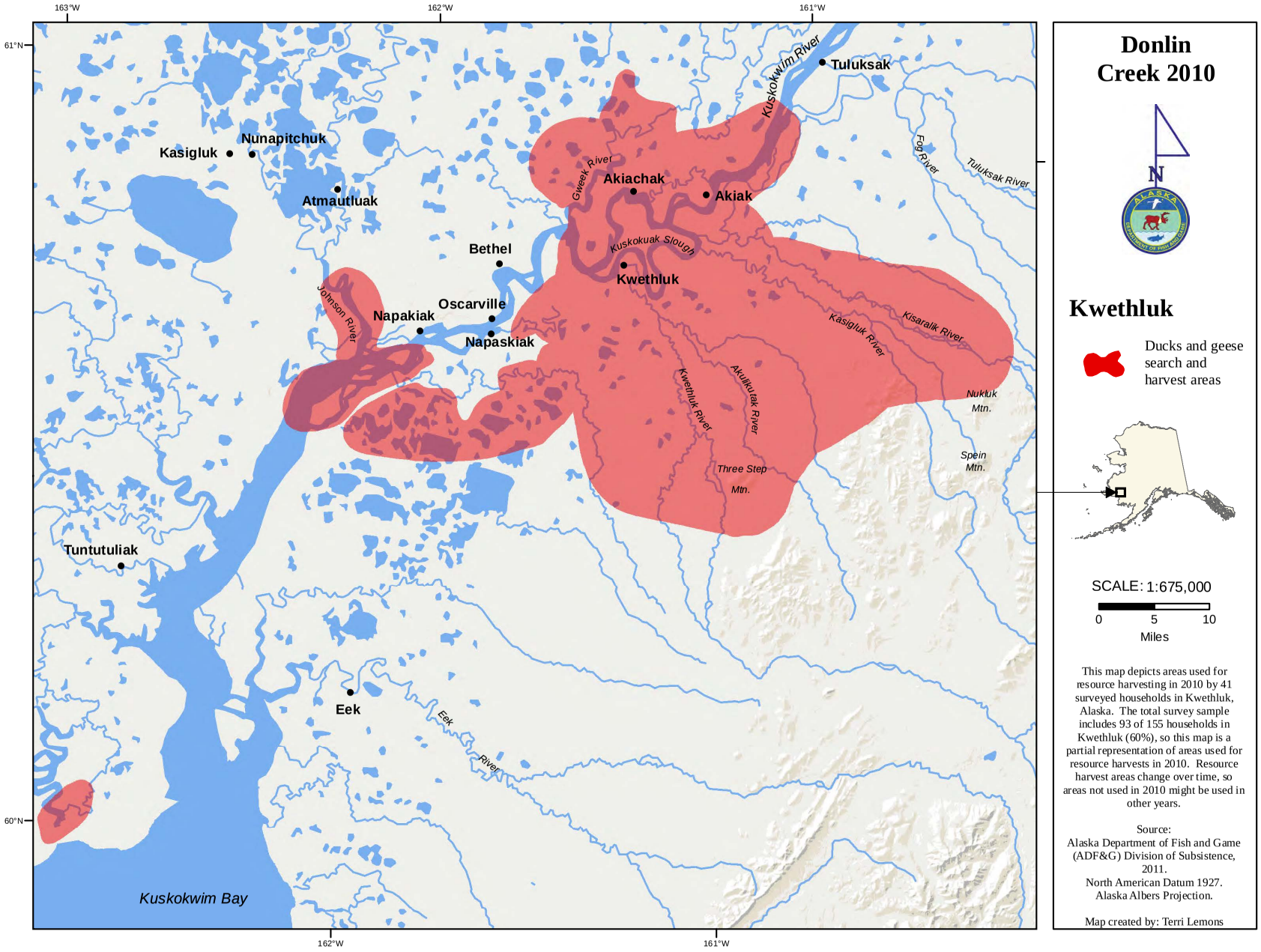

Figure 6-16.–Harvest locations and search areas, ducks and geese, Kwethluk, 2010.

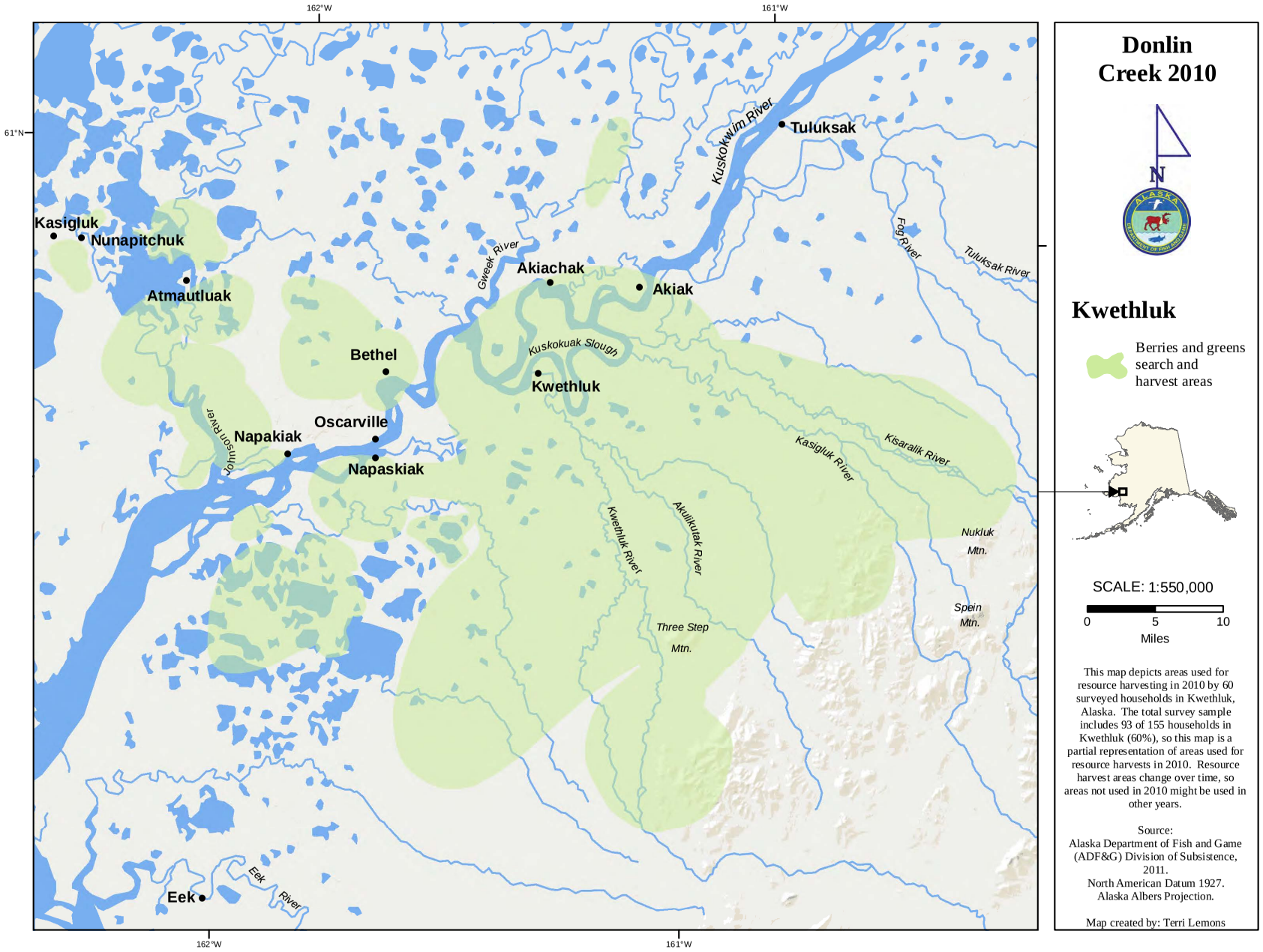

Figure 6-17.–Harvest locations and search areas, berries and greens, Kwethluk, 2010.

can be assessed by comparing current harvest estimates with past harvest estimates, which is discussed in the section "Comparison with Prior Results."

For all resource categories except marine mammals and marine invertebrates, a majority of respondents reported that they got enough (Figure 6-18) in 2010. For land mammals and marine mammals, 69% and 47% of respondents respectively, reported getting enough. For both nonsalmon fish species and vegetation, 59% of respondents reported getting enough. Only 51% reported getting enough salmon in 2010. Although only 3 households responded to this question for marine invertebrates, these households all reported getting enough in 2010. More than one-half the respondents (66% of reporting households) reported using less salmon than in recent years, compared to 23% that reported using the same amount and 9% that reported using more (Figure 6-19). Of those households that reported using less, 21% reported that low abundance of salmon prevented them from meeting their needs, and another 20% cited poor weather or environmental conditions as preventing them from meeting their needs. Other commonly cited reasons were lack of equipment to fish (16%), low effort (13%), and being unlucky (9%). Forty-five percent of households reported not getting enough salmon. Twenty-three percent specifically identified Chinook salmon as the species they did not get enough of, and another 8% identified sockeye salmon. When assessing the severity of this absence,

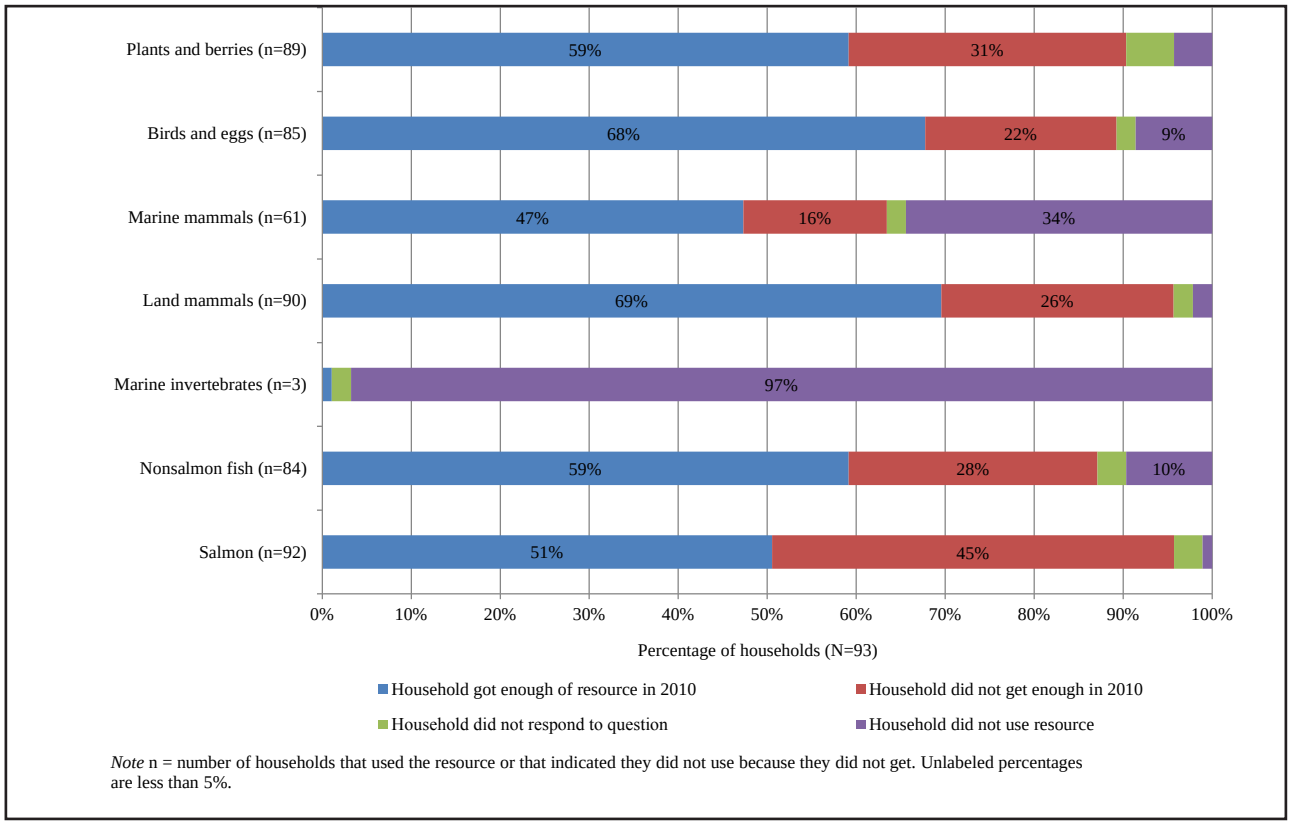

Figure 6-18.–Harvest assessments, Kwethluk, 2010. Responses to the question: "Did your household get enough in 2010?"

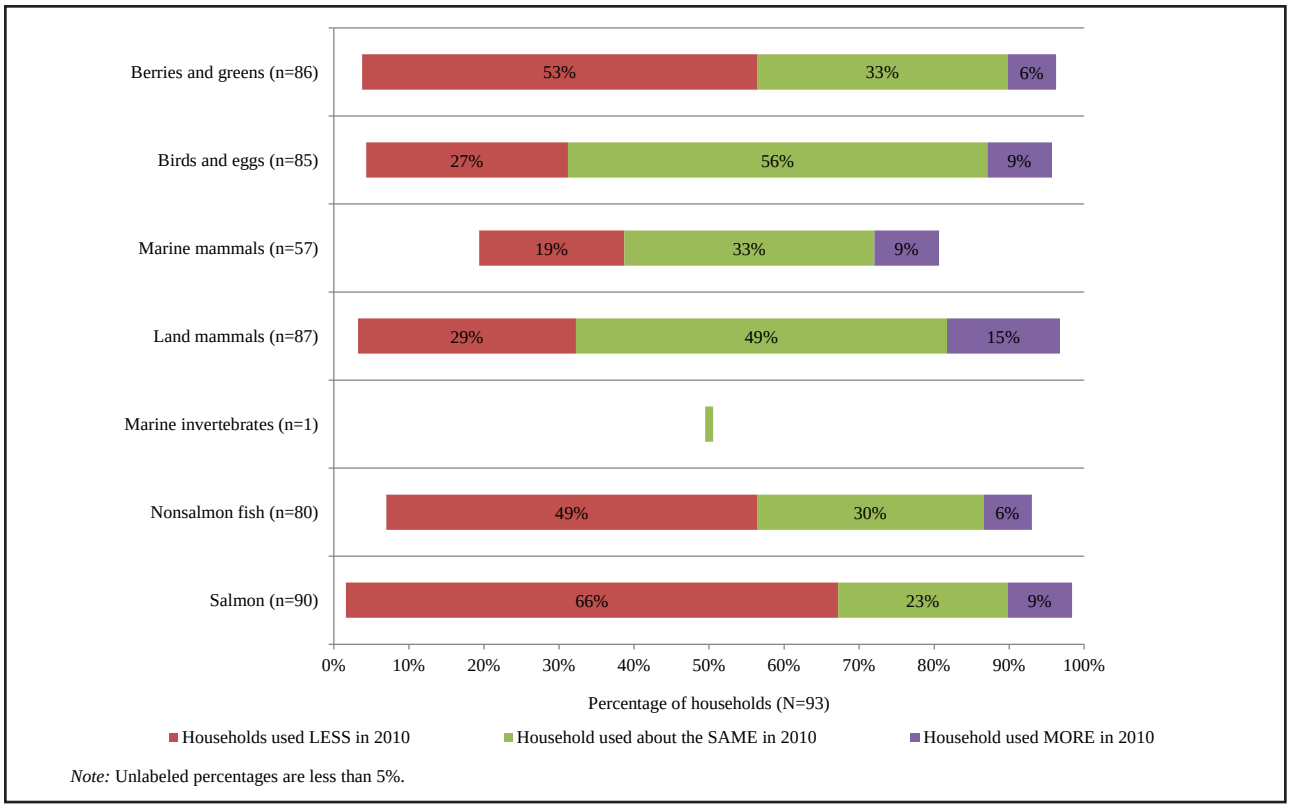

Figure 6-19.–Harvest assessments, Kwethluk, 2010. Responses to the question: "Did your household use less, more, or about the same amount in 2010 as in the past?"

50% of responding households said the impact was minor and 31% said it was major. Twelve percent of households described that not getting enough salmon had a severe impact in their household; furthermore, salmon was the resource category with the highest percentage of households reporting that not getting enough had a severe impact.

Responses to harvest assessment questions for nonsalmon fish species showed a similar pattern to those for salmon. More households (49%) reported getting less nonsalmon fish species in 2010 than those that reported that they got the same (30%) or more (6%) in recent years. Responses for why households got fewer nonsalmon species were varied. Common answers were that the respondent lacked the equipment to fish, such as motors and nets (17%), or that they did not have enough personal time to target nonsalmon fish (17%). Less frequently cited responses included that the household did not receive as much nonsalmon fish as usual (12%), or that they did not put as much effort into fishing (12%). Whitefishes were most frequently identified as the nonsalmon fish resource of which households did not get enough. Seventy percent of households described the impact of not getting enough nonsalmon fish as minor.

Fifteen percent of the households that used land mammals had more than in recent years, and a fairly large proportion (49%) used just as much as they had in recent years. Of the households that used land

mammals more, 23% said it was because they received more from other households. Of those that used less, unsuccessful hunting effort and the high price of gas were the most often cited reasons. Of the 24 households that said they did not get enough land mammals in 2010, 50% said that not getting enough posed a minor impact to the family, whereas 42% said it had a major impact. The resources lacking most often were caribou (reported by 19 households) and moose (reported by 17). Attesting to the distance that hunters needed to travel to harvest moose, the most frequent reason hunters did not successfully harvest was due to high gas prices. Many also mentioned over-competition in the local area coupled with short opportunity (10 days in September) to harvest moose. Two percent of the households also noted specifically that they did not get enough beavers.

The harvest and use of marine mammals were discussed less by respondents than large land mammals. Of the 57 households that reported using marine mammals, the majority stated that they used the same amount as in recent years. Although only 13% of Kwethluk households harvested marine mammals in 2010, the fact that 61% of households used marine mammals indicates high levels of sharing marine mammals or marine mammal products. Consistent with this pattern, the most often cited reason for a household not getting enough marine mammals is that they were not given enough. Relatively few (9%) households described using more marine mammals in 2010 in relation to previous years.

Fifty-six percent of respondents that reported using birds and eggs used the same amount of birds and eggs as previous years, a high level of consistent use suggesting few barriers to access or participation in harvesting. Respondents offered an increase in effort for higher harvest levels of birds, yet no equipment, low harvest effort, and lack of receiving the resources from other households were all frequently cited reasons for using fewer birds than in recent years. Households reported wanting more mallards, northern pintails, white-fronted geese, black scoters, cranes, and ptarmigans. All households that reported not getting enough birds and eggs felt that it had a minor impact on the household.

2010 was described by many respondents as a bad berry year. As such, quite a few households that used berries reported using less (53%) berries and greens in 2010 than in previous years. Twenty-two percent of those reporting less use said it was because of low resource availability. Of the 49 households reporting less use, 23 households reported specifically needing berries and 4 of those specifically needed more blueberries. Households were asked about the severity of hardship associated with not gathering enough berries and greens. Responses varied from 10% saying that the impact was not noticeable to another 10% saying that the low berry harvests had a severe impact. Forty-five percent said it was a minor impact to the household.

Jobs and Income

Respondents were asked about both earned income (jobs held and wages earned by all household members 16 years old and older) and unearned income (Alaska Permanent Fund Dividend, Social Security, public assistance, etc.). For 2010, Kwethluk households earned or received an estimated $5.3

million, of which $3.2 million (61%) was from wage employment and $2.1 million (39%) was from other sources (Table 6-7). The per capita income was $7,445; for comparison, the American Community Survey reported a per capita income of $14,522 or approximately $6.5 million for the community (U.S. Census Bureau 2010a). This survey estimated the mean per household income was $34,250.

The top source of income was employment related to local government ($2.3 million), which included city or tribal employment, from which 104 households received income (Figure 6-20). The second largest source of income was from Alaska Permanent Fund dividends, which accounted for

Table 6-7. – Estimated earned and other income, Kwethluk, 2010.

Income source	Number of people	Number of households	Total for community	Mean per household[a]	Percentage of total
Earned income					
Local government	137.4	103.9	$2,301,454	$14,848	43.4%
Services	15.7	15.9	$310,358	$2,002	5.8%
Retail trade	13.9	14.1	$176,730	$1,140	3.3%
Transportation, communication, and utilities	7.0	7.0	$101,121	$652	1.9%
Construction	7.0	7.0	$90,649	$585	1.7%
Agriculture, forestry, and fishing	22.6	22.9	$76,618	$494	1.4%
Other employment	5.2	5.3	$68,713	$443	1.3%
Federal government	5.2	5.3	$51,682	$333	1.0%
State government	3.5	3.5	$23,807	$154	0.4%
Mining	1.7	1.8	$17,644	$114	0.3%
Earned income subtotal	**196.3**	**121.5**	**$3,218,776**	**$ 20,766**	**60.6%**
Other income					
Alaska Permanent Fund Dividend		146.7	$806,520	$5,203	15.2%
Food stamps		53.3	$409,907	$2,645	7.7%
Social Security		31.7	$275,037	$1,774	5.2%
Unemployment		33.3	$103,625	$669	2.0%
Pension/retirement		18.3	$101,702	$656	1.9%
Supplemental Security Income		13.3	$81,711	$527	1.5%
Adult public assistance		18.3	$81,650	$527	1.5%
Native corporation dividend		121.7	$59,094	$381	1.1%
Energy assistance		41.7	$55,696	$359	1.0%
Citgo fuel voucher		86.7	$43,113	$278	0.8%
Other		6.7	$41,055	$265	0.8%
Longevity bonus		15.0	$22,473	$145	0.4%
Medicare/medicaid		1.7	$7,240	$47	0.1%
Child support		1.7	$1,083	$7	0.0%
Workers' compensation/insurance		0.0	$0	$0	0.0%
Disability		1.7	$0	$0	0.0%
Veterans assistance		1.7	$0	$0	0.0%
Foster care		0.0	$0	$0	0.0%
Meeting honoraria		1.7	$0	$0	0.0%
Other income subtotal		**1.7**	**$2,089,906**	**$ 13,483**	**39.4%**
Community income total			**$5,308,682**	**$34,250**	**100.0%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. For confidentiality, income amounts are not listed for sources reported by fewer than 4 households.

15% of the community's total income source, and were received by all households. Entitlements, such as Medicare and Supplemental Security income, composed the third largest income source (11% of community total). In Figure 6-20, "other" (3%) refers to miscellaneous income such as ANCSA corporation dividends, foster care, and meeting honoraria. Agriculture, forestry, and fishing brought $76,620 to Kwethluk and employed 23 households in 2010 (Table 6-7).

This survey estimated a community total of 461 adults, of which 196 (43%) held employment for at least part of 2010. The total number of jobs estimated was 226, which includes employment in the community, in neighboring Bethel, and jobs held in other parts of Alaska. The mean number of jobs held by Kwethluk households was 1.9. Only 39% of the employment was year-round. Most of the employment held by residents was on a seasonal basis, providing, on average, 8.3 months of wage income.

The data collected on jobs and income in this study differed from data collected for the study year of 1986 by Coffing (1991) in that it documented jobs available to Kwethluk residents inside and outside the community whereas Coffing created an inventory of jobs available within the community. In 1986, Coffing (1991) found that more than one-half of the jobs in the community (55%) were full-year jobs. This study recorded a smaller proportion of year-round employed persons (39%) to those holding seasonal jobs. Furthermore, Coffing (1991) found that more than one-half of the jobs in the community, both seasonal and year-round, were part-time. This study documented that 32% of the jobs

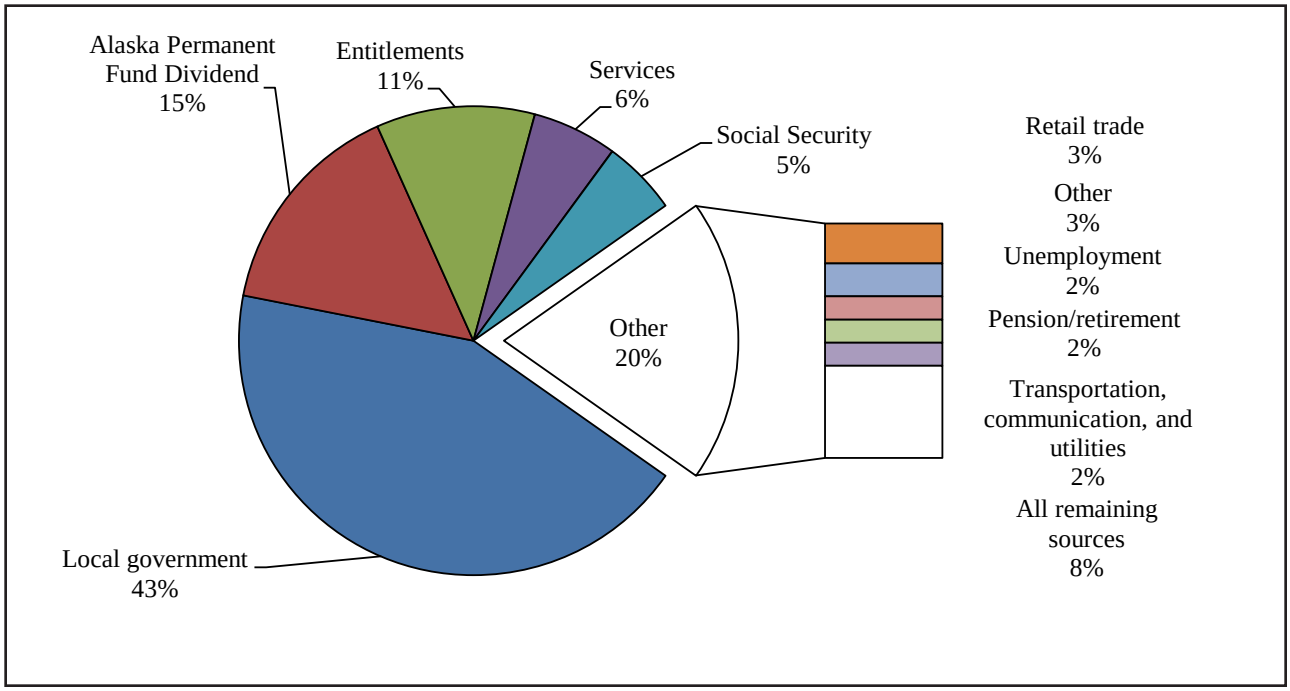

Figure 6-20.–Top 10 income sources ranked by estimated amount, Kwethluk, 2010.

held by residents were part-time, whereas 48% were full-time. That suggests that either the structure of employment has changed over the last 25 years, or that differences in sampling caused this study to record a higher number of individuals that accepted seasonal employment outside the community than was recorded for 1986.

Food Security

Respondents were asked a short series of questions to assess their household's food security, defined as "access by all people at all times to enough food for an active, healthy life" (Nord et al. 2009). Modeled on a method developed by the USDA, survey questions were modified by ADF&G to account for differences in access to subsistence and store-bought foods. Core questions and community responses are summarized in Figure 6-21. Results in this section are expanded from the frequency of reporting households.

Households were scored based on their responses to the prompts shown in Figure 6-21A. Households were then designated as having high, marginal, low, or very low food security. In Kwethluk in 2010, 72% of the surveyed households were food secure, having either high or marginal food security (Figure 6-21B). In the analysis, food secure households reported no more than 2 instances of food insecurity, often manifesting as anxiety over food availability for at least part of the year or as a food shortage that did not disrupt their eating pattern. Eighteen percent of Kwethluk households had low

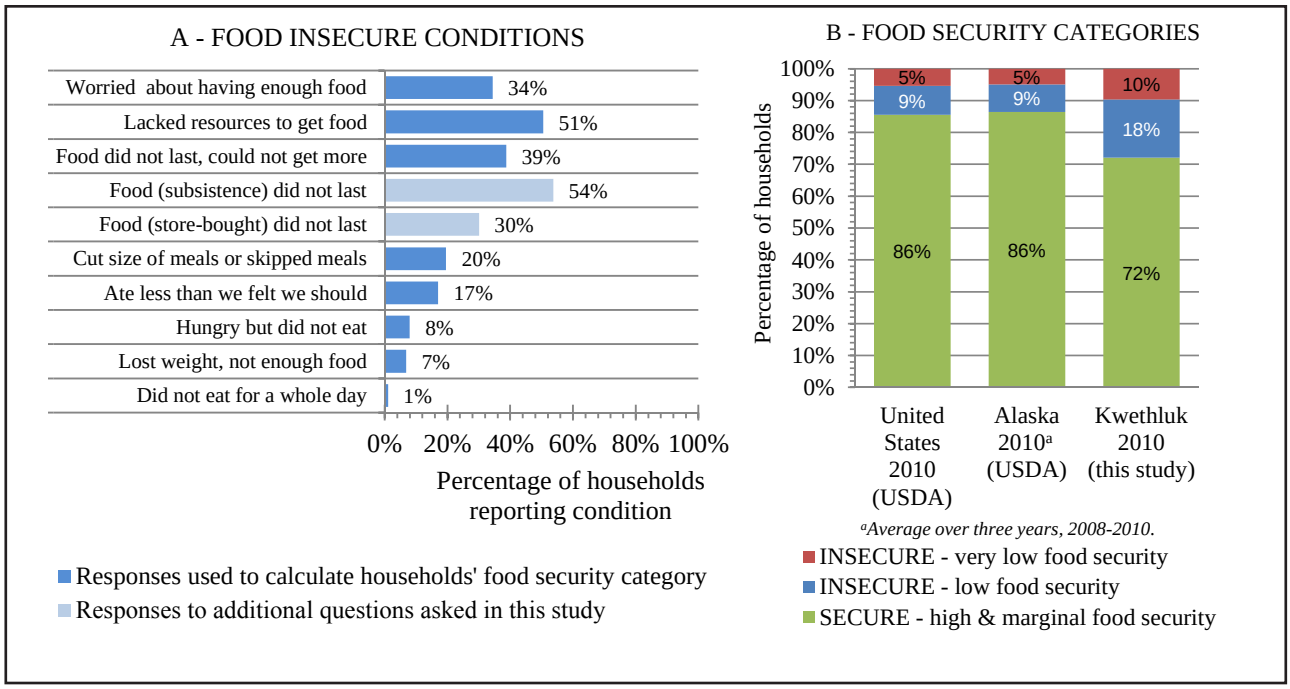

Figure 6-21.–Food security results, Kwethluk, 2010.

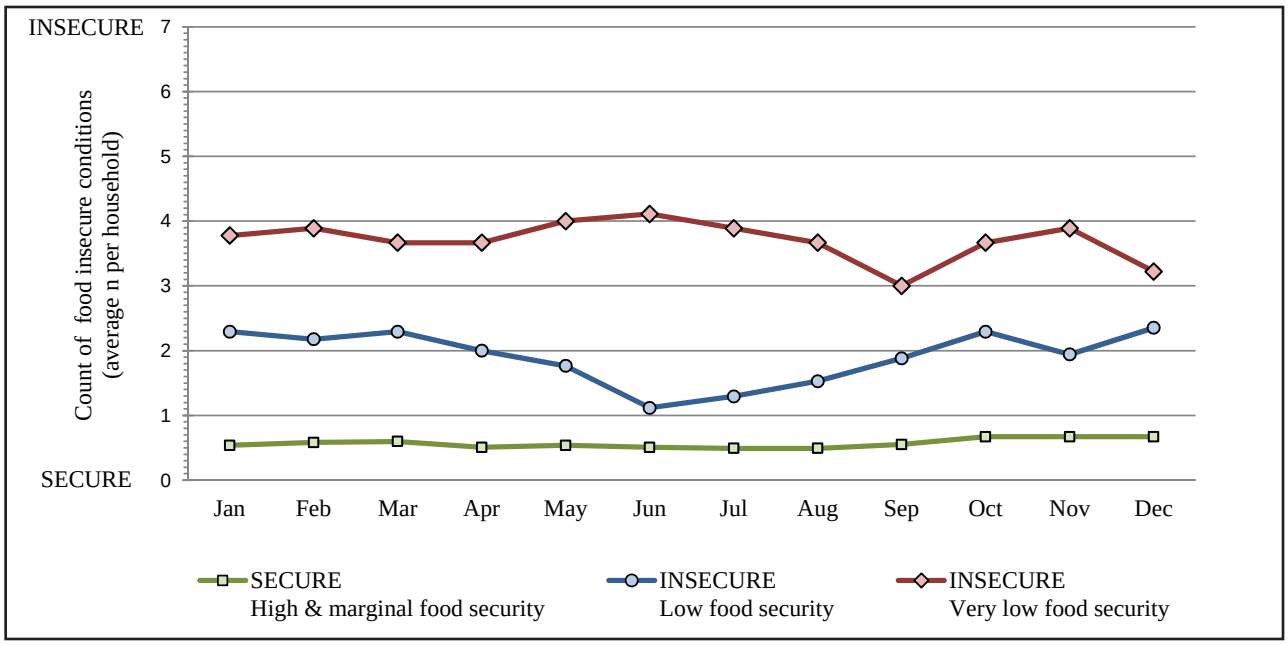

Figure 6-22.–Food insecure conditions by month and by household category, Kwethluk, 2010.

food security. These are households in which heads of households, at some point during the year, had trouble providing enough food for their family. The remaining 10% of households reported conditions of very low food security. These households reported a disruption in their eating pattern for at least 7 months of the calendar year.

Figure 6-22 portrays the responses to food security questions, or reports of instances of food insecure conditions, through the year. The food secure households collectively indicated that they remained steadily secure throughout the whole year. Households labeled as food insecure, those with low or very low food security, experienced the most seasonal variability as a group, experiencing food insecurity most strongly in October until May. The most insecure households indicated the most instances of insecurity in June but consistently reported an average of 3 insecure conditions per month. This follows the model experienced by other communities.

Wild Food Networks

Subsistence hunting, fishing, and gathering are highly cooperative endeavors that few individuals undertake alone. Furthermore, the food and materials gained through a person's efforts are usually distributed along kinship lines or through other social relationships. This survey collected information on distribution networks for individual resource categories, and some important resources such as moose and seals, between households in this community and with other communities. Respondents

were asked "Last year, who killed the ___ your household used?" and "Last year, who processed the ___ your household used?" For each resource used, every household was asked if they gave that resource to another household, and if they received that resource from another household.

Figure 6-23 portrays a network of Kwethluk households linked to each other, as well as to other Alaska communities, by the sharing of resources. Each node represents one household (or household in another community in the case of a blue circle), the size of which correlates to the household's total harvest amount. The nodes are shaped according to the structure of the household, and colored according to the age of the head or heads of household. The sharing of harvested and processed resources is portrayed by the directional arrows, originating from the source household providing the resource and directed toward the receiving household. The weight of the line represents the number of links between households. One limitation of the study is that the ties between households do not document resources other than wild foods that might be shared in these relationships of reciprocity, such as furnishing gas, equipment, or cash in exchange for processing or harvesting services.

Many of the higher producing households conformed to the patterns demonstrated in other studies of typically high harvesting households (Magdanz et al. 2002). The highest harvesting household (headed by a single male) harvested 11,514 edible pounds of resources. This household participated in a relatively small network with 3 other households and 2 communities. Common reasons a household formed a network with another household was for support (such as processing or harvesting labor), and cultural interpretation of, and access to, subsistence resources. Network ties would likely be sought with other households that have specialized knowledge and ability in harvesting, elder households to interpret the natural world, and high harvesting households. Following this, a household with a heterogeneous network is more advantaged in terms of access to the subsistence economy (Hanneman and Riddle 2005). The second highest harvesting household is led by a mature couple, defined as the oldest household head above the age of 59. It harvested a total of 11,396 lb and was named as a source household for 41 different exchanges. The household shares a network with a diversity of households and one community.

Six households reported having no ties with any other households, represented by the solitary nodes on the top left of Figure 6-23. Half of these households are elder households, which are generally supported by other households; it is unclear why these households are isolates in Kwethluk.

Comparisons with Prior Results

This section compares the major findings of the 2010 study with previously published data. This is the second comprehensive subsistence harvest survey conducted by ADF&G in Kwethluk; Coffing (1991) documented harvest and use patterns, search area maps, and ethnographic data for Kwethluk residents in 1986. ADF&G has also conducted subsistence salmon surveys (gathering information on both salmon and nonsalmon species) in Kwethluk in most years from 1960 to the present. Finally,

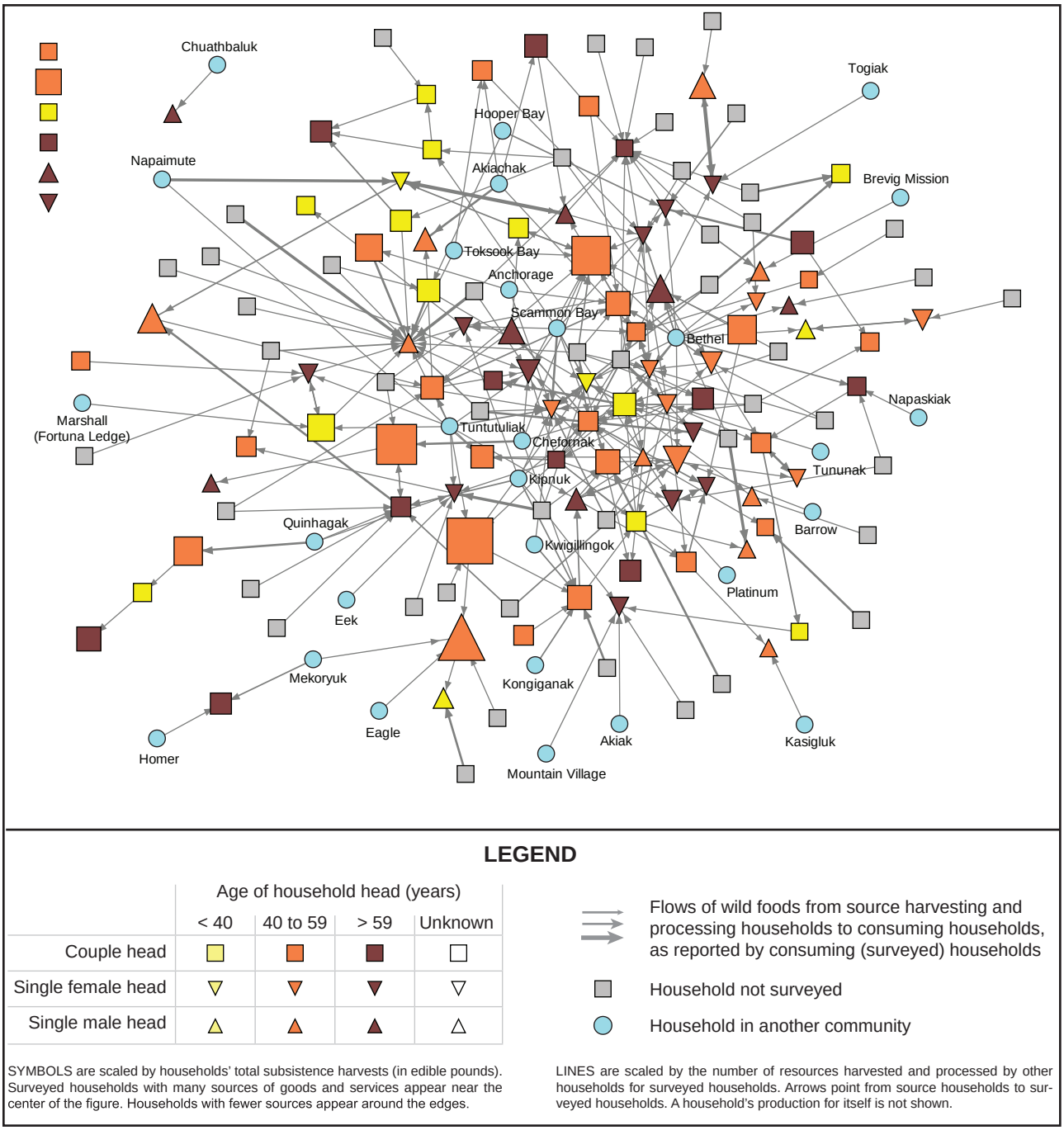

Figure 6-23.–Wild food harvesting and processing network, Kwethluk, 2010.

ADF&G estimated migratory bird harvests as part of the Alaska Migratory Birds Co-Management program from 2004 to 2008. This section discusses the current results, and compares them with prior results.

Figure 6-24 shows the estimated subsistence salmon harvests, for all species but pink salmon, from 2000 through 2010. The 4 species are ordered according to run timing, beginning with Chinook salmon in June and ending with coho salmon in late August. In the preceding decade, from 2000 to 2010, Kwethluk fishers relied heavily on Chinook salmon; it was the highest harvested species of salmon in all but 2 years. Chinook salmon harvests are relatively stable in Kwethluk; harvests ranged from 4,925 to 8,303, with an average of 5,892 fish harvested yearly from 2000 through 2010. In 2000 and 2002, when Chinook salmon were not the highest salmon harvest, reportedly due to poor fishing conditions, warm weather, and fishing schedules, chum salmon took its place (Fall et al. 2002, Fall et al. 2003). Chum salmon harvests averaged 4,461 fish in the past 10 years—sockeye and coho salmon were harvested in lesser quantities, averaging 3,064 and 2,863 fish, respectively. As shown in Figure 6-24, there was an average harvest of 16,460 salmon. The higher-than-average harvests in 2008 were likely due to increased effort during the peak of the runs and few regulatory restrictions.

A change in salmon abundance and harvest effort was a central theme among key respondents. Fishers pointed out that the 10 years presented in Figure 6-24 is insufficient to infer temporal trends in population abundance (032111KW2). An entire lifetime was generally used as a frame of reference when offering observations on salmon abundance. One elder respondent described his family's salmon fishing effort when he was a youth:

> We drift. That's when salmon was plentiful …. We harvested three, sometimes four loads with our wooden boat. When we catch a lot, the boat, you could count at least a hundred something. It's like about four hundred fish. I can't remember …. Most of the time [they] were chums. We get about … a quarter were red salmon. But the kings were about half of them. And the rest were silver. The three main ones we gather. (032111KW2)

There was a consensus among elder respondents that over the course of their lifetimes, annual variation has occurred, though salmon abundance has generally declined since their younger years. According to ADF&G, chum and sockeye salmon abundance in 2010 were regarded as very good, whereas coho salmon abundance was below the 10-year average and Chinook salmon abundance was poor (ADF&G 2010a). These data are reflected in the subsistence harvest data in Figure 6-24 for the year 2010. Sockeye and chum salmon harvests are above average and Chinook and coho salmon harvests below average. However, harvest numbers do not vary in direct proportion to yearly run abundance. For instance, Chinook salmon harvest, the earliest run, varied only by as much as 17% of its 10-year average. Variance in yearly harvest numbers is greater for later-run salmon species such

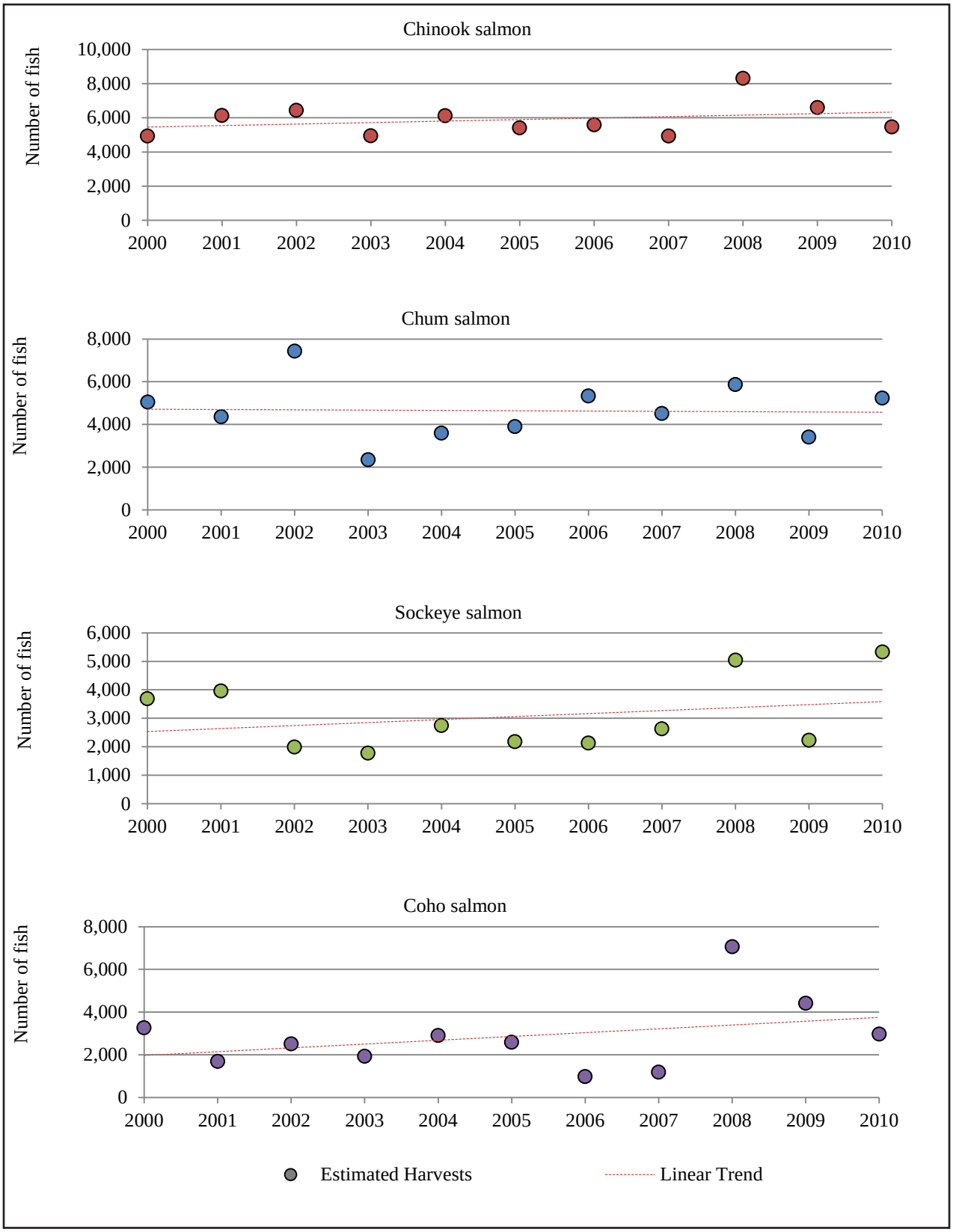

Figure 6-24.–Estimated numbers of Chinook, chum, sockeye, and coho salmon harvested by residents of Kwethluk, 2000–2010.

as sockeye (41% variation from its mean) and coho (69% variation). This indicates that fishers focus their effort early in the summer fishing season and strive to attain their personal harvest goal.

There have been changes in nonsalmon fish harvests, as indicated by the 2 study years. In 1986, northern pike harvests amounted to 40,694 lb as compared to 24,125 lb in 2010. Fishers harvested 33,735 lb of burbot in 1986 as compared to 1,938 lb harvested in 2010. Though the 2 years of data suggest fishers are harvesting nonsalmon species in lesser quantities, whitefish harvests appear stable. Fishers harvested almost 30,000 lb in both years. In both years, Arctic grayling and char were harvested in relatively small numbers, and exclusively with rod and reel, although ethnographic data assign great cultural importance to these small species (Coffing 1991). When one community member reviewed Figure 6-1 (the top 10 species harvested ranked by edible weight) he exclaimed, "What I don't see up there are the rainbow trout, the grayling, and the Dolly Varden." He continued, "What I don't want is that my right to go upriver and harvest … taken from me, because my family used to go up there and fish" (participant, community review meeting, Kwethluk, personal communication, November 2011). Though these harvests are documented in this study and do not occur in the top 10 harvested species, they continue to be locally important resources, even though they are not harvested in higher quantities.

The Division of Subsistence has collected information on large land mammal harvests in Kwethluk only twice—first by Coffing (1991) in 1986 and second by this study for the year 2010. Brown bear harvest data were collected in 1991 and 1992 by the Association of Village Council Presidents (data reported in the CSIS). Kwethluk's estimated moose harvest in 2010 (33 moose) was equal to the moose harvest documented in 1986, although this should not be interpreted to mean that moose population or harvest efforts have been steady. To the contrary, hunting patterns have adapted to meet changes in abundance. Moose were still a developing population and were a rarity for all respondents during their childhoods. One respondent told a story about sneaking away from his family's spring camp as a child to get his first look at a moose (032211KW4). Respondents observed that moose numbers are growing and all agreed that the local 6-year moratorium enacted to protect the colonizing population was markedly beneficial.[3]

Given the perceived increasing abundance of moose in the vicinity of Kwethluk, most concerns raised by respondents referred to relieving hunting restrictions. "The past three years it's been kind of unlucky due to the shortness of the moose season. First time it was 10 days. Then last year it was 7 days. Didn't have time. We just needed more time to hunt for moose" (031911KW5). Another respondent recommended caution in lengthening the season or in establishing an antlerless hunt so soon after the moose moratorium as some hunters wished for.

"There is getting to be more and more down here. We aren't doing this [moratorium] for us. It's for our kids." He concluded on the current season, "People are saying that moose hunting isn't long

3. Due to a desire for a larger moose population to meet subsistence needs, a cooperative agreement between the Lower Kuskokwim Fish and Game Advisory Committee, the Association of Village Council Presidents, interested individuals, and the USFWS was reached to close the lower portion of the Kuskokwim River Drainage, including Eek River, to the harvesting of moose for 5 consecutive years beginning in the year 2004.

enough. This and that. I understand what's going on. I understand what people are saying, but the way it's set up is fine with me" (032411KW6)

As noted earlier in this chapter, caribou was a staple resource along the prehistoric Kwethluk and Kisaralik rivers. Their migratory nature has made them less of a mainstay for Kwethluk residents in the past 2 decades. Elder respondents reported that during their youth they encountered migrating caribou from the Mulchatna herd in the Kilbuck Mountains although they did not descend to the tundra around Kwethluk. "Caribou around here is unheard of, 70s and 80s, around that time. It's not too long ago that the caribou start coming down. That's what the old people say, 'They are going to start coming back again'" (032211KW4). Through radiocollaring, ADF&G identified Kilbuck caribou calving along the headwaters of the Kisaralik and Kwethluk rivers, and ranging as close as Three Step Mountain (Coffing 1991). This smaller herd was short-lived. According to the 2009 ADF&G Caribou Management Report, migrating caribou from the larger Mulchatna herd began reabsorbing the smaller, discrete Kilbuck caribou herd in 1994 (Perry 2009). At that time of the study, though, caribou were overwintering close to Kwethluk, leading to higher harvests. One respondent noted that his sons did not even have to travel farther than the airport during the winter of 2010 to harvest 3 caribou (031911KW5).

Both brown and black bears are an important game species for fur and food and there appeared to be no significant change in harvest quantities between the 2 study years. There was no discussion of changes in either bear abundance or distribution in recent decades; this is likely because there has been no change. However, bear/human encounters did occur in the year prior to this study.

> This year we had lots of black bears getting into people's smokehouses last fall. Must have been 4 or 5 bears after freeze-up. There was snow around and they were still walking. It's because there were no berries, so they had to get food. It's weird last year. (032411KW6)

Black bears occur in the same habitat as moose, which is along the riparian corridor, and many are harvested in conjunction with fall moose hunting. Brown bear hunting is regarded as more specialized and only a few community members become an expert. One active hunter thought that brown bear numbers suffered from the moose moratorium because harvest effort of brown bears increased to fill local freezers as a substitute for moose (032411KW6). Figure 6-25 portrays estimated large land mammal harvests by Kwethluk residents from 2000 to 2010.

Bird and egg harvest estimates recorded in the years 2004–2008 are only reported on the regional level, so direct comparisons between the 2 studies cannot be made. Kwethluk is part of an area in the lower Kuskokwim River that is rich in migratory waterfowl habitat—a fact reflected by high community reliance on ducks and geese (Coffing 1991). The Lower Kuskokwim River area, encompassing 13 communities, harvested a range of 16,557 to 58,983 birds in the years 2004–2008. For reference, in 2010 Kwethluk harvested 5,357 birds, compared to 6,507 birds in 1986 (Naves 2010, 2010 [rev],

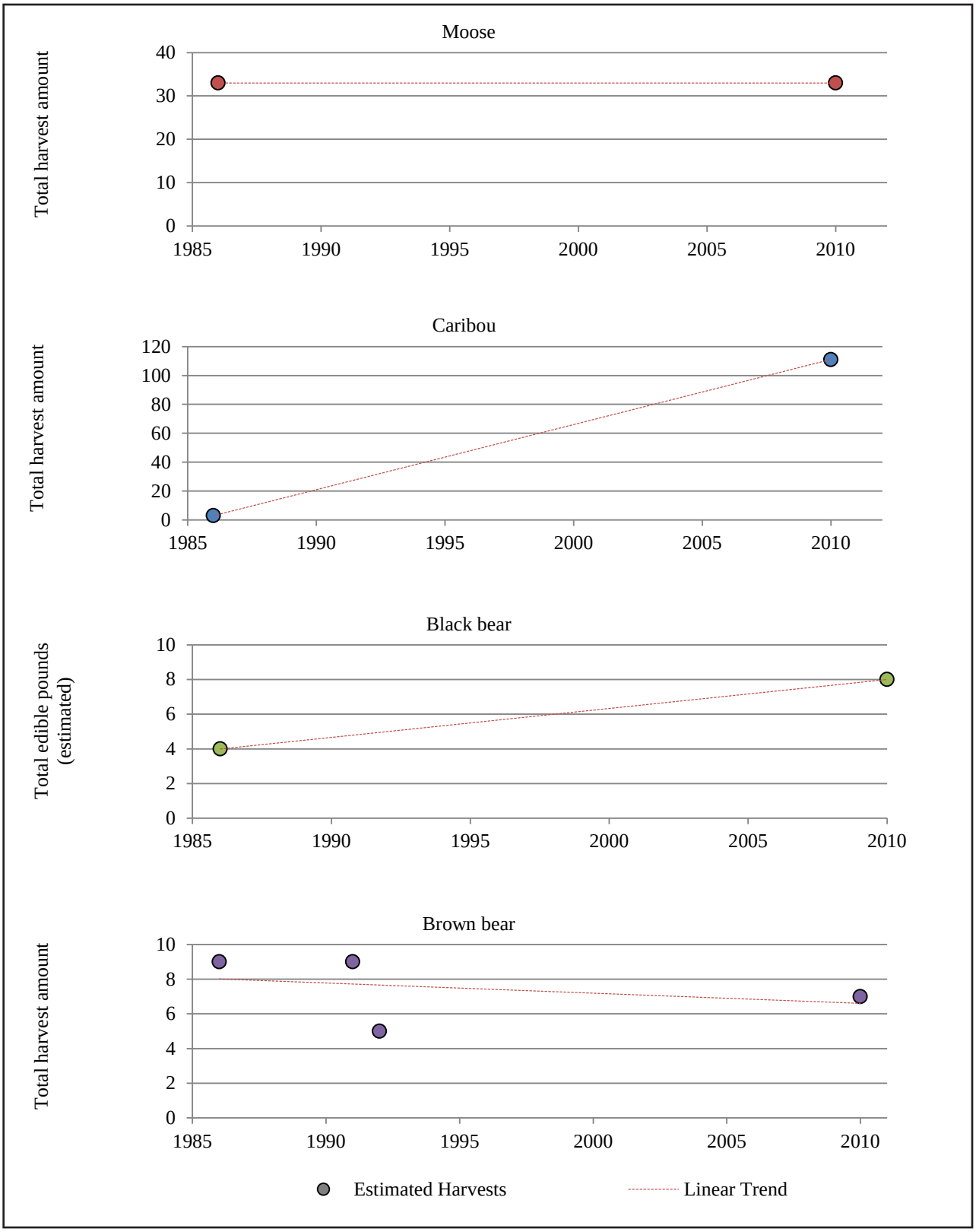

Figure 6-25.–Estimated numbers of moose, caribou, black bear, and brown bear harvested by residents of Kwethluk, 1986–2010.

Coffing 1991). Large bird harvests increased drastically, likely due to the creation of spring waterfowl hunting opportunities to federaly qualified hunters. There was a 646% increase in geese harvests and slight increases in swan and crane harvests. One respondent reported large flocks of snow geese flying along the mountains south of Kwethluk beginning in recent years (032211KW1). Another respondent credited steel shot for improving cackling and white-fronted geese abundance (031911KW5).[4]

Land use data was collected by Coffing (1991) and presented in Figure 6-26. Unfortunately, the historical land use data encompasses 67 years, an entire lifetime of activity, which makes side-by-side analysis with the 2010 data difficult, if not misleading. Historical land use information was collected in this study by 2 methods: oral accounts and historic land use mapping. It is useful to consider both methods to draw a comparison between the 2 studies. When comparing the 2 data sets, those contained in Coffing (1991) should be interpreted as a maximum extent, whereas this survey (figures 6-10 through 6-17) only portrays a minimum extent of land use from a 60% sample of Kwethluk households. Annual variation requires subsistence hunters, fishers, and gatherers to utilize a variety of places in different years, such that any one year will not likely capture all of the places that are significant for a particular activity.

Coffing (1991) recorded land use by Kwethluk residents for a period beginning in 1920 until 1987 (Figure 6-26). In such a wide expanse of time, seasonal patterns of occupancy changed, transportation methods improved drastically, and regulations and enforcement became more robust. Further, although wildlife important for subsistence follow generally predictable routes, annual variation to those routes may force subsistence users to change their areas of land use from year to year. The historical use maps collected by Coffing (1991) and depicted in Figure 6-26 show the life experiences of 8 Kwethluk residents. The 4 respondents born in Kwethluk recorded big game hunting, nonsalmon fishing, and small game trapping in the Kilbuck Mountains until recent decades. In general, there was less use of central Kuskokwim River lands and Kilbuck Mountain areas, and more use of the Yukon River in pursuit of subsistence resources.

Historical salmon fishing occurred along the Kanektok, Kwethluk, Kisaralik rivers by families who camped along the middle tributaries, and in the Holitna and Hoholitna river drainages in conjunction with other subsistence activities. Salmon fishing in these tributaries was not documented by the respondents in their lifetime, save for targeting coho salmon with rod and reel in the Kwethluk and Kisaralik rivers while fall moose hunting. In 1986, as with 2010, the majority of salmon fishing was located in the Kuskokwim River and Kuskokuak Slough, both of which are adjacent to the community.

Nonsalmon fishing, especially for trout, Arctic grayling, and char, was a favorite activity of the respondents during their spring migration to the mountains. In addition, nonsalmon species were targeted in Heart, Upnuk, and Chikuminuk lakes and the Tuluksak, Aniak, Holokuk, and Oskawalik rivers (Coffing 1991). Respondents in this study reported that hunters traveling in the Central

4. Lead shot settles to the bottoms of ponds and lakes. They may be mistaken for the grit consumed to aid in the digestion of food, leading to lead poisoning of waterfowl.

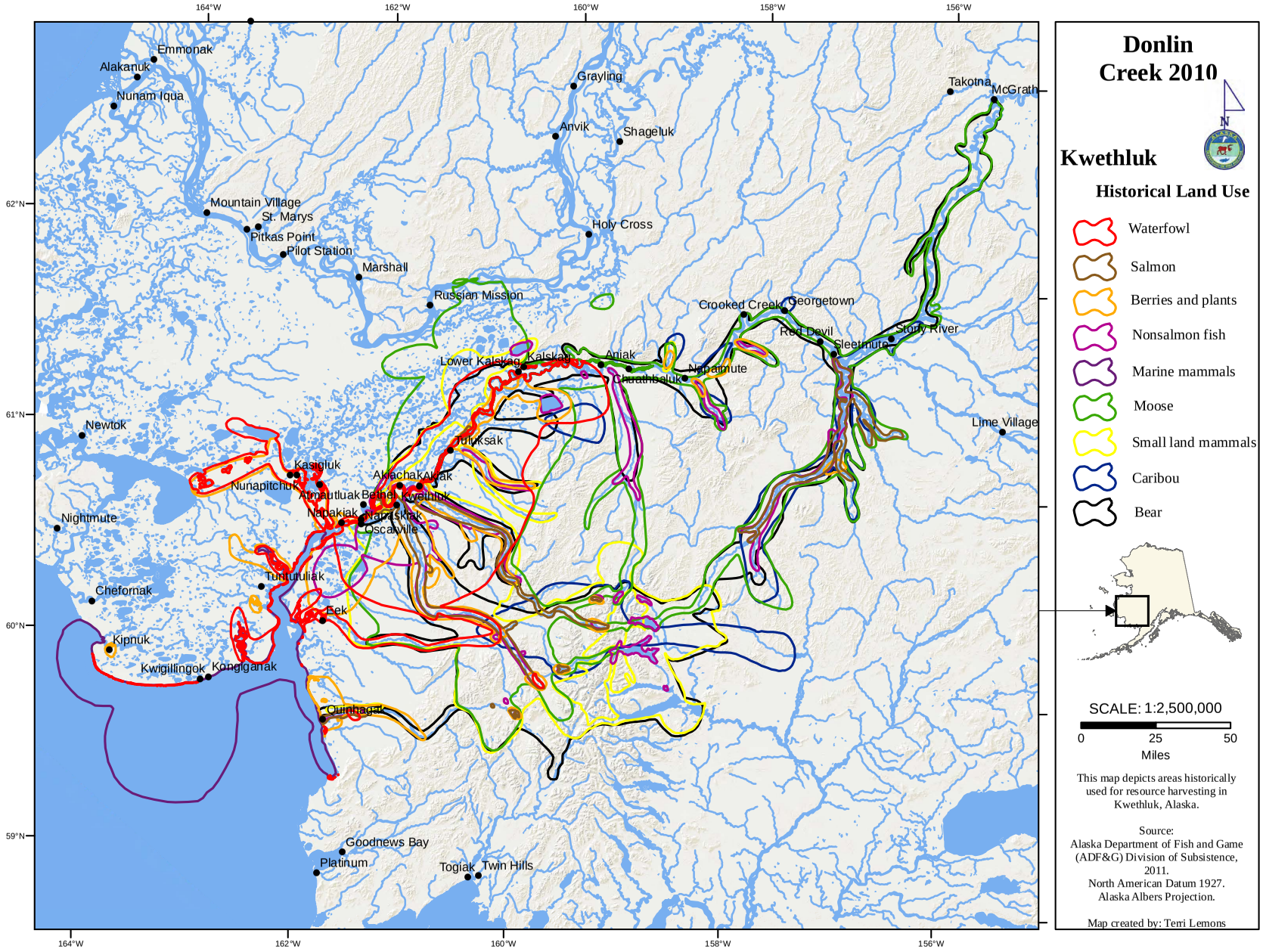

Figure 6-26.–Historical harvest locations and search areas, Kwethluk, 1920–1987 .

Kuskokwim River region still favor fresh trout and whitefishes as a camp food (032211KW4). Due to less travel by Kwethluk residents and a more sedentary lifestyle, nonsalmon harvesting is more centralized around the community.

Search areas for moose are the single most changing feature of the historical and contemporary maps. Short-term changes in moose search areas were precipitated by declining abundance, user conflict, and restrictive regulations. Residents opportunistically harvested moose while trapping or camping in the mountains in the 1920s to 1950s. Harvesting large land mammals was a logistical necessity for seasonal travel back to summer fishing areas.

> And those … rafts were made out of … moose hides. Whenever … whenever we can find a moose, we gladly take it. Couple of them makes a good … good-sized boat to … float up maybe 2–3 families. (032211KW1)

Moose were actively sought, beginning in the 1940s, in the Aniak, Holitna, Holokuk, and Oskawalik rivers, and along the mainstem Kuskokwim River as far as McGrath (Coffing 1991). Respondents recalled taking skiffs upriver, with either a hunting party or their family, to established camps.

> My first moose hunt was like in 1980. After high school. [We went to] Chuathbaluk. Following year, my first moose hunt was Holitna. Real moose hunt. The first hunt was like a trip. Like exploring, we were camping and watching out for moose. I didn't know that much about moose hunting. But we went as far as Chuathbaluk … my dad used to talk about moose hunting, going up that way. (032511KW8)

Progressively restrictive measures put in place during the previous decade in GMU 19 by the BOG drastically limited moose hunting areas for all but a couple hunters that received Tier II harvest permits (Brown et al. 2012). In contemplating the relation between hunting areas and restrictive regulations, one respondent commented:

> I'm glad they have that moose opening towards over at the Yukon. That's what is saving the moose around here. We have a chance to go hunt at the Yukon. If it wasn't for that, I don't think this moratorium would work. If they tried to limit that hunt somehow, that would be no good. And in 21E, I wish they would open it up to anyone on the Kuskokwim. We used to go over there too, above Kalskag. (032411KW6)

Caribou search areas were much more consolidated than moose. Coffing (1991) noted that the most concentrated search area was in the Kilbuck Mountains. Key respondent maps show that from the 1980s to present day that search areas shifted closer and closer to the community of Kwethluk as small groups of the Mulchatna herd descended from the Kilbuck Mountains. When asked when the caribou began to descend the Kilbuck Mountains, one respondent mused, "That was in the 90s, it seems like.

When they had … the Mulchatna herd and a big snowstorm. It [caribou] all went down. We started hunting" (032411KW6). In 2010, caribou were not extensively hunted in the Kilbuck Mountains because they were known to be overwintering directly south of the community.

Small land mammals were harvested in conjunction with other subsistence activities, and historical search areas mirror the expansive area of big game hunting. This pattern does appear to hold true in the year of 2010, although search areas for big game became largely constricted to the tributaries around Kwethluk. Although extensive trapping activity is documented in earlier years, there were no mapped traplines in 2010 nor did respondents discuss actively trapping in their lifetime. When asked about trapping, respondents recalled their fathers traveling from camps in the Kilbuck Mountains into the Aniak and Holitna drainages and along the mountain foothills. The respondents stated they were still too young to accompany the older generation, thus, they did not have firsthand experience with trapping (032211KW1, 031911KW5).

When considering the need to travel to harvest resources, in the past as in contemporary Kwethluk, one resident said, "The only reason Kwethluk is here is for resources around us. It's just one word repeated three times: 'Location'" (Kwethluk IRA council member, Organized Village of Kwethluk, Kwethluk, personal communication, November 2011). The people of Kwethluk have benefited from the strategic choice of location. By choosing a settlement at the juncture of multiple environments, the people of Kwethluk have ensured themselves a plentiful and varied source of food.

Kwethluk has experienced many changes throughout its history. Discontinuing their annual migration to the Kilbuck Mountains decreased their access to a number of subsistence resources found in that region. However, advances in transportation allowed residents to travel far upriver for big game and to the ocean in search of marine mammals. Currently, the large population of Kwethluk again enjoys access to a number of resources, although this is only truly beneficial if residents can meet the high financial cost of equipment and transportation.

7. Comprehensive Survey Results Napaimute, 2010

Prepared by Brittany Retherford

In May and June 2011, researchers surveyed 16 of 25 Napaimute households (64%). Like Georgetown, Napaimute is a unique settlement from most other villages on the Kuskokwim River because its residents are primarily seasonal—they travel to their cabins from other parts of the river drainage and Alaska to recreate and pursue subsistence activities. Napaimute once had a sizable population of both Native and non-Native residents, but the population dwindled post-World War II, similarly to other villages at the time, as residents relocated to regional centers or larger Alaska cities for employment or other opportunities (Mikow 2010). The village site of Napaimute was never entirely abandoned, however, and there is now a directed effort by the Napaimute Traditional Council to resettle the village site. Though Napaimute is not a typical village, the people who seasonally inhabit the area share a communal affiliation because of an affection for or cultural ties to the Napaimute landscape and its flora and fauna. The atypical characteristics of the Napaimute community and its history will be discussed in further detail in the next section "About Napaimute," but like any community, the relationship each individual has to the place he or she is connected to varies from person to person. The terms "community" and "community members" are used in place of "village" and "residents" throughout this chapter to differentiate Napaimute's unique status from other villages in this study that have permanent residents and also because, unlike Georgetown, a household's eligibility was not tied to tribal membership.

To determine which households would be considered eligible for survey participation, a household list was compiled with assistance from the Napaimute Traditional Council's Director of Development and Operations. The household list identified households consisting of families and individuals who either resided permanently in Napaimute, or, who owned or shared a cabin in Napaimute. A total of 25 households were identified with permanent residences in Anchorage, Chuathbaluk, Aniak, Napaimute, and Bethel. Surveys were conducted in-person in Bethel, Aniak, and Napaimute. One survey was conducted telephonically.

Expanding for 9 unsurveyed households, Napaimute's estimated total harvest of wild foods between January and December 2010 was 21,875 lb (±41%). The average harvest per household was 875 lb; the average harvest per person was 311 lb. Three species—Chinook salmon, moose, and coho salmon—made up 65% of the total community harvest in 2010 (Figure 7-1). In terms of edible pounds, Chinook salmon contributed more than any other single species to the total community harvest in

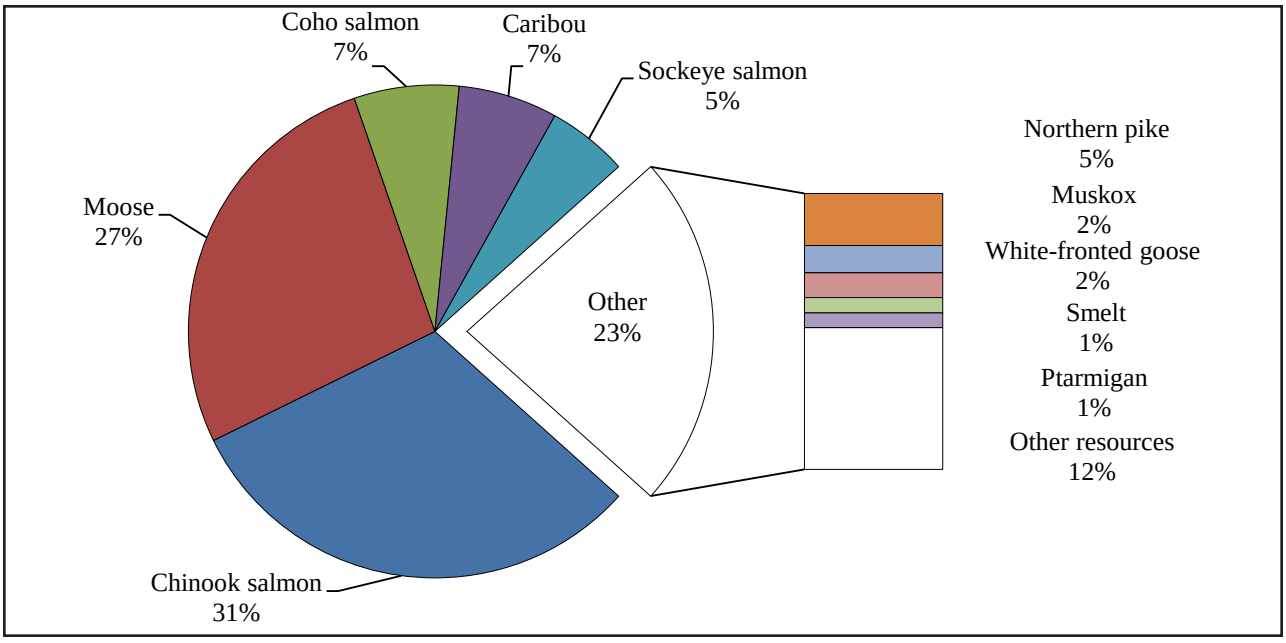

Figure 7-1.–Top 10 species harvests ranked by estimated edible weight, Napaimute, 2010.

2010; an estimated 6,798 lb was harvested, contributing 31% to the total community harvest of wild foods. Napaimute community members were also asked to indicate whether harvests occurred near Napaimute, in other parts of the Kuskokwim River drainage, or elsewhere in Alaska. A total of 20% of harvests of all resources were around Napaimute, 73% were from other areas on the Kuskokwim River, and 7% were harvested in other areas of Alaska.

This chapter summarizes findings from the household surveys, including demographic characteristics, responses to harvest assessment questions, harvest estimates, reported employment and income, and responses to food security questions. Harvest numbers are expanded estimates. In addition to the comprehensive survey, 2 key respondents were interviewed about their knowledge of the area and of subsistence practices and uses. These respondents were an elder couple who were actively involved in hunting, fishing, gathering, and/or preparing subsistence foods and had extensive historical and contemporary knowledge of the Napaimute area. In addition to this interview, notes were taken during surveys with respondents and during communications with tribal leaders. A community review meeting was conducted with 2 community leaders in December 2011. This meeting was recorded and provided further valuable information about Napaimute's past and present subsistence activities and uses. This information provided critical context for understanding survey responses, historical background, and other valuable data. Survey results and ethnographic findings are presented throughout this chapter.

Because of the unique nature of the status of Napaimute and its community members and the fact that most are permanent residents of places other than Napaimute, results from this survey are not included in the CSIS.

About Napaimute

> Napaimute is where our taproot is. It is where we come from. It is who we are. Out of the taproot comes a tree, and the taproot is firmly embedded in the ground in the shale at the side of the mountain. The tree has leaves and fruits, and the leaves and fruits are dispersed throughout the world. These are our people. These are our family. This is our tribe. This is who we are. Napaimute is a Yup'ik word that means tree, trees. We are the people of the trees. (Participant, community review meeting, Napaimute, December 2011, personal communication)

Napaimute is located on the northern bank on the Kuskokwim River about 30 miles east of Aniak in the Kilbuck–Kuskokwim Mountains (Figure 7-2). The climate of the Central Kuskokwim River region is continental, with annual temperatures ranging between –59˚F and 94˚F. Total annual average precipitation is 20 inches and average snowfall is 85 inches (ADCCED 2012a). The ecology of the area consists of diverse vegetation that is mainly spruce–hardwood forest and low-lying muskeg. The Central Kuskokwim region is home to Yup'ik and Athabascan peoples. More specifically, the area has been described by cultural anthropologists as being jointly occupied by the *Kuskquqvagmiut* group of Yup'ik Eskimos and the Georgetown subgroup of the *Deg Hit'an* (VanStone 1984). Napaimute is located at the intersection of 3 Alaska Native languages—Central Yup'ik, Deg Hit'an (formerly known as *Ingalik*), and *Dena'ina*.

Napaimute is distinct from other villages and villages in an earlier study (Brown et al. 2012) and this

Photograph ADF&G Brittany Retherford

Figure 7-2.–A view of the northern end of Napaimute from the Kuskokwim River.

phase of this study because it currently has few permanent residents. And while the Native Village of Napaimute is a federally recognized tribe, not all community members were tribal members. Napaimute community members maintain the common bond of having strong cultural, historical, recreational, and subsistence ties to the land and waterways around the village site, though individuals' relationships to the area vary from household to household. Community members during the study year held some combination (but not all) of the following characteristics:

- Native Village of Napaimute tribal members.
- Familial and cultural ties to the area.
- Relatively new to the Kuskokwim River drainage (primarily residing in Bethel), but who are leasing land from the Napaimute Tribe to build cabins for recreational and subsistence activities.
- Migrated to the area because of subsistence, recreational, or other opportunities.

According to anthropologist Wendell Oswalt (1980), who organized one of the most complete compilations of Kuskokwim history, Russian explorers first reached the Central Kuskokwim via the Hoholitna River in the 1790s, searching to establish trading relationships and routes that would support a Russian fur trade. Another expedition followed in 1818, but it was not until the 1830s that the fur trading activities escalated and 2 Russian trading stations were established—one at the junction of the Holitna and Kuskokwim rivers (Kolmakov Redoubt), and a second one known as Lukin's Odinochka at the village of *Kwigiumpainukamiut* (Brown 1983:195). With the Russian explorers came smallpox and other diseases, and in 1838–1839, an epidemic killed what is believed to have been about 50%–60% of the Native population in the region (Brown 1983).

Kolmakovskiey Redoubt, a trading station 9 miles from present-day Napaimute, was established by the Russian-American Company in 1841. Oswalt (1980) noted that Russian explorer Lavrenty Zagoskin likely visited the village site during his extensive explorations of the Yukon–Kuskokwim River drainages in the 1840s. Zagoskin remarked in his journals about passing an "empty camp" just before reaching the village of Little Mountain Village. Little Mountain Village was later abandoned in the 1920s, but it was located a few miles upriver of present-day Napaimute (Brown 1983:193–194). Since *Napa* means "tree" in Yup'ik and the camp Zagoskin visited was referred to as *Kybgakhtuk*, which means "forest," Oswalt (1980) deduced that Kybgakhtuk was the site of the first Napaimute (the village site is known to have been relocated a few times since then). *Napaimute* is a Yup'ik word meaning "people of the forest."

In 1867, the United States successfully purchased Russia's possessions in Alaska, formally ending Russian influence in the area. Napaimute was an occupied village when the first U.S. Census survey of Alaska was undertaken in 1880. In 1884, American explorer W.H. Weinland observed that there were a few people at Napaimute, but also that it appeared to have been a larger settlement at one time because of the number of abandoned "barrabaras," or dwellings (Oswalt 1980:62). The settlement was

possibly abandoned and relocated to its current location after suffering an influenza epidemic around 1900. As Oswalt (1980) noted in his study, the entire Central Kuskokwim region's Native population declined precipitously as a result of an epidemic around this time; generally, only the younger people survived the influenza.

In 1906, the village was formally established as a trading post by George Hoffman, an Englishman who ended up settling in the area after migrating to Alaska in the 1890s. He became a well-known trader with a large family, and Napaimute was often referred to as "Hoffman's," especially during the early years. George Hoffman, George Fredericks, and George Morgan are known collectively as the "three Georges" by Kuskokwim residents. The trio met while traveling by boat to Alaska in the late 1890s (participant, community review meeting, Napaimute, December 2011, personal communication). The three Georges worked together as partners for many years, creating a series of trading posts on the Kuskokwim and Yukon rivers that serviced the area's gold and other metal mining operations. During the fall of 1905, Hoffman and Fredericks were en route to bring winter outfits and supplies to their post at Georgetown to sell to miners upriver in the bustling mining communities in the area. Low water and early freeze-up prevented them from moving farther upriver than Napaimute, and the two men quickly erected a cabin and overwintered (participant, community review meeting, Napaimute, December 2011, personal communication).

Hoffman and Fredericks were struck with the fortune of good luck. Soon after they were forced to overwinter, a gold strike was discovered in Iditarod, and miners from Nome and other parts of Alaska began arriving in the area. Because of its location en route between gold mines, Napaimute became an important stopover trading station. One of the miners, Harold Peckenpaugh (1973:45), described visiting Napaimute during his Iditarod mining years, saying, "Napaimiut is a sizeable Indian village with a small trading post run by an Englishman. Fairly good accommodations were available. Here the trail left the river and headed across country to Marvel Creek." That historical trail route is still visible in winter (0527NA02). Because a trading station was established next to a Native settlement, the village grew up around a Western economic system, but was also heavily influenced by Native traditions and a subsistence way of life (participant, community review meeting, Napaimute, December 2011, personal communication).

Hoffman came to appreciate the location, deciding to raise his family at Napaimute and operated the trading post until his death in 1932 (Brown 1983:194). He married Elizabeth (Liza) Lind, the daughter of a Finnish trader and his Yup'ik wife. Together, they had 12 children, and to accommodate their family, Hoffman built a territorial school, which opened in 1920. It was the first territorial school on the Kuskokwim River. After the decline in fur trading, mining, and reindeer industries that were significant contributors to the economy of the Central Kuskokwim, the population of Napaimute dwindled. By 1950, the population was just 24 residents. During World War II and shortly after, many residents migrated to Bethel or Aniak "where government agencies were beginning to create more stable job

opportunities."[1] Some residents also wanted to be closer to health care facilities (122111NA4). For many years, Alta Brink, the former school teacher, was the only resident who remained in Napaimute (ASCG Incorporated 2004).

In 1969, Delores Matter and her husband, Joe, purchased the cabin that belonged to her grandfather, George Hoffman. The cabin was built in 1906 with hand-hewn logs by Napaimute's chief, a man known as "Old Chief" (participant, community review meeting, Napaimute, December 2011, personal communication). The Matters restored the cabin, and today it is the oldest habitable building on the Kuskokwim River (Figure 7-3). In 2006, a celebration was held by the Napaimute community to commemorate the 100-year anniversary of the construction of the house (0527NA01). In 1975, Agnes Charles, (a daughter of George Hoffman), returned to live full-time in Napaimute and was integral in maintaining the relationship between her home village and the families that trace their roots to this part of the Kuskokwim River. Agnes Charles died in 2002 and is buried in Napaimute.

The Napaimute Traditional Council has worked in the past few decades to revitalize the village; during the time of the study many community members were working on building and renovating cabins and houses. In 1991, a 12-acre area of land was granted by the Kuskokwim Corporation to Napaimute. In 1994, Napaimute was recognized as a federally recognized tribe. While the Native

1. Native Village of Napaimute, Alaska. 2012. http://napaimute.org/ (Accessed 2012).

Photograph ADF&G Brittany Retherford

Figure 7-3.–The white house on the right was built in 1906 and is the oldest habitable home on the Kuskokwim River.

Village of Napaimute had initially joined the Kuskokwim Native Association, Napaimute withdrew in 1996 and joined the Association of Village Council Presidents. Napaimute's governing body is a 5-member traditional council and Delores Matter is the lifetime traditional chief. Business enterprises run by the tribe include retail gas sales, a convenience store, lodging, equipment rental, and a sawmill that produces lumber and cabin packages.[2] In the summer of 2006, the Napaimute Home Site Program was established. Under this program, a specified number of lots are opened for home site development each year for 5 years. The program is open to both tribal members and the general public. Five (new to the community) families began to develop homes and some of the surveyed households included these families.[3]

The village of Napaimute is spread along the northern bank of the Kuskokwim River, though a few homes (including a community-owned rental cabin) are located on the southern bank. The primary concentration of houses is located near the tribal infrastructure, which includes a multi-purpose community building and a tribal office. A nondenominational church completed in 2009 sits on a hillside above Napaimute and overlooks one of the 2 cemeteries and the Kuskokwim River.

2. Native Village of Napaimute, Alaska. 2012. http://napaimute.org/ (Accessed 2012).
3. Native Village of Napaimute, Alaska. 2012. http://napaimute.org/ (Accessed 2012).

Photograph ADF&G Brittany Retherford

Figure 7-4.–Many Napaimute community members live in Bethel and travel to Napaimute whenever they can. This boat belongs to a community member who is planning to travel to Napaimute for the Memorial Day weekend.

Napaimute is accessible via boat or plane during summer months and via snowmachine or plane during the months that the Kuskokwim River is frozen. At least one community member owns a plane and travels by air regularly to Napaimute. Charter flights are also available. With the rising cost of fuel, travel to Napaimute is becoming increasingly expensive. Survey respondents reported costs of roughly $500–$900 for the 8–10 hour roundtrip boat ride from Bethel to Napaimute (Figure 7-4).

The Napaimute Traditional Council has been organizing an effort to resettle Napaimute and develop viable opportunities for growth as well as maintain opportunities for subsistence activities at the village site. Resettlement activities have expanded particularly during the past 5 years. Tribal leadership noted that cabin and community infrastructure building and restoration efforts have limited somewhat the abilities of community members to participate in subsistence activities because of time constraints (participant, community review meeting, Napaimute, December 2011, personal communication). Napaimute tribal members reside throughout the United States and a signpost on the bank of the river depicts the diversity of their geography (Figure 7-5).

Seasonal round

> Your eating style was based on time of year. And then everybody's lifestyle would also be based on seasons. (052711NA1)

While there is no literature describing the historical seasonal round for Napaimute residents, similarities in the availability of species, cultural and kinship ties that exist within and between historical and contemporary central Kuskokwim villages, and comparable weather patterns and geography suggest that the historical seasonal round for Napaimute residents was likely similar to other villages in the Central Kuskokwim region. Indeed, many residents of other Central Kuskokwim villages have historically used the Napaimute area for subsistence activities and continue to use the area today (participant, community review meeting, Napaimute, December 2011, personal communication). The contemporary seasonal round is distinct because subsistence activities of a significant portion of Napaimute community members take place outside the Napaimute area and in other areas of the Kuskokwim River. Historically, for example, Chinook salmon begin arriving in the Bethel area by June 1, and area residents are finished with their local harvest by mid-July, but in upriver districts such as near McGrath (507 miles from the mouth of the river), Chinook salmon do not arrive until about the first of July (Andrews and Coffing 1986). The following section provides an overview of the historical seasonal round as it would have been practiced by Napaimute residents when the community had a larger population during the 1920s–1950s (052711NA1). The contemporary subsistence seasonal round is informed by both the past and the present.

Napaimute life was determined by the seasons, and elder respondents spoke of how activities were

Photograph ADF&G Brittany Retherford

Figure 7-5.–Two signposts in front of the community hall display the geographic diversity of Napaimute tribal members by showing the names of the villages and cities in and outside Alaska where they currently live, although all participants for this research were state residents..

dictated by the seasons and the seasonal availability of wild foods. A general description of the year follows:

> In the springtime you would go to spring camp. There are certain things you would eat and certain things you would do at spring camp. Then you would go to fall camp, and then you would go to winter trapping grounds. And then you come home for summer, you know, for your fishing. And the cycle would start all over again. (052711NA1)

This respondent has spent considerable time in the Napaimute area since she was born there in the early 1930s. During a key respondent interview with her and her husband, she discussed in detail the way she was raised and the importance of the seasonal round to her people's history, identity, health, and culture.

Traditionally, in Napaimute, the beginning of the seasonal round started in the early spring (April), when fresh bird meat was a welcome change to people's diet. "You got ducks and geese coming up, and then my uncles would go out and hunt as much as they could in the area," the elder respondent explained (052711NA1). In spring, geese would be the first to arrive, descending upon the marshy tundra area, which was a kind of flyway for migratory birds on the south side of the Kuskokwim River. "That's where they used to hunt. And then there used to be a lake, but it's grassed up now," she recalled. The Kuskokwim River would break up soon after migratory birds arrived, and after the ice went out, fishers would set nets to catch sheefish and different species of whitefishes.

Spring was also an important time for families who gardened to begin readying the beds to plant vegetables that supplemented wild-caught foods. "My mother especially was an avid gardener," the respondent recalled, explaining, "we'd do the garden and then we'd plant, get the smokehouse ready to fish, and then by that time the kings [Chinook salmon] are beginning to come up" (0527NA1). Late spring and early summer was the time of year that residents would move to seasonal fish camps along the Kuskokwim River to harvest salmon—targeting Chinook salmon first and then sockeye salmon in June and July. This respondent recalled her family having a fish camp about 8 miles upriver from Napaimute where they used both hand-hung nets and a fish wheel. After the Chinook and sockeye salmon arrived, she explained:

> My mom would keep on fishing. They'd put up all the dogs [chum salmon] that they could catch because that's what fed the animals, you know, the dog teams because everybody had a dog team. We didn't know what a snowmachine was back then. And everybody had at least 5 dogs and up. And so you had to prepare for the winter to feed them …. And then the silvers [coho] would come in. (0527NA1)

The salmon harvest season overlapped with berry picking time, which began with salmonberries in July (though very limited in the Napaimute area), and followed with blueberries, blackberries

(crowberries) and red berries (lowbush cranberries). Recalling the importance of the berry harvest, the woman explained, "… and you better get out there and get and harvest all of those, because that was your fruit for the winter" (052711NA1). People would gather as many berries as they could, and preserve most by making jams/jellies or freezing them.

Beginning in August, gardeners would need to be ready to harvest vegetables from their gardens. People grew potatoes, cabbage, carrots, beets, leaf lettuce, head lettuce, chard, parsnips, turnips, rutabagas, radishes, broccoli, cauliflower, and rhubarb. "You've got to remember, every house back then had a cellar; that was their refrigerator. We have rhubarb that my grandfather planted over there, it is still growing and usable," explained a respondent (052711NA1). In addition to a cellar, residents also often used a *teq'alleq*, a birch-bark lined hole dug into the permafrost that could keep foods frozen and usable for a long time. While the garden was being harvested, "In the meantime, if you saw moose or you saw caribou and you were able to get it or somebody was able to get it or somebody would bring us meat, [my mom] would jar it. I remember jarred meat. Just because we didn't have deep freezers those days" (052711NA1).

Besides moose and caribou hunting in fall time, residents would hunt for ptarmigans, and grouses (both ruffed grouse, also called willow grouse, and spruce grouse, also called spruce hens). "They're plentiful here. Everybody usually had a gun and shells so you'd catch those and then by that time it's freezing up," said the respondent when describing the role of birds in the seasonal round (052711NA1). Trees used for firewood were often cut and left to dry near winter trails during spring or summer months while hunters and fishers were traveling the land in pursuit of other subsistence activities. Soon after the first snowfall, this wood could easily be retrieved by dog team and brought to Napaimute. The respondent said, "And that was our winter wood for the duration" (052711NA1). Families who did not have a male household member to gather the wood were hard-pressed to gather enough wood for winter to stay warm. Wintertime was also busy and the respondent remembered snaring hares, ptarmigans, and ruffed and spruce grouses, as well as participating in trapping other furbearers.

The store in town would supply residents with "outfits" that would include basic food items such as flour, sugar, etc., that were not available locally. One community member explained that every family would depend on both a spring and a fall outfit: "And the fall outfit was hopefully able to sustain you all winter long with things like sugar, flour, yeast, butter, lard. And back then you'd save everything" (052711NA1). Although people used store-bought food for important supplements, the local diet was primarily made up of wild foods. Sheefish oil, for example, could be used in place of store-bought canola oil to make fried bread dough. The respondent explained a typical scene from her childhood outside a smokehouse at fish camp: "You had dry fish hanging, you had Eskimo ice cream in a dish sitting on the side, and you had this fried bread dough. And that was your sustenance for a day; all pretty much subsistence" (052711NA1).

Unlike other Central Kuskokwim communities (but more similar to Lower Kuskokwim River region

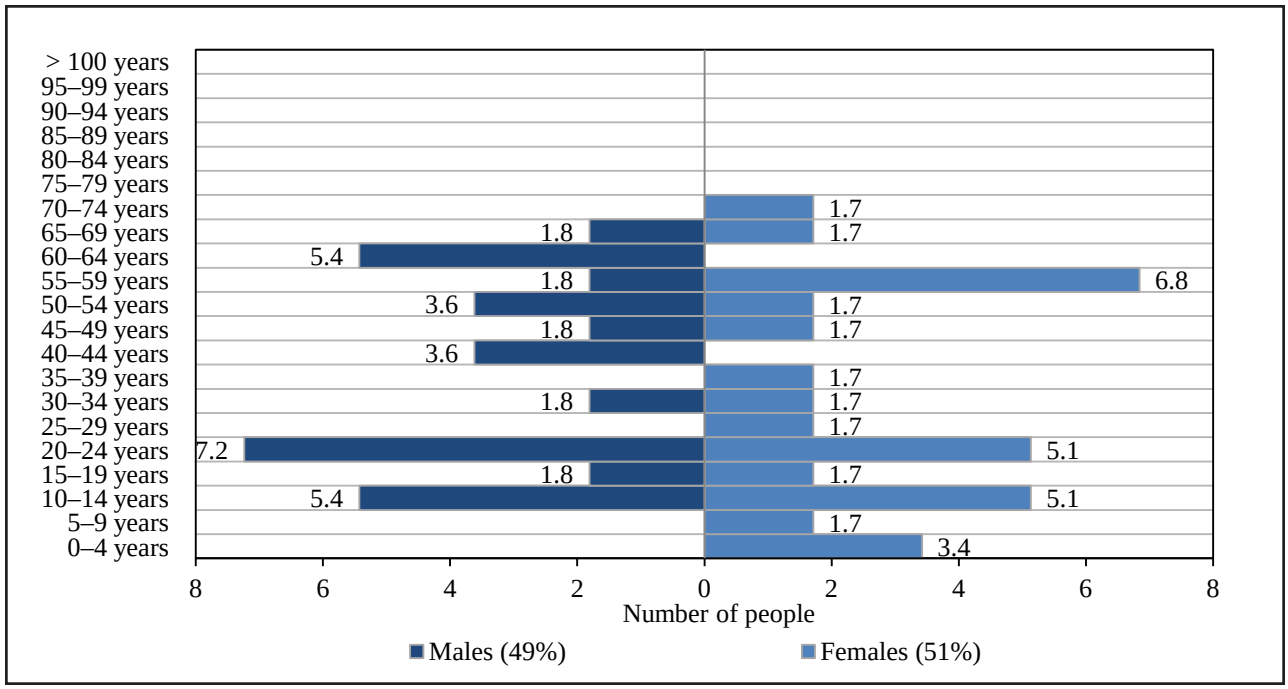

Figure 7-6.–Population profile, Napaimute, 2010.

communities), some surveyed community members participated in commercial fisheries. Commercial fishing on the Kuskokwim River was an important source of income for many lower river village residents. One commercial fisher from the lower river who participated in the 2010 commercial fishery reported harvesting sheefish as incidental catch and keeping it for his family's use.

Demographics

The 16 surveyed households included 45 people. Expanding for unsurveyed households, the estimated population of 70 included 34 males (49%) and 36 females (51%) (Figure 7-6); 59 were Alaska Natives (84%). Household sizes ranged from 1 to 5 people, with an average of 3 people per household. The average age was 35 years old, and the oldest person was 73 years old. Most Napaimute community members identify their permanent place of residence as somewhere in Alaska other than the study community. As a result, the survey instead asked respondents to identify how many weeks they spent in Napaimute during the study year rather than when they last moved to Napaimute (as it did for other study communities). Respondents reported an average of 4.4 weeks spent in Napaimute in 2010, however, the range of responses varied with the maximum amount of time reported at 36 weeks and the minimum reported at zero weeks. Many survey respondents said that they tried to visit Napaimute as often as they could. One woman explained: "We come up every chance we get, weekends and stuff;

Table 7-1. – Primary residence location of Napaimute households, 2010.

Number of households	Primary places of residence
1	Napaimute
14	Bethel
1	Bethel/Aniak/Anchorage
1	Napaimute/Aniak
4	Napaimute/Bethel
1	Napaimute/Anchorage
1	Napaimute/Chuathbaluk

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

when we could get off. We took them [our children] outside quite a bit because of his family and so they got to see different ways of life, different cultures, different whatever" (NDM0511).

Community members' ties to Napaimute vary from family to family. A few households conduct a majority of their subsistence activities in the area, although others are relative newcomers. These newcomers took advantage of the land lease opportunity opened by the Napaimute Traditional Council and are primarily Bethel residents. Many households spend most of their time in the village working on building their cabins and engaging in activities such as rod and reel fishing for Arctic grayling or grouse hunting.

Napaimute respondents were asked to identify their hometown, which would have been the village or city where their parents were living when they were born. Of survey respondents, 33% reported their parents' place of residence when the respondent was born as Bethel. Other respondents reported outside of Alaska (19%), Napaimute (11%), and Anchorage, Russian Mission, Saint Marys, and Upper Kalskag (all 4%). This also reflects current residency patterns of Napaimute community members, except that all research participants were Alaska residents. A majority of households reside permanently in Bethel.

The survey did not ask for respondents to identify permanent places of residences, however, tribal leadership did assist with identifying where people resided. Table 7-1 describes Napaimute households and their primary places of residences. Note that some households have multiple primary places of residences. If the survey had asked respondents to identify their legal residency, this would display only 1 community per household, but it did not and this table more accurately reflects the mixed residency characteristics of the households that compose the Napaimute community.

Wild Food Use and Harvests

The primary purpose of the household survey was to collect information about the harvest and uses of wild foods and other wild resources. Respondents were asked whether their household used or tried to harvest each resource during the study year. If they tried to harvest a resource, they were asked how much they harvested and other details of the harvest such as gear type, sex of the animal, or month of harvest. Napaimute community members were also asked to identify whether they harvested the resource around the Napaimute area, other parts of the Kuskokwim River area, or elsewhere in Alaska.

The tables and figures (tables 7-2 through 7-7; figures 7-7 through 7-9) in this section summarize responses to the harvest questions and depict levels of harvest uses and participation in harvest activities. They display estimated total harvests by resource, which includes all successful harvest activities that occurred throughout the state of Alaska. To better understand the use of the land and waterways specifically around Napaimute, there are 2 columns in the tables that display percentages of the total harvest for either the "Napaimute area" or "Other Kuskokwim." The "Napaimute area" is the area immediately around the village site. "Other Kuskokwim" includes the rest of the Kuskokwim River drainage basin, including the Portage Lakes area between Upper Kalskag and Russian Mission–Paimiut on the Yukon River. Napaimute community members harvested 20% of all their subsistence resources in the area around Napaimute and 73% of all resources in other Kuskokwim River areas.

One hundred percent of Napaimute households used fish, making this the most widely used resource category. Fish also composed more than one-half of the community's total subsistence harvest (11,867 lb of total 21,875 lb). Land mammals were used by 94% of households, which is the same percentage of households that used vegetation including berries, plants, and wood. Land mammals composed the second largest share of the total harvested pounds of subsistence resources (8,317 lb) whereas vegetation represented the second smallest share (587 lb). The resources harvested most commonly were fish (88%) and vegetation (88%). On average, Napaimute households each used 17 different wild foods in the study year, though the range varied widely among households. The fewest number of resources reportedly used by any one household was 3 while the largest number was 53 wild resources.

Napaimute community members were actively engaged in a variety of activities related to harvesting wild foods during the study year. Roughly 64% of all community members attempted to harvest at least one wild food resource. The same percentage was also engaged in processing activities (cutting fish, drying fish, hunting moose, etc.). More community members were involved in activities related to harvesting fish (56% of all members) than any other resource. The second most popular activity was gathering plants (42% of community members), and 31% of community members attempted to harvest land mammals or birds (and eggs, which fall into the same resource category, but egg harvest activity is minimal by community members).

Sharing of resources harvested or gathered is a significant custom in both Central and Lower Kuskokwim River region villages where a majority of the Napaimute community members live.

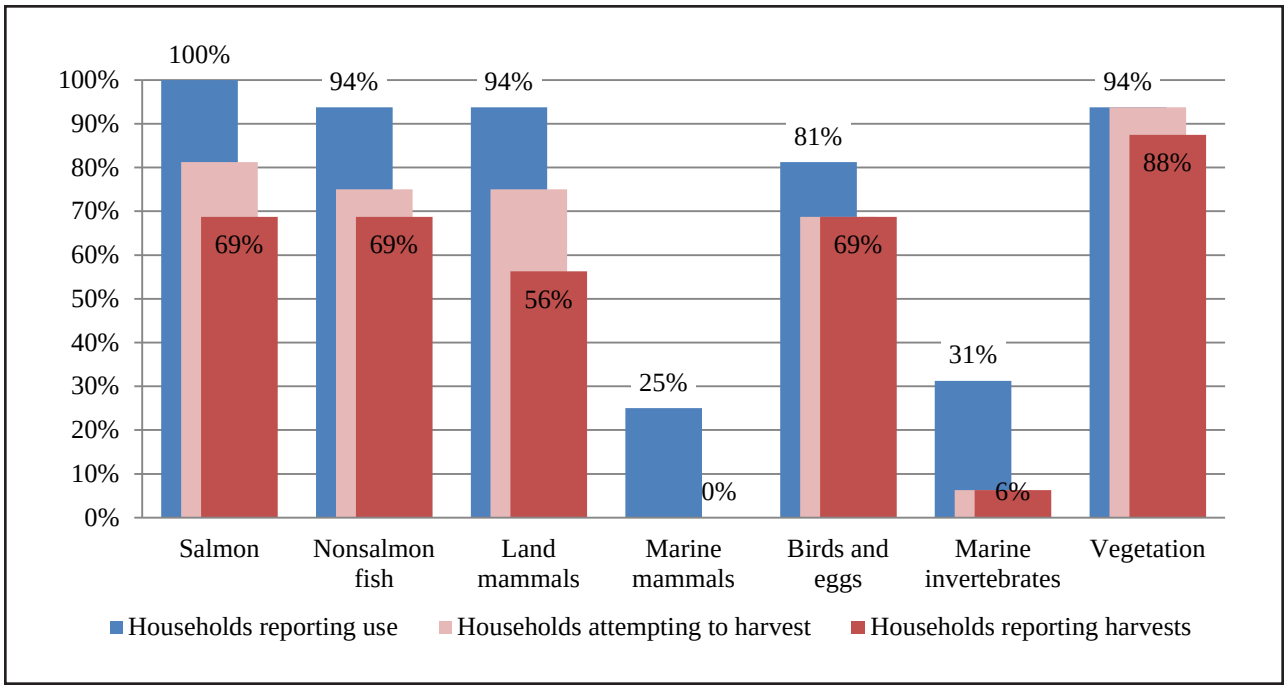

Figure 7-7.–Percentages of households using, attempting to harvest, or harvesting subsistence resources by category, Napaimute, 2010.

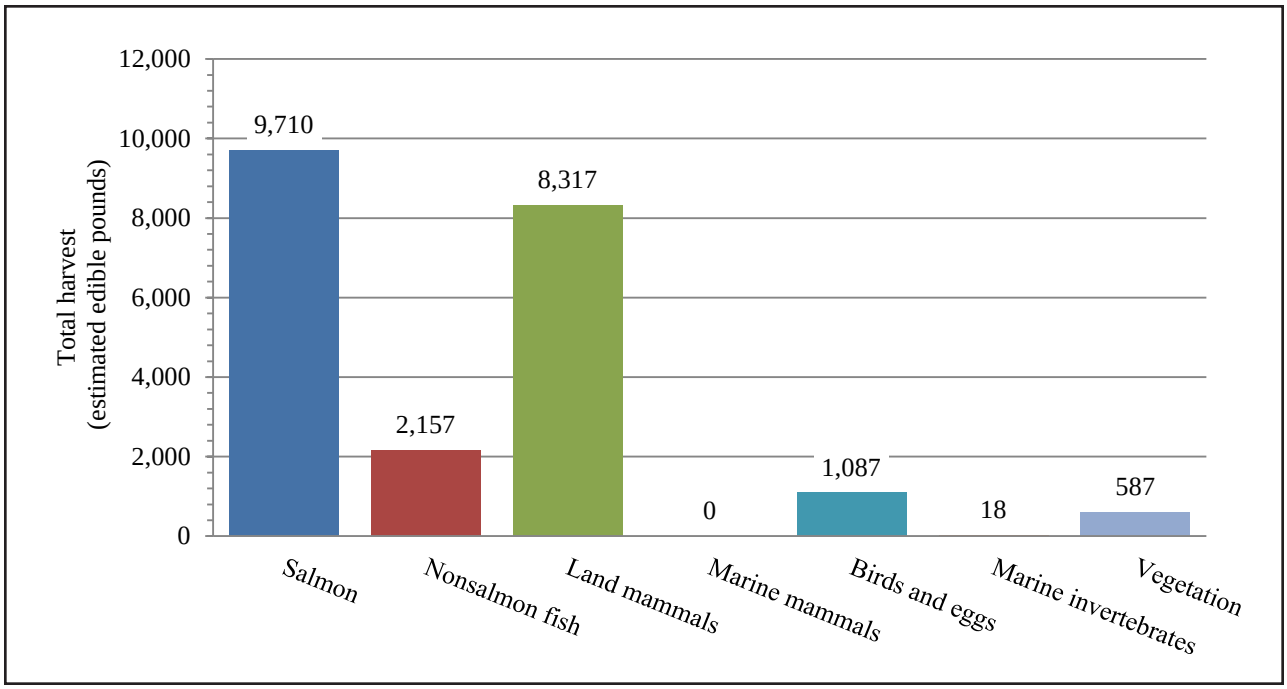

Figure 7-8.–Total estimated edible pounds harvested by the community by resource category, Napaimute, 2010.

Table 7-2. – Estimated uses and harvests of fish, Napaimute, 2010.

	Percentage of households					Estimated pounds harvested			Total estimated amount[a] harvested by community	95% conf. limit	Percentage from	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Napiamute area	Other Kuskokwim
Fish												
Salmon												
Chum salmon	31%	25%	25%	6%	6%	251.0 lb	10.0 lb	3.6 lb	49.4 ind.	± 85%	73%	27%
Coho salmon	75%	56%	50%	25%	13%	1,503.6 lb	60.1 lb	21.4 lb	284.4 ind.	± 57%	12%	88%
Chinook salmon	88%	75%	69%	44%	31%	6,797.8 lb	271.9 lb	96.7 lb	720.2 ind.	± 68%	10%	90%
Pink salmon	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Sockeye salmon	63%	50%	50%	19%	19%	1,157.5 lb	46.3 lb	16.5 lb	229.7 ind.	± 50%	18%	82%
Unknown salmon	13%	6%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**100%**	**81%**	**69%**	**56%**	**31%**	**9,709.9 lb**	**388.4 lb**	**138.1 lb**	**1,284 ind.**	**± 61%**	**13%**	**87%**
Char												
Dolly Varden	25%	25%	25%	0%	6%	47.8 lb	1.9 lb	0.7 lb	53.1 ind.	± 94%	100%	0%
Lake trout	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**25%**	**25%**	**25%**	**0%**	**6%**	**47.8 lb**	**1.9 lb**	**0.7 lb**	**53.1 ind.**	**± 94%**	**100%**	**0%**
Trout												
Rainbow trout	13%	13%	13%	0%	6%	41.6 lb	1.7 lb	0.6 lb	29.7 ind.	± 91%	0%	100%
Subtotal	**13%**	**13%**	**13%**	**0%**	**6%**	**41.6 lb**	**1.7 lb**	**0.6 lb**	**29.7 ind.**	**± 91%**	**0%**	**100%**
Whitefishes												
Sheefish	19%	19%	13%	6%	6%	234.4 lb	9.4 lb	3.3 lb	39.1 ind.	± 104%	20%	80%
Broad whitefish	44%	13%	13%	38%	19%	24.1 lb	1.0 lb	0.3 lb	17.2 ind.	± 116%	100%	0%
Bering cisco	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Least cisco	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Humpback whitefish	31%	13%	13%	25%	13%	262.5 lb	10.5 lb	3.7 lb	87.5 ind.	± 88%	55%	45%
Round whitefish	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown whitefish	13%	6%	6%	6%	0%	4.4 lb	0.2 lb	0.1 lb	3.1 ind.	± 128%	0%	100%
Subtotal	**75%**	**25%**	**25%**	**63%**	**31%**	**525.3 lb**	**21.0 lb**	**7.5 lb**	**146.9 ind.**	**± 61%**	**41%**	**59%**
Anadromous/marine fishes												
Pacific herring	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Smelt	44%	31%	31%	13%	31%	281.3 lb	11.3 lb	4.0 lb	46.9 gal.	± 59%	0%	100%
Cod	6%	0%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Saffron cod	6%	0%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Pacific halibut	31%	0%	0%	31%	6%	0.0 lb	0.0 lb	0.0 lb	0.0 lbs.	± 0%	0%	0%
Arctic lamprey	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Stickleback (needlefish)	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Subtotal	**56%**	**31%**	**31%**	**38%**	**31%**	**281.3 lb**	**11.3 lb**	**4.0 lb**		**± 59%**	0%	100%
Other fresh water fish												
Alaska blackfish	13%	6%	6%	6%	6%	58.6 lb	2.3 lb	0.8 lb	58.6 lbs.	± 128%	0%	100%
Burbot	19%	13%	13%	19%	6%	150.0 lb	6.0 lb	2.1 lb	62.5 ind.	± 90%	0%	100%
Arctic grayling	31%	38%	31%	0%	6%	89.4 lb	3.6 lb	1.3 lb	127.7 ind.	± 82%	98%	2%
Northern pike	44%	38%	38%	13%	19%	963.3 lb	38.5 lb	13.7 lb	214.1 ind.	± 69%	8%	88%
Longnose sucker	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**50%**	**56%**	**50%**	**19%**	**19%**	**1,261.2 lb**	**50.4 lb**	**17.9 lb**		**± 66%**	**13%**	**84%**
All fish	**100%**	**88%**	**88%**	**88%**	**69%**	**11,867.0 lb**	**474.7 lb**	**168.8 lb**		**± 53%**	**14%**	**85%**
All resources[b]	**100%**	**100%**	**94%**	**100%**	**94%**	**21,875.3 lb**	**875.0 lb**	**311.1 lb**		**± 41%**	**20%**	**73%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

Sharing of resources is common not only between Napaimute community members, but also between Napaimute community members and residents of other villages. In this study, sharing was measured by asking responding households whether they gave away or received each subsistence resource. In 2010, 100% of Napaimute households said that they received and 94% said they gave away subsistence foods. The most commonly received wild foods were land mammals (88%) and fish (88%). The high rate of households receiving fish accompanied the common practice of giving fish (69%), making it the most frequently exchanged resource.

Residents who live on the Kuskokwim River are primarily a fishing people and members of the Napaimute community are no different; they engage in a variety of subsistence fishing activities throughout the year. Salmon have historically been one of the most important sources of sustenance for Napaimute community members. Fish continue to be very important—one respondent explained that her family eats fish about 2–3 times per week year-round (052711NA1). In 2010, the community harvested an estimated 11,867 lb of fish (169 lb of fish per person). In terms of pounds harvested, salmon was the most important resource category harvested by Napaimute community members. Chinook salmon was the most commonly harvested fish species of any kind—community members harvested an estimated total of 6,798 lb (720 individual fish, 97 lb per person). Coho were the second most harvested fish at 1,504 lb harvested for the community (or 21 lb per person). One survey respondent observed that, in general, salmon was increasingly harder to get because of a decline in abundance, thus making it difficult to fill the smokehouse each year (HH24).

Napaimute community members largely fall into one of 2 camps when it comes to subsistence salmon fishing—those who do the largest share of their fishing activities near Bethel and those who do their subsistence fishing primarily at Napaimute. In 2010, 87% of salmon harvested by community members was caught in other parts of the Kuskokwim River outside the Napaimute area. However, one of the most active Napaimute-area fishing households was not surveyed. If they had been, this percentage would likely show a higher portion of fish caught in Napaimute (participant, community review meeting, Napaimute, December 2011, personal communication).

There are several factors that can explain the different choices families make in determining where to fish, including work schedules, availability of resources (such as boats), gas prices, traditional knowledge of local harvest practices, resource abundance, and personal preference of salmon quality. For example, many Bethel-based Napaimute community members participated in subsistence fishing activities after work or on weekends, and it was more convenient to fish closer to their permanent homes. Some based their activities out of family fish camps, which are shared with other family members who may not be part of the Napaimute community. The high cost of gas was also a deterrent for families from transporting food the long distance between Napaimute and Bethel. Some community members said they preferred the taste of salmon caught in the lower river because they are richer in oil and

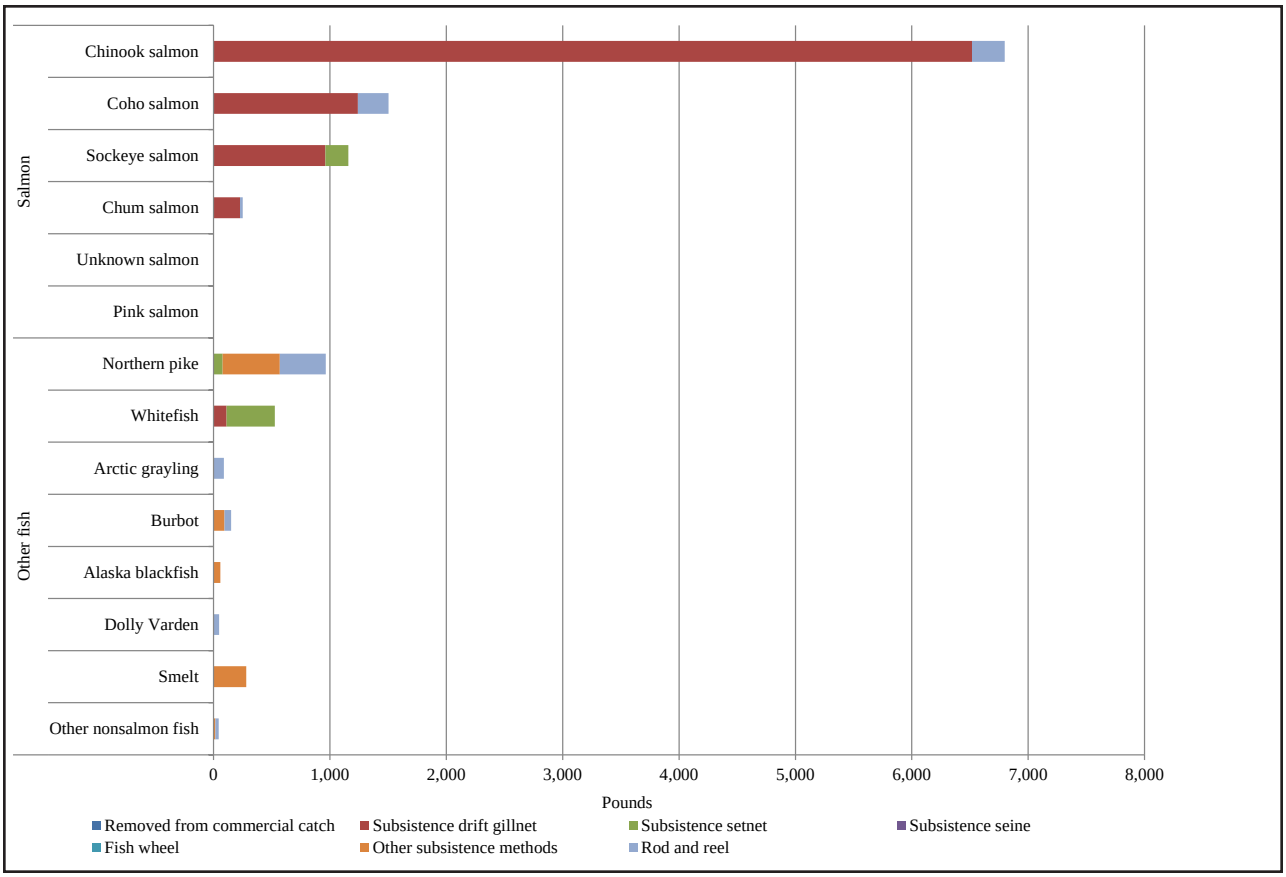

Figure 7-9.–Fish harvests by gear type, Napaimute, 2010.

have firmer flesh (122011NA3). One survey respondent referred to fish caught nearer to the Bethel area as "freezer fish," or fish that is preserved by freezing, as opposed to jarring or smoking (HH19).

The fishing profile of households that harvest more of their fish at Napaimute is different than that of those who fish primarily near Bethel. Many of those who predominantly fish near Napaimute also have permanent residences closer to Napaimute (such as in Aniak or in Napaimute itself), or they spend more average weeks per year in Napaimute. One man who harvests the majority of his salmon in Napaimute said everything he knew about fishing the area he learned from his mother-in-law, an elder who spent a significant part of her life in Napaimute and had been actively living a subsistence lifestyle (122011NA3). This access to traditional knowledge of local harvest areas and fishing patterns has provided him with the tools and means necessary to be successful—and to pass this knowledge on to his own children (122011NA3). Fishing near Napaimute is not necessarily more difficult than fishing in the lower river, but it does require some specialized knowledge. According to the respondent, salmon are less abundant, and generally, fishers have to spend more time fishing to catch the same amount of fish as they do in the lower river (122011NA3). There are also fewer areas that are suitable for drifting and only 1 or 2 good eddies to set a net because the river is narrower with fewer turns.

Napaimute community members who harvested Chinook salmon most often used a drift gillnet, and

a small percentage harvested Chinook by rod and reel or setnet. Rod and reel fishing was a popular activity in the Napaimute area during the study year, with the primary species harvested being Chinook (207 lb) and coho salmon (182 lb) (Figure 7-9). While a greater amount of each of these species was caught outside the Napaimute area using drift gillnets, the rod and reel harvests for both of these species was greater around the Napaimute area. This reflects harvest patterns observed by residents who live in the Bethel area (where most Napaimute community members have permanent homes):

> Individuals commonly harvest fish with rod and reel gear in association with summer berry picking activities and late summer/early fall hunting activities throughout the Kuskokwim River drainage. Fishing from the Bethel seawall is also a popular activity during the summer months and affords people an opportunity to harvest fish for subsistence use without requiring the investment of a boat and motor. (Coffing 2001:5)

Bethel residents who are Napaimute community members also enjoyed rod and reel fishing during summer and early fall in the Napaimute area and other Kuskokwim River tributaries such as the Kisaralik River nearer to Bethel. The salmon species harvested most commonly in the Napaimute area was chum salmon (73% of all chum salmon was caught around Napaimute). The total estimated chum salmon harvest for the community was 251 lb. Fish wheels were also a historical method of catching salmon, but no one uses a fish wheel in Napaimute anymore.

One respondent described Chinook and sockeye salmon as "the eating fish" (052711NA1). "Eating fish" was dried on fish racks during summer fishing months and then could be consumed during cold winter months when wild resources were sparser. "Drying fish was like the way you guys use refrigerator and a deep freeze. That was the only way back then that they could keep it all year long and be guaranteed that they would at least have something to eat," she explained (NDM0511). "Blanket fish" was another method of preparing fish, primarily the large Chinook salmon. This method involved separating the flesh of the fish from the ribs, but keeping the skin along the backbone attached so that when it was laid flat, it would resemble a "blanket."

No Napaimute community members reported feeding whole salmon to dogs (however, they did feed "scraps" or leftover unused portions of salmon to dogs). Historically, chum or "dog" salmon were fed to dogs and, similar to other Kuskokwim River villages, dogs were a common form of transportation. Dog teams have been largely replaced by snowmachines and other forms of transportation, greatly decreasing the need for dog food. One Napaimute community member explained that when she was growing up everybody had a dog team with at least 5 dogs (052711NA1). Napaimute's only permanent resident is believed to have been one of the last people on the Kuskokwim River to run a dog team for working purposes only. This resident no longer has a dog team and acquired a snowmachine only a few years ago (122011NA3).

Coho salmon are the last salmon species to arrive in Napaimute, which marks the end of the salmon

fishing season. Traditionally, Napaimute village residents would use coho salmon bellies to make "salt fish," or *sulunaq*. The remainder of the fish would then be jarred. One respondent explained that she traditionally salts the bellies of male coho salmon because they are "less flabby" than the bellies of females (052711NA1).

Nonsalmon fish species are also an important part of the seasonal round and subsistence diet for Napaimute community members. The most commonly used nonsalmon species in 2010 were smelt (44%), broad whitefish (44%), and northern pike (44%). However, in terms of edible pounds harvested for the community, the most significant species was northern pike (963 lb), followed by smelt (281 lb), humpback whitefish (263 lb), and sheefish (234 lb). The high percentage of broad whitefish use can be attributed to the custom of households sharing subsistence resources with friends and family members. For example, although only 13% of Napaimute households harvested broad whitefish, 38% reported receiving this species from another household and 44% of households reported using it. Broad whitefish was the third most received species (38% of households) behind moose (63%) and Chinook salmon (44%). Relationships with friends and family in tundra villages such as Nunapitchuk were key in supplying Napaimute community members with the highly-prized broad whitefish. One respondent explained why:

> That's [broad whitefish] the cream of the crop because not only is it good for flaking and using for making the Eskimo ice cream, but if you catch a female, they have white eggs. And then you take the eggs and then you save those … and you take them and you whip it up with a fork like this and get all the membranes and whatever off of it so you end up with just nothing but the eggs. And then you can mix that with, my mom used to make, what they call it? There's no white man's word for it. Made with red berries. It's called *kavirliq.* (052711NA1)

She also learned to mix the whipped broad whitefish eggs with minced onions and ate it "like caviar" (052711NA1).

The first species targeted after spring breakup (May) in the Napaimute area are whitefishes (primarily broad), explained one respondent. She described learning from her mother how to hang and use a 4.5 inch mesh "whitefish" net just after breakup in the springtime. This respondent grew up in Napaimute but had family on the coast and would go to spring camp on the tundra of the lower Kuskokwim River (52711NA1). Fishing for other whitefish species around Napaimute also begins just after breakup in spring. During research conducted in May 2011, a respondent set a 4 inch mesh net near her cabin on the Kuskokwim River every day. "Our normal routine has been since we retired, I fish, I put my net out, we eat a few and I give some away. I cut them and smoke them," she said (NDM0511).

Considered an indicator species for Chinook salmon, smelt are harvested using dip nets in the Bethel area around Memorial Day weekend (Figure 7-10). The run is short and timing is critical for fishers that target this species (HH12). Smelt do not migrate as far as Napaimute and are not harvested in

Photograph ADF&G Brittany Retherford

Figure 7-10.–Napaimute community member Bobby Kristovich uses a dip net to harvest smelt near Akiachak on his return from Napaimute over Memorial Day.

that area but are harvested by some fishers while traveling between the lower Kuskokwim River and Napaimute over the holiday weekend. Smelt was also the most commonly given away nonsalmon fish species (31%), which was the same percentage of households who reported giving away Chinook salmon and moose.

Community members also commonly use other nonsalmon fish species. During summer months, many Napaimute community members fish for Arctic grayling and Dolly Varden in addition to coho salmon around the Napaimute area. One household received Alaska blackfish from another household, which they said was caught with a trap (HH24). Several households reported using herring eggs, which came from Sitka. One survey respondent who did not get enough salmon supplemented the household salmon supply with nonsalmon fish species.

After salmon and nonsalmon fish species, land mammals (Table 7-3) provided the largest amount in pounds of wild food for the Napaimute community. The largest share of the land mammal harvest was moose, totaling 5,906 edible pounds in 2010 (27% of the total subsistence harvest). The estimated harvest of 11 male moose occurred in September. Second to fish, moose was the most heavily used

Table 7-3. – Estimated uses and harvests of land and marine mammals, Napaimute, 2010.

	Percentage of households					Estimated pounds harvested			Total estimated amount[a] harvested by community	95% conf. limit	Percentage from	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Napiamute area	Other Kuskokwim
Land mammals												
Large land mammals												
Black bear	6%	13%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Brown bear	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Caribou	50%	25%	25%	38%	25%	1,421.9 lb	56.9 lb	20.2 lb	10.9 ind.	± 59%	0%	100%
Moose	94%	69%	38%	63%	31%	5,906.3 lb	236.3 lb	84.0 lb	10.9 ind.	± 46%	43%	43%
Muskox	6%	6%	6%	0%	0%	460.9 lb	18.4 lb	6.6 lb	1.6 ind.	± 128%	0%	0%
Subtotal	**94%**	**75%**	**50%**	**88%**	**44%**	**7,789.1 lb**	**311.6 lb**	**110.8 lb**	**23.4 ind.**	**± 41%**	**32%**	**51%**
Small land mammals												
Beaver	19%	13%	13%	6%	13%	210.9 lb	8.4 lb	3.0 lb	14.1 ind.	± 114%	0%	100%
Red fox	13%	13%	13%	0%	0%	0.0 lb	0.0 lb	0.0 lb	9.4 ind.	± 0%	0%	0%
Snowshoe hare	25%	25%	25%	0%	6%	246.1 lb	9.8 lb	3.5 lb	98.4 ind.	± 102%	3%	97%
Alaska hare (jackrabbit)	13%	13%	13%	0%	0%	0.0 lb	0.0 lb	0.0 lb	4.7 ind.	± 0%	0%	0%
River (land) otter	6%	6%	6%	0%	0%	9.4 lb	0.4 lb	0.1 lb	3.1 ind.	± 128%	0%	100%
Lynx	0%	6%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Marmot	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Marten	6%	6%	6%	0%	6%	0.0 lb	0.0 lb	0.0 lb	6.3 ind.	± 0%	0%	0%
Mink	6%	6%	6%	0%	0%	*Not usually eaten*			3.1 ind.	± 128%	0%	0%
Muskrat	6%	6%	6%	0%	0%	35.2 lb	1.4 lb	0.5 lb	46.9 ind.	± 128%	0%	100%
Porcupine	6%	6%	6%	0%	0%	12.5 lb	0.5 lb	0.2 lb	3.1 ind.	± 128%	0%	100%
Arctic ground (parka) squirrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Red (tree) squirrel	6%	6%	6%	0%	0%	7.8 lb	0.3 lb	0.1 lb	15.6 ind.	± 128%	100%	0%
Weasel	6%	6%	6%	0%	0%	0.0 lb	0.0 lb	0.0 lb	7.8 ind.	± 0%	0%	0%
Wolf	6%	6%	6%	0%	0%	*Not usually eaten*			3.1 ind.	± 0%	0%	100%
Wolverine	13%	13%	6%	0%	6%	*Not usually eaten*			4.7 ind.	± 0%	0%	0%
Subtotal	**38%**	**31%**	**31%**	**6%**	**19%**	**528.1 lb**	**21.1 lb**	**7.5 lb**	**220.3 ind.**	**± 107%**	**3%**	**96%**
Marine mammals												
Bearded seal	13%	0%	0%	13%	6%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Ringed seal	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Spotted seal	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown seal	19%	0%	0%	19%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Walrus	13%	0%	0%	13%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Beluga	13%	0%	0%	13%	6%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Bowhead	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**25%**	**0%**	**0%**	**25%**	**6%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**0.0 ind.**	**± 0%**	**0%**	**0%**
All land mammals	**94%**	**75%**	**56%**	**88%**	**50%**	**8,317.2 lb**	**332.7 lb**	**118.3 lb**		**± 43%**	31%	54%
All marine mammals	**25%**	**0%**	**0%**	**25%**	**6%**	**0.0 lb**	**0.0 lb**	**0.0 lb**		**± 0%**	0%	0%
All resources[b]	**100%**	**100%**	**94%**	**100%**	**94%**	**21,875.3 lb**	**875.0 lb**	**311.1 lb**		**± 41%**	**20%**	**73%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

resource (94%); however, the rate of attempted harvest (69%) and the actual success rate (38%) were much lower than those of salmon or nonsalmon fish. Nonetheless, Napaimute community members reported the highest per capita harvest of moose (84 lb) of any other village surveyed as part of this report. There are a number of potential factors that could explain this, including more time spent traveling on the land (due to the commute between Napaimute and Bethel area) or higher per capita income (to pay for high fuel prices that accompany moose hunting activities). However, without additional information, it is not possible to fully explain this trend.

Caribou harvested by Napaimute households was also significant in terms of edible pounds harvested—Napaimute community members brought home 1,422 lb of caribou meat in 2010. An estimated 11 caribou were harvested (5 females and 6 males) in February, March, or November. Unlike moose, there was a 100% success rate for those who attempted to harvest caribou (25% of households). One-half of Napaimute households also reported using caribou. An estimated 2 muskoxen were harvested; however, this is based on an expansion of 1 successful harvest on Nunivak Island. No one reported using or attempting to harvest brown bears. Thirteen percent of households reported attempting to harvest black bears, but none were successful. One household reported receiving black bears.

Marine mammal and marine invertebrate harvest and use, while higher than any other Central Kuskokwim River area community, were the smallest contributors of any resource category to the subsistence diet of Napaimute community members (tables 7-3 and 7-4). No household reported harvesting any marine mammals, however, through customary trade and barter networks, Napaimute community members obtained bearded seal, seal oil, walrus, and beluga whale. One-quarter of households reported using shellfish, including clams (13%), tanner crabs (6%), and shrimp (6%).

Small land mammals were harvested for meat, fur, or both. Small land animals contributed 528 edible pounds to the total estimated harvest of wild foods by Napaimute community members. There were reports of mink, wolf, and wolverine harvests but these animals were not usually eaten. The most commonly harvested small land mammals were snowshoe hares (25% of all households successfully harvested), followed by beavers, wolverines, red foxes, and Arctic hares (13% each). The community harvested an estimated total of 98 snowshoe hares, 47 muskrats, 16 red (tree) squirrels, 14 beavers, and 9 red foxes.

In the past, there were traditional customs associated with hunting and processing of certain land animals. “They weren’t allowed to use an axe or hatchet to cut any bones in any animal. You could not use an axe. You had to do it with a knife, you know,” explained one respondent (052711NA2). Another custom concerned the role of women in harvesting practices. One Napaimute elder said her mother could only handle the flesh and the hide of a beaver if she was not menstruating. If she was menstruating, then her husband would take care of the harvest (052711NA1). A similar custom for the handling of bear was discussed by a key respondent who lived in Crooked Creek during a 2009

Table 7-4. – Estimated uses and harvests of marine invertebrates, Napaimute, 2010.

	Percentage of households					Estimated pounds harvested			Total estimated amount[a] harvested by community	95% conf. limit	Percentage from	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Napaimute area	Other Kuskokwim
Marine invertebrates												
Clams	13%	6%	6%	6%	0%	17.6 lb	0.7 lb	0.3 lb	5.9 gal.	± 128%	0%	0%
King crab	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Tanner crab	6%	0%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Shrimp	6%	0%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown marine invert.	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Subtotal	**25%**	**6%**	**6%**	**19%**	**0%**	**17.6 lb**	**0.7 lb**	**0.3 lb**		**± 128%**	**0%**	**0%**
All marine invertebrates	**25%**	**6%**	**6%**	**19%**	**0%**	**17.6 lb**	**0.7 lb**	**0.3 lb**		**± 128%**	**0%**	**0%**
All resources[b]	**100%**	**100%**	**94%**	**100%**	**94%**	**21,875 lb**	**875.0 lb**	**311.1 lb**		**± 41%**	**20%**	**73%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

study in that village (Brown et al. 2012). Traditionally, the bones and non-useable remains were buried in a particular way with the head facing to the east, the Napaimute respondent further explained (052711NA1). Other land mammal bones were also saved and stored on the porch until the ground thawed in the spring and could be buried (052711NA1).

A variety of food preparation methods were developed over the years to utilize the entire harvest. An elder woman discussed her days growing up in the 1930s and 1940s and the uses for the various parts of a harvested moose:

> Those days are hard to explain. They weren't in an affluent society, you know, they were pretty much hand to mouth. My mom had this big copper boiler … and she could put a whole moose head in there. She would make moose head jelly, head cheese. The nose, that was the delicacy. Cook that and skin it and eat it. She would keep all of the moose bones, all of them. With the exception of maybe, well, even the ribs because she would cook them a certain way. She'd put them in this boiler and leave some meat on them and put some salt in there and that would be our meal, with, we'd have like fried bread dough and moose bones and we'd break them after they were cooked you could break them, and then we'd eat the marrow. She never threw away. Not only her, everybody did this, you know, because you couldn't run to the store when you ran out. You can go from here in a big fancy boat down to Aniak to the stores and pick up something and come right back home within 2 hours you're back up here. You couldn't do that. So you had to you had to utilize and use everything. (052711NA1).

Bird hunting, both of migratory waterfowl and other birds such as ptarmigan and grouse, was popular among Napaimute community members. Sixty-nine percent of households harvested grouse and ptarmigan for a total of 156 spruce grouse, 66 ruffed grouse, and 270 ptarmigan (Table 7-5). All of

Table 7-5. – Estimated uses and harvests of birds, Napaimute

	Percentage of households					Estimated pounds harvested			Total estimated amount[a] harvested by community	95% conf. limit	Percentage from	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Napiamute area	Other Kuskokwim
Migratory birds												
Ducks												
Bufflehead	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Canvasback	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Common eider	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown eider	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Goldeneye	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Mallard	19%	19%	19%	0%	6%	15.6 lb	0.6 lb	0.2 lb	15.6 ind.	± 74%	20%	80%
Common merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Red-breasted merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Long-tailed duck (oldsqua	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Northern pintail	6%	6%	6%	0%	0%	3.8 lb	0.2 lb	0.1 lb	4.7 ind.	± 128%	0%	100%
Scaup	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Black scoter	6%	6%	6%	0%	6%	21.1 lb	0.8 lb	0.3 lb	23.4 ind.	± 128%	0%	100%
Surf scoter	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
White-winged scoter	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Northern shoveler	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Green-winged teal	6%	6%	6%	0%	0%	1.4 lb	0.1 lb	0.0 lb	4.7 ind.	± 128%	0%	100%
Wigeon	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown ducks	13%	0%	0%	13%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**31%**	**19%**	**19%**	**13%**	**6%**	**41.9 lb**	**1.7 lb**	**0.6 lb**	**48.4 ind.**	**± 91%**	**7%**	**93%**
Geese												
Brant	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Cackling goose	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Lesser Canada goose	6%	6%	6%	0%	6%	15.0 lb	0.6 lb	0.2 lb	12.5 ind.	± 128%	0%	100%
Unknown Canada goose	6%	6%	6%	0%	6%	9.4 lb	0.4 lb	0.1 lb	7.8 ind.	± 128%	0%	100%
Emperoro goose	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Snow goose	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
White-fronted goose	31%	25%	25%	6%	19%	497.9 lb	19.9 lb	7.1 lb	207.4 ind.	± 98%	2%	98%
Unknown geese	19%	0%	0%	19%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**44%**	**25%**	**25%**	**25%**	**19%**	**522.2 lb**	**20.9 lb**	**7.4 lb**	**227.8 ind.**	**± 94%**	**1%**	**99%**
Other migratory birds												
Tundra swan (whistling)	6%	6%	6%	0%	0%	31.3 lb	1.3 lb	0.4 lb	3.1 ind.	± 128%	0%	100%
Sandhill crane	13%	6%	6%	6%	0%	65.6 lb	2.6 lb	0.9 lb	7.8 ind.	± 128%	0%	100%
Whimbrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**13%**	**6%**	**6%**	**6%**	**0%**	**96.9 lb**	**3.9 lb**	**1.4 lb**	**10.9 ind.**	**± 128%**	**0%**	**100%**
Other birds												
Spruce grouse	69%	56%	56%	13%	25%	109.4 lb	4.4 lb	1.6 lb	156.3 ind.	± 50%	100%	0%
Ruffed grouse	50%	44%	44%	6%	6%	45.9 lb	1.8 lb	0.7 lb	65.6 ind.	± 48%	88%	12%
Ptarmigan	56%	56%	56%	0%	44%	270.3 lb	10.8 lb	3.8 lb	270.3 ind.	± 42%	12%	88%
Subtotal	**75%**	**69%**	**69%**	**13%**	**44%**	**425.6 lb**	**17.0 lb**	**6.1 lb**	**492.2 ind.**	**± 37%**	**43%**	**57%**
All migratory birds	**50%**	**31%**	**31%**	**31%**	**25%**	**661.0 lb**	**26.4 lb**	**9.4 lb**	**287.1 ind.**	**± 94%**	**2%**	**98%**
All other birds	**75%**	**69%**	**69%**	**13%**	**44%**	**425.6 lb**	**17.0 lb**	**6.1 lb**	**492.2 ind.**	**± 37%**	**43%**	**57%**
All resources[b]	**100%**	**100%**	**94%**	**100%**	**94%**	**21,875.3 lb**	**875.0 lb**	**311.1 lb**		**± 41%**	**20%**	**73%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

Table 7-6. – Estimated uses and harvests of eggs, Napaimute

	Percentage of households					Estimated pounds harvested			Total estimated amount[1] harvested by community	95% conf. limit	Percentage from	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Napiamute area	Other Kuskokwim
Eggs												
Duck eggs	6%	0%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Geese eggs	6%	0%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Swan eggs	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Shorebird eggs	6%	0%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Gull eggs	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Unknown eggs	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%	0%	0%
Subtotal	**6%**	**0%**	**0%**	**6%**	**0%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**0.0 ind.**	**± 0%**	**0%**	**0%**
All birds and eggs	**0%**	**0%**	**0%**	**0%**	**0%**	**0 lb**	**0.0 lb**	**0.0 lb**	**0.0 ind.**	**± 0%**	**0%**	**0%**
All resources[b]	**100%**	**100%**	**94%**	**100%**	**94%**	**21,875.3 lb**	**875.0 lb**	**311.1 lb**		**± 41%**	**20%**	**73%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

the of the spruce grouse and 88% of the ruffed grouse were harvested in the Napaimute area, whereas 88% of the ptarmigan were harvested in "Other Kuskokwim," which is largely the Bethel area. One respondent also explained a traditional form of conservation management adhered to by area residents to preserve the population abundance. He explained:

> You don't want to kill off your grouse supply. You can only get so many in an area, you know, then you got to move out. So you can only get maybe a dozen, 10 or 12 grouse. And you could probably eat them in a few meals, you know, and then save the rest. They ain't like salmon where you could get, you know, a lot of them and save them. Grouse is a little different. (052711NA2)

Grouse and ptarmigan traditionally played a large role in the subsistence diet of Napaimute residents, especially when other meat such as moose was scarce. "So between the ptarmigan and the willow grouse and the spruce chicken and the rabbits, we got to have some meat. You either got that or you starved," explained one respondent (052711NA1). Ptarmigan and grouse can be jarred or eaten fresh. Napaimute is also becoming an increasingly used area for regional subsistence hunters, one respondent said. With the expansion of the airport and road system, grouse have become easier to hunt and residents of other villages (Crooked Creek and Chuathbaluk for example) often travel to Napaimute to harvest these birds (122011NA3).

Ducks, geese, and other migratory birds are less commonly targeted, but are still an important part of the seasonal round. One respondent who grew up in Napaimute recalled her uncles bird hunting around Napaimute during spring. Napaimute community members still hunt for ducks and geese; however, those who participate in this activity tend to do it closer to their permanent residence—namely

Table 7-7. – Estimated uses and harvests of vegetation, Napaimute, 2010.

	Percentage of households					Estimated pounds harvested			Total estimated amount[a] harvested by community	95% conf. limit	Percentage from	
	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total for community	Mean per household	Mean per capita			Napaimute area	Other Kuskokwim
Berries												
Blueberry	69%	63%	56%	13%	13%	156.3 lb	6.3 lb	2.2 lb	40.6 gal.	± 54%	0%	84%
Lowbush cranberry	31%	31%	31%	6%	6%	106.3 lb	4.3 lb	1.5 lb	26.6 gal.	± 57%	6%	94%
Highbush cranberry	19%	19%	19%	0%	13%	43.8 lb	1.8 lb	0.6 lb	10.9 gal.	± 70%	29%	71%
Gooseberry	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Currants	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Raspberry	19%	13%	13%	6%	0%	10.2 lb	0.4 lb	0.1 lb	2.5 gal.	± 118%	8%	0%
Salmonberry	63%	44%	44%	31%	19%	221.9 lb	8.9 lb	3.2 lb	55.5 gal.	± 46%	0%	100%
Crowberry (blackberry)	13%	19%	6%	6%	0%	6.3 lb	0.3 lb	0.1 lb	1.6 gal.	± 128%	0%	100%
Berries	**81%**	**69%**	**69%**	**38%**	**31%**	**544.5 lb**	**21.8 lb**	**7.7 lb**	**137.7 gal.**	**± 39%**	**4%**	**90%**
Plants/greens/mushrooms												
Wild rhubarb	13%	13%	13%	0%	6%	15.6 lb	0.6 lb	0.2 lb	3.9 gal.	± 89%	100%	0%
Eskimo potato	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Fiddlehead ferns	6%	0%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Hudson's Bay tea	13%	13%	13%	0%	6%	6.3 lb	0.3 lb	0.1 lb	6.3 gal.	± 87%	75%	25%
Mint	6%	6%	6%	0%	0%	0.2 lb	0.0 lb	0.0 lb	0.2 gal.	± 128%	100%	0%
Sour dock	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Willow leaves	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Cow parsnip (wild celery)	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Wild rose hips	13%	13%	13%	0%	6%	9.4 lb	0.4 lb	0.1 lb	2.3 gal.	± 93%	67%	33%
Unknown mushrooms	6%	6%	6%	0%	0%	9.4 lb	0.4 lb	0.1 lb	9.4 gal.	± 128%	100%	0%
Fireweed	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Stinkweed	6%	6%	6%	0%	6%	1.6 lb	0.1 lb	0.0 lb	1.6 gal.	± 128%	100%	0%
Punk	19%	19%	6%	0%	6%	0.0 lb	0.0 lb	0.0 lb	23.4 gal.	± 0%	100%	0%
Mousefoods[c]	6%	0%	0%	6%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%	0%	0%
Subtotal	**31%**	**31%**	**25%**	**13%**	**13%**	**42.4 lb**	**1.7 lb**	**0.6 lb**	**47.1 gal.**	**± 69%**	**89%**	**11%**
Wood												
Wood	63%	63%	56%	13%	13%	0.0 lb	0.0 lb	0.0 lb	64.1 cord	± 40%	0%	0%
Subtotal	**63%**	**63%**	**56%**	**13%**	**13%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**64.1 cord**	**± 40%**	**0%**	**0%**
All vegetation	**94%**	**94%**	**88%**	**44%**	**50%**	**586.91 lb**	**23.5 lb**	**8.3 lb**		**± 39%**	**10%**	**84%**
All resources[b]	**100%**	**100%**	**94%**	**100%**	**94%**	**21,875.34 lb**	**875.0 lb**	**311.1 lb**		**± 41%**	**20%**	**73%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

c. "Mousefoods" = various plant roods obtained from mouse caches.

Bethel. Located on the tundra, Bethel is surrounded by prime duck and geese habitat. Ducks and geese are often taken opportunistically. For example, one respondent said that the one time she went duck hunting in 2010 was with another community member while on their way to a meeting in the nearby village of Crooked Creek (052711NA1). The duck species most commonly harvested by Napaimute community members were mallards (19%), northern pintails (6%), black scoters (6%), and green-winged teals (6%). A higher percentage of residents harvested geese (25%) including white-fronted geese (25%), lesser Canada geese (6%), and unknown Canada geese (6%).

Summer and fall time are also times when community members are actively harvesting wild berries and plants to supplement and accompany harvests of other wild foods. Use of the variety of species of vegetation available in the Kuskokwim region is high, with 94% of households reporting having

used at least one species in 2010 (Table 7-7). The most commonly used resource category was berries, including blueberries (69%), salmonberries (63%), and lowbush cranberries (locally known as red berries) (31%). One respondent explained how they would harvest berries in the past:

> By about July, late, end of July, you started your berry picking, you know. And you went the full route. The blueberries first, you know, if you can get salmonberries up here they would get salmonberries first. Then the blueberries would come in, of course you would get as much berries as you could and the only way you could preserve them those days was in these stave barrels with sugar. They'd line berries and sugar and berries and sugar. (NDM0511)

One woman explained that berry abundance varied from year to year. For example, during the summer of 2011 (the year following the study year), blueberries and salmonberries were scarce, but there was an abundance of crowberries (locally known as blackberries). It was important to take advantage of abundance when it was available, explained one longtime community member.

> They rest their seasons … we always thought that if there was no blueberries, this was the year they rest and there will be more the next year or the year after and then we won't get no blackberries. They switch, so you pick all you can while you can. (122011NA4)

Customary trade of berries can be a source of income for some Kuskokwim River villages. Although there were no Napaimute community members who discussed picking berries to sell, a few households said that they had purchased berries. "That's I buy, because I can't pick anymore, I can't bend. So I bought berries. I usually try to buy about 10 gallons of salmonberries, but I make akutaq and jams, I don't waste none of my stuff" (122011NA4). She said prices were as high as $600 for 5 gallons of berries in 2011 (the year after the study year). She probably would have paid that price, but fortunately found a seller who would give her the same amount of berries for $300. That price was still high, she said, but subsistence foods are more important to her than traveling to Anchorage or using the money for other purchases.

Additionally, 63% of households reported using firewood, harvesting a total of 64 cords for the community. Other plants harvested by Napaimute community members included wild rhubarb (13% of households), Hudson's Bay tea (13% of households), punk, (19% of households), and wild rose hips (13% of households). One household (6%) reported harvesting mushrooms.

Harvest Areas

For 6 different resource categories (salmon, nonsalmon fish, large land animals, small land animals, birds, and berries and greens), households were asked to locate on a map the areas in which they had hunted or fished for the resource and the locations at which they had actually harvested the resource. For each category, all households' search areas and harvest locations were combined to create a

series of maps depicting Napaimute's subsistence use areas in 2010. Figure 7-11 summarizes all the mapped data collected from Napaimute for 2010 and figures 7-12 through 7-17 depict mapped data for individual resource categories

Napaimute residents reported using a total of 3,327 square miles in the Kuskokwim River drainage for subsistence in 2010. This number does not include other areas in Alaska that are outside the region. After Kwethluk (6,379 square miles), Napaimute had the second largest subsistence use area of all communities in this report, likely because of the residency patterns of Napaimute households. The total area reported used in 2010 was also likely smaller than the actual area used by subsistence users in 2010 because one high harvesting household's harvest information was not included (this household was unavailable during the time of field research). By comparison, the nearby village of Crooked Creek reported using a total of 1,246 square miles for subsistence activities in the previous year (Brown et al. 2012). Roughly 20% of all Napaimute's subsistence activities took place in the Napaimute area, 73% occurred in the larger Kuskokwim River drainage, and 7% occurred in other parts of Alaska. This section focuses primarily on the Napaimute area, but given the heavy usage outside Napaimute proper, it will discuss other areas as well. Napaimute community members take advantage of the variety of opportunities offered in the diverse terrain of their use area. They also hunt and fish opportunistically while traveling between their permanent places of residence (such as Bethel) and Napaimute.

Environmental, wildlife, and human factors can contribute to determining the breadth of the harvest use area. Areas can vary from year to year depending on species abundance, regulatory regime, population shifts, personal preferences, and socioeconomic factors such as gas prices or other responsibilities such as building or repairing cabins. Napaimute is located on a section of the Kuskokwim River that flows nearly due east–west. The north bank of the river, where the village site lies, is characterized by steep hills. The southern side of the river is low-lying tundra that makes Buckstock and Holokuk mountains visible from cabins in town. Behind the village, the hills steepen into the Horn and the Russian mountains. Local rivers and creeks are the Holokuk River, Kolmakof River, Sue River, Sue Creek, and Victoria Creek.

All salmon search and harvest areas are shown in Figure 7-12. As noted earlier, the majority (87%) of the salmon harvest activity occurred outside the Napaimute area in the Kuskokwim River drainage, with the heaviest activity taking place in the river's mainstem in the Bethel area. However, chum salmon were harvested more commonly in the Napaimute area (73%). In Napaimute, there are a few households who target salmon in the area specifically around the village site. Chinook salmon was harvested in June in Napaimute in the mainstem near town. Coho salmon, chum salmon, and Arctic grayling were caught with rod and reel near the mouth of the Holokuk River from August to September. Rod and reel fishing was popular in Napaimute and the fresh fish caught (especially the Arctic grayling) were typically eaten immediately. Smelt was caught using dip nets in May just upriver from Akiak.

Some community members use the Napaimute area specifically for their hunting activities. Others

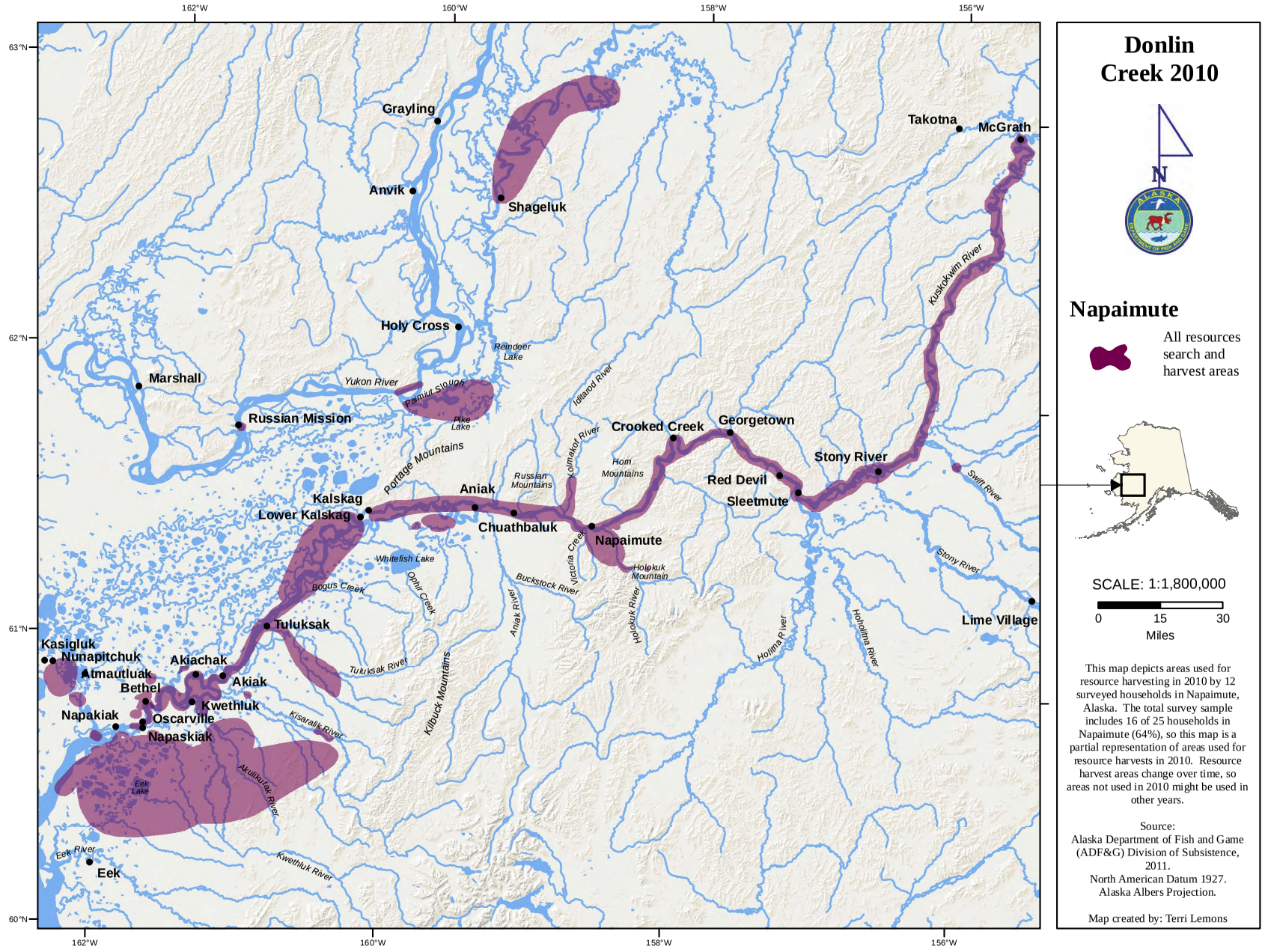

Figure 7-11.–Harvest locations and search areas, all resources, Napaimute, 2010.

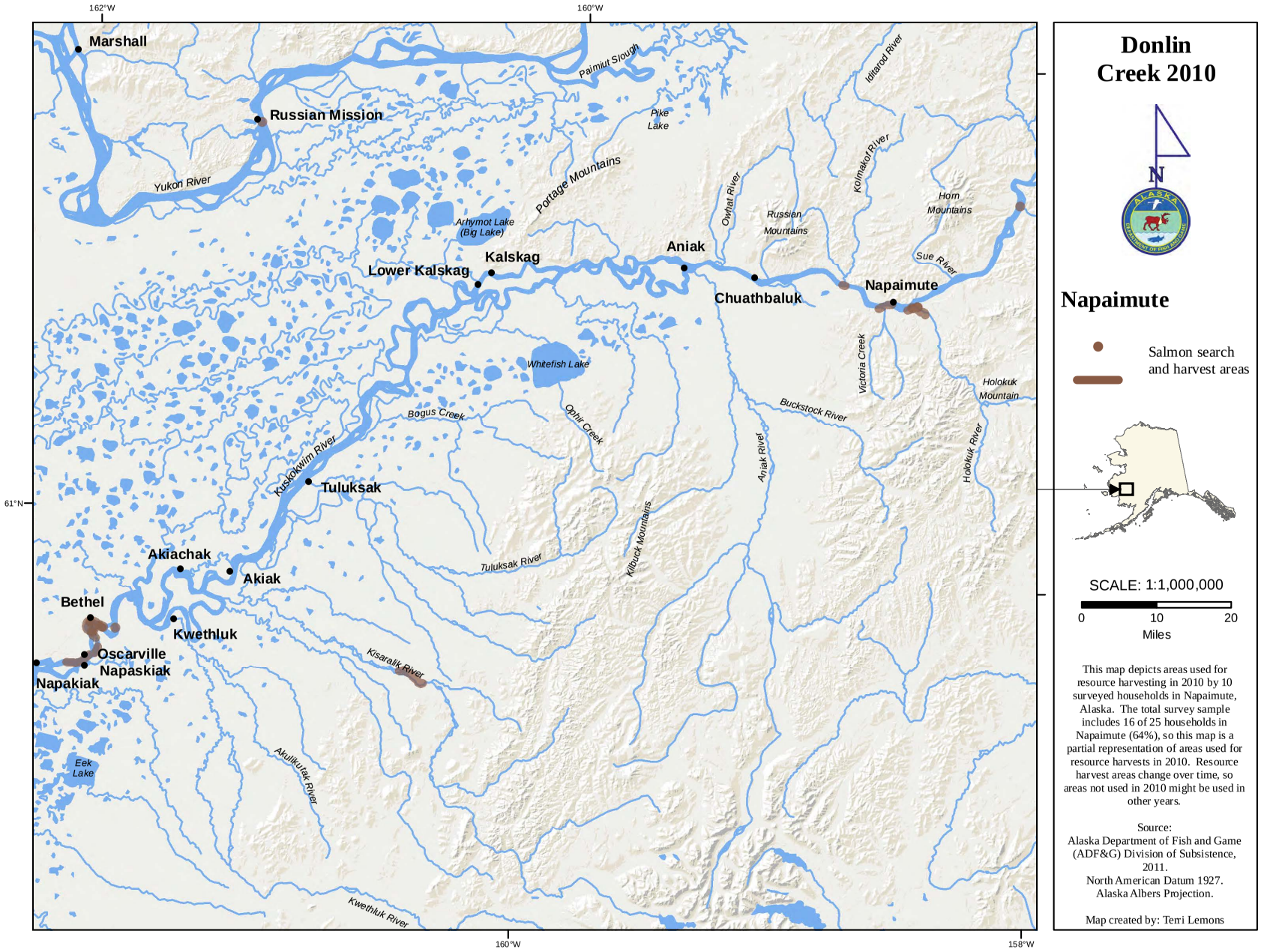

Figure 7-12.–Harvest locations and search areas, salmon, Napaimute, 2010.

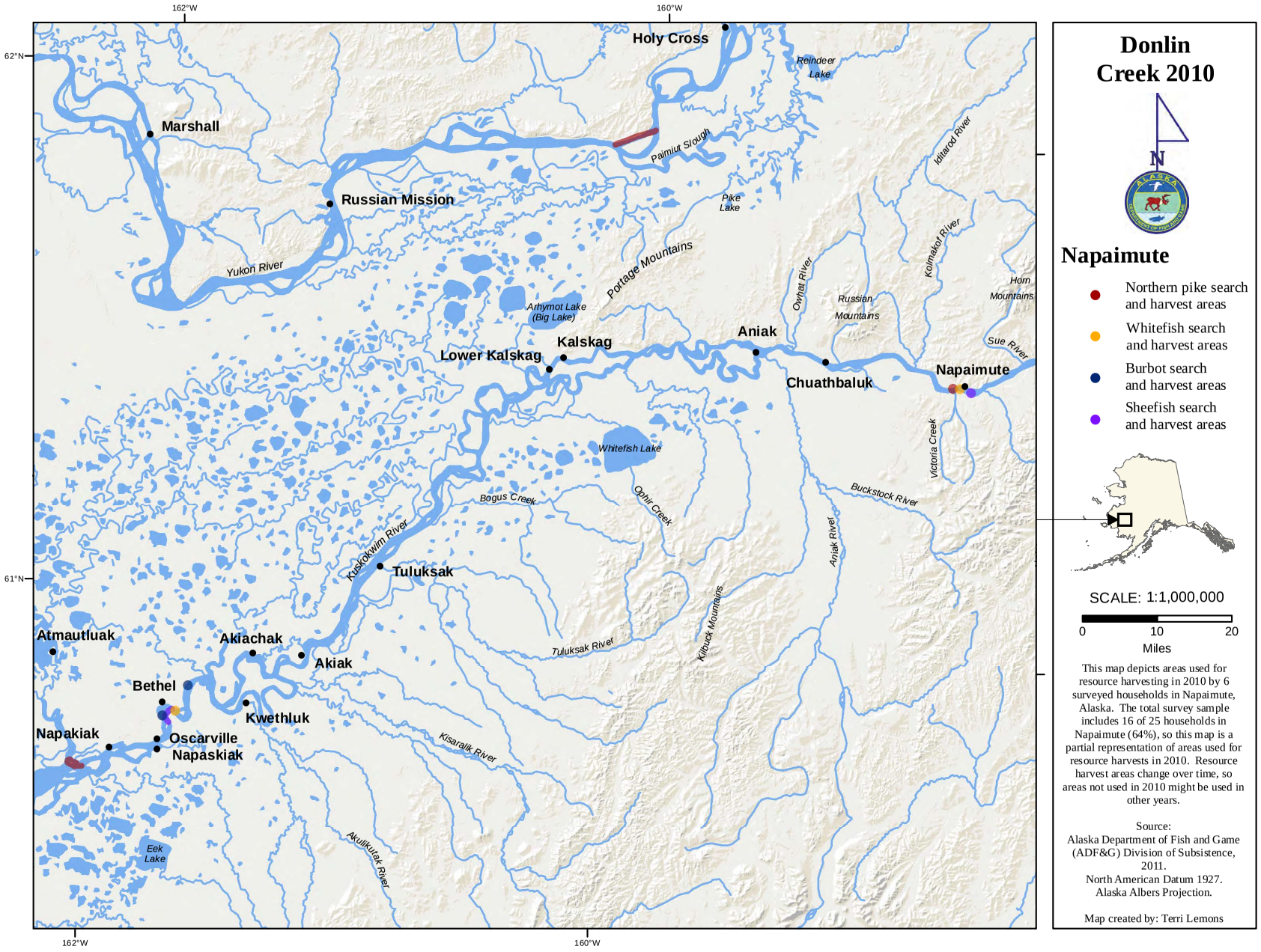

Figure 7-13.–Harvest locations and search areas, northern pike, whitefish, burbot, and sheefish, Napaimute, 2010.

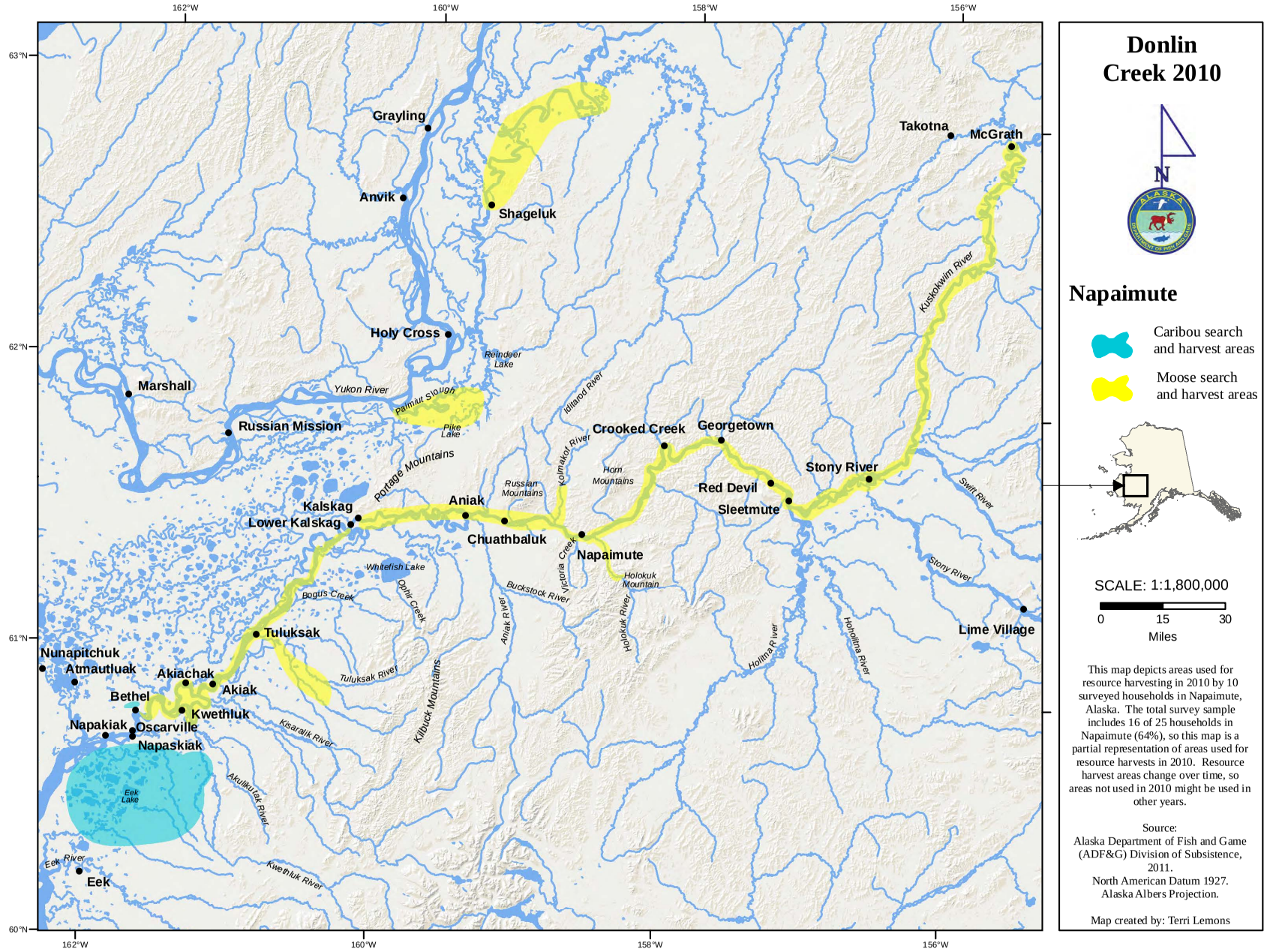

Figure 7-14.–Harvest locations and search areas, caribou and moose, Napaimute, 2010.

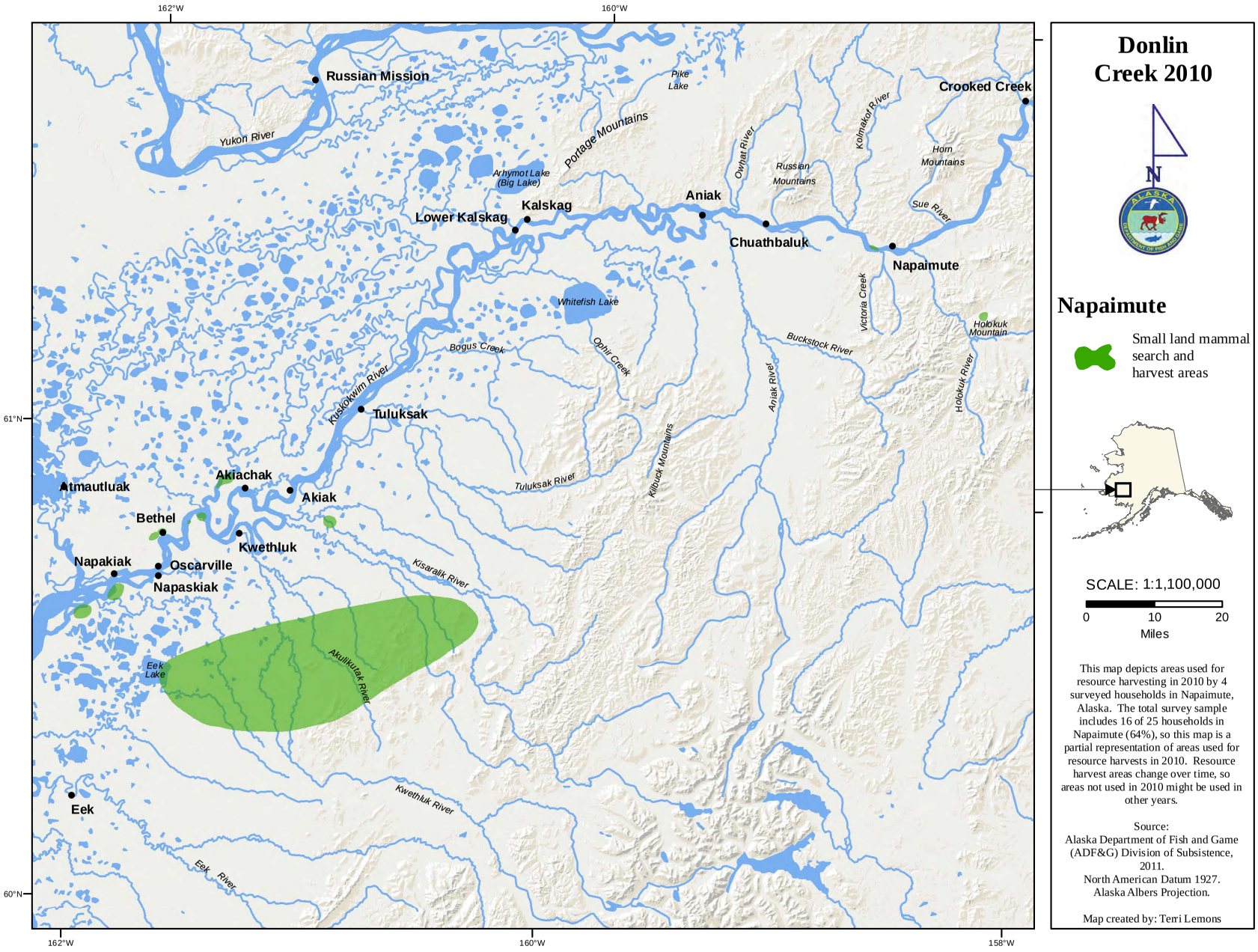

Figure 7-15.–Harvest locations and search areas, small land mammals, Napaimute, 2010.

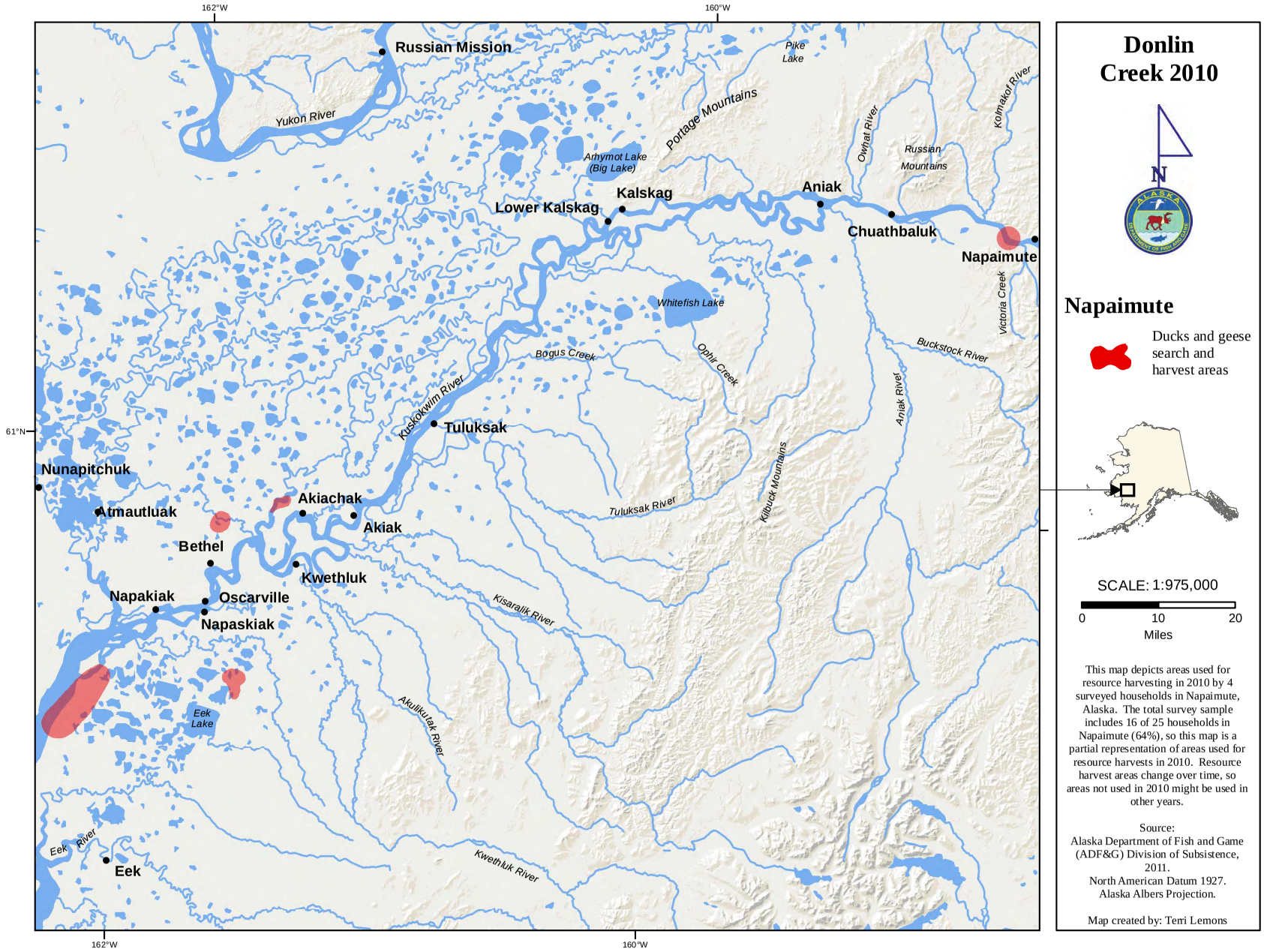

Figure 7-16.–Harvest locations and search areas, ducks and geese, Napaimute, 2010.

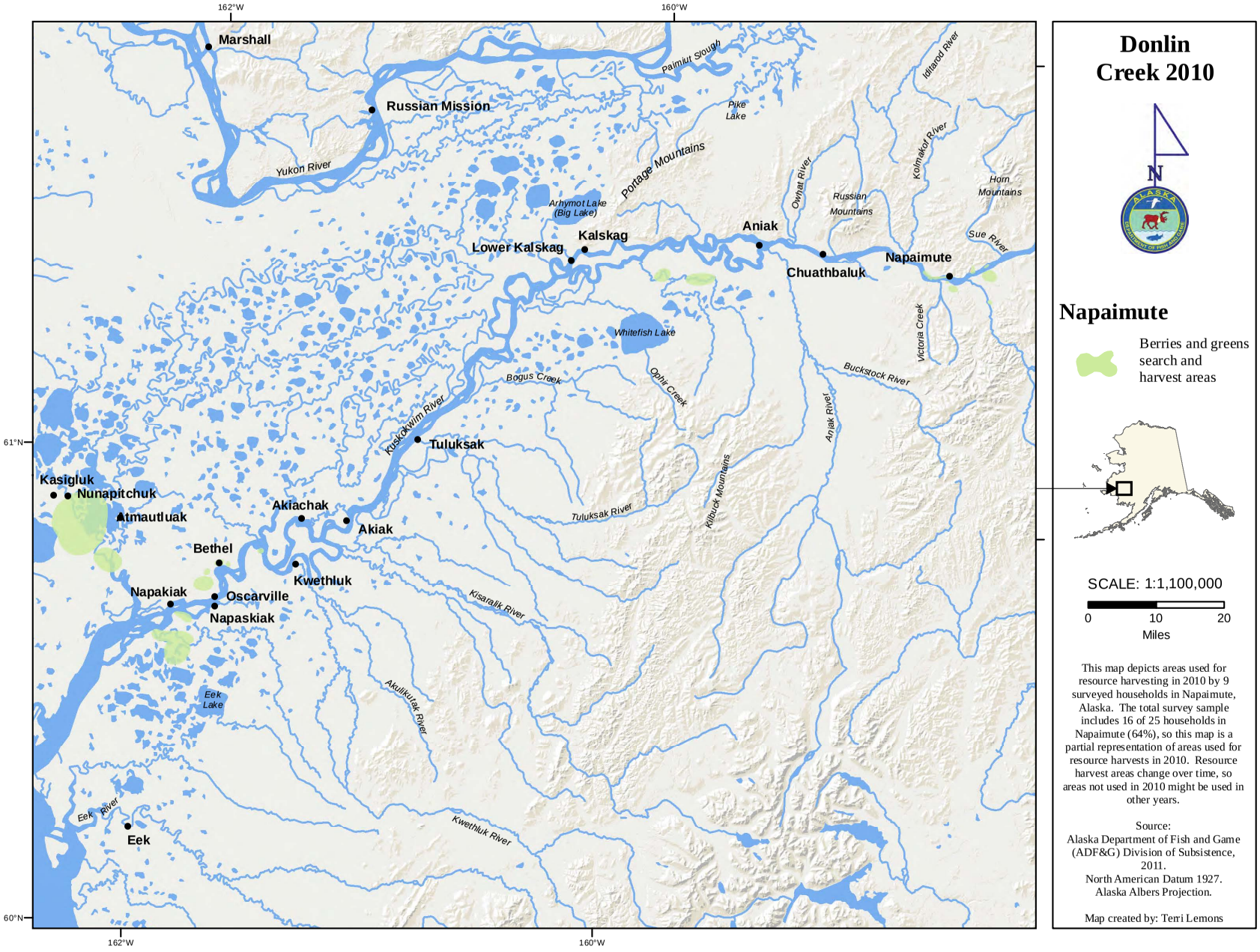

Figure 7-17.–Harvest locations and search areas, berries and greens, Napaimute, 2010.

target areas outside of the Napaimute area (primarily the lower Kuskokwim River). The Holokuk River is an important area for Napaimute community members. In 2010, Napaimute community members reported traveling up the Holokuk River in March and harvesting Arctic hares. Moose hunting is one of the most popular hunting activities in the area. Napaimute community members reported traveling along the Kuskokwim River mainstem from Bethel to McGrath in search of moose, including areas up the tributaries of the Tuluksak, Kolmakof, and Holokuk rivers. Additional search areas for moose included the Paimiut Slough (between Holy Cross and Russian Mission), and the Innoko River near Shageluk. One resident traveled upriver to McGrath in search of moose. The area just past Stony River was part of the registration hunt for residents only (GMU 19D).

Caribou were hunted in February up the Kwethluk River, just below Three Step Mountain. Willow grouse were hunted along Discovery Creek between Upper Kalskag and Aniak. Ptarmigan and grouse were popular to harvest along the north bank of the Kuskokwim River to the west of Sue Creek in the Napaimute area.

The Bethel area is heavily used for berry and plant gathering. For example, salmonberries were gathered in July along the banks of the Johnson River, the outlet of which lies downriver from Bethel and in the area toward the tundra villages of Kasigluk, Nunapitchuk, and Atmautlauk.

Harvest Assessments

The survey asked respondents to assess their own harvests in 2 ways: whether they got more, less, or about the same amount of six resource categories in 2010 as in past years, and whether they got "enough" of each of the 6 resource categories. This section discusses responses to those questions. Percentages include households that did not respond to the question or reported that they never harvested the resource.

For all resource categories, the majority of Napaimute respondents who provided responses said they got enough in 2010 (Figure 7-18). For example, all households responded to the question about whether they got enough salmon in 2010. Six households (38%) said they did not get enough salmon. This is in contrast to the marine mammals category where only 4 of 16 respondents answered the question and of the 4 responses, 100% said they got enough marine mammals. Twenty-five percent of respondents reported not getting enough land mammals, 19% reported not getting enough birds and eggs, but only 6% reported not getting enough nonsalmon fish.

To understand how a household's use might compare with recent years, the survey also asked respondents to evaluate whether their household used less, same or more of a resource category than in recent years (Figure 7-19). Overall, 40% of households who responded said they used less, 28% used more, and 32% said they used the same amount of all resources. Fifty percent of Napaimute community members said they used less salmon than in recent years, whereas only 13% of respondents used less nonsalmon fish, 19% used less birds and eggs, and 25% used less land mammals. Fewer

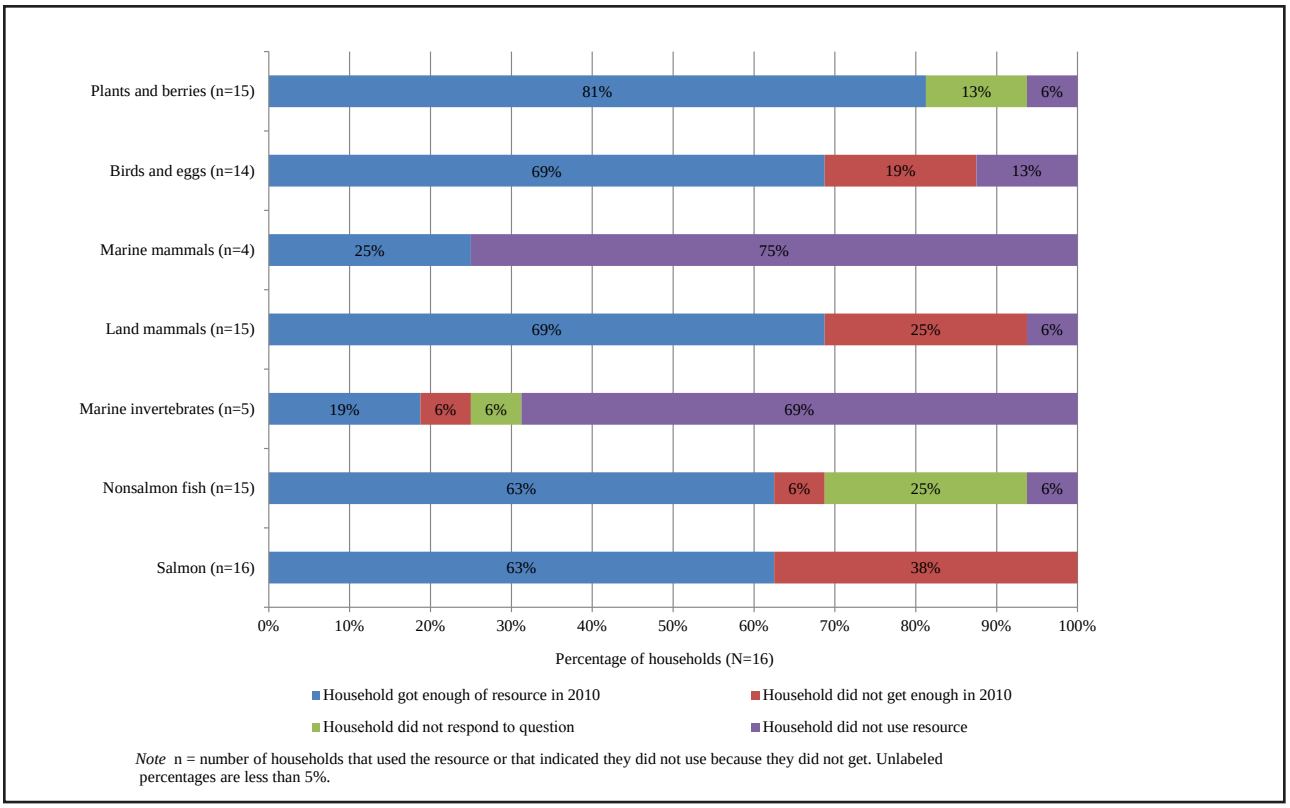

Figure 7-18.–Harvest assessments, Napaimute, 2010. Responses to the question: "Did your household get enough in 2010?"

respondents reported using more of these categories, for example, 19% said they used more salmon, 13% said they used more nonsalmon fish, and no one reported using more birds and eggs. However, 13% did report using more land mammals, and all these households (2) said they used more because they were more successful hunting in 2010 than they had been in recent years.

The impact to households of not getting enough of a certain resource varied from household to household. For example, of the 6 of respondents who did not get enough salmon in 2010, 1 said the impact was "not noticeable," 1 said it was "minor," 2 characterized it as "major," and 2 did not answer the question. One community member explained that in 2010, they were unable to harvest a moose, which had a two-fold impact on their household: "When you don't get subsistence meat, then you have no choice but to buy it at the stores. So it not only impacts our health, but it also impacts our pocketbook, you know? And we're retired, so there's a big difference there" (052711NA1).

Five households said that they wanted or needed more Chinook salmon, highlighting both the preference for and reliance upon this fish species by Napaimute people. The distribution was similar for respondents who did not get enough land mammals, however, all 4 respondents who reported not getting enough also said they needed or wanted more moose. Other resources that households said they needed or wanted more of included smelt, geese, spruce grouses, and razor clams.

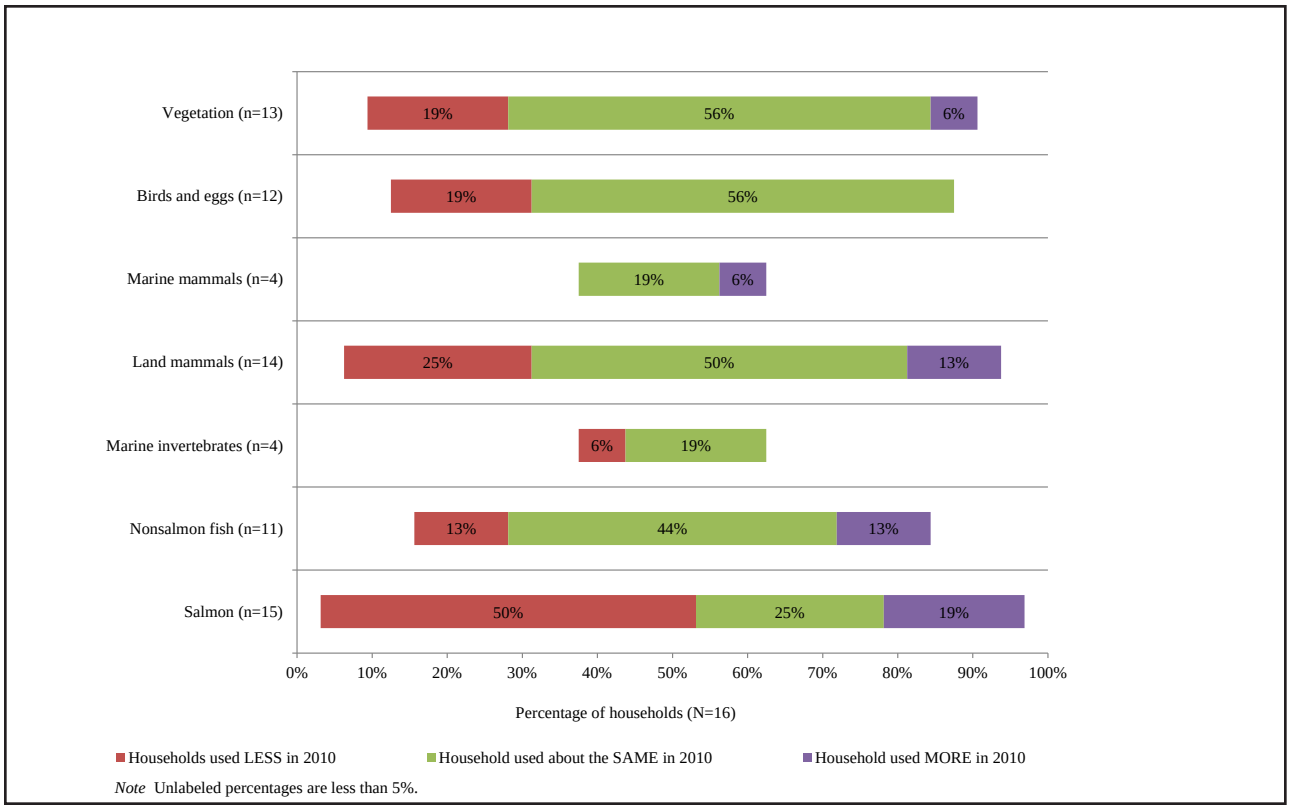

Figure 7-19.–Harvest assessments, Napaimute, 2010. Responses to the question: "Did your household use less, more, or about the same amount in 2010 as in the past?"

Reasons for not getting enough varied, but the most common was attributed to personal or family reasons (this could have been health problems, family death, etc.). Another common reason cited for not getting enough was an inability or lack of opportunity to go out hunting. Four respondents cited this as a reason, which could be caused by high gas prices, conflicting work schedule, travel, or other factors that prevented a household from being able to go hunting as much as they wanted or at all.

Jobs and Income

Respondents were asked about both earned income (jobs held and wages earned by all household members 16 years old and older) and unearned income (Alaska Permanent Fund Dividend, Social Security, public assistance, etc.). For 2010, Napaimute households earned or received an estimated $2.8 million, of which $2.6 million (93%) was from wage employment and $193,604 (7%) was from other sources (Table 7-8). The U.S. Census data for Napaimute is not comparable because of the unique nature of Napaimute's community structure. Average per capita income in 2010 was $40,509, and average household income was $113,424. The top 3 sources of income for Napaimute households were jobs in services, local government, and transportation, communications and utilities.

Traditionally, Napaimute's economy has been mixed. The lack of economic opportunities caused

Table 7-8. – Estimated earned and other income, Napaimute, 2010.

Income source	Number of people	Number of households	Total for community	Mean per household[a]	Percentage of total
Earned income					
Services	18.3	11.7	$714,487	$28,579	25.2%
Local government	4.1	3.3	$465,754	$18,630	16.4%
Transportation, communications, and utilities	8.1	6.7	$422,562	$16,902	14.9%
Manufacturing	2.0	1.7	$362,429	$14,497	12.8%
State government	6.1	5.0	$351,779	$14,071	12.4%
Construction	8.1	3.3	$323,087	$12,923	11.4%
Agriculture, forestry, and fishing	2.0	1.7	$1,908	$76	0.1%
Earned income subtotal	**48.4**	**21.7**	**$2,642,005**	**$ 105,680.20**	**93.2%**
Other income					
Alaska permanent fund dividend		23.4	$82,064	$3,283	2.9%
Social security		6.3	$47,932	$1,917	1.7%
Supplemental security income		3.1	$14,869	$595	0.5%
Native corporation divident		17.2	$12,957	$518	0.5%
Meeting honoraria		1.6	$12,500	$500	0.4%
Disability		1.6	$11,250	$450	0.4%
Longevity bonus		1.6	$6,563	$263	0.2%
Citgo fuel voucher		10.9	$5,469	$219	0.2%
Adult public assistance		0.0	$0	$0	0.0%
Food stamps		0.0	$0	$0	0.0%
Energy assistance		0.0	$0	$0	0.0%
Pension/retirement		1.6	$0	$0	0.0%
Workers' compensation/insurance		0.0	$0	$0	0.0%
Unemployment		0.0	$0	$0	0.0%
Veterans assistance		0.0	$0	$0	0.0%
Child support		0.0	$0	$0	0.0%
Other		0.0	$0	$0	0.0%
Foster care		0.0	$0	$0	0.0%
Other income subtotal		**6.3**	**$193,604**	**$ 7,744.14**	**6.8%**
Community income total			**$2,835,609**	**$113,424**	**100.0%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. For confidentiality, income amounts are not listed for sources reported by fewer than 4 households.

residents to relocate during the 1940s and 1950s. Some of these people would later choose to enroll on the tribal rosters of the Napaimute Village after the settlement of ANCSA in 1971, but many did not. Current community members are a blend of tribal members, lease holders, longtime area residents, and/or descendants of George Hoffman and Liza Lind. Many Napaimute community members have had the opportunity to pursue post-secondary education and have pursued jobs requiring high skill levels in the places of their permanent homes (primarily Bethel and Aniak), which could explain the higher percentage of earned income compared to other communities in the study (participant, community review meeting, Napaimute, December 2011, personal communication). A higher income could contribute to being able to pay for the high costs of transportation to Napaimute.

Figure 7-20 shows the percentage of community income by source. Service occupations include health care, social services, education, and tourism or guiding-related businesses. Local government

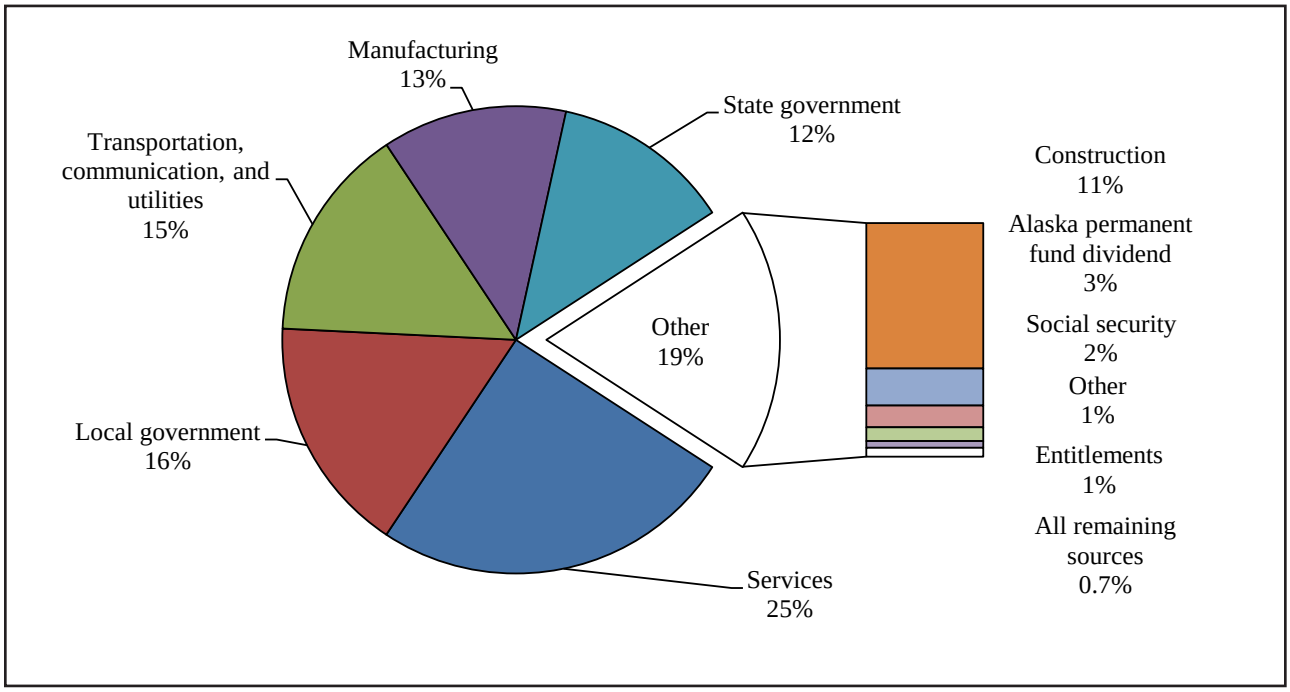

Figure 7-20.–Top 10 income sources ranked by estimated amount, Napaimute, 2010.

includes work for city and tribal organizations. As a regional hub, Bethel provides more opportunities for these jobs than in surrounding villages. In 2010, 89% percent of Napaimute adults reported having a job and were employed an average of 10 months out of the year. The survey also asked about job schedules—whether respondents worked full-time, part-time, shift, or on-call. Seventy-six percent of community members (or 85% of households) reported having a full-time job. Sixteen percent of community members (or 31% of households) had a part-time job. There was a small percentage (4%) of people who reported working either on-call or did not report a schedule. Some employers in the Kuskokwim area accommodate subsistence activities by allowing their employees to take time off work during critical times of year (Chinook salmon fishing season or moose hunting season). Napaimute Traditional Council allows its employees take time to go fish, hunt, and gather food because the organization realizes how important these foods are to its employees and their families (many of whom live in nearby villages such as Crooked Creek) (participant, community review meeting, Napaimute, December 2011, personal communication).

Food Security

Respondents were asked a short series of questions intended to assess their household's food security, that is, "access by all people at all times to enough food for an active, healthy life" (Nord et al. 2009:2). The food security questions were modeled on questions developed by the USDA, and

modified by ADF&G to account for differences in access to subsistence and store-bought foods. Core questions and Napaimute responses are summarized in Figure 7-21.

Based on their responses to these questions, households were categorized as having high, marginal, low, or very low food security following a USDA protocol (Bickel et al. 2000). In Napaimute in 2010, 75% of the surveyed households had high food security and 19% had marginal food security; USDA considers households in both categories to be "food secure." Of the remaining households, 6% had low food security and 0% had very low food security (Figure 7-21B). Compared with both the rest of the United States and Alaska in 2010, Napaimute reported higher food security, which is likely because of the higher per household income of Napaimute community members.

The series of questions used to evaluate food security included various indicators of the source of insecurity (Figure 7-21A). For example, in Napaimute, 13% of respondents reported that their subsistence foods did not last compared with 5% who reported that their store-bought foods did not last. Only 6% said they worried about having enough food, but 25% said they lacked the resources to get food (including cash or other resources needed to purchase, hunt, gather, or fish for food).

Food insecurity was most commonly reported to happen from October through December (Figure 7-22), which coincides with moose hunting season as well as the time of year when community members are paying heating bills and other bills in preparation for winter. It is likely that households feel a heightened sense of anxiety over food during months with increased pressure to pay bills and put food away for winter. These fall and early winter months were also the same months that respondents reported that their subsistence foods did not last. All the people who were worried about having enough food worried year-round. One elder respondent explained that while she always has enough food nowadays, she experienced several winters of severe food shortage as a child and therefore was always concerned about her food supply (052711NA1).

Subsistence users rely not only on their own resources to go out and gather and hunt food, but they also rely on family members and high harvesters to provide wild foods. This is particularly important for elders, who may have health problems that limit their abilities to participate in subsistence activities, but for whom subsistence resources are treasured. One elder woman explained the connection between her feeling of food security and rising gas prices that make it difficult for people to share their resources:

> I noticed people don't share because gas [is more expensive]. Before, people would bring me berries, people would bring me fish, moose meat. I never worried, but I noticed that as gas gets more expensive, food is going up and everything is going up. You have to pay for your water and all this junk, a lot of them don't have the money to share. (122011NA4)

In Napaimute, the discrepancy between high food security and the responses to questions that show one-quarter of respondents could not get the food they needed because of a lack of resources could probably be explained by the high importance community members place on their wild foods. Most

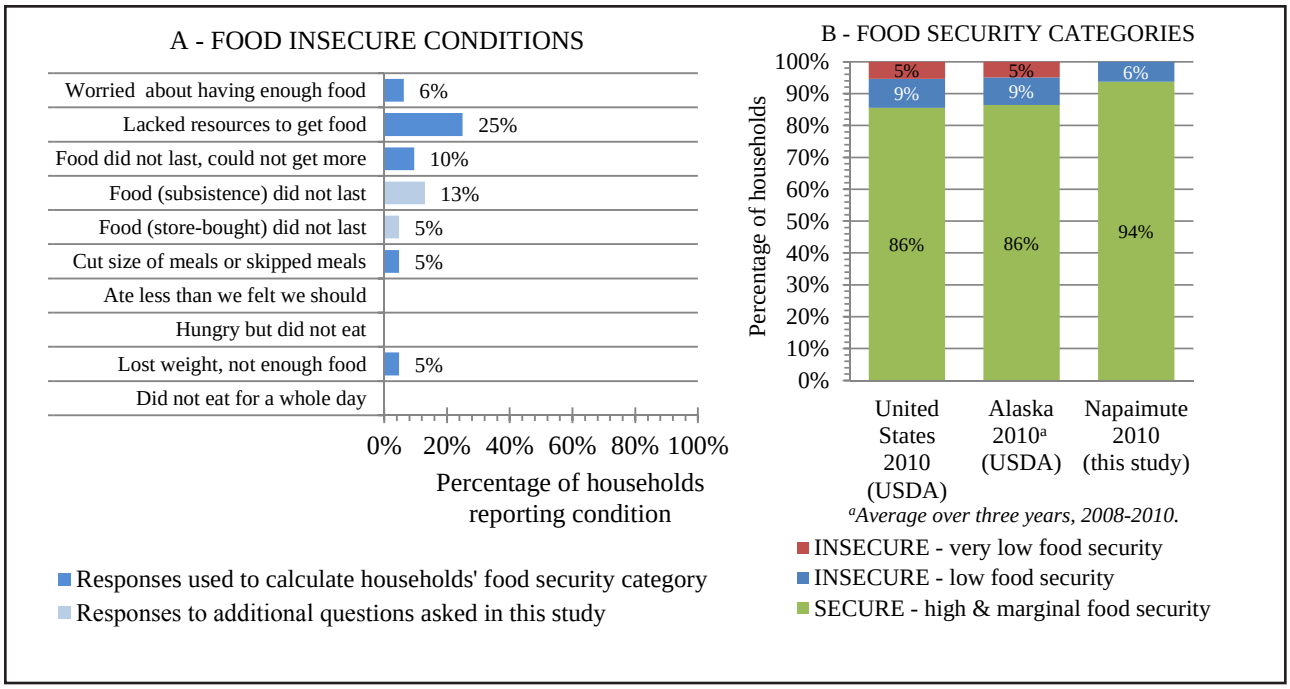

Figure 7-21.–Food security results, Napaimute, 2010.

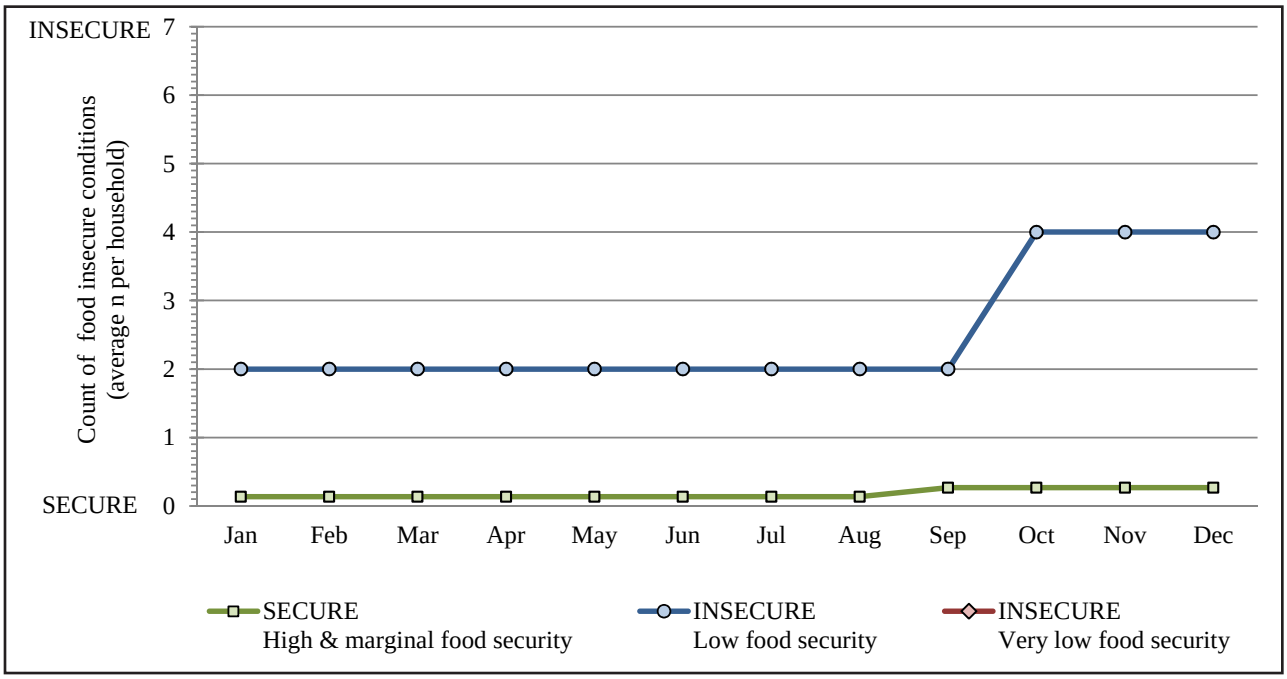

Figure 7-22.–Food insecure conditions by month and by household category, Napaimute, 2010.

community members might have enough cash to purchase store-bought food, for example, but the value of subsistence foods is so great that any difficulty in securing those resources contributes to food insecurity.

Wild Food Networks

A Napaimute community member described the sharing, bartering, and trading of wild foods as being the "essence of subsistence" (122011NA3). Redistribution of subsistence foods among community members and neighboring communities is an important traditional practice in Central Kuskokwim communities (Jonrowe *n.d.* [c1980]; Stickney 1981; Charnley 1983; Charnley 1984) and is guided by customary and traditional systems and rules (Wolfe and Ellanna 1983). The following is an anecdotal description of one household's pattern of sharing with friends and family in Napaimute and other communities:

> **Wife**: I took some [white]fish down to some friends of mine down in Aniak because I know they didn't have any. Fish to make akutaq with. And they give me stuff and I give them stuff, so I guess that's a form of bartering.
>
> **Husband**: Yeah. Honor system. Kind of an honor system.
>
> **Wife**: And then (a Napaimute community member) come over and he said, "Auntie, if you get a big sheefish tomorrow, if you're not gonna use it, can I have it? Because I wanna take it to Bethel." For his family. So I was lucky the next day, I got 2. A big one and then a not so big one. And I gave those and a pike that I caught to a lady over here.
>
> **Husband**: She doesn't have … she's got a little 7-year-old boy over there. And I know they didn't have a net set because we were upriver where they've setnet and it wasn't there. So I knew. I know she likes fish. And so I sent her them. And we gave some to a lady that's over here with the kids. She might not be there right now. But she's one of the worker's wives.
>
> **Wife**: Yeah. We gave her some and she said, "Huh! I wished I had berries so I could make akutaq!" But she didn't, you know? That's with the fish. And then, last year, my cousin got a bunch of … spruce chickens? And he gave me 6 on his way back down Bethel. So that supplied us with that.
>
> **Husband**: Yeah, he's trying this new rifle out. And he cleaned it (the birds) too.

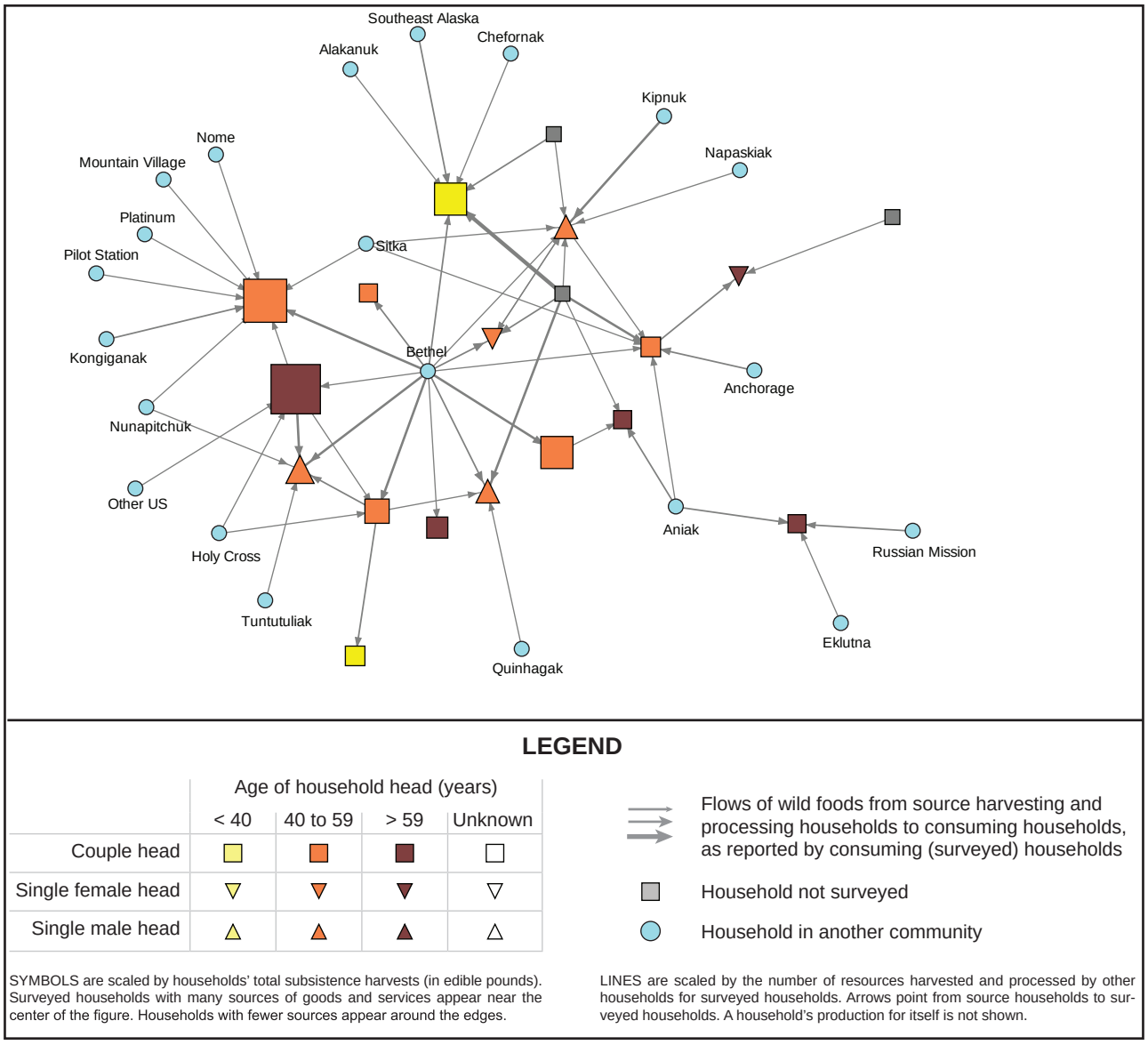

Figure 7-23.–Wild food harvesting and processing network, Napaimute, 2010.

Wife: So I guess there's a form of, I don't know whether bartering is the right word, it's just sharing.

Husband: Family. Mostly family, though. Family that are close. (052711NA1, 052711NA2)

These wild food networks are not only important as a means of redistributing resources, but they also have strong cultural and social implications. For example, one elder woman recalled that when she was a younger woman with young children, she attributed her decision to move back near family after separating from her husband to knowing that, despite what other difficulties that might arise, she would never starve because her family would share resources with her. This also allowed her family to stay together, providing the opportunity to transfer knowledge of subsistence hunting and fishing to children and grandchildren (participant, community review meeting, Napaimute, December 2011, personal communication).

This survey collected quantitative data to determine the rates of giving away and receiving foods, as well as patterns of sharing between households. For every single resource, survey respondents were asked whether they gave away or received that resource. If a resource was received by a household, the respondent was also asked which household in the community shared or traded that resource with them. Confidentiality was preserved by allocating each household a random identification number. If a household lived in another community, the name of the community was recorded. The resulting wild food sharing network is displayed in Figure 7-23.

The network data for Napaimute depict a community that is largely similar to other villages that have a permanent year-round resident population. Indeed, every surveyed household reported at least 1 link to another household and most households reported 2 or more links. The community of Bethel's location in the center of the network is the most striking difference between Napaimute's diagram and other communities in this report. Typically, households cluster toward the center of the diagram, with other communities falling on the outside because there naturally are more opportunities to share within a community than between communities. However, given that most Napaimute community members live in Bethel, the sharing, trading, and bartering networks with people in Bethel are just as profound as those between Napaimute community members. Another striking difference is the geographic variety of other communities within the Napaimute network. Many households who reported receiving wild foods from other communities indicated that they had family or close friends who lived in that village. For example, 4 households reported receiving foods from Sitka or Southeast Alaska. This link can be attributed to a familial relationship to that area. Many of the respondents who received foods from this area reported trading locally available foods for Southeast Alaska specialty foods such as herring eggs or halibut. Many researchers have identified kinship relationships as being "the primary principle involved in the organization of hunting and fishing activities in study communities" (Ellanna and Sherrod 1984:1). While Napaimute is comprised of a blend of community members, the strongest

link between most people is some type of kinship relationship. Where a kinship relationship exists, the links are more numerous, depicting a stronger tie between the households.

There was an interesting pattern of demographic diversity for high harvesting households. Of the 4 highest harvesting households, all were headed by couples. One was an elder household (heads were 60 years or older), 2 were mature households (heads were 30–59 years), and 1 was a developing household (heads were under 30 years old). The high harvesting yellow square household (developing couple household) was headed by a couple in their early 20s (and where the female head was the sole household member engaged in any subsistence activity). There was 1 unsurveyed household that would likely have exceeded all 4 of these households in numbers of pounds harvested (participant, community review meeting, Napaimute, December 2011, personal communication). This household appears as a grey square in the right middle section of the figure. Although not included in the survey, the numerous links between this household and the community was still apparent. This household would have been depicted on the diagram as an orange square (mature couple household).

The resources that responding households received from other households is also indicative of harvest patterns and resource availability trends. As noted before, particular resources are only available in certain areas of the state. Some places such as Anchorage serve as a redistribution city for many subsistence foods that are harvested in other areas. Herring eggs and halibut were shared from Southeast Alaska. Residents of Nome and Anchorage and the Kenai Peninsula shared marine invertebrates with Napaimute community members (i.e., tanner crab from Nome and razor clams from Nikiski). Whitefishes were received from Holy Cross, Nunapitchuk, Bethel, and Aniak. These communities have access to an abundance of whitefishes in close proximity to their villages. For example, Nunapitchuk is located on the tundra near many lakes where people fish for humpback whitefish, and Aniak residents use Whitefish Lake to harvest other whitefish species. Bird eggs were not harvested by Napaimute community members but were given to a Napaimute household by another in Kongiganak. Beluga whale came from Kongiganak and Alakanuk, and seals (seal oil) were given from Kongiganak, Chefornak, Kipnuk, and Anchorage households. Plants, largely berries, were picked by residents of Kipnuk, Bethel, Nunapitchuk, and Platinum and either given or sold to Napaimute community members.

Comparisons with Prior Results

This was the first comprehensive subsistence harvest survey conducted by ADF&G in Napaimute, but ADF&G has conducted subsistence salmon surveys (gathering information on both salmon and nonsalmon species) in several other nearby Kuskokwim River villages. Napaimute is unique in its resettlement patterns; however, it is not the only tribal community in the state of Alaska that largely abandoned its original land area only to reestablish itself many years later.

Since this is the first subsistence harvest study of any kind for Napaimute, there is no comparable

historic quantitative or qualitative data. However, Napaimute community members have been active subsistence users in other Kuskokwim River communities where studies have been conducted. Napaimute community members' contemporary rate of subsistence harvests is comparable to harvest levels in other Central Kuskokwim River region communities. For Napaimute in 2010, the average harvest per person was 311 lb. Between January and December 2009, residents of 8 other Central Kuskokwim communities (Aniak, Chuathbaluk, Crooked Creek, Lower Kalskag, Red Devil, Sleetmute, Stony River, and Upper Kalskag) harvested an estimated 292 lb per capita. Estimated harvest rates for each community ranged from 187 lb per person in Lower Kalskag to 533 lb per person in Stony River (Brown et al. 2012). Harvest estimates in communities can fluctuate from year to year depending on species availability and abundance, access to harvest areas, and other conditions such as gas prices; however, it is interesting to note that Napaimute in 2010 had a significantly larger reliance on moose than any of the 8 Central Kuskokwim villages that were surveyed in 2009. Moose composed 11% of the total harvest in 2009 for the Central Kuskokwim villages, with an average harvest rate of 33 lb per capita. In 2010 in Napaimute, moose harvests composed 27% of the total harvest, with an average harvest of 84 lb per capita.

Historically, Napaimute's subsistence harvests have fluctuated over time as community members have responded to changes in residences, abundance, and socioeconomic factors such as high gas prices. In 1986, the Division of Subsistence published a report comparing Chinook salmon fishing in the lower and upper Kuskokwim River, including subsistence practices and harvest levels (Andrews and Coffing 1986). This report was published at a time when commercial fishing was a more significant part of the economy (especially in the lower river). Andrews and Coffing (1986) found that in general, lower Kuskokwim families harvested an average of 50 to 150 Chinook salmon per year during the previous 10 years compared with an average of 56 to 105 Chinook salmon per year caught by upper river families during the same period. Lower Kuskokwim fishing families harvested roughly 80% of the total Chinook salmon harvest for the entire river drainage (Andrews and Coffing 1986). A larger overall human population coupled with Chinook salmon availability contributed to the greater share of subsistence harvests by lower river families. Chinook harvests in 2010 among Napaimute community members followed this historic trend; 90% of the Chinook salmon harvested by Napaimute community members was caught in "Other Kuskokwim" areas, primarily near the Bethel area. As noted before, one high harvesting household that fishes primarily in the Napaimute area was not surveyed. Ethnographic data suggest that if this household had been surveyed, the Napaimute share of the overall Chinook salmon harvest would be greater, bringing the rate of harvest closer in line with the all-river trend (80% of Chinook salmon caught in the lower river).

Certain wild resources have experienced changes over time in the Napaimute area, according to longtime residents. Changes were noticeably more pronounced particularly in wild game and fish populations beginning about 8–10 years ago and have resulted in community members having to expend

more energy to harvest the same number of resources. This respondent explained his observations of Chinook salmon abundance and size in the Napaimute area:

> I went to put my king net in up here. By the time I got down, you know, halfway down around the bend I would have enough. Maybe I'd probably have 10–12 kings, which would be enough for (my wife) to cut one day. Now I could make 3 drifts and I'm lucky if I get 2 or 3 kings. I'm talking about king net, you know. Kings are hitting the net, but they're going right through it. It's a 6-inch mesh. But I don't feel like picking chums out of my net, you know? For small kings. But if you have to, you can. But that's what a lot of people are doing. They're using chum nets for kings. Because the kings are smaller and smaller, just over-harvested. (052711NA2)

One respondent who grew up in the area recalled the abundance of chum (also called dog salmon) around the village and how that has drastically declined over time along with Chinook salmon abundance. She explained, "I can remember when I was a child and the kings would come in and the dogs right after the kings. There was so many dog fish in the river that you could smell it. It had a fishy smell. But that doesn't happen anymore" (052711NA1).

Historical reliance on moose by residents throughout the Central Kuskokwim region (GMU 19) has been documented by several researchers, most recently in the Brown et al. study (2012). One respondent said that he observed a change in moose population numbers about 10 years ago. He blamed overharvesting. "It was insane. People from all over, airplanes from all over, Anchorage and big game guides and hunters moved in here" (052711NA2). Brown et al. (2012) discusses in detail the history of this user conflict that resulted from declining moose populations during the 1990s. The study notes that residents continued to observe that from the early 1990s, the ongoing moose hunting moratorium in the Lower Kuskokwim region (GMU 18) increased hunting pressure on the Central Kuskokwim moose populations. This conflict was further exacerbated by a decision by the Kuskokwim Corporation, which is the conglomerate corporation for Central Kuskokwim village corporations, to limit moose hunting on corporation lands to shareholders only. Furthermore, overall state moose hunting regulations were becoming increasingly more conservative (Brown et al. 2012:355).

The Napaimute respondent also said that 10 years ago there was a winter hunt in addition to the September hunt. People were able to snowmachine in from all over during the winter hunt. This respondent blamed bad regulations for the resulting overharvest and depletion of the moose population. Moose hunting practices have also changed over time:

> The old timers, they used to get calf moose, you know, instead of cows. They'd catch calves swimming with their cows and get the calf because they couldn't keep the meat, so they'd catch the calves. And there used to be lots of moose. Maybe right

up until about 10–15 years ago until they screwed up all the hunting regulations. (052711NA2)

One community leader acknowledged that increased access and the land lease program opens the area for increased competition for subsistence resources. While many community members (especially those who are newer to the community) spend much of their time clearing land and building cabins, this community member said that in the future, this time will likely be spent hunting and fishing. These activities are one of the major draws to the area for community members who do not have ancestral ties to the village (participant, community review meeting, Napaimute, December 2011, personal communication).

Napaimute community members continue to work toward expanding infrastructure to accommodate a more permanent population. One of the major efforts of the last decade was to construct an airport to allow year-round access. Access to Napaimute during the shoulder seasons (breakup and freeze-up) was historically impossible because of the uncertainty of ice conditions. In 2002, a longtime and beloved elder who was born in Napaimute, Agnes Charles, passed away and community members desired to return her body to her home in Napaimute. Unstable ice conditions prevented her return until the following summer when a memorial and potlatch were given in her honor. But the experience made community leaders recognize the need for better year-round access to Napaimute. A few community members own airplanes, and there is also regular air service to many villages in the central Kuskokwim River drainage. Many community members still travel to Napaimute either via boat during open water season or snowmachine or vehicle when the Kuskokwim River is frozen, but the option for access via airplane is critical for emergencies and access during seasons when the ice is unstable. It is also important for access to hunting and fishing areas that many community members and their families have been using for generations.

The community of Napaimute continues to undergo changes and as it does, the relationship community members have to the traditional village site will continue to change. Subsistence activities remain a cornerstone of the lifestyle of community members, however, and the knowledge of the land and waterways around the area are critical for the continuing participation in these activities.

8. Comprehensive Survey Results Oscarville, 2010

Prepared by Lisa J. Slayton

In March 2011, researchers surveyed 12 of 14 households (86%) in Oscarville. Expanding for 2 unsurveyed households, the residents of Oscarville's estimated total harvest of edible pounds of wild foods between January and December 2010 was 32,796 lb (± 21%). The average harvest per household was 2,343 lb; the average harvest per person was 521 lb. During the study year Oscarville residents harvested 47 known species of fish, wildlife, and vegetation.

Five fish species—Chinook salmon, northern pike, humpback whitefish, summer chum salmon, and sockeye salmon—accounted for 75% of the total harvest in 2010 (Figure 8-1). In edible pounds, Chinook salmon contributed more than any other single species to the total community harvest. In 2010, an estimated 1,097 Chinook salmon were harvested for an estimated total harvest of 10,352 edible pounds or 32% of the total community harvest of wild foods.

This chapter summarizes findings from the household surveys, including demographic characteristics, responses to harvest assessment questions, harvest estimates, employment, income, and food security. Harvest numbers are expanded estimates. Results from this survey are available online in the CSIS.

In addition to the 2010 comprehensive survey, 2 ethnographic interviews were conducted with 2

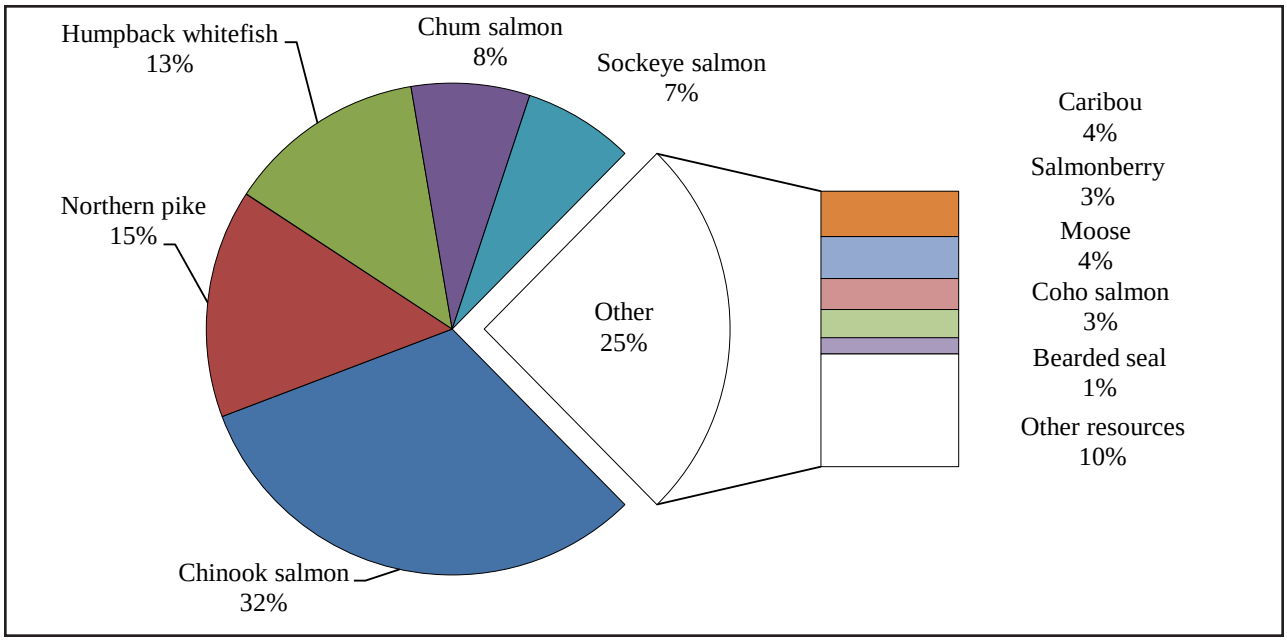

Figure 8-1.–Top 10 species harvests ranked by estimated edible weight, Oscarville, 2010.

individuals including 1 female elder who is still active in subsistence processing and 1 active male hunter and fisher. These ethnographic interviews provide context for the quantitate data presented in this chapter. Findings from these interviews, historical background information, and comparisons to earlier studies are presented throughout the chapter.

About Oscarville

Oscarville (*Kuiggayagaq*) is a Yup'ik Eskimo community located on the north bank of the Kuskokwim River, directly opposite the larger community of Napaskiak (*Napaskiaq*). It lies approximately 6 miles southwest of Bethel and 401 miles west of Anchorage. The community is located in the Yukon Delta National Wildlife Refuge (YDNWR). Winter temperatures average –2˚F to 19˚F, and summer temperatures average from 42˚F to 62˚F with an average annual participation of 16 inches per year. Average annual snowfall is approximately 50 inches. The weather is influenced by both the inland continental climate and by maritime storms from the Bering Sea. The Kuskokwim River near Oscarville is ice-free from mid-June through October (ADCCED 2011c).

Oscarville is located in a transitional area between two biotic zones, the "Hudsonian" zone characterized by spruce growth, and the "Eskimoan" or northern treeless zone. The area mostly comprises wet tundra, dwarf birch and alder thickets, freshwater marshes and willow thickets (Oswalt 1963b:4). Residents of Oscarville have reported that some spruce and stands of larger willow trees have been increasing, and that this new opportunity for browse may be one of the reasons for the increase of moose in the area in recent times. Another animal seen around Oscarville in more recent times is the marmot. An interview respondent stated, "A couple of years ago they saw marmots around here. They don't usually come down [the river] this far" (070310OS1). Year-round fauna include moose, red foxes, muskrats, river (land) otters, mink, hares, ermines, ptarmigans, spruce grouse, ravens, gray (Canada) jays, and several microtines (e.g., shrews, voles, and lemmings). The occasional wolf, wolverine, lynx, and brown or black bear may pass near the community. Caribou migrate within hunting distance of the community each year. In addition to 4 species of salmon and 5 species of whitefishes, smelt, loche (burbot), Alaska blackfish, and northern pike can be found at various times of the year (Oswalt 1963b).

Archaeological investigations in the vicinity of Oscarville have uncovered evidence that can be attributed to an Eskimo culture dating between 3,000 and 4,000 years ago (Ackerman 1980). This evidence, in the form of lithic artifacts (i.e., stone tools and flakes) recovered from prehistoric game lookout stations, intercept points (i.e., kill sites), and processing camps located along river corridors and inland lakes, speaks to a past subsistence pattern tied to the landscape and the migration patterns of caribou, the principal big game animal of the time. Many of these archaeological sites dating to this period were discovered in the Eek and Kwethluk River drainages and in the foothills and drainages

of the Kilbuck Mountains (Ackerman 1980:10–11). These areas continue to be used for subsistence pursuits by the residents of Oscarville today.

At the time of European contact in the mid-19th century, subsistence activities were pursued by individual families moving throughout the landscape for the majority of the year as they followed seasonally available wild resources. Salmon was the major subsistence resource for families, followed by fur-bearing mammals, and large land mammals, such as caribou (Oswalt 1963b). A description of the historical seasonal round begins in late March and early April, known locally as the "hungry time," when stores of frozen and dried foods became depleted, and people had to depend on small mammals, such as hares, and birds, such as ptarmigan, for food. Ptarmigan were particularly important because large flocks could be found around the village by April (Oswalt 1963b:84–85). In late April, before breakup, whole families moved to tundra camps to set fish traps under the ice for Alaska blackfish and whitefishes, and to hunt for muskrats, beavers, river otters, snowshoe hares, and ptarmigans. Ducks and geese were hunted at this time as well (Oswalt 1963b:87). In May, families would move to their summer fish camps. The first fish to come up the Kuskokwim River was smelt, followed by runs of Chinook salmon, followed by sockeye, then chum, and finally coho salmon. The entire summer was devoted primarily to harvesting and processing salmon. After the fishing season ended in early September, families moved to their tundra camps to harvest whitefishes and blackfish migrating from tundra lakes, trap furbearers, and hunt ducks and geese. By October, families returned to their winter villages. At this time, groups of men would make hunting trips up the Kuskokwim River as far as Aniak for moose, caribou, and sometimes bears. In the winter months, families trapped for furbearers and fished through the ice for whitefishes and blackfish. Trapping continued through December and then resumed in late February to April. Fishing occurred with fish traps in nearby streams throughout the winter and early spring (Oswalt 1963b:12, 80–84).

After European contact in the mid- to late 1800s, the Kuskokwim region experienced a slow but steady increase of Russian and American traders, prospectors, and missionaries, who brought with them changes that greatly affected the lives of the Native people living along the banks of the Kuskokwim River. Trade items first introduced by the Russians included steel traps, knives, and guns. These new items made trapping and hunting much more efficient. Traders encouraged the Native people to use them to hunt and trap as many fur-bearing animals as possible for trade rather than for personal use and clothing needs (Brown 1983). The fur trade in the Kuskokwim region greatly increased during the American period beginning in 1867. In 1884, the Alaska Commercial Company recorded that approximately 4,000 pelts consisting of muskrats, minks, beavers, martens, and foxes were obtained from the Bethel station alone (Brown 1983). Mink from the Yukon–Kuskokwim Delta region was among the largest and best quality in North America at that time and demand was great (Klein 1966:324). Trapping minks and muskrats was once a major occupation of Oscarville residents (Oswalt 1963b:82–84).

The years 1900 to 1913 brought dramatic changes to the Kuskokwim region that affected all of the established villages including nearby Bethel and Napaskiak. The influx of traders, prospectors, and missionaries brought influenza, measles, and other diseases previously unknown to the Kuskokwim Natives. In 1900, a disastrous influenza and measles epidemic, the "Great Sickness," took the lives of more than one-half of the Native adults and most all of the babies in the region, thus causing a major shift of populations up and down the Kuskokwim River. As a result, some villages were abandoned and new villages established (Oswalt 1963b). Subsequent epidemics of various diseases caused periods of starvation in many villages due to the death or illness of household subsistence providers and processors (Lenz 1985).

In 1913, the first commercial fishery on the Kuskokwim River was established by J.E. Shields (Brown 1983). Commercial fishing has been on the decline in Oscarville in recent years. Revenue from commercial fishing can be used to help pay for the costly equipment (i.e., boats, motors, nets, and snowmachines) that subsistence activities require.

Historically, the use of salmon as dog food was a significant portion of the overall subsistence salmon harvest (Brown et al. 2005). The 1960s brought the advent of snowmachines, which quickly took the place of dog teams as the major form of transportation used for subsistence activities such as hunting and trapping. The declining use of dog teams meant that the vast amount of mostly chum salmon previously needed to feed the dogs could now either be sold commercially, or the time spent fishing to produce food specifically for the dogs could now be used for other subsistence pursuits or wage employment.

A year-long study of Oscarville's neighbor, the community of Napaskiak, conducted in 1955–1956 by Wendell H. Oswalt, serves as a major source of information about historical Oscarville. At the time of Oswalt's study, Oscarville was considered as part of the Napaskiak community (Oswalt 1963b). The links between Oscarville and Napaskiak are numerous and significant. In the past, as now, residents of Oscarville and Napaskiak generally used many of the same harvest areas, pursued the same subsistence resources, and used the same types of gear. The only permanent store available to both communities was the Oscarville Trading Post (a.k.a. Samuelson's store) in Oscarville, which was owned and managed at that time by Oscar Samuelson's daughter Alice (Oswalt 1963b). Children from both communities attended the Bureau of Indian Affairs (BIA) school in Napaskiak. Kinship and marriage bonds intimately connected the 2 communities, which they still do today.

The written history of Oscarville began at the turn of the 20th century. In 1906, Norwegian-born Oscar Samuelson and his wife, a Yup'ik woman from the Nushagak region, moved from the Bristol Bay area to Napaskiak, 6 miles below Bethel. There, they opened a small store initially stocked with their own provisions (Oswalt 1963b:72–73). In addition to becoming a local trader, Samuelson, a former commercial fisherman in Cook Inlet and Nushagak, also became a government mail carrier. He carried mail by dog team with a 14-foot sled in winter and by motor launch and canoe in summer to several

villages on the Kuskokwim River, and to Holy Cross on the Yukon River along the Bethel–Tuluksak Trail. He held this position until 1922, when his son John took over the route (Lenz 1985:24).

In 1908, Samuelson and his wife relocated their Napaskiak store to a site directly across the Kuskokwim River (Brown 1983). This move coincided with the first major gold strike on the Kuskokwim in 1907–1908. Around this time, William Fisher and others discovered commercially viable gold-bearing gravels along Bear Creek, a tributary of the upper Tuluksak River (Oswalt 1980). In response to this and other gold strikes on the Kuskokwim River, new trading posts and stores sprung up along the river to supply the miners.

The exact reason for Samuelson's move from Napaskiak to the north bank of the Kuskokwim is lost to history, but it may have been to provide easier access for landing boats or in response to increased river traffic. Whatever the reason, a few Native families from Napaskiak soon settled near Samuelson's new store and the site came to be known as Oscarville in 1910 (ADCCED 2011c). Prior to the Samuelsons' move, sometime before 1908, a man of European decent named Albert Roemer was said to have lived in the area where the new store was established making him the first person to settle permanently at the site (Oswalt 1980).

Samuelson and his wife owned and managed the Oscarville store until his death in 1953. The store continued to be owned and managed by their daughter Alice and her husband Joe Mendola until 1975 when it was sold to Frank Gregory. Following Gregory's death in 1978, it was purchased by Walter Edwards and Jim Adkins. The Oscarville store closed its doors for the last time in the early 1980s (Oswalt 1980).

Oswalt (1963b) states that historically, and during the year of his ethnographic study of Napaskiak (1955–1956), one of the most important "outsiders" in the lives of the Oscarville and Napaskiak residents, and Alaska villages in general, was the store owner or trader. It was through the trader that most imported food and manufactured goods funneled into communities, and furs were traded or sold outside the community (Figure 8-2). Oswalt (1963b) reports that Oscar Samuelson's store was patronized by most residents of Oscarville and Napaskiak. Samuelson extended credit in lean years, and provided an expanded stock in good years (Oswalt 1963b). Almost all goods were exchanged in a barter system. Subsistence resources such as dried fish and furs were traded for commodities such as imported food, clothing, hardware, ammunition, outboard motors, and other manufactured goods. Store-bought foods considered necessities by the locals included flour, milk, sugar, coffee, tea, and salt. Most families relied upon their fish and fur harvests as their primary source of income, and were tied through these resources to a credit system with the store. Credit would be extended to trappers for supplies to outfit them for fall mink trapping and for spring muskrat trapping (Oswalt 1963b). See Oswalt (1963b) for a more detailed discussion of the early economy of Oscarville.

The history of Oscarville is intertwined with that of its immediate neighbor Napaskiak. Native people from Napaskiak used both the north and south banks of the Kuskokwim River for hunting

Photograph courtesy of AMRC Wein Collection, University of Alaska Anchorage

Figure 8-2.–Inspecting wolf and wolverine pelts at the Oscarville Trading Post circa 1940s or 1950s.

and fishing activities well before the founding of Oscarville, and along with the Samuelsons, were the first to settle in Oscarville. According to local tradition, the people of Napaskiak once lived at a winter village called *Oovingiyuk* located approximately 1 mile up the slough at the upper end of the present community. They moved, in approximately 1800, to the present site of Napaskiak when the slough changed and Oovingiyuk began washing away (Oswalt 1980; Brown 1983). Before the move, the people of Oovingiyuk used the present site of Napaskiak as a spring camp for harvesting smelt (Oswalt 1963b). The new village of Napaskiak was infused with people from a downriver village called *Eekchuk* whose numbers had declined due to feuds with coastal Eskimos (Oswalt 1980). Napaskiak first appears in the public record in 1867 when it was listed on a U.S. Coast Survey Map (Oswalt 1963b).

Today, the economy of Oscarville is a mixed subsistence-cash economy. Subsistence remains an integral part of everyday life. Trapping no longer plays the key role that it did in earlier years, but it still continues today along with land mammal hunting, subsistence fishing, and some commercial

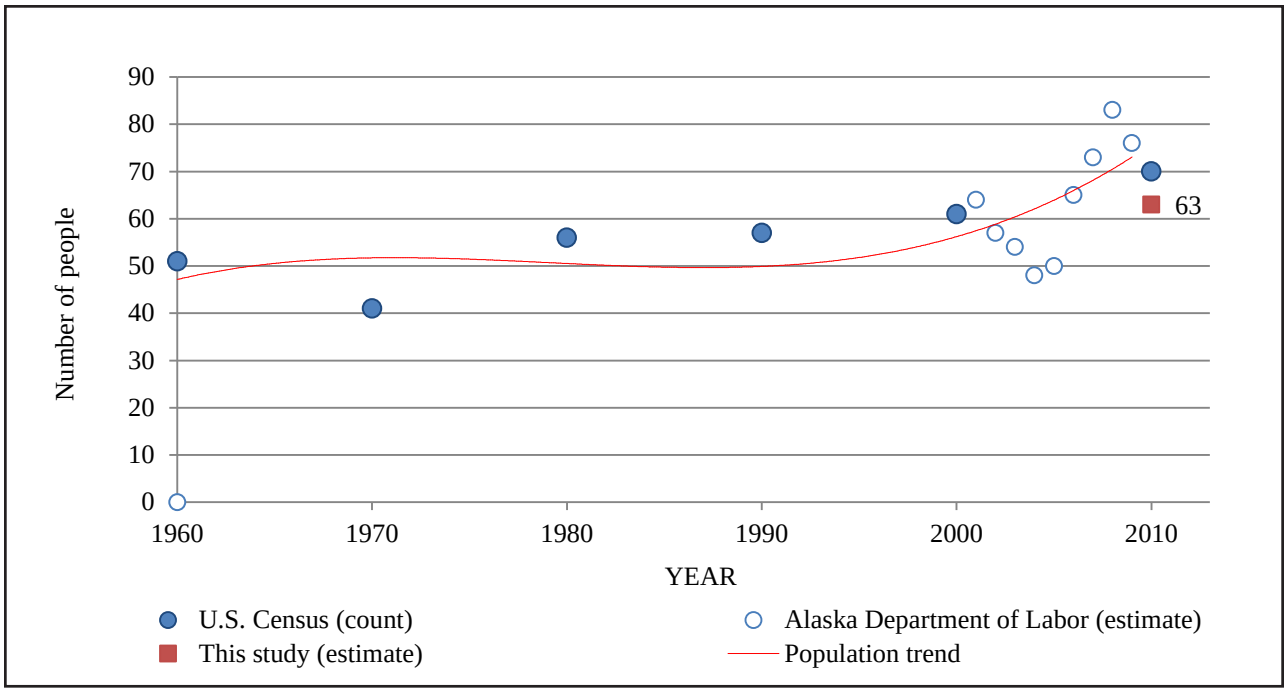

Figure 8-3.–Population history, Oscarville, 1960–2010.

fishing. Subsistence activities continue to provide most food sources. Subsistence activities were, and continue to be, the bedrock of the economy in Oscarville.

The health clinic, tribal and city offices, and the K–12 school provide permanent sources of employment (ADCCED 2011c). Some residents travel to jobs in nearby Bethel by snowmachine or truck in winter (on the Kuskokwim River via an ice road), and by boat on the Kuskokwim River, or by all-terrain vehicles (ATVs) on a back trail in summer. A small store serving both communities is located in Napaskiak. Oscarville is supplied with electrical power via a transmission line from Bethel. Treated well-water is hauled from the washeteria. The washeteria and the new school have complete plumbing systems while most individual homes have running water to the kitchen only. Oscarville is not connected to other Alaska communities by a road system. Oscarville residents rely on the Napaskiak airstrip for mail, passenger, and cargo services. Barge services deliver goods once a year via the Kuskokwim River (ADCCED 2011c).

The population of Oscarville has grown slowly over the years. The population was recorded in the 1940 U.S. Census as 11. For the 1950 U.S. Census, the population had increased to 27. By 1955, there were 42 individuals, 13 homes, 1 store, and 2 warehouses in Oscarville (ADCCED 2011c; Oswalt 1963b). In 1964, a school was built by the BIA to accommodate the growing number of children (ADCCED 2011c). Prior to 1964, children attended school in Napaskiak. By 1979 Oscarville's population was steady at 52. Oscarville's population has continued to increase slightly between 1980 and the present. Population trends from 1960 to 2010 are shown in Figure 8-3.

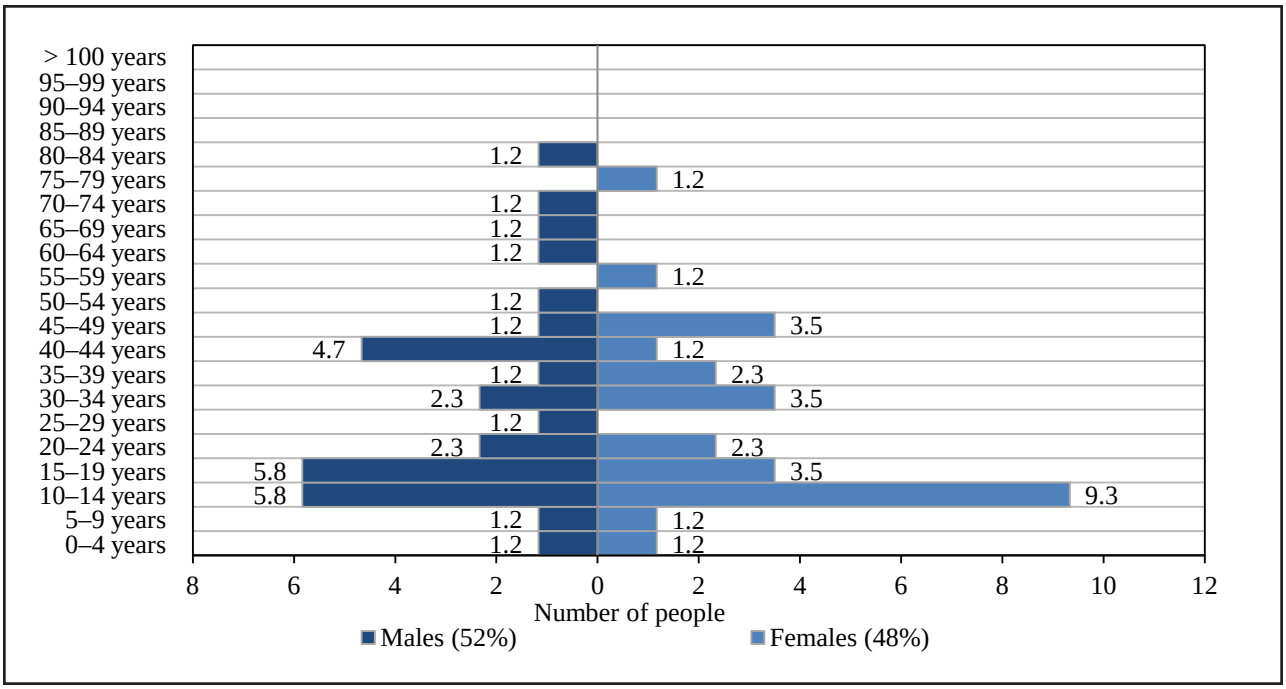

Figure 8-4.–Population profile, Oscarville, 2010.

Demographics

The 12 surveyed households in Oscarville included 54 residents. Household sizes ranged from 1 to 9 people, with an average of 5 people per household. The average age of residents was 29; the oldest person was 83. On average, residents had lived in Oscarville for approximately 23 years. Expanding for the 2 unsurveyed households, the estimated population for 2010 was 63 residents (52% male, 48% female) as shown in Figure 8-4. The total population of 63 included 30 females and 33 males, with self-identified Alaska Natives composing 98% of those surveyed.

For population comparisons, the U.S. Census Bureau in 2010 reported a total population of 70 people residing in Oscarville, including 37 females (53%) and 33 males (47%); 64 (91%) were self-identified Alaska Natives and 6 (9%) were non-Native. The U.S. Census estimated a total population of 61 residents for the year 2000.

Wild Food Use and Harvests

The primary purpose of the household survey was to collect information about the harvest and use of edible wild foods. Respondents were asked whether their household used or attempted to harvest each resource during the study year. If they attempted to harvest a resource, they were asked if and how much they harvested and for additional details of the harvest such as gear type, sex of the animal, or month of harvest.

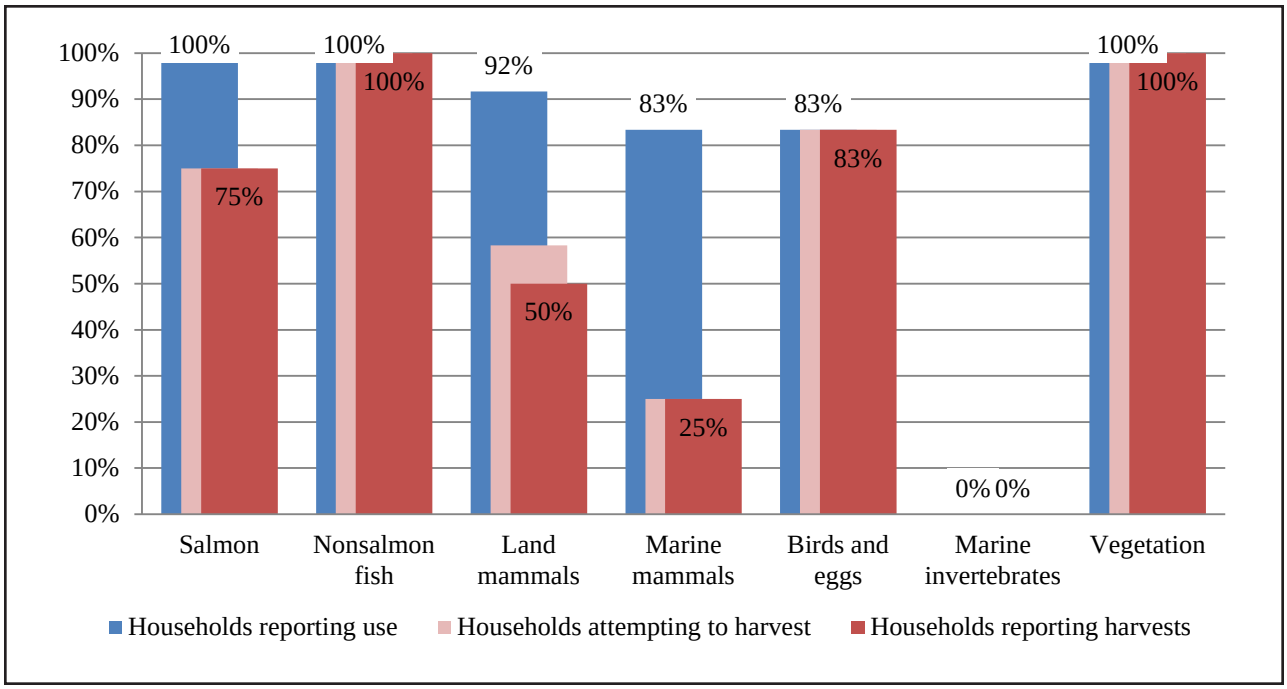

Figure 8-5.–Percentages of households using, attempting to harvest, or harvesting subsistence resources by category, Oscarville, 2010.

Tables and figures in this section summarize responses to the harvest and use questions. The term *harvest* includes resources actually harvested by any member of the surveyed household. The term *use* includes all resources harvested and used or given away, or resources received from others. Of the surveyed households, 100% of Oscarville households used some kind of wild food, and 100% of households reported that a member had harvested wild foods (Figure 8-5). In most Kuskokwim communities, households use wild foods harvested by others through sharing networks, so the percentages of households harvesting usually are lower than the percentages of households using wild foods. However, this was not entirely the case in all resource categories for Oscarville residents. While sharing certainly did take place to a great degree (75% reporting giving away some type of wild food and 100% receiving wild food), at least one member of every household surveyed reported harvesting some type of wild food. Distribution of wild food networks will be discussed later in the "Wild Food Networks" section.

Oscarville residents harvested and/or used subsistence resources from all of the 6 major resource categories discussed within this chapter, with salmon contributing the most by edible pounds (16,128 lb) (Figure 8-6). Fish (both salmon and nonsalmon species) and vegetation were the most widely used resource categories (100% of households each), followed by land mammals (92%). Marine mammals, and birds and eggs were used by 83% of households. Most households reported using berries (92%), followed by wood (75%), and sour dock (58%). In the land mammal category, residents reported using only 3 species—caribou (92%), moose (75%) and river otters (8%). Along with reporting high levels

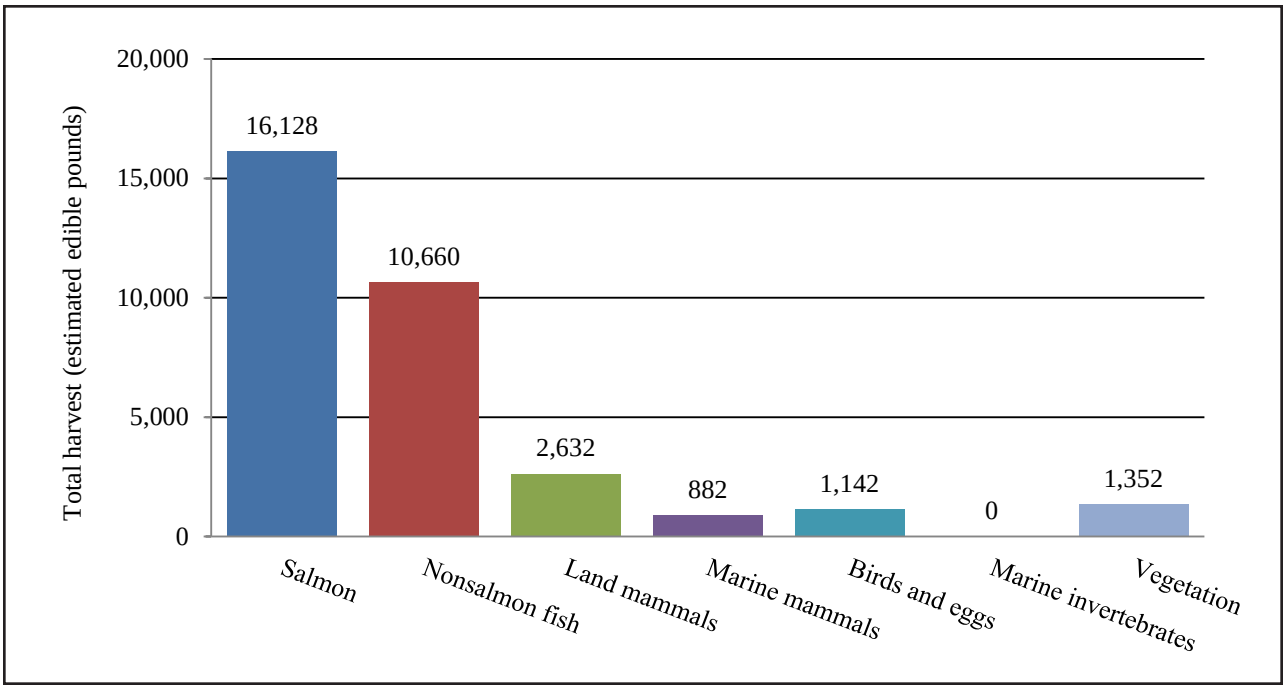

Figure 8-6.–Total estimated edible pounds harvested by the community by resource category, Oscarville, 2010.

of use of fish and vegetation, Oscarville households reported high levels of harvest of these resource categories, with 100% of Oscarville households reporting the harvest of some type of fish and some type of vegetation. Oscarville residents reported the second highest levels of harvest in the birds and eggs resource category with 83% of households reporting harvest. Land mammals were harvested by 50% of Oscarville households, and marine mammals were harvested by 25%. There was no reported harvest of marine invertebrates—most likely due to Oscarville's distance from the coast. The high percentage of households (100%) harvesting vegetation may be explained by the fact that the harvesting of berries and plants requires less equipment and skills than other subsistence activities such as drifting for salmon or large mammal hunting; therefore most households, including those with children and elders, can participate in vegetation gathering. Also, most family members can participate in wood gathering activities around the community or at camp. Cottonwood was cited by several respondents as the preferred wood to use in smoke houses for smoking fish, while other types of wood, including drift wood, was preferred for fuel.

Tables 8-1 to 8-5 in this section summarize uses and harvests for all reported resources harvested throughout the year by Oscarville residents. For this chapter, the contemporary seasonal round of subsistence activities begins with summer. Summer brings with it a flurry of subsistence activities centering on the harvest and processing of salmon species and other fish species to a lesser degree. In the past, the arrival of summer would signal a family move to summer fish camp, but it has now become a time of divided activities between a family's home in the community and their fish camp

located nearby on the Kuskokwim River or on the major slough behind Oscarville. Motor-powered boats make daily trips to and from fish camp—a much less arduous task than moving the whole family to camp for several months at a time. Some families now harvest their salmon at fish camp and bring them back home to process, or harvest and process the fish at camp and simply go back home at night. Smoke houses are now located at home as well as at fish camp, making it easier to pursue other activities close to home while still tending the summer catch. Other activities in fish camp, particularly along the slough, include fishing for whitefishes with a rod and reel and gathering wood for the smokehouse.

The first salmon to arrive at Oscarville are Chinook (king) salmon approximately 2 weeks after the smelt run in May. "When we see the smelt, we know the salmon come after" (070310OS1). Sockeye salmon are the second species to arrive, followed by chum and then coho salmon (locally known as "silvers"). The salmon season comes to an end in early September after the run of coho salmon. In 2010, Oscarville households harvested a total of 16,128 lb of salmon (Table 8-1). Chinook, sockeye, and summer chum salmon were harvested by 75% of households each, while coho salmon was harvested by 42%. The species of choice was Chinook salmon with 100% of households reporting use. According to respondents, salmon in general is the main subsistence food for the residents of Oscarville (Figure 8-7). In addition to use for human consumption, chum salmon (105 individual salmon out of a total of 501) were also used for dog food in 2010.

Photograph ADF&G Lisa Slayton

Figure 8-7.–Salmon, the main subsistence pursuit of Oscarville residents.

Table 8-1. – Estimated uses and harvests of fish, Oscarville, 2010.

	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		
Fish										
Salmon										
Chum salmon	92%	75%	75%	17%	33%	2,550.4 lb	182.2 lb	40.5 lb	501.7 ind.	± 26%
Coho salmon	50%	42%	42%	8%	8%	845.1 lb	60.4 lb	13.4 lb	159.8 ind.	± 39%
Chinook salmon	100%	75%	75%	25%	42%	10,351.7 lb	739.4 lb	164.3 lb	1,096.7 ind.	± 26%
Pink salmon	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Sockeye salmon	92%	75%	75%	17%	33%	2,381.1 lb	170.1 lb	37.8 lb	472.5 ind.	± 20%
Unknown salmon	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**100%**	**75%**	**75%**	**25%**	**42%**	**16,128.3 lb**	**1,152.0 lb**	**256.0 lb**	**2,231 ind.**	**± 23%**
Char										
Dolly varden	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Lake trout	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**0%**	**0%**	**0%**	**0%**	**0%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**0.0 ind.**	**± 0%**
Trout										
Rainbow trout	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**0%**	**0%**	**0%**	**0%**	**0%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**0.0 ind.**	**± 0%**
Whitefishes										
Sheefish	17%	17%	17%	0%	8%	217.0 lb	15.5 lb	3.4 lb	36.2 ind.	± 80%
Broad whitefish	25%	25%	25%	0%	8%	73.5 lb	5.3 lb	1.2 lb	52.5 ind.	± 49%
Bering cisco	8%	8%	8%	0%	8%	16.3 lb	1.2 lb	0.3 lb	11.7 ind.	± 83%
Least cisco	33%	25%	25%	17%	0%	49.0 lb	3.5 lb	0.8 lb	49.0 ind.	± 53%
Humpback whitefish	67%	42%	42%	25%	25%	4,291.0 lb	306.5 lb	68.1 lb	1,430.3 ind.	± 67%
Round whitefish	8%	0%	0%	8%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown whitefish	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**83%**	**58%**	**58%**	**42%**	**25%**	**4,646.8 lb**	**331.9 lb**	**73.8 lb**	**1,580 ind.**	**± 66%**
Anadromous/marine fishes										
Pacific herring	25%	0%	0%	25%	8%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Smelt	75%	67%	67%	8%	25%	441.0 lb	31.5 lb	7.0 lb	73.5 gal.	± 30%
Cod	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Saffron cod	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Pacific halibut	50%	8%	0%	50%	8%	0.0 lb	0.0 lb	0.0 lb	0.0 lbs.	± 0%
Arctic Lamprey	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Stickleback (needlefish)	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Subtotal	**92%**	**67%**	**67%**	**58%**	**42%**	**441.0 lb**	**31.5 lb**	**7.0 lb**		**± 30%**
Other freshwater fishes										
Alaska blackfish	33%	33%	33%	0%	25%	161.0 lb	11.5 lb	2.6 lb	161.0 lbs.	± 40%
Burbot	75%	67%	67%	17%	17%	481.6 lb	34.4 lb	7.6 lb	200.7 ind.	± 31%
Arctic grayling	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Northern pike	83%	83%	83%	8%	58%	4,929.8 lb	352.1 lb	78.3 lb	1,095.5 ind.	± 29%
Longnose sucker	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**92%**	**83%**	**83%**	**25%**	**58%**	**5,572.4 lb**	**398.0 lb**	**88.5 lb**		**± 28%**
All fish	**100%**	**100%**	**100%**	**75%**	**67%**	**26,788.4 lb**	**1,913.5 lb**	**425.2 lb**		**± 23%**
All resources[b]	**100%**	**100%**	**100%**	**100%**	**75%**	**32,796.1 lb**	**2,342.6 lb**	**520.6 lb**		**± 21%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

The intricacies of harvesting, processing, preparing, and preserving salmon are passed down from one generation to the next, and training begins early. One interview respondent recalled that she was 6 or 7 years old when her grandfather taught her how to cut fish. Usually this is a skill that is passed through the female line, but in this case these skills were taught by a male family member out of necessity. She recalls how her grandfather taught her to make a mark on her fish to signify ownership. Her mark was an "X" carved on the tail portion of her fish (070310OS2). One of the interview respondents described how salmon are sometimes processed and prepared:

> You cut the fish, and then you can dry or smoke it … most people salt the heads, salmon heads. And, then there are stink heads. They dig a little pit and then cover it with grass and put in the heads and the innards, and wait about a month or so, and that is when they are stink heads … fermented. To salt the heads, they cut the heads in half from the back on the underside. They put them in a 5-gallon bucket with rock salt and they do the same thing over and over until the bucket gets full, just salt, no liquid … *sulunaq* … salted fish.
>
> To dry salmon you cut them up into slabs, make little slits on the side, hang it over by the tails if it's red salmon and chum salmon, too. But, the kings we make into slabs, and once they get half-dry and you can't feel the oil on the underside anymore, we string them together and those 2 slabs we let dry for another couple of days, and when they are almost all dry, we put them in a smoke house.
>
> Salmon roe is used for making soup. Almost everybody uses it for soup. We also use the roe for bait for catching those least cisco [a species of whitefish]. (070310OS1)

During the first few weeks of fishing for Chinook salmon, sheefish and other fish species are caught incidentally in the nets. Generally sheefish are kept and prepared (mostly by baking) for immediate human consumption, or they are given to the dogs as food. In 2010, all of the sheefish (36) harvested by Oscarville residents were used for dog food (Table 8-1). Only 17% of households reported harvesting and using sheefish in 2010. In addition to salmon fishing, other summer subsistence activities may include targeted fishing for nonsalmon species, some opportunistic hare or ptarmigan hunting, and plant and wood gathering.

The rules when harvesting and processing salmon involve cleanliness, showing respect to the fish, and avoiding waste. One interview respondent stated that, "The treatment of fish is a big thing. They are food, and our way of life. Always show respect and clean up after cutting them up, even little chunks we gather them up into piles and we put them under trees where they can give back to nature" (070310OS1). Another respondent reported that, "Some signs of respect when working with salmon is to keep clean in the cutting area, don't waste anything, and don't step on fish scraps or animal

remains. If you don't follow these rules, bad luck will come and the animals or fish will not come around" (080310OS2).

Subsistence households often use more than one type of gear (i.e., drift gillnet, set gillnet, rod and reel, or fish wheel) when harvesting salmon and other fish species**.** The most common gear type used throughout the Kuskokwim River is the drift gillnet (Brown et al. 2005). The majority of fish (14,350 lb, or 54%) harvested by Oscarville households in 2010 were taken with drift gillnets. Set gillnets accounted for 6,266 lb (23% of the total fish harvest). Rod and reel gear accounted for 211 lb (1%). Subsistence fish taken with other types of gear (see below) accounted for 5,961 lb (22%) of the total fish harvest. There were no fish taken with a fish wheel in 2010. Of the salmon species more specifically, 89% (14,329 lb) were taken with drift gillnets and 10% (1,614 lb) were taken with set gillnets. Rod and reel gear accounted for 1% (185 lb). Of the nonsalmon fish including whitefish species, less than 0.2% (21 lb) were taken with drift gillnets, while 43% (4,653 lb) were harvested using set gillnets. Rod and reel gear accounted for less than 0.2% (26 lb). Rod and reel gear is used to harvest fewer fish when less are sought, where other gear types are not as effective or efficient, or by those who may not have access to other gear types (Brown et al. 2005) (Figure 8-8).

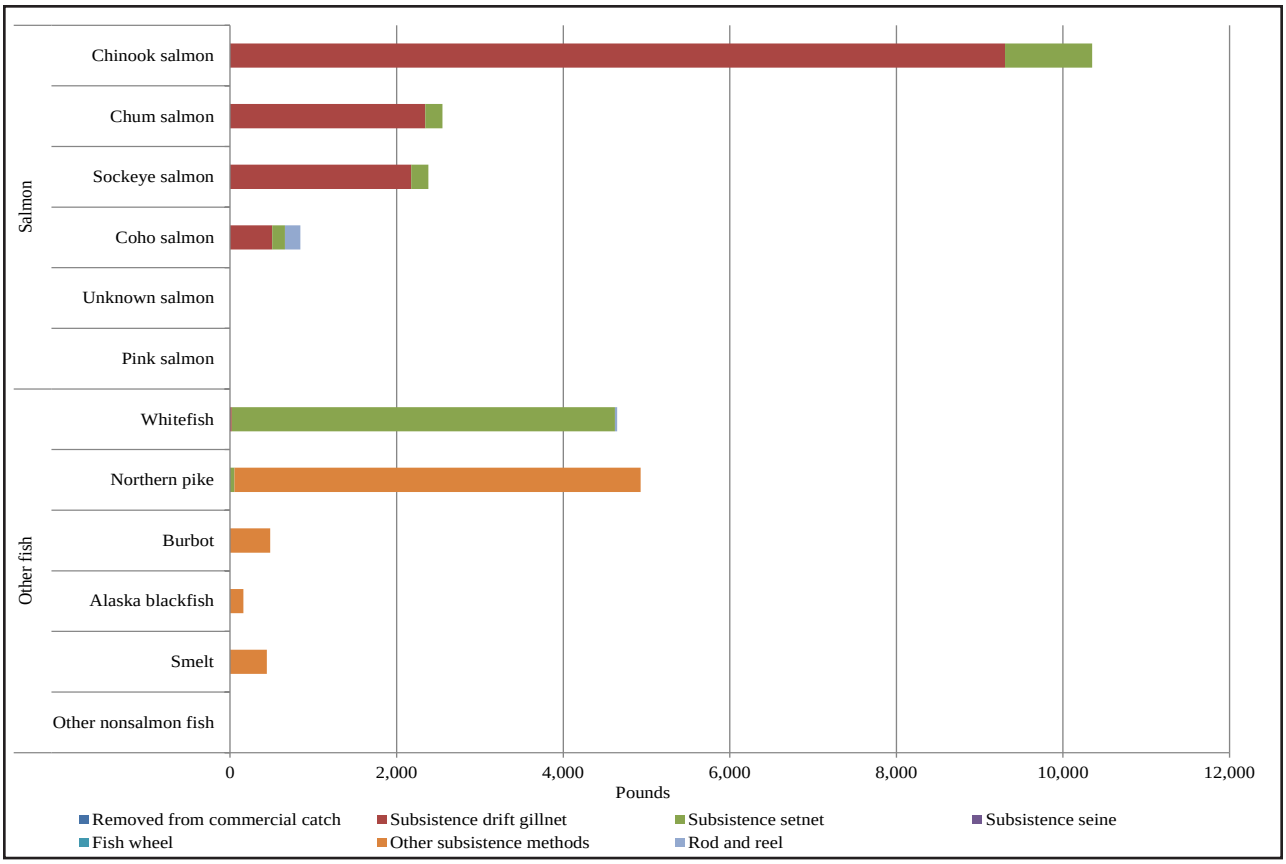

Figure 8-8.–Fish harvests by gear type, Oscarville, 2010.

One interview respondent described how he planned to experiment with his fishing gear for the 2012 salmon season:

> Some people setnet, most driftnet for salmon. What I was thinking about doing next season was to turn the driftnet into a setnet overnight and then turning it back into a driftnet, because we only have like two, two kind[s] of salmon nets, and my uncle uses one, and I have the other. Like uh, use two anchors and turn the driftnet into a setnet overnight. Next day just check it and take out the anchors and driftnet. (070310OS1)

The category of other fishing gear consisted mainly of traditional jigging methods. A hole is first cut in the ice (usually with a hand- or gas-powered auger), and then a wooden stick with attached line and hook is used to jig for fish. Approximately 4,877 lb of northern pike and 482 lb of burbot (loche) were harvested using this method by Oscarville households in 2010. Dip nets, another type of gear, are used to harvest smelt. One interview respondent described the type of dip net he used for these fish:

> The nets are like 2 to 3 feet wide and have a long net in back, not as big as the dip nets for salmon fishing. [There are] small 2 to 3 inch holes in the netting. They use[d] to make them out of wood, bark, skin strips … now it's nylon. Some of them [people] used to dip net for blackfish. I think some still do. (070310OS1)

Fish traps were another gear type used by respondents in 2010. Homemade Alaska blackfish traps were by far the most common form of trap used. One resident explained how he made his blackfish trap out of chicken wire and the lid of a 5-gallon bucket (Figure 8-9). Another interview respondent described how he made his blackfish traps, "For my bottom part I use chicken wire and copper tubing. I use 3 rounds, 1 in the bottom, 1 in the middle, and 1 on top. I also put copper tubing on the funnel too" (070310OS1).

The fall season ushers in another intense period of subsistence activity. The main subsistence activities at this time involve hunting for large land mammals such as moose and caribou. Fishing for whitefishes, blackfish, and burbot; berry picking; and waterfowl hunting round out the fall subsistence activities. Hunters harvested moose in the month of September—17% of Oscarville households were successful in harvesting moose (for a community total of 1,260 lb), and 75% of households used moose (Table 8-2). Although, according to most residents, moose were more prevalent closer to Oscarville in recent times than they were in the past, only 33% of households attempted to harvest moose in 2010. Some reasons residents gave for the increase in moose coming nearer to the community were: changes in the vegetation (e.g., more willow growth) making for a more conducive moose habitat, forest fire destruction pushing the moose downriver, and wolves keeping the moose on the move. Large groups of hunters no longer have to travel as far upriver, or spend extended periods of time to harvest moose. One interview respondent stated:

Photograph ADF&G Lisa Slayton

Figure 8-9.–Homemade blackfish trap made of chicken wire and the lid of a 5-gallon bucket.

> Some people go moose hunting in fall camps, and some people still go up [the river in small groups] and camp for moose, but it rarely happens. I know my uncle still does. I did it a couple of times. It wasn't too bad. We seemed to be more lucky that way. Yeah, we split a moose. What I do is hunt from here [from home on a daily basis]. I usually hunt with a partner. It takes a lot of time and patience. You have to get up early. Nowadays, there are a lot of hunters from other villages … it's in the fall, September. You have to be one of the first to see that bull. (070310OS1)

Another interview respondent reported that if a person was lucky enough to get a moose, all parts of it should be used. The meat is used for human consumption; the hair for making camping mats or trim for clothing; the antlers for hanging things or making crafts, decorations, or *uluak* (woman's knife) handles; and boiled hoofs for making gelatin, or for decoration (080310OS2). Another interview respondent spoke about the use of moose stomach:

> This year I found out that the [elders] used moose stomach and they eat it raw with seal oil. I'm going to try it this year. They told me to empty it out, wash it, and cut it up into bite-sized pieces and eat it. I didn't know about it until this year. It sounds delicious, kind of like sushi, but it's land animals. (070310OS1)

In 2010, caribou was harvested in November, December, and March by 50% of households, and 92% of households reported use of caribou. Eleven caribou were harvested for a community total

Table 8-2. – Estimated uses and harvests of land and marine mammals,Oscarville, 2010.

	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										
Black bear	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Brown bear	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Caribou	92%	58%	50%	42%	50%	1,365.0 lb	97.5 lb	21.7 lb	10.5 ind.	± 28%
Moose	75%	33%	17%	58%	25%	1,260.0 lb	90.0 lb	20.0 lb	2.3 ind.	± 56%
Subtotal	**92%**	**58%**	**50%**	**58%**	**50%**	**2,625.0 lb**	**187.5 lb**	**41.7 lb**	**12.8 ind.**	**± 35%**
Small land mammals										
Beaver	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Red fox	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Arctic hare	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Snowshoe hare	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
River (land) otter	8%	8%	8%	0%	0%	7.0 lb	0.5 lb	0.1 lb	2.3 ind.	± 83%
Lynx	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Marmot	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Marten	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Mink	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Muskrat	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Porcupine	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Arctic gound (parka) squirrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Red (tree) squirrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Weasel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Gray wolf	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Wolverine	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Subtotal	**8%**	**8%**	**8%**	**0%**	**0%**	**7.0 lb**	**0.5 lb**	**0.1 lb**	**2.3 ind.**	**± 83%**
Marine mammals										
Bearded seal	50%	8%	8%	42%	25%	490.0 lb	35 lb	7.8 lb	1.2 ind.	± 83%
Ringed seal	8%	8%	8%	0%	8%	65.3 lb	5 lb	1.0 lb	1.2 ind.	± 83%
Spotted seal	25%	25%	25%	8%	25%	261.3 lb	19 lb	4.1 lb	4.7 ind.	± 47%
Unknown seal	67%	8%	8%	58%	25%	65.3 lb	5 lb	1.0 lb	1.2 ind.	± 83%
Walrus	17%	0%	0%	17%	0%	0.0 lb	0 lb	0.0 lb	0.0 ind.	± 0%
Beluga	0%	0%	0%	0%	0%	0.0 lb	0 lb	0.0 lb	0.0 ind.	± 0%
Bowhead	8%	0%	0%	8%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**83%**	**25%**	**25%**	**67%**	**42%**	**882.0 lb**	**63.0 lb**	**14.0 lb**	**8.2 ind.**	**± 54%**
All land mammals	**92%**	**58%**	**50%**	**58%**	**50%**	**2,632.0 lb**	**188.0 lb**	**41.8 lb**	**15.2 ind.**	**± 35%**
All marine mammals	**83%**	**25%**	**25%**	**67%**	**42%**	**882.0 lb**	**63.0 lb**	**14.0 lb**	**8.2 ind.**	**± 54%**
All resources[b]	**100%**	**100%**	**100%**	**100%**	**75%**	**32,796.1 lb**	**2,342.6 lb**	**520.6 lb**		**± 21%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

of 1,365 lb (Table 8-2). Both interview respondents stated that caribou seemed to be more abundant closer to the community in recent years for reasons similar to those for moose. One respondent said that he did not have to go far to hunt caribou, "At freeze-up time we go behind Napaskiak, it's like 10 to 15 miles. In the fall they go up the Kwethluk River. And, some people go down to the Eek Lake area" (070310OS1). Of the large land mammals, caribou and moose accounted for 4% each of the total wild food harvest for the community, contributing a combined total of 2,625 lb of edible meat. No brown bears or black bears were reported harvested or used in 2010 in Oscarville.

In addition to the nutritional benefit of harvesting animals for subsistence needs, a certain amount of prestige and recognition accompanies a boy's first kill. Oswalt (1963b) reports that when a boy kills his first animal of each species, a small family dinner is held. The boy receives praise, but is not allowed to eat any of the animals he has taken. He must instead share them with others.

Fall fishing consists mostly of harvesting whitefishes, although they are not in as great abundance as in spring, and also blackfish and loche (burbot). Blackfish were harvested by 33% of households and used by 33% (Table 8-1). Blackfish are mostly targeted behind Oscarville in the small creeks between tundra ponds. Sometimes other fish species are harvested in blackfish traps as well, such as yearling whitefishes and tiny loche. One interview respondent described how blackfish are prepared, "We pick out the big ones and put them in a pot and pour hot water over them. They can boil for like 5 minutes. You scoop them out with ladles with holes in them, and then put seal oil and salt on them" (070310OS1). Another interview respondent recalled that blackfish trapping used to be a common subsistence activity in the spring and fall but is not as important as it once was. She remembered that the elders used to dry and mash the blackfish and then dip them in seal oil (070310OS2). Burbot is mostly harvested at the mouth of the slough behind Oscarville. This species was harvested by 67% of households in 2010, and used by 75% of households.

Berry picking is a major fall subsistence activity. Berries are picked in close proximity to the community, at fall camps, and on day trips by boat to other areas along the Kuskokwim River. Crowberries (locally known as blackberries) are generally picked in the hills behind the community. Crowberries were harvested by 50% of Oscarville households in 2010, and used by 83% (Table 8-3). Blueberries were harvested by 67% and used by 75% of households. Lowbush cranberries were harvested by 67% and used by 67%, and highbush cranberries were harvested by 17% of Oscarville households and used by 17%. All of these berries took a backseat to salmonberries in 2010 with a community total of 938 lb. Salmonberries were harvested by 83% of Oscarville households and used by 92%, and were the eighth most harvested resource for the community in 2010. The community total of all berries combined was 1,327 lb. In addition to the subsistence value of harvesting berries, a certain amount of recognition and prestige accompanies a young girl's first berry harvest. Oswalt (1963b) reported that when a girl picks her first berries, a special family dinner is held.

Fall hunting of waterfowl and other birds took place from fall bird camps in the lake areas south

Table 8-3. – Estimated uses and harvests of vegetation, Oscarville, 2010.

	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		
Berries										
Blueberry	75%	67%	67%	25%	25%	114.3 lb	8.2 lb	1.8 lb	28.6 gal.	± 34%
Lowbush cranberry	67%	67%	67%	8%	17%	93.9 lb	6.7 lb	1.5 lb	23.5 gal.	± 27%
Highbush cranberry	17%	17%	17%	0%	8%	1.2 lb	0.1 lb	0.0 lb	0.3 gal.	± 56%
Gooseberry	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Currants	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Raspberry	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Salmonberry	92%	83%	83%	25%	50%	938.0 lb	67.0 lb	14.9 lb	234.5 gal.	± 21%
Crowberry (blackberry)	83%	50%	50%	58%	17%	179.7 lb	12.8 lb	2.9 lb	44.9 gal.	± 33%
Berries	**92%**	**92%**	**92%**	**67%**	**50%**	**1,327.1 lb**	**94.8 lb**	**21.1 lb**	**331.8 gal.**	**± 19%**
Plants/greens/mushrooms										
Wild rhubarb	17%	8%	8%	8%	8%	9.3 lb	0.7 lb	0.1 lb	2.3 gal.	± 83%
Eskimo potato	17%	8%	8%	8%	17%	4.7 lb	0.3 lb	0.1 lb	1.2 gal.	± 83%
Fiddlehead ferns	17%	17%	17%	0%	8%	2.6 lb	0.2 lb	0.0 lb	2.6 gal.	± 74%
Nettle	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Hudson's Bay tea	17%	17%	17%	0%	0%	2.3 lb	0.2 lb	0.0 lb	2.3 gal.	± 56%
Mint	8%	8%	8%	0%	8%	0.6 lb	0.0 lb	0.0 lb	0.6 gal.	± 83%
Sour dock	58%	33%	33%	25%	8%	4.1 lb	0.3 lb	0.1 lb	4.1 gal.	± 49%
Spruce tips	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Cow parsnip (wild celery)	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Wild rose hips	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Yarrow	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown mushrooms	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Fireweed	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Stinkweed	8%	8%	8%	0%	8%	1.2 lb	0.1 lb	0.0 lb	1.2 gal.	± 83%
Punk	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Puffballs	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown greens from land	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Subtotal	**67%**	**42%**	**42%**	**33%**	**33%**	**24.8 lb**	**1.8 lb**	**0.4 lb**	**14.3 gal.**	**± 39%**
Wood										
Firewood	75%	75%	75%	0%	33%	0.0 lb	0.0 lb	0.0 lb	25.1 crd.	± 29%
Subtotal	**75%**	**75%**	**75%**	**0%**	**33%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**25.1 crd.**	**± 29%**
All vegetation	**100%**	**100%**	**100%**	**75%**	**58%**	**1,351.9 lb**	**96.6 lb**	**21.5 lb**		**± 19%**
All resources[b]	**100%**	**100%**	**100%**	**100%**	**75%**	**32,796.1 lb**	**2,342.6 lb**	**520.6 lb**		**± 21%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

of Oscarville that are located on the south bank of the Kuskokwim River, or along the Kuskokwim River corridor. Some whitefishes harvesting took place at the fall camps as well. While residents harvested several species of birds in the fall, the fall harvest of 133 birds was much smaller than the spring harvest of 679 individual birds in 2010. The most harvested bird for the 2010 fall season was scaup (55 individuals). The second most harvested bird in the fall was mallard (19). Other birds and ducks harvested in the fall in descending order were: unknown widgeons; northern pintails, green-winged teals, and goldeneyes; northern shovelers and long-tailed ducks; buffleheads and tundra swans; canvasbacks and snow geese; and sandhill cranes. Table 8-4 shows the total annual harvest.

Oscarville residents did not report extensive marine mammal hunting during the fall months. Only 1 bearded seal was reported harvested in September, for a community total of 490 lb of edible meat (Table 8-2). Only 25% of Oscarville households reported attempting to harvest marine mammals in 2010, and 25% reported harvesting them. The percentage of households who reported using marine mammals (83%), and the percentage of those receiving marine mammals (67%) suggests that Oscarville residents were acquiring marine mammals from other communities as well as from other households in Oscarville (see "Wild Food Networks" section). In addition to seal oil (a commonly used marine mammal product), Oscarville residents used marine mammals in a number of ways:

> We have stink flipper too. Some people make them different ways like put them in a box with tundra grass or reindeer moss like, and make it very compact with little air going in. It takes about 3 weeks in a cardboard box, don't bury it. That's how I do it. Some people bury them like fish heads. (070310OS1)

As fall comes to a close, people shift into a more relaxed mode of subsistence activity. In no longer needing to prepare for a fur trapping season or care for dog teams, as in the past, households in Oscarville begin preparing for a winter of setnetting under the ice, jigging for pike, large mammal hunting, and occasional ptarmigan or small land mammal hunting.

In addition to 6 caribou harvested in December, 36 ptarmigan were harvested in the winter along with the majority of the 1,096 northern pike harvested in 2010. Fishing for northern pike occurred roughly from January to the end of April with people either jigging for them through the ice at the mouth of the Johnson River, or setting nets under the ice on lakes. According to one interview respondent, northern pike fishing seems to have increased in recent years:

> Years ago, not many people fished for pike and when they did, they didn't have to go far. There used to be a lot of pike close to Oscarville. Now, they go to Johnson River and Tuntutuliak to fish. When the ice gets bad, they will fish nearby for pike. (080310OS2)

Another interview respondent described how pike are used, "We dry them. Some people boil them and make soup out of them. I have never tried them baked" (070310OS1). A total of 83% of households

Table 8-4. – Estimated uses and harvests of birds, Oscarville, 2010.

	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	8%	8%	8%	0%	8%	1.4 lb	0.1 lb	0.0 lb	3.5 ind.	± 83%
Canvasback	8%	8%	8%	0%	0%	5.1 lb	0.4 lb	0.1 lb	4.7 ind.	± 83%
Common eider	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown eider	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Goldeneye	17%	17%	17%	0%	8%	8.4 lb	0.6 lb	0.1 lb	10.5 ind.	± 57%
Mallard	58%	50%	50%	17%	33%	67.7 lb	4.8 lb	1.1 lb	67.7 ind.	± 32%
Common merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Red-breasted merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Long-tailed duck (oldsquaw)	17%	17%	17%	0%	8%	6.5 lb	0.5 lb	0.1 lb	8.2 ind.	± 57%
Northern pintail	25%	25%	25%	0%	8%	27.1 lb	1.9 lb	0.4 lb	33.8 ind.	± 58%
Scaup	50%	42%	42%	17%	17%	104.0 lb	7.4 lb	1.7 lb	115.5 ind.	± 35%
Black scoter	75%	50%	50%	25%	33%	111.3 lb	8.0 lb	1.8 lb	123.7 ind.	± 34%
Surf scoter	8%	8%	8%	0%	0%	6.3 lb	0.5 lb	0.1 lb	7.0 ind.	± 83%
White-winged scoter	25%	25%	25%	0%	8%	43.1 lb	3.1 lb	0.7 lb	47.8 ind.	± 48%
Northern shoveler	17%	17%	17%	0%	8%	4.9 lb	0.4 lb	0.1 lb	8.2 ind.	± 57%
Green-winged teal	25%	17%	17%	8%	8%	3.2 lb	0.2 lb	0.1 lb	10.5 ind.	± 57%
Wigeon	17%	17%	17%	0%	8%	9.0 lb	0.6 lb	0.1 lb	12.8 ind.	± 59%
Unknown ducks	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**75%**	**58%**	**58%**	**33%**	**33%**	**397.8 lb**	**28.4 lb**	**6.3 lb**	**453.8 ind.**	**± 26%**
Geese										
Brant	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Cackling goose	75%	50%	50%	25%	42%	168.0 lb	12.0 lb	2.7 lb	140.0 ind.	± 29%
Lesser Canada goose	17%	8%	8%	8%	8%	28.0 lb	2.0 lb	0.4 lb	23.3 ind.	± 83%
Unknown Canada goose	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Emperor goose	8%	8%	8%	0%	8%	87.5 lb	6.3 lb	1.4 lb	35.0 ind.	± 83%
Snow goose	8%	8%	8%	0%	8%	5.4 lb	0.4 lb	0.1 lb	2.3 ind.	± 83%
White-fronted goose	50%	33%	33%	17%	25%	126.0 lb	9.0 lb	2.0 lb	52.5 ind.	± 36%
Unknown geese	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**75%**	**50%**	**50%**	**25%**	**42%**	**414.9 lb**	**29.6 lb**	**6.6 lb**	**253 ind.**	**± 32%**
Other migratory birds										
Tundra swan (whistling)	25%	25%	25%	8%	8%	58.3 lb	4.2 lb	0.9 lb	5.8 ind.	± 46%
Sandhill crane	33%	33%	33%	0%	17%	98.0 lb	7.0 lb	1.6 lb	11.7 ind.	± 44%
Whimbrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**42%**	**42%**	**42%**	**8%**	**17%**	**156.3 lb**	**11.2 lb**	**2.5 lb**	**17.5 ind.**	**± 42%**
Other birds										
Spruce grouse	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Ruffed grouse	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Ptarmigan	67%	50%	50%	25%	25%	129.5 lb	9.3 lb	2.1 lb	129.5 ind.	± 33%
Subtotal	**67%**	**50%**	**50%**	**25%**	**25%**	**129.5 lb**	**9.3 lb**	**2.1 lb**	**129.5 ind.**	**± 33%**
All migratory birds	**75%**	**58%**	**58%**	**33%**	**42%**	**969.0 lb**	**69.2 lb**	**15.4 lb**	**725 ind.**	**± 26%**
All other birds	**67%**	**50%**	**50%**	**25%**	**25%**	**129.5 lb**	**9.3 lb**	**2.1 lb**	**130 ind.**	**± 33%**
All resources[b]	**100%**	**100%**	**100%**	**100%**	**75%**	**32,796.1 lb**	**2,342.6 lb**	**520.6 lb**		**± 21%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

reported harvesting pike, and 83% reported using it in 2010. Northern pike was second in the list of top 10 subsistence resources harvested by Oscarville residents in 2010 by weight.

Another category of fish harvested under the ice in Oscarville is whitefishes—mostly humpback whitefish and least cisco. Humpback whitefish were harvested by 42% of the households, representing the third most heavily harvested resource by weight, and used by 67% of households. Least cisco were harvested by 25% of the households and used by 33%. Oscarville fishers harvested an estimated 4,647 lb of all whitefish species combined in 2010.

Spring begins with the arrival of the first birds (seagulls and mallards among others) and a May run of rainbow smelt. Few residents move their families to spring camps now as they did in the past, but individuals or small groups of hunters still use certain areas as their spring base for bird hunting and for catching whitefishes. One interview respondent stated, "I would say that they [spring camps] are almost the same as they used to be but in different locations. Most people hunt for birds in spring and that is pretty much it, and just a little bit of whitefish" (070310OS1). This same respondent reported that one seasonal indicator of the arrival of the first birds in spring is that, "These little bugs start showing up over the ice." Bird species usually targeted in spring are black scoters, scaups, long-tail duck, Canada and white-fronted geese, mallards, swans, and cranes. Black scoters and mallards were each harvested by 50% of Oscarville households in 2010, and scaups were harvested by 42% (Table 8-4). For geese in 2010, 50% of households harvested cackling geese and 33% harvested white-fronted geese. Sandhill cranes were harvested by 33% of the households.

The most harvested bird species by number of birds in the spring was cackling geese at 140 individuals. The second most harvested species was black scoter at 124. Third in number of individual birds harvested was ptarmigan at 93. Other spring birds in order of number of individuals (at least 2 or more) harvested were: scaups, white-fronted geese, mallards, white-winged scoters, emperor geese, northern pintails, lesser Canada geese, surf scoters, and sandhill cranes.

Rules for the harvesting and processing of birds centered on respect, and taking only what was needed. One interview respondent stated that, "If you catch them [birds], you got to eat them, bring them home. You don't just throw them around anywhere. You treat them like they are actual people" (070310OS1). Another interview respondent also stated that birds must be treated like people—with respect. She recalled that when she was growing up during hard times, the resource that was most shared with her family was birds. She stated that she felt that people do not hunt or share birds now as much as they did in the recent past (070310OS2).

The harvest of bird eggs at inland locations such as Oscarville is typically much lower than for communities in coastal areas where there is an abundance of coastal shore birds. Bird eggs were harvested by 58% of households in 2010, and used by 75% (Table 8-5). Duck eggs were the most widely used (75% of households), followed by geese eggs (42%). A total of 223 eggs were harvested.

Table 8-5. – Estimated uses and harvests of eggs, Oscarville, 2010.

	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	75%	58%	58%	17%	25%	15.2 lb	1.1 lb	0.2 lb	101.5 ind.	± 25%
Geese eggs	42%	33%	33%	8%	17%	7.4 lb	0.5 lb	0.1 lb	24.5 ind.	± 43%
Swan eggs	8%	8%	8%	0%	8%	7.4 lb	0.5 lb	0.1 lb	11.7 ind.	± 83%
Shorebird eggs	8%	8%	8%	0%	0%	0.1 lb	0.0 lb	0.0 lb	1.2 ind.	± 83%
Gull eggs	33%	25%	25%	8%	8%	6.9 lb	0.5 lb	0.1 lb	21.0 ind.	± 51%
Ptarmigan eggs	33%	33%	33%	0%	8%	6.3 lb	0.5 lb	0.1 lb	63.0 ind.	± 42%
Unknown eggs	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**75%**	**58%**	**58%**	**17%**	**25%**	**43.2 lb**	**3.1 lb**	**0.7 lb**	**223 ind.**	**± 31%**
All birds and eggs	**83%**	**83%**	**83%**	**33%**	**42%**	**1,141.7 lb**	**81.6 lb**	**18.1 lb**	**1,076.8 ind.**	**± 25%**
All resources[b]	**100%**	**100%**	**100%**	**100%**	**75%**	**32,796.1 lb**	**2,342.6 lb**	**520.6 lb**		**± 21%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

Whitefish species targeted in the spring were mostly humpback and broad whitefish. These fish are prepared in a number of ways:

> Same as any other whitefish, some people dry them, and smoke them. Some people freeze them, make soup. We eat *kumlaneq*, frozen fish with seal oil and salt. They make fermented whitefish too, *tep'ngaayak*, under the ground. You use the whole fish except for the innards. It is frozen after it has been aged, and then eaten uncooked and frozen. (070310OS1)

Although whitefishes and sheefish are harvested year-round, the meat is reportedly very good immediately after breakup. At this time, they are half-dried and then cooked. They are also used with lard and seal oil to make ice cream. Occasionally they may be used for dog food. Both interview respondents stated that they felt that the harvest and use of these fish were declining somewhat in recent years (070310OS1 and 070310OS2). An indication of sharing of these particular resources can be seen in the percentage of those households using (83%) versus those harvesting (58%) these resources in 2010.

Smelt continues to be the first run of fish in the spring. A natural indicator that the smelt will soon arrive is the appearance of seagulls diving into the Kuskokwim River downriver from Oscarville to catch them as they swim upriver. This run of fresh smelt in May is a welcome change in diet from winter fare. Harkening back to the days when the Napaskiak area was the site of a spring camp established expressly for the annual run of smelt, people directly across the river in Oscarville look forward to this predictable spring subsistence resource today. Smelt was harvested by 67% of Oscarville

households in 2010 and used by 75% of households. One interview respondent described how the smelt are harvested and prepared:

> They come up in a great amount and I just dip net for them. We use willow to weave through the gills and hang them together. Once they are dry on one side, we turn them over for the other side … it looks like a spruce tree when done. When that side gets dry, we put them in a smokehouse. Then, we take the head off, fins, insides, kind of like taking the meat off of the bone. Then, we dip the meat and part of the skin in seal oil and eat them up! (070310OS1)

Other spring subsistence activities include small land mammal hunting and trapping and marine mammal hunting. Trapping activities are not undertaken by residents as much now as in the past due in part to a lack of demand in the fur industry. One interview respondent stated that when she was growing up, people did a lot more hunting and trapping for muskrats, beavers, minks, and otters than they do now. She remembers her mother putting food and water in the mouths of dead otters as a sign of respect so that they would continue to present themselves to be taken for food (070310OS2). Another interview respondent spoke of this as well:

> If we get like an otter, we put food in its mouth to show respect. And, what is that cat? Yeah, lynx, they cover its face just to show respect because it doesn't usually show its face to people, to anybody, so we cover its face and bring it home. The first I heard of that was when I caught a lynx a few years ago, and I didn't cover the face. Somebody else came over and covered it for me and told me that's what they do. (070310OS1)

In 2010, Oscarville households harvested 2 river otters in the month of April. This was the entire small land mammal harvest reported, and these otters were used by only 8% of households. The same interview respondent said:

> Marten were like those mink. Mink is mostly abundant here, and otter. I know [a person who] used to trap for beavers and otters and mink, but not as much as he used to. I used to trap for fox fur for my grandma but I don't anymore because no one has a use for fox fur. Maybe 2 years ago I went out for blackfish trapping and caught 26 muskrats in one day. We have no use for muskrat fur. They were getting into the blackfish traps trying to get at those blackfish I suppose … 26 overnight, I thought that was something! [There were] 26 in one blackfish trap! It [the trap] was about 3.5 feet high by 2 feet wide. (070310OS1)

A total of 8 seals were harvested in April and May. Only 25% of households harvested and 25% used spotted seal. Just 8% of households harvested and 8% used ringed seal. Marine mammals in total were pursued and harvested by only 25% of Oscarville households, but used by 83% of the households, suggesting that people continue to want and use marine mammals to a great extent, but that there

are few harvesters of these resources in the community. The lack of a large number of harvesters of marine mammals is most likely due Oscarville's distance from the coast. The percentage of households reporting that they received marine mammals was 67%, indicating that this valued resource is shared widely. Most marine mammals and marine mammal products are acquired from family and friends living in coastal areas. The few Napaskiak harvesters that travel to the coast themselves share their harvest with friends and family within the community as well. In addition to using marine mammal meat, many dishes are prepared using seal oil as a main ingredient or for dipping. Sometimes it is used as a medicine for dogs. Seal skin is primarily used for making mukluks (Oswalt 1963b).

Harvest Areas

For 47 different subsistence resources harvested (e.g., moose, mallards, chum salmon, and blueberries), in 6 different resource categories (e.g., land mammals, birds, fish, and vegetation), households were asked to locate on a map the areas in which they had hunted or fished for the resource, and the locations at which they had actually harvested the resource. For each resource and category, all households' search areas and harvest locations were combined to create a series of maps depicting Oscarville's subsistence use areas in 2010. Figure 8-10 summarizes all the mapped data collected from Oscarville for 2010. Residents reported using a total of 522 square miles for subsistence activities in 2010. Circumstances such as regulatory changes, environmental changes, technological advances, and economic considerations have continuously affected Oscarville subsistence users' geographic patterns and areas of use to varying degrees over time.

Salmon species were mostly targeted in the mainstem Kuskokwim River between Oscarville and Napaskiak for a few miles in both upstream and downstream directions (Figure 8-11). These salmon species were also heavily targeted in the main slough behind Oscarville. Additionally, at least 1 household harvested coho salmon at the main fork of the Kwethluk River, the mouth of the Kasigluk River at its intersection with the Kuskokwim River, and in a portion of the Kisaralik River.

Similarly, residents fished for nonsalmon species along the mainstem of the Kuskokwim and in the slough behind Oscarville (Figure 8-12). Residents also harvested whitefish species along with salmon species in the mainstem of the Kuskokwim River, and in the various lakes and waterways both behind Oscarville and to the south in the Eek Lake area. Northern pike were targeted mostly at the mouth of the Johnson River south of Oscarville at its junction with the Kuskokwim River. Burbot were also harvested near the mouth of the Johnson River, as well as in the main slough behind Oscarville. Historically, the wetlands to the southeast, and the area surrounding Eek Lake were used extensively for resource harvesting in the spring and fall (Oswalt 1963b). As noted above, these same areas are still used by Oscarville residents today.

Historically, large land mammals such as caribou and moose were hunted and harvested much farther from Oscarville than they are today (Brown 1983). Search and harvest areas for moose in

2010 extended to both sides of the Kuskokwim River in the vicinity (within approximately 15 miles) of Oscarville and Napaskiak. Caribou search and harvest areas were more extensive including in the Eek Lake area, the area encompassing the junction of the Kwethluk and Akulikutak rivers, a large area in the drainages directly behind Napaskiak, and the foothills of the Kilbuck Mountains to the southeast (Figure 8-13).

The extent of the historical search and harvest areas for small land mammals demonstrates a notable change in land use over time by the residents of Oscarville. In the past, when fur from the Kuskokwim region was in great demand, extensive areas were used for trapping and hunting furbearers such as foxes, beavers, minks, and muskrats. In more recent times, without a demand for fur, the harvest of small land mammals has dropped dramatically. Consequently the search and harvest areas for these species have receded. The only small land mammals harvested in 2010 were 2 river otters from the lakes and rivers system south of Napaskiak (Figure 8-14). The lack of harvest variety demonstrates a dramatic change in use of small land mammals over time.

Duck and goose hunting occurred in both the spring and the fall along the main Kuskokwim River corridor near Oscarville and Napaskiak, along the Kuskokwim River corridor to the south of the mouth of the Johnson River, and in lakes and waterways to the southeast including the Eek Lake area (Figure 8-15). Historically these same areas were used extensively, demonstrating the continued reliance on these areas and the species that inhabit them (Oswalt 1963b; Brown 1983). While hunting or fishing for other subsistence resources, residents harvested grouse and ptarmigan opportunistically in and around the community.

Search and harvest areas for marine mammals occurred on the north bank of the mouth of the Kuskokwim River at its junction with Kuskokwim Bay, and in the Kuskokwim Bay near the community of Quinhagak. This area is depicted in Figure 8-16.

Berry and plant harvesting took place as far away as the wetland areas to the south of the community of Tuntutuliak, a large area between the Kwethluk River and Napaskiak, the Eek Lake area, and areas to the north and west of the community of Bethel (Figure 8-17). The gathering of berries and plants in these areas by Oscarville residents occurred mostly with family and friends from these particular communities, and these events were generally viewed as social outings as well as subsistence harvesting opportunities. The harvesting of berries and plants also occurred close to home in the area immediately surrounding the community of Oscarville itself, as well as in conjunction with other subsistence activities such as fall fishing, bird hunting, and moose hunting.

Harvest Assessments

The survey asked respondents to assess their own harvests in 2 ways: whether they got more, less, or about the same amount of 6 resource categories in 2010 as in past years, and whether they got "enough" of each of the 6 resource categories. This section discusses responses to those questions.

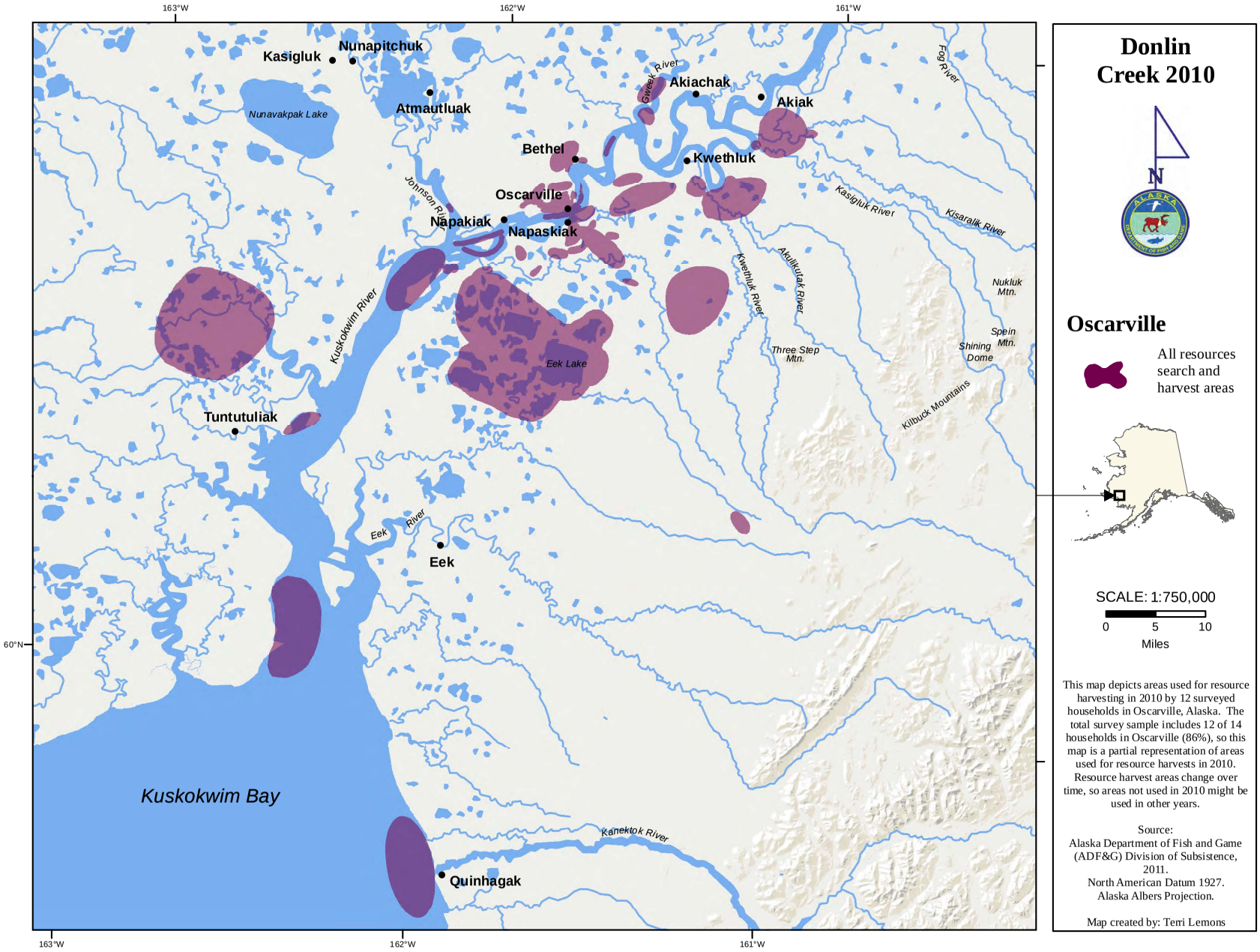

Figure 8-10.–Harvest locations and search areas, all resources, Oscarville, 2010.

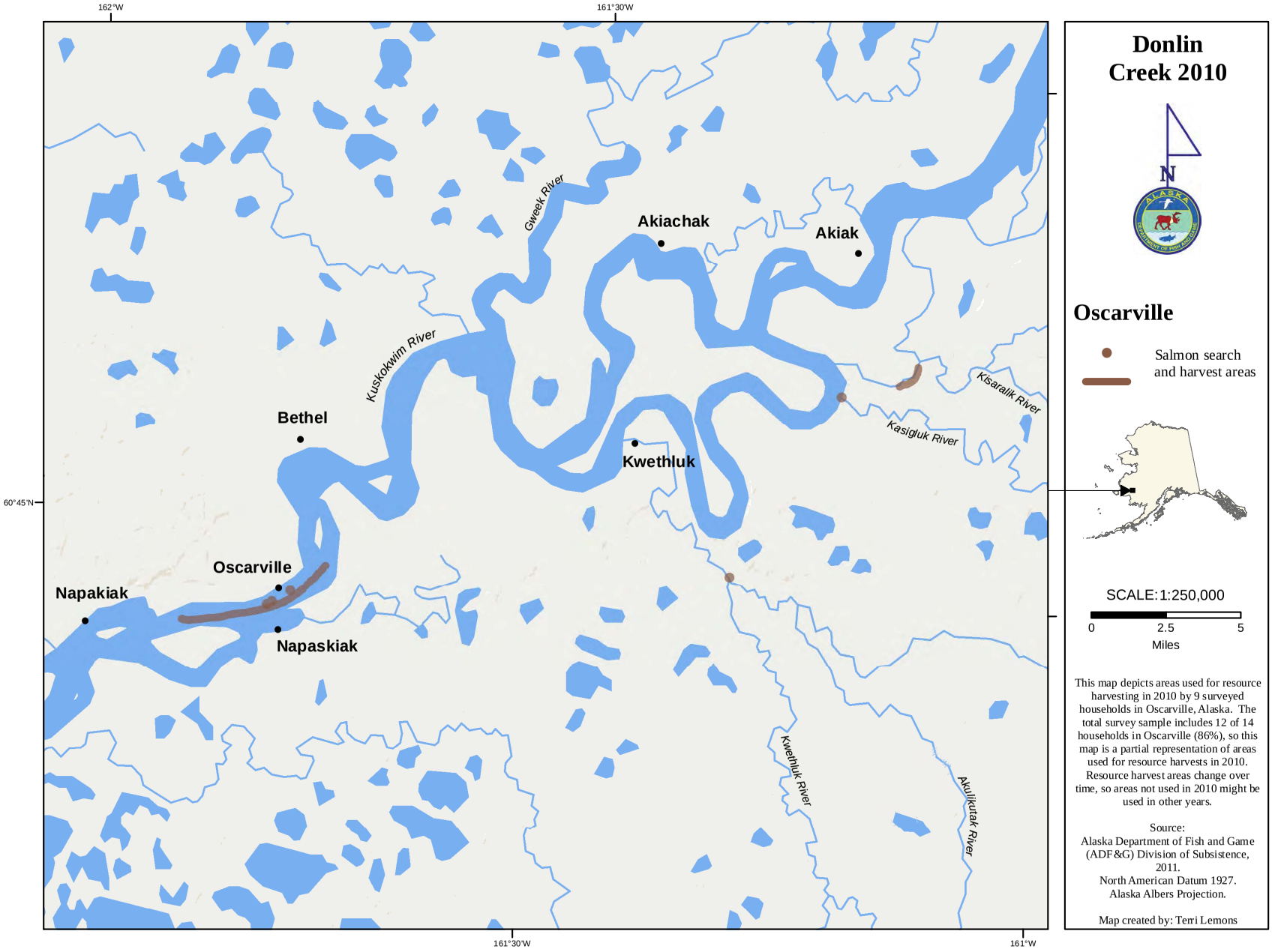

Figure 8-11.–Harvest locations and search areas, salmon, Oscarville, 2010.

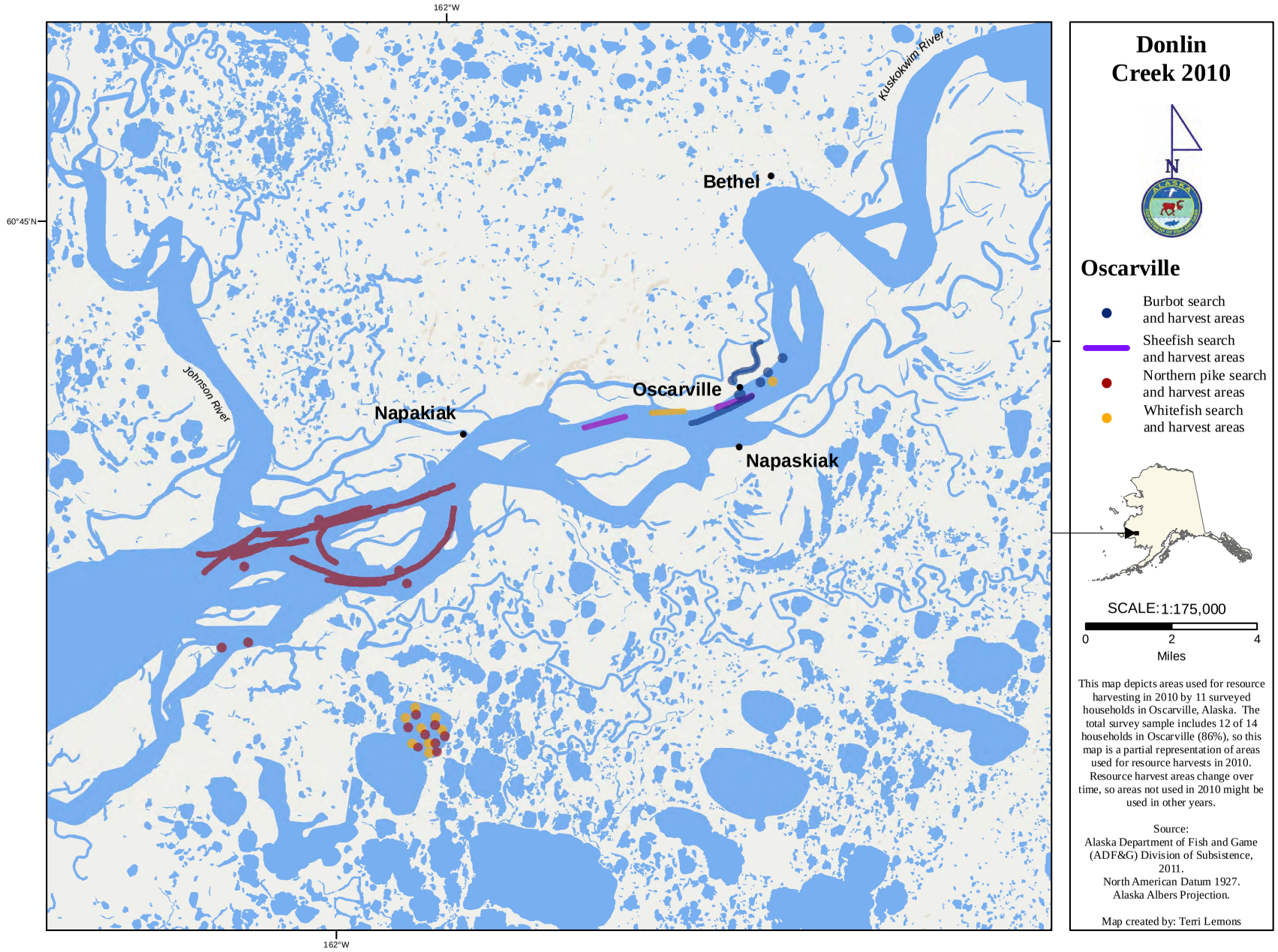

Figure 8-12.–Harvest locations and search areas, whitefish, sheefish, northern pike, burbot, Oscarville, 2010.

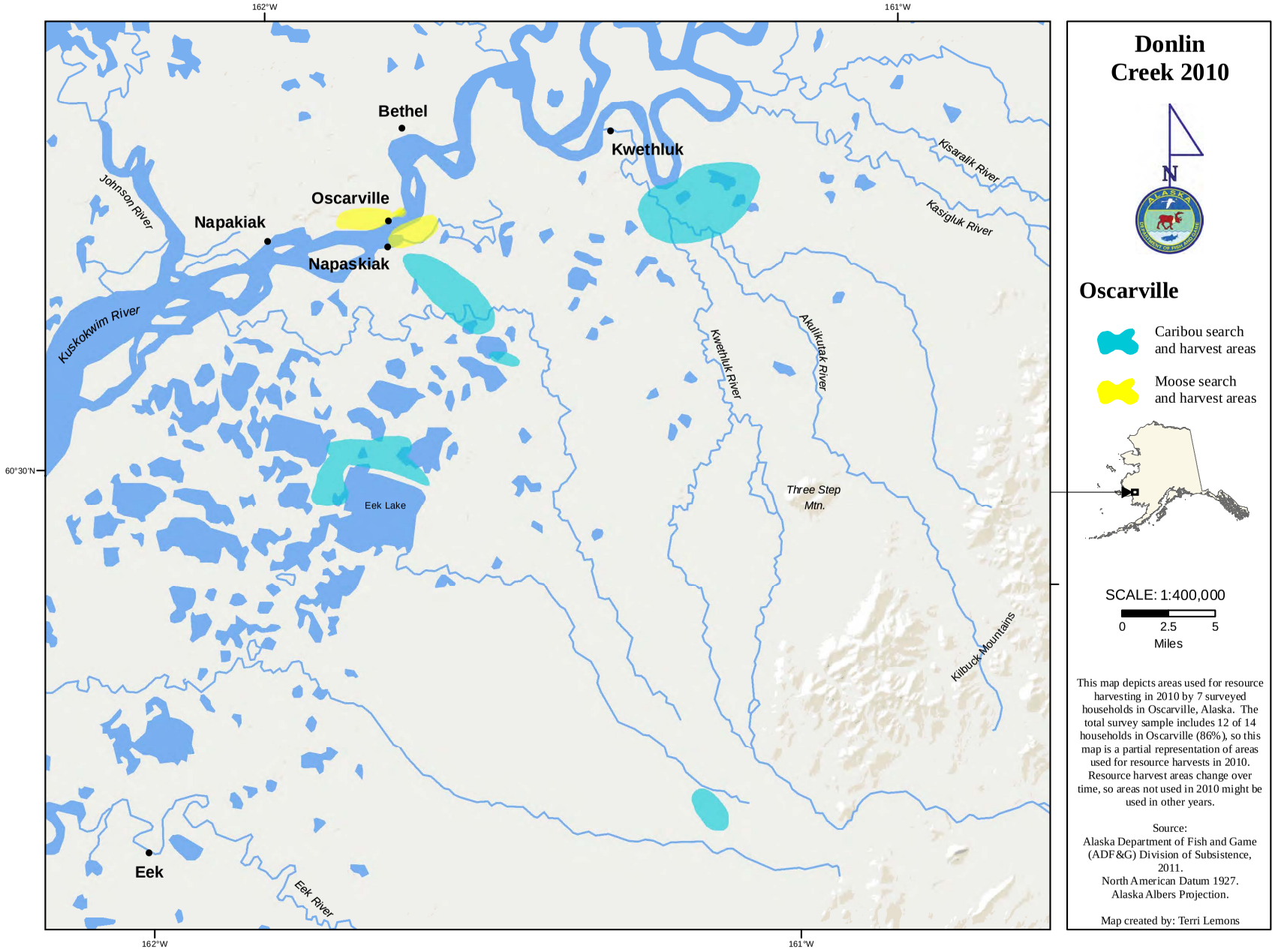

Figure 8-13.–Harvest locations and search areas, large land mammals, Oscarville, 2010.

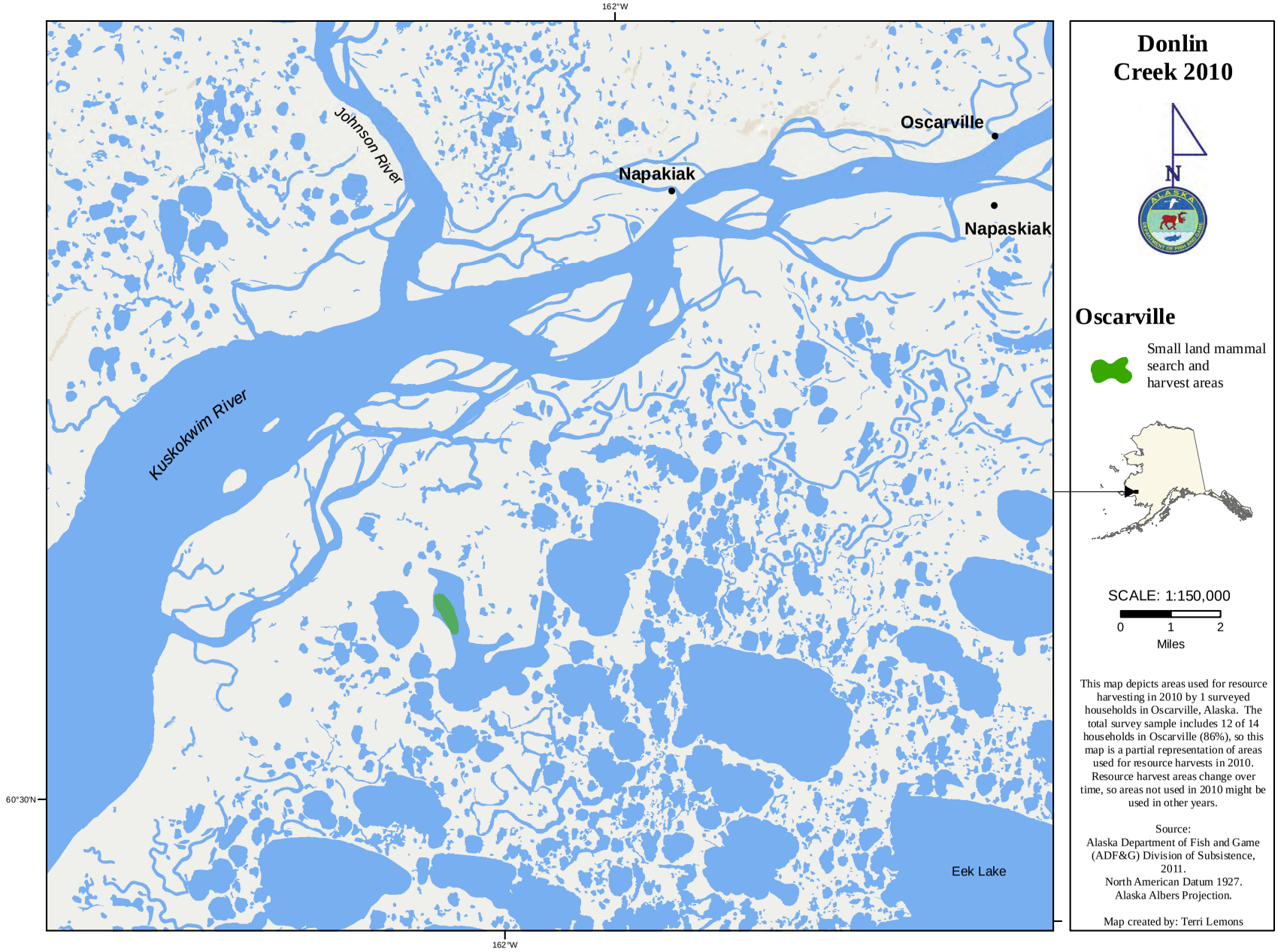

Figure 8-14.–Harvest locations and search areas, small land mammals, Oscarville, 2010.

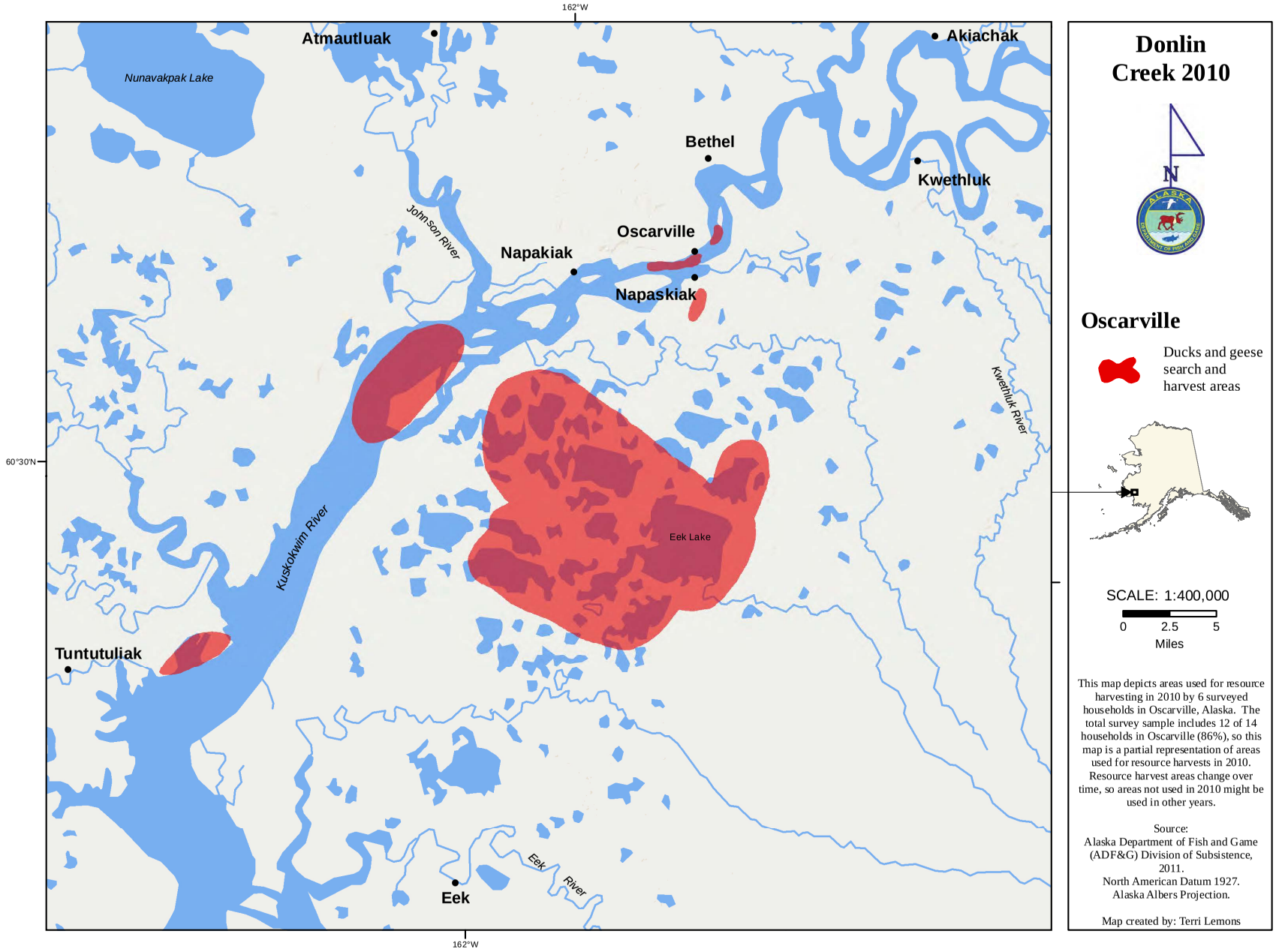

Figure 8-15.–Harvest locations and search areas, ducks and geese, Oscarville, 2010.

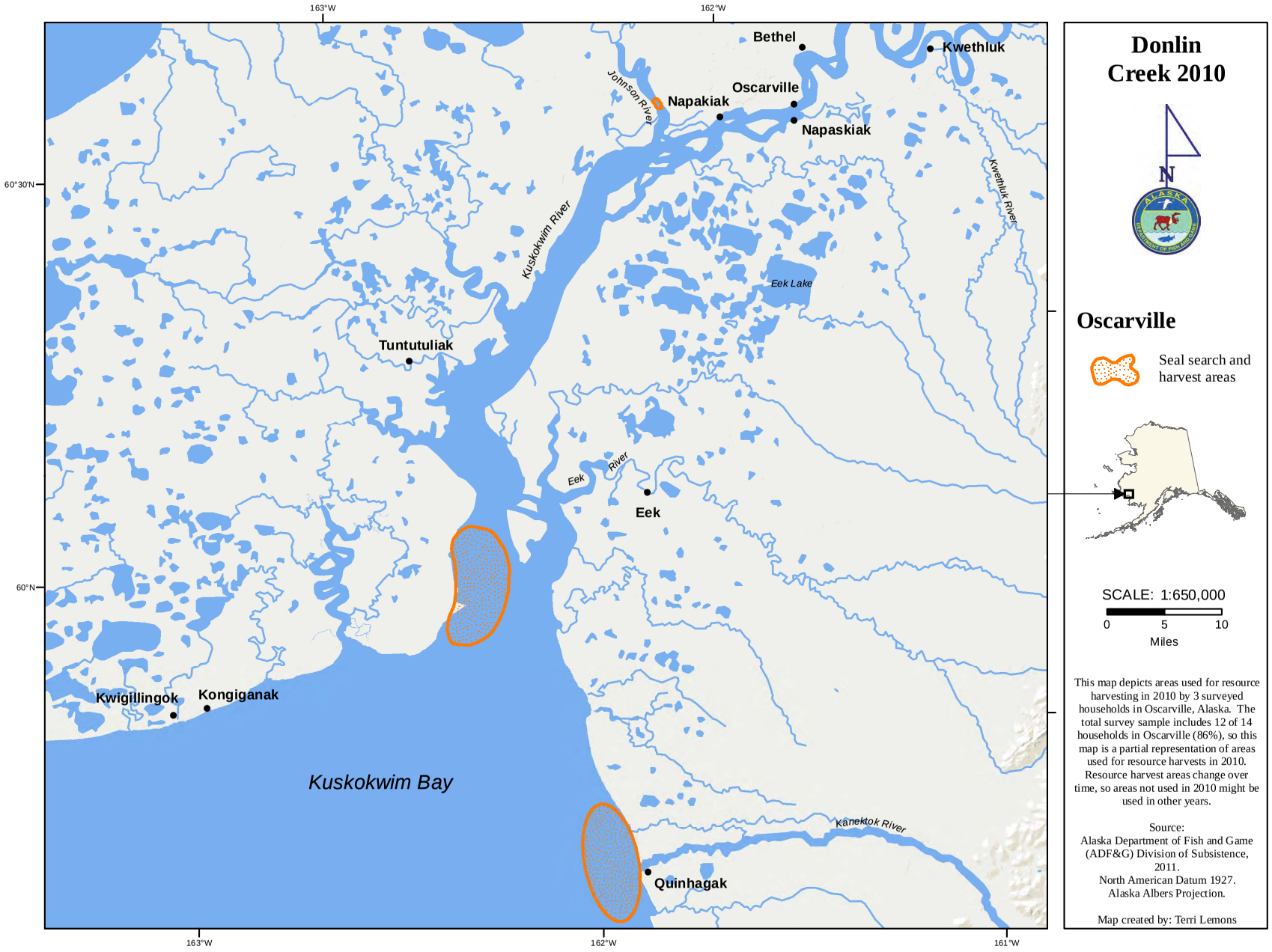

Figure 8-16.–Harvest locations and search areas, marine mammals, Oscarville, 2010.

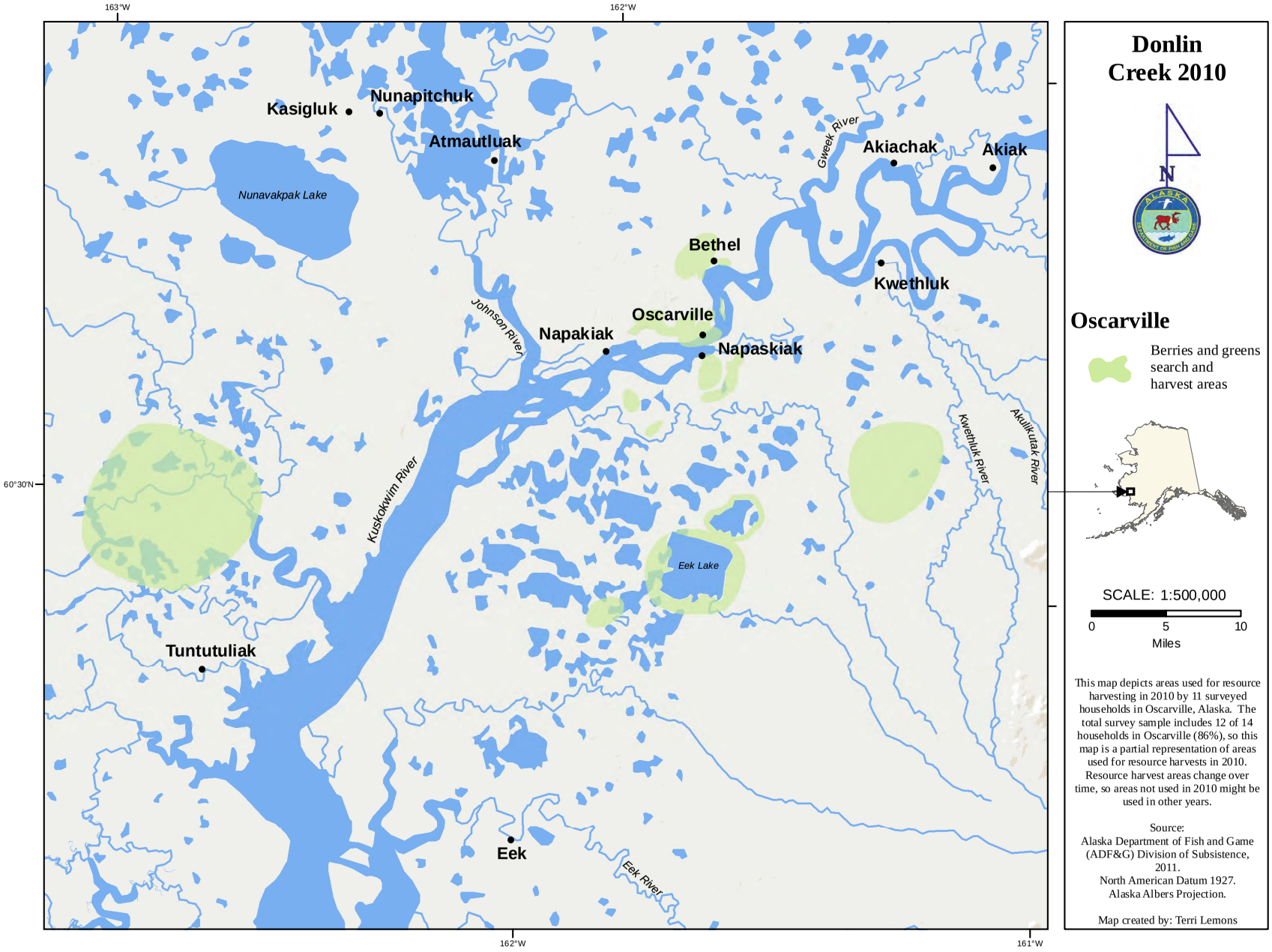

Figure 8-17.–Harvest locations and search areas, berries and greens, Oscarville, 2010.

Subsistence harvest success also can be assessed by comparing current harvest estimates with past harvest estimates; that will be discussed in a later section.

For almost every category, the majority of Oscarville respondents said they used about the same amount or less of subsistence resources in 2010 as they had in recent past years (Figure 8-18)**.** For the salmon category, 42% of respondents reported using the same amount, while 42% reported using less. Only 17% reported using more salmon in 2010. The high percentage of those reporting less use was striking. Many households stated that regulations have negatively impacted their harvest and use of salmon. For nonsalmon fish, 50% reported the same level of use in 2010 as in recent years, 33% reported less, and 17% reported more. In the land mammal category, 50% of respondents reported the same level of use, 25% reported less, and 17% reported more. For marine mammals (oil and other products), 67% reported the harvesting the same amount and 17% reported less. For birds and eggs, 67% reported the same and 8% reported less. In the berries and greens (vegetation) category 75% reported using the same amount and 17% reported using less.

The reasons given for using less of a resource category varied. In the category of salmon, family or personal reasons were cited by 1 household who said they used less of this resource in 2010. "Other" reasons were cited by 4 households who said they used less salmon. For nonsalmon fish,

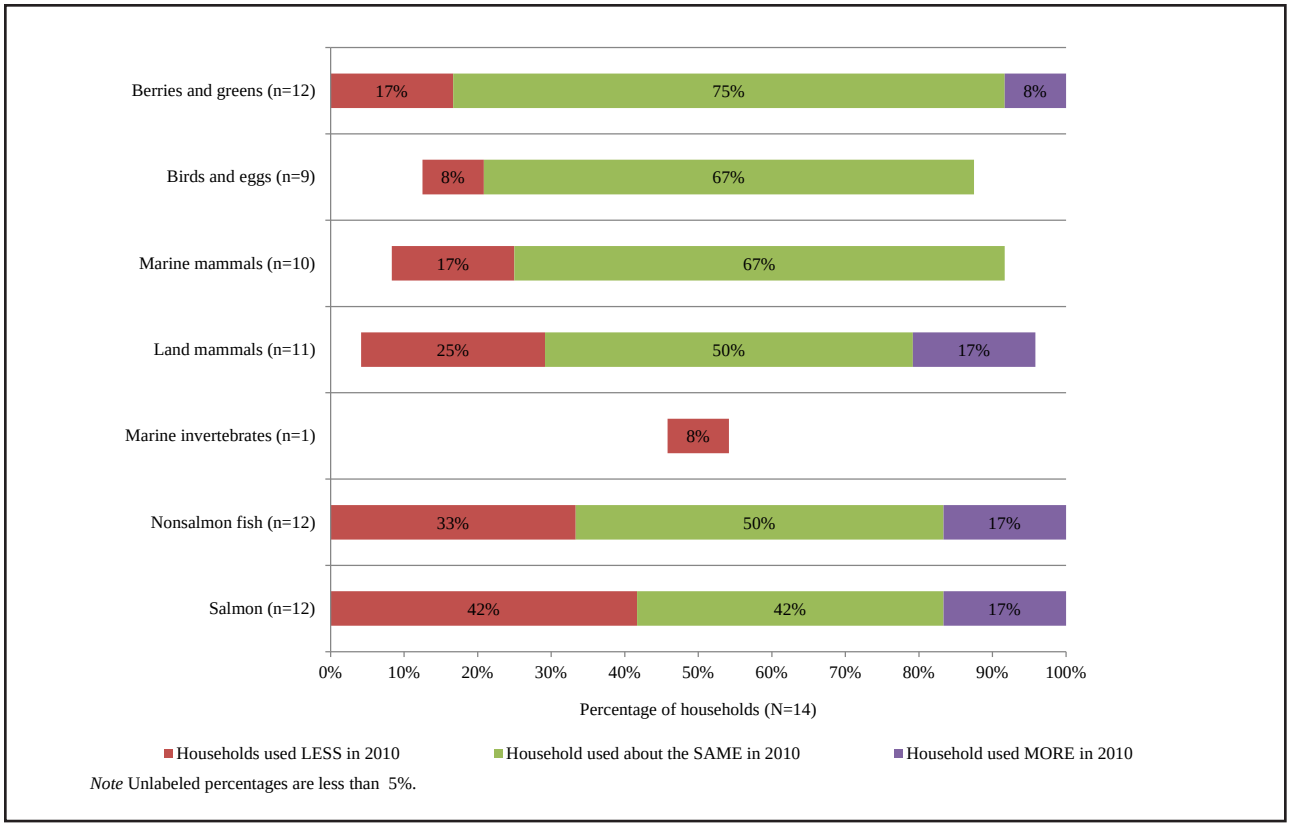

Figure 8-18.–Harvest assessments, Oscarville 2010. Responses to the question: "Did your household use less, more, or about the same amount in 2010 as in the past?"

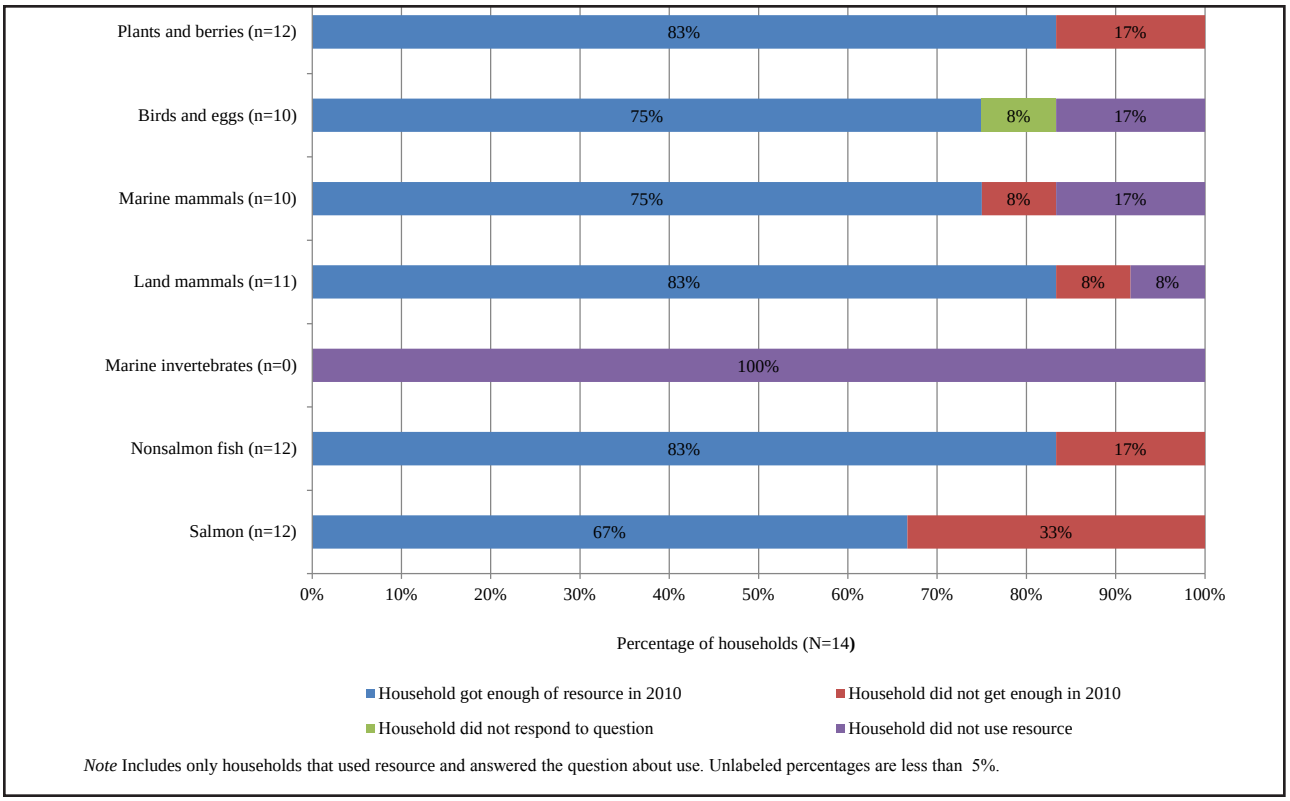

Figure 8-19.–Harvest assessments, Oscarville, 2010. Responses to the question: "Did your household get enough in 2010?"

one household said that not having equipment, or equipment problems, was their reason for getting less, and 1 household cited poor resource availability as the primary reason they used less nonsalmon fish in 2010. In the land mammals category, 2 households reported being unsuccessful or "unlucky" in hunting. For the marine mammals category, 1 household reported a low effort of hunting, while another household stated that they did not get enough even though they tried. Low harvest effort was the reason cited by 1 household for using less birds and eggs. In the berries and greens category, 1 household cited "other" reasons for using less in 2010, while 1 household said that they did not get enough even though they tried.

Of those responding to the question of why they got more of a certain resource category in 2010, 2 households cited "other" reasons for using more salmon. For nonsalmon, 1 household cited "other" reasons. In the category of land mammals, 1 household stated that they had received more, 1 household reported increased harvesting effort, and 1 household cited increased success at harvesting. For the vegetation category, 1 household cited an increase in availability of berries and greens as the reason they used more in 2010.

Responses to the "did your household get enough" question varied according to resource category (Figure 8-19). Of the fish species, 4 out of 12 households (33%) reported not getting enough salmon,

while 2 households (17%) reported not getting enough nonsalmon. Of the vegetation category, 2 (17%) reported not getting enough berries and greens. In the land mammals category only 1 household out of 11 (8%) reported not getting enough. Of the marine mammals category only 1 household out of 10 (8%) reported that they did not get enough in 2010 (Figure 8-19). Two households reported doing something different as a result of not getting enough of a certain resource. One of these households reported that they increased their harvest effort for salmon, while the other household reported purchasing nonsalmon fish. Of the specific fish resources, 2 households said they would like to have had more Chinook salmon, 1 household said they would like to have had more chum salmon, 1 household stated that they wanted more sockeye salmon, and 1 said they wanted more northern pike.

The survey also asked to what degree, if any, the impact of not getting enough of a resource had on households. Three households out of the 4 who reported not getting enough salmon stated that the impact on their household was minor, while 1 household reported that the impact was severe. Of the nonsalmon category 2 households reported not getting enough nonsalmon fish but stated that the impact was minor. For the land mammals category, 1 household reported that they would like to have had more caribou, while 1 household said that they would like to have had more moose. One household reported that they did not get enough land mammals, but that the impact on their household as a result was minor. For the vegetation category, 1 household said that they would like to have had more sour dock. Of the 2 households that did not get enough berries and greens, 1 reported that the impact was minor. The household that reported not getting enough marine mammals stated that the impact to their household was not noticeable. With only 1 exception, the majority of households reported that the impact of not getting enough of a certain resource in 2010 was minor. This suggests that most Oscarville households are doing OK or are adapting to any resource changes that may occur.

Jobs and Income

Respondents were asked about both earned income (jobs held and wages earned by all household members 16 years and older) and unearned income (Alaska Permanent Fund Dividend, Social Security, public assistance, etc.). For 2010, Oscarville households earned or received an estimated total of $640,248 of which $439,977 (69%) was from wage employment and $200,271 (31%) was from other sources (Table 8-6). The average earned income per household was an estimated $31,427. In 2010 only 1 household in Oscarville held a commercial fishing permit.

Local government jobs (including the school and the tribal government) composed the single largest earned income category, contributing an estimated $343,400 (54%). The second largest earned income category was services, which contributed $79,828 (13%) in wages to Oscarville. The third largest source was agriculture, forestry, and fishing at $14,562 (2%). In the category of "other income," the Alaska Permanent Fund Dividend was the largest contributor to community income at $76,220 (12%). Figure 8-20 shows the top 10 income sources ranked by estimated contribution.

Table 8-6. – Estimated earned and other income, Oscarville, 2010.

Income source	Number of people	Number of households	Total for community	Mean per household[a]	Percentage of total
Earned income					
Local government	21.0	11.7	$343,400	$24,529	53.6%
Services	3.9	3.5	$79,828	$5,702	12.5%
Agriculture, forestry, and fishing	10.5	7.0	$14,562	$1,040	2.3%
Retail trade	1.3	1.2	$2,187	$156	0.3%
Earned income subtotal	**32.4**	**14.0**	**$439,977**	**$ 31,427**	**68.7%**
Other income					
Alaska Permanent Fund Dividend		12.8	$76,220	$5,444	11.9%
Food stamps		3.5	$47,600	$3,400	7.4%
Social Security		4.7	$40,063	$2,862	6.3%
Pension/retirement		1.2	$23,333	$1,667	3.6%
Unemployment		2.3	$8,167	$583	1.3%
Energy assistance		3.5	$2,100	$150	0.3%
Meeting honoraria		2.3	$2,100	$150	0.3%
Native corporation divident		4.7	$688	$49	0.1%
Adult public assistance		0.0	$0	$0	0.0%
Supplemental Security Income		0.0	$0	$0	0.0%
Longevity bonus		0.0	$0	$0	0.0%
Workers' compensation/insurance		0.0	$0	$0	0.0%
Disability		0.0	$0	$0	0.0%
Veterans assistance		0.0	$0	$0	0.0%
Child support		0.0	$0	$0	0.0%
Other		0.0	$0	$0	0.0%
Foster care		0.0	$0	$0	0.0%
Citgo fuel voucher		0.0	$0	$0	0.0%
Other income subtotal		**2.3**	**$200,271**	**$ 14,305**	**31.3%**
Community income total			**$640,248**	**$45,732**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2011.

a. For confidentiality, income amounts are not listed for sources reported by fewer than 4 households.

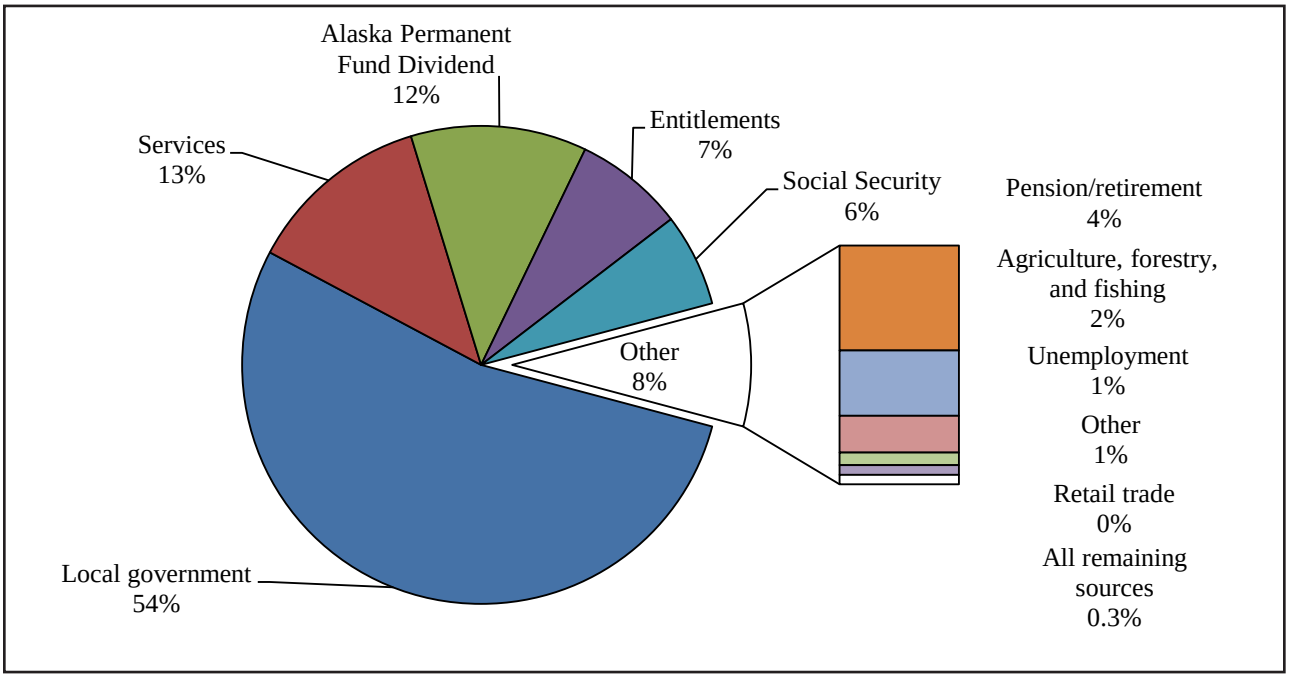

Figure 8-20.–Top 10 income sources ranked by estimated amount, Oscarville, 2010.

Food Security

Respondents answered a short series of questions intended to assess their household's food security status; that is, "access by all people at all times to enough food for an active, healthy life" (Nord et al. 2009:2). The food security questions were modeled on questions developed by USDA, and modified by ADF&G to account for differences in access to subsistence and store-bought foods. Core questions and community responses are summarized in Figure 8-21.

Based on their responses to these questions, households were categorized as having high, marginal, low, or very low overall food security following a USDA protocol (Bickel et al. 2000). In Oscarville for 2010, 92% of the surveyed households had high and marginal food security and 8% had low food security; USDA considers households in high and marginal categories to be "food secure." No household fell within the category of very low food security (Figure 8-21B). Food insecurity was highest in May and early June, and again in October, suggesting that food insecurity conditions are seasonal (Figure 8-22). In October, residents face the significant expense of purchasing fuel oil for the coming winter consequently reducing household funds typically reserved for purchasing store-bought food. Also, the fall moose hunt may have been unsuccessful, causing increased concern about winter stores of food. During the spring months, referred to historically as the "hungry time," residents often face food shortages after winter's depletion of their stored subsistence food. Regardless of season, households with high food security did not report food-access problems or limitations and households with marginal food security reported only 1 or 2 instances of food-access problems or limitations.

According to some respondents, the lack of resources (e.g., cash, gas, boats, motors, and other fishing and hunting gear) was a major factor affecting the acquisition of the types of food residents wanted. In response to the statement, "We could not get the kinds of food we wanted because of lack of resources," 33% of respondents reported that this was a concern (Figure 8-21A). Two households (17%) reported that due to a lack of resources, they were unable to get the subsistence food they needed. One household (8%) reported store bought-food shortages for their households due to a lack of cash resources. In most cases, respondents preferred subsistence foods over store-bought foods, stating that store-bought foods were not as healthy or as filling as wild foods.

Wild Food Networks

Although every household surveyed reported harvesting some type of wild resource, a small group of high producing households shared the bulk of total harvests with the entire community. The highest producing households are usually active elder households, mature couples, and single active males (Magdanz et al. 2002). Of the 3 highest harvesting households in Oscarville in 2010, 1 was headed by a mature couple (ages 30–59), 1 was headed by a developing couple (ages less than 30), and 1 was headed by an elder couple (greater than 60 years old).

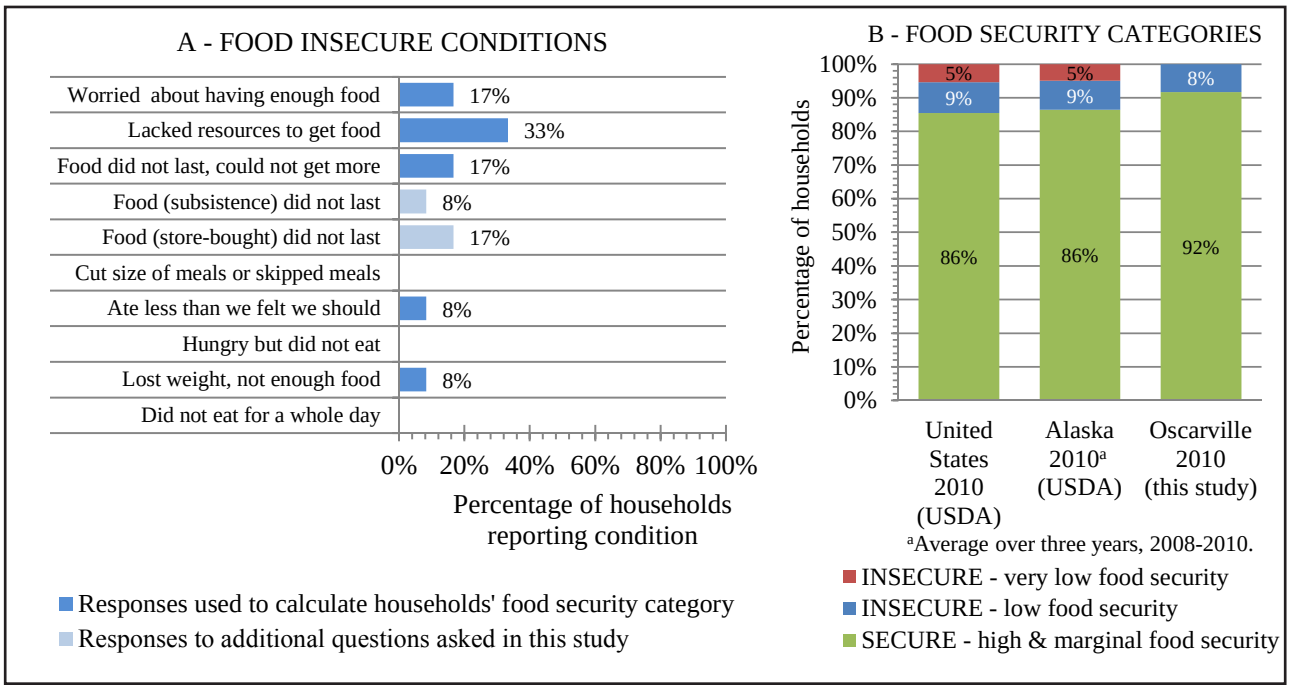

Figure 8-21.–Food security results, Oscarville, 2010.

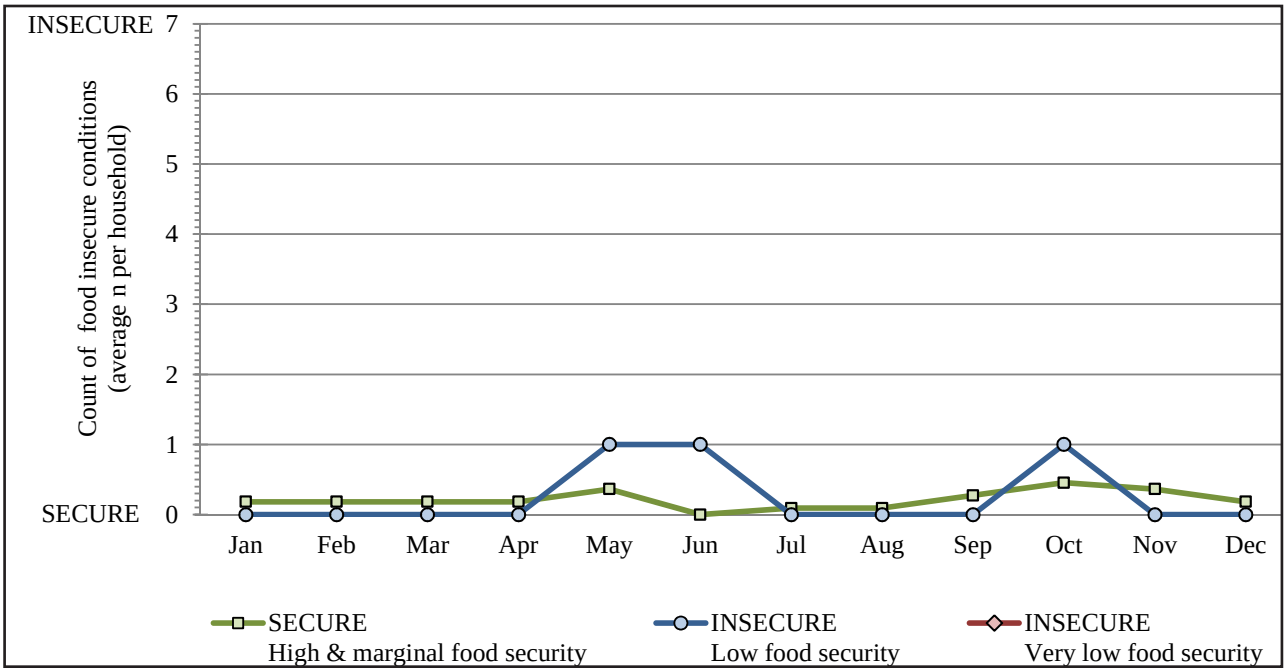

Figure 8-22.–Food insecure conditions by month and by household category, Oscarville, 2010.

Sharing harvests is an important means of redistributing subsistence resources throughout Oscarville. Sharing with elders who may not be able to acquire subsistence foods on their own is expected. Not only did the survey capture sharing patterns in Oscarville but it also documented the broader sharing networks Oscarville residents have with friends and family members in neighboring villages. Guided by customary and traditional systems and rules, the redistribution of subsistence foods is an important traditional practice for Kuskokwim communities (Jonrowe *n.d.* [c1980]; Stickney 1981; Charnley 1984). In 2010, Oscarville households reported participating in inter-community subsistence resource sharing with other households in Tuntutuliak, Chefornak, Kipnuk, Newtok, Platinum, Napaskiak, Kasigluk, Bethel, and Anchorage. In most cases, close familial ties exist between these communities and Oscarville to create the sharing network. The communities of Platinum, Kipnuk, and Chefornak are coastal or near-coastal communities. Respondents stated that connections between Oscarville and these communities allowed for sharing and exchange of coastal and Interior subsistence foods between 2 geographically different use areas. Although a wild foods network diagram depicting these connections was produced for Oscarville, it will not be presented in this report due to confidentiality issues because of the small overall population of the community.

Comparisons with Prior Results

This baseline survey was the first comprehensive subsistence harvest survey conducted by ADF&G in Oscarville. Oswalt (1963b) described contemporary subsistence harvest areas, seasonal rounds, and resource use for the nearby community of Napaskiak for 1 year from 1955 to 1956. For most purposes, he considered Oscarville as part of the Napaskiak community and treated it as such throughout his study (Oswalt 1963b). In addition to Oswalt (1963b), a study by the Alaska Cooperative Wildlife Research Unit (Klein 1966) was conducted from April to June of 1964 and in February of 1965 to provide basic information for an appraisal of the seasonal use of waterfowl by Native Alaskans in the Yukon–Kuskokwim Delta, which included Oscarville. More recent migratory bird surveys were conducted in the Yukon–Kuskokwim Delta in 2004–2007 but results were presented only at the regional level. Finally, ADF&G has conducted postseason subsistence salmon surveys in Oscarville in most years from 1989 to 2009. This section discusses the current 2010 baseline data and compares them with prior results.

Gear Types and Subsistence Strategies

Gear types and subsistence strategies for Oscarville residents have changed to some degree over the years. Prior to European contact, fishing gear consisted mainly of setnets, dip nets, and fish traps made of natural materials such as wooden poles, wood or bark strips, and sinew. Salmon were harvested in setnets placed at river eddies and the mouths of large tributaries, or in large wooden fish traps set

in openings of pole and bush weirs (Oswalt 1963b). Other shore-based fishing methods included dip netting and spearing (Brown 1983, Bower 1940).

Large mammals such as moose, caribou, and bears were often pursued by groups of men (usually around 12 in number). These groups traveled up the Kuskokwim River and its tributaries to hunt, and if the hunt was successful, "bullboats" would be constructed to carry the harvest back downriver to the village. Until the late 1800s, hunters killed large land mammals with bows and arrows, and spears (Oswalt 1963a). Beavers were killed with bows and arrows or sticks or were caught in nets at the entrances to their lodges. Hares were generally snared. Foxes and martens were killed in baited nets set in deadfalls (Oswalt 1963a).

Waterfowl and other birds were taken while in flight with bows and blunt-tipped arrows, bolas, and bird spears, or were harvested by groups of people during cooperative drives (Klein 1966). Cooperative drives occurred in midsummer when adult birds were molting their flight feathers and before juveniles had attained flight. The drives involved a large number of people working together in the lake system southeast of Oscarville, where the ducks and geese congregated to molt. The birds were first herded into one large flock by boats and kayaks. Then, the birds were forced onto land where additional people chased them into fish nets or through a line of waiting people who killed the birds with clubs. The average harvest per drive was between 1,000 to 2,000 birds**.** Longtail and greater scaup ducks, and lesser Canada geese apparently dominated the harvest (Klein 1966). Klein (1966) stated that these drives were still happening at the time of his study (1963) but to a much lesser degree, and only in a few coastal areas, inland at Nunapitchuk, and significantly for this baseline study, Napaskiak. Cooperative waterfowl drives no longer occur in the Oscarville or Napaskiak area. Waterfowl and other birds are currently harvested primarily by individuals using shotguns or rifles. Also, fewer people move to spring camps for bird harvesting than did so in the past.

For comparative purposes, findings from Oswalt's (1963b) study provide an excellent opportunity to compare subsistence resources, subsistence strategies, resource use, and subsistence gear for the community of Oscarville over time (late 1950s to 2010).

By the late 1950s (the time period of Oswalt's study), Oscarville residents had a wide variety of subsistence gear constructed of various new materials available to them. One major change to fishing gear was the introduction of nylon netting, which took the place of sinew and wood strips. Some of the major items used to pursue subsistence activities were plank boats, outboard motors, gillnets (drift and set), shotguns or other gun types, ammunition, dog teams and sleds, various types of fish traps, steel traps for small mammals, drying racks for fish, smokehouses, and caches (above-ground structure for food storage) (Oswalt 1963b). The motors ranged from 1.5 to 32 horsepower. Nylon fishing nets and boat motors were purchased from the store. People built their own boats or bought them from one of the boat builders in the area. The cost of an average boat was approximately $150 for materials and $75 to $100 for labor (Oswalt 1963b). Today, boats and motors are generally purchased from dealers

outside of the community. The average cost for a serviceable boat is around $3,000. The average cost for a 40-horsepower motor can range from $1,000 to $10,000.

According to Oswalt (1963b), basket sleds and dog teams were used for winter overland travel. The sled was usually 10 to 12 feet in length, 20 inches wide, and had a bed supported with stanchions approximately 8 inches above the runners. The wood most commonly used in sled construction was hickory purchased from the local trader for around $20. A 10 foot sled of this type was worth about $80. The materials cost approximately $40. A good sled lasted 4 or more years. Most sleds were purchased from sled builders in Napaskiak or Oscarville. Young dogs were worth $20 and were occasionally purchased as well as bred. Teams usually consisted of 5 to 7 dogs. Dog houses were made out of oil drums or lumber and in late fall were filled with a grass bedding.

Most of the same basic types of equipment and structures used in the 1950s for subsistence activities are still used today, albeit with some advances in technology and material types. Subsistence fishing, for the most part, still requires set and driftnets, boats and motors, smokehouses, and fish racks. Subsistence hunting and trapping still require traps, guns and ammunition, boats and motors, and overland transportation. One major difference in overland transportation in modern times is the use of snowmachines instead of sleds and dog teams, although these are still used by some people. Dog teams are used to a much lesser extent today and as a consequence, fewer dogs are kept, and less fish is needed to feed them. ATVs are another transportation innovation used for subsistence activities.

Although fishers employ many of the same fishing strategies (i.e., placing setnets at river eddies and the mouths of large tributaries, dip netting, and jigging) as in the past, modern boats and motors make driftnetting more of a key strategy today. Rod and reel gear is used regularly as well (Brown 1983, Brown et al. 2005). Boats, motors, ATVs, and most other subsistence equipment are now purchased outside the community. Rarely—with the exception of fish racks, smokehouses, and some fish traps—are plank boats, nets, or other subsistence equipment made within the community today. Currently, with the demise of the fur trade and local traders, it is even more imperative that residents of Oscarville have cash income in order to obtain the equipment that they need to continue to pursue subsistence activities. The use of more advanced gear types such as steel traps, guns, boats with motors, and nylon fishing nets is the norm today, and individualist hunting and trapping strategies have taken the place of group hunts and other group subsistence activities.

Harvest Quantities

Findings from Klein's (1966) study provide an opportunity to compare subsistence migratory bird harvests and uses for the community of Oscarville over the past 48 years. Klein (1966) produced the following estimated harvests (extrapolating data from Napaskiak to obtain estimates) of waterfowl for Oscarville from April to June 1964, and in February 1965: 150 spring ducks averaging 15 per household, and 250 spring geese and brants averaging 25 per household; 30 fall ducks averaging 3 per

household; 100 fall geese and brants averaging 10 per household; 20 swans averaging 2 per household, and a total of 2 cranes for the community. The most harvested species of geese was the Canada goose (i.e. cackling geese), while the most harvested duck species was the pintail. An estimated total of 552 migratory birds were harvested. According to the BIA census, Oscarville had a population of 61 residents in 1963 (Klein 1966). In comparison, 725 migratory birds were harvested by Oscarville residents in 2010. Cackling geese continued to be the most important geese species. Black scoter was reported as the most harvested species of duck. Only 25% of households used northern pintails in 2010 while 75% used black scoters. More cranes (12) and fewer swans (6) were harvested in 2010 compared with Klein's (1966) results. According to the U.S. Census (2011), Oscarville had an estimated population of 70 in 2010.

An estimated 48 bird eggs were harvested by Oscarville residents according to Klein (1966). Egg harvesting mostly occurred near the village, but sometimes women and children would take a boat to a more productive area for the day (Klein 1966). By contrast, Oscarville residents harvested 223 eggs in 2010, and reported that 58% of households harvested eggs and 75% used them. While still not considered a major subsistence activity, these numbers suggest that egg harvesting by Oscarville residents is an important aspect of the subsistence harvest for Oscarville residents.

Subsistence Salmon Surveys

The ADF&G postseason subsistence salmon surveys present an excellent resource to use when looking at changes in salmon harvests over time (Figure 8-23). According to ADF&G salmon surveys conducted in most years between 1989 and 2009, the Chinook salmon harvest for Oscarville residents was higher (by 343 individual salmon) in 2010 than the previous year. The previous year was the lowest Chinook salmon harvest (754) since 2001. The Chinook salmon harvest in 2010 (1,097) however, is the fourth highest Chinook salmon harvest overall since 2001. The highest harvest year (1,753) for Chinook salmon over this time period was in 2001.

Chum salmon harvests for Oscarville overall have dropped significantly since the 2001 high of 2,097 fish. The 2010 chum salmon harvest for Oscarville residents was the lowest (502) since 2001, and marked the second year in a row of harvests of less than 600 individual chum salmon. Though there were some minor fluctuations over time, chum salmon harvests appear to be declining in recent years. One reason may be the declining use of dogs for transportation. Owning fewer dogs mean that fewer chum salmon are needed to feed dogs.

The sockeye salmon harvest was higher in 2010 (by 139) than the previous year. Similar to chum salmon, sockeye salmon harvests overall have declined from a high in 2001 of 1,620 individuals. The 2010 sockeye salmon harvest of 473 was the fourth lowest sockeye harvest since 2001. Sockeye salmon harvests have increased from a low of 257 in 2005 to remain between 334 and 677 for the past 5 years.

Unlike the other 3 species of salmon harvested by Oscarville residents, coho salmon harvests have

fluctuated greatly from year to year between 2001 and 2010, with 2001 being the second lowest harvest year (42 individuals) in this time period. The coho salmon harvest by Oscarville residents in 2010 was higher (by 93) than the previous year. Coho salmon, at 160 individuals, were the least targeted and harvested salmon species by Oscarville residents in 2010. Coho salmon harvests were highest in 2004 and 2006; in these years there were decreased harvests of sockeye and Chinook salmon. This pattern suggests that coho salmon were targeted more in years when other salmon species were not as available. This pattern does not hold true for 2010 however. There is no correlating harvest decrease for the other 3 salmon species for 2010. The coho salmon harvest for Oscarville residents has been increasing for the past 4 years, and the 2010 harvest was the third highest since 2001.

Overall, Oscarville residents are still able to adapt their subsistence strategies to meet changing conditions, using substitute resources when a particular resource is not available to them. This strategy works as long as other subsistence resources remain available. It is a delicate balance, maintained through the years and passed down through many generations of Oscarville residents. It is a balance maintained through the intimate knowledge and continuing respect of the natural environment.

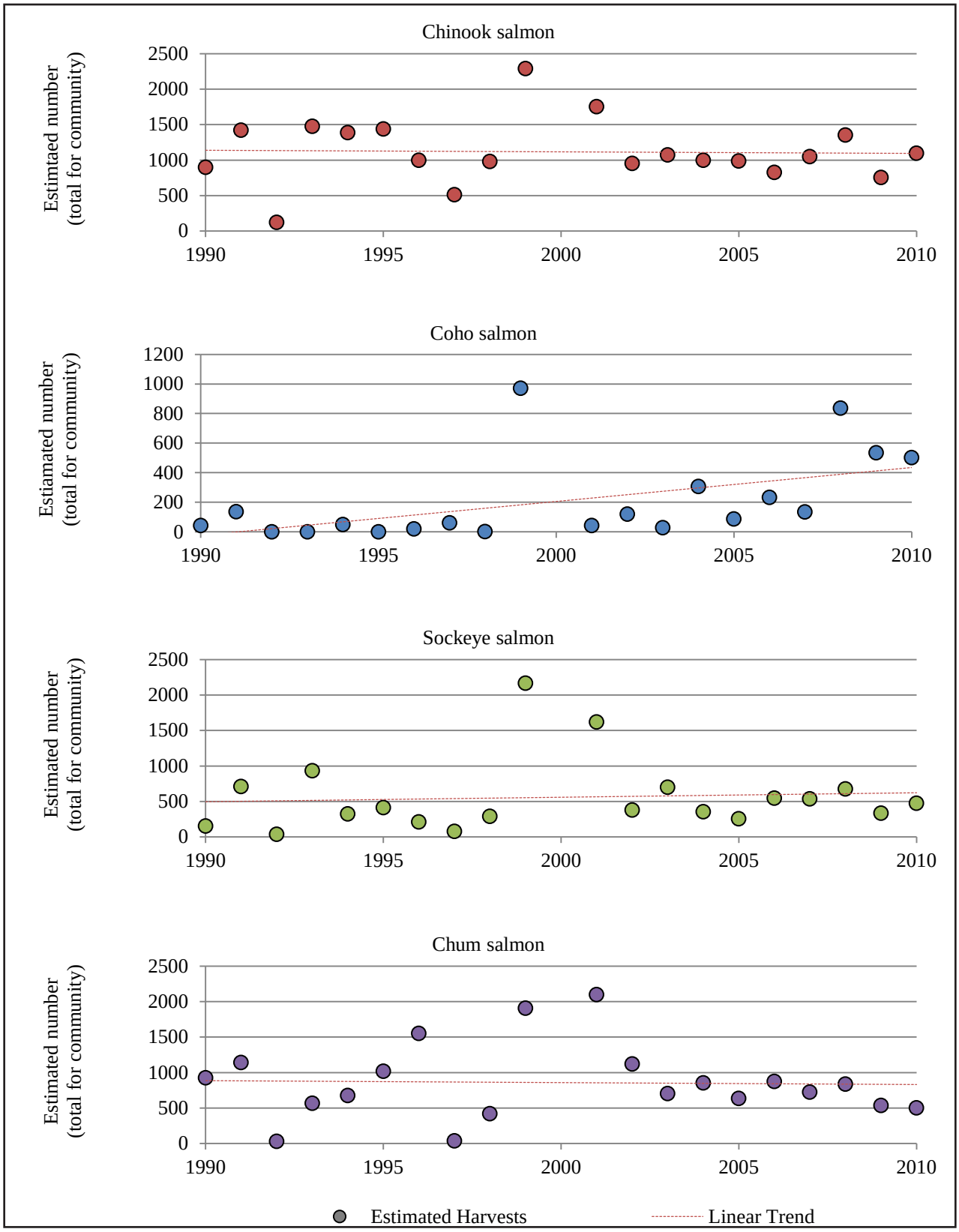

Figure 8-23.–Estimated numbers of Chinook, coho, sockeye, and chum salmon harvested by residents of Oscarville, 1990–2010.

9. Comprehensive Survey Results Tuluksak, 2010

Prepared by David Runfola and Andrew Brenner

In April 2011, researchers surveyed 68 of 86 households (79%) in Tuluksak. Expanding for 18 unsurveyed households, Tuluksak's estimated total harvest of wild foods in 2010 was 163,606 lb (±14%). The estimated average harvest per household was 1,902 lb, with an average per capita harvest of 359 lb.

In 2010, 8 of the top 10 harvested species were fish, composing 68% of the total pounds of edible wild foods harvested in the community (Figure 9-1). Nearly one-half (48%) of the total harvest was comprised of 4 species of salmon: Chinook salmon (22% or 35,853 lb), chum salmon (12% or 20,322 lb), sockeye salmon (10% or 15,966 lb), and coho salmon (4% or 6,441 lb). Other fish species among the top 10 resources harvested were northern pike (7%), humpback whitefish (5%), burbot (4%), and smelt (4%). The only mammal in the top 10 harvested resources was moose (7% of the total wild food harvest by weight or 10,927 lb). Salmonberries composed 2% of all resources harvested by weight.

This chapter summarizes findings from the household surveys, including demographic characteristics, responses to harvest assessment questions, harvest estimates, employment and income, and responses

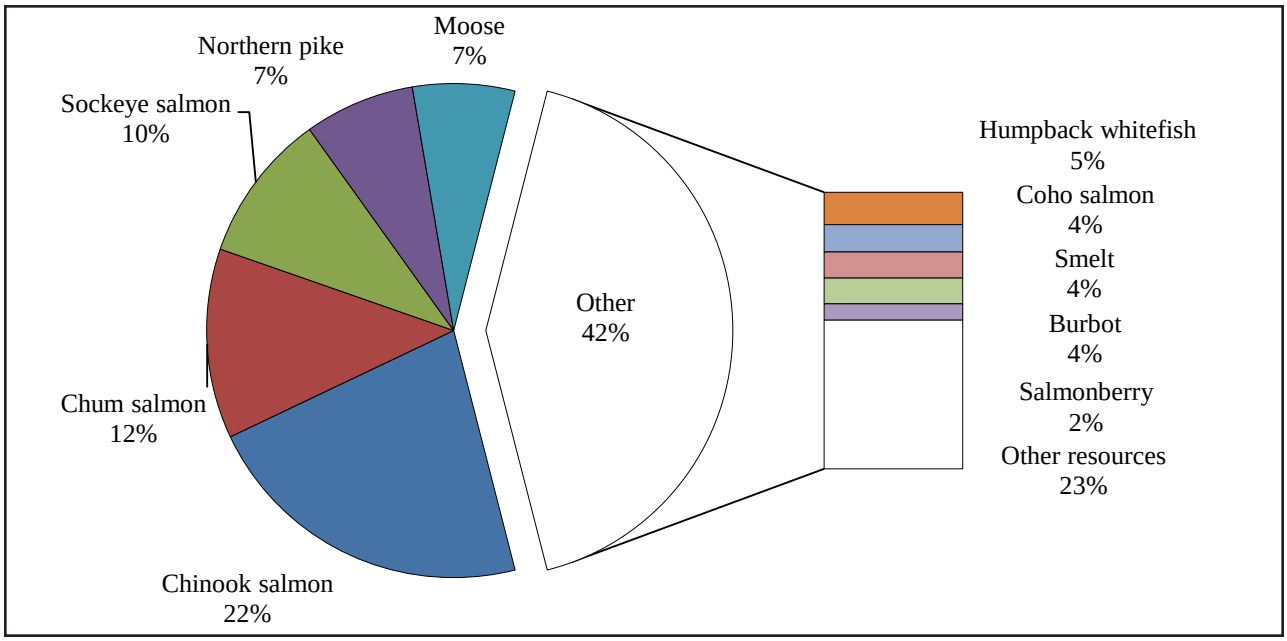

Figure 9-1.–Top 10 species harvests ranked by estimated edible weight, Tuluksak, 2010.

to food security questions. Harvest numbers are expanded estimates. Results from this survey are available online in the CSIS.

This chapter also includes results from 65 maps created by researchers and respondents during household surveys. These maps depict harvest search areas of select resources for households that participated in subsistence harvesting activities during the study year 2010. Data from these maps were compiled to create the community use maps (figures 9-7 through 9-14). Additionally, ethnographic interviews were conducted with 5 knowledgeable subsistence users, all men, to give historical as well as contemporary context to the single-year harvest estimates. Four of the 5 key respondents were active subsistence harvesters and community leaders, as well as knowledgeable elders speaking on community history, resource use changes and continuity, and contemporary concerns related to subsistence. The fifth key respondent was an active trapper who had lived in Tuluksak for 2 years and had knowledge of contemporary patterns of furbearer harvest in the area.

About Tuluksak

Tuluksak is located on the southeast (left) bank of the Tuluksak River where it joins the Kuskokwim River approximately 35 miles northeast of Bethel. The community is located in the Yukon–Kuskokwim Delta and within the Yukon Delta National Wildlife Refuge (YDNWR). The Central Yup'ik name for the community, *Tuulkessaaq*, is derived from *tuullek*, the Central Yup'ik word meaning "loon" (Oswalt 1980:84)[1]. One Tuluksak key respondent explained that the name refers to 2 loons mating (TLT04221102). Based on the results of this study, Tuluksak had an estimated population of 455 people in 2010. The U.S. Census enumerated a population of 373 residents in the same year.

Archaeological records indicate that the Central Yup'ik people and their ancestors have resided in the Lower Kuskokwim River region for approximately 4,000 years (VanStone 1984:227). Local oral history accounts and archaeological data indicate the presence of several communities and seasonal camps in the area surrounding present-day Tuluksak (Buzzell and Chambers 2010). The explorer Lt. L. A. Zagoskin of the Imperial Russian Navy recorded habitation of Tuluksak in the mid-19th century, possibly as early as 1843 (Buzzell and Chambers 2010). The first U.S. Census to record Tuluksak's population occurred in 1880, estimating that 150 people lived in a community on the Tuluksak River bank opposite the current village site (Petroff 1884:17). The population of Tuluksak declined to 57 people in 1907, possibly due to disease epidemics and resettlement to other communities (Oswalt 1980:85; Wolfe 1982; Andrews and Peterson 1983:9).

From 1907, settlement in Tuluksak continued, and by 1930 the population had grown to 96 (Andrews and Peterson 1983:10). Several factors apparently influenced this population increase, including mining activity in the Tuluksak River drainage and construction of a chapel, a store, and a school.

1. Contemporary sources have not clearly recorded the local nomenclature for various species of loons. Jacobson (1984:380) translates tuullek as both common loon Gavia immer and yellow-billed loon Gavia adamsii. While Andrews and Peterson (1983:8) report that the name refers to yellow-billed loon, Oswalt (1980:84) claims "loon" as the translation.

Prospectors first discovered gold in 1907 near the headwaters of the Tuluksak River, making a larger discovery in 1908; the latter strike brought many temporary settlers to the area (Oswalt 1980:67; Brown 1985:203–204; Buzzell and Chambers 2010). In 1912, Moravian missionaries built a chapel in Tuluksak (Henkelman and Vitt 1985:65), coinciding with an immigration of families from Uknavik, a historical village approximately 20 river miles upstream on the Kuskokwim River (Oswalt 1980; Andrews and Peterson 1983:11). In 1918, Moravian missionaries moved mission buildings from Uknavik to the present-day site of Tuluksak. A store was also established during this period. Residents of the historical village of *Kuigurlurmiut* on Bogus Creek settled in Tuluksak, as well as residents of 8 seasonal settlements and camps upstream on the Tuluksak River (Andrews and Peterson 1983:11; Buzzell and Chambers 2010). Residents moved the village to its present site in the late 1920s after consistent flooding of the original location (Andrews and Peterson 1983:11; Brown 1985:203–204), and by 1930, the U.S. Department of Interior Bureau of Education established an elementary school there (Barnhardt 1985:49).

In 1948, residents of Tuluksak established a local tribal government under provisions of the Indian Reorganization Act (IRA), forming the Tuluksak Native Community Tribal Council (TNC or locally referred to as the Tuluksak Native Community) (Andrews and Peterson 1983:12). This tribal council serves the community today as the principal municipal authority. The City of Tuluksak was incorporated as a second class city in 1970 but ceased to exercise its powers in 1986, at which time TNC assumed responsibility of city services (ADCRA 1994). The State of Alaska officially recognized the City of Tuluksak's dissolution in 1997 (ADCCED 2012b). In 1971, under ANCSA, residents of Tuluksak formed Tulkisarmute Incorporated, a for-profit village corporation. Tuluksak has a public school serving kindergarten through 12th grade and is part of the Yupiit School District. The Yukon–Kuskokwim Health Corporation (YKHC) operates a health clinic in the community.

Tuluksak Native Community operates a water treatment facility that supplies a community water, laundry, and shower center, or "washeteria." Dwellings in Tuluksak lack indoor plumbing. Residents obtain their water from natural sources or from the treatment facility, which has a capacity of 7,000 gallons of water. Residents use indoor privies, commonly referred to as "honey buckets," which TNC collects with a community sanitation service and deposits at a central sewage lagoon.

Tuluksak is not connected to other communities by paved roads. Travel into and out of the village is available by air, boat, or snowmachine. Tuluksak has an airstrip but no boat docking facilities. The State of Alaska maintains the airstrip, as well as a winter ice road that connects Tuluksak with other Kuskokwim River communities. The community's transportation and commerce needs are served out of Bethel, the regional hub.

Gold mining activity on the Tuluksak River has been a significant factor in the history of the area. Productive placer deposits of gold were discovered in 1908 on Bear Creek, 94 miles up the Tuluksak River (Buzzell and Chambers 2010). This discovery immediately brought prospectors into the Tuluksak

River drainage, and by the 1920s as many as 50 miners were working in the area each summer. These miners obtained their supplies from Bethel overland in winter and by small steam-powered vessels in summer. These boats reached as far as 50 miles upstream on the Tuluksak River, where crews off-loaded supplies onto poling boats for transport to mining sites. By the early 1920s, the New York-Alaska Gold Dredging Company purchased most of the mining claims around Bear Creek and consolidated them, establishing the mining community of Nyac at Tuluksak River mile 92. Operations of the New York-Alaska Gold Dredging Company, and of numerous smaller mining outfits on the Tuluksak River, varied in intensity from the 1920s until the onset of World War II. A moratorium on gold mining during World War II halted mining activity, but it resumed following the war and continued until 1965 when the New York-Alaska Gold Dredging Company closed all operations (Andrews and Peterson 1983:4). As an indication of the significance of gold mining in the region, the Tuluksak drainage was the third most productive placer gold mining district in Alaska from 1945 to 1965; this ranked after Nome and Fairbanks (Buzzell and Chambers 2010). Other mining companies have operated out of Nyac since then, and gold mining operations continue today.

The effect that mining has had on the community of Tuluksak has not been limited to the influx of miners and their goods into the Tuluksak drainage. While some Tuluksak residents benefitted from wage jobs in mining operations and from sales of goods to miners, most saw little direct benefit from the mines. Further, mining activity largely disrupted traditional travel routes and harvesting activities in the headwaters of the Tuluksak River. One Tuluksak resident, a key respondent in 2011, discussed the experiences that many hunters have had when interacting with miners in the Nyac area.

> Some [miners] welcome us but a lot of them don't welcome us. They just told us to get off their land. It's our land. It's supposed to be our land, not theirs …. We used to go moose hunting [there]. They'd follow our trails, and when they'd catch up to us, they'd say, "Get off our land." (TLT04251103)

Deposition of tailings downstream of mine activity increased turbidity of streams, which according to Tuluksak residents resulted in poor water quality (Andrews and Peterson 1983:36–37; Buzzell and Chambers 2010). During key respondent interviews in 2011, residents discussed the change in water quality, indicating they remembered the Tuluksak River being a clear water stream, and that the water is now more turbid. One key respondent explained:

> The water back then was very clear in the summertime. You could see fish swimming … nowadays … it is just dirty, dirty water; murky water. Like rusty color. (TLT04261104)

Another key respondent also discussed this, saying, "The water used to be clear. We could see the fish swimming down in front of Tuluksak. Now it's dirty. We can't see nothing" (TLT04251103).

The effects of a century of mining activity on stream morphology and water quality in the Tuluksak

River have been of critical importance to many Tuluksak residents. Perhaps most significant was a severe disturbance of the Tuluksak River streambed that occurred in 1983 near Nyac, when a placer-mining dredge operated by Northland Gold Dredging Ltd. (NGD) made an unauthorized crossing of the river channel resulting in deposition of mud and sand downstream of the mining site (Adams 2005:1; Naves 2011:26–27; Buzzell and Chambers 2010). At the time, Tuluksak residents claimed that this and other mining activities made travel by boat more challenging in some locations (Buzzell and Chambers 2010). In January 1984, in reaction to the dredge-crossing and in protest of NGD's proposed 6,300-foot-long diversion of the Tuluksak River, Tuluksak residents gave public testimony claiming that placer mining increased stream turbidity, fouled drinking water, destroyed fish spawning habitat, and disrupted travel and subsistence fishing.[2] The Tuluksak Native Community Tribal Council had attempted to halt mining operations on the Tuluksak River in several legal actions since the 1980s[3]; however, those efforts were ultimately unsuccessful and placer mining activities continue.

Seasonal Round

The people of Tuluksak have adapted to seasonal variation in the abundance of subsistence resources by developing, over generations, a flexible schedule of hunting, fishing, and gathering of wild foods. Although Tuluksak residents have modified harvest patterns due to changing environmental, social, and economic conditions through time, the following description of Tuluksak's seasonal round is an overview of the broad-scale historical and contemporary patterns of subsistence in this area. Today, as in the past, Tuluksak's subsistence economy is centered on the harvest of salmon, and is complemented by a diverse harvest of nonsalmon fish species, large and small game, waterfowl, berries, and greens. When discussing the harvest and use of resources respondents described the values associated with, and respect given to, the resources they take. One respondent explained:

> When you catch fish, take care of them, when you catch moose take care of them. It's hard at times but we have to do our best effort to respect what is given to us because all of this stuff is borrowed stuff. It's not ours, we are borrowing it. (TLT04261104)

Fishing dominates subsistence activities during late spring and summer. At this time, many households relocate to family fish camps along the Kuskokwim or Tuluksak rivers for part of the summer, which serve as bases for harvesting, cutting, drying, and smoking salmon. Fish camp has been historically an integral part of many families' activities during this season; fish camp activities require a great deal of work harvesting and processing the catch. Preparations for salmon fishing include cleaning camps,

2. "Villagers oppose mining firm plans," *Anchorage Daily News*, January 30, 1984.
3. P. Dean, "She's fighting for her village: villager battles mining company to keep Tuluksak River clean," *Anchorage Daily News*, December 2, 1984.
R. Mauer, "River permit granted." *Anchorage Daily News*, May 12, 1984.
"Eskimos file lawsuit to halt miner plan to reroute river," *Houston Chronicle*, December 15, 1985.

transporting gear, and repairing nets. One key respondent described the onerous task of clearing debris from the Kuskokwim River in anticipation of the salmon harvest:

> We found some spots on the Kusko that were good drifting spots. We'd have to clear areas before we could start fishing [there]. We'd bring snaggers, big hooks with thick rope, grab the stumps and yank them out of there. We had to do that because there were some [good] spots … [that] collected stumps and logs …. We'd tear up nets if we didn't do that. (TLT04261104)

The combination of these subsistence harvest activities and the preparations that are required for the rapidly approaching salmon fishing season led one respondent to explain:

> Springtime is the busiest time of year. Getting fish nets ready for summer use. We used to have plywood boats; get those boats ready for spring. Everything ready for spring. From spring camp we'd come back in early June and then dump all of our stuff to our fish camp because we will be moving to fish camp right away. (TLT04251103)

The first harvests of anadromous fishes in late spring include dip net fishing for rainbow smelt in late May or early June, immediately followed by drift gillnet and set gillnet fishing for Chinook salmon. By late June, fishers begin harvesting chum and sockeye salmon. Most households continue to focus their efforts on salmon fishing and processing through July and into August, when the harvests of coho and pink salmon occur. A variety of edible greens are also gathered throughout late spring and summer—often opportunistically while at fish camp. Starting in July, Tuluksak residents harvest salmonberries in large quantities through late summer. Residents gather blackberries (crowberries), blueberries, and lowbush cranberries from August through much of September.

Andrews and Peterson (1983:22, 28) described moose hunting as primarily occurring in the fall, but also in November, December, February, and March. Several other subsistence activities occur during the fall, including hunting bear and waterfowl and setting nets for whitefishes. Tuluksak fishers also target coho salmon in August and September using gillnets. One key respondent discussed that some fishers travel upstream on the Tuluksak River to harvest coho salmon with rod and reel, noting that this results in higher quality fish because the flesh is not damaged by gillnets (TLT04221102). As ice forms in October, Tuluksak residents fish extensively for northern pike, burbot, and other nonsalmon fish species, and these activities continue throughout the winter and into spring. One Tuluksak resident discussed fall fishing for northern pike:

> In fall time we used to go up to Bogus Creek. We'd ice fish for pike up there. Hundreds, hundreds, hundreds of pike for dogs. We used to use 2 [hooks]; one in [each] hand. (TLT04251103)

He continued by describing harvests of whitefishes which also took place during the fall:

> Before freeze-up, at fall camp down on Mishevik Slough, downriver from Tuluksak; that's

where all the whitefish are. That's where we'd have our mud houses[4], too. [We'd use] big fish traps. We'd empty it morning and evening. Lot of whitefish, big whitefish, not those small ones. (TLT04251103)

Trapping for furbearers and small game hunting occurs throughout the winter months, as well as harvests of large game such as moose and caribou. Historically, Tuluksak hunters harvested moose during winter in the upper Johnson River (Schneider et al. 2004). Survey respondents discussed moose hunting activities in the same area in 2010 (Figure 9-10). Since the late 1980s, caribou have regularly migrated near Tuluksak during winter. Respondents described that although caribou were quite rare before that time, they have now become an important part of most residents' diets.

In March, April, and May, prior to ice breakup in the Kuskokwim River, nonsalmon fishes, particularly northern pike and burbot, are harvested in large quantities by jigging under the ice. Migratory waterfowl hunting begins with the birds' arrival during the same season. One key respondent described his experiences during a typical hunting trip:

In spring between here and the Yukon [River], we used to get the flat bottom [sleds], three feet wide. Two teams, then I start going [bird] hunting down to the Kuskokwim. We came early morning before sunrise when the snow was hard, with dog team. We got into the Kuskokwim somewhere around noon time. We start right after we have a snack. Start shooting ducks, geese, swans. A lot of swans, mostly swans …. We fill up our sled with mostly swans. (TLT04251103)

Historically, most residents in the region surrounding Tuluksak moved to temporary spring camps in order to harvest nonsalmon fish, muskrats, beavers, and waterfowl. Spring trapping and hunting provided some people in the area the opportunity to make money in preparation for the summer fishing season. At spring camp, one respondent remembered when he and his brother hunted muskrats to make "just enough money for the summer to get what we need, for fuel" (TLT04221102). Although few, if any, Tuluksak residents currently occupy such camps for extended periods of time, many of these same harvesting activities continue into the present day. Many of these camps were located in the Tuluksak River drainage (Buzzell and Chambers 2010). Traditional use of the Tuluksak River and surrounding territory by area residents included hunting large game, furbearer trapping, harvesting fish, and harvesting berries and plants (see Andrews and Peterson 1983). One key respondent discussed the historical use of the Tuluksak River by his family and other residents of the community in reference to their movements into spring camps.

The things that people [did], during spring time, when we were growing up we used to go up [Tuluksak River], middle part, first week of April. We stayed there getting anything that we need for the summer. Even muskrats. They call it spring camp. Then we come down right

4. The term "mud houses" likely refers to the dwellings that Yup'ik people of the Yukon–Kuskokwim Delta region historically constructed of logs and sod (Fienup-Riordan 2007:289–291).

> before smelts start coming. Maybe after breakup …. Then in fall time we go to Tuluksak River and on the Fog River side there is a creek going somewhere. It's where we fish for pike, trout, and grayling. (TLT04221102)

The Tuluksak River drainage also provided access to territory where moose, black bears, and caribou were more prevalent than in areas close to the mainstem Kuskokwim River. In early spring, Tuluksak residents traveled up the Tuluksak River, and other streams and rivers, as far as the foothills of the Kilbuck Mountains to access these resources (Fienup-Riordan 2007:159; Buzzell and Chambers 2010). Hunting parties traveled upriver in springtime by dog team in order to harvest caribou, moose, brown bears, black bears, and Arctic ground squirrels. During these excursions, hunters and their families constructed boats by fashioning the frames out of locally available willow and cottonwood and the hulls from the hides of harvested animals. They used the boats to travel downstream following ice breakup. Hunting parties typically constructed skin boats with a shallow draft and a wide beam. Although skin boats were difficult to maneuver, their design gave them a large weight capacity that aided in the downriver transport of hunters, dogs, supplies, and harvested meat. After returning to their summer camps or villages, hunters disassembled the boats and made clothing and other useful items from the hides (Brown 1985:143; Fienup-Riordan 2007:159–164).

Demographics

The 68 surveyed households in Tuluksak included 360 people. Expanded for the 18 unsurveyed households, this study estimates the Tuluksak population was 455 individuals in 2010. As noted earlier, the 2010 U.S. Census enumerated 373 individuals in Tuluksak (Figure 9-2). According to the survey data, the household size in 2010 ranged from 1 to 14 people per household, with an average of 5.3 people per household. The average age in Tuluksak was 25 years, with 56% of the population under 25 years of age (median = 20–24 years of age). The average length of residency was 13.6 years. In Tuluksak, 99% of the estimated population was Alaska Native. The gender ratio in Tuluksak was 49% male and 51% female (Figure 9-3).

Wild Food Harvests and Use

The primary purpose of the household survey was to collect information about the harvests and uses of edible wild resources. Respondents were asked whether their household used or attempted to harvest each resource during the study year. If they attempted to harvest a resource, they were asked how much they harvested, and for additional details of their effort, such as gear type, sex of the animal, or month of harvest.

Tables and figures in this section summarize responses to the harvest and use questions. Ninety-

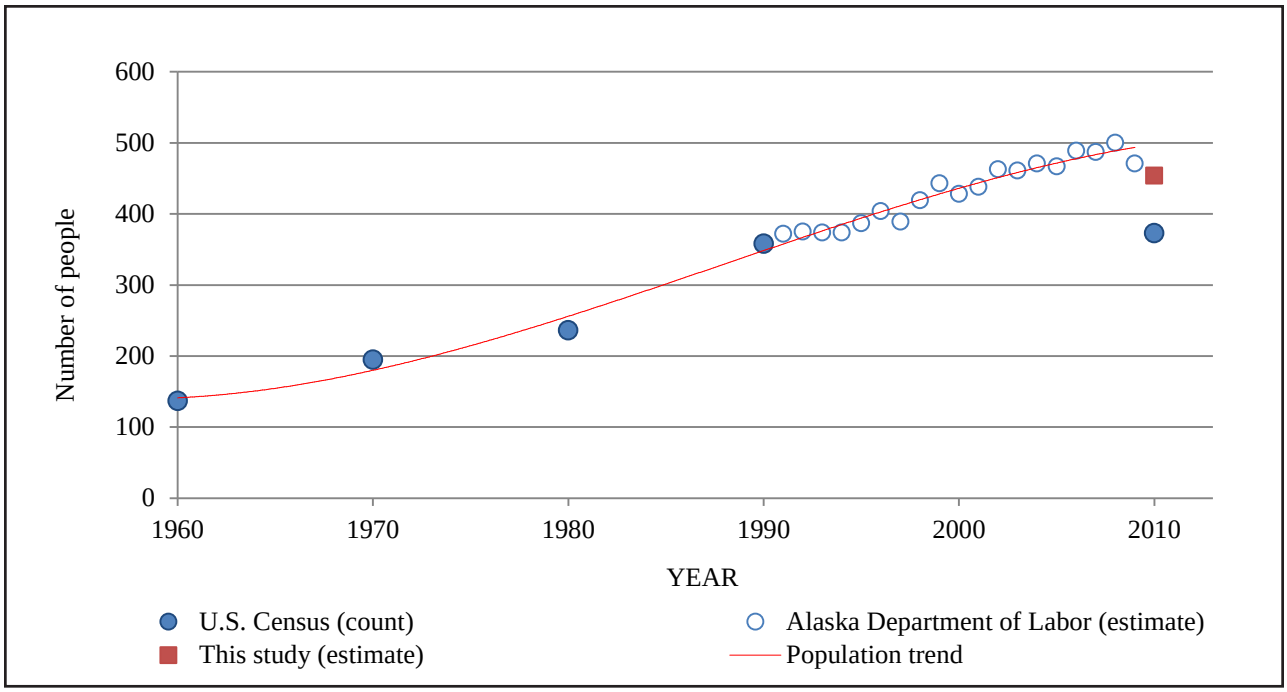

Figure 9-2.–Population history, Tuluksak, 1960–2010.

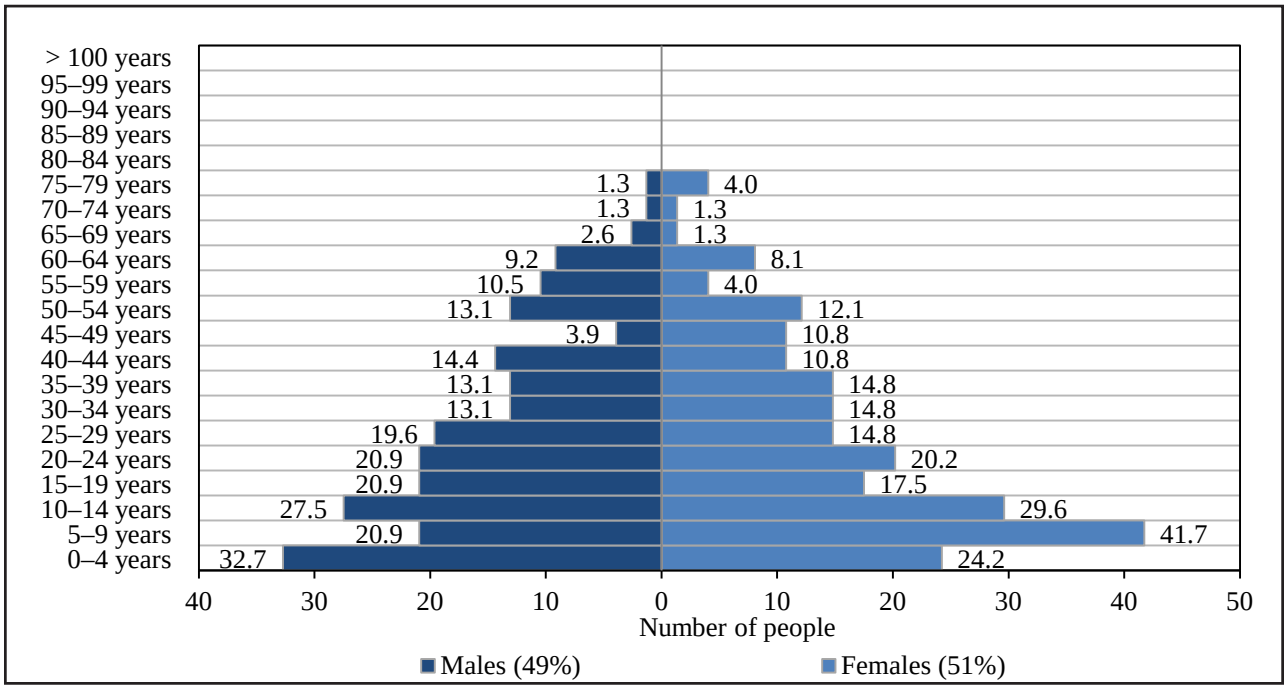

Figure 9-3.–Population profile, Tuluksak, 2010.

nine percent of households used at least one wild food resource, and 97% reported that a member harvested some type of wild food in 2010. Vegetation, including berries and other wild plants, was the most widely used resource category (by 99% of households), closely followed by salmon (96%), birds and eggs (96%), and land mammals (93%) (Figure 9-4). Although Tuluksak residents' harvest areas generally do not extend into the marine environment, nearly one-half (47%) of households used marine mammals and 7% used marine invertebrates during the study year, providing one indication of Tuluksak residents' ties, through sharing and trade, to coastal communities in the region.

Chinook salmon, sockeye salmon, and salmonberries were the most widely used resources by individual species in 2010 in Tuluksak. The percentage of households recorded as using a particular resource included both households that actively harvested the resource as well as households that received the resource from other households during the study year. Chinook salmon was used by 94% of households and harvested by 76% of households. Sockeye salmon was used by 84% and harvested by 71% of households. Salmonberries were used by 82% and harvested by 78% of households. Additional wild food resources used by most (>50%) households in Tuluksak during the study year included chum salmon (76%), tundra swans (74%), blueberries (74%), black scoters (74%), moose (71%), humpback whitefish (71%), smelt (71%), and 11 other resources. These high levels of use of a wide variety of wild food resources reflect the diversity of diet previously documented in Tuluksak and other Western Alaska communities (Andrews and Peterson 1983:22; Wolfe and Ellanna 1983:261–262).

In addition to documenting percentages of Tuluksak households using and harvesting wild food resources, surveyors asked respondents to describe the quantity (typically recorded as individual animals or gallons of vegetation) of each resource their household harvested in 2010. These quantities were then converted to estimated edible weights for each species and resource category, and compiled to give estimates of the total edible weight of wild foods harvested in Tuluksak. Figure 9-5 summarizes estimated edible weights of wild food harvests for 7 resource categories: salmon, nonsalmon fish, land mammals, vegetation, birds and eggs, marine mammals, and marine invertebrates.

Tuluksak residents harvested an estimated 78,777 lb of salmon in 2010, composing 48% of all wild food resources by edible weight. All 5 species of Pacific salmon found in Alaska waters were harvested, although Chinook, chum, and sockeye salmon made up the bulk of the salmon harvest. During ethnographic interviews, respondents described the contemporary and historical significance of Chinook salmon in the diets of Tuluksak residents and the necessity of having enough salmon for the winter. Residents in the area typically used a variety of methods to preserve fish for extended periods of time. One respondent explained, "We did everything with our king salmon back then. We hung them and made slabs, we salted them, we pressure jar them. I had a pressure jar cooker from when I moved up from Bethel. It was a 21-quart. We could jar 7 big jars at a time. …. We made stink heads. We did everything with our fish back then to preserve it for the winter" (TLT04261104). The respondent also described the process of fermenting fish. "We do it a very special way, we do it no

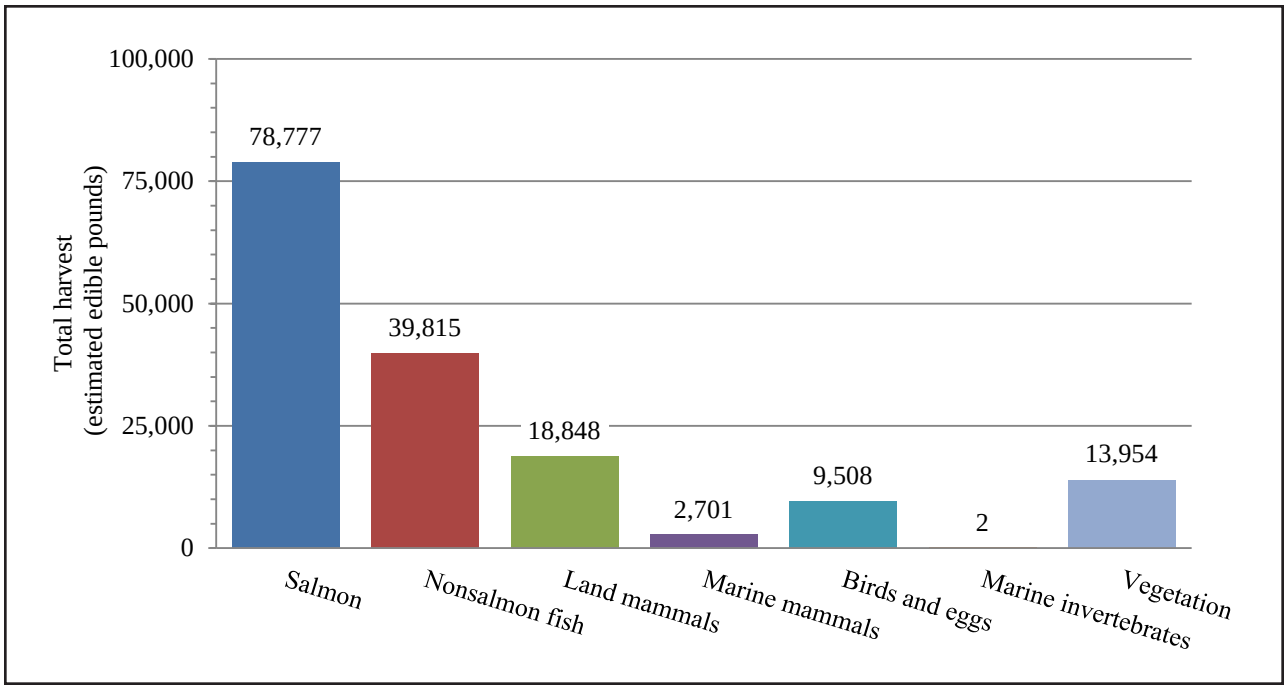

Figure 9-4.–Total estimated edible pounds harvested by the community by resource category, Tuluksak, 2010.

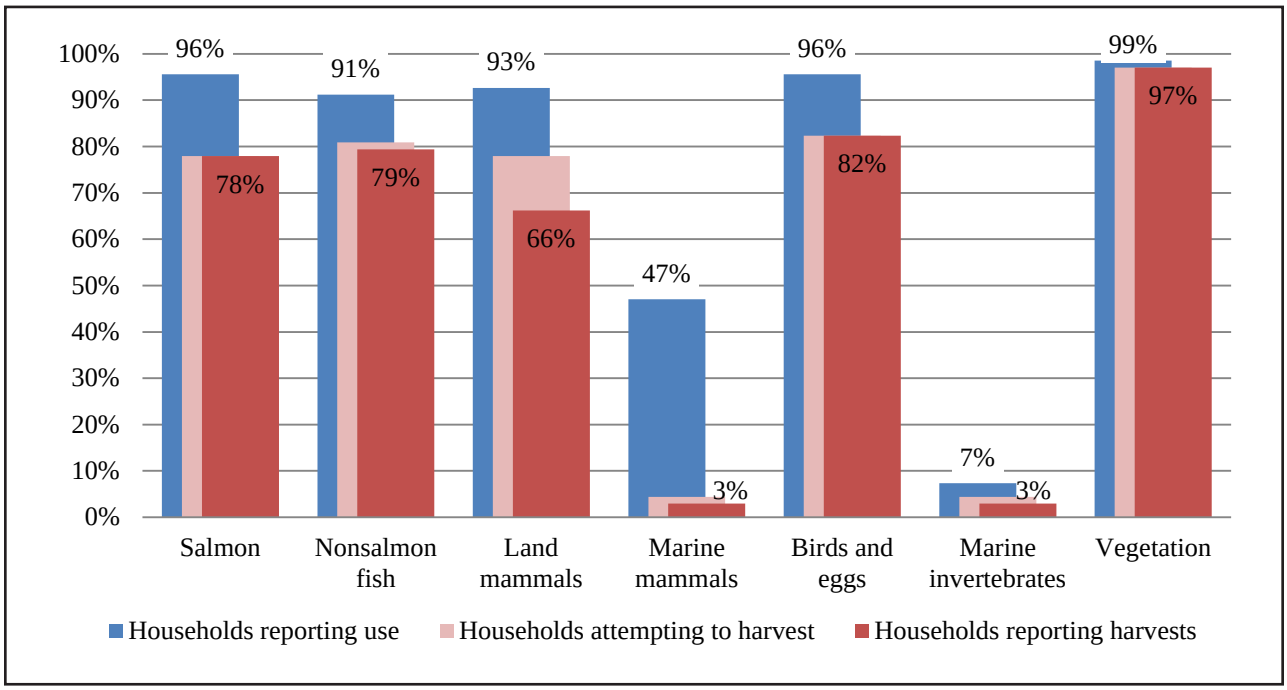

Figure 9-5.–Percentages of households using, attempting to harvest, or harvesting subsistence resources by category, Tuluksak, 2010.

other way. We were taught this from our parents. We dig a hole about 3.5 to 4 feet about 32 inches in diameter. We don't waste … time. We put fresh fish in. Put some grass in the bottom, then my wife would prepare the guts" (TLT04261104). After about 2 weeks the fermented fish was ready to eat. Freezing fish is more common today than it was in the mid-20th century but Tuluksak residents continue to use the variety of other preservation methods discussed above.

The majority of salmon were harvested with subsistence drift gillnets, although subsistence set gillnets were also used (Figure 9-6). A small portion of coho salmon, and a few individual Chinook and chum salmon, were also harvested with rod and reel. Tuluksak key respondents recalled their experience with drifting and the changes made to their gear type over time. One respondent remembers drifting with his brother at the age of 10 (1950). At that time there were so many boats drifting on the Tuluksak River that they became "night drifters" to avoid the crowds and maximize harvest. They used a 45-foot long cotton net handmade by his sister and mother (TLT04251103). Cotton nets were common at the time but eventually were replaced by stronger nylon nets, which is the same kind used today.

Another respondent described fishing as a child with his parents, and how at that time, "they mostly used oaring or sailing" to drift for salmon (TLT04221102). As an alternative to using an expensive gasoline-powered engine, his father would either row or rig a sail to the hull of the boat and trail a

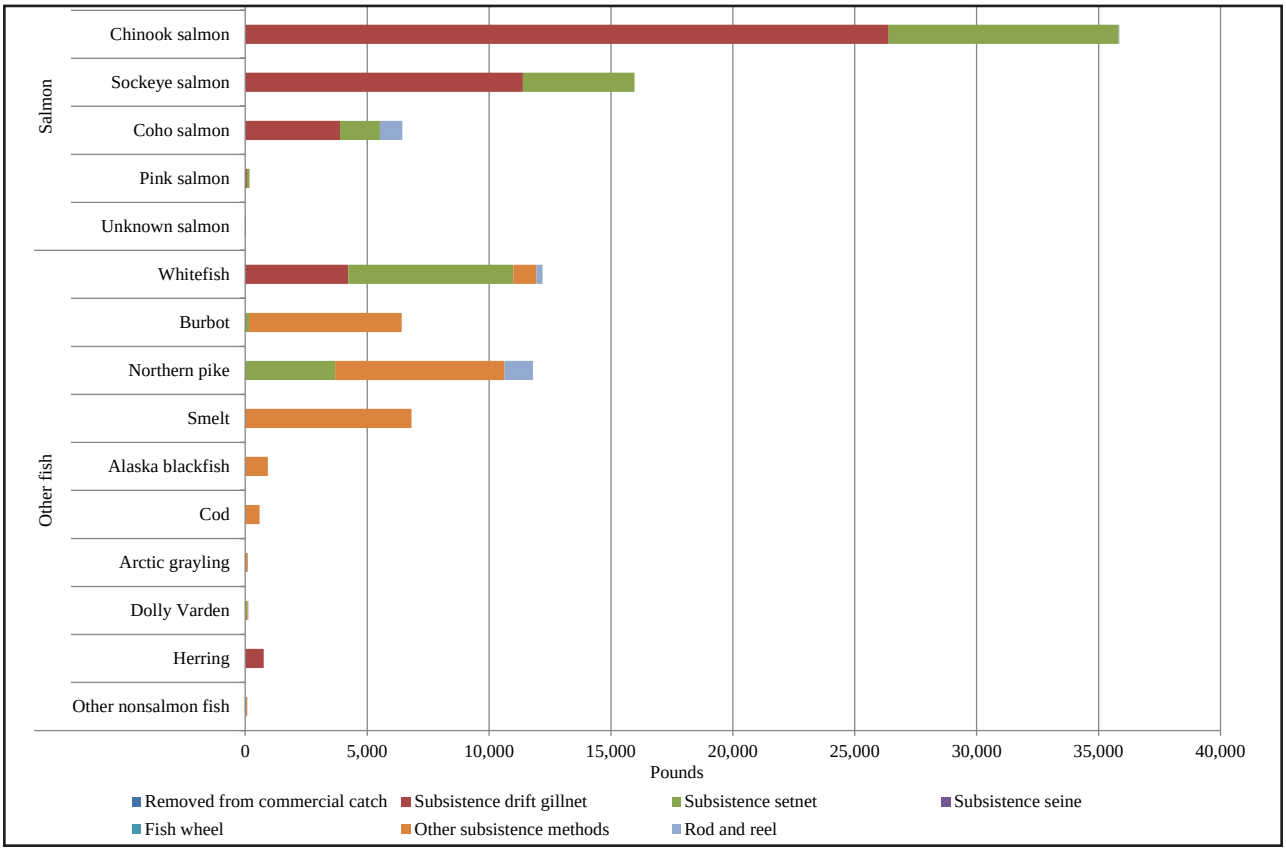

Figure 9-6.–Fish harvests by gear type, Tuluksak, 2010.

Table 9-1. – Estimated uses and harvests of fish, Tuluksak, 2010.

	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		
Fish										
Salmon										
Chum salmon	76%	66%	65%	24%	29%	20,321.5 lb	236.3 lb	44.6 lb	3,997.3 ind.	± 16%
Coho salmon	63%	53%	53%	15%	22%	6,441.2 lb	74.9 lb	14.1 lb	1,218.2 ind.	± 17%
Chinook salmon	94%	76%	76%	32%	38%	35,852.9 lb	416.9 lb	78.7 lb	3,798.3 ind.	± 16%
Pink salmon	4%	4%	4%	1%	1%	171.6 lb	2.0 lb	0.4 lb	73.4 ind.	± 67%
Sockeye salmon	84%	71%	71%	19%	34%	15,965.8 lb	185.6 lb	35.1 lb	3,168.2 ind.	± 16%
Unknown salmon	1%	1%	1%	0%	0%	24.4 lb	0.3 lb	0.1 lb	3.8 ind.	± 91%
Subtotal	**96%**	**78%**	**78%**	**44%**	**44%**	**78,777 lb**	**916.0 lb**	**173.0 lb**	**12,259 ind.**	**± 13%**
Char										
Dolly Varden	21%	19%	19%	3%	6%	121.8 lb	1.4 lb	0.3 lb	135.3 ind.	± 49%
Lake trout	3%	3%	3%	0%	1%	8.9 lb	0.1 lb	0.0 lb	6.3 ind.	± 65%
Subtotal	**21%**	**19%**	**19%**	**3%**	**6%**	**130.6 lb**	**1.5 lb**	**0.3 lb**	**142 ind.**	**± 48%**
Trout										
Rainbow trout	15%	10%	10%	4%	1%	74.4 lb	0.9 lb	0.2 lb	53.1 ind.	± 42%
Subtotal	**15%**	**10%**	**10%**	**4%**	**1%**	**74.4 lb**	**0.9 lb**	**0.2 lb**	**53 ind.**	**± 42%**
Whitefishes										
Sheefish	40%	31%	31%	10%	12%	1,623.9 lb	18.9 lb	3.6 lb	270.6 ind.	± 23%
Broad whitefish	47%	40%	35%	15%	15%	1,032.8 lb	12.0 lb	2.3 lb	737.7 ind.	± 29%
Bering cisco	10%	10%	9%	1%	6%	179.8 lb	2.1 lb	0.4 lb	128.4 ind.	± 50%
Least cisco	32%	32%	31%	3%	15%	1,105.0 lb	12.8 lb	2.4 lb	1,105.0 ind.	± 31%
Humpback whitefish	71%	57%	56%	25%	25%	8,060.5 lb	93.7 lb	17.7 lb	2,686.8 ind.	± 36%
Round whitefish	13%	13%	12%	3%	6%	189.7 lb	2.2 lb	0.4 lb	379.4 ind.	± 62%
Unknown whitefish	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**82%**	**68%**	**66%**	**35%**	**31%**	**12,191.6 lb**	**141.8 lb**	**26.8 lb**	**5,308 ind.**	**± 29%**
Anadromous/marine fishes										
Herring	6%	1%	1%	4%	1%	758.8 lb	8.8 lb	1.7 lb	126.5 gal.	± 91%
Smelt	71%	56%	54%	22%	25%	6,822.5 lb	79.3 lb	15.0 lb	1,137.1 gal.	± 27%
Cod	13%	3%	3%	10%	4%	586.8 lb	6.8 lb	1.3 lb	183.4 ind.	± 69%
Saffron cod	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Pacific halibut	7%	0%	0%	7%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 lb	± 0%
Arctic lamprey	3%	1%	0%	3%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Stickleback (needlefish)	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Subtotal	**74%**	**56%**	**54%**	**37%**	**26%**	**8,168.1 lb**	**95.0 lb**	**17.9 lb**		**± 26%**
Other freshwater fishes										
Alaska blackfish	40%	25%	24%	22%	21%	925.5 lb	10.8 lb	2.0 lb	925.5 lb	± 40%
Burbot	46%	29%	26%	22%	21%	6,419.6 lb	74.6 lb	14.1 lb	2,674.9 ind.	± 42%
Arctic grayling	18%	15%	15%	4%	4%	108.0 lb	1.3 lb	0.2 lb	154.3 ind.	± 45%
Northern pike	66%	62%	60%	16%	24%	11,797.1 lb	137.2 lb	25.9 lb	2,621.6 ind.	± 21%
Longnose sucker	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**72%**	**66%**	**65%**	**32%**	**35%**	**19,250.2 lb**	**223.8 lb**	**42.3 lb**		**± 25%**
All fish	**96%**	**87%**	**85%**	**66%**	**57%**	**118,592.4 lb**	**1,379.0 lb**	**260.5 lb**		**± 15%**
All resources[b]	**99%**	**97%**	**97%**	**91%**	**81%**	**163,606.3 lb**	**1,902.4 lb**	**359.3 lb**		**± 14%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

cotton drift gillnet made by his wife. In comparison to setting a gillnet, drifting in this way was much more labor intensive but increased the effectiveness of the family's fishing efforts.

Sixteen species of nonsalmon fish contributed 39,815 lb to Tuluksak residents' total wild food harvest in 2010, forming 24% of all resources by edible weight (Table 9-1). Northern pike, humpback whitefish, burbot, and smelt formed 83% of the total nonsalmon fish harvested by edible weight and each contributed between 14 and 26 edible pounds per capita. One respondent described whitefishes as a "main staple of our diets here" (TLT04221102).

Sheefish, broad whitefish, least cisco, Pacific herring, cod, and Alaska blackfish were harvested in quantities yielding between 1 and 4 edible pounds per capita. Dolly Varden, lake trout, rainbow trout, Bering cisco, round whitefish, and Arctic grayling formed a relatively minor portion of Tuluksak residents' nonsalmon fish harvest, with each species contributing less than 1 edible pound per capita. These data reflect the diversity of nonsalmon fish species harvested. Tuluksak fishers described using several different types of gear in 2010 (Figure 9-6). Drift gillnets, used primarily for salmon, also incidentally caught whitefishes and sheefish during 2010. Set gillnets were used to harvest salmon, northern pike, whitefishes, and sheefish. Other gear, most likely jigs with a line beneath the ice, was used to harvest the majority of northern pike and burbot. During months of open water, rod and reel gear was also used to harvest northern pike, coho salmon, and whitefishes. Finally, residents of Tuluksak used fish traps to harvest blackfish and dip nets to harvest smelt.

Typically, nonsalmon fish harvests have composed an important part of Tuluksak's subsistence harvests. Key respondents reported the historical use of fish traps, with one respondent describing harvests of as many as 200 burbot in one night with the use of large fish traps in the mainstem Kuskokwim River (TLT04251103). Prior to the introduction of snowmachines, Tuluksak residents relied on dog teams for transportation. Nonsalmon fishes played an integral role in sustaining these teams. One respondent recounted harvesting and preserving large amounts of northern pike to feed to dog teams (TLT04241103).

Land mammals constituted the second largest portion of Tuluksak residents' wild food harvest by resource category, contributing an estimated 18,848 lb or 12% of the total harvest by weight. Large land mammals composed an estimated 10% (15,664 lb), and small land mammals composed 2% (3,184 lb) of Tuluksak residents' total wild food harvest during 2010 (Table 9-2). Although few households harvested large land mammals relative to the high percentages of those harvesting fish, the large percentage of households that used mammal species such as caribou and moose indicate high levels of sharing and distribution of these resources throughout the community.

Moose was the most widely used (71% of households) land mammal resource, and also formed the largest percentage of the land mammal harvest by edible weight (10,927 total edible pounds, 24 lb per capita). Tuluksak residents harvested an estimated 20 moose in 2010. Sixty-five percent of households attempted to harvest moose; 24% of households successfully harvested moose. Tuluksak

Table 9-2. – Estimated uses and harvests of land and marine mammals,Tuluksak, 2010.

	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										
Black bear	15%	10%	7%	9%	7%	758.8 lb	8.8 lb	1.7 lb	7.6 ind.	± 42%
Brown bear	6%	3%	1%	4%	1%	178.3 lb	2.1 lb	0.4 lb	1.3 ind.	± 91%
Caribou	68%	35%	22%	51%	24%	3,800.1 lb	44.2 lb	8.3 lb	29.2 ind.	± 26%
Moose	71%	65%	24%	54%	19%	10,927.1 lb	127.1 lb	24.0 lb	20.2 ind.	± 20%
Subtotal	**91%**	**66%**	**40%**	**75%**	**38%**	**15,664 lb**	**182.1 lb**	**34.4 lb**	**58.3 ind.**	**± 18%**
Small land mammals										
Beaver	50%	37%	35%	18%	18%	1,790.6 lb	20.8 lb	3.9 lb	119.4 ind.	± 24%
Red fox	4%	4%	4%	0%	1%	0.0 lb	0.0 lb	0.0 lb	12.6 ind.	± 0%
Arctic hare	1%	1%	1%	0%	0%	50.6	0.6	0.1	20.2 ind.	± 91%
Snowshoe hare	47%	44%	44%	10%	21%	1,098.9 lb	13 lb	2.4 lb	439.6 ind.	± 20%
River (land) otter	7%	7%	7%	0%	1%	56.9 lb	0.7 lb	0.13 lb	19.0 ind.	± 57%
Lynx	4%	6%	4%	0%	0%	50.6 lb	0.6 lb	0.11 lb	12.6 ind.	± 74%
Marmot	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.00 lb	0.0 ind.	± 0%
Marten	3%	3%	3%	0%	1%	*Not usually eaten*			5.1 ind.	± 64%
Mink	1%	1%	1%	0%	0%	7.6 lb	0.1 lb	0.0 lb	3.8 ind.	± 91%
Muskrat	6%	4%	4%	1%	0%	5.7 lb	0.1 lb	0.0 lb	7.6 ind.	± 56%
Porcupine	25%	22%	22%	6%	10%	97.6 lb	1.1 lb	0.2 lb	24.4 ind.	± 24%
Arctic ground (parka) squirrel	1%	1%	1%	0%	1%	25.3 lb	0.3 lb	0.1 lb	50.6 ind.	± 91%
Red (tree) squirrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Weasel	1%	1%	1%	0%	1%	*Not usually eaten*			1.3 ind.	± 91%
Gray wolf	1%	1%	1%	1%	1%	*Not usually eaten*			2.5 ind.	± 91%
Wolverine	0%	0%	0%	0%	0%	*Not usually eaten*			0.0 ind.	± 0%
Subtotal	**66%**	**60%**	**59%**	**22%**	**32%**	**3,184 lb**	**37.0 lb**	**7.0 lb**	**718.6 ind.**	**± 18%**
Marine mammals										
Bearded seal	1%	1%	1%	0%	0%	531.2 lb	6.2 lb	1.2 lb	1.3 ind.	± 91%
Ringed seal	1%	1%	1%	0%	0%	70.8 lb	0.8 lb	0.2 lb	1.3 ind.	± 91%
Spotted seal	7%	3%	3%	4%	4%	424.9 lb	4.9 lb	0.9 lb	7.6 ind.	± 77%
Unknown seal	41%	3%	1%	41%	4%	283.3 lb	3.3 lb	0.6 lb	5.1 ind.	± 91%
Walrus	4%	1%	1%	3%	1%	1,391.2 lb	16.2 lb	3.1 lb	1.3 ind.	± 91%
Beluga	3%	0%	0%	3%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Bowhead	1%	0%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**47%**	**4%**	**3%**	**47%**	**7%**	**2,701 lb**	**31.4 lb**	**5.9 lb**	**16.4 ind.**	**± 80%**
All land mammals	**93%**	**78%**	**66%**	**76%**	**51%**	**18,848.0 lb**	**219.2 lb**	**41.4 lb**	**777.0 ind.**	**± 15%**
All marine mammals	**47%**	**4%**	**3%**	**47%**	**7%**	**2,701.4 lb**	**31.4 lb**	**5.9 lb**	**16.4 ind.**	**± 80%**
All resources[b]	**99%**	**97%**	**97%**	**91%**	**81%**	**163,606.3 lb**	**1,902.4 lb**	**359.3 lb**		**± 14%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

hunters harvested an estimated 29 caribou in 2010, for an estimated community harvest of 3,800 edible pounds or 8 lb per capita. Twenty-two percent of Tuluksak households harvested and 68% of households used caribou. In the 1980s Respondents remembered an increase in the availability of caribou for the community. Prior to this time, caribou were scarce and moose was the primary large land animal harvested in the area. One respondent expressed gratitude for this change, "Yeah, the caribou, I'm glad the caribou are around. I am used to them. I forget how to eat moose meat. I never eat it for so long. I am more used to eating caribou because they are close by." (TLT04221102).

Tuluksak residents harvested an estimated 8 individual black bears (759 total edible pounds, 2 lb per capita) and 1 brown bear. Black bear and brown bear were harvested by 7% and 1% of households, respectively, and used by 15% and 6% of households, respectively.

Beaver and snowshoe hare were Tuluksak households' most used small mammal species in 2010, and each contributed around 1% of the total subsistence harvest by edible weight (Table 9-2). An estimated 50% of households used beaver and 47% used snowshoe hare. Residents harvested an estimated 119 beavers (totaling 1,791 lb in edible weight) and 440 snowshoe hares (1,099 lb in edible weight).

Several key respondents discussed the increased abundance of beaver in the area surrounding Tuluksak. One respondent, while describing his historical Arctic grayling, pike, and Alaska blackfish harvest locations, noted, "Right now when I go up there, there are nothing but beaver dams. Even from the mouth. It's sad to see them like that because I grew up getting animals out of those places" (TLT04221102). Another respondent estimated that on Mishevik Slough he had observed beaver lodges approximately every one-half mile, and a similar density of distribution in the Tuluksak River and in surrounding ponds (TLT04221105). One respondent felt that beavers were "destroying" rivers by cutting down trees, blocking the current, and making the landscape unrecognizable (TLT04261104). Respondents explained that a decline in trapping was a cause for the increased beaver population. Additionally, one respondent said that because of the low market value of beaver pelts, harvesting beaver was not economically feasible for trappers in Tuluksak (TLT04271105). Other small mammal species harvested in 2010 included 51 Arctic ground squirrels, 24 porcupines, 20 Arctic hares, 19 river otters, 13 red foxes, 13 lynx, and small numbers of martens, minks, muskrats, weasels, and wolves.

Marine mammal harvests contributed 2% to the total harvest at an estimated 2,701 lb and included 8 spotted seals, 5 unknown seals, 1 bearded seal, 1 ringed seal, and 1 walrus (Table 9-2). All harvests of marine mammals by Tuluksak residents in 2010 took place relatively far away from Tuluksak because the community is generally too far from the coast for the regular occurrence of marine mammals. Tuluksak residents based their hunting out of other communities closer to, or on, the Kuskokwim Bay coast and surrounding areas.

Birds and eggs combined contributed 9,508 lb or 6% of the total harvest; however, the widespread harvest (reported by 82% of households) and use (96%) of birds and eggs suggest that their percentage of the total wild food harvest likely underrepresents their value to the community (Table 9-3). Twenty-

Table 9-3. – Estimated uses and harvests of birds,Tuluksak, 2010.

	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	1%	1%	1%	0%	0%	3.0 lb	0.0 lb	0.0 lb	7.6 ind.	± 91%
Canvasback	4%	4%	4%	0%	1%	13.9 lb	0.2 lb	0.0 lb	12.6 ind.	± 61%
Common eider	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown eider	1%	1%	1%	0%	1%	8.4 lb	0.1 lb	0.0 lb	3.8 ind.	± 91%
Goldeneye	24%	22%	22%	3%	4%	166.4 lb	1.9 lb	0.4 lb	207.9 ind.	± 33%
Harlequin	1%	1%	1%	0%	1%	12.6 lb	0.1 lb	0.0 lb	25.3 ind.	± 91%
Mallard	66%	59%	59%	15%	24%	449.7 lb	5.2 lb	1.0 lb	449.7 ind.	± 19%
Common merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Red-breasted merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Unknown merganser	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Long-tailed duck (oldsquaw)	15%	13%	13%	3%	4%	135.6 lb	1.6 lb	0.3 lb	169.5 ind.	± 50%
Northern pintail	38%	34%	34%	7%	13%	255.4 lb	3.0 lb	0.6 lb	319.2 ind.	± 25%
Scaup	38%	35%	35%	6%	13%	411.3 lb	4.8 lb	0.9 lb	457.0 ind.	± 24%
Black scoter	74%	65%	62%	19%	25%	828.8 lb	9.6 lb	1.8 lb	920.9 ind.	± 17%
Surf scoter	1%	1%	1%	0%	1%	8.0 lb	0.1 lb	0.0 lb	8.9 ind.	± 91%
White-winged scoter	18%	21%	15%	4%	6%	310.7 lb	3.6 lb	0.7 lb	345.3 ind.	± 34%
Northern shoveler	6%	6%	6%	1%	3%	19.0 lb	0.2 lb	0.0 lb	31.6 ind.	± 48%
Green-winged teal	13%	13%	13%	1%	4%	28.9 lb	0.3 lb	0.1 lb	96.4 ind.	± 44%
Wigeon	32%	26%	26%	10%	13%	145.8 lb	1.7 lb	0.3 lb	208.3 ind.	± 42%
Unknown ducks	9%	6%	6%	3%	3%	53.0 lb	0.6 lb	0.1 lb	62.0 ind.	± 50%
Subtotal	**85%**	**75%**	**75%**	**28%**	**31%**	**2,850 lb**	**33.1 lb**	**6.3 lb**	**3,326 ind.**	**± 19%**
Geese										
Brant	6%	4%	4%	3%	3%	83.5 lb	1.0 lb	0.2 lb	69.6 ind.	± 69%
Cackling goose	59%	53%	50%	18%	15%	590.6 lb	6.9 lb	1.3 lb	492.2 ind.	± 20%
Lesser Canada goose	35%	38%	31%	10%	7%	406.6 lb	4.7 lb	0.9 lb	338.9 ind.	± 31%
Unknown Canada goose	15%	13%	13%	3%	1%	107.8 lb	1.3 lb	0.2 lb	89.9 ind.	± 39%
Emperor goose	3%	1%	1%	1%	1%	15.8 lb	0.2 lb	0.0 lb	6.3 ind.	± 91%
Snow goose	13%	10%	9%	6%	3%	320.0 lb	3.7 lb	0.7 lb	139.1 ind.	± 62%
White-fronted goose	57%	54%	53%	13%	18%	1,263.0 lb	14.7 lb	2.8 lb	526.3 ind.	± 16%
Unknown geese	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**88%**	**76%**	**75%**	**31%**	**22%**	**2,787 lb**	**32.4 lb**	**6.1 lb**	**1,662 ind.**	**± 21%**
Other migratory birds										
Tundra swan (whistling)	74%	60%	60%	26%	24%	2,339.7 lb	27.2 lb	5.1 lb	234.0 ind.	± 18%
Sandhill crane	19%	13%	12%	7%	6%	223.1 lb	2.6 lb	0.5 lb	26.6 ind.	± 39%
Whimbrel	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Subtotal	**75%**	**62%**	**62%**	**28%**	**25%**	**2,563 lb**	**29.8 lb**	**5.6 lb**	**261 ind.**	**± 19%**
Other birds										
Spruce grouse	22%	22%	21%	4%	6%	83.2 lb	1.0 lb	0.2 lb	118.9 ind.	± 26%
Ruffed grouse	9%	10%	7%	3%	4%	31.9 lb	0.4 lb	0.1 lb	45.5 ind.	± 48%
Unknown grouse	1%	1%	1%	0%	1%	4.4 lb	0.1 lb	0.0 lb	6.3 ind.	± 91%
Ptarmigan	57%	47%	47%	19%	16%	912.9 lb	10.6 lb	2.0 lb	912.9 ind.	± 18%
Subtotal	**66%**	**56%**	**56%**	**22%**	**24%**	**1,032 lb**	**12.0 lb**	**2.3 lb**	**1,084 ind.**	**± 16%**
All migratory birds	**91%**	**79%**	**79%**	**41%**	**37%**	**8,200.6 lb**	**95.4 lb**	**18.0 lb**	**5,248.6 ind.**	**± 17%**
All other birds	**66%**	**56%**	**56%**	**22%**	**24%**	**1,032.4 lb**	**12.0 lb**	**2.3 lb**	**1,083.7 ind.**	**± 16%**
All resources[b]	**99%**	**97%**	**97%**	**91%**	**81%**	**163,606.3 lb**	**1,902.4 lb**	**359.3 lb**		**± 14%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

Table 9-4. – Estimated uses and harvests of eggs, Tuluksak, 2010.

	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	10%	12%	9%	3%	3%	42.9 lb	0.5 lb	0.1 lb	285.8 ind.	± 49%
Geese eggs	13%	13%	10%	4%	3%	61.5 lb	0.7 lb	0.1 lb	204.9 ind.	± 51%
Swan eggs	12%	9%	9%	4%	4%	57.9 lb	0.7 lb	0.1 lb	91.9 ind.	± 50%
Shorebird eggs	1%	0%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Gull eggs	15%	12%	10%	6%	4%	110.4 lb	1.3 lb	0.2 lb	334.5 ind.	± 46%
Ptarmigan eggs	1%	1%	1%	0%	1%	1.9 lb	0.0 lb	0.0 lb	19.0 ind.	± 91%
Unknown eggs	4%	1%	1%	3%	0%	0.8 lb	0.0 lb	0.0 lb	3.8 ind.	± 91%
Subtotal	**22%**	**16%**	**15%**	**12%**	**6%**	**275.3 lb**	**3.2 lb**	**0.6 lb**	**939.8 ind.**	**± 44%**
All birds and eggs	**96%**	**82%**	**82%**	**51%**	**44%**	**9,508.4 lb**	**110.6 lb**	**20.9 lb**	**7,272.1 ind.**	**± 17%**
All resources[b]	**99%**	**97%**	**97%**	**91%**	**81%**	**163,606.3 lb**	**1,902.4 lb**	**359.3 lb**		**± 14%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

five species of migratory birds including ducks, geese, swans, and cranes formed the majority (89%) of harvested birds by edible weight. Black scoter, referred to locally as blackbird or black duck, was the most harvested migratory bird species in terms of individual birds (921), followed by white-fronted geese (526), cackling Canada geese (492), scaups (457), mallards (450), lesser Canada geese (339), and northern pintails (319). Although the harvest of tundra swans (234) involved fewer individual birds relative to geese and ducks, these species provided a relatively large portion (25%) of the total edible weight due to their much larger size per individual. Residents of Tuluksak also harvested 1,032 edible pounds of other birds including 913 ptarmigan, 119 spruce grouse, and 46 ruffed grouse. The 2010 harvest of wild bird eggs by Tuluksak residents is estimated at 940 eggs, totaling 275 lb (Table 9-4).

Vegetation harvests totaled 13,954 lb or 9% of the total harvest by weight. The survey asked about the harvests and uses of different species of vegetation including berries and edible or medicinal greens by Tuluksak residents (Table 9-5). Nearly all households (99%) used and 97% harvested at least one vegetation resource. Salmonberry was the most commonly harvested (78% of households) and used (82%) resource in this category, and was the plant species with the highest harvest by edible weight (4,089 lb). Wild rhubarb had the second highest harvest in this category with 3,747 edible pounds. Wild rhubarb was used and harvested by more than one-half of sampled households (56% and 54% of households, respectively). Tuluksak residents also harvested large amounts of blueberries (1,528 lb), lowbush cranberries (1,456 lb), crowberries (blackberries) (1,096 lb), highbush cranberries (423 lb), stinkweed (353 lb), and Eskimo potatoes (402 lb), as well as smaller quantities of currants, raspberries, fiddlehead ferns, Hudson's Bay tea, mint, sour dock, spruce tips, wild celery, rose hips, yarrow, and fireweed. Additional plant species harvested in 2010, totaling an estimated 67 lb, were

Table 9-5. – Estimated uses and harvests of vegetation, Tuluksak, 2010.

	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		
Berries										
Blueberry	74%	71%	71%	12%	18%	1,527.8 lb	17.8 lb	3.4 lb	381.9 gal.	± 12%
Lowbush cranberry	66%	56%	56%	15%	12%	1,455.7 lb	16.9 lb	3.2 lb	363.9 gal.	± 15%
Highbush cranberry	35%	29%	29%	7%	1%	422.6 lb	4.9 lb	0.9 lb	105.7 gal.	± 50%
Gooseberry	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Currants	6%	4%	4%	1%	0%	21.5 lb	0.3 lb	0.0 lb	5.4 gal.	± 60%
Raspberry	28%	26%	26%	1%	0%	79.2 lb	0.9 lb	0.2 lb	19.8 gal.	± 28%
Salmonberry	82%	78%	78%	18%	22%	4,088.8 lb	47.5 lb	9.0 lb	1,022.2 gal.	± 14%
Crowberry (blackberry)	49%	37%	37%	18%	10%	1,095.9 lb	12.7 lb	2.4 lb	274 gal.	± 27%
Berries	**96%**	**94%**	**94%**	**32%**	**29%**	**8,691.4 lb**	**101.1 lb**	**19.1 lb**	**2,173 gal.**	**± 13%**
Plants/greens/mushrooms										
Wild rhubarb	56%	56%	54%	4%	16%	3,747.0 lb	43.6 lb	8.2 lb	936.7 gal.	± 25%
Eskimo potato	6%	4%	4%	3%	1%	402.2 lb	4.7 lb	0.9 lb	100.5 gal.	± 77%
Fiddlehead ferns	3%	3%	3%	1%	0%	12.8 lb	0.1 lb	0.0 lb	12.8 gal.	± 90%
Nettle	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Hudson's Bay tea	38%	37%	37%	1%	6%	165.4 lb	1.9 lb	0.4 lb	165.4 gal.	± 70%
Mint	28%	26%	26%	1%	7%	246.8 lb	2.9 lb	0.5 lb	246.8 gal.	± 40%
Sour dock	6%	4%	4%	3%	1%	46.8 lb	0.5 lb	0.1 lb	46.8 gal.	± 82%
Spruce tips	18%	18%	18%	1%	0%	27.5 lb	0.3 lb	0.1 lb	27.5 gal.	± 32%
Cow parsnip (wild celery)	3%	3%	3%	0%	0%	1.3 lb	0.0 lb	0.0 lb	1.3 gal.	± 89%
Wild rose hips	18%	18%	18%	0%	3%	186.9 lb	2.2 lb	0.4 lb	46.7 gal.	± 52%
Yarrow	7%	7%	7%	0%	0%	4.0 lb	0.0 lb	0.0 lb	4.0 gal.	± 61%
Unknown mushrooms	1%	1%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Fireweed	6%	6%	6%	0%	0%	2.8 lb	0.0 lb	0.0 lb	2.8 gal.	± 81%
Stinkweed	41%	38%	38%	4%	9%	353.0 lb	4.1 lb	0.8 lb	353.0 gal.	± 55%
Punk	60%	57%	57%	6%	15%	0.0 lb	0.0 lb	0.0 lb	5,642.0 gal.	± 0%
Puffballs	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown greens from land	9%	7%	7%	3%	0%	65.5 lb	0.8 lb	0.1 lb	65.5 gal.	± 63%
Mousefoods[c]	1%	1%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown vegetation	4%	3%	3%	1%	0%	0.9 lb	0.0 lb	0.0 lb	1 gal.	± 61%
Subtotal	**84%**	**81%**	**81%**	**18%**	**35%**	**5,262.8 lb**	**61.2 lb**	**11.6 lb**	**7,653 gal.**	**± 26%**
Wood										
Firewood	82%	79%	79%	15%	15%	0.0 lb	0.0 lb	0.0 lb	459.5 cord	± 14%
Subtotal	**82%**	**79%**	**79%**	**15%**	**15%**	**0.0 lb**	**0.0 lb**	**0.0 lb**	**459.5 cord**	**± 14%**
All vegetation	**99%**	**97%**	**97%**	**41%**	**51%**	**13,954.2 lb**	**162.3 lb**	**30.6 lb**		**± 17%**
All resoruces[b]	**99%**	**97%**	**97%**	**91%**	**81%**	**163,606.3 lb**	**1,902.4 lb**	**359.3 lb**		**± 14%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

c. "Mousefoods" = various plant roots obtained from mouse caches.

Table 9-6. – Estimated uses and harvests of marine invertebrates, Tuluksak, 2010.

	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										
Clams	6%	4%	3%	3%	1%	1.8 lb	0.0 lb	0.0 lb	0.6 gal.	± 77%
King crab	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Tanner crab	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown crab	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 ind.	± 0%
Shrimp	1%	0%	0%	1%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Unknown marine invertebrates	0%	0%	0%	0%	0%	0.0 lb	0.0 lb	0.0 lb	0.0 gal.	± 0%
Subtotal	**7%**	**4%**	**3%**	**4%**	**1%**	**1.8 lb**	**0.0 lb**	**0.0 lb**		**± 77%**
All marine invertebrates	**7%**	**4%**	**3%**	**4%**	**1%**	**1.8 lb**	**0.0 lb**	**0.0 lb**		**± 77%**
All resources[b]	**99%**	**97%**	**97%**	**91%**	**81%**	**163,606.3 lb**	**1,902.4 lb**	**359.3 lb**		**± 14%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. Summary rows that include incompatible units of measure have been left blank.

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

described in the survey as "unknown greens from land" and "unknown vegetation" due to difficulties with identification and inconsistent terminology use among the surveyors and within the community (Table 9-5). Tuluksak residents harvested an estimated 460 cords of firewood during 2010. Residents also harvested an estimated 5,642 gallons of "punk," a shelf fungus *Phellinus ignarius* widely used throughout the Kuskokwim region as a component of *iqmik*, a mixture of tobacco leaf and shelf fungus ash that is chewed or held in the mouth (Blanchette et al. 2002).

Tuluksak residents' harvest of marine invertebrates in 2010 was negligible; estimates indicate that marine invertebrates harvested by Tuluksak households provided 2 edible pounds total for the entire community (Table 9-6). One household described that there were fewer freshwater clams in the area surrounding Tuluksak—which the survey included with marine invertebrates—than in past years, and had greater difficulty in finding them. Although the survey data indicate that the harvest of shellfish by Tuluksak residents was minimal during the study year, it is possible that harvests would be higher for some community members in years of higher abundance or accessibility.

Harvest Areas

For 121 different subsistence resources (e.g., Chinook salmon, trout, caribou, and moose), and for 7 different resource categories (salmon, nonsalmon fish, large land mammals, small land mammals, marine mammals, birds, and berries and greens) households were asked to locate on a map the areas in which they had hunted or fished for the resource, and the locations at which they had actually harvested the resource. For each resource and category, all households' search areas and harvest locations were combined to create a series of maps depicting Tuluksak's subsistence use areas in 2010. Figure 9-7 summarizes all the mapped data collected from Tuluksak for 2010.

For 2010, Tuluksak respondents reported using a total of 1,958 square miles for subsistence. The majority of the reported search and harvest area consisted of a 20-mile radius surrounding the community, the Kuskokwim River extending 10 miles beyond Kalskag, and the lower Johnson River. Other reported search and harvest areas include the lower Kasigluk and Kisaralik rivers, Bogus Creek, Discovery Creek, Whitefish Lake, and a 10-mile section of the Yukon River in the area of Twelvemile Slough.

Salmon search and harvest areas are shown in Figure 9-8. Tuluksak respondents focused their salmon harvests using drift gillnets on a section of the Kuskokwim River extending from approximately 5 miles upriver and 10 miles downriver from the mouth of the Tuluksak River. Other salmon harvest areas included the section of the Kuskokwim River beginning at Akiak and ending 2 miles downstream. Also, some households reported harvesting salmon approximately 1 mile upstream and adjacent to Oscarville on the mainstem of the Kuskokwim River. The most common salmon set gillnet locations were on the Kuskokwim River within a few miles of Tuluksak as well as on the Tuluksak River approximately 7 to 9 miles from the community.

Burbot, sheefish, whitefishes, and northern pike were harvested at various locations in the Kuskokwim River from approximately 30 miles upstream to approximately 13 miles downstream of Tuluksak (Figure 9-9). Tuluksak fishers also harvested whitefishes in Whitefish Lake, the lower portion of Bogus Creek, and in a location on the Kuskokwim River immediately upriver from Oscarville. Some households searched for and harvested burbot, whitefishes, and northern pike in a lake 7 miles south of Tuluksak. Residents also searched for and harvested northern pike to the east and south of Tuluksak in an area covering approximately 45 square miles.

The large land mammal map (Figure 9-10) shows search and harvest areas for moose, caribou, and black bear. The caribou search area consisted of an 8-mile radius around the community as well as a large area extending to the northeast as far as Whitefish Lake and south and west along the Tuluksak and Fog rivers. Residents also hunted caribou on a section of the Johnson River extending from near the mouth to approximately 8 miles upriver. The primary black bear search and harvest area encompassed Tuluksak and extended out approximately 10 to 15 miles from the community in all directions. Tuluksak residents also searched for and harvested black bear in the lower Johnson River drainage from approximately 2 miles north of Atmautluak and extending 7 miles down the Johnson River. The moose harvest and search areas largely overlapped with the caribou search areas; however, the moose search and harvest areas also extended up the Kuskokwim River to approximately 10 miles beyond Kalskag and up the first 12 miles of Discovery Creek. Moose hunting activities extended into the Tuluksak and Fog rivers, and also occurred on a 10-mile section of the Yukon River in an area including and adjacent to Twelvemile Slough. A small percentage of Tuluksak households (1%) (Table 9-2), searched for and harvested marine mammals in 2010. Tuluksak residents harvested bearded

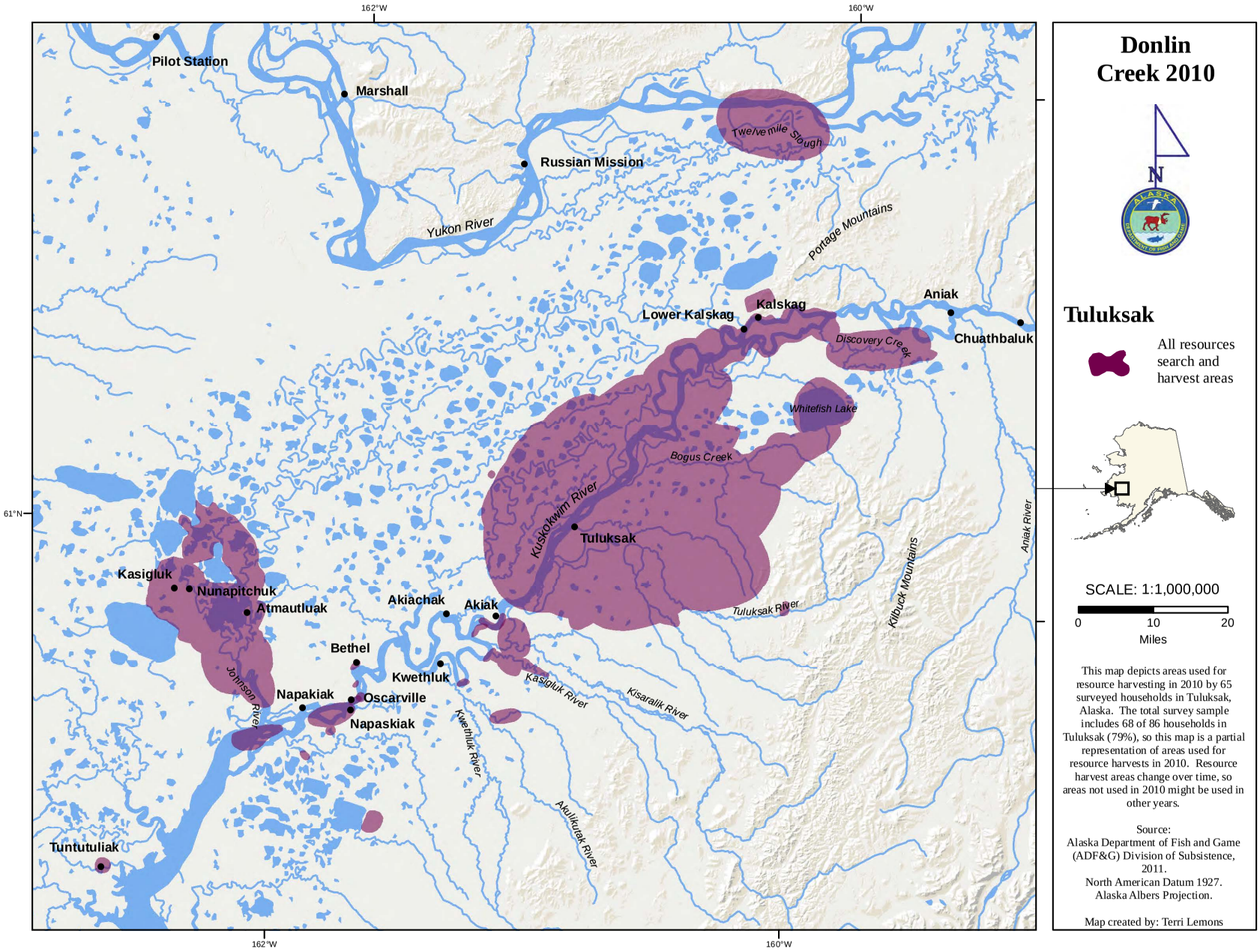

Figure 9-7.–Harvest locations and search areas, all resources, Tuluksak, 2010.

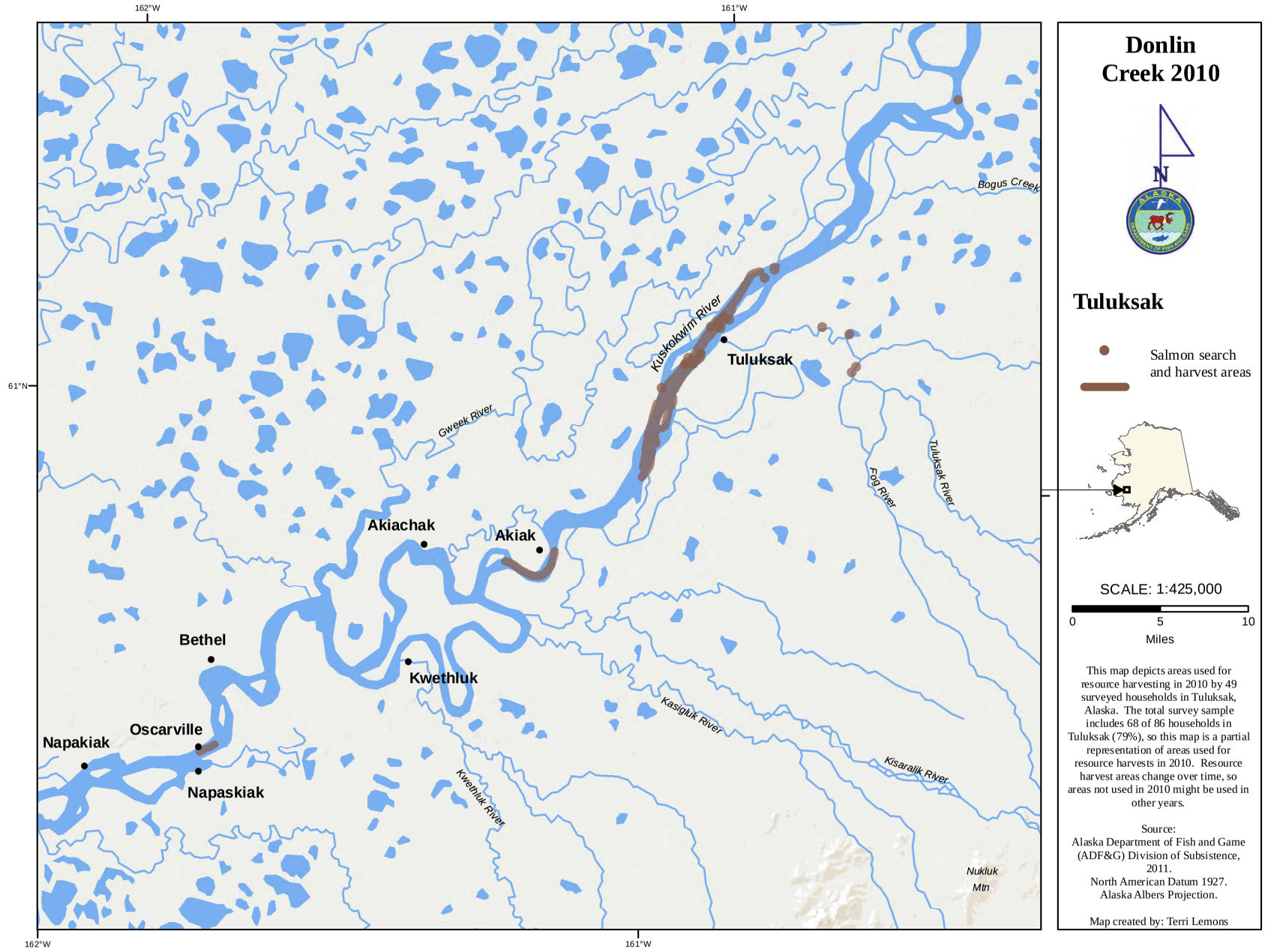

Figure 9-8.–Harvest locations and search areas, salmon, Tuluksak, 2010.

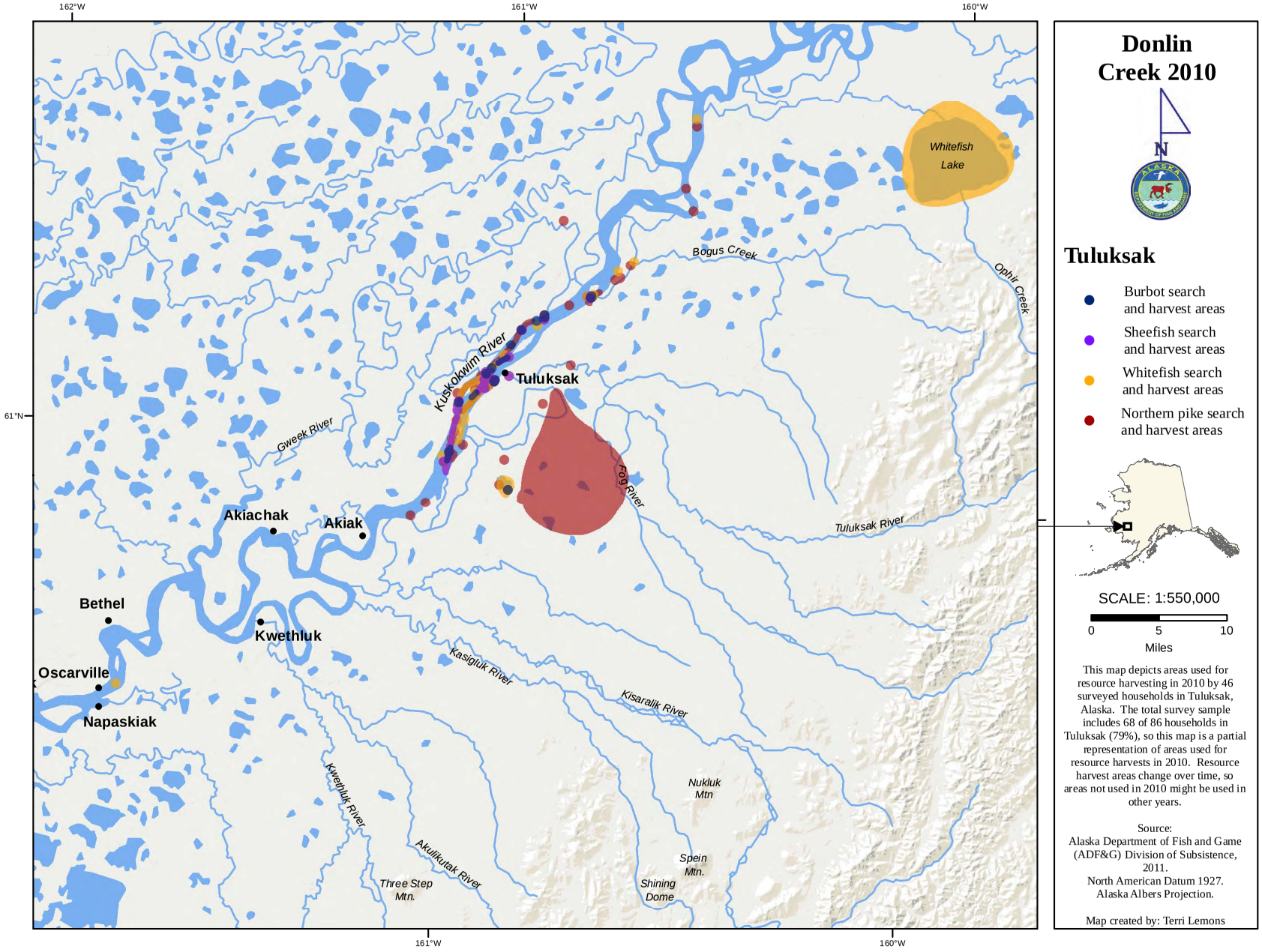

Figure 9-9.–Harvest locations and search areas, burbot, sheefish, whitefish, and northern pike, Tuluksak, 2010.

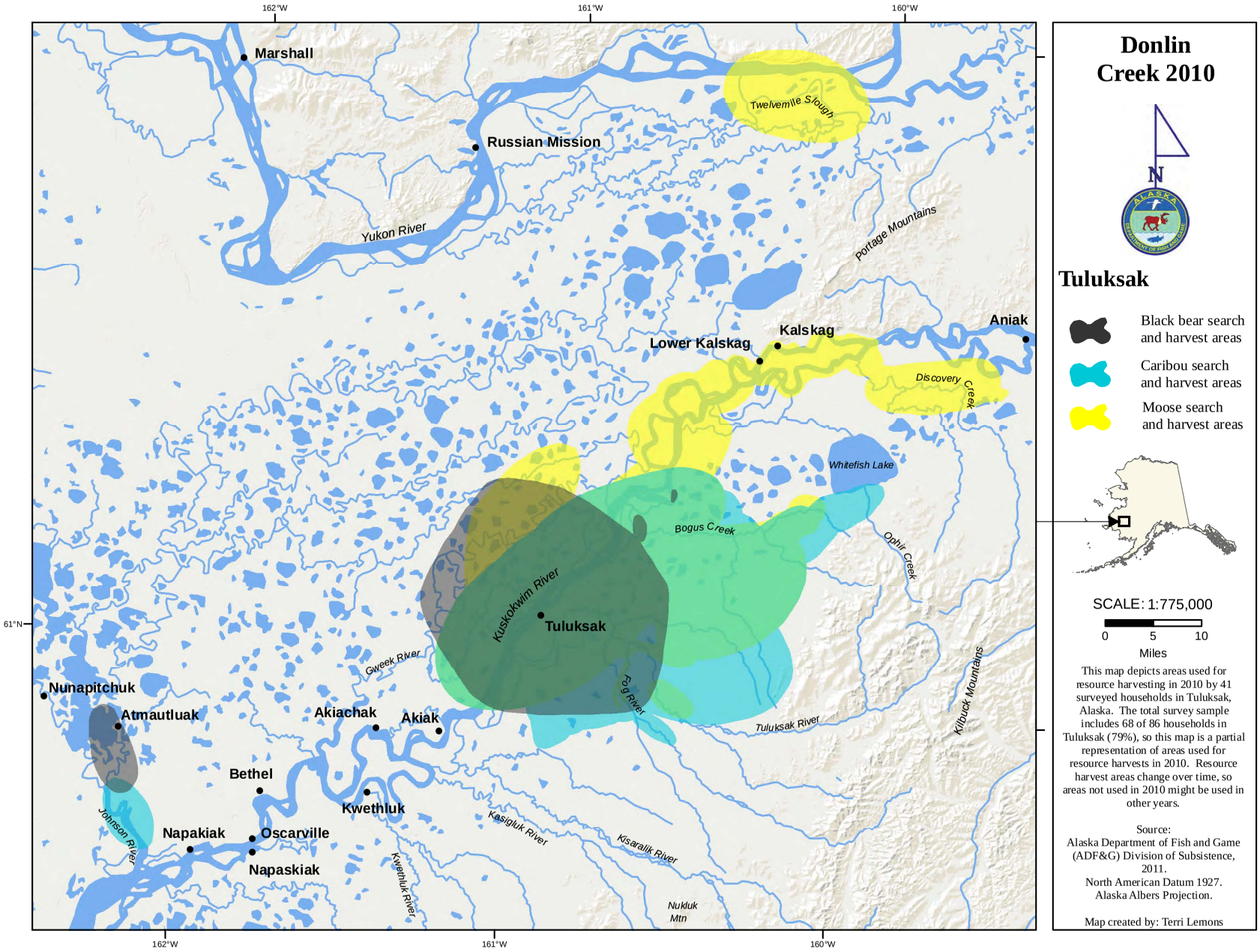

Figure 9-10.–Harvest locations and search areas, large land mammals, Tuluksak, 2010.

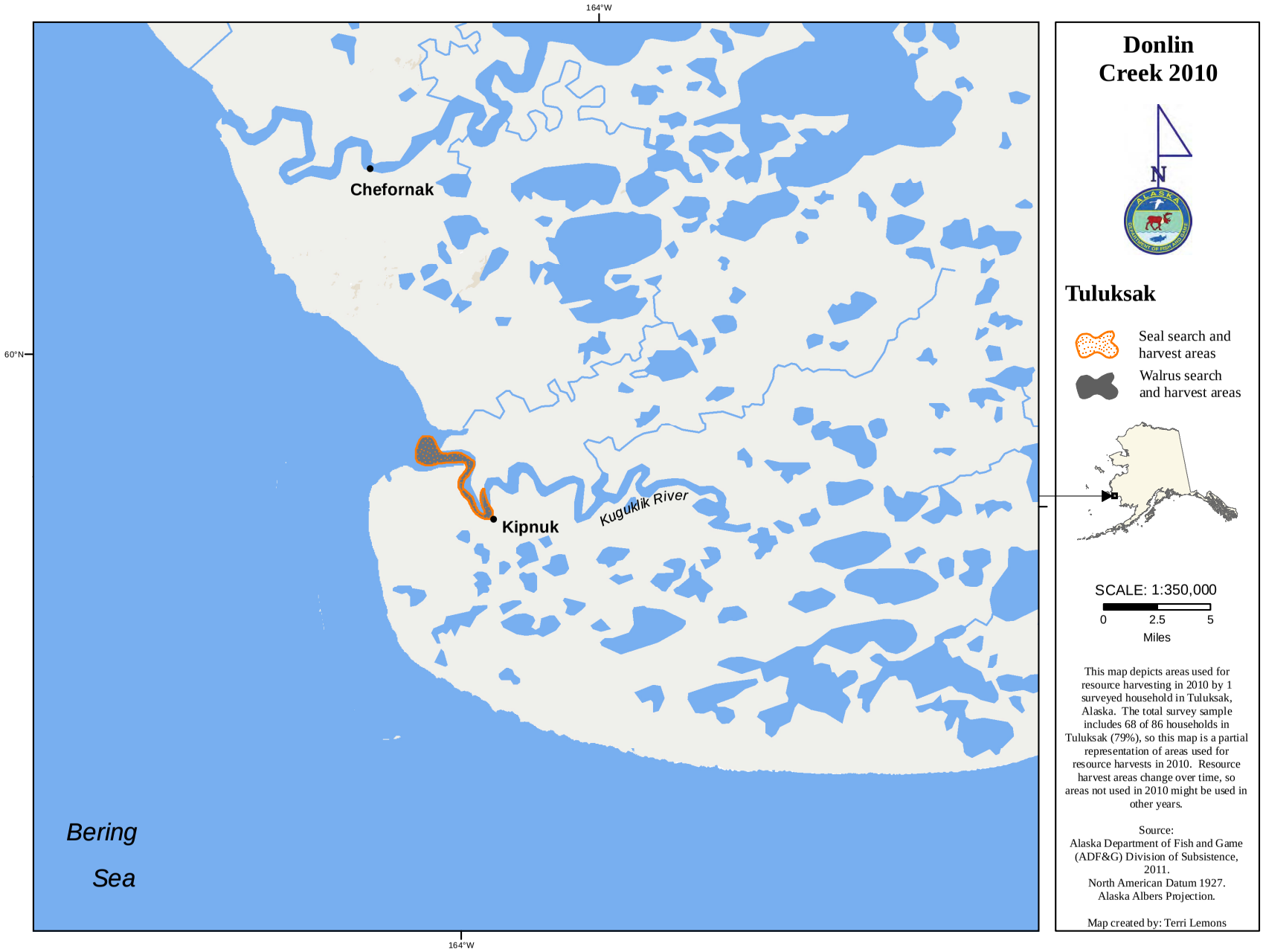

Figure 9-11.–Harvest locations and search areas, marine mammals, Tuluksak, 2010.

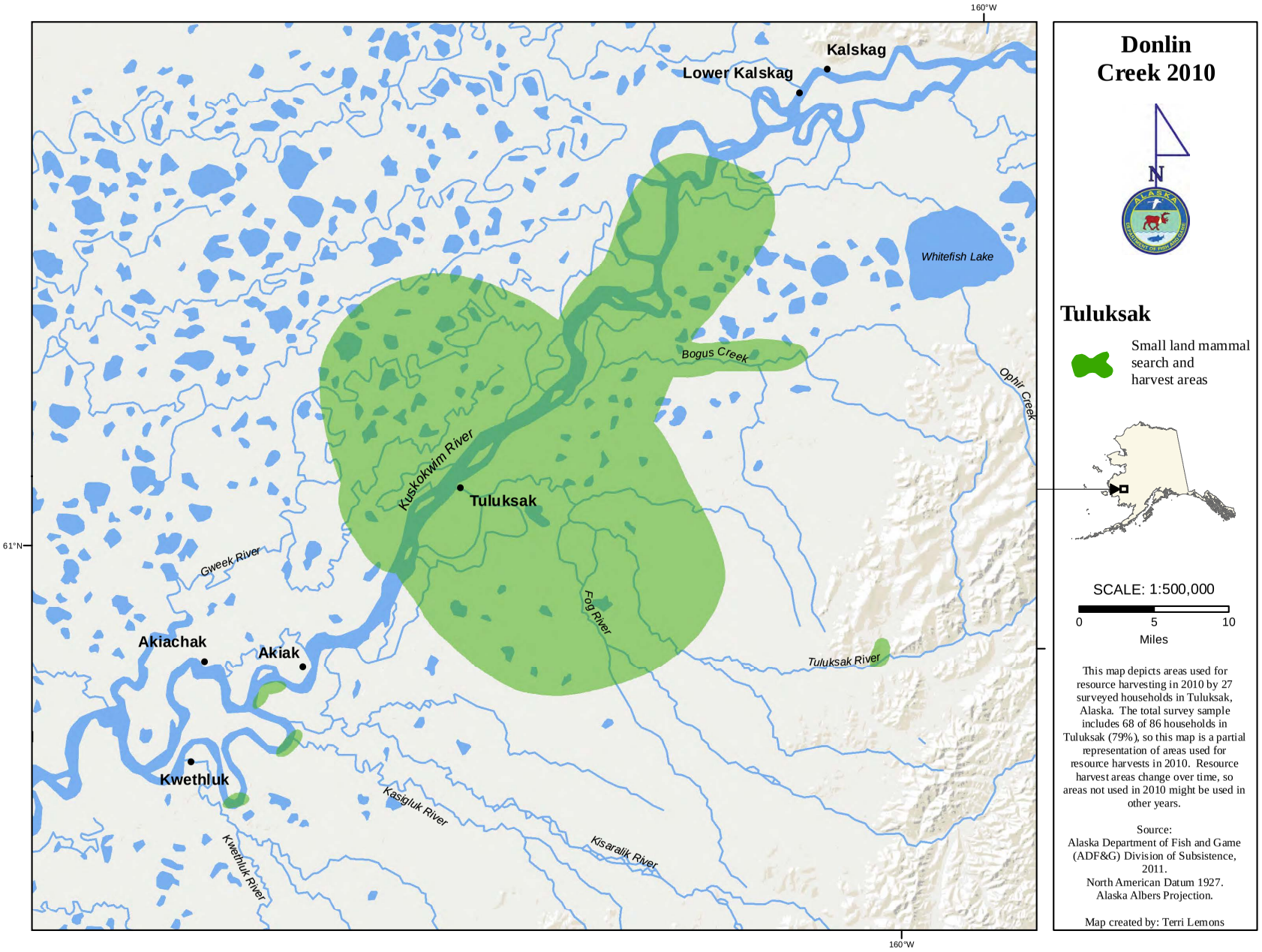

Figure 9-12.–Harvest locations and search areas, small land mammals, Tuluksak, 2010.

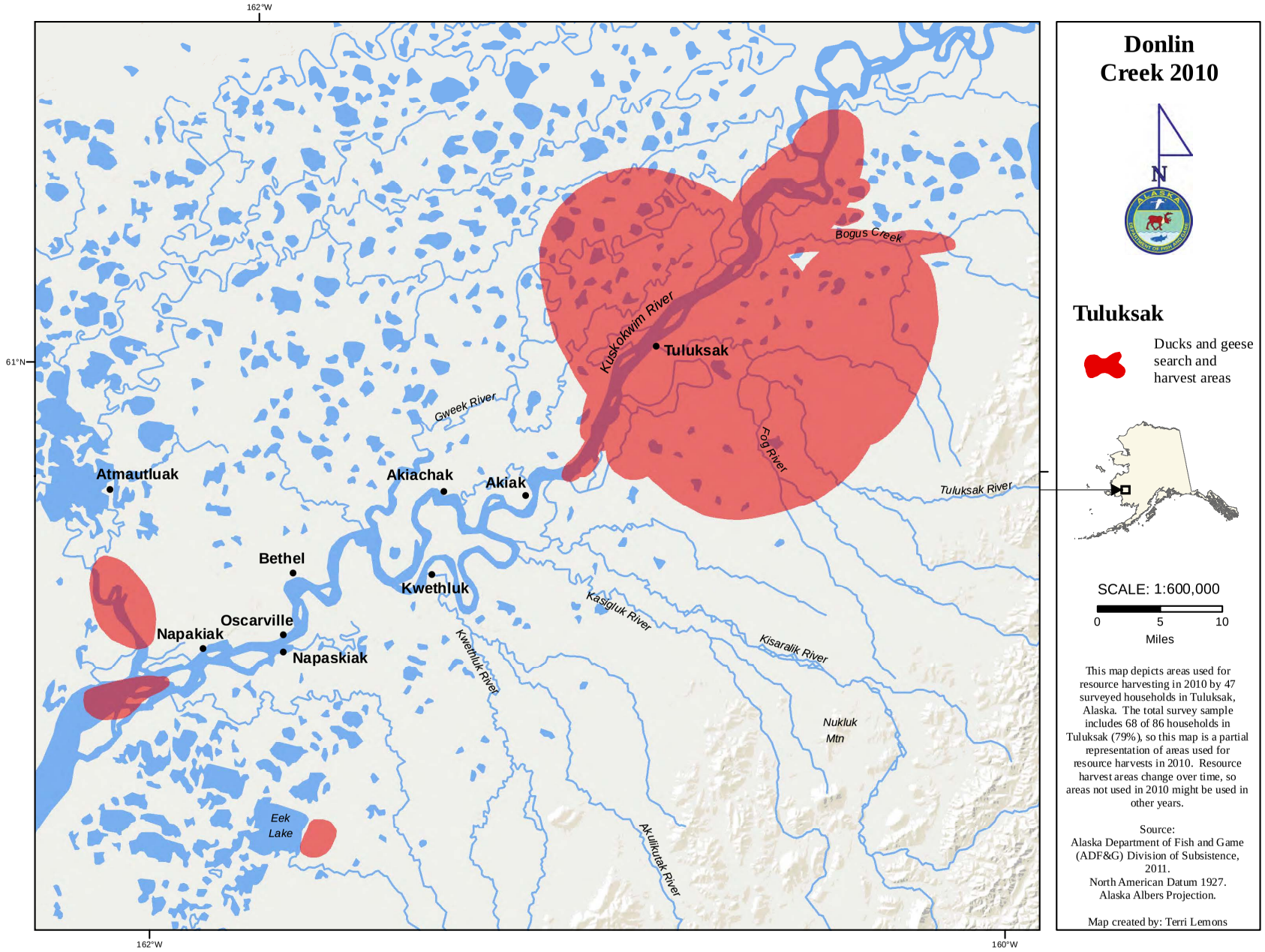

Figure 9-13.–Harvest locations and search areas, ducks and geese, Tuluksak, 2010.

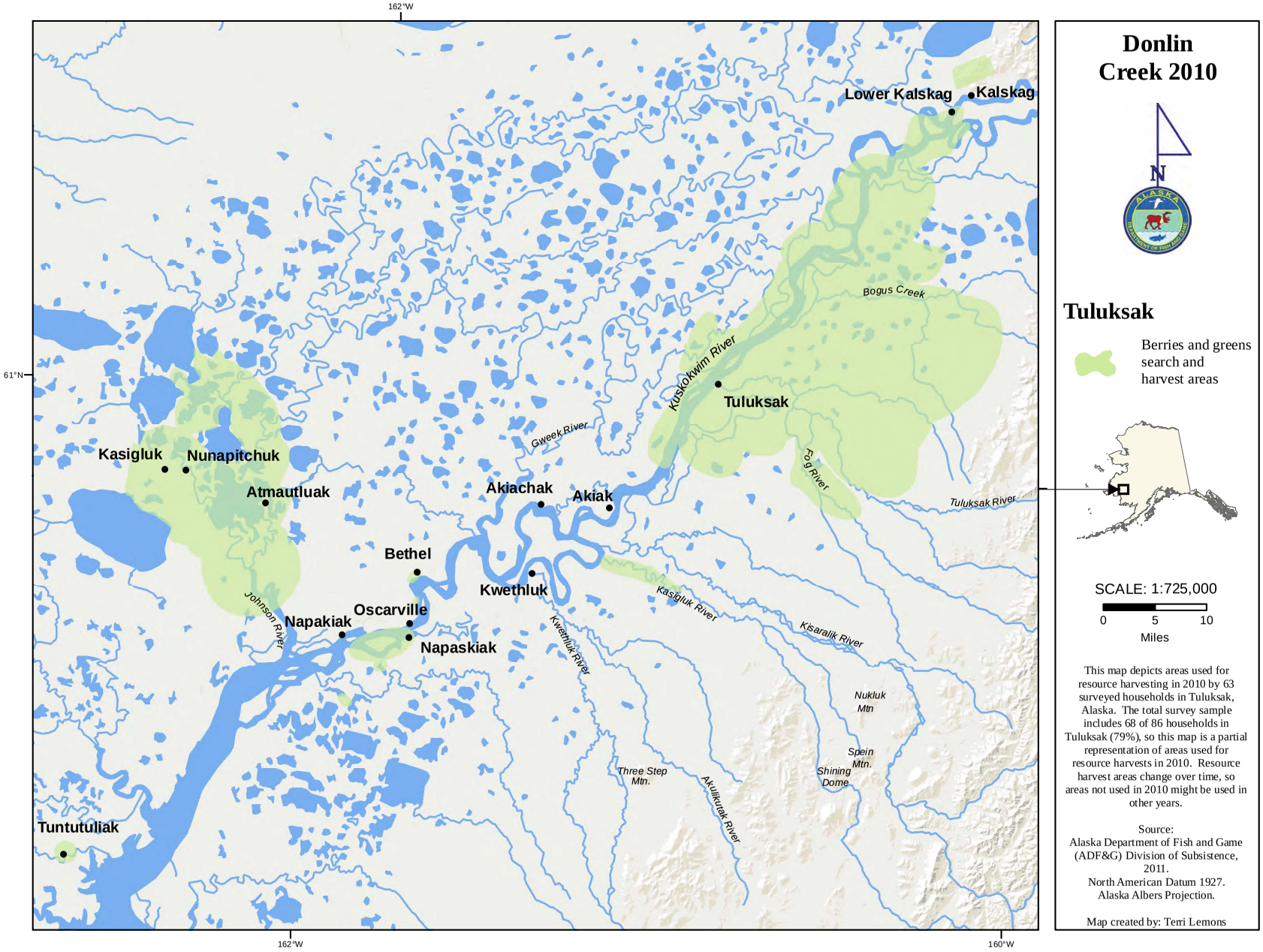

Figure 9-14.–Harvest locations and search areas, berries and greens, Tuluksak, 2010.

seal, ringed seal, spotted seal, and walrus in the lower Kuguklik River and in Kinak Bay near Kipnuk (Figure 9-11).

Tuluksak residents searched for and harvested small land mammals (Figure 9-12) in a large area extending 12 miles to the northwest and 15 miles to the southeast of the community, encompassing the lower Fog and Tuluksak rivers as well as portions of the Gweek and Kuskokwim rivers. In addition, Tuluksak residents hunted or trapped small land mammals along the first 12 miles of Bogus Creek and on the Kuskokwim River to approximately 5 miles downriver from the community of Lower Kalskag and extending 1 to 5 miles on each side of the Kuskokwim River. Other small mammal harvest areas include a few small sections adjacent to the Kuskokwim River between the communities of Akiak and Kwethluk.

The duck and geese search and harvest area (Figure 9-13) was similar to that of the small land mammal search and harvest area—extending from Tuluksak primarily to the northwest and southeast, and continuing several miles up the Kuskokwim River and Bogus Creek. Additional areas included a large section east of Tuluksak and an area directly south of Bogus Creek, an area on the east side of Eek Lake, and a 5-mile section of the Kuskokwim River near the mouth of the Johnson River. Harvest areas also extended up the Johnson River approximately 7 miles.

Figure 9-14 shows the harvest area for berries and greens. This area includes sections along the Kuskokwim River extending from 10 miles below Tuluksak to the community of Lower Kalskag. Tuluksak residents also harvested berries and greens in a large area extending southeast of the Kuskokwim River from as far as 25 miles east of Tuluksak, and south to the Tuluksak and Fog rivers. Additionally, harvesters searched for vegetation in the area surrounding the lower Johnson River, from near the mouth of the Johnson River to approximately 10 miles north of Nunapitchuk, and the territory surrounding the lakes of this area. Tuluksak residents also used the area between Napaskiak and Napakiak, on the left bank of the Kuskokwim River approximately 60 miles downriver from Tuluksak, and the lowest 10 miles of the Kasigluk River area for harvesting berries and greens.

Harvest Assessments

The survey asked respondents to assess their own harvests in 2 ways: whether they used less, more, or about the same amount of 7 resource categories in 2010 as in past years, and whether they got "enough" of each of the 7 resource categories. If households reported using less or more of a resource, they were asked why their use had changed. When a household said they did not get enough of a resource category, they were asked as follow-up what kind of resources they needed and how much this impacted their household. These households were also asked what they did differently, if anything, as a result of not getting enough. Out of the 68 Tuluksak households surveyed in 2011, not all households actually responded to these harvest assessment questions.

During ethnographic interviews some key respondents described values associated with meeting their

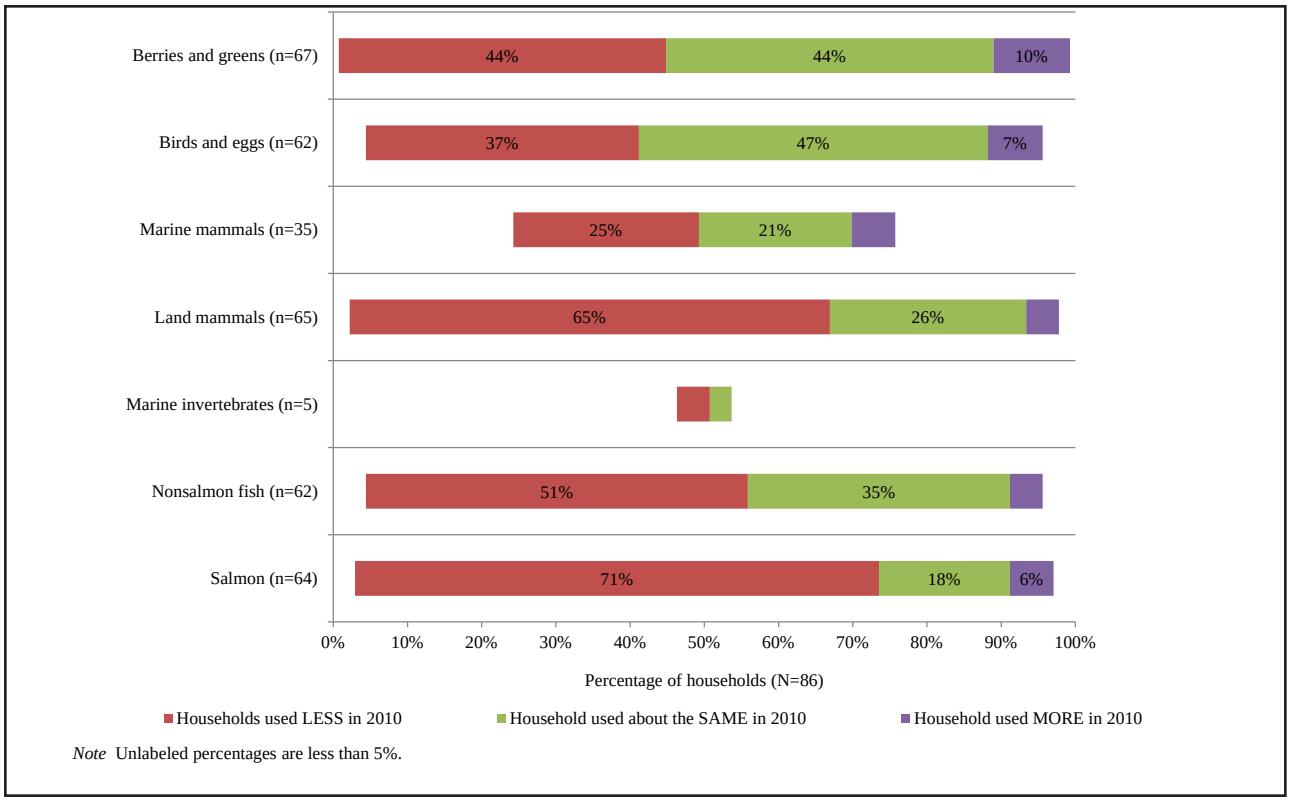

Figure 9-15.–Harvest assessments,Tuluksak, 2010. Responses to the question: "Did your household use less, more, or about the same amount in 2010 as in the past?"

families' needs and getting enough subsistence resources. One respondent explained that, "Our rule is to not catch too much. When it is enough, it is enough. Our parents told us, 'No more fishing, enough, for us or the dogs or whoever needs them'" (TLT04251103). As such, key respondents described that avoiding the overharvest or waste of resources is an important component of a household's assessment of their needs. For the resource categories of salmon, land mammals, and nonsalmon fish, the majority of surveyed households that provided responses to harvest assessment questions reported that they used less of these resources in 2010 than in previous years. Of 64 households responding, 71% reported using less salmon in 2010 than previous years, and 65% reported using less land mammals. More than one-half (51%) of households that responded to the question also reported using less nonsalmon fish in 2010. Forty-four percent of Tuluksak respondents reported using less berries and greens in 2010, and an equal amount of households (44%) reported using the same amount of berries and greens. Thirty-seven percent of households described using less birds and eggs, and 25% reported using less marine mammals. In no resource category did more than 10% of households say they used more of that resource in 2010 than in previous years (Figure 9-15).

Except for marine mammals and marine invertebrates, responses to questions regarding whether people got enough showed that most Tuluksak households obtained what they considered to be sufficient

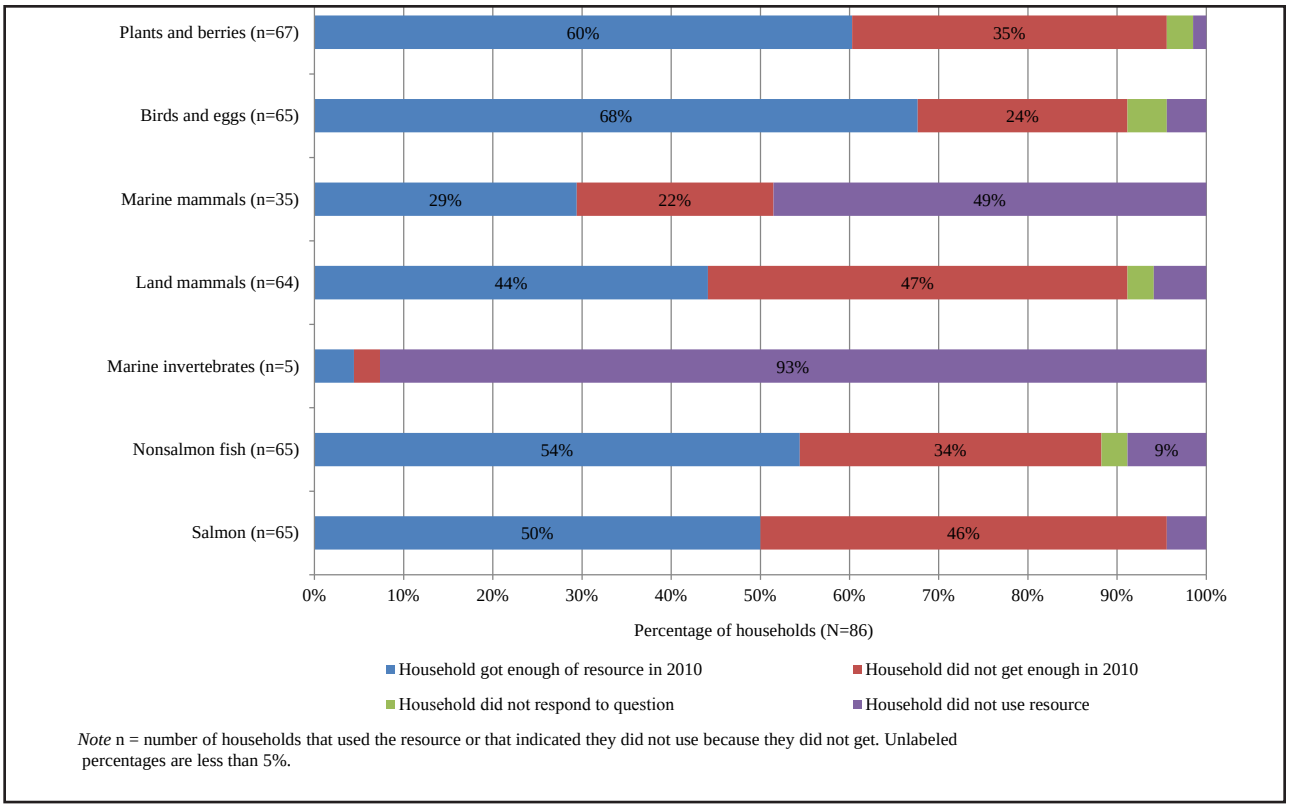

Figure 9-16.–Harvest assessments, Tuluksak, 2010. Responses to the question: "Did your household get enough in 2010?"

quantities of subsistence foods in 2010 (Figure 9-16). When asked about all subsistence resources, more than one-half (56%) of Tuluksak households indicated that they got "enough" in 2010. All surveyed households responded to this question, and nearly all reporting households (99%) used subsistence resources (Table 9-1).[5] More than one-half of households responding to assessment questions also indicated that they got enough of the resource categories of nonsalmon fish (54%) berries and other plants (60%), and birds and eggs (68%). Nearly all Tuluksak households used salmon during the study year, but only one-half (50%) of surveyed households indicated that they got enough salmon. Ethnographic interview respondents described past fishing seasons when families could harvest the Chinook salmon they needed in a very short period of time relative to contemporary harvests. This was particularly true in the 1980s when, as one key respondent described, Chinook salmon weighing 50 to 60 lb were apparently more common. At the time of the ethnographic interview, this key respondent explained that Chinook salmon were very scarce (TLT04261104**)**.

Forty-four percent of households reported getting enough land mammals while 47% reported they did not get enough, and less than one-half (44%) of surveyed households reported getting enough

5. For each specific resource category (e.g., salmon, land mammals, berries and plants), a minority of Tuluksak households responded that they did not use the resource. Also, some Tuluksak households did not respond to this question for some resource categories. For example, when asked if they got enough birds and eggs, 68% of surveyed households responded that they got enough, 24% responded that they did not get enough, 4% did not use the resource, and 4% did not respond to the question.

land mammals. Only 29% of households reported getting enough marine mammals, although 49% of households indicated that they did not typically use marine mammals. Finally, although only 4% of households reported getting enough marine invertebrates, 93% of households indicated they did not use this resource category in 2010.

When Tuluksak households indicated that they did not get enough of a particular resource category, surveyors asked them to describe of which specific resource they wanted more. The resources with the greatest numbers of households wanting more included moose (31 households reported wanting more), caribou (23), Chinook salmon (21), and berries (18). When asked why they did not get enough of a particular resource, households provided numerous explanations that researchers condensed into 14 categories. For moose and caribou, the 2 most frequently provided reasons for not getting enough fit into the broad categories of "weather/environment" and "resource not available." For Chinook salmon, the most frequent reasons fell into the categories of "too far to get it" and "working/no time," and for berries the most frequent reasons fell into the categories of "too far to get it" and "resource not available."

The impacts to households that did not get enough varied by category. Land mammals was the resource category with the highest percentage of households (47%) indicating they did not get enough in 2010 (Figure 9-16); 25% of these households reported that not getting enough land mammals had a severe impact on them, 41% described the impact as major, 28% described the impact as minor, and 6% described the impact as not noticeable. For salmon, the resource category with the second highest percentage of households (46%) indicating they did not get enough in 2010 (Figure 9-16), 19% of households reported that not getting enough salmon had a severe impact on them, 36% described the impact as major, 42% described the impact as minor, and 3% described the impact as not noticeable. For all other resource categories (e.g., nonsalmon fish, birds and eggs, berries and greens), some Tuluksak households reported that they did not get enough in 2010 and described severe or major impacts as a result.

Sixty-three percent of Tuluksak households that did not get enough of all subsistence resources reported doing things differently as a result. Respondents reported that the most frequent change was the increased use of store-bought food. Of Tuluksak respondents who did not get enough land mammals and did things differently as a result, 79% reported using more store-bought food, 11% made due without or received public assistance, and 5% asked others for help or increased their effort to harvest. For all resource categories other than salmon (e.g., berries and greens, birds and eggs, nonsalmon fish), the majority of respondents who did not get enough and behaved differently as a result reported that they used more store-bought food. Tuluksak residents showed a more diverse set of responses to not getting enough salmon than that seen in reaction to lack of other resources. Tuluksak households that did not get enough salmon (23% of responding households) reported that they used more store-bought food, replaced salmon with other subsistence foods, or asked others for help as a result. Fifteen percent of

Table 9-7. – Estimated earned and other income, Tuluksak, 2010.

Income source	Number of people	Number of households	Total for community	Mean per household[a]	Percentage of total
Earned income					
Local government	90.3	65.5	$1,173,892	$13,650	36.3%
Services	23.2	20.5	$229,745	$2,671	7.1%
Construction	16.8	15.4	$171,998	$2,000	5.3%
Transportation, communication, and utilities	9.0	9.0	$104,366	$1,214	3.2%
Retail trade	14.2	10.3	$95,363	$1,109	2.9%
State government	5.2	5.1	$41,758	$486	1.3%
Agriculture, forestry, and fishing	7.7	7.7	$31,998	$372	1.0%
Federal government	5.2	5.1	$21,680	$252	0.7%
Other employment	1.3	1.3	$8,691	$101	0.3%
Earned income subtotal	**154.6**	**82.1**	**$1,879,492**	**$21,855**	**58.1%**
Other income					
Alaska Permanent Fund Dividend		80.9	$541,111	$6,292	16.7%
Food stamps		50.6	$368,783	$4,288	11.4%
Unemployment		35.4	$115,332	$1,341	3.6%
Social Security		11.4	$66,659	$775	2.1%
Citgo fuel voucher		56.9	$49,321	$573	1.5%
Pension/retirement		10.1	$37,229	$433	1.2%
Disability		8.9	$36,245	$421	1.1%
Foster care		1.3	$30,444	$354	0.9%
Energy assistance		41.7	$29,546	$344	0.9%
Native corporation dividend		54.4	$24,430	$284	0.8%
Supplemental Security Income		6.3	$21,809	$254	0.7%
Adult public assistance		6.3	$18,619	$217	0.6%
Longevity bonus		3.8	$8,085	$94	0.2%
Meeting honoraria		5.1	$6,314	$73	0.2%
Child support		6.3	$1,810	$21	0.1%
Workers' compensation/insurance		0.0	$0	$0	0.0%
Veterans assistance		0.0	$0	$0	0.0%
Other		0.0	$0	$0	0.0%
Other income subtotal		**83.5**	**$1,355,738**	**$15,764**	**41.9%**
Community income total			**$3,235,230**	**$37,619**	**100.0%**

Source Alaska Department of Fish and Game, Division of Subsistence household surveys, 2011.

a. For confidentiality, income amounts are not listed for sources reported by fewer than 4 households.

households reported making due without salmon, 15% reported obtaining public assistance, and 8% reported increasing their harvest effort for salmon.

Jobs and Income

Respondents were asked about both earned income (jobs held and wages earned by all household members 16 years old and older) and unearned income (Alaska Permanent Fund Dividend, Social Security, public assistance, etc.). For 2010, Tuluksak households earned or received an estimated $3.2 million, of which $1.9 million (58%) was from wage employment and $1.4 million (42%) was from other sources (Table 9-7). The 2010 U.S. Census reported a median household income of $35,417 and an average income per person of $7,767, or approximately $2.9 million for the community (U.S. Census

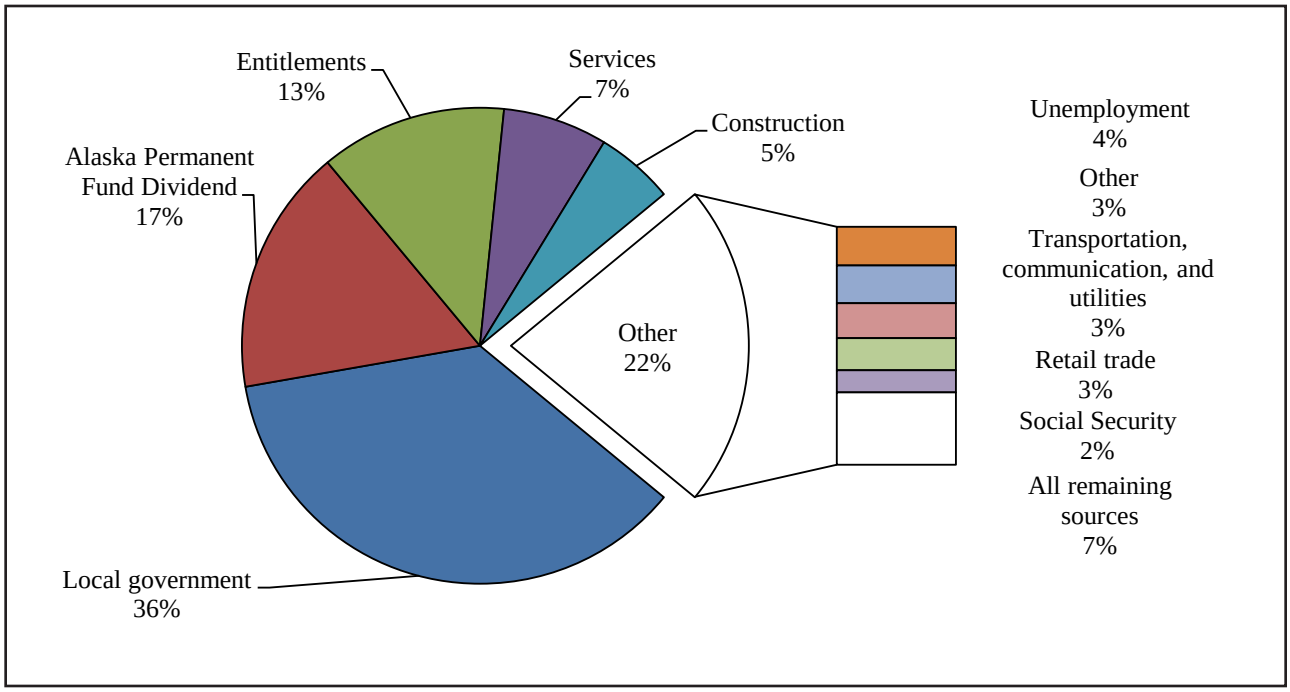

Figure 9-17.–Top 10 income sources ranked by estimated amount, Tuluksak, 2010.

Bureau 2010b). The estimated mean per household income in this survey was $37,619. Historical income data available from a previous ADF&G study recorded a median household income of $7,159 for Tuluksak in 1979 (Andrews and Peterson 1983:13) not adjusted for inflation.

The principal source of income ($1.2 million or 37%) was from employment related to local government, which includes tribal government and school employment (Table 9-7). Income from services; construction; transportation, communication, utilities; and retail trade represented 19% of the total earned income ($601,472). Earnings from agriculture, forestry, and fishing totaled $31,998 or 1% of the total income for Tuluksak in 2010. Alaska Permanent Fund Dividends represented 17% of the community's total income ($541,111). Other sources of unearned income in Tuluksak included food stamps ($368,783 or 11%), unemployment insurance benefits ($115,332 or 4%), and Social Security benefits ($66,659 or 2%) (Figure 9-17).

Food Security

Respondents were asked a short series of questions intended to assess their household's food security, that is, "access by all people at all times to enough food for an active, healthy life" (Nord et al. 2009:2). The food security questions were modeled on questions developed by the USDA, modified by ADF&G to account for differences in access to subsistence and store-bought foods. Core questions and Tuluksak responses are summarized in Figure 9-18.

Based on their responses to these questions, households were categorized as having high, marginal,

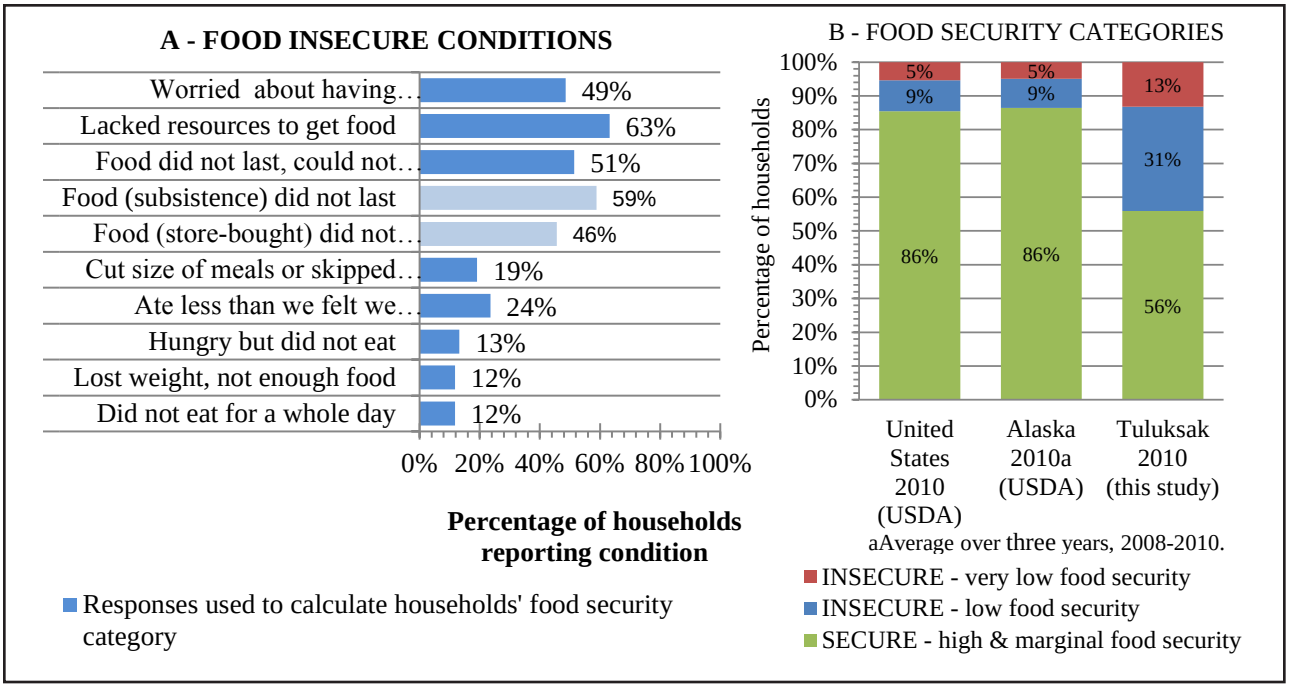

Figure 9-18.–Food security results, Tuluksak, 2010.

low, or very low food security following a USDA protocol (Bickel et al. 2000). From this study, in Tuluksak in 2010, 56% of the surveyed households had high or marginal food security. USDA considers households in both categories to be "food secure." Of the remaining households, 31% had low food security and 13% had very low food security (Figure 9-18A). Households with low and very low food security conditions were categorized as "food insecure." Therefore, in Tuluksak in 2010, 44% of households were considered food insecure based on these criteria. These results indicate that Tuluksak households reported lower food security overall when compared to average Alaska and U.S. households. State and national food security data reported by USDA indicate that in Alaska and throughout the U.S., 86% of households had high or marginal food security, while 14% were considered food insecure (Figure 9-18). Of the Lower Kuskokwim River region communities discussed in this study, Tuluksak possessed the lowest percentage of food secure households at 56%. Akiak and Kwethluk reported that 75% and 72% of households, respectively, were food secure (Figures 4-18 and 6-21), while Oscarville reported high food security with 92% of households reporting that they obtained sufficient food resources (Figure 8-21).

Households were also asked questions addressing the apparent reasons why each may have experienced conditions of food insecurity (Figure 9-18A). Responses to these questions showed that 63% of Tuluksak households reported that they lacked the resources they needed to get food. Resources could have included gasoline, transportation equipment, nets, firearms, ammunition, or cash needed to purchase or maintain any or all of these. Also, resources could have included cash needed to purchase food from stores or to purchase wild foods from another household or community as well

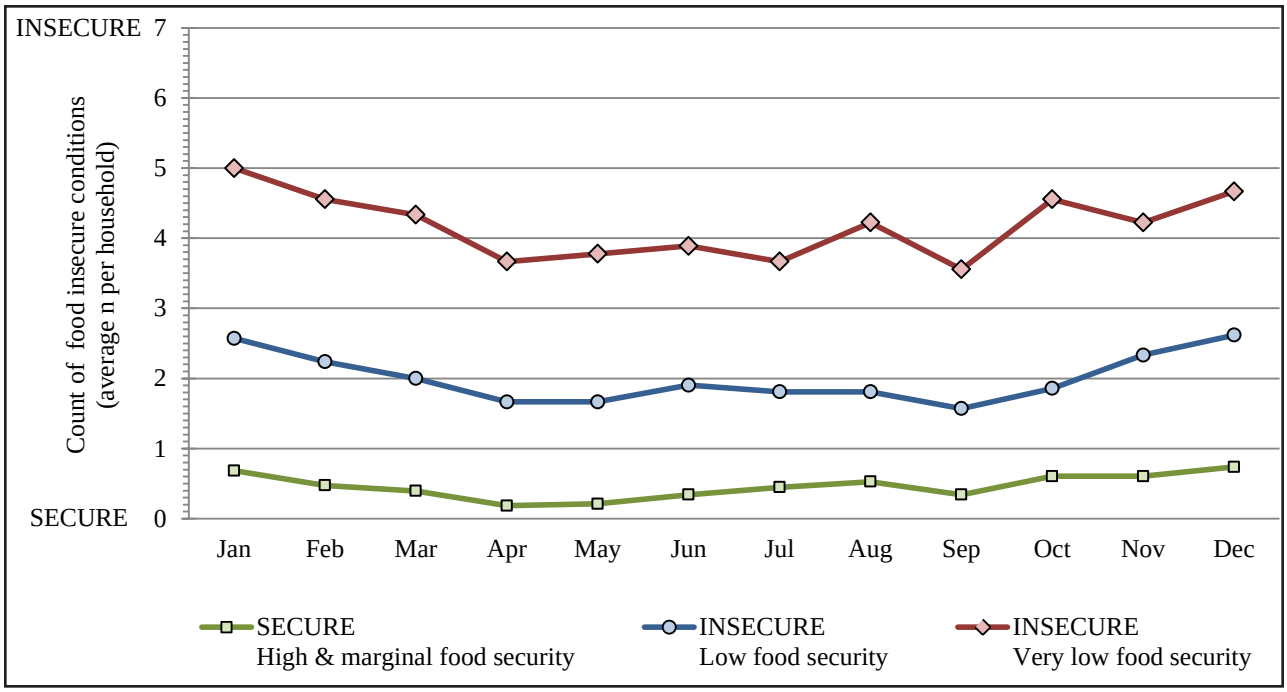

Figure 9-19.–Food insecure conditions by month and by household category, Tuluksak, 2010.

as the time needed to harvest subsistence foods. Lack of resources could certainly have been a factor in determining whether food lasted long enough and whether a household experienced some anxiety over having enough food. Responses to other questions showed that 59% of households reported that their subsistence foods did not last and they could not get more, 51% reported that all their foods did not last and they could not get more, and 49% of households worried about having enough food sometime during the year (Figure 9-18). These data suggest that for many Tuluksak households, food security was largely related to their ability to obtain the cash, fuel, or equipment necessary to harvest subsistence resources. Because of the important role that food sharing has within the Yup'ik culture (Langdon 1991; Fienup-Riordan 2007:22; Brown et al. 2012), any single household's lack of resources often affects other households within the community. A household may express anxiety over its food supply not only when it experiences its own lack of resources, but also when other households are lacking resources as well. Thus, any lack of resources for any number of households can result in an overall diminished availability of subsistence foods for the entire community.

Food security in the study region can vary throughout the year and is affected by many factors. These factors include seasonal changes in the abundance of different wild food resources, the availability of cash and equipment, the amount and quality of food stored by households, weather and travel conditions, seasonal changes in demands for heating fuel and electricity, and hunting and fishing regulations. In Tuluksak in 2010, the average number of food insecure conditions per household was slightly higher from January through March and from October through December, and slightly lower from April through September (Figure 9-19). These data, as well as the importance of fish relative to other wild

food resources, suggest that Tuluksak households experienced the highest food security during months when fish tend to be most abundant. Adult Pacific salmon in the Kuskokwim River are present during spawning migrations from June through September, at which time Tuluksak fishers harvest, process, and store them in large quantities. Northern pike and burbot are harvested primarily in late winter and early spring and rainbow smelt in late spring, during each species' respective spawning migration (McPhail and Lindsey 1970; Morrow 1980).

Tuluksak residents described the lowest food security during the late fall and winter months of 2010. It is likely that fish was particularly important to food security at this time because fish represented the majority of the total subsistence harvest (72%) in 2010. Also, during the fall and winter months, households experience a higher demand for heating fuel and electricity, with the poorest households in rural Alaska spending nearly one-half of their income on home energy costs (Howard et al. 2009). Therefore in some households, utility expenses offer potentially severe constraints on the amount of cash available for the gasoline and equipment needed to harvest wild foods during colder months.

Wild Food Networks

Sharing is a significant social and cultural practice in Yup'ik communities of rural Alaska (Langdon 1991; Magdanz et al. 2002; Fienup-Riordan 2007:22), and has been documented in Kuskokwim River communities in previous studies (Stickney 1981:20; Charnley 1983:35–42; Wolfe et al. 1984; Coffing 1991:82–83; Brown et al. 2012). The types of shared resources often include wild foods, material resources such as gasoline or equipment, and labor during hunting, fishing, gathering, and processing activities. Results of this study indicate that Tuluksak residents shared many wild food resources extensively throughout the community, as well as with other communities in the region and throughout the state.

In 2010, 91% of Tuluksak households reported that they received wild food resources and 81% reported that they gave wild food resources to another household (Table 9-1). A majority of households reported that they shared fish, with 66% receiving the resource and 57% giving fish to other households (Table 9-1). Other resources that residents commonly shared included plants (41% received and 51% gave away) (Table 9-5) and migratory birds (41% received and 37% gave away) (Table 9-3). Large land mammals, such as moose, caribou, black bears, and brown bears, were harvested by 40% of Tuluksak households, and 75% of households received these resources (Table 9-2). Similarly, households harvesting seals and walruses represented 3% of all Tuluksak households and nearly one-half (47%) of the households in the community received marine mammals (Table 9-2). These data suggest the possibility that Tuluksak residents place high value on large land mammals and marine mammals, and are more likely to share them throughout the community when hunters harvest them. It is also likely

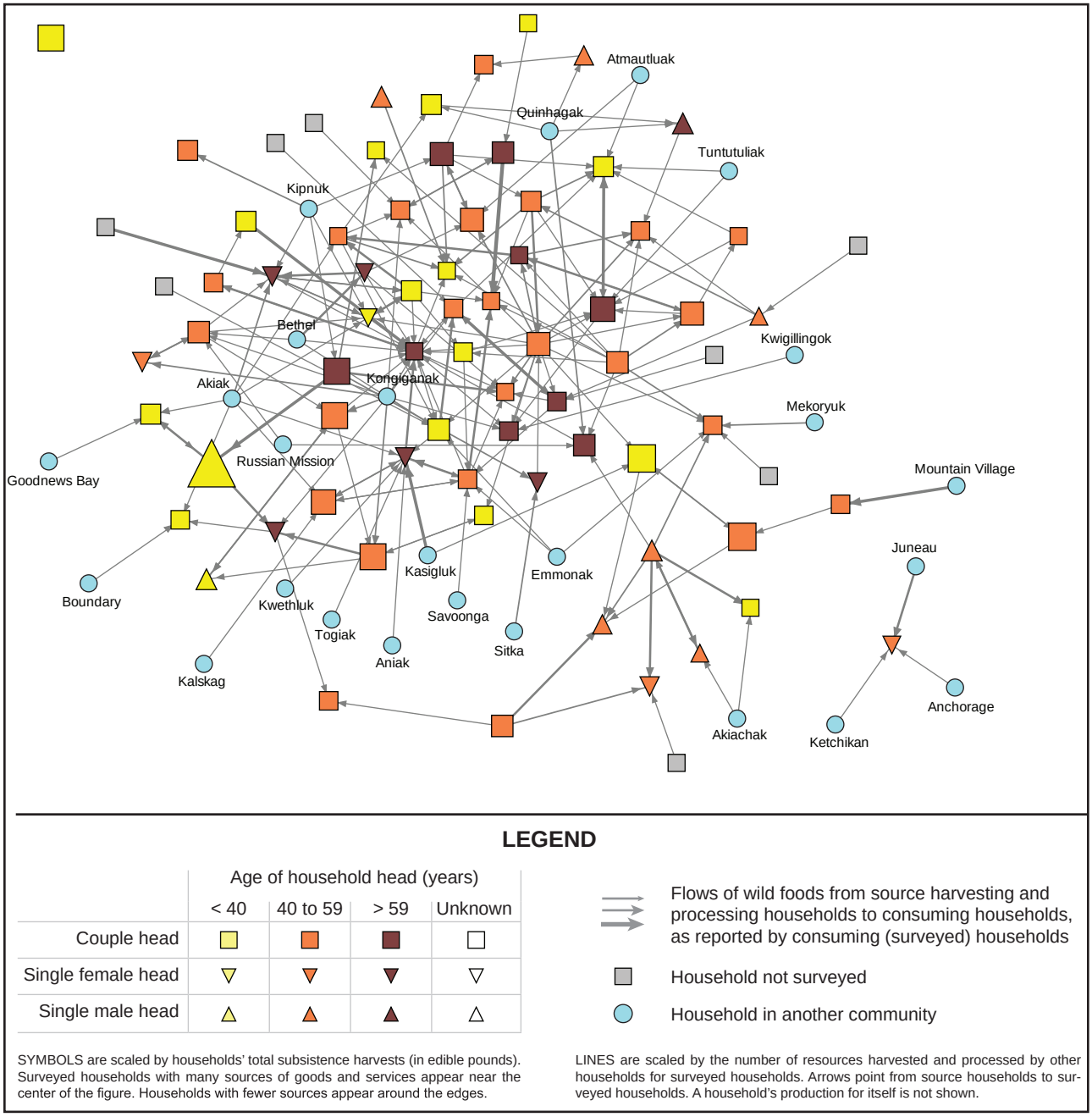

Figure 9-20.–Wild food harvesting and processing network, Tuluksak, 2010.

that outside communities shared these resources, particularly seal oil, which is a highly prized resource that originates in areas relatively distant from the community, with many Tuluksak households.

A wild food network analysis of Tuluksak households in 2010 indicated that many households were linked in an extensive and complex network of sharing subsistence resources (Figure 9-20). Figure 9-20 portrays Tuluksak's wild food network among households, analyzed through their demographic composition and their connections to other households both within Tuluksak and in other communities. Each household is depicted by a symbol (or node) representing various demographic characteristics. The shape of each node indicates whether the household is headed by a couple (square), a single female (downward-pointing triangle), or a single male (upward-pointing triangle). These symbols are scaled by households' total subsistence harvests in edible pounds. Surveyed households with many external sources of subsistence goods and services appear near the center of the figure. Households with fewer external sources appear closer to the margin of the figure. The color of each node depicts the age of the household head, with yellow representing household heads whose age is less than 40 (developing), orange for heads aged from 40 to 59 (mature), and brown for heads who are aged 60 and older (elder). Grey nodes represent households for which demographic data is lacking because they were not surveyed.[6] Blue circles depict households in communities to which survey respondents described having a sharing connection. Arrows between nodes show the direction of the flow of shared resources, with the thickness of lines scaled by the number of resources harvested and processed by the source node.

Approximately 70% of all subsistence resources harvested in 2010 was produced by 31% of Tuluksak households. The highest harvesting households tended to be headed by mature and elder couples who shared with a large number of households throughout the community. Among the households that were most central to the wild food network was an elder couple with a relatively small total subsistence harvest; however, this household was connected to 17 other households, including 2 in outside communities. Most of the elder households, many of which show low wild food harvests, lay closer to the center of the network. This indicates their relatively high number of connections to other households. This likely demonstrates the community's regard for its senior population, and the expectation that younger households need to support their elder relatives and friends who may not be capable of harvesting very much of their own food. Several of the higher harvesting mature households and one higher harvesting developing household, all headed by couples, appear closer to the margin of Figure 9-20. This may suggest that these households had a relatively low number of sharing relationships with other households than did those closer to the center of the figure, possibly due to differences in the number of kinship ties. Many developing households, regardless of total harvests, also appear close to the margin of the figure. This includes the highest harvesting household in Tuluksak in 2011, headed by a single male, which had very few connections within the network.

6. It is possible to include data from grey nodes in the complete network analysis because survey respondents described their connections to these unsurveyed households.

Attempting to explain an apparent anomaly such as this household would be purely speculative; however, like other households with limited sharing relationships, it may lack kinship ties within the community. The majority of the information depicted in Figure 9-20 appears to reflect the pattern described in other studies, which showed that mean wild food harvests increase with the maturity of households in rural Alaska communities (Magdanz et al. 2002:61; Wolfe et al. 2010).

Connections between households were not limited to Tuluksak. Many communities were the source of wild foods which extended the Tuluksak network throughout Alaska. This statewide network included nearby communities such as Kalskag, Akiak, and Akiachak, as well as the distant cities of Anchorage, Juneau, Ketchikan, and Sitka. Tuluksak households reported many other links to several communities within the Yukon–Kuskokwim Delta. Connections with households in 2 other communities in particular were central to Tuluksak's wild food network in 2011. Bethel was likely so closely connected due to the fact that it is the hub community for the region, and many Tuluksak households may have family living there. Kongiganak also showed a close tie to many households. One possible scenario explaining the nature of this node is that a former Tuluksak resident may have settled in Kongiganak and maintained ties to several households in his or her home community. The person may also be a high harvester of wild foods in Kongiganak who is capable of sharing a great deal of resources with many Tuluksak households.

Comparisons with Prior Results

This section discusses the results of the 2010 study in comparison to previously collected data. Historical quantitative information on subsistence harvests in Tuluksak is limited. This was the first comprehensive subsistence study conducted by ADF&G in Tuluksak, resulting in quantitative harvest and use data for all resources. In 1983, the Division of Subsistence gathered wild resource harvest and use data as well as ethnographic information in Tuluksak (Andrews and Peterson 1983). Andrews and Peterson (1983) interviewed 11 key respondents for the purpose of documenting subsistence harvest and use patterns and for mapping subsistence harvest and search areas. The study also recorded community demographic and economic data. Harvest and use data and ethnographic information described by Andrews and Peterson (1983) was primarily limited to the Tuluksak River drainage and was not comprehensive; however, the authors did report total salmon harvests for the community in 1983.

In harvest surveys they conducted in 1983, Andrews and Peterson (1983:35) observed that 100% of Tuluksak households reported to have fished for salmon for subsistence, as compared to 78% of households in 2010 (Table 9-1). The 2010 comprehensive survey did not explicitly investigate changes in harvest fishing effort; however, one key respondent expressed that the price of gasoline has affected subsistence salmon fishing activities. When comparing historic and contemporary subsistence salmon fishing, this key respondent explained, "Gas was a lot cheaper back then. We could travel a lot father …. Now it is so expensive that we can't travel all over the place" (TLT04261104). Furthermore,

from July 10 through July 31, 2010, the U.S. Fish and Wildlife Service (USFWS) took special action in Emergency Order No. 3-KS-01-10 for conservation of Chinook salmon in federal waters of the Tuluksak River. This emergency order closed the Tuluksak River to subsistence fishing using gillnets with mesh greater than 4 inches and longer than 60 feet, and to subsistence fishing for Chinook salmon using all subsistence gear types including hook and line (Brazil et al. 2011). Due to this action by the USFWS, Tuluksak fishers in 2010 experienced unprecedented restrictions on salmon fishing effort, which may have had a significant effect on residents' ability to harvest the fish that they needed. Data from the 1983 study recorded an average estimated total salmon harvest of 44,977 lb with an estimated 146 lb per capita for the community of Tuluksak (CSIS). Tuluksak salmon harvests in 1983 included estimated per capita harvests of 62 lb Chinook salmon, 66 lb chum salmon, and 18 lb sockeye salmon. Between 1989 and 2007, the Division of Subsistence also conducted postseason subsistence salmon surveys in Tuluksak. Since 2008, ADF&G Division of Commercial Fisheries has administered these surveys. The Division of Subsistence has compiled recent results from these surveys in this report in order to show the estimated total annual subsistence harvests of Chinook, sockeye, coho, and chum salmon for Tuluksak from 1999 through 2010 (Figure 9-21); however, these data do not provide rates of harvest for each species for each year.

The size of Tuluksak has ranged from 60 households in 1990 to 86 households in 2009. The annual weighted average of the estimated total salmon harvest in Tuluksak from 1990 to 2009 was 8,331 individual salmon (Eggers et al. 2010). Of that total, the average estimated harvests of individual salmon included 2,756 Chinook salmon, 3,050 chum salmon, 1,583 sockeye salmon, and 891 coho salmon. These averages were weighted by the number of households in the community each year in the interval from 1990 through 2009, excluding 2007 for which subsistence salmon harvest data are absent. In 2010, Tuluksak residents harvested 12,259 total salmon (Table 9-1) which is within the range of harvests recorded since 1990. These 2010 harvests included 3,798 Chinook salmon, 3,997 chum salmon, 3,168 sockeye salmon, and 1,218 coho salmon (Table 9-1). Annual subsistence salmon harvest surveys from 1990 through 2009 recorded a weighted average of 19 total salmon per capita in Tuluksak, ranging from a minimum of 6 salmon per capita in 2006 to a maximum of 39 salmon per capita in 1991 (Eggers et al. 2010). Data from comprehensive subsistence surveys show that residents harvested an estimated total of 27 salmon per capita in 2010, which falls within the recorded range of harvests for Tuluksak since 1990. Fishers in 2010 limited most of their subsistence salmon harvests to an area on the Kuskokwim River within 5 to 10 miles of Tuluksak (Figure 9-8), which is similar to salmon fishing areas recorded by Andrews and Peterson (1983:30). Therefore, overall subsistence salmon harvest activities in 2010 were similar to historical patterns.

The ADF&G Division of Wildlife Conservation maintains a reporting database that records hunter harvest and hunting activity information for a number of large game species. This database, the Wildlife Information Network (WinfoNet), recorded an average annual harvest of 2 moose and 4 caribou for

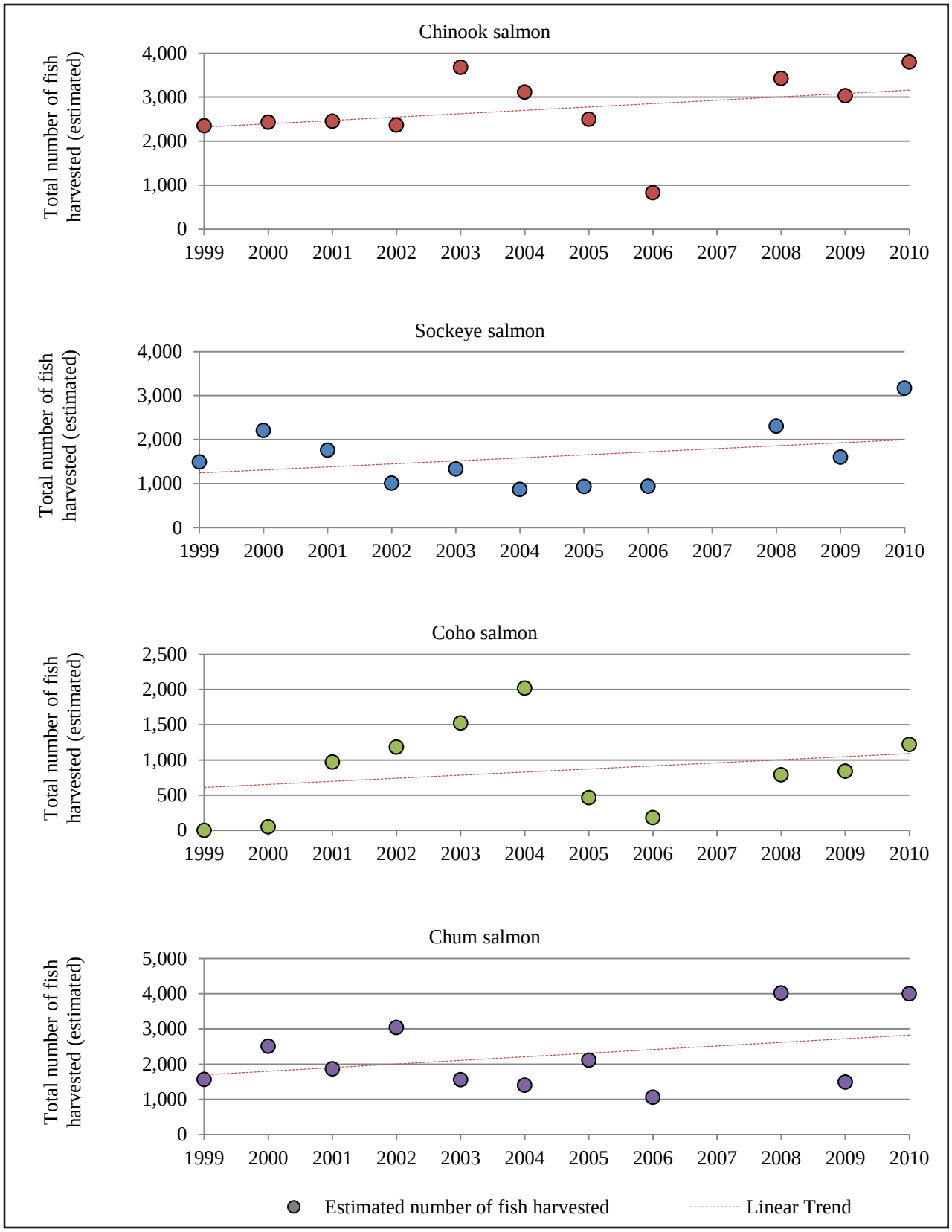

Figure 9-21.–Estimated numbers of Chinook, sockeye, coho, and chum salmon harvested by residents of Tuluksak, 1999–2010.

residents of Tuluksak from 1982 through 2010. Annual harvests of moose and caribou during these years ranged from 0 to 12 moose and from 0 to 13 caribou. These average harvests are based on the number of harvest tickets returned to the Division of Wildlife Conservation by hunters residing in Tuluksak. Because it is uncommon for all hunters to report their harvests by returning harvest tickets, these data usually underrepresent most communities' actual total harvests for these species (Andersen and Alexander 1992). Consistent with Andersen and Alexander's (1992) observations, results from the 2010 comprehensive surveys suggest that harvest ticket returns do not provide an accurate estimate of the total harvest of moose and caribou in the study community. In 2010, ADF&G Division of Wildlife Conservation recorded a harvest of 11 moose and 3 caribou by Tuluksak residents (WinfoNet[7]). This study estimated that in 2010, Tuluksak residents harvested 20 moose and 29 caribou, resulting in 127 and 44 lb per capita, respectively (Table 9-2).

Management of moose populations in game management units (GMUs) 18 and 19 has the goal of rebuilding low-density moose populations in the Kuskokwim River region (Perry 2010b:272, 280; Seavoy 2010:288, 298–300). Similarly, the Mulchatna caribou herd (MCH), a portion of which winters south of the Kuskokwim River, is under intensive management to increase its population. In its most recent published surveys from 2008, ADF&G estimated the MCH to consist of approximately 30,000 caribou, well below the management objective of 100,000 to 150,000 animals (Woolington 2009:12–14). Among other techniques, accurate harvest estimates are essential to achieving these management goals. Although harvest ticket returns provide an effective method of determining big game harvests in some areas of Alaska, comprehensive subsistence harvest surveys such as those conducted in Tuluksak for 2010 can improve the accuracy of harvest estimates in rural Alaska communities.

Under the authority of Alaska Migratory Bird Co-Management Council (AMBCC), USFWS currently administers annual subsistence migratory bird harvest surveys in communities of the Yukon–Kuskokwim Delta region, including Tuluksak (Naves 2010). The USFWS does not report migratory bird harvests for individual survey communities; however, it does use data from these surveys to calculate regional and subregional harvest estimates for much of rural Alaska. Tuluksak is within the Lower Kuskokwim subregion as determined by the AMBCC. The AMBCC migratory bird subsistence harvest data for 2008 recorded an estimated total harvest of 22,813 migratory birds and 5,296 migratory bird eggs in the communities of the Lower Kuskokwim subregion (Naves 2010). Composing 5% of the total subsistence harvest by weight for Tuluksak in 2010, birds and eggs may not appear to represent a substantial portion of the harvest; however, because they are harvested only in spring and late summer, migratory birds and eggs likely constitute a large part of the total harvests during these 2 relatively short seasons.

A comparison of Andrews and Peterson's (1983) data to results from the current study demonstrates changes in the areas used for subsistence by residents of Tuluksak. Figure 9-22 portrays areas historically

7. ADF&G, WinfoNet: http://winfonet.alaska.gov/.

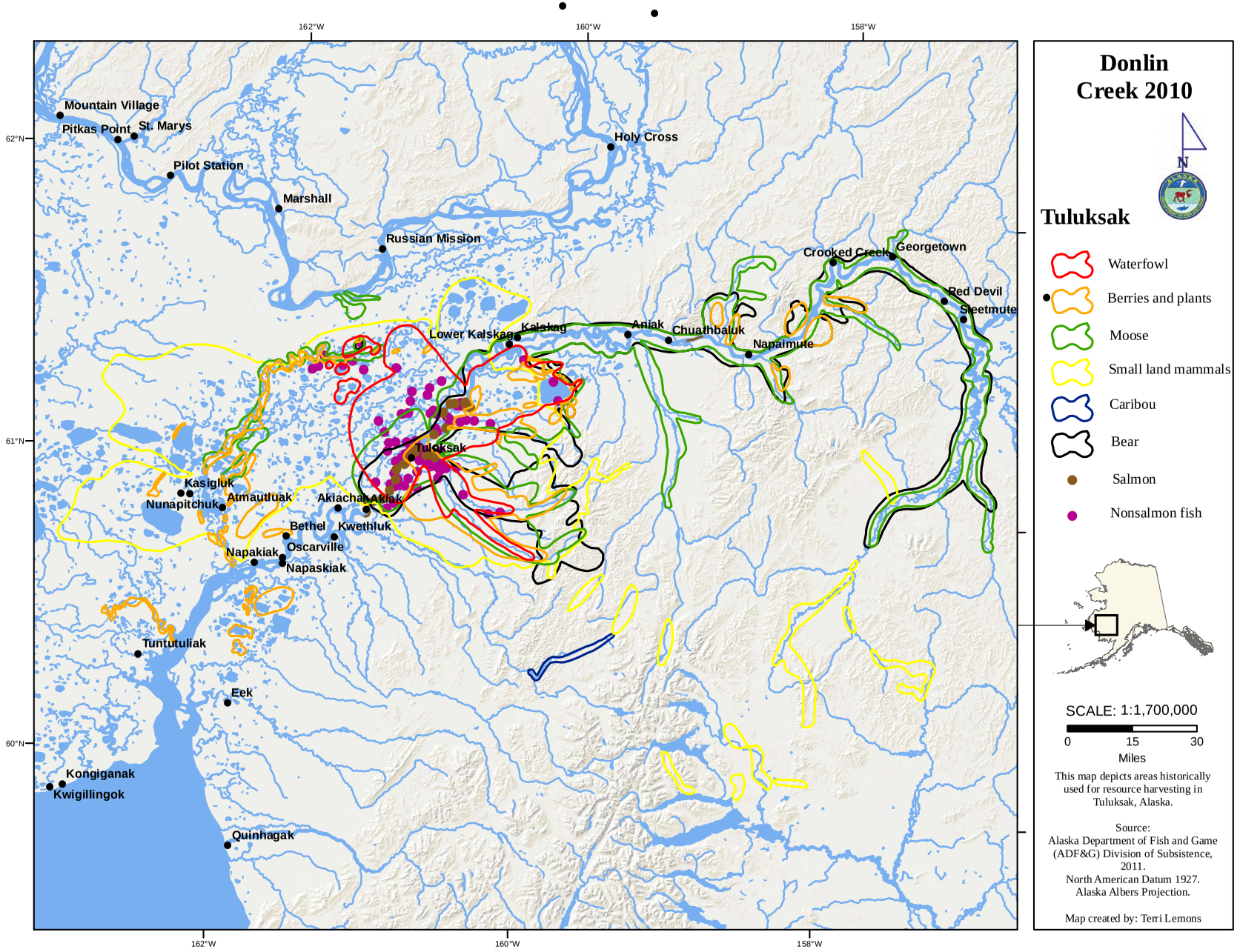

Figure 9-22.–Historic harvest locations and search areas, Tuluksak, 1983.

used for resource harvesting for Tuluksak residents. In Andrews and Peterson (1983), Tuluksak residents indicated that the majority of harvest and use areas of all resources included the lower Tuluksak and Fog rivers. Set and drift gillnet salmon fishing took place in the Kuskokwim River within 5 miles of the community (Andrews and Peterson 1983:27). Key respondents participating in the 1983 study also discussed harvest and use of many resources occurring in other areas similar to those indicated in this study, including Bogus Creek, Mishevik Slough, and Otter Creek. Harvest and use mapping data from the 2010 comprehensive subsistence surveys showed that Tuluksak residents accessed a larger area and more distant locations compared to those discussed in Andrews and Peterson (1983). For example, the 2010 study indicates harvests and uses of resources in the region of the lower Johnson River, the Yukon River, and on the Kuskokwim River as far as Kalskag. Andrews and Peterson (1983) focused their research on traditional and contemporary use of the Tuluksak River drainage and adjacent areas and did not describe subsistence harvest and use extending into the Johnson and Yukon rivers, or into the territory near Kalskag.

Of all resource use areas described in 2010, contemporary fishing areas most resembled those reported in 1983. Both in 1983 and 2010, most salmon were harvested in the Kuskokwim River within a few miles of Tuluksak; however, fishers in 2010 extended their subsistence salmon fishing a greater distance down the Kuskokwim River than did fishers in 1983. Harvest of nonsalmon fish in 1983 extended as far as 25 to 30 miles up the Tuluksak and Fog rivers, with most intensive fishing activity occurring within 12 miles of Tuluksak (Andrews and Peterson 1983:30). While in 2010 very little nonsalmon fishing activity was reported in the Tuluksak and Fog river drainages, some fishing for northern pike occurred south of the lower Fog River. Also notable was the use of Whitefish Lake by Tuluksak residents in 2010 for harvesting whitefishes, which is an activity that was not reported by respondents in the 1983 study.

In 1983, moose hunting activity was reported to occur only within an area extending 60 miles up the Tuluksak River and 50 miles up the Fog River, as well as some on the Kuskokwim River within 2 miles of Tuluksak (Andrews and Peterson 1983:27). In 2010, Tuluksak moose hunters reported very different search and harvest areas. While some moose hunting occurred as far as approximately 20 miles up the Tuluksak and Fog rivers, hunters also used a large territory along the Kuskokwim River and into the Bogus and Discovery Creek drainages. In 1983, none of the respondents reported any moose hunting activity in the Yukon River. In contrast, Tuluksak hunters used a portion of the Yukon River and Twelvemile Slough downstream of Paimiut Island. The only other large land mammal hunting reported in 1983 was for black bears, which occurred in areas along the Tuluksak River, and ranged as far as the Kilbuck Mountains (Andrews and Peterson 1983:28). Black bear hunting in these areas is also described by Fienup-Riordan (2007:159) and by key respondents in other studies, including interviews discussed in Buzzell and Chambers (2010) and Schneider et al. (2004). Black bear hunting in 2010 was mostly limited to an area 20 miles in diameter centered on Tuluksak, as well as some

activity in the territory adjacent to Atmautluak. Andrews and Peterson (1983) did not present data on caribou hunting in their report.

In addition to fish and big game, Andrews and Peterson (1983) reported harvests of several other resources occurring mostly in the lower to middle Tuluksak and Fog River drainages. These harvests included waterfowl, small land mammals, furbearers, berries, plants, and firewood.

The one issue that key respondents in the 2010 study discussed that explains changes in the use of the Tuluksak River was conflicts with placer gold miners near the headwaters. Historical use of the Tuluksak River drainage included long hunting and gathering excursions into the foothills of the Kuskokwim Mountains;, families returned to Tuluksak and other settlements in boats made of wooden frames and moose, caribou, or bear hide hulls. This practice is not known to have occurred in the recent memory of Tuluksak residents; however, one key respondent explained that his parents participated in these excursions. He and others recalled confrontations in the upper Tuluksak River which resulted in hunting, gathering, and travel being thwarted by gold miners. He stated:

> My parents used to go up [to the Nyac area], hunting every spring [until] that mining got started. I don't know what year. Probably way before I was born [in 1940]. Then [the miners] don't welcome them anymore and kick them out. (TLT04251103)

Finally, local residents' concerns about water quality in the Tuluksak River may have influenced recent subsistence harvesters' choice to search for resources elsewhere. It is important to note that although key respondents in 1983 reported that the highest intensity of the community's harvests occurred with the Tuluksak River drainage, there is evidence that Tuluksak residents historically accessed a large territory throughout the lower Kuskokwim River drainage from Discovery Creek, downstream to Akiak and Akiachak, and into the upper Johnson River drainage south and east of Kalskag. Key respondents in Schneider et al. (2004) indicated use of these areas, which are beyond the extent of those presented both in Andrews and Peterson (1983) and the 2010 study.

When compared to other studies in Tuluksak, respondents reported limited use of the Tuluksak River drainage and the foothills of the Kuskokwim Mountains in 2010; however, subsistence harvesters were still very active in other areas. Contemporary subsistence activities of Tuluksak residents included a diversity of resources, harvested throughout a large territory of the lower Kuskokwim River drainage and into the Yukon River drainage. Although historical harvest data for the community is limited, comprehensive subsistence surveys in 2010 documented generally similar and possibly greater harvests of some resources as described in other studies. Despite high per capita harvests of fish, 2010 harvests of these and other resources were apparently not sufficient for some households to avoid conditions of food insecurity. Tuluksak's social network likely ameliorated these conditions for some households; however, residents' traditions of sharing more importantly represent the significant social and cultural practices that connect Yup'ik communities in the lower Kuskokwim River region.

10. Regional Discussion and Conclusion

Prepared by Andrew Brenner, David Runfola, and Elizabeth Mikow

The objective of the second phase of the Donlin Gold Subsistence Research Program was to describe the contemporary subsistence uses of fish, wildlife, and plant resources by 4 Lower Kuskokwim River communities—Oscarville, Kwethluk, Akiak, and Tuluksak—and for the communities of Napaimute and Georgetown in the central Kuskokwim. Although an attempt was made to select a representative sample of communities in the Lower Kuskokwim region, the distribution of surveyed communities in 2011 was restricted to the area upriver from Oscarville and did not include 7 communities on the Kuskokwim or its tributaries that are located downriver from Oscarville—Napaskiak, Napakiak, Atmautluak, Kasigluk, Nunapitchuk, Tuntutuliak, and Eek. Additionally, Akiachak, and also Bethel—the hub community for the Yukon–Kuskokwim Delta region—are not represented in this study. The 4 Lower Kuskokwim communities are 4 of 12 smaller communities in the Lower Kuskokwim area (excluding Bethel[1]), with 1,617 people of a total area population of 4,942 (U.S. Census Bureau 2011). They share a similar natural environment within a largely similar cultural and linguistic context and so likely share more in common with each other than with Napaimute and Georgetown. Harvest and use areas described for the 4 communities in this study may generally reflect but do not represent the entirety of subsistence harvest and use patterns in the Lower Kuskokwim subregion. Due to the numerous differences between the 4 Lower Kuskokwim River communities and the communities of Georgetown and Napaimute, regional results for each set of communities are discussed separately below in the sections "Subsistence in the Lower Kuskokwim River: Summary of 2010 Data and Regional Overview" (Oscarville, Kwethluk, Akiak, and Tuluksak) and "Relationships between Georgetown, Napaimute, and other Central Kuskokwim River Communities."

Demographics

The 4 Lower Kuskokwim River communities surveyed in this study—Akiak, Kwethluk, Oscarville, and Tuluksak—had a total estimated population of 1,513 individuals with an average of 378 individuals per community. Populations ranged from 54 in the smallest community of Oscarville to 713 in Kwethluk, the largest community in this study. These communities' populations have all shown considerable growth over the past century, with 2010 populations for Kwethluk and Tuluksak more than twice what they were in 1960 (U. S. Census Bureau 1963; ADCCED 2011b; ADCCED 2012b).

1. Bethel differs markedly from other communities in the Lower Kuskokwim River region in terms of population size, demographics, economic structure, and basic infrastructure (Wolfe et al. 1986), and it is likely that these factors influence subsistence harvest and use patterns. The degree to which Bethel's subsistence harvest and use patterns differ from other communities in the region has not been quantitatively described for resources other than salmon and migratory birds at this time.

An estimated 96% of all residents in the 4 study communities are Alaska Native, and nearly all Alaska Native residents of Lower Kuskokwim River region communities are of Yup'ik heritage.

Subsistence in the Lower Kuskokwim River: Summary of 2010 Data and Regional Overview

During this survey, residents of the Lower Kuskokwim River region described long traditions of engaging in a variety of subsistence activities, including harvesting large and small mammals, multiple species of salmon and nonsalmon fishes, migratory waterfowl, marine mammals, and a variety of edible and medicinal plants. Many expressed that access to subsistence resources is essential to maintaining their cultural heritage and family and community ties. Between January and December 2010, residents of the 4 surveyed Lower Kuskokwim communities harvested an estimated total of 693,542 edible pounds of subsistence resources, with an estimated average harvest of 429 lb per capita. Estimated harvests for each community ranged from 359 lb per capita in Tuluksak to 616 lb per capita in Akiak.

Figure 10-1 shows the 10 wild fish and game species that contributed most to subsistence harvests in the 4 study communities. In these 4 communities, 10 species provided 80% of the annual harvest in terms of edible pounds. The importance of fish in particular was evident: 8 fish species—Chinook,

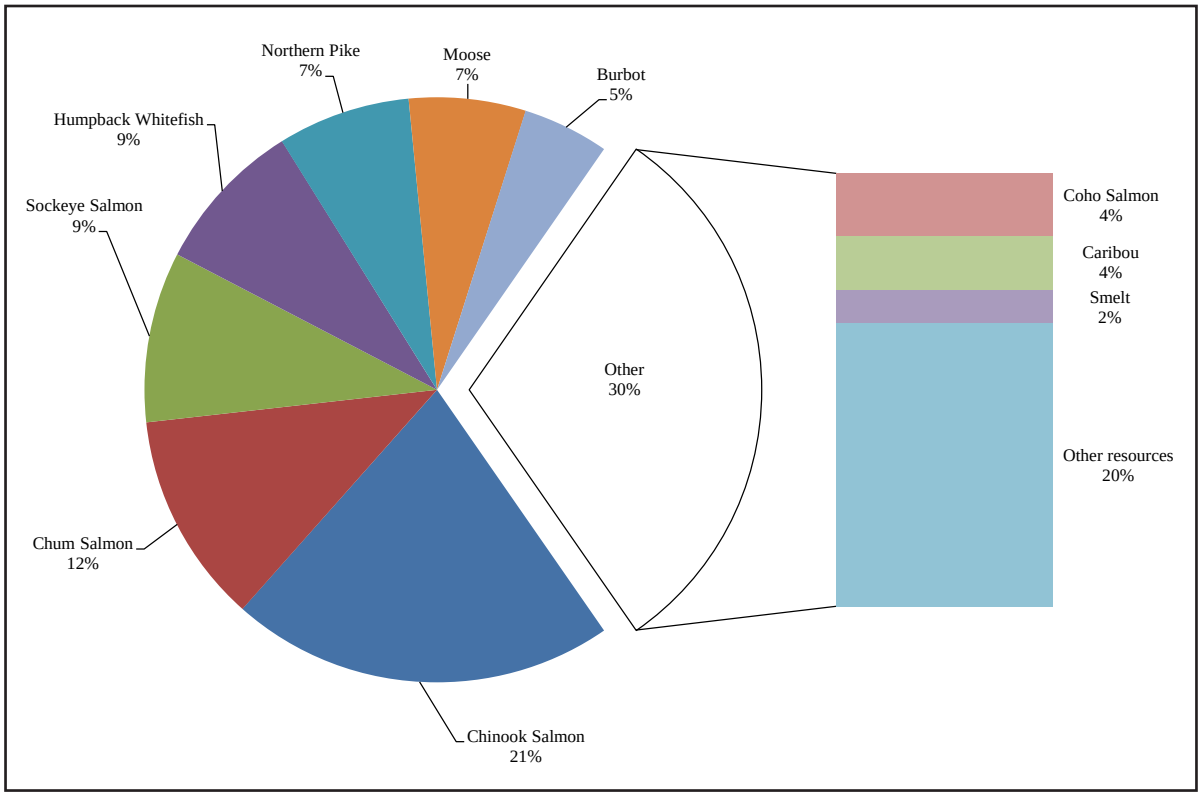

Figure 10-1.–Percent of total harvest by resource, all study communities, 2010.

chum, and sockeye salmon; humpback whitefish; northern pike; burbot; coho salmon; and smelt—composed 70% of the total regional subsistence harvest by weight. Large land mammals made up the remainder of the top 10 resources, with moose contributing approximately 7% and caribou 4% to the total subsistence harvest by edible weight. Although resources such as berries and greens, birds and eggs, and marine mammals formed a smaller portion of the subsistence harvest, these resources were also used extensively during the study year. The harvest patterns of the 4 surveyed communities in 2010 largely mirror historical patterns for the lower Kuskokwim River, typified by a diverse resource base with a heavy reliance on fishes (salmon and nonsalmon fish species) and land mammals (primarily moose and caribou), supplemented with harvests of marine mammals, migratory birds and eggs, and berries and greens.

Comparison of 2010 subsistence harvest data for the 4 surveyed communities to harvest data from past subsistence studies in these and other communities in the Lower Kuskokwim River region provides insight into regional trends in harvest patterns. Past comprehensive subsistence studies have been conducted in Tuluksak (Andrews and Peterson 1983), Nunapitchuk (Andrews 1989; Ray et al. 2010), Kwethluk (Coffing 1991), Akiachak (Coffing et al. 1998), Eek (Ray et al. 2010), and Tuntutuliak (Ray et al. 2010). Annual subsistence harvest data has been collected through various survey methods for salmon, migratory birds, and large land mammals in the Lower Kuskokwim River region, and limited harvest data have been collected for furbearers.

Past studies generally reveal regional subsistence harvest patterns that closely resemble those of the 4 study communities in terms of the species composition of the harvest. Quantities of resources harvested in these earlier studies show considerable variation regionally and temporally, and past studies that involved collection of harvest data for all resources show generally higher per capita subsistence harvests than those documented in communities surveyed for 2010. These higher harvests may reflect inter-annual variability in resource availability or harvest effort, differences in harvest levels between different villages within the Lower Kuskokwim River region, or possibly a trend toward declining harvest levels for undetermined reasons.

The following sections summarize subsistence harvest and use patterns for individual resource categories in the 4 surveyed Lower Kuskokwim River communities, and for selected resources include comparisons between this study's harvest data and previously collected harvest information for Lower Kuskokwim River communities. As noted earlier, the distribution of surveyed communities in 2011 was restricted to the area upriver from Oscarville and, as a result, reflects but does not represent the entirety of harvest and use patterns for subsistence resources in the Lower Kuskokwim subregion in 2010.

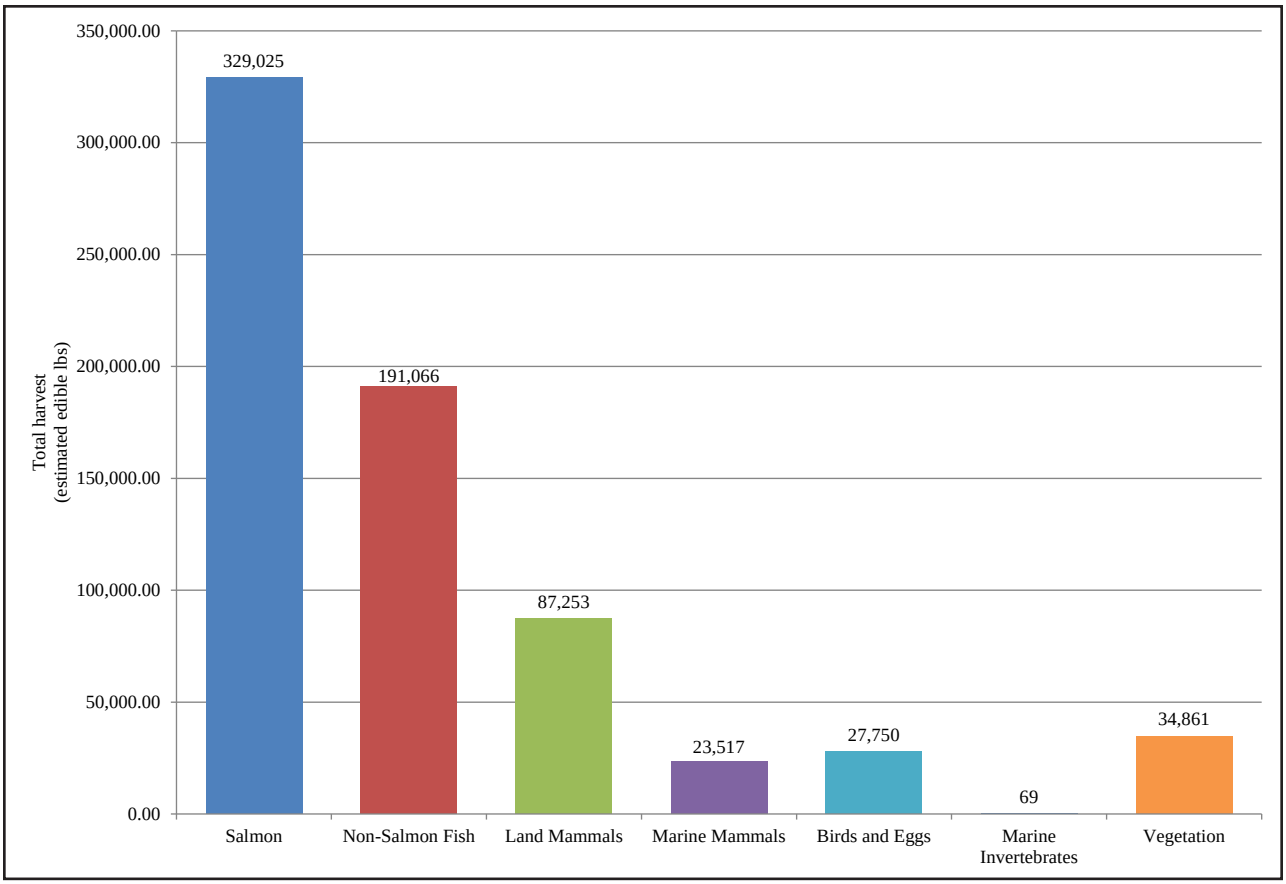

Figure 10-2.–Total estimated edible pounds harvested by the community by resource category, Akiak, Kwethluk, Oscarville, and Tuluksak, 2010.

SALMON

By resource category salmon dominated the 2010 harvest, contributing 329,025 lb or 47% of the total estimated harvest, for the 4 study communities (Figure 10-2). Chinook salmon represented the largest contribution of a single species to the subsistence harvest by edible weight. Chum, sockeye, and coho salmon also formed a large portion of the total harvest, while relatively few pink salmon were harvested in 2010. Corresponding to this large contribution, 71% of households reported harvesting salmon, and nearly all (97%) households used salmon during 2010 (Figure 10-3). ADF&G has collected salmon harvest data for Kuskokwim River communities through post-season household surveys since the 1960s. This discussion will include an analysis of these estimates since 1990.[2] Past comprehensive subsistence surveys have also documented salmon harvests in Kwethluk (Coffing 1991), Nunapitchuk (Andrews 1989), and Akiachak (Coffing et al. 2001), and data from these studies provide additional context to salmon harvests in 2010.

2. Methods for the survey were redesigned in 1988. Data collection methods prior to 1988 were variable, and data published from the 1960s–1988 is not comparable with post 1988 data. Additionally, relatively minor variations in harvest data collection since 1990 led to re-analysis and updated harvest numbers from 1990–2009 (Hamazaki 2011).

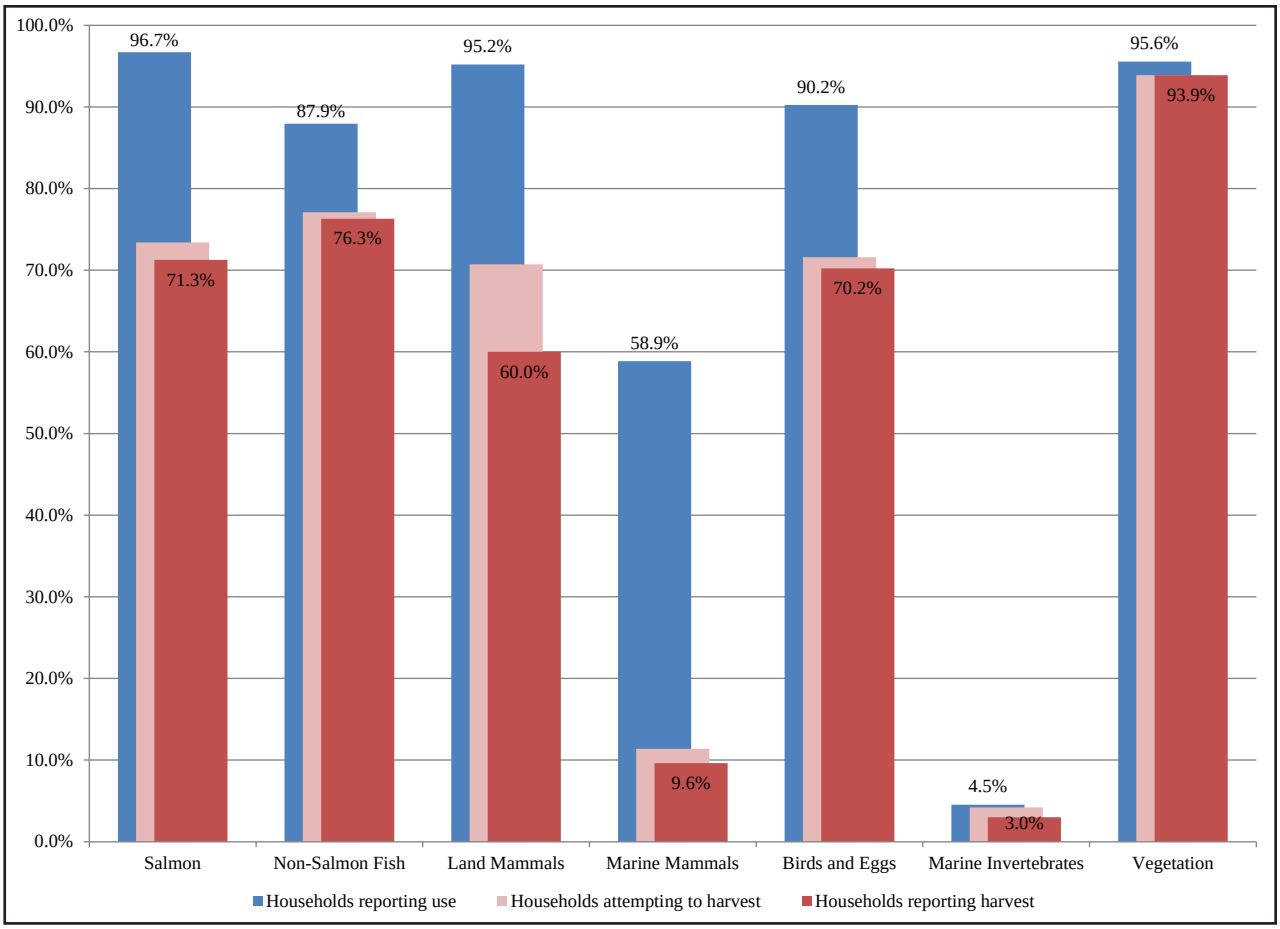

Figure 10-3.–Percentages of households using, attempting to harvest, or harvesting subsistence resources by category, Akiak, Kwethluk, Oscarville, and Tuluksak, 2010.

In general, salmon harvests in the Lower Kuskokwim River for all species other than chum salmon are estimated to have remained stable between 1990 and 2009 in terms of total numbers of salmon harvested (Hamazaki 2011:31–34). However, increases in household numbers (Hamazaki 2011:44) and population (ADLWD 2011)[3] in the Lower Kuskokwim River region suggest that per capita harvests of all salmon species have likely decreased. Chum salmon harvested for subsistence have likely decreased both in terms of total and per capita harvests.

Between 1990 and 2009, Chinook salmon harvests in the Lower Kuskokwim River region ranged from 57,864 to 93,725 individual salmon (Hamazaki 2011:20) with 10-year averages of 73,782 for 1990–1999 and 71,505 for 2000–2009. Estimated Chinook salmon harvests for 2010 and 2011 in the Lower Kuskokwim region were the lowest for any years since the survey was redesigned in 1988 with 57,819 total Chinook salmon harvested in 2010 (Fall et al. 2013) and 50,371 in 2011(T. Hamazaki, Biometrician, ADF&G, Anchorage, personal communication, May 2012). Additionally, ADF&G

3. Alaska Department of Labor and Workforce Development population data for 1990–2011 describe an increase in population within the Bethel census area, which roughly approximates the Lower Kuskokwim River region, but also includes coastal and upriver communities.

restricted subsistence Chinook salmon fishing in the Kuskokwim River Drainage during 2012 due to low projections of returning Chinook salmon. As a result, harvests of Chinook salmon were likely lower than in recent years.

Chum salmon subsistence harvests in the Lower Kuskokwim region for the years 1990–2009 ranged from 29,882 to 118,417 total salmon, and were higher in the period 1990–1999 (mean annual harvest 62,180 salmon) than in the period 2000–2009 (mean annual harvest 50,430 salmon) (Hamazaki 2011:22). It is unknown whether this reflects a long-term trend in declining chum salmon harvests or temporary fluctuations in harvest patterns. Chum salmon harvests for 2010 in the Lower Kuskokwim River region were lower than the 10-year average from 2000–2009 (50,430 salmon), with an estimated 36,756 salmon harvested (Fall et al. 2013).

Sockeye and coho salmon subsistence harvests in the Lower Kuskokwim River show considerable variability between individual years from 1990–2009 (Hamazaki 2011:31). Sockeye salmon annual harvests from 1990–2009 for the Lower Kuskokwim River ranged from 22,347 to 45,670 total salmon (Hamazaki 2011:24), with a 20-year average of 33,287 total salmon. In 2010, the sockeye salmon estimated harvest of 30,171 salmon was slightly higher than the previous 20 years' average (Fall et al. 2013). Coho salmon annual harvests from the Lower Kuskokwim River for the years 1990–2009 ranged from 18,709 to 49,412 salmon with a 20-year average of 29,885 total salmon (Hamazaki 2011:31). In 2010, the Lower Kuskokwim River coho salmon estimated harvest of 26,753 salmon (Fall et al. 2013) was slightly lower than the previous 20 years' average harvest.

Relatively few pink salmon were harvested in 2010. This species is normally utilized when harvested incidentally to other species but is rarely targeted by subsistence fishers in the lower Kuskokwim River. As such, its contribution to the total subsistence salmon harvest has been negligible for at least the past several decades, as it was for surveyed communities in 2010.

Between 1990 and 2011, harvests consistently exceeded the lower limit of the amount reasonably necessary for subsistence (ANS, see Appendix D, Kuskokwim River Salmon Regulations) range for Kuskokwim River salmon, with a few notable exceptions. The Chinook salmon ANS range lower limit for the Kuskokwim River drainage was not exceeded in 2006 (Hamazaki 2011:58), and 2011 harvests also fell below the lower limit of the ANS range for Chinook salmon in the Kuskokwim River drainage (T. Hamazaki, Biometrician, ADF&G, Anchorage, personal communication, May 2012). Although 2010 Chinook and chum salmon harvests for the Kuskokwim River exceeded ANS range lower limits, harvests for both species were below recent averages. This indicates that estimated salmon harvests for 2010 in this study are possibly an underrepresentation of the communities' typical harvest and use patterns for these species.

Comparison of 2010 comprehensive survey harvest data to information from past comprehensive subsistence studies completed in the 1980s provides additional perspectives on trends in salmon harvests and uses in 2010 relative to previous years. Past subsistence studies in the 1980s of Kwethluk in 1986

(Coffing 1991), Nunapitchuk in 1983 (Andrews 1989), and Tuluksak in 1983 (Andrews and Peterson 1983) show possible differences between salmon harvest patterns in the 1980s relative to 2010. For example, residents of communities surveyed in the 1980s generally appear to have harvested more chum salmon relative to Chinook salmon than communities in 2010. Kwethluk, Nunapitchuk, and Tuluksak's estimated harvests of Chinook salmon from the 1980s studies represented between 41% and 60% of estimated chum salmon harvests in terms of individual salmon (i.e., these communities harvested about 2 chum salmon for every 1 Chinook salmon). In 2010, communities' Chinook salmon harvests from this study ranged from 84% to 219% of chum salmon harvests in terms of individual salmon, indicating that communities in 2010 harvested similar (Akiak, Kwethluk, and Tuluksak) or greater (Oscarville) amounts of Chinook salmon relative to chum salmon. It is unclear whether this represents a long-term shift in salmon harvest and use patterns, and explanations for such a shift (such as reductions in commercial fishery incidental catch of chum salmon, changes in food preference, or resource availability) have not been explored in depth at this time.

Respondents in this study voiced multiple concerns over the future of salmon and salmon fishing, particularly for Chinook salmon. Although Chinook salmon populations were above or near average levels from 2005–2009 (Estensen et al. 2009), abundance was poor in 2010, and there has been a noticeable decrease in the average size of returning Chinook salmon.[4] Respondents in this study were particularly concerned about bycatch of marine salmon in high-seas pollock fisheries and the potential for future closures of subsistence salmon fishing. An additional concern voiced by respondents is the relatively recent decline in commercial fishing opportunities, which provided an important source of cash income for residents of the region in the past.

NONSALMON FISH SPECIES

Nonsalmon fish species formed a large component of the 2010 subsistence harvest, contributing 191,066 total edible pounds and 126 lb per capita across all 4 communities, or 28% of the total estimated harvest. Communities harvested at least 22 different nonsalmon fish species in 2010, although the relative contribution of each fish species to the different communities' harvests differed somewhat (see individual chapters). Five species dominated the nonsalmon fish harvest in terms of edible weight when averaged across all 4 communities: humpback whitefish (58,742 lb), northern pike (50,842 lb), burbot (33,023 lb), smelt (16,136 lb), and sheefish (15,575 lb). Altogether these 5 species together formed 91% of the total nonsalmon fish harvest.

Several contemporary sources have reported substantial harvests of nonsalmon fish by residents of the Lower Kuskokwim River region. The Division of Subsistence CSIS includes records of harvests for several species of fish other than salmon for 5 Lower Kuskokwim River communities. These data were collected during subsistence harvest surveys that took place in Nunapitchuk (Andrews 1989),

4. Alaska Department of Fish and Game, "2010 Kuskokwim River Salmon Fishery News Release #22; 2010 Kuskokwim Area Salmon Fishery Summary; Districts Affected: Kuskokwim River," news release, October 7, 2010.

Kwethluk (Coffing 1991), Akiachak (Coffing et al. 2001), and again in Nunapitchuk, as well as in Eek and Tuntutuliak (Ray et al. 2010). These studies reported estimated per capita harvests for individual communities ranging from 134 to 365 edible pounds of nonsalmon fish species during the study years (CSIS). Simon et al. (2007 a and b) also recorded harvests of nonsalmon fishes by Bethel residents for years 2001–2004. In Bethel, harvest totals were compiled primarily from household surveys with additional data from harvest calendars and postcard surveys that participating households returned to researchers (Simon et al. 2007b). Because these methods did not record household size of Bethel respondents, Simon et al. (2007b) did not report annual per capita harvest rates of nonsalmon fish in Bethel; however, the authors did report a Bethel population of 5,471, and recorded an average total harvest of 98,347 lb of nonsalmon fish per year for Bethel residents during the study period (Simon et al. 2007b:30–32). Based on these data, a preliminary estimate of 18 lb per capita can be calculated for all Bethel residents in 2001 through 2004. While it appears from the limited data presented above that nonsalmon fish harvests by the 4 surveyed communities in 2010 were somewhat lower on a per capita basis than estimates developed as part of earlier comprehensive subsistence surveys, increases in population in all 4 communities since these previous surveys suggests that total harvests of nonsalmon fish species in the lower Kuskokwim River may have remained fairly stable over the past several decades. Nonsalmon fish species also continue to form a major component of the subsistence harvest in the Lower Kuskokwim River region in ways not captured in harvest estimates; Brown et al. (2011:185–187), for example, discuss the historical and contemporary significance of whitefish harvests for communities of the Lower Kuskokwim River, as well as the important role that these species have had in sharing and barter among people of the region.

LAND MAMMALS

Land mammals, including both large land mammals (such as moose) and small land mammals (such as beavers and hares), contributed another 87,253 lb (13%) to the 2010 subsistence harvest. Residents of the 4 communities altogether harvested at least 19 different land mammal species. Moose and caribou represented the largest component of this harvest in terms of edible weight—an estimated 206 caribou and 83 moose total contributed 71,412 edible pounds—while beavers, black bears, and hare species also contributed substantial amounts of food.

Historical moose harvest information for lower Kuskokwim River communities is limited. Until recently, moose occurred at low densities in the Lower Kuskokwim River region and were virtually absent prior to 1940 (Andrews 1989:329; Charnley 1983:3; Perry 2010b:271). Moose gradually colonized the region throughout the latter 20th century and became a major component of subsistence harvests in the region. Of all subsistence resources other than fish harvested by surveyed communities in 2010, moose contributed the most by edible weight. Relatively low local abundance of moose in

previous decades resulted in extensive travel outside of the region by locals to hunt moose, as well as intensive hunting and corresponding management challenges within the region (see chapter 3).

Historically there have been a considerable number of unreported moose harvests annually in this area, particularly before 2001–2004 when outreach and education efforts to increase harvest reporting occurred (Perry 2006: 268–9). Reported total harvests occurring in the lower Kuskokwim and Johnson River areas ranged from 11 to 36 individual moose between 1981 and 2003 (Perry 2006: 277–279). Information from comprehensive surveys indicates that harvests may have been higher during this time: comprehensive surveys estimated individual village harvests of 12 moose in Nunapitchuk in 1983 (Andrews 1989) and 33 moose in Kwethluk in 1986. Although many area residents likely travelled outside of these areas into the Yukon River portion of GMU 18 as well as into GMU 19 to harvest moose during these years, the fact that harvest levels for individual villages are similar to reported harvests for the entire region indicates that harvest estimates derived from historical harvest reporting in the Lower Kuskokwim River area are likely not useful for comparison to 2010 harvest estimates. Historical harvest information from comprehensive surveys is primarily limited to Nunapitchuk in 1983 and Kwethluk in 1986. These past studies provide some indication that per capita harvests of moose in 2010 were similar to those in the 1980s. For example, the average 2010 estimated per capita harvest of 28 edible pounds for all 4 surveyed Lower Kuskokwim area communities is intermediate between Nunapitchuk's estimated per capita harvest of 19 edible pounds and Kwethluk's estimated per capita harvest of 33 edible pounds. This suggests that in spite of several dramatic changes in moose hunting regulations that affected lower Kuskokwim River hunters, such as creation of a Tier II moose hunt in the Central Kuskokwim region in 2006 and moose hunting moratoriums on the Lower Kuskokwim (2004–2009) and Lower Yukon (1988–1994), Lower Kuskokwim communities may have maintained fairly consistent per capita moose harvests between the 1980s and the present.

Similar to moose, caribou harvest data for the Lower Kuskokwim River region that is directly comparable to the 2010 data for the 4 surveyed communities is limited. Caribou harvest data from the surveyed communities currently can only be compared to limited harvest ticket return data as well as to past subsistence reports in the Lower Kuskokwim River region. Subsistence caribou harvests in the Lower Kuskokwim River region are strongly influenced by caribou herds' geographic distribution and population size, and harvest patterns show considerable changes over time in response to caribou herd dynamics. 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 1984:6; McAtee 2010). Caribou were scarce and were likely unavailable to subsistence hunters during this time period. A small group of caribou, the Kilbuck Mountains herd, was present to the south of this report's study communities and was hunted beginning, at the latest, in the mid-1980s (Spaeder 2005). A comprehensive subsistence survey for Kwethluk documented a community harvest of 2 caribou in 1986 (Coffing 1991), and these harvests likely were Kilbuck caribou. The Mulchatna herd

rapidly expanded beginning in the 1980s and hunting regulations were liberalized as the herd grew in number (Woolington and Machida 2001). A comprehensive survey of Akiachak during this period of liberalized regulations documented an estimated harvest of 374 caribou in 1998 (Coffing et al. 2001).

Harvest and ethnographic information from this study reflects a trend of declining small land mammal harvests for most species throughout the Lower Kuskokwim River region. While harvest levels of some small land mammals, including beaver and hare species, remain comparable to past years, other furbearer harvests were minimal during the study year, for surveyed communities, relative to historical levels. Reduced harvest in recent years throughout the Yukon–Kuskokwim Delta region has been attributed to reductions in fur prices (Seavoy 2004:237) and increased costs of fuel (ADF&G 2010b:62). For most species, furbearer populations in the Lower Kuskokwim region were abundant and underexploited during the study year (Perry 2010a). Harvests of some furbearer species that historically were especially important in this region have virtually ceased. Muskrats were formerly specifically targeted at spring camp locations and harvested in large numbers. In recent years, most muskrat hunting and trapping has been incidental to spring waterfowl hunting, and harvests have declined (Perry 2010a). Mink were also formerly harvested in large quantities throughout the Yukon–Kuskokwim Delta region, with an average annual harvest in the 1940s of 16,000 mink across the region (Seavoy 2004:237). In the 1980s, surveyed communities in the Yukon–Kuskokwim Delta region, including Nunapitchuk (Andrews 1989) and Kwethluk (Coffing 1991) in the Lower Kuskokwim subregion reported annual harvests of hundreds of mink as did Lower Yukon River area communities (Wolfe 1981). During 2010, Tuluksak households harvested an estimated 4 mink, and this was the only community harvesting any mink out of the 4 surveyed communities. In spite of their reduced monetary importance, furbearers are widely used in handicrafts and articles of clothing such as fur hats and parka ruffs, and some furbearer species—including beaver, lynx, muskrat, river (land) otter, and mink—are valued as food resources in these communities.

MARINE MAMMALS

Marine mammals are an important subsistence resource in the Yukon–Kuskokwim Delta region (Coffing et al. 1999:1), and all 4 communities harvested marine mammals during the study year. Altogether, marine mammals—bearded, ringed, and spotted seal, Pacific walrus, and beluga whale—contributed 23,517 edible pounds (3% of total harvest) to the 4 communities. The proportions of marine mammals harvested by species varied considerably between communities, as did the number of individual marine mammals harvested. Kwethluk and Oscarville residents harvested relatively large per capita numbers of marine mammals relative to Tuluksak and Akiak, and this may be related to the greater proximity of these 2 communities to the coast (Figure 10-4).

This study estimates that the 4 surveyed communities in 2010 had an average harvest of 15 edible lb per capita of marine mammals, primarily seals. These harvest levels fall within the range of past

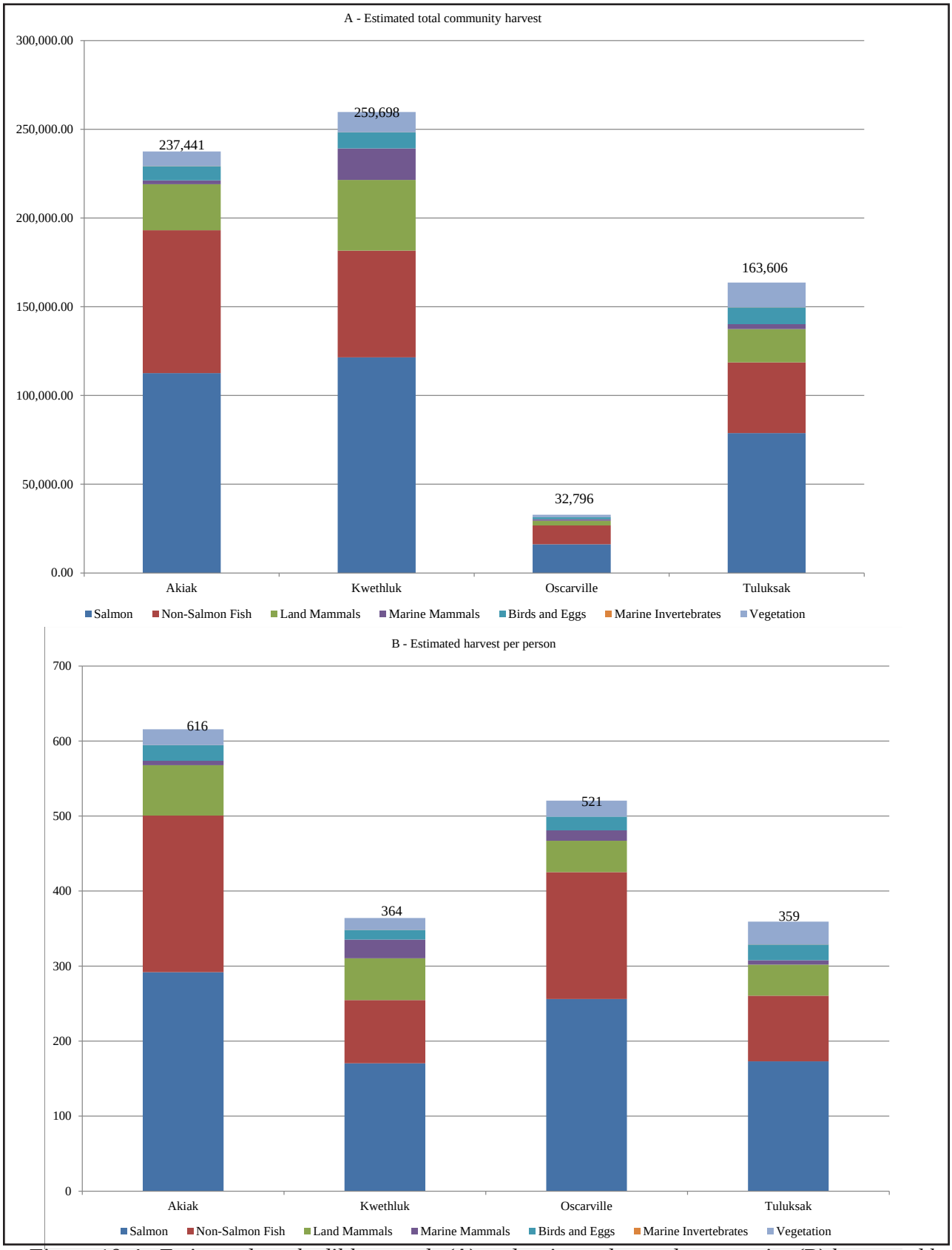

Figure 10-4.–Estimated total edible pounds (A) and estimated pounds per capita (B) harvested by residents of Akiak, Kwethluk, Oscarville, and Tuluksak, 2010.

subsistence studies— Kwethluk residents harvested 8 edible pounds per capita of marine mammals in 1986; Nunapitchuk residents harvested 19 edible pounds per capita of marine mammals in 1983, and Akiachak residents harvested 30 lb per capita of marine mammals in 1998 (Coffing 1991; Andrews 1989; Coffing et al. 1998)—indicating that harvest levels across the region have likely remained fairly stable over the past few decades. Marine mammal harvests are likely higher for most coastal and near-coastal communities than for the 4 surveyed communities in 2010, which are all somewhat removed from the marine environment. Marine mammals made up on average 3% of the total subsistence harvest by edible weight for surveyed 2010 Lower Kuskokwim River area communities, compared to an estimated 16% of the total subsistence harvest for Quinhagak, a coastal community, in 1983 (CSIS). However, the low harvest levels of marine mammals recorded in this study relative to coastal communities is not paralleled by low use levels in these communities—nearly all households in this study (95%) used marine mammal products in 2010. Seal oil in particular is ubiquitous in the Lower Kuskokwim River region as an essential component of the local cuisine.

BIRDS AND EGGS

Birds and eggs together contributed 27,750 edible pounds (4% of total harvest) to the 4 communities. Community members reported harvesting at least 28 species of birds in 2010. For all communities other than Oscarville, the same 5 bird species contributed the most to bird harvests in terms of edible pounds—black scoter, cackling goose, ptarmigan species (primarily willow ptarmigan), tundra swan, and white-fronted goose. All communities, except Akiak, reported harvesting wild bird eggs–primarily duck, geese, and gull eggs.

Historical data for migratory bird harvests in the Lower Kuskokwim River region is largely limited to information from the Alaska Migratory Bird Co-Management Council's (AMBCC) annual migratory bird harvest surveys and past ADF&G subsistence studies. The AMBCC and/or the USFWS have conducted annual migratory bird surveys in the Lower Kuskokwim River region since 1995. These surveys ask about harvests of migratory and nonmigratory birds and involve surveying a stratified sample of households in alternating villages throughout the Yukon–Kuskokwim Delta region as well as other regions in Alaska. Data are not reported by AMBCC for harvests of birds by individual villages but rather are described only on a regional and subregional basis. AMBCC data are not directly comparable to data from this study due to sampling differences, differences in sample size, and differences in sampled communities. However, a general comparison can be made between average regional per capita harvests of migratory birds that accounts for the difference in sample size and variation between communities to some extent. Per capita harvest comparisons between AMBCC's Lower Kuskokwim subregion and the average per capita harvests for Akiak, Kwethluk, Oscarville, and Tuluksak from this study (all located within AMBCC's Lower Kuskokwim subregion) show generally higher per capita harvests of migratory birds in this study's communities—the regional average per capita harvest of

individual birds and eggs from this study's 4 lower Kuskokwim River communities was 15 birds and 1 egg per capita in 2010, while AMBCC's estimated per capita harvests for the Lower Kuskokwim subregion ranged from 3 to 13 birds and 0.2 to 1 egg per capita between 2004 and 2010 (Naves 2012:33, 34)[5]. This potentially indicates a slightly higher importance of birds in the 4 surveyed communities relative to other communities in the surrounding area, although this difference could also be attributed to a different survey design or normal variation between years and communities.

A comparison of harvest data from 1964–1965 (Klein 1966) with that collected in 2011 as part of this study shows differences between the proportions of different categories of migratory birds harvested by each community in these 2 years. For example, it appears that geese may have been more heavily used relative to ducks in 1966 than they were in each individual village in 2011. Previous ADF&G Division of Subsistence studies of Lower Kuskokwim communities show variation between villages, with total per capita harvests of birds and eggs ranging from 21 lb per capita in Kwethluk in 1986 (Coffing 1991) to 69 lb per capita in Akiachak in 1998 (Coffing et al. 2001). This compares to a somewhat lower regional average of 17 lb per capita for the 4 communities in this study in 2010, indicating that bird per capita harvests may have declined over the past few decades.

VEGETATION

Vegetation, including berries, edible or medicinal greens, and edible mushrooms contributed an estimated 34,861 lb (5% of total harvest) to the 2010 subsistence harvest. Salmonberries formed the largest portion (38%) of the vegetation harvest by edible weight, and blueberries, blackberries, and lowbush cranberries were also important contributors to the vegetation harvest for all 4 communities. At least 21 additional species of edible or medicinal berries, greens, and fungi were harvested by the communities in various quantities. Tuluksak households harvested much higher levels of edible greens, especially wild rhubarb, than the 3 other communities. Of all greens, plants, and mushrooms, other than berries, harvested by the 4 communities, 65% were harvested by Tuluksak households. In addition to edible vegetation, communities also harvested 1,155 cords of firewood and 12,861 gallons of punk, a conch fungus that is commonly converted from its raw state, reported in this study, to ash that is used as a chewing tobacco additive to create a blend referred to as *iqmik* (Jacobson 1984:173) throughout the region.

MARINE INVERTEBRATES

Regionally, marine invertebrates harvested for subsistence formed a negligible portion of the total subsistence harvest by edible weight for the 4 study communities in 2010. However, all communities other than Oscarville harvested unspecified clams in 2010, indicating that for some households in the Lower Kuskokwim region this may be an important subsistence resource. Historical harvest data

5. Per capita harvests developed through use of 2010 census estimates for communities included in Lower Kuskokwim subregion in Naves (2012:86).

does not suggest that marine invertebrates have been harvested in any substantial numbers by Lower Kuskokwim River communities in the recent past.

HARVEST AREAS

Residents of the Lower Kuskokwim River region utilize extensive subsistence resource search and harvest areas, including nearly continuous use areas on the mainstem Kuskokwim River and surrounding lands from near the mouth at Kuskokwim Bay and upriver into the Central Kuskokwim region. With the exception of Tuluksak (the most upriver community), the remaining 3 communities accessed Kuskokwim Bay in search of marine mammals. All of the surveyed communities, other than Oscarville, utilized the Johnson River and associated areas near the tundra village communities of Atmautluak, Nunapitchuk, and Kasigluk. This area was used to harvest berries and greens, and, in the case of Kwethluk, northern pike. For caribou harvests, search areas were similar for all communities and were located south of the Kuskokwim River between Napaskiak and Tuluksak. Households in all 4 study communities were hunting the Mulchatna herd, which was located in this area during 2010. It is important to note that caribou search and harvest areas can shift over time with the varying migration patterns of the herd. Another similarity shared by the 4 Lower Kuskokwim communities appeared to be a general avoidance of the Bethel area for subsistence activities. It is possible that this is related to increased competition with or traffic by Bethel residents in the immediate vicinity of Bethel, or it could indicate adherence to areas used historically by particular communities.

Individual communities also display unique variations to regional patterns. Oscarville residents, in general, described more limited and less continuous subsistence search and harvest areas, likely due to Oscarville's small population relative to the other communities in this study. Other examples of community variation include Kwethluk residents' use of the Holitna River and Yukon River between Mountain Village and Russian Mission for moose hunting; and Tuluksak residents' description of using a more upriver portion of the Yukon River near Twelvemile Slough between Russian Mission and Holy Cross for moose hunting. Akiak residents, like Kwethluk households, reported traveling significant distances up the Kuskokwim River in search of moose, with search and harvest areas ranging as far upriver as Georgetown in the Central Kuskokwim River area.

HARVEST ASSESSMENTS

A subsistence assessments section included on the survey allowed respondents to compare their 2010 harvests to previous years' harvests in order to place these harvests into context. The survey module asked whether households harvested less, more, or the same amount of particular subsistence resources as they had in the past, and whether they got enough of that resource. In the event that harvests changed or were inadequate, respondents were asked why this occurred.

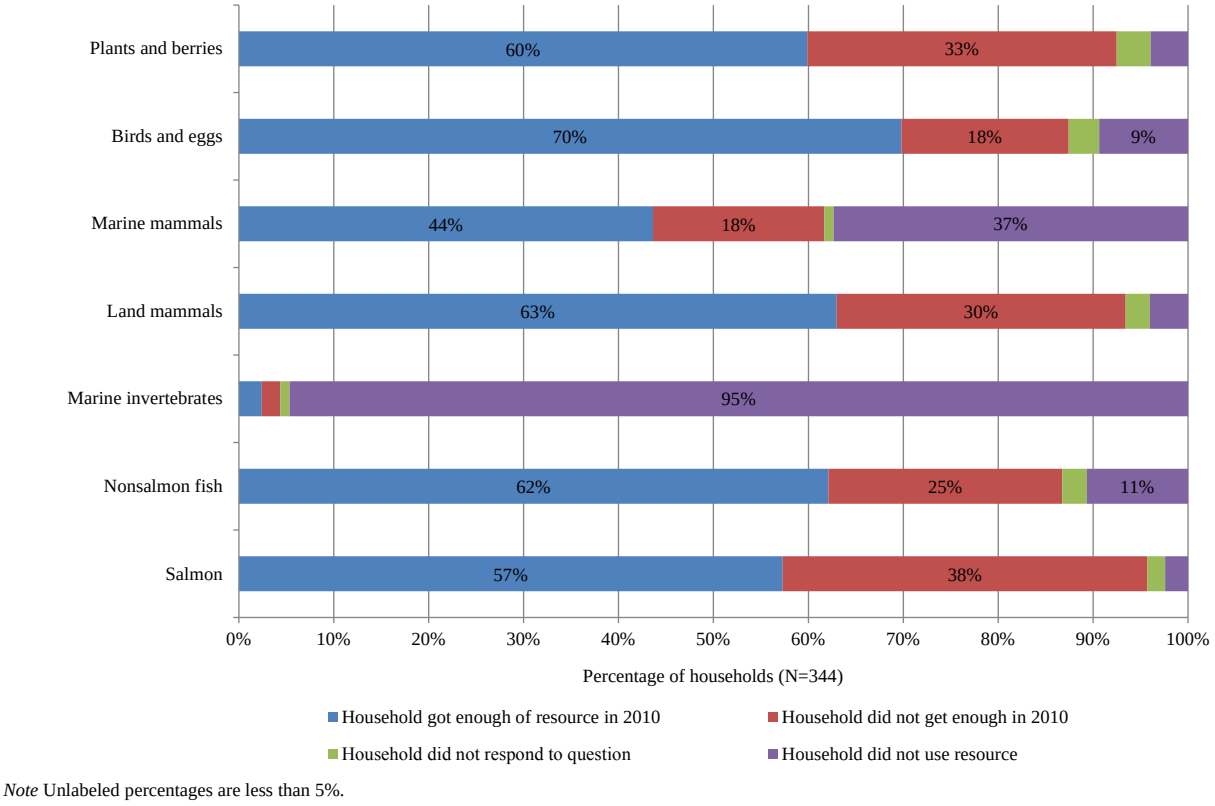

Figure 10-5.–Harvest assessments, Akiak, Kwethluk, Oscarville, and Tuluksak, 2010. Response to the question, "Did your household get enough in 2010?"

On a regional level, at least one-half of all households reported getting enough subsistence resources in 5 out of the 7 resource categories: plants and berries, birds and eggs, land mammals, nonsalmon fish, and salmon (Figure 10-5). Less than one-half of all households (44%) reported getting enough marine mammals in 2010, although 37% reported not using the resource. Similarly, less than one-half of households reported getting enough marine invertebrates, although the percentage of households reporting that they do not use the resource was much higher (95%). However, significant percentages of households reported not getting enough of particular resources, namely salmon (38%), plants and berries (33%), and land mammals (30%). A closer look at the community level harvests provides more detail regarding inadequate harvests.

On a regional level, 57% of households reported they got enough salmon. Despite this figure, 58% of households also reported that they used less salmon in 2010 than in previous years; only 26% of households said they used the same amount (Figure 10-6). For Kwethluk and Tuluksak, approximately one-half of households reported getting enough salmon, while percentages were higher in Oscarville

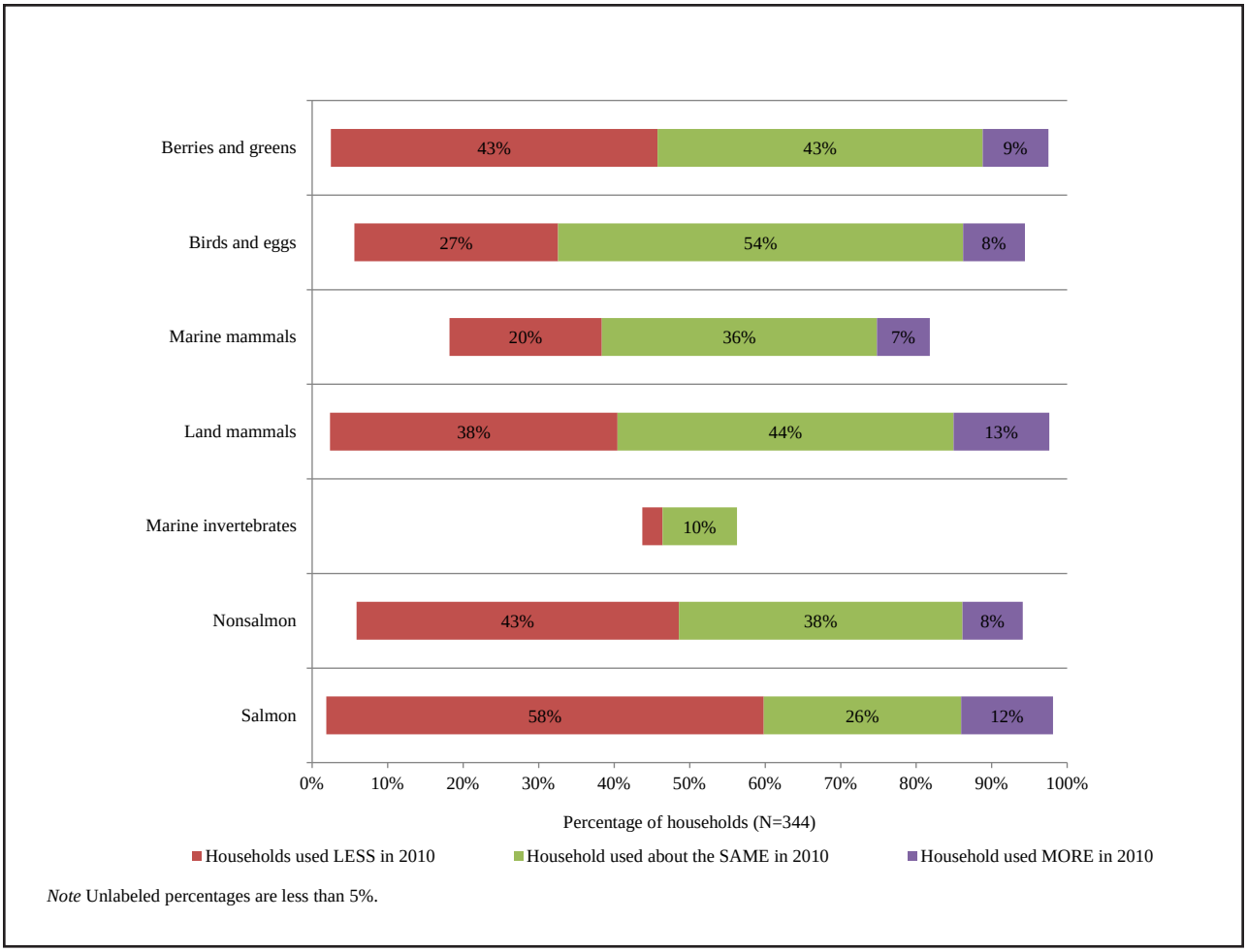

Figure 10-6.–Harvest assessments, Akiak, Kwethluk, Oscarville, and Tuluksak, 2010. Response to the question, "Did your household use less, more, or about the same in 2010 as in the past?"

and Akiak (67% and 75%, respectively). Reasons for not getting enough salmon varied by community and included: resource unavailability; poor weather and environmental reasons; lack of time; and unspecified reasons. Additionally, survey comments and ethnographic data indicate that a portion of households across the region reported concerns over salmon abundance and restrictions (particularly "window" timing), and that respondents largely wanted more Chinook salmon.

For vegetation, study communities varied widely in reports of whether resident households got enough of this resource or not; Oscarville had the highest percentage of households reporting that they got enough vegetation (83%), while between 57% and 60% of households in the other 3 communities reported getting enough. Regionally, 43% of households reported using less berries and greens in 2010; 43% also reported using the same amount of vegetation. Despite the differences between reported adequacies of harvests between communities, a majority of households who did not get enough vegetation reported wanting more berries. Reasons for not getting enough berries also varied

across study communities, although common reasons given included high gasoline prices and resource unavailability. Ethnographic data from Kwethluk indicated that 2010 was a bad year for berry harvests.

Regionally, 38% of households reported that they used fewer land mammals in 2010 than in recent years (Figure 10-6). Like vegetation, community reports as to whether they got enough of a particular land mammal resource varied between communities; 83% of Oscarville households reported getting enough land mammals, while between 44% and 69% of households in the other 3 communities reported getting enough. Moose was the resource of which households regionally reported needing more, followed closely by caribou. Survey comments and opinions offered by respondents indicated that moose populations were on the rise as a result of the 5-year moratorium (from 2004–2009) on harvests in the lower portion of GMU 18 (in which the 4 Lower Kuskokwim study communities are located). Due to this observed population increase, some respondents felt that the fall hunting season should be lengthened. Reasons given for not getting enough moose and caribou varied throughout the region, although common responses across communities included resource unavailability, distance, and high gas prices.

Although only 25% of households across the region reported not getting enough nonsalmon fish, 43% of households also reported using fewer nonsalmon fish in 2010 than they had in previous years (figures 10-5 and 10-6). Community reports of getting enough were varied across the region, ranging from a higher percentage of households in Oscarville and Akiak (83% and 71%, respectively) to fewer households reporting getting enough in Tuluksak and Kwethluk (54% and 59%, respectively). Regionally, those households reporting that they did not get enough nonsalmon fish indicated that they needed more northern pike and whitefish species. These resources are important to community harvests across the region as indicated by the fact that northern pike and 1 or more species of whitefish are among the top 10 harvested resources by edible weight for each community in 2010. Reasons given for not getting enough nonsalmon fish varied by community, but some common reasons included weather and environmental factors, resource unavailability, and high gas prices.

On the regional level, a higher percentage of households reported using the same amount of birds and eggs. In fact, the highest percentage of households (70%) reported getting enough of this resource in 2010 (figures 10-5 and 10-6). This may be indicative of generally stable resource use patterns for this resource.

For the entire region, only a small percentage of households (13%) reported using more of all resources as a whole than in previous years. With limited longitudinal data (data that measure the same topics or practices, such as harvesting, over time), it is difficult to determine what this means, if anything. It may suggest reduced adaptive ability to replace a lower harvested resource with another, more available resource, a general decline in harvest practices due to socioeconomic reasons or changes in resource availability, or a general reluctance to not report using more of a resource.

FOOD SECURITY

As noted in the "Methods" chapter, the food security component of the survey used a modified version of a standard national questionnaire to assess whether or not each surveyed household had enough food to eat, whether from subsistence sources or from market sources.

The USDA's food security measure is based on responses to 8 food security statements or questions, and the frequency of 2 of those conditions (Bickel et al. 2000). Appendix A contains the 8 standard USDA statements in the survey with the additional 2 statements used to determine whether food insecurities, if any, were related to subsistence foods, store-bought foods, or both.[6] The statements are presented to households in an order that reflects increasing levels of food insecurity. Households who report none of these conditions are categorized as "food secure–high." Households that answer yes to 1 or more questions fall into lower food security categories. Results were reported in 3 categories defined by USDA: "secure–high and marginal food security," "insecure–low food security," and "insecure–very low food security." From the survey data, researchers calculated food security scores for each household and categorized them using USDA's procedures. The percentage of food secure households (high or marginal food security) in the surveyed Lower Kuskokwim communities ranged from a high of 92% in Oscarville to a low of 56% in Tuluksak. Households that reported very low food security ranged from 0% in Oscarville, with no households reporting very low food security conditions, to a high of 13% in Tuluksak (Figure 10-7).

Community level responses to food security questions/statements reported in this study can be compared to responses collected on state of Alaska and national levels. In 2010, food security reports from Alaska households were similar to those from all U.S. households: approximately 86% of both United States and Alaska households were food secure, 9% reported low food security, and 5% reported very low food security. In comparing state and national results to results for the surveyed Lower Kuskokwim River area communities, this study shows that Lower Kuskokwim communities, with the exception of Oscarville, have on average lower levels of food security than households surveyed at the state or national levels.

As described in the methodology section, ADF&G modified the USDA questionnaire format to include 2 questions that provide greater detail about possible sources of food insecurities. The third statement on this section of the survey asked respondents to provide information about different kinds of food: subsistence foods or store-bought foods that did not last. Across the region, 50% of households reported that their subsistence foods did not last, compared to 36% for store-bought foods (Figure 10-8); this suggests a lack of subsistence foods was a larger contributor to food insecurity than a lack of store-bought foods in 2010. Earlier research (Wolfe and Walker 1987) suggests strong links between a household's access to cash resources and subsistence production. That is, households with

6. These 2 additional questions are asked only by ADF&G, not by USDA, and are not considered in calculating food security scores or categories. However, questions 3a and 3b are analyzed separately and discussed in the community chapters.

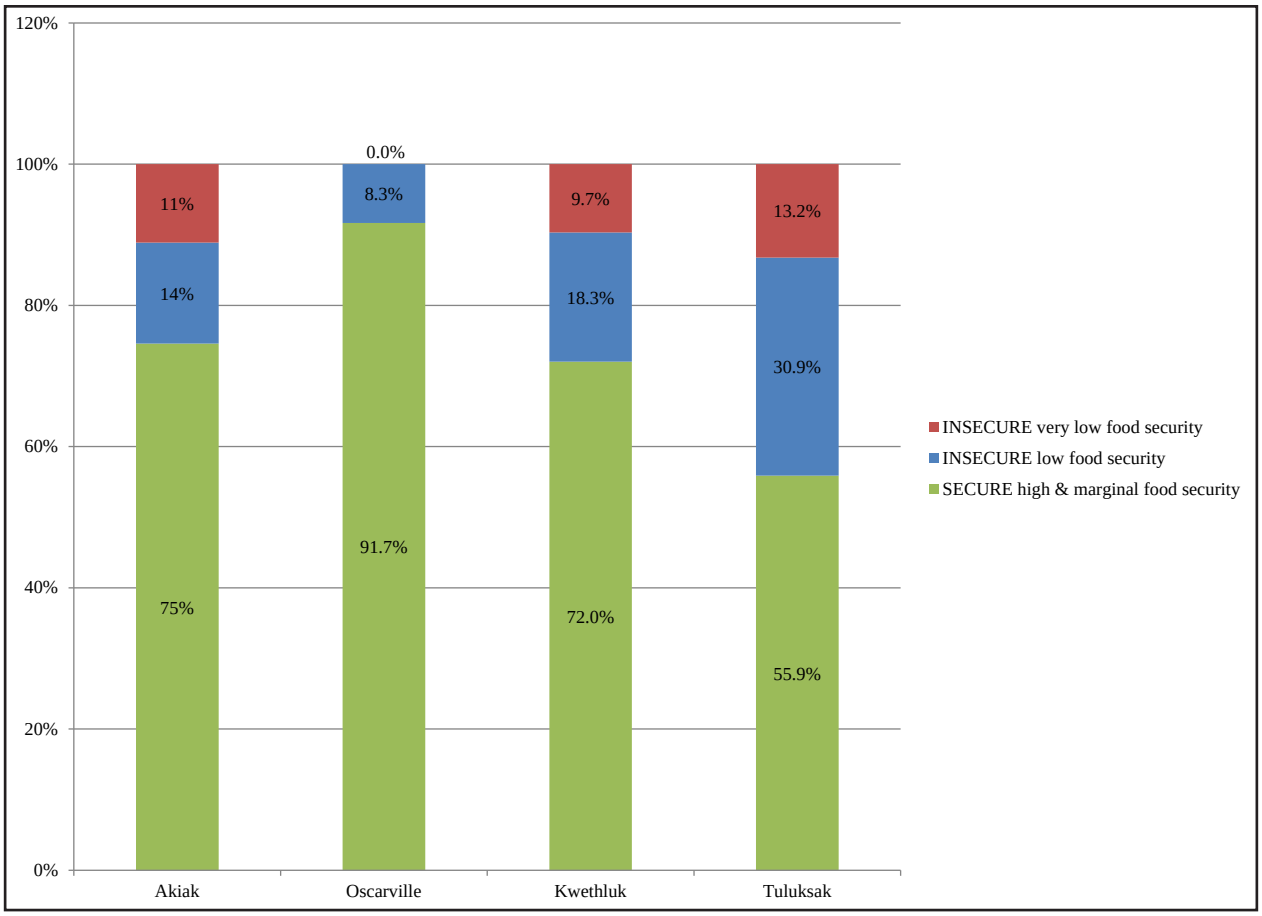

Figure 10-7.–Household food security status, Akiak, Kwethluk, Oscarville, and Tuluksak, 2010.

access to cash, usually from wage labor, along with other factors, such as household maturity and larger household sizes (Magdanz et al. 2002), often harvest greater quantities of subsistence foods and resources (Wolfe et al. 2010). Money is an important element in buying nets, boats, snowmachines, gasoline, rifles, and other subsistence-related technology. Thus, higher levels of household income could correlate with greater subsistence food security. This study estimated that the average earned income per household for the 4 study communities ranged from $20,766 in Kwethluk to $31,427 in Oscarville. Federal poverty guidelines during 2010 in Alaska for households of 4 and 5 individuals[7] were $27,570 and $32,250, respectively (U.S. Department of Health and Social Services 2011), indicating that many households in each community earned incomes below the poverty level. These low income levels likely influenced some households' subsistence food security in 2010. While income levels may account for the degree of insecurity related to making subsistence foods last, the high rate of insecurity in making store-bought foods last may reflect the difficulties and expense of the infrastructure that supplies store-bought foods to rural Alaska—a possible explanation for the differences between the levels of food security between Lower Kuskokwim River communities and the rest of the nation. Other

7. Mean household size for study communities ranged from 4.3 to 5.3 individuals.

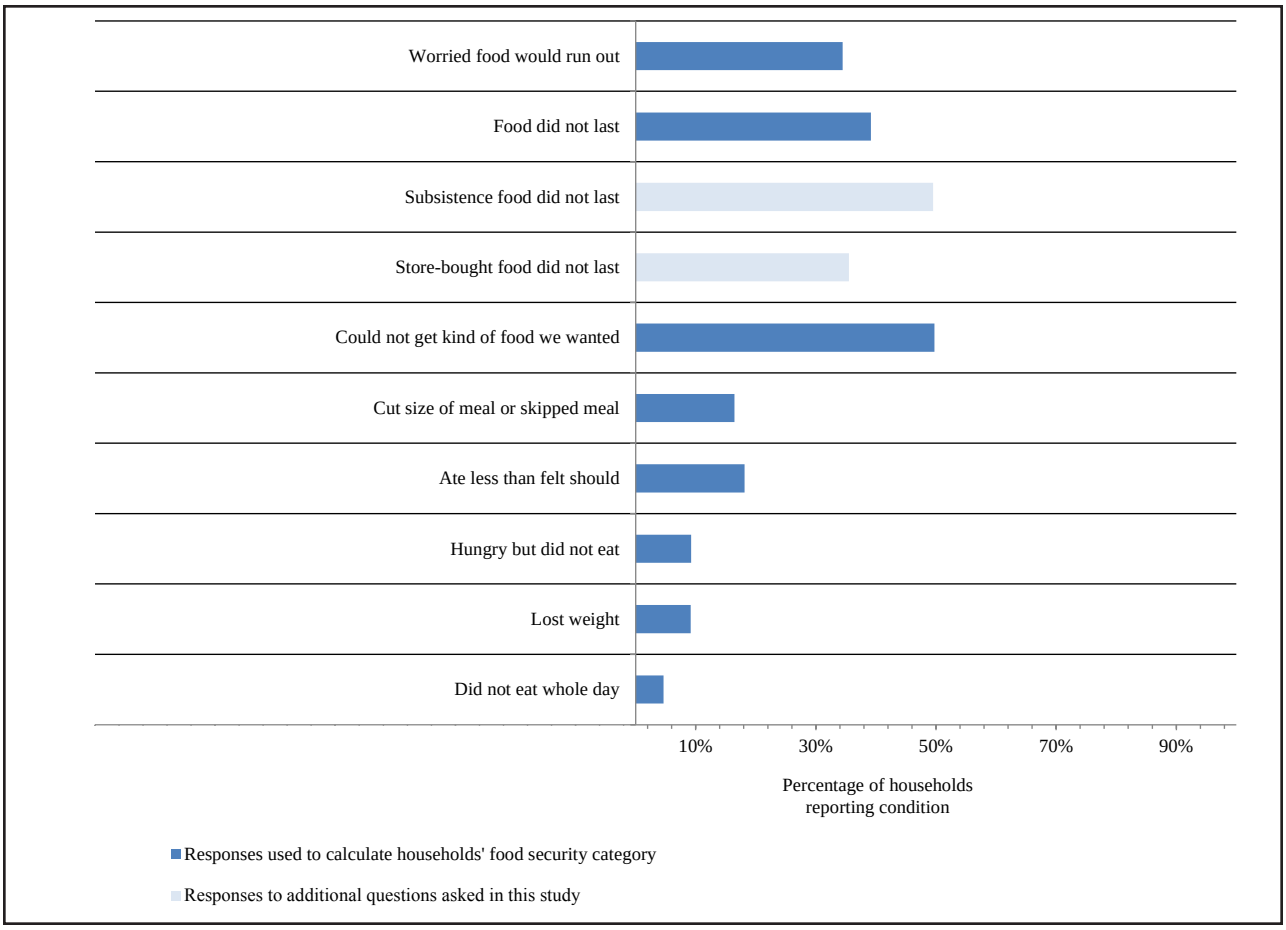

Figure 10-8.–Food security responses, Akiak, Kwethluk, Oscarville, and Tuluksak, 2010.

non-income related explanations for lower levels of food security potentially include low availability of particular subsistence resources due to low abundance or subsistence restrictions (explored previously in the "Subsistence Resources of the Lower Kuskokwim" chapter), and possibly competing demands between earning cash income and harvesting subsistence resources.

Useful comparisons to the national data can also be drawn by looking at the responses to the statements and questions in descending order. In the national data from USDA, the percentage of households responding "yes" is greatest for the first statement ("we worried that food would run out") and decreases for subsequent statements and questions. However, the Lower Kuskokwim River communities' survey results differed (Figure 10-8). Fewer households (34%) reported being worried that food would run out than reported that they "could not get the kind of food (they) wanted" (50%), or that "subsistence food did not last" (50%). This suggests that particular ways of worrying about food may be culturally influenced. That is, people accustomed to the seasonal variation in subsistence foods and who are embedded in a supportive social network may be less inclined to worry about where their next meal is coming from and perhaps more inclined to worry about access to particular foods. If they do not have enough food, somebody else in the community will usually provide it—a powerful

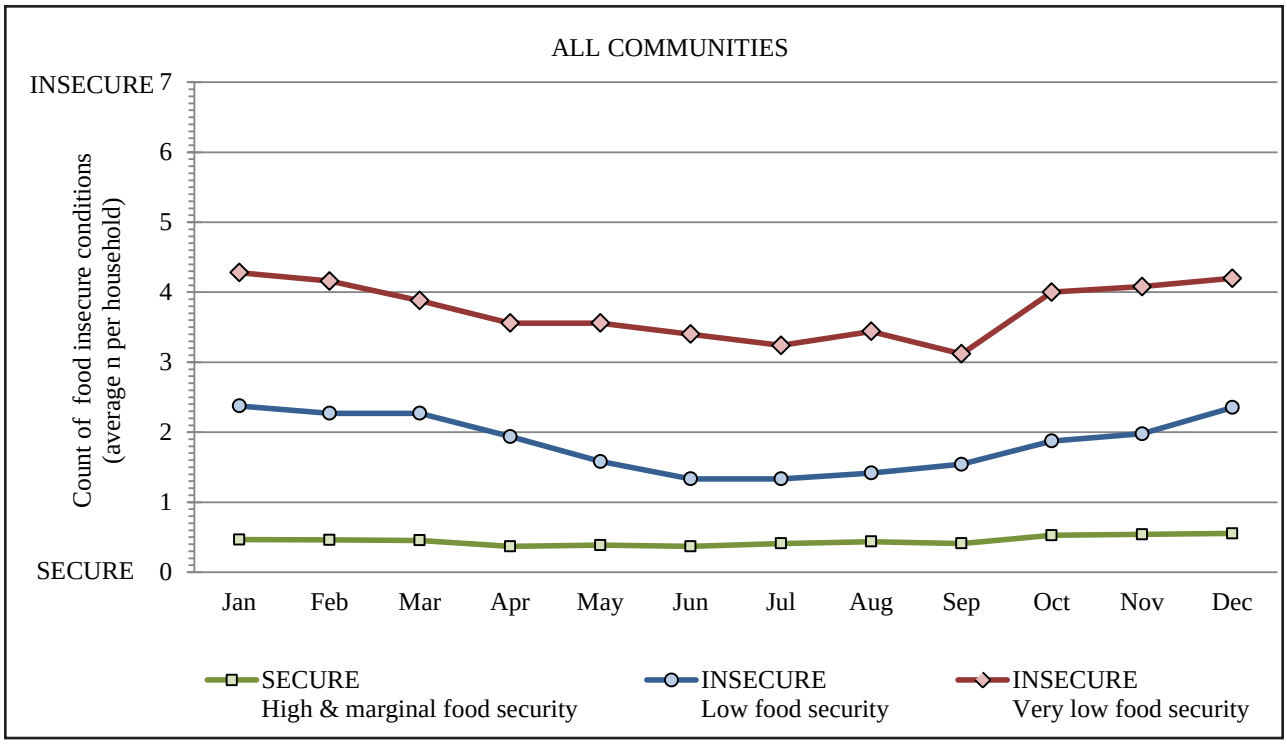

Figure 10-9.–Food insecure conditions by month and household category, Akiak, Kwethluk, Oscarville, and Tuluksak, 2010.

statement about the nature of subsistence economies. Even so, residents of the 4 Lower Kuskokwim area communities still expressed measurable concern about their food security.

One of the unique features of the ADF&G instrument is that households with certain food-insecure conditions are asked to report the month(s) in which those conditions occurred (Figure 10-9). For households in each food security category, the average number of insecure conditions reported (of 10 possible food insecure conditions) was calculated for each month. Averages were used instead of the number of actual responses because the number of households in each category varied substantially. By definition, food security decreases as the reported number of food insecure conditions increases. On average, food-secure households reported 0.3 to 0.5 food insecure conditions each month, with little variation during the study year. Food-insecure households with "low" food security reported 1.3 to 2.3 food insecure conditions each month, with higher food insecurity occurring from October through April rather than in the summer months. This seasonal variation in food insecurity averages was also evident among households with "very low" food security: the average number of food insecurity conditions for these households ranged from 3.0 to 3.4 from April to September, while the average from October to March was higher, ranging from 3.7 to 4.3. While households were not asked to explain why food insecurity increased in these months, these are months when many subsistence resources are not available. Additionally, during the coldest winter months, households with limited income may make choices between buying all the food they need to supplement their subsistence

stores and buying heating oil or fuel. Reported food insecurity levels are lowest during the summer months between May and September and are possibly connected to the availability of salmon and other fish, which are the resources that historically constitute a majority of the subsistence harvest in the Lower Kuskokwim River region.

WILD FOOD NETWORKS

Sharing, as a way of distributing food for both economic and social reasons, has long been considered a hallmark of subsistence economies. The survey measured food distribution in 2 ways: 1) by asking households to report if they gave away particular resources or received resources from other households or communities, and 2) by asking who harvested and processed certain key resources (e.g., salmon, moose, berries) used by the household. Answers could identify individuals from a respondent's own household, other households in the same community, or households from other communities. The sharing and receiving data are shown by resource category in the harvest and use tables in each community chapter. These data were utilized to build diagrams that represent the networks of resource distribution in each community chapter. Together, these data show remarkable levels of sharing both within and between communities, attesting to the nature and role of sharing food in subsistence economies.

The most heavily harvested resources—fish and land mammals—were also the most heavily shared. Approximately 59% of households in all 4 communities reported giving fish to other households, and 70% of households reported receiving fish. Fifty percent of households gave land mammals to other households, and 83% of households reported receiving land mammals (the highest level of receiving for any resource category). Marine mammals, birds and eggs, and vegetation were shared at lower levels; between 39% and 54% received these resources. Marine invertebrates were shared at much lower rates, coinciding with their limited use in the surveyed communities.

Results from the network data show dense webs of exchange within each community. The network diagrams organize households based on their own harvest levels as well as on their ties to other households in the community or other communities. Household symbols are scaled in size based on their harvest levels; households that harvest greater quantities of food by edible weight appear larger in the figures. Households whose members received resources or provided resources or services, such as cutting fish, to multiple other households or communities appear closer to the center of the diagram, while households with relatively few such relationships are located nearer to the edges. On average, approximately 27% of the households in 2010 study communities harvested 70% of the estimated total harvest used by each community. This suggests that there was a central core of specialized harvesting households who often redistributed these resources to other households within the community and to households in other communities or parts of the state. This pattern is common to many rural Alaska Native communities (Wolfe 1987).

The composition of high harvesting households tends to follow predictable patterns as well; according to Magdanz et al. (2002), the highest producing households in Northwest Alaska are active elder households, mature couples, or single active males. Similar patterns emerge in the Lower Kuskokwim River region data. Mature households (household heads between 30 and 59 years old) were generally the largest producers in each of the 4 communities. Tuluksak provides one exception to this pattern, yet still follows the general pattern described by Magdanz et al. (2002); the largest producer was a developing household (household head is younger than 30 years old) headed by a single male. In each community, the majority of households cooperated in one single, interconnected, large unit (Magdanz et al. 2011:68). In all communities, there was a minimal percentage (on average around 5%) of completely isolated households that did not report receiving from or providing resources or services to any other households.

Network data for all communities reveals a high level of sharing between the 4 surveyed communities and other communities throughout Alaska. Sharing of subsistence resources among communities is particularly extensive throughout the Yukon–Kuskokwim Delta region, roughly corresponding to GMU 18. The 4 surveyed communities together reported receiving subsistence resources or services from a total of 29 communities[8] located within GMU 18 and an additional 16 Alaska communities[9], both urban and rural, outside of GMU 18.

As noted earlier, the distribution of surveyed communities in 2011 for the 2010 study year was restricted to the area upriver from Oscarville and, as a result, reflects but does not represent the entirety of subsistence harvest and use patterns in the Lower Kuskokwim subregion.

COMPARISON OF THE LOWER KUSKOKWIM RIVER REGION TO THE CENTRAL KUSKOKWIM RIVER REGION

The comprehensive surveys conducted in the 4 Lower Kuskokwim River region communities for this report comprised the second phase of the Donlin Gold Subsistence Research Program. Phase 1 documented the contemporary subsistence uses of fish, wildlife, and plant resources by 8 Central Kuskokwim River communities (Aniak, Chuathbaluk, Crooked Creek, Lower Kalskag, Red Devil, Sleetmute, Stony River, and Upper Kalskag) for the study year 2009. This section compares the reported subsistence harvests and use practices documented in both phases of the research project. Clearly, the environmental contexts of the 2 regions are quite different—the Lower Kuskokwim River communities are located on the broad, coastal tundra that characterizes the Yukon–Kuskokwim Delta, whereas the Central Kuskokwim River communities are located in the boreal forest of the Interior. Despite this difference, comparisons between the 2 regions can allow for a better understanding of

8. Communities are Akiachak, Akiak, Atmautluak, Bethel, Chefornak, Chevak, Eek, Emmonak, Goodnews Bay, Hooper Bay, Kalskag, Kasigluk, Kipnuk, Kongiganak, Kwethluk, Kwigillingok, Marshall, Mekoryuk, Mountain Village, Napaskiak, Newtok, Oscarville, Pilot Station, Russian Mission, Scammon Bay, Toksook Bay, Tuluksak, Tuntutuliak, Tununak.
9. Communities are Anchorage, Aniak, Barrow, Big Lake, Boundary, Brevig Mission, Chuathbaluk, Eagle, Homer, Juneau, Ketchikan, Kotzebue, Napaimute, Savoonga, Sitka, Togiak.

how the effects of environmental changes and regulatory policies may similarly or differentially affect subsistence practices in these 2 regions located in the Kuskokwim River drainage.

The harvest patterns of both the Lower and Central Kuskokwim River study communities are similar in that the communities in both regions use a diverse resource base with a heavy reliance on fishes (salmon and nonsalmon species) and land mammals (Figure 10-10). As mentioned previously, the estimated total harvest of wild foods by the 4 Lower Kuskokwim River communities in 2010 was 693,542 edible pounds, or 429 lb per capita for the estimated 1,617 residents of these villages. In 2009, the estimated total harvest of subsistence resources for the 8 Central Kuskokwim River communities was 411,135 edible pounds, with a per capita harvest of 292 lb for the estimated 1,450 residents in the study communities. Differences in per capita harvests are not evenly distributed across resource categories, which will be discussed in greater depth below. Likewise, availability of resource categories is different between the 2 regions. For example, marine mammals and migratory birds are more abundant and accessible in the coastal plain of the lower Kuskokwim River.

One overarching similarity between the Lower and Central Kuskokwim River regions was the heavy reliance on fish species as indicated by the large contribution of both salmon and nonsalmon species to the respective harvests in each region; in fact, 8 species of fish are present in the top 10 resources for both regions. Salmon harvests dominated both the Lower and Central Kuskokwim River regions' harvests in their respective study years. For the Central Kuskokwim River region, 4 salmon species—Chinook salmon (114,817 lb were harvested contributing 30% to the total regional harvest and 79 lb per capita), chum salmon (59,411 lb, 15% of regional harvest, and 41 lb per capita), coho salmon (44,095 lb, 12% of regional harvest, and 30 lb per capita), and sockeye salmon (34,135 lb, 8% of regional harvest, and 24 lb per capita)—composed 65% of the total 2009 subsistence harvest by weight for the region as a whole and all species taken together provided 174 lb per capita. In 2010, the Lower Kuskokwim River region reported harvesting 320,037 lb of the same 4 species of salmon—Chinook salmon (147,088 lb harvested, contributing 21% to the total regional harvest, and 91 lb per capita), chum salmon (80,994 lb, 12% of regional harvest, and 50 lb per capita), sockeye salmon (65,350 lb, 9% of regional harvest, and 40 lb per capita), and coho salmon (30,774 lb, 4% of regional harvest, and 19 lb per capita)—and this salmon harvest contributed 46% of the total annual subsistence harvest for the region and 200 lb per capita. Nonsalmon fish were another important contribution to the total subsistence harvests for both regions. In the Central Kuskokwim River region in 2009, nonsalmon fish harvests (68,969 lb, 17% of the annual subsistence harvests, and 46 lb per capita) were dominated by sheefish, whitefishes, burbot, and northern pike. For the Lower Kuskokwim region in 2010, nonsalmon fish species contributed 191,066 edible pounds and composed 28% of the total estimated harvest for the region (118 lb per capita). Five species composed the bulk of the 2010 harvest in terms of edible weight: humpback whitefish, northern pike, burbot, smelt, and sheefish. The overall importance of both salmon and nonsalmon species is evident in the per capita harvests for residents of both regions. For

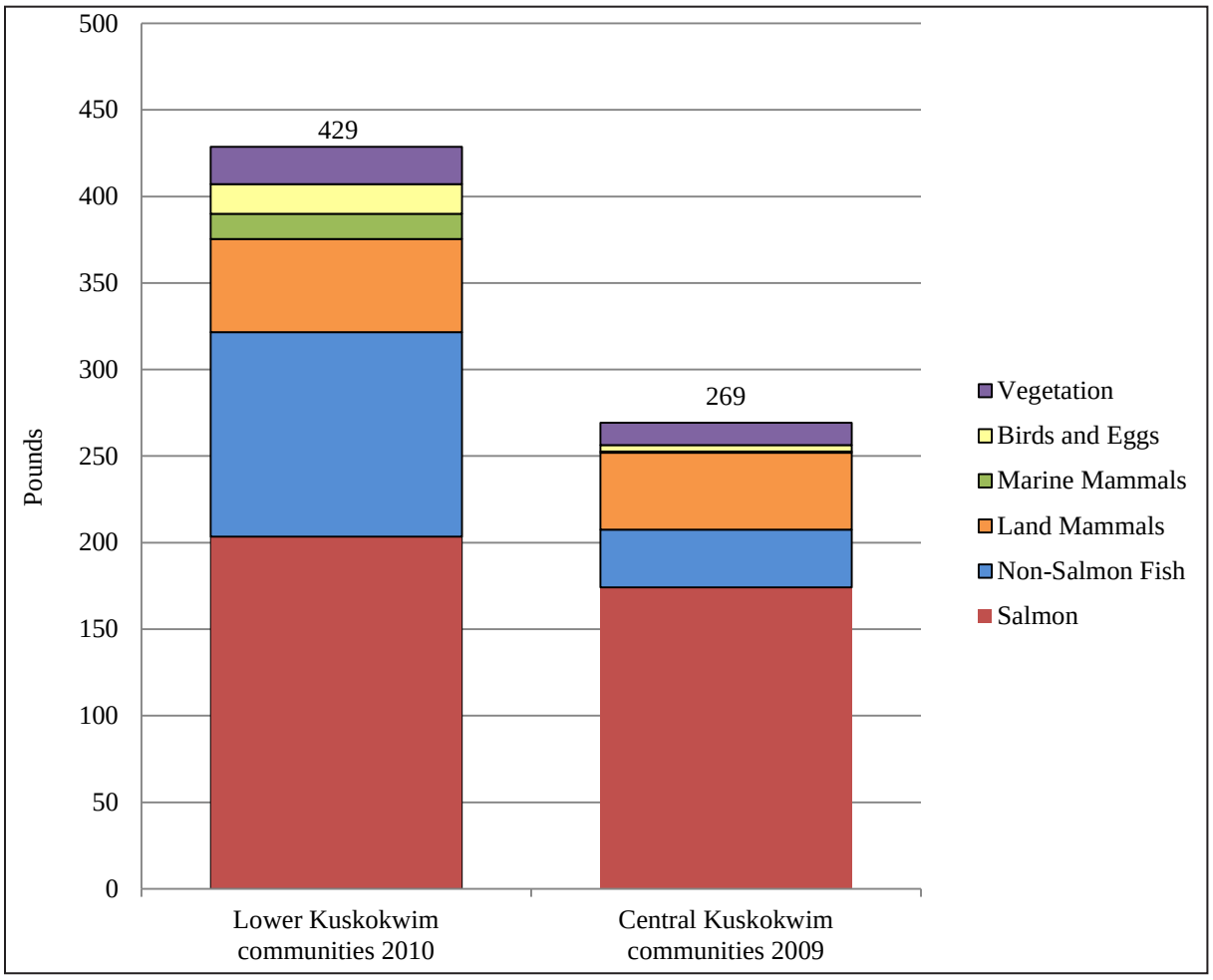

Figure 10-10.–Per capita harvests, edible pounds, Lower and Central Kuskokwim communities.

the Central Kuskokwim River region all fish species contributed 220 lb per capita (75% of the total per capita harvest of 292 lb), and fish species contributed 322 lb per capita for the Lower Kuskokwim River region (75% of the total per capita harvest of 429 lb).

Mammal harvests (including large land mammals, small land mammals, and marine mammals) in 2009 contributed 16% (46,588 lb) in the Central Kuskokwim region, and this resource category contributed 13% to Lower Kuskokwim region communities in 2010. Historically, large land mammals, particularly moose, have been a staple food (Charnley 1983:54) and likely formed a larger proportion of the subsistence harvest in the Central Kuskokwim region than in the Lower Kuskokwim region.

Moose and caribou were scarce in the Lower Kuskokwim for much of the 20th century, and although many residents traveled upriver to access moose, Lower Kuskokwim River residents likely have been more dependent on salmon and nonsalmon fishes than large land mammals historically (USFWS 1987:22). Recent trends (such as conservative moose management in the Central Kuskokwim region and an influx of the Mulchatna caribou herd into the Lower Kuskokwim River region) likely explain the decrease of large land mammal harvests in the Central Kuskokwim River region and the harvest

increase in the Lower Kuskokwim River region. Per capita large mammal harvests, made up primarily of moose and caribou, were nearly equal between the 2 regions in 2009 and 2010 (between 40 and 65 lb per capita for all 12 communities). For the Central Kuskokwim River communities, moose composed 11% and caribou composed less than 1% of the total estimated harvest in 2009, while moose composed 7% of the total estimated harvest for Lower Kuskokwim River communities and caribou provided an additional 4%.

In 2009 in the Central Kuskokwim region, beaver provided a significant harvest of edible pounds (8,531 lb, 2% of harvest, and 6 lb per capita), and in 2010 in the Lower Kuskokwim region this species contributed 8,879 lb (1% of harvest and 5 lb per capita) to the communities. One significant difference in mammal harvests between the Lower and Central Kuskokwim regions was the harvest and use of black bears. Black bears provided just more than 1% of the total estimated harvest for the Central Kuskokwim region (5,123 lb and 4 lb per capita), whereas this species contributed only 2,012 lb (less than 1% and 1 lb per capita) to Lower Kuskokwim communities in 2010.

Marine mammal harvests were another resource category that set the Lower and Central Kuskokwim River regions apart. The 4 Lower Kuskokwim River communities, although somewhat removed from the marine environment, all reported harvests of marine mammals during the study year, including bearded, ringed, and spotted seals, Pacific walruses, and beluga whales. These species contributed 23,517 edible pounds to the regional harvest (3% of the region's total estimated harvest and 15 lb per capita). In contrast, the coastally-distant Central Kuskokwim River communities did not report significant harvest or use of marine mammal species—1 beluga whale harvest was reported in 2009 contributing 1,002 lb to the total estimated harvest of the region.

Other resource categories varied in their individual contribution to the respective total estimated harvests for the Central and Lower Kuskokwim River regions. Birds and eggs were important to both Central and Lower Kuskokwim River communities although this resource category composed a larger portion of the Lower Kuskokwim River regional estimated harvest (27,750 edible pounds, 4% of total harvest, and 17 lb per capita) compared to the Central Kuskokwim region (5,439 lb, 1% of total harvest, and 4 lb per capita). Vegetation harvests between the 2 regions were similar in the percentages that this resource category contributed to the respective estimated total harvests. In 2009, communities in the Central Kuskokwim region reported harvesting 18,767 edible pounds of vegetation (5% of total harvest and 13 lb per capita); the vast majority of this harvest was berries (16,629 lb or 87% of vegetation harvests). The Lower Kuskokwim region reported harvesting 34,861 lb (5% of total harvest and 22 lb per capita) of vegetation, of which 77% were berry species.

A high level of sharing of subsistence resources is a similarity that characterizes both the Lower and Central Kuskokwim River regions. In both the 2009 and 2010 comprehensive surveys, respondents were asked if they used a resource, if they harvested a resource, and if they gave a resource away. For all resource categories and in both regions, a larger percentage of households reported using

resources than reported harvesting the resource themselves. This was especially apparent for fish species, large land mammals, and marine mammals for both the 2009 and 2010 comprehensive studies. In 2009, 95% of Central Kuskokwim River region households reported using fish species, while only 78% reported harvesting this resource; in 2010, 97% of Lower Kuskokwim River region households reported using fish species, while only 71% reported harvesting this resource themselves. For land mammals, 81% of Central Kuskokwim River households reported using this resource in 2009, while only 39% of households reported harvesting large land mammals; in 2010, 88% of Lower Kuskokwim River households reported using this resource, while only 76% reported harvesting large land mammals. In 2009, 20% of households in the coastally-distant Central Kuskokwim River region reported using marine mammals while none actually reported harvesting this resource; in 2010, 95% of Lower Kuskokwim River households reported using marine mammals while only 60% reported harvesting this resource. Households in both the Central and Lower Kuskokwim River regions reported receiving resources from households within their individual communities and households from other communities, both within and outside their respective regions.

Relationships between Georgetown, Napaimute, and other Central Kuskokwim River Communities

Although some Georgetown and Napaimute community members reside in the Lower and Upper Kuskokwim River regions and identify with these regions, the communities remain firmly rooted within the Central Kuskokwim River region through geography, history, culture, and current land use. The individual chapters for Georgetown and Napaimute describe specific relationships with other Central Kuskokwim River communities but do not address general patterns of similarities and differences on a regional level. Subsistence patterns for these 2 communities in relation to other Central Kuskokwim River communities[10] are described in this section because Georgetown and Napaimute were not included in the Brown et al. (2012) report, *Subsistence Harvests in 8 Communities in the Central Kuskokwim River Drainage, 2009*.

Survey methods differed considerably between Georgetown, Napaimute, and the 8 Central Kuskokwim communities surveyed in Brown et al. (2012). Whereas surveys for communities in Brown et al. (2012) were all conducted in person and in the location of each study community, Georgetown and Napaimute surveys were conducted through a combination of phone and in-person interviews in Aniak, Bethel, McGrath, and Napaimute rather than in the study communities themselves in most cases. As described earlier in the "Methods" chapter and in the individual community chapters, Napaimute and Georgetown household lists were developed with input from tribal council staff. The study years also differed. For the Brown et al. (2012) study, data collected reflected harvests and uses

10. Communities include Aniak, Chuathbaluk, Crooked Creek, Lower Kalskag, Red Devil, Sleetmute, Stony River, and Upper Kalskag.

in 2009, while Napaimute and Georgetown data was collected in 2011 for harvest and uses that took place during 2010.

Annual subsistence harvests can vary based on a variety of factors. Weather patterns, for example, can affect berry growth. Caribou migratory routes vary from year to year within regions and individual communities. These and other variable factors should be taken into account when comparing communities in the same region during separate years.

Georgetown and Napaimute have much in common due to their geographic proximity and shared regional history, yet members of each community have different identities and traditions, making them distinct communities. They do share some unique characteristics with others in the Central Kuskokwim region: both are small communities with community members that have maintained predominantly seasonal residency patterns over the past few decades. While some community members have maintained year-round residences in Napaimute and until very recently in Georgetown, most members of both communities currently access the areas around Georgetown and Napaimute primarily during summer and fall seasons when major subsistence opportunities such as moose hunting and salmon fishing are possible. Due to this seasonal residency and other factors, there are key differences between Georgetown, Napaimute, and the other Central Kuskokwim communities' harvest patterns and uses of subsistence resources. One of the most notable differences is in access to employment opportunities. Since many Napaimute and Georgetown community members have permanent residences outside the Central Kuskokwim River region and in areas such as Bethel, where economic activity is more viable, employment levels are higher for these communities. This translates into a few notable differences in the harvest and use patterns for these communities: Napaimute and Georgetown community members had more opportunities to harvest wild resources outside of the Central Kuskokwim River region, such as around the Bethel area, and also exhibited more diversified sharing networks than other Central Kuskokwim communities. This could be because of familial ties developed in their permanent communities of residence or other reasons such as simply a difference in the available species harvested. In spite of these differences, Georgetown and Napaimute have maintained a strong connection to subsistence patterns that are typical of the Central Kuskokwim River region that distinguish them from the Lower Kuskokwim villages described elsewhere in this study.

In 2010, surveyed households in Georgetown and Napaimute reported higher average rates of employment than other Central Kuskokwim communities, likely due to many community members' residence in the regional or subregional hub communities of Aniak, Bethel, and McGrath, in addition to Anchorage. Aniak is the subregional hub community for the Central Kuskokwim and was surveyed in 2010 as part of the Brown et al. (2012) study. Households in Aniak reported having more jobs than any other community that participated in that study; this suggests that employment opportunities were more available. However, Georgetown and Napaimute community members enjoyed a higher employment rate than did Aniak households, as well as higher than the average for all Central Kuskokwim River

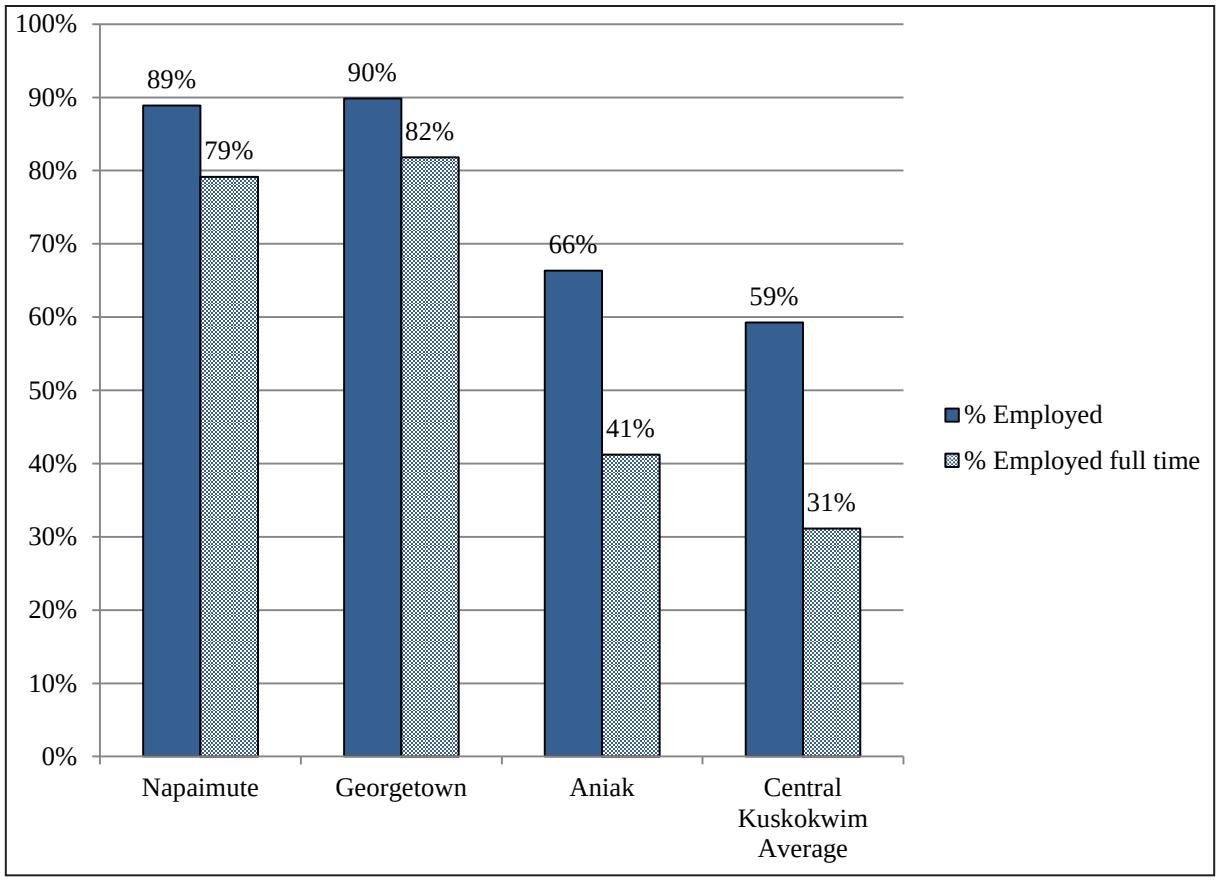

Figure 10-11.–Employment rates, Central Kuskokwim communities.

communities (Figure 10-11). Most adult Georgetown (90%) and Napaimute (89%) community members were employed at least part-time in 2010, compared with 66% of adult Aniak residents and 59% of adult residents in the Central Kuskokwim region as a whole. The nature of Napaimute and Georgetown employment was further characterized by more households reporting year-round employment. This is a contrast to the often seasonal nature of employment in the Central Kuskokwim region. Georgetown and Napaimute household incomes were also higher than other Central Kuskokwim communities. Brown et al. (2012) found that for the 8 communities in the Central Kuskokwim surveyed for the 2009 study year, the average annual household income was $10,370. In 2010, the average household income was $54,409 in Georgetown and $105,608 in Napaimute.

A higher rate of employment and higher community income has interesting implications for subsistence harvest and use patterns for these communities. Napaimute and Georgetown community members who adhere to traditional wage employment schedules might find their time more limited to pursue subsistence activities that do not fall neatly within these employment regimes. On the other hand, access to cash as a result of steadier wage employment also allows subsistence users the opportunity to purchase the expensive gear, equipment, and fuel that is necessary to pursue subsistence activities.

The correlation between cash, subsistence harvest levels, and wage employment has been explored

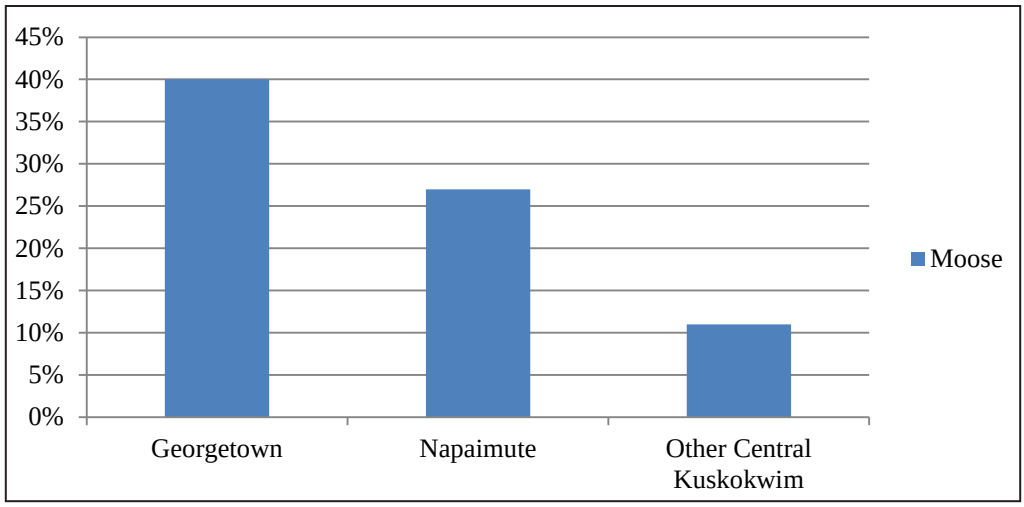

Figure 10-12.–Moose, percentage of total harvest

in greater detail in Wolfe (1981:93) and Wolfe et al. (1984:430–490); different individuals and communities develop different strategies for integrating the cash and subsistence economies, and Georgetown and Napaimute residents' harvest of moose may represent such a strategy shared by these communities. Harvesting big game species such as moose and caribou requires specialized skills and a larger cash investment relative to some subsistence resources, but rewards are significant, especially in terms of edible food. In Georgetown and Napaimute, moose contributed more to the total subsistence harvest by edible weight than in any other Central Kuskokwim communities. Moose composed 40% of the total community harvest by edible weight in Georgetown and 27% in Napaimute; this compares to 11% of the average total harvest for other Central Kuskokwim communities (Figure 10-12). Explanations for the high contribution of moose to the total subsistence harvest in these 2 communities include food preferences for these resources, availability of these resources at locations frequented by community members, and possibly the efficiency of time rather than or in addition to the availability of cash as described above.

Georgetown and Napaimute community members harvested or received subsistence resources less readily available to residents of other Central Kuskokwim communities, including caribou, muskoxen, and marine invertebrates. Residency in the Bethel area provided easier access for Napaimute hunters to harvest 11 caribou from the nearby Mulchatna herd in 2010 (providing 20 lb per capita), and Georgetown residents living in McGrath harvested 2 caribou near Lime Village (4 lb per capita). Although caribou were once plentiful in the Central Kuskokwim region (Charnley 1983:5), respondents in Brown et al. (2012) generally described a local absence of caribou in 2009. The total harvest for the 8 Central Kuskokwim communities in 2009 was 18 individual caribou, providing less than 1 lb per capita. Some Georgetown and Napaimute community members traveled long distances to harvest locally unavailable resources such as muskoxen or clams. This would not have been feasible for many

residents of other Central Kuskokwim River communities and is not part of the traditional subsistence harvest patterns for these communities.

Although Napaimute and Georgetown community members have greater access to some resources that are uncommon in the Central Kuskokwim region, survey results indicate lower harvests and uses of certain subsistence resources readily available to other Central Kuskokwim communities. This is likely explained by seasonal residency patterns. For example, since fewer households visit Georgetown and Napaimute during winter months, this may account for Georgetown and Napaimute's low harvest levels of furbearers, such as martens, relative to other Central Kuskokwim communities. Martens are harvested during winter months in the Central Kuskokwim region and are less available in the Lower Kuskokwim where many Georgetown and Napaimute community members reside in winter. The harvest of martens for Georgetown and Napaimute together was 6 martens in 2010; in 2009 other Central Kuskokwim River region communities harvested 967 martens. Most community members visit Napaimute and Georgetown during the summer and fall and take advantage of subsistence opportunities available during these seasons, such as salmon fishing and moose hunting. Both Georgetown and Napaimute are currently pursuing additional development and potential resettlement by some community members to their town sites. Such increased activity in the future would likely result in increased subsistence use in the area around Georgetown and Napaimute, particularly during winter and spring seasons when fewer individuals lived in these communities during the study year.

Despite these differences, Georgetown and Napaimute community members share several subsistence harvest and use patterns with other Central Kuskokwim communities' historical harvest patterns. Moose have historically composed a larger percentage of the subsistence harvests in the Central Kuskokwim than in the Lower Kuskokwim (Stickney 1981:3). This pattern has not held in several Central Kuskokwim communities in recent years, because the Central Kuskokwim region has been under intensive moose hunting restrictions due to low moose populations. Many Central Kuskokwim households struggled to get the moose they needed in 2009, but Georgetown and Napaimute respondents generally described getting enough land mammals in 2010.[11] Moose contributed the first and second highest quantities of subsistence food by edible weight in Georgetown and Napaimute, respectively, and this pattern is typical of the Central Kuskokwim region. Marine mammal harvest and use levels in Georgetown and Napaimute generally correspond to levels documented in other Central Kuskokwim communities. Many Georgetown and Napaimute residents live in Bethel where marine mammals are an important component of subsistence. However, no marine mammal hunting took place by members of Georgetown or Napaimute, and use of marine mammals received from other communities occurred at similar rates to those in other Central Kuskokwim communities. Other commonalities in subsistence patterns between Georgetown, Napaimute, and other Central Kuskokwim communities include high

11. Sixty-seven percent of Georgetown and 69% of Napaimute households described getting enough land mammals in 2010. This compares to a regional average of 53% of Central Kuskokwim area households from other communities in 2009.

levels of use and sharing of subsistence resources and emphasis on salmon fishing with supplementary harvests of nonsalmon fish.

Georgetown and Napaimute also differ from other Central Kuskokwim communities in the diversity of their food sharing networks. These sharing networks provide evidence of Georgetown and Napaimute's connection both to other Central Kuskokwim communities and to a greater diversity of communities throughout the lower and upper Kuskokwim River. Because Georgetown and Napaimute community members currently live in several different locations, their subsistence sharing relationships with communities outside of the Central Kuskokwim region are generally more diverse than those for other Central Kuskokwim communities (though Aniak, Upper Kalskag, and Lower Kalskag also had diverse subsistence sharing relationships). The 40 surveyed households in Georgetown and Napaimute together described subsistence sharing relationships with 29 different Alaska communities in 9 distinct Alaska regions or subregions outside of the Central Kuskokwim.[12] While connected to many regions of Alaska, Georgetown and Napaimute are also connected to the Central Kuskokwim through subsistence networks; in 2010, multiple Georgetown and Napaimute households received subsistence resources from 3 other Central Kuskokwim communities—Aniak, Chuathbaluk, and Upper Kalskag.

Though not all Napaimute community members are members of the Native Village of Napaimute, both Napaimute and Georgetown are part of the Central Kuskokwim regional corporation, The Kuskokwim Corporation (TKC). As individual subsistence users of the area, and as shareholders of TKC, Georgetown and Napaimute community members have a vested interest in the lands of not only their respective communities but of their region. As subsistence users of this region, respondents described many of the same concerns documented in Brown et al. (2012) for other Central Kuskokwim communities, including concerns over size and quantity of future returning salmon, and moose hunting regulations in the Central Kuskokwim region.

While the subsistence harvest and use patterns of Georgetown and Napaimute differ somewhat from those of other Central Kuskokwim communities, there are also numerous similarities. Members of these 2 communities have developed unique and flexible subsistence traditions that, although adapted to somewhat unusual patterns of community residency, reflect their deep connection to the Central Kuskokwim River region.

12. The subsistence sharing relationships were with 6 communities in the Cook Inlet–Prince William Sound region, 5 Lower Kuskokwim, 5 Lower Yukon, 1 Middle Yukon, 1 North Slope, 2 Norton Sound, 1 Southeast Alaska, 2 Upper Kuskokwim, and 6 Yukon–Kuskokwim Delta coastal communities.

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Data were entered by Margaret Cunningham, Rebecca Fink, Hollie Wynne, and Garrett Zimpelman, who are all with ADF&G. Data analysis was conducted by ADF&G research analysts Terri Lemons and Pat Fox and ADF&G Information Management coordinator David Koster, with assistance from former ADF&G researcher James Magdanz. Many thanks go to these individuals for their hard work to construct the harvest tables, figures, and maps contained within this report.

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COMPREHENSIVE SUBSISTENCE SURVEY

AKIAK, ALASKA

From January 1, 2010 to December 31, 2010

SURVEY PRINTED
2011-03-01

This survey is used to estimate subsistence harvests and to describe community subsistence economies. We will publish a summary report, and send it to all households in your community. We share this information with the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service and the National Park Service. We work with the Federal Regional Advisory Councils and with local Fish and Game Advisory Committees to better manage subsistence, and to implement federal and state subsistence priorities.

We will NOT identify your household. We will NOT use this information for enforcement. Participation in this survey is voluntary. Even if you agree to be surveyed, you may stop at any time.

HOUSEHOLD ID:		
COMMUNITY ID:	AKIAK	4
INTERVIEWER:		
INTERVIEW DATE:		
START TIME:		
STOP TIME:		
DATA CODED BY:		
DATA ENTERED BY:		
SUPERVISOR:		

PHOTO BY JAMES VAN LANEN

COOPERATING ORGANIZATIONS

AKIAK NATIVE COMMUNITY
BOX 52127
AKIAK, AK 99552

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

907-459-7320

HOUSEHOLD MEMBERS

HOUSEHOLD ID

First, I would like to ask about the people in your household, permanent members of your household who sleep at your house. This includes students who return home every summer. I am NOT interested in people who lived with you temporarily, even if they stayed several months.

Last year, that is, between January 1, 2010, and December 31, 2010, WHO were the head or heads 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?	Except for school or military service, has this person always lived in Akiak?	*If person has NOT always lived in Akiak…* WHEN did they LAST move here?	From WHERE did this person move?	Where is this person's birth home?*	TOTAL years lived here?
								community in Alaska,		
ID#	*circle*	*relation*	*circle*	*circle*	*age*	*circle*	*year*	*OR state in the US, OR country*		*years*
HEAD	Y N		M F	Y N		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		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		Y N				
3	0									
PERSON 4			M F	Y N		Y N				
4	0									
PERSON 5			M F	Y N		Y N				
5	0									
PERSON 6			M F	Y N		Y N				
6	0									
PERSON 7			M F	Y N		Y N				
7	0									
PERSON 8			M F	Y N		Y N				
8	0									
PERSON 9			M F	Y N		Y N				
9	0									
PERSON 10			M F	Y N		Y N				
10	0									
PERSON 11			M F	Y N		Y N				
11	0									
PERSON 12			M F	Y N		Y N				
12	0									
PERSON 13			M F	Y N		Y N				
13	0									
PERSON 14			M F	Y N		Y N				
14	0									

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

PERMANENT HH MEMBERS: 01 **AKIAK: 4**

HOUSEHOLD PARTICIPATION

HOUSEHOLD ID

This page asks about your household members' participation in subsistence activities, such as fishing, hunting, gathering, or processing subsistence foods.

Starting with the first head of household, and thinking just about LAST YEAR, did this person...

Repeat for each person in the household. Responses for each person should be on the same row on the left and right pages.

	Fish		Big Game		Marine Mammals		Birds & Eggs		Plants & Berries	
	…try to fish or shellfish?	…process fish or shellfish?	…hunt for or try to trap land animals?	…process land animals?	…hunt for marine mammals?	…process marine mammals?	…hunt for birds or gather eggs?	…process birds or eggs?	…gather berries or plants?	…process berries or plants?
ID #	*circle each activity reported for each person, make no mark in other cells*									
HEAD	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
1										
NEXT, enter participation for spouse or partner. If household has a SINGLE HEAD, leave HEAD 2 row BLANK, and move to PERSON 3.										
HEAD	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
2										
BELOW, enter participation for children (oldest to youngest), grandchildren, grandparents, or anyone else living full-time in this household.										
PERSON 3	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
3										
PERSON 4	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
4										
PERSON 5	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
5										
PERSON 6	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
6										
PERSON 7	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
7										
PERSON 8	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
8										
PERSON 9	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
9										
PERSON 10	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
10										
PERSON 11	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
11										
PERSON 12	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
12										
PERSON 13	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
13										
PERSON 14	try to catch fish or shlfsh?	process fish or shlfsh?	hunt for land animals	process land animals	hunt for marine mamls	process land animals	hunt or gather birds or eggs	process birds or eggs	gather berries or plants	process plants
14										

PERMANENT HH MEMBERS: 01 **AKIAK: 4**

EMPLOYMENT STATUS

HOUSEHOLD ID

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

This page asks about jobs and income. We ask about jobs and income because we are trying to understand all parts of the community economy. Many people use wages from jobs to support subsistence activities. Starting with the first head of your household, what job or jobs did he or she have last year?

For each member of this household born before 1995, 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 1995 (this includes anyone who is 16 years old or older).

order | role | res.	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?
	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 - expenses

EMPLOYMENT: 23 **AKIAK: 4**

OTHER INCOME

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

Between JANUARY 1, 2010, and DECEMBER 31, 2010…
…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 2010?	TOTAL amount all members of your household received from _____ in 2010.	
		circle one	*dollars*	
DIVIDENDS	ALASKA PERMANENT FUND DIVIDEND	Y N	$	/YR
	32			
	NATIVE CORPORATION DIVIDENDS	Y N	$	/YR
	13			

Alaska PFD IN 2010
1 PFD = $1,281
2 PFDs = $2,562
3 PFDs = $3,843
4 PFDs = $5,124
5 PFDs = $6,405
6 PFDs = $7,686
7 PFDs = $8,967
8 PFDs = $10,248
9 PFDs = $11,529
10 PFDs = $12,810
11 PFDs = $14,091
12 PFDs = $15,372

Regional Corporations	***Dividend***
Calista Corp.....	*$ 2.25*
Doyon Ltd.....	*$ 4.21*

Village Corporation(s)	***Dividend***
Kokarmiut Corporation.....	*$ -*

Between JANUARY 1, 2010, and DECEMBER 31, 2010…
…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? *circle one*	Total Amount? *dollars*	
EMPLOYMENT RELATED	UNEMPLOYMENT	Y N	$	/YR
	12			
	WORKERS' COMP	Y N	$	/YR
	8			
	SOCIAL SECURITY	Y N	$	/YR
	7			
	PENSION & RETIREMENT	Y N	$	/YR
	5			
	DISABILITY	Y N	$	/YR
	31			
	VETERANS ASSISTANCE	Y N	$	/YR
	35			
ENTITLEMENTS	FOOD STAMPS (QUEST CARD)	Y N	$	/YR
	11			
	ADULT PUBLIC ASSISTANCE	Y N	$	/YR
	3			
	SUPPLEMENTAL SECURITY INCOME (SSI)	Y N	$	/YR
	10			
STATE BENEFITS	ENERGY ASSISTANCE	Y N	$	/YR
	9			
	ALASKA SENIOR BENEFITS (LONGEVITY)	Y N	$	/YR
	6			

		Received? *circle one*	Total Amount? *dollars*	
OTHER	CITGO FUEL VOUCHER	Y N	$	/YR
	CHILD SUPPORT	Y N	$	/YR
	15			
	FOSTER CARE	Y N	$	/YR
	41			
	MEETING HONORARIA *(not per diem)*	Y N	$	/YR
	OTHER *(describe)*	Y N	$	/YR
	OTHER *(describe)*	Y N	$	/YR

Scratch paper for calculations

for _____ weeks =
for _____ months =

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 **AKIAK: 4**

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, 2010, AND DECEMBER 31, 2010),
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,* did you or members of your household….

…fish commercially for _____?

…keep some _____ from your COMMERCIAL CATCH for your own use or to share?

Was the _____ that you kept INCIDENTAL CATCH? *That is, NOT a target species in the fishery*

IF "…keep some from commercial catch" is YES, ask questions below…

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.

Insert names below in blanks above	*COM FISH?*	*KEEP?*	*INCI?*	How many were removed for your OWN USE? *number*	How many were removed for your CREW? *number*	How many were removed to give to OTHERS? *number*	Units *** *specify*	*comments*
CHINOOK SALMON *KING SALMON*	Y N	Y N	Y N					
113,000,001								
SOCKEYE SALMON *RED SALMON*	Y N	Y N	Y N					
115,000,001								
COHO SALMON	Y N	Y N	Y N					
112,000,001								
CHUM SALMON *DOG SALMON*	Y N	Y N	Y N					
111,000,001								
PINK SALMON *HUMPIES*	Y N	Y N	Y N					
114,000,001								
HERRING	Y N	Y N	Y N					
120,200,001								
HALIBUT	Y N	Y N	Y N					
121,800,001								
LAMPREY *EEL*	Y N	Y N	Y N					
122,000,001								
SHEEFISH	Y N	Y N	Y N					
125,600,001								
BROAD WHITEFISH	Y N	Y N	Y N					
126,404,001								

RETAINED COMMERCIAL HARVESTS continued on next page…

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"USE" includes harvesting, processing, eating, trading, feeding to dogs, etc.*

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

COMMERCIALLY HARVESTED RESOURCES: 03 **AKIAK: 4**

RETAINED COMMERCIAL HARVESTS

HOUSEHOLD ID

...RETAINED COMMERCIAL HARVESTS continued from previous page.

During the last year,* did you or members of your household….

…fish commercially for _____?

…keep some _____ from your COMMERCIAL CATCH for your own use or to share?

Was the _____ that you kept INCIDENTAL CATCH? *That is, NOT a target species in the fishery*

IF "…keep some from commercial catch" is YES, ask questions below…

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.

Insert names below in blanks above	*COM FISH?*	*KEEP?*	*INCI?*	How many were removed for your OWN USE? *number*	How many were removed for your CREW? *number*	How many were removed to give to OTHERS? *number*	Units *** *specify*	*comments*
HUMPBPACK WHITEFISH	Y N	Y N	Y N					
126,408,001								
LEAST CISCO	Y N	Y N	Y N					
126,406,061								
BERING CISCO	Y N	Y N	Y N					
126,406,041								
CLAMS	Y N	Y N	Y N					
500,600,001								
CRABS	Y N	Y N	Y N					
501,000,001								
	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 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.

* "LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.

** "USE" includes harvesting, processing, eating, trading, feeding to dogs, etc.

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

COMMERCIALLY HARVESTED RESOURCES: 03 **AKIAK: 4**

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, 2010, AND DECEMBER 31, 2010), 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,* did you or members of your household….					IF …try to harvest is "YES," ask questions below…							
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? TRY includes looking, even if you got none		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. Please estimate how many salmon ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year. How many were...							How many OF THOSE were used just for dogfood?
Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	Caught with SET NET	Caught with DRIFT NET	Caught with SEINE NET	Caught with FISH WHEEL	Caught with ROD & REEL	Caught with OTHER GEAR	Units ***	
					number harvested by each gear type						*specify*	*number*
CHINOOK SALMON *KING SALMON*	Y N	Y N	Y N	Y N								
113,000,000												
SOCKEYE SALMON *RED SALMON*	Y N	Y N	Y N	Y N								
115,000,000												
COHO SALMON	Y N	Y N	Y N	Y N								
112,000,000												
SUMMER CHUM SALMON *DOG SALMON*	Y N	Y N	Y N	Y N								
111,010,000												
FALL CHUM SALMON	Y N	Y N	Y N	Y N								
111,020,000												
PINK SALMON *HUMPIES*	Y N	Y N	Y N	Y N								
114,000,000												
SALMON - UNKNOWN	Y N	Y N	Y N	Y N								
119,000,000												
	Y N	Y N	Y N	Y N								
	Y N	Y N	Y N	Y N								
	Y N	Y N	Y N	Y N								

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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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.*

NON-COMMERCIAL SALMON: 04 **AKIAK: 4**

SUBSISTENCE SUMMARY: SALMON

HOUSEHOLD ID

If this household did NOT USE or HARVEST salmon last year, go to the ASSESSMENT section below.

Otherwise, continue with mapping and network questions…

MAPPING: SALMON

On map, mark all the areas where members of your household fished for SALMON.

NETWORK: SALMON

WHO CAUGHT the SALMON your household used last year?			WHO PROCESSED the SALMON your household used last year?		
List most important harvesters and processors first.					
SALMON harvesters living in…			SALMON processors living in…		
…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities

ASSESSMENTS: SALMON 110000000

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

Last year…

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

X = do not use

If LESS or MORE…

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

2

Last year…

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

If NO…

What KIND of salmon did you need?.....

WHY did your household NOT get enough salmon?..... 1

2

How would you describe the impact to your household of not getting enough salmon last year?..... ...not noticable? (0) ...minor? (1) ...major? (2) severe? (3)

Did your household do anything DIFFERENTLY because you did NOT get enough salmon?..... Y N

IF YES…

What did your household do differently?..... 1

2

NETWORKS & ASSESSMENTS OF SALMON: 66, 67 **AKIAK: 4**

SUBSISTENCE HARVESTS: WHITEFISH

HOUSEHOLD ID

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

2. During the last year (between JANUARY 1, 2010, AND DECEMBER 31, 2010), did you or members of your household USE or TRY TO FISH FOR whitefish? ..... 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,* did you or members of your household….					IF …try to harvest is "YES," ask questions below…							
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? TRY includes looking, even if you got none		INCLUDE whitefish 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.							
					Please estimate how many whitefish ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year. How many were...							How many OF THOSE were used just for dogfood?
Read names below in blanks above	USE?	REC?	GIVE?	TRY?	Caught with SET NET	Caught with DRIFT NET	Caught with SEINE NET	Caught with FISH WHEEL	Caught with ROD & REEL	Caught with OTHER GEAR	Units ***	
					number harvested by each gear type						specify	number
SHEEFISH	Y N	Y N	Y N	Y N								
125,600,000												
HUMPBACK WHITEFISH	Y N	Y N	Y N	Y N								
126,408,000												
BROAD WHITEFISH	Y N	Y N	Y N	Y N								
126,404,000												
ROUND WHITEFISH	Y N	Y N	Y N	Y N								
126,412,000												
BERING CISCO	Y N	Y N	Y N	Y N								
126,406,040												
LEAST CISCO	Y N	Y N	Y N	Y N								
126,406,060												
UNKNOWN WHITEFISH	Y N	Y N	Y N	Y N								
126,499,000												
	Y N	Y N	Y N	Y N								
	Y N	Y N	Y N	Y N								
	Y N	Y N	Y N	Y N								

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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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.*

NON-SALMON FINFISH: 06 **AKIAK: 4**

HARVESTS: OTHER FISH

HOUSEHOLD ID

1. Do you or members of your household USUALLY fish for other fish for subsistence, such as LUSH, SMELT, or any other other fish?..... 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 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,* did you or members of your household….					IF ...try to harvest is "YES," ask questions below…							
					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.							
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? TRY includes looking, even if you got none		Please estimate how many other fish ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year. How many were...							How many OF THOSE were used just for dogfood?
					Caught with SET NET	Caught with DRIFT NET	Caught with SEINE NET	Caught with FISH WHEEL	Caught with ROD & REEL	Caught with OTHER GEAR	Units ***	
Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	*number harvested by each gear type*						*specify*	*number*
BURBOT *LUSH*	Y N	Y N	Y N	Y N								
124,800,000												
NORTHERN PIKE	Y N	Y N	Y N	Y N								
125,500,000												
SMELT	Y N	Y N	Y N	Y N								
120,400,000												
GRAYLING	Y N	Y N	Y N	Y N								
125,200,000												
RAINBOW TROUT	Y N	Y N	Y N	Y N								
126,204,000												
DOLLY VARDEN *CHAR*	Y N	Y N	Y N	Y N								
125,006,000												
LAKE TROUT	Y N	Y N	Y N	Y N								
125,010,000												
BLACKFISH	Y N	Y N	Y N	Y N								
124,600,000												
STICKLEBACK *NEEDLEFISH*	Y N	Y N	Y N	Y N								
123,800,000												
LAMPREY *EEL*	Y N	Y N	Y N	Y N								
122,000,000												

OTHER FISH continued on next page…

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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.*

HARVESTS: OTHER FISH

HOUSEHOLD ID

OTHER FISH continued from previous page…

During the last year,* did you or members of your household….

…use** _____?

…receive _____ from someone in another household or community?

…give _____ to someone in another household or community?

…try** to harvest _____? *INCLUDE looking, even if you got none*

IF ...try to harvest is "YES," ask questions below...

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.

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

Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	Caught with SET NET	Caught with DRIFT NET	Caught with SEINE NET	Caught with FISH WHEEL	Caught with ROD & REEL	Caught with OTHER GEAR	Units ***	How many OF THOSE were used just for dogfood?
					number harvested by each gear type						*specify*	*number*
HERRING	Y N	Y N	Y N	Y N								
120,200,000												
HALIBUT	Y N	Y N	Y N	Y N								
121,800,000												
PACIFIC TOMCOD	Y N	Y N	Y N	Y N								
121,008,000												
SAFFRON COD *TOMCOD*	Y N	Y N	Y N	Y N								
121,010,000												
SUCKER	Y N	Y N	Y N	Y N								
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								

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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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.*

NON-SALMON FINFISH: 06 **AKIAK: 4**

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 and network questions…

MAPPING: FISH OTHER THAN SALMON

On map, mark all the areas where members of your household fished for WHITEFISH, SHEEFISH, NORTHERN PIKE, and BURBOT.

NETWORK: FISH OTHER THAN SALMON

WHO CAUGHT the WHITEFISH your household used last year?			WHO PROCESSED the WHITEFISH your household used			WHO CAUGHT the OTHER FISH your household used last year?			WHO PROCESSED the OTHER FISH your household used last		
List most important harvesters and processors first.						*List most important harvesters and processors first.*					
WHITEFISH harvesters living in…			WHITEFISH processors living in…			OTHER FISH harvesters living in…			OTHER FISH processors living in…		
…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities

ASSESSMENTS: FISH OTHER THAN SALMON 100000002

To conclude our fish other than salmon section, I am going to ask a few general questions about fish other than salmon.

Last year…

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

If LESS or MORE… *X = do not use*

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

2

Last year…

…did your household GET ENOUGH fish other than salmon?..... Y N

If NO…

What KIND of fish other than salmon did you need?.....

WHY did your household NOT get enough fish other than salmon?. 1

2

How would you describe the impact to your household of not getting enough fish other than salmon last year?..... ...not noticable? (0) ...minor? (1) ...major? (2) severe? (3)

Did your household do anything DIFFERENTLY because you did NOT get enough fish other than salmon?..... Y N

IF YES…

What did your household do differently?..... 1

2

NETWORKS & ASSESSMENTS OF FISH OTHER THAN SALMON: 66, 67 **AKIAK: 4**

SUBSISTENCE HARVESTS: MARINE INVERTEBRATES

HOUSEHOLD ID ____

1. Do you or members of your household USUALLY get marine invertebrates for subsistence, such as KING CRAB, CLAMS, or any other marine invertebrates?..... Y N
2. During the last year (between JANUARY 1, 2010, AND DECEMBER 31, 2010), did you or members of your household USE or TRY TO GET marine invertebrates?..... 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,* did you or members of your household….					*IF …try to harvest is "YES," ask questions below…*		
					Please estimate how many marine invertebrates ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.		
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? *TRY includes looking, even if you got none*		*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.*		
					How many did your HH get?	Units ***	
Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	*amount*	*specify*	*comments*
KING CRAB	Y N	Y N	Y N	Y N		GAL	
501,008,000							
TANNER CRAB	Y N	Y N	Y N	Y N		GAL	
501,012,000							
CLAMS	Y N	Y N	Y N	Y N		GAL	
500,600,000							
SHRIMP	Y N	Y N	Y N	Y N		GAL	
503,400,000							
OTHER INVERTEBRATES	Y N	Y N	Y N	Y N		GAL	
509,900,000							
	Y N	Y N	Y N	Y N		GAL	
	Y N	Y N	Y N	Y N		GAL	
	Y N	Y N	Y N	Y N		GAL	
	Y N	Y N	Y N	Y N		GAL	
	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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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.*

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 and network questions…

MAPPING: MARINE INVERTEBRATES

There are no maps for marine invertebrates, continue to NETWORK questions below.

NETWORK: MARINE INVERTEBRATES

WHO GOT the INVERTEBRATES your household used last year?			WHO PROCESSED the INVERTEBRATES your household		
List most important harvesters and processors first.					
Harvesters living in…			Processors living in…		
…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities

ASSESSMENTS: MARINE INVERTEBRATES 500000000

To conclude our marine invertebrates section, I am going to ask a few general questions about marine invertebrates.

Last year…

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

If LESS or MORE… *X = do not use*

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

2

Last year…

…did your household GET ENOUGH marine invertebrates?..... Y N

If NO…

What KIND of marine invertebrates did you need?.....

WHY did your household NOT get enough marine invertebrates?.... 1

2

How would you describe the impact to your household of not getting enough marine invertebrates last year?..... ...not noticable? (0) ...minor? (1) ...major? (2) severe? (3)

Did your household do anything DIFFERENTLY because you did NOT get enough marine invertebrates?..... Y N

IF YES…

What did your household do differently?..... 1

2

NETWORKS & ASSESSMENTS OF MARINE INVERTEBRATES: 66, 67 **AKIAK: 4**

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, 2010, AND DECEMBER 31, 2010), 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,* did you or members of your household….					IF …try to harvest is "YES," ask questions below…														
					Please estimate how many large land animals ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.														
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? TRY includes looking, even if you got none		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.														
Insert names below in blanks above	USE?	REC?	GIVE?	TRY?	SEX	January	February	March	April	May	June	July	August	September	October	November	December	Unknown	Units ***
						number killed in each month													specify
MOOSE	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	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															IND
210,600,000																			
BROWN BEAR	Y N	Y N	Y N	Y N															IND
210,800,000																			
	Y N	Y N	Y N	Y N															IND
	Y N	Y N	Y N	Y N															IND
	Y N	Y N	Y N	Y N															IND
	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.

* "LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.

** "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.

LAND MAMMALS: 10 **AKIAK: 4**

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, SNOWSHOE HARE, or any other small land animals?..... Y N
2. During the last year (between JANUARY 1, 2010, AND DECEMBER 31, 2010), 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,* did you or members of your household….

…use** _____?

…receive _____ from someone in another household or community?

…give _____ to someone in another household or community?

…try** to harvest _____?

TRY includes looking, even if you got none

IF …try to harvest is "YES," ask questions below…

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.

Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	January	February	March	April	May	June	July	August	September	October	November	December	Unknown	Units ***	Number Used For Food or for Food & Fur
					number killed in each month													*specify*	
BEAVER	Y N	Y N	Y N	Y N														IND	
220,200,000																			
MUSKRAT	Y N	Y N	Y N	Y N														IND	
222,400,000																			
SNOWSHOE HARE	Y N	Y N	Y N	Y N														IND	
221,004,000																			
ARCTIC HARE *JACKRABBIT*	Y N	Y N	Y N	Y N														IND	
221,002,000																			
PORCUPINE	Y N	Y N	Y N	Y N														IND	
222,600,000																			
TREE SQUIRREL	Y N	Y N	Y N	Y N														IND	
222,804,000																			
PARKA SQUIRREL (GROUND)	Y N	Y N	Y N	Y N														IND	
222,802,000																			
MARMOT	Y N	Y N	Y N	Y N														IND	
221,800,000																			
	Y N	Y N	Y N	Y N														IND	
	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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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.*

LAND MAMMALS: 10 **AKIAK: 4**

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 MARTEN, WOLF, or any other fur animals?..... Y N
2. During the last year (between JANUARY 1, 2010, AND DECEMBER 31, 2010), 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,* did you or members of your household….

…use** _____?

…receive _____ from someone in another household or community?

…give _____ to someone in another household or community?

…try** to harvest _____?

TRY includes looking, even if you got none

IF …try to harvest is "YES," ask questions below…

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.

Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	January	February	March	April	May	June	July	August	September	October	November	December	Unknown	Units ***	Number Used For Food or for Food & Fur
					number caught in each month													*specify*	
MARTEN	Y N	Y N	Y N	Y N														IND	
222,000,000																			
WOLVERINE	Y N	Y N	Y N	Y N														IND	
223,400,000																			
WOLF	Y N	Y N	Y N	Y N														IND	
223,200,000																			
RED FOX	Y N	Y N	Y N	Y N														IND	
220,804,000																			
LAND OTTER	Y N	Y N	Y N	Y N														IND	
221,200,000																			
LYNX	Y N	Y N	Y N	Y N														IND	
221,600,000																			
MINK	Y N	Y N	Y N	Y N														IND	
222,200,000																			
WEASEL	Y N	Y N	Y N	Y N														IND	
223,000,000																			
	Y N	Y N	Y N	Y N														IND	
	Y N	Y N	Y N	Y N														IND	

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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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.*

FURBEARERS: 14 **AKIAK: 4**

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 and network questions…

MAPPING: LAND ANIMALS

On map, mark all the areas where members of your household looked for MOOSE, CARIBOU, and SMALL LAND MAMMALS.

NETWORK: LAND ANIMALS

WHO KILLED the MOOSE your household used last year?			WHO PROCESSED the MOOSE your household used last year?			WHO KILLED the CARIBOU your household used last year?			WHO PROCESSED the CARIBOU your household used last year?		
List most important harvesters and processors first.						***List most important harvesters and processors first.***					
MOOSE harvesters living in…			MOOSE processors living in…			CARIBOU harvesters living in…			CARIBOU processors living in…		
…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities

ASSESSMENTS: LAND ANIMALS 122000002

To conclude our land animals section, I am going to ask a few general questions about land animals.

Last year…

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

X = do not use

If LESS or MORE…

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

2

Last year…

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

If NO…

What KIND of land animals did you need?.....

WHY did your household NOT get enough land animals?..... 1

2

How would you describe the impact to your household of not getting enough land animals last year?..... ...not noticable? (0) ...minor? (1) ...major? (2) severe? (3)

Did your household do anything DIFFERENTLY because you did NOT get enough land animals?..... Y N

IF YES…

What did your household do differently?..... 1

2

NETWORKS & ASSESSMENTS OF LAND ANIMALS: 66, 67 **AKIAK: 4**

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, 2010, AND DECEMBER 31, 2010),
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,* did you or members of your household….

…use** _____?

…receive _____ from someone in another household or community?

…give _____ to someone in another household or community?

…try** to harvest _____?
TRY includes looking, even if you got none

IF …try to harvest is "YES," ask questions below…

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.

Insert names below in blanks above	USE?	REC?	GIVE?	TRY?	January	February	March	April	May	June	July	August	September	October	November	December	Unknown	Units ***	
					number killed in each month													*specify*	*comments*
BEARDED SEAL *MUKLUK*	Y N	Y N	Y N	Y N														IND	
300,802,000																			
RINGED SEAL	Y N	Y N	Y N	Y N														IND	
300,810,000																			
SPOTTED SEAL	Y N	Y N	Y N	Y N														IND	
300,812,000																			
SEAL OIL *OR OTHER SEAL PRODUCTS*	Y N	Y N	Y N	Y N														IND	
300,899,000																			
BELUKHA WHALE *WHITE MUKTUK*	Y N	Y N	Y N	Y N														IND	
301,602,000																			
BOWHEAD WHALE *BLACK MUKTUK*	Y N	Y N	Y N	Y N														IND	
301,606,000																			
WALRUS	Y N	Y N	Y N	Y N														IND	
301,400,000																			
	Y N	Y N	Y N	Y N														IND	
	Y N	Y N	Y N	Y N														IND	
	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.

* "LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.

** "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.

MARINE MAMMALS: 12 **AKIAK: 4**

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 and network questions…

MAPPING: MARINE MAMMALS

On map, mark all the areas where members of your household looked for SEALS and BELUKHA WHALES.

NETWORK: MARINE MAMMALS

WHO KILLED the SEALS your household used last year?			WHO PROCESSED the SEALS your household used last year?			WHO KILLED the WHALES your household used last year?			WHO PROCESSED the WHALES your household used last year?		
List most important harvesters and processors first.						***List most important harvesters and processors first.***					
SEALS harvesters living in…			SEALS processors living in…			WHALES harvesters living in…			WHALES processors living in…		
…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities

ASSESSMENTS: MARINE MAMMALS 300000000

To conclude our marine mammals section, I am going to ask a few general questions about marine mammals.

Last year…

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

X = do not use

If LESS or MORE…

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

2

Last year…

…did your household GET ENOUGH marine mammals?..... Y N

If NO…

What KIND of marine mammals did you need?.....

WHY did your household NOT get enough marine mammals?..... 1

2

How would you describe the impact to your household of not getting enough marine mammals last year?..... ...not noticable? (0) ...minor? (1) ...major? (2) severe? (3)

Did your household do anything DIFFERENTLY because you did NOT get enough marine mammals?..... Y N

IF YES…

What did your household do differently?..... 1

2

NETWORKS & ASSESSMENTS OF MARINE MAMMALS: 66, 67 **AKIAK: 4**

HARVESTS: DUCKS

HOUSEHOLD ID

1. Do you or members of your household USUALLY hunt ducks for subsistence, such as MALLARD, GOLDENEYE, 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,* did you or members of your household….					IF ...try to harvest is "YES," ask questions below…					
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? TRY includes looking, even if you got none		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.					
					January February November December	April May June	July August	September October	Season of harvest unknown	
					WINTER	SPRING	SUMMER	FALL		
Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	*number killed in each season*				*number*	*specify*
MALLARD	Y N	Y N	Y N	Y N						IND
410,214,000										
NORTHERN PINTAIL	Y N	Y N	Y N	Y N						IND
410,220,000										
GOLDENEYE	Y N	Y N	Y N	Y N						IND
410,210,000										
WIGEON	Y N	Y N	Y N	Y N						IND
410,236,000										
GREEN WINGED TEAL	Y N	Y N	Y N	Y N						IND
410,232,060										
NORTHERN SHOVELER	Y N	Y N	Y N	Y N						IND
410,230,000										
SCAUP	Y N	Y N	Y N	Y N						IND
410,226,000										
BUFFLEHEAD	Y N	Y N	Y N	Y N						IND
410,202,000										
LONG-TAILED DUCK *OLDSQUAW*	Y N	Y N	Y N	Y N						IND
410,218,000										
CANVASBACK	Y N	Y N	Y N	Y N						IND
410,204,000										

DUCKS continued on next page…

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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 **AKIAK: 4**

HARVESTS: DUCKS

HOUSEHOLD ID

DUCKS continued from previous page…

During the last year,* did you or members of your household….

…use** _____?

…receive _____ from someone in another household or community?

…give _____ to someone in another household or community?

…try** to harvest _____? *INCLUDE looking, even if you got none*

IF ...try to harvest is "YES," ask questions below…

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

INCLUDE ducks that members of the 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.

Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	January February March April WINTER	May June SPRING	July August September SUMMER	October November December FALL	Season of harvest unknown	Units ***
					number killed in each season				*number*	*specify*
BLACK SCOTER *BLACK DUCK*	Y N	Y N	Y N	Y N						IND
410,228,020										
SURF SCOTER	Y N	Y N	Y N	Y N						IND
410,228,040										
WHITE-WINGED SCOTER	Y N	Y N	Y N	Y N						IND
410,228,060										
COMMON EIDER	Y N	Y N	Y N	Y N						IND
410,206,020										
UNKNOWN EIDER	Y N	Y N	Y N	Y N						IND
410,206,990										
COMMON MERGANSER	Y N	Y N	Y N	Y N						IND
410,216,020										
RED-BREASTED MERGANSER	Y N	Y N	Y N	Y N						IND
410,216,040										
UNKNOWN MERGANSER	Y N	Y N	Y N	Y N						IND
410,216,990										
UNKNOWN DUCKS	Y N	Y N	Y N	Y N						IND
410,299,000										
	Y N	Y N	Y N	Y N						IND
	Y N	Y N	Y N	Y N						IND
	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, 2010, and DECEMBER 31, 2010.*

** *"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 **AKIAK: 4**

SUBSISTENCE HARVESTS: GEESE

HOUSEHOLD ID

1. Do you or members of your household USUALLY hunt geese for subsistence, such as LITTLE "CACKLERS", SPECKLEBELLY, or any other geese?..... Y N
2. During the last year (between JANUARY 1, 2010, AND DECEMBER 31, 2010), 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,* did you or members of your household….					IF …try to harvest is "YES," ask questions below…					
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? TRY includes looking, even if you got none		Please estimate how many geese ALL MEMBERS OF YOUR HOUSEHOLD got 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.					
					January February November December	April May June	July August	September October	Season of harvest unknown	
					WINTER	SPRING	SUMMER	FALL		
Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	*number got in each season*				*number*	*Units *** specify*
CANADA GEESE *LITTLE "CACKLERS"*	Y N	Y N	Y N	Y N						IND
410,404,040										
CANADA GEESE *BIG "LESSER"*	Y N	Y N	Y N	Y N						IND
410,404,080										
CANADA GEESE *UNKNOWN SPECIES*	Y N	Y N	Y N	Y N						IND
410,404,990										
WHITE-FRONTED GEESE *SPECKLEBELLY*	Y N	Y N	Y N	Y N						IND
410,410,000										
BRANT *SEA GEESE*	Y N	Y N	Y N	Y N						IND
410,402,000										
EMPEROR GEESE	Y N	Y N	Y N	Y N						IND
410,406,000										
SNOW GEESE	Y N	Y N	Y N	Y N						IND
410,408,000										
UNKNOWN GEESE	Y N	Y N	Y N	Y N						IND
410,499,000										
	Y N	Y N	Y N	Y N						IND
	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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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 **AKIAK: 4**

SUBSISTENCE HARVESTS: OTHER BIRDS

HOUSEHOLD ID

1. Do you or members of your household USUALLY hunt other birds for subsistence, such as SPRUCE CHICKEN, PTARMIGAN, or any other other birds?..... Y N
2. During the last year (between JANUARY 1, 2010, AND DECEMBER 31, 2010), 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,* did you or members of your household….					***IF ...try to harvest is "YES," ask questions below…***					
					Please estimate how many other birds ALL MEMBERS OF YOUR HOUSEHOLD got for subsistence uses during the last year.					
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? *TRY includes looking, even if you got none*		*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.*					
					January February November December	April May June	July August	September October	Season of harvest unknown	
					WINTER	SPRING	SUMMER	FALL		
Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	*number got in each season*				*number*	*specify*
SPRUCE GROUSE *SPRUCE CHICKEN*	Y N	Y N	Y N	Y N						IND
421,802,020										
RUFFED GROUSE *WILLOW GROUSE*	Y N	Y N	Y N	Y N						IND
421,802,060										
PTARMIGAN	Y N	Y N	Y N	Y N						IND
421,804,990										
SANDHILL CRANE	Y N	Y N	Y N	Y N						IND
410,802,000										
TUNDRA SWAN *WHISTLING SWAN*	Y N	Y N	Y N	Y N						IND
410,604,000										
WHIMBREL	Y N	Y N	Y N	Y N						IND
411,009,040										
	Y N	Y N	Y N	Y N						IND
	Y N	Y N	Y N	Y N						IND
	Y N	Y N	Y N	Y N						IND
	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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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 **AKIAK: 4**

SUBSISTENCE HARVESTS: EGGS

HOUSEHOLD ID

1. Do you or members of your household USUALLY gather eggs for subsistence, such as DUCK EGGS, SWAN EGGS, or any other eggs?..... Y N
2. During the last year (between JANUARY 1, 2010, AND DECEMBER 31, 2010), 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,* did you or members of your household….					IF …try to harvest is "YES," ask questions below…		
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? TRY includes looking, even if you got none		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.		
Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	How many did you gather? *amount*	Units *** *specify*	*comments*
DUCK EGGS	Y N	Y N	Y N	Y N			
430,200,000							
GEESE EGGS	Y N	Y N	Y N	Y N			
430,400,000							
SWAN EGGS	Y N	Y N	Y N	Y N			
430,600,000							
GULL EGGS	Y N	Y N	Y N	Y N			
431,212,990							
SHORE BIRD EGGS	Y N	Y N	Y N	Y N			
431,099,000							
UNKNOWN EGGS	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	Y N			IND

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.

* "LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.

** "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 **AKIAK: 4**

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 and network questions…

MAPPING: BIRDS & EGGS

On map, mark all the areas where members of your household looked for DUCKS & GEESE and PTARMIGAN & GROUSE.

NETWORK: BIRDS & EGGS

WHO GOT the BIRDS your household used last year?			WHO PROCESSED the BIRDS your household used last year?			WHO GOT the EGGS your household used last year?			WHO PROCESSED the EGGS your household used last year?		
List most important harvesters and processors first.						***List most important harvesters and processors first.***					
BIRDS harvesters living in…			BIRDS processors living in…			EGGS harvesters living in…			EGGS processors living in…		
…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities

ASSESSMENTS: BIRDS & EGGS 430000000

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

Last year…

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

If LESS or MORE… *X = do not use*

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

2

Last year…

…did your household GET ENOUGH birds & eggs?..... Y N

If NO…

What KIND of birds & eggs did you need?.....

WHY did your household NOT get enough birds & eggs?..... 1

2

How would you describe the impact to your household

of not getting enough birds & eggs last year?..... ...not noticable? (0) ...minor? (1) ...major? (2) severe? (3)

Did your household do anything DIFFERENTLY because you did NOT get enough birds & eggs?..... Y N

IF YES…

What did your household do differently?..... 1

2

NETWORKS & ASSESSMENTS OF BIRDS & EGGS: 66, 67 **AKIAK: 4**

SUBSISTENCE HARVESTS: BERRIES

HOUSEHOLD ID

1. Do you or members of your household USUALLY pick berries for subsistence, such as BLUEBERRIES, CROWBERRIES, or any other berries?..... Y N
2. During the last year (between JANUARY 1, 2010, AND DECEMBER 31, 2010), 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,* did you or members of your household….					IF …try to harvest is "YES," ask questions below…		
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? TRY includes looking, even if you got none		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.		
Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	How many did you pick? *amount*	Units *** *specify*	*comments*
BLUEBERRIES	Y N	Y N	Y N	Y N		GAL	
601,002,000							
SALMONBERRY *CLOUDBERRIES*	Y N	Y N	Y N	Y N		GAL	
601,022,000							
BLACKBERRIES *CROWBERRIES*	Y N	Y N	Y N	Y N		GAL	
601,007,000							
LOW-BUSH CRANBERRIES	Y N	Y N	Y N	Y N		GAL	
601,004,000							
HIGH-BUSH CRANBERRIES	Y N	Y N	Y N	Y N		GAL	
601,006,000							
RASPBERRY	Y N	Y N	Y N	Y N		GAL	
601,020,000							
CURRANTS	Y N	Y N	Y N	Y N		GAL	
601,012,000							
GOOSEBERRY	Y N	Y N	Y N	Y N		GAL	
601,010,000							
	Y N	Y N	Y N	Y N		GAL	
	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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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.*

PLANTS: 17 **AKIAK: 4**

SUBSISTENCE HARVESTS: GREENS

HOUSEHOLD ID

1. Do you or members of your household USUALLY pick greens for subsistence, such as WILD RHUBARB, CHYTHLOOK, or any other greens?..... Y N
2. During the last year (between JANUARY 1, 2010, AND DECEMBER 31, 2010), 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,* did you or members of your household….					IF ...try to harvest is "YES," ask questions below…		
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? TRY includes looking, even if you got none		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.		
Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	How many did you pick? *amount*	Units *** *specify*	*comments*
WILD RHUBARB	Y N	Y N	Y N	Y N		GAL	
602,006,000							
FIREWEED	Y N	Y N	Y N	Y N		GAL	
602,042,000							
STINKWEED *CHYTHLOOK*	Y N	Y N	Y N	Y N		GAL	
602,044,000							
HUDSON BAY TEA *LABRADOR TEA*	Y N	Y N	Y N	Y N		GAL	
602,018,000							
FIDDLEHEAD FERNS	Y N	Y N	Y N	Y N		GAL	
602,014,000							
WILD CELERY	Y N	Y N	Y N	Y N		GAL	
602,032,000							
FIELD MINT	Y N	Y N	Y N	Y N		GAL	
602,022,000							
SOURDOCK	Y N	Y N	Y N	Y N		GAL	
602,028,000							
WILLOW LEAVES	Y N	Y N	Y N	Y N		GAL	
602,031,000							
UNKNOWN GREENS	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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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 **AKIAK: 4**

SUBSISTENCE HARVESTS: OTHER PLANTS

HOUSEHOLD ID

1. Do you or members of your household USUALLY get other plants for subsistence, such as ESKIMO POTATO, MUSHROOMS, or any other other plants?..... Y N
2. During the last year (between JANUARY 1, 2010, AND DECEMBER 31, 2010), 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,* did you or members of your household….					*IF …try to harvest is "YES," ask questions below…*		
…use** _____?	…receive _____ from someone in another household or community?	…give _____ to someone in another household or community?	…try** to harvest _____? *TRY includes looking, even if you got none*		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.*		
Insert names below in blanks above	*USE?*	*REC?*	*GIVE?*	*TRY?*	How many did you get? *amount*	Units *** *specify*	*comments*
ESKIMO POTATO	Y N	Y N	Y N	Y N		GAL	
602,009,000							
ROSE HIPS	Y N	Y N	Y N	Y N		GAL	
602,036,000							
MUSHROOMS	Y N	Y N	Y N	Y N		GAL	
602,040,000							
PUFFBALLS	Y N	Y N	Y N	Y N		GAL	
602,046,020							
PUNK	Y N	Y N	Y N	Y N		GAL	
602,046,010							
YARROW	Y N	Y N	Y N	Y N		GAL	
602,037,000							
NETTLE	Y N	Y N	Y N	Y N		GAL	
602,016,000							
SPRUCE TIPS	Y N	Y N	Y N	Y N		GAL	
602,030,000							
FIREWOOD	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 CORDS.*
	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.

* *"LAST YEAR" means between JANUARY 1, 2010, and DECEMBER 31, 2010.*

** *"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.*

PLANTS: 17 **AKIAK: 4**

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 and network questions…

MAPPING: BERRIES & GREENS

On map, mark all the areas where members of your household looked for BERRIES & GREENS.

NETWORK: BERRIES & GREENS

WHO PICKED the PLANTS your household used last year?			WHO PROCESSED the PLANTS your household used last year?			WHO PICKED the FIREWOOD your household used last year?			WHO PROCESSED the FIREWOOD your household used last year?		
List most important harvesters and processors first.						*List most important harvesters and processors first.*					
PLANTS harvesters living in…			PLANTS processors living in…			FIREWOOD harvesters living in…			FIREWOOD processors living in…		
…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities	…THIS Household	... OTHER Households in Akiak	...Other Communities

ASSESSMENTS: BERRIES & GREENS 601000000

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

Last year…

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

If LESS or MORE… *X = do not use*

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

2

Last year…

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

If NO…

What KIND of berries & greens did you need?.....

WHY did your household NOT get enough berries & greens?..... 1

2

How would you describe the impact to your household

of not getting enough berries & greens last year?..... ...not noticable? (0) ...minor? (1) ...major? (2) severe? (3)

Did your household do anything DIFFERENTLY because you did NOT get enough berries & greens?..... Y N

IF YES…

What did your household do differently?..... 1

2

NETWORKS & ASSESSMENTS OF BERRIES & GREENS: 66, 67 **AKIAK: 4**

FOOD SECURITY

HOUSEHOLD ID

The questions on this page have been asked all over the United States to find out if Americans have enough to eat. We would like to know if people in your village have enough to eat. I am going to read you FIVE statements about different food situations. Please tell me whether EACH statement was true for your household (HH) in the last 12 months.

Think about all your household's food, both subsistence and store-bought…

STATEMENT 1. We WORRIED that our household would not have ENOUGH FOOD. HH2

In the last 12 months, was this ever true for your household?..... N Y ?

If YES…

…in which months did this happen?..... J F M A M J J A S O N D

…did this happen because your HH couldn't get SUBSISTENCE foods, your HH couldn't get STORE-BOUGHT foods, or your HH couldn't get BOTH KINDS of food?..... SUB STOR BOTH

STATEMENT 2. We could not get the kinds of foods we wanted to eat because of a LACK OF RESOURCES. HH4

By "lack of resources," we mean your household (HH) did NOT have what you needed to hunt, fish, gather, or buy food.

In the last 12 months, was this ever true for your household?..... N Y ?

If YES…

…in which months did this happen?..... J F M A M J J A S O N D

…did this happen because your HH couldn't get SUBSISTENCE foods,your HH couldn't get STORE-BOUGHT foods, or your HH couldn't get BOTH KINDS of food?..... SUB STOR BOTH

STATEMENT 3. The food we had JUST DID NOT LAST, and we could not get more. HH3

In the last 12 months, was this ever true for your household?..... N Y ?

If YES, in which months did this happen?..... J F M A M J J A S O N D

Now, think just about your household's SUBSISTENCE food…

STATEMENT 4. The SUBSISTENCE food we had just did not last, and we could not get more.

In the last 12 months, was this ever true for your household?..... N Y ?

If YES, in which months did this happen?..... J F M A M J J A S O N D

Now, think just about your household's STORE-BOUGHT food…

STATEMENT 5. The STORE-BOUGHT food we had just did not last, and we could not get more.

In the last 12 months, was this ever true for your household?..... N Y ?

If YES, in which months did this happen?..... J F M A M J J A S O N D

In the last 12 months, did you or other adults in your household ever CUT THE SIZE OF YOUR MEALS OR SKIP MEALS because the HH could not get the food that was needed?..... AD1 N Y ?

If YES, in which months did this happen?..... J F M A M J J A S O N D

In the last 12 months, did you or other adults in your household ever EAT LESS THAN YOU FELT YOU SHOULD because the HH could not get the food that was needed?..... AD2 N Y ?

In the last 12 months, were adults in the HH ever HUNGRY BUT DID NOT EAT because there was not enough food?..... AD3 N Y ?

In the last 12 months, did adults in the HH LOSE WEIGHT because there was not enough food?..... AD4 N Y ?

In the last 12 months, did you or other adults in your household ever NOT EAT FOR A WHOLE DAY because there was not enough food?..... AD5 N Y ?

If YES, in which months did this happen?..... J F M A M J J A S O N D

FOOD SECURITY: 201 **AKIAK: 4**

SURVEY SUMMARY

HOUSEHOL

ASSESSMENTS: ALL RESOURCES

To conclude our survey, I am going to ask a few general questions about ALL SUBSISTENCE RESOURCES.

Last year…

…did your household use LESS, SAME, or MORE subsistence resources than in recent years?.....

If LESS or MORE…

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

_____

Last year…

…did your household GET ENOUGH subsistence resources?.....

If NO…

What KIND of subsistence resources did you need?..... _____

WHY did your household NOT get enough all resources?..... _____

_____

How would you describe the impact to your household

of not getting enough all resources last year?..... ...not noticable? (0) ...minor? (1) ...major? (2) severe? (3)

Did your household do anything DIFFERENTLY because you did NOT get enough all resources?.....

IF YES…

What did your household do differently?..... _____

_____

QUESTIONS, COMMENTS, CONCERNS

Do you have any questions, comments, or concerns?

INTERVIEW SUMMARY

HOUSEHOL

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

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

Appendix B–TEK Interview Protocol

Lower Kuskokwim Baseline Project

Part 1. Demographic Information
In the beginning of each interview, I recommend asking some basic demographic questions:

1. name
2. year/location born
3. parents names and where from?
4. how long has respondent been hunting/fishing?

Then, it is often useful to take the seasonal round approach when doing interviews and let people answer the questions below through the structure of a description of the parts of the seasonal round that they participate in. That way, you can also document seasonal camps used in the past or currently used by respondent. **[Keep in mind that you do not have to do it this way, but the species sections below are ordered by a seasonal round. Skip around if that works better for you and your respondent.]**

Beginning in the spring with bird hunting…

Part 2. Migratory Bird hunting

1. Please describe your current migratory bird hunting practices:

a. what are the primary species you try to get every year? Do you collect eggs (which kinds?)

b. who do you hunt with year to year? How is this determined?

c. if you are successful, what do you do with the birds – how do you distribute/share it?

d. How do you preserve/process your harvest?

e. how do you feel the different bird populations are doing right now? Why do you think the population is declining/increasing? Are the different bird species healthy?

f. Are there environmental factors that contribute to changes in bird migrations and hunting? (changing weather patterns, changing habitat, etc)

g. are younger people learning to hunt birds? If so, how do they do that? How did you learn?

h. can you show us where you hunt now (or in the last 5 years?) what about the last 10 or 20 years? Have those areas changed at all?

i. are there any rules about hunting or the treatment of birds during hunting/harvest?

j. native names for birds or other aspects of bird hunting? Do you remember any traditional stories about birds or bird hunting in your village?

k. are there any natural seasonal indicators that you use to know when the birds will come?

Part 3. Non-salmon fishing – ask questions for each species (households are likely to harvest multiple species. While we want to document all species they harvest, the most important species to cover will be: whitefish [differentiate species if possible], sheefish, and pike. If a household heavily harvests another species, document that as much as possible.**)**

1. Please describe your current non-salmon fishing practices:

a. which species do you harvest? Timing of that harvest (for each species)?

b. do you fish with other people? How is this determined?

c. what are the primary means you use to harvest different species of non-salmon? (gear type by species?)

d. what do you do with the non-salmon you harvest – how do you distribute/share it?

e. are younger people learning to fish? If so, how do they do that? How did you learn?

f. how do you feel the non-salmon population is doing right now? Why do you think the population is declining/increasing? Are the non- salmon healthy?

g. Have your fishing areas changed at all? (map changes in area – currently and 10-20 years ago)

h. if there are changes to your fishing areas, what explains those changes? (environmental conditions, personal circumstances, traditional areas, changes in the fish population, regulations, etc)

i. Are there environmental factors that contribute to changes in non-salmon fishing? (weather, river conditions, etc)

g. which parts of the fish do you use? How do you preserve/process these parts?

h. are there any rules about fishing or the treatment of fish/nets during fishing?

i. native names for non- salmon species or other aspects of fishing? Do you remember any traditional stories about non-salmon species or fishing in your village?

Part 4. Salmon fishing

1. Please describe your current salmon fishing practices:

a. do you fish with other people? How is this determined?

b. which species do you harvest? Timing of that harvest?

c. what are the primary means you use to harvest salmon? (gear type by species?)

d. what do you do with the salmon you harvest – how do you distribute/share it?

e. which parts of the salmon do you use? How do you preserve/process these parts?

f. how do you feel the salmon population is doing right now? Why do you think the population is declining/increasing? Are the salmon healthy?

g. Have your fishing areas changed at all? (map changes in area – currently and 10-20 years ago)

h. if there are changes to your fishing areas, what explains those changes? (environmental conditions, personal circumstances, traditional areas, changes in the fish population, regulations, etc)

i. Are there environmental factors that contribute to changes in salmon fishing? (weather, river conditions, etc)

j. many people say that the elders used observations of the environment (changes in the land or water, weather, other animals' behavior) to know when salmon were coming and how many might come. Do you remember any of these 'natural indicators'?

k. are younger people learning to fish? If so, how do they do that? How did you learn?

l. are there any rules about fishing or the treatment of fish/nets during fishing?

m. native names for salmon species or other aspects of fishing? Do you remember any traditional stories about salmon or fishing in your village?

Part 5. Moose hunting

1. Please describe your current moose hunting practices

a. who do you hunt with year to year? How is this determined?

b. if you are successful, what do you do with the moose – how do you distribute/share it?

c. which parts of the moose do you use? How do you preserve/process these parts?

d. how do you feel the moose population is doing right now? Why do you think the population is declining/increasing (e.g. predation concerns, hard winters, good habitat, etc?)? Are the moose healthy?

e. Are there environmental factors that contribute to changes in moose hunting? (weather, river conditions, etc)

f. are younger people learning to hunt? If so, how do they do that? How did you learn?

g. can you show us where you hunt now (or in the last 5 years?) what about the last 10 or 20 years? Have those areas changed at all?

h. are there any rules about hunting or the treatment of moose or other animals during moose hunting/harvest?

i. native names for moose or other aspects of moose hunting? Do you remember any traditional stories about moose or moose hunting in your village?

Part 6. Other large game hunting (brown bear, black bear, caribou)

1. Please describe your current big game hunting practices (for each…)

a. who do you hunt with year to year? How is this determined?

b. if you are successful, what do you do with the bear/caribou – how do you distribute/share it?

c. which parts of the bear/caribou do you use? How do you preserve/process these parts?

d. how do you feel the bear/caribou population is doing right now? Why do you think the population is declining/increasing? Are they healthy?

e. can you show us where you hunt now (or in the last 5 years?) what about the last 10 or 20 years? Have those areas changed at all?

f. Are there environmental factors that contribute to changes in bear/caribou hunting? (weather, river conditions, winter conditions, migratory routes (caribou), etc)

g. are younger people learning to hunt? If so, how do they do that? How did you learn?

h. are there any rules about hunting or the treatment of bear/caribou or other animals during moose hunting/harvest?

i. native names for bear/caribou or other aspects of bear/caribou hunting? Do you remember any traditional stories about bear/caribou or bear/caribou hunting in your village?

Part 7. Trapping

1. Please describe your current trapping practices:

a. do you trap with anyone else? How is this determined?

b. how do you 'hold' your trapline? From whom (if anyone) did you get it/take it over?

c. are younger people learning to trap? If so, how do they do that? How did you learn?

d. what species do you trap? Why?

e. how do you feel the population of the animals you trap is doing right now? Why do you think the population is declining/increasing? Are the species you trap healthy?

f. can you show us where you trap now (or in the last 5 years?) what about the last 10 or 20 years? Have those areas changed at all?

g. Are there environmental factors that contribute to changes in trapping? (changing weather, snow pack, river conditions, etc)

Part 8. Marine mammals

1. Please describe your current marine mammal 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 animal(s) – how do you distribute/share it?

c. which parts of the aniaml do you use? How do you preserve/process these parts?

d. how do you feel the various marine mammal populations are 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 marine mammal hunting? (weather, sea ice or river conditions, locations, 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 marine mammal species?

i. native names for marine mammal species or other aspects of marine mammal hunting? Do you remember any traditional stories about marine mammal species or marine mammal hunting in your village?

Appendix C–Conversion Factors

Resource	Latin name	Units	Conversion to pounds
Summer chum salmon	*Oncorhynchus keta*	Individual	5.08
Fall chum salmon	*Oncorhynchus keta*	Individual	5.08
Unknown chum salmon	*Oncorhynchus keta*	Individual	5.08
Coho salmon	*Oncorhynchus kisutch*	Individual	5.29
Chinook salmon	*Oncorhynchus tshawytscha*	Individual	9.44
Pink salmon	*Oncorhynchus gorbuscha*	Individual	2.34
Sockeye salmon	*Oncorhynchus nerka*	Individual	5.04
Unknown salmon		Individual	6.42
Herring	*Clupea pallasi*	Gallon	6.00
Herring roe		Individual	7.00
Smelt		Gallon	6.00
Pacific tomcod	*Microgadus proximus*	Individual	3.20
Saffron cod	*Eleginus gracilis*	Individual	0.21
Pacific halibut	*Hippoglossus stenolepis*	Pounds	1.00
Arctic lamprey	*Lampetra spp.*	Individual	0.60
Stickleback (needlefish)		Gallon	6.00
Alaska blackfish	*Dallia pectoralis*	Pounds	1.00
Burbot	*Lota lota*	Individual	2.40
Dolly Varden	*Salvelinus malma*	Individual	0.90
Lake trout	*Salvelinus namaycush*	Individual	1.40
Arctic grayling	*Thymallus arcticus*	Individual	0.70
Northern pike	*Esox lucius*	Individual	4.50
Sheefish	*Stenodus leucichthys*	Individual	6.00
Sturgeon	*Acipenser spp.*	Individual	34.00
Longnose sucker	*Catostomus catostomus*	Individual	0.70
Rainbow trout	*Oncorhynchus mykiss*	Individual	1.40
Unknown trout		Individual	1.40
Broad whitefish	*Coregonus nasus*	Individual	1.40
Bering cisco	*Coregonus laurettae*	Individual	1.40
Least cisco	*Coregonus sardinella*	Individual	1.00
Humpback whitefish	*Coregonus pidschian*	Individual	3.00
Round whitefish	*Prosopium cylindraceum*	Individual	0.50
Unknown whitefish		Individual	1.40
Black bear	*Ursus americanus*	Individual	100.00
brown bear	*Ursus arctos*	Individual	141.00
Caribou	*Rangifer tarandus*	Individual	130.00
Moose	*Alces alces*	Individual	540.00
Beaver	*Castor canadensis*	Individual	15.00
Arctic hare	*Lepus arcticus*	Individual	2.50
Snowshoe hare	*Lepus americanus*	Individual	2.50
River (land) otter	*Lontra canadensis*	Individual	3.00
Lynx	*Lynx canadensis*	Individual	4.00
Marmot	*Marmota spp.*	Individual	5.00
Mink	*Neovison vison*	Individual	2.00
Muskrat	*Ondatra zibethicus*	Individual	0.75
Porcupine	*Erethizon dorsatum*	Individual	4.00
Parka squirrel (ground)	*Spermophilus parryii*	Individual	0.50
Red (tree) squirrel	*Tamiasciurus hudsonicus*	Individual	0.50

-continued-

Resource	Latin name	Units	Conversion to pounds
Bearded seal	*Erignathus barbatus*	Individual	420.00
Harbor seal	*Phoca vitulina*	Individual	56.00
Ringed seal	*Histriophoca fasciata*	Individual	56.00
Spotted seal	*Phoca largha*	Individual	56.00
Unknown seal		Individual	56.00
Walrus	*Odobenus rosmarus*	Individual	1,100.00
Beluga whale	*Delphinapterus leucas*	Individual	1,000.00
Bowhead whale	*Balaena mysticetus*	Individual	28,677.00
Bufflehead	*Bucephala albeola*	Individual	0.40
Canvasback	*Aythya valisineria*	Individual	1.10
Common eider	*Somateria mollissima*	Individual	2.21
King eider	*Somateria spectabilis*	Individual	1.43
Unknown eider		Individual	2.21
Goldeneye	*Bucephala spp.*	Individual	0.80
Harlequin	*Histrionicus histrionticus*	Individual	0.50
Mallard	*Anas platyrhynchos*	Individual	1.00
Common merganser	*Mergus merganser*	Individual	1.27
Red-breasted merganser	*Mergus serrator*	Individual	0.62
Unknown merganser	*Mergus spp.*	Individual	0.95
Long-tailed duck (oldsquaw)	*Clangula hyemalis*	Individual	0.80
Northern pintail	*Anas acuta*	Individual	0.80
Scaup	*Aythya spp.*	Individual	0.90
Black scoter	*Melanitta nigra*	Individual	0.90
Surf scoter	*Melanitta perspicillata*	Individual	0.90
White-winged scoter	*Melanitta fusca*	Individual	0.90
Northern shoveler	*Anas clypeata*	Individual	0.60
Green-winged teal	*Anas crecca*	Individual	0.30
Unknown wigeon	*Anas spp.*	Individual	0.70
Unknown ducks		Individual	0.86
Brant	*Branta bernicla*	Individual	1.20
Cacklers	*Branta hutchinsii*	Individual	1.20
Lesser Canada geese (taverner/parvipes)	*Branta canadensis*	Individual	1.20
Unknown Canada geese		Individual	1.20
Emperor geese	*Chen canagica*	Individual	2.50
Snow geese	*Chen caerulescens*	Individual	2.30
White-fronted geese	*Anser albifrons*	Individual	2.40
Unknown geese		Individual	2.40
Trumpeter swan	*Cygnus buccinator*	Individual	10.00
Tundra swan (whistling)	*Cygnus columbianus*	Individual	10.00
Sandhill crane	*Grus canadensis*	Individual	8.40
Unknown crane	Grus spp.	Individual	8.40
Whimbrel	*Numenius phaeopus*	Individual	0.10
Grebe	*Podiceps spp.*	Individual	1.50
Arctic (Pacific) loon	*Gavia pacifica/arctica*	Individual	3.00
Common loon	*Gavia immer*	Individual	5.44
Spruce grouse	*Falcipennis canadensis*	Individual	0.70
Ruffed grouse	*Bonasa umbellus*	Individual	0.70
Unknown grouse		Individual	0.70

-continued-

Resource	Latin name	Units	Conversion to pounds
Ptarmigan		Individual	1.00
Duck eggs		Individual	0.15
Geese eggs		Individual	0.30
Swan eggs		Individual	0.63
Shorebird eggs		Individual	0.05
Common snipe eggs	*Gallinago gallinago*	Individual	0.05
Unknown shorebird eggs		Individual	0.05
Gull eggs		Individual	0.33
Murre eggs		Individual	0.05
Ptarmigan eggs		Individual	0.10
Unknown eggs		Individual	0.22
Freshwater clams		Gallon	3.00
Razor clams	*Siliqua spp.*	Gallon	3.00
U		Gallon	3.00
Unknown clams [cf retention]		Gallon	3.00
Dungeness crab	*Cancer magister*	Gallon	0.70
King crab		Gallon	2.30
Tanner crab	*Chionoecetes spp.*	Gallon	1.60
Unknown crab		Individual	1.53
Unknown crab [cf retention]		Individual	1.53
Shrimp		Gallon	2.00
Snails		Gallon	2.00
Unknown marine invertebrates		Gallon	2.13
Blueberry	*Vaccinium uliginosum*	Gallon	4.00
Lowbush cranberry	*Vaccinum vitis-idaea*	Gallon	4.00
Highbush cranberry	*Viburnum edule*	Gallon	4.00
Gooseberry	*Ribes oxyacanthoides*	Gallon	4.00
Currants	*Ribes spp.*	Gallon	4.00
Raspberry	*Rubus idaeus*	Gallon	4.00
Salmonberry	*Rubus spectabilis*	Gallon	4.00
Blackberry	*Empetrum nigrum*	Gallon	4.00
Other wild berry		Gallon	4.00
Wild rhubarb	*Polygonum alaskanum*	Gallon	4.00
Eskimo potato	*Hedysarum alpinum*	Gallon	4.00
Fiddlehead ferns		Gallon	1.00
Nettle	*Urtica spp.*	Gallon	1.00
Hudson's Bay (Labrado) tea	*Ledum palustre*	Gallon	1.00
Mint	*Mentha spp.*	Gallon	1.00
Sourdock	*Rumex fenestratus*	Gallon	1.00
Spruce tips	*Picea spp.*	Gallon	1.00
Willow leaves	*Salix spp.*	Gallon	1.00
Wild celery	*Angelica lucida*	Gallon	1.00
Wild rose hips	*Rosa acicularis*	Gallon	4.00
Yarrow	*Achillea spp.*	Gallon	1.00
Other wild greens		Gallon	1.00
Unknown mushrooms		Gallon	1.00
Fireweed	*Epilobium angustifolium*	Gallon	1.00
Stinkweed	*Artemisia tilesii*	Gallon	1.00
Puffballs		Gallon	1.00

-continued-

Resource	Latin name	Units	Conversion to pounds
Unknown greens from land		Gallon	1.00
Mousefoods		Gallon	1.00
Willow	*Salix spp.*	Gallon	1.00
Unknown vegetation		Gallon	1.00

Appendix D–Kuskokwim River Salmon Regulations
Kuskokwim River Salmon Regulations

Regulatory authority for Kuskokwim River salmon management is shared by the Federal Subsistence Board and the State of Alaska Board of Fisheries (BOF). The Alaska Department of Fish and Game (ADF&G) is responsible for implementing regulations in accordance with the Kuskokwim River Salmon Management Rebuilding Plan (5 AAC 07.365, adopted by the BOF in 2001) and also has in-season discretionary management authority of salmon in 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-season 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 non-federally qualified subsistence uses must be eliminated in order to meet the federal subsistence priority. The Kuskokwim River Salmon Management Working Group (KRSMWG) is composed of knowledgeable stakeholders acting in a representative fashion for communities throughout the Kuskokwim River drainage, processors, 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 John C. 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. Under conditions that 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 the subsistence use priority (above sport and commercial uses) when resources are not abundant enough to provide for all consumptive uses, 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, as determined by the BOF. In 1993, the BOF made a positive finding for customary and traditional use for all salmon species in the entire Kuskokwim Area.[1] As part of this finding, the BOF then described a minimum quantity of salmon required to satisfy subsistence needs in the Kuskokwim Area, i.e., the amount reasonably necessary for subsistence (ANS). Based on

1 . 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. 38 communities are located within this area.

historical harvest information, an ANS of 192,000–242,000 for salmon of all species was determined. Commercial and sport uses of salmon are not provided for unless resource abundance allows for a sustainable harvestable surplus that also exceeds or is expected to exceed defined ANS levels.

In 2001, the BOF amended 5 AAC 01.286 to include a revised finding of ANS by salmon species for the Kuskokwim Area using subsistence harvest data from the years 1990 to 1999. After reviewing various options, the BOF made an ANS finding for the Kuskokwim River by species and for the remainder of the Kuskokwim Area by all species combined. The current ANS ranges for salmon in the Kuskokwim River drainage, determined by the BOF in 2012, are as follows: 67,200–109,800 Chinook salmon; 41,200–116,400 chum salmon; 32,200–58,700 sockeye salmon; 27,400–57,600 coho salmon; and 500–2,000 pink salmon; in Districts 4 and 5 combined: 6,900–17,000 salmon; and in the reminder of the Kuskokwim area: 12,500–14,400 salmon (5 AAC 01.286).[2]

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 07.365, 5 AAC 01.260, and 5 AAC 07.365). 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 and has since been discontinued (Chuck Brazil, former Area Management Biologist, ADF&G, Bethel, May 2007, personal communication; ADF&G 2007). There were generally few restrictions on Kuskokwim area Chinook salmon subsistence harvests in the period 1990–2010, other than temporary closures around commercial fishing periods, and the subsistence fishing schedule as described above. Subsistence salmon fishing was restricted and temporarily closed for all salmon species for the first time on the Kuskokwim River in 1993, and was restricted again in 2000 (Bavilla et al. 2010:64-65). Salmon may be taken for subsistence purposes by set and drift gillnet, beach seine, hook and line attached to a rod or pole, or hand line or fish wheels, subject to specifics in regulation (5 AAC 01.270). Licenses and permits have not been required for subsistence salmon fishing in the Kuskokwim area, nor were any required during 2010 (5 AAC 01.280). Between 2010 and 2012, the Kuskokwim drainage has experienced the lowest estimated total run and spawning escapements on record for Chinook salmon, although there were no restrictions on subsistence fishing in 2010, with the exception of tributary restrictions and closures associated with commercial fishing (Eggers and Carroll 2011:19). In 2011 and 2012, managers implemented salmon fishing restrictions in response to continuing low numbers of returning Chinook

2. In 2012, ADF&G submitted a proposal to the BOF to provide an opportunity for the BOF and public to revisit the ANS for salmon stocks in the Kuskokwim area. Such ANS revisions may be justified due to revised historical harvest data. A new harvest estimation method was deployed retroactively by ADF&G Division of Commercial Fisheries for years 1990–2009 (Hamazaki 2011). This new method attempts to provide a better estimation of subsistence salmon harvests than previous methods, and currently is being used by ADF&G Division of Commercial Fisheries, which reassumed control of the Kuskokwim subsistence salmon harvest monitoring program in 2008. Kuskokwim Area subsistence salmon harvests have been estimated by ADF&G Division of Commercial Fisheries since 1960 (except for the period 1988–2007 when the Division of Subsistence implemented the program), although harvest estimation methods have changed over time. The ANS findings in codified regulations were set by the BOF in 2001 based upon harvest estimates for years of 1990–1999. Revised harvest estimates for these years may necessitate a revision of ANS findings.

salmon. In 2011, subsistence salmon fishing was closed 3 times by emergency order for a total of 10 days, and in 2012 area managers implemented multiple closures and gear restrictions on subsistence salmon fishing in an attempt to meet escapement goals.[3,4]

Most recently, in 2012, the BOF implemented additional regulatory changes. The BOF adopted sustainable escapement goal (SEG) ranges for Kuskokwim River Chinook salmon as follows: 65,000-120,000 drainagewide; 4,100–7,500 in the Kwethluk River; 4,800–8,800 in the Kogrukluk River; and 1,800–3,300 in the George River. The BOF also updated the Kuskokwim River Salmon Rebuilding Management Plan to include several major changes: 1) management of the Chinook fishery will be based on preseason and in-season escapement projections; 2) when the projected escapement of Chinook salmon is within the drainagewide escapement goal range, harvest opportunity might be limited or liberalized depending on available surplus. If there is limited surplus, a fishing period may open during which Chinook salmon may only be taken by individuals 60 years of age or older. When it is necessary to conserve Chinook salmon, the subsistence fishery may be restricted to gillnets with 4-inch or less mesh size until sockeye and chum salmon abundance exceed Chinook salmon abundance.

3. Alaska Department of Fish and Game, "2011 preliminary Kukskokwim Area salmon season summary," news release, October 12, 2011.
4. Alaska Department of Fish and Game, "2012 preliminary Kukskokwim Area salmon season summary," news release, October 13, 2012.

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