

Technical Paper No. 354

**Subsistence Harvests in Northwest Alaska,
Kivalina and Noatak, 2007**

by

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Alaska Department of Fish and Game

Division of Subsistence



Symbols and Abbreviations

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

all atomic symbols

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

General

<i>all commonly-accepted abbreviations</i>	
<i>e.g., Mr., Mrs., AM, PM, etc.</i>	
<i>all commonly-accepted professional titles e.g., Dr., Ph.D., R.N., etc.</i>	
Alaska Administrative Code	AAC
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
mid-eye-to-fork	MEF
mid-eye-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 ₀
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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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 State Library and on the Internet: <http://www.subsistence.adfg.state.ak.us>. This publication has undergone editorial and professional review.

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TABLE OF CONTENTS

	Page
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
LIST OF APPENDICES.....	iii
ABSTRACT.....	1
INTRODUCTION.....	1
Background.....	1
Research Questions.....	4
General Study Objectives.....	5
Rationale and Literature Review.....	5
Relationships with Alaska Native Communities.....	7
METHODS.....	7
General Research Design.....	8
Data Needs in 2008.....	8
Variables.....	9
Survey Instrument.....	9
Limitations and Assumptions.....	9
Procedures.....	10
Data Analysis.....	14
COMPREHENSIVE SURVEY RESULTS–KIVALINA 2007.....	16
About Kivalina.....	17
Demographics.....	19
Wild Food Use and Harvests.....	20
Harvest Areas.....	27
Harvest Assessments.....	29
Jobs and Income.....	30
Food Security.....	34
Comparisons with Prior Results.....	35
COMPREHENSIVE SURVEY RESULTS–NOATAK 2007.....	39
About Noatak.....	40
Demographics.....	41
Wild Food Use and Harvests.....	41
Harvest Areas.....	49
Harvest Assessments.....	51
Jobs and Income.....	53
Food Security.....	56
Comparisons with Prior Results.....	58
SUMMARY AND DISCUSSION.....	61
A Review of Subsistence Harvest Estimates.....	61
Discussion.....	69

Table of Contents, continued

	Page
ACKNOWLEDGEMENTS.....	73
REFERENCES CITED	74
APPENDIX A: LIST OF SPECIES HARVESTED IN NORTHWEST ALASKA FOR SUBSISTENCE USES.....	78
APPENDIX B: FACTORS USED TO CONVERT INDIVIDUAL RESOURCES AND GALLONS TO POUNDS EDIBLE WEIGHT	84
APPENDIX C: KIVALINA MAPS, 2007	88
APPENDIX D: NOATAK MAPS, 2007.....	103
APPENDIX E: KIVALINA SURVEY, 2007.....	120

LIST OF TABLES

Table	Page
1. Research teams, Noatak and Kivalina, 2007.....	10
2. Comprehensive survey samples, 1964–2007.....	14
3. Estimated harvests of fish, game, and plant resources, Kivalina, 2007.....	22
4. Estimated earned and other income, Kivalina, 2007.....	31
5. Employment, Kivalina, 2007.....	33
6. Estimated harvests of fish, game, and plant resources, Noatak, 2007.....	43
7. Estimated earned and other income, Noatak, 2007.....	53
8. Employment, Noatak, 2007.....	55

LIST OF FIGURES

Figure	Page
1. Northwest Alaska and the study communities for 2007.....	3
2. Salmon harvest page from comprehensive survey, Noatak, 2008.....	11
3. Survey orientation session, Noatak, February 2008.....	12
4. Survey orientation session, Kivalina, February 2008.....	13
5. Top 10 species ranked by estimated edible weight, Kivalina, 2007.....	16
6. Kivalina in October 2007, looking northwest towards Point Hope.....	18
7. Population profile, Kivalina, 2007.....	19
8. Percentages of households using or harvesting by species category, Kivalina, 2007.....	20
9. Estimated pounds harvested by category, Kivalina, 2007.....	21
10. Fish harvest by gear type, Kivalina, 2007.....	26
11. Harvest locations and search areas, all resources, Kivalina, 2007.....	28
12. Harvest assessments, Kivalina, 2007.....	30
13. Top 10 income sources ranked by estimated amount, Kivalina, 2007.....	32
14. Food security responses, Kivalina, 2007.....	34
15. Food security categories, Kivalina, 2007.....	35
16. Estimated total subsistence harvests and community populations, Kivalina, 1964–2007.....	36
17. Estimated per capita subsistence harvests and community population, Kivalina, 1960–2007.....	36
18. Estimated subsistence harvests of top 5 species, Kivalina, 1964–2007.....	37
19. Estimated total subsistence harvests by category, Kivalina, 1964–2007.....	38
20. Top 10 species ranked by estimated edible weight, Noatak, 2007.....	39
21. Noatak in September 2009, looking northeast towards the Maiyumerak Mountains.....	41
22. Population profile, Noatak, 2007.....	42

List of Figures, continued

Figure	Page
23. Estimated pounds harvested by category, Noatak, 2007.	42
24. Percentages of households using or harvesting by species category, Noatak, 2007.	47
25. Fish harvests by gear type, Noatak, 2007.	48
26. Harvest locations and search areas, all resources, Noatak, 2007.	50
27. Harvest assessments, Noatak, 2007.	52
28. Top 10 income sources ranked by estimated amount, Noatak, 2007.	54
29. Food security responses, Noatak, 2007.	57
30. Food security categories, Noatak, 2007.	57
31. Estimated total subsistence harvests and community populations, Noatak, 1994–2007.	59
32. Estimated per capita subsistence harvests and community populations, Noatak, 1990–2007.	59
33. Estimated total subsistence harvests by category, Noatak, 1994–2007.	60
34. Community populations, Northwest Alaska, 1980–2007.	62
35. Top 20 subsistence foods, by average edible weight, 1964–2007.	63
36. Subsistence harvest estimates for 6 small communities, Northwest Alaska, 1964–2007.	64
37. Subsistence harvest estimates, Kotzebue, 1986–2004.	65
38. Estimated harvests per person in Northwest Alaska communities, 1964–2007.	67
39. Estimated harvests per person in Northwest Alaska communities, 1980–2007.	68
40. Associations between community populations and total subsistence harvests, 1982–2007.	69
41. Search areas and harvest locations, Kivalina and Noatak, 2007.	71

LIST OF APPENDICES

Appendix	Page
A. List of species harvested in northwest Alaska for subsistence uses, and their English, Latin, and <i>Iñupiaq</i> names.	79
B. Factors used to convert individual resources and gallons to pounds edible weight.	85
C. Kivalina maps, 2007.	89
D. Noatak maps, 2007.	104
E. Kivalina survey, 2007.	121

ABSTRACT

In Northwest Alaska, a cooperative group of state and federal agencies, tribes, communities, nongovernmental organizations, and industries work together to monitor subsistence harvests using comprehensive household surveys. This report summarizes recent results from comprehensive surveys conducted in February 2008. In Kivalina, comprehensive subsistence harvest surveys were administered to 42 of 81 households (52%). Expanding for 39 unsurveyed households, Kivalina's estimated total harvest of wild foods in 2007 was 256,088 lb ($\pm 23\%$), while average harvests were 3,162 lb per household and 595.6 lb per person. Kivalina has one of the longest reliable subsistence harvest records of any community in Alaska, dating back to 1964, with resurveys in 1965, 1983, 1984, 1992, and now 2007. Although Kivalina's human population has more than doubled during the past 50 years, estimates of total community subsistence harvest have been stable, ranging between an estimated 210,497 lb (in 1982) and an estimated 269,497 lb (in 1965). Because of the increasing human population, estimated per capita harvests in Kivalina declined. In Noatak, researchers surveyed 90 of 119 households (76%). Expanding for 29 unsurveyed households, Noatak's estimated total harvest of wild foods in 2007 was 191,589 lb ($\pm 18\%$), with average harvests per household of 1,610 lb, and average harvests per person of 364 lb. At this time, reliable, comprehensive estimates of total community subsistence harvests were available for 7 of 11 Northwest communities. In those communities, subsistence harvests provided approximately 500 lb of wild food per person per year. With a regional population of about 7,000 people, the data suggested that subsistence harvests contributed about 3.5 million lb of wild foods to the Northwest Alaska diet each year.

Key words: subsistence hunting, subsistence fishing, subsistence mapping, food security, Kivalina, Noatak.

INTRODUCTION

Residents of Northwest Alaska rely substantially on subsistence hunting, fishing, and gathering for nutrition and to support their customary and traditional ways of life. Since in the early 1980s, estimates of average subsistence harvests have ranged between 398 and 940 lb per person per year (Burch Jr. 1985; Fall and Utermohle 1995; Georgette and Loon 1993; Magdanz et al. 2002; Magdanz et al. 2004). Earlier estimates, although not strictly comparable because of differences in methods, ranged well over 1,000 lb per person per year (Foote and Williamson 1966; Patterson 1974; Saario and Kessel 1966).

Subsistence harvests of wild foods are diverse. Harvests vary from community to community, and harvests vary over time in both amounts and species harvested. Species harvested include, but are not limited to, salmon, sheefish (inconnu), Dolly Varden, whitefishes, caribou, moose, bearded seals, beluga whales (white whales), seals, geese, ducks, crabs, clams, wild berries, and wild greens.¹

In Northwest Alaska, a cooperative group of state and federal agencies, tribes, communities, nongovernmental organizations, and industries work together to monitor subsistence harvests using comprehensive household surveys. The cooperators seek not only to conduct a continuing program of basic subsistence monitoring, but also to integrate other studies of contemporary patterns of subsistence uses of natural resources whenever possible. The program is coordinated by the Alaska Department of Fish and Game (ADF&G) Division of Subsistence.

In 2008, comprehensive household surveys were conducted in the communities of Kivalina and Noatak, while big game surveys were conducted in the community of Deering. This report summarizes the results from the comprehensive surveys. Cooperators included ADF&G, Stephen R. Braund and Associates (SRB&A), Maniilaq Association, the City of Kivalina, and the Native Village of Noatak. The 2008 research was funded by SRB&A and the ADF&G Division of Wildlife Conservation.

BACKGROUND

Northwest Alaska includes all lands and waters that drain into Kotzebue Sound and the Chukchi Sea between Cape Espenberg and Point Hope, including marine waters under both state and federal

¹ For a list of species used and harvested in Northwest Alaska, see Appendix A.

jurisdictions. A variety of similar, but not always identical, political boundaries encompassed Northwest Alaska, including:

- The Northwest Arctic Borough (a political subset of the State of Alaska).
- The NANA Region (an Alaska Native corporation).
- The Northwest Arctic Region (a federal subsistence management area).
- The Kotzebue Area (a fishing regulatory area that extends south to Cape Prince of Wales).
- ADF&G Game Management Unit 23 (a hunting regulatory area that extends north to Cape Lisburne).

Northwest Alaska encompasses about 100,000 km² of land, about the same size as the state of Ohio. The project area includes both state and federal waters used for subsistence fishing, such as the Noatak River, Kobuk River, Selawik River, Buckland River, Goodhope River, Kotzebue Sound, near shore waters of the Chukchi Sea, and numerous coastal lagoons. The area includes portions of the Bering Land Bridge National Preserve and Gates of the Arctic National Park. It also includes the entire Kobuk Valley National Park, Cape Krusenstern National Monument, Noatak National Preserve, and Selawik National Wildlife Refuge.

Within Northwest Alaska are the traditional territories of 11 *Iñupiat* Eskimo societies (Burch Jr. 1998). During the 20th century, these societies coalesced into 11 small predominantly Native communities ranging in size from 135 people in Kobuk to 3,133 people in Kotzebue (ADLWD 2008). These communities include Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Kotzebue, Noatak, Noorvik, Selawik, and Shungnak (Figure 1). In the 2000 census, more than 80% of the 7,208 residents of the area were Alaska Native or American Indian, primarily *Iñupiat* Eskimo (U. S. Census Bureau 2001).

Alaska Natives, including the *Iñupiat* of Northwest Alaska, are among the very few indigenous peoples of the world who inhabit their traditional territories; who are a majority of the population in their territories; whose territories have been largely unaffected by agriculture, industrial development, or roads; who manage their political and economic affairs through both traditional (tribal) and contemporary (borough and corporate) structures; and who continue to rely substantially on hunting, fishing, and gathering to provide for their sustenance.

Alaska is unique in the nation in having both state and federal laws that provide priorities for customary and traditional subsistence hunting and fishing over other consumptive uses, such as commercial fishing. Aboriginal hunting and fishing rights were extinguished by the Alaska Native Claims Settlement Act in 1971. Recognizing the lack of legal protection for Alaska's subsistence traditions, and mindful of the risks to subsistence posed by competing commercial and recreational uses, both the Alaska legislature and the U.S. Congress subsequently adopted laws intended to preserve opportunities for customary and traditional uses of fish and wildlife in Alaska.

Under the Marine Mammal Protection Act of 1972, "coastal Alaska Natives" were granted an exemption which allowed them to continue to hunt for marine mammals for subsistence. In 1978, the Alaska legislature adopted priorities for subsistence over other consumptive uses of fish and game, a subsistence fishing priority under AS 16.05.251(b) and a subsistence hunting priority under AS 16.05.255(b). In 1987, these were repealed in response to a court decision, and the legislature adopted similar priorities under AS 16.05.258, as amended in 1992. Under this law, the Alaska Board of Fisheries and the Alaska Board of Game manage subsistence on state and private lands. In 1980, the U.S. Congress adopted a similar subsistence priority in the Alaska National Interest Lands Conservation Act (ANILCA), under which the Federal Subsistence Board manages subsistence on federal public lands (about 60% of the state).



Figure 1.—Northwest Alaska and the study communities for 2007.

In 2003, the Alaska Migratory Bird Co-Management Council 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 *Hippoglossus stenolepis* by eligible members of Alaska Native tribes and eligible residents of rural Alaska communities.

Alaska also is unique in the nation in having an applied anthropological research group established by statute to conduct “policy research” (*sensu* Trotter II. and Schensul 1998:692) regarding customary and traditional uses of fish and wildlife resources. The ADF&G Division of Subsistence conducted 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, included 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 conducted research and applied the results of previous research to “evaluate the impact of state and federal laws and regulations on subsistence hunting and fishing,” as well as to the development of “statewide and regional management plans so that those plans recognized and incorporated the needs of subsistence users of fish and game” (AS 16.05.094).

Support for a harvest monitoring program in Northwest Alaska was strong. A planning effort by the Division of Subsistence, Maniilaq Association, and the Northwest Arctic Borough (Magdanz et al. 2010) found widespread support for harvest survey research during meetings in the 11 Northwest Arctic communities in 2006 and 2007 (Magdanz et al. 2010). Of the 146 meeting participants, 94% thought harvest surveys should be conducted in their communities, and 74% favored a cooperative approach involving tribes and 1 or more regional organizations, usually including a resource management agency. This harvest monitoring program relied on the continued public support of the residents of Northwest Alaska and on the continued financial support of the cooperating organizations.

RESEARCH QUESTIONS

The principal questions addressed by the harvest monitoring program in Northwest Alaska were the amounts of wild foods harvested for subsistence and whether those harvests exceeded the harvestable surpluses of fish stocks and wildlife populations. Related questions involved the role of wild foods in Northwest Alaska's economy, the impacts of economic development on subsistence activities, the lands and waters used for subsistence, the impacts of competing, nonsubsistence uses of fish and wildlife, and the impacts of climate changes.

Most fish stocks and wildlife populations, although variable over time, were in natural and healthy conditions in Northwest Alaska. As of 2007, both the Alaska Board of Fisheries and the Alaska Board Game had found that harvestable surpluses of all fish and wildlife species were sufficient to provide the amounts necessary for subsistence uses, and to provide for other nonsubsistence uses, except for muskoxen, which were managed for limited subsistence uses only.

Neither the environment nor the economy of Northwest Alaska were static. Supplies of and demand for fish and wildlife changed over time, sometimes dramatically and rapidly. Climate-related changes have occurred and were expected to continue to occur in Northwest Alaska (Grebmeier et al. 2006; Hinzman et al. 2005; Overland and Stabeno 2004). In addition, proposed industrial developments potentially will 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 (Fried and Robinson 2008). Specific examples included proposed expansion of the Red Dog Mine (Tetra Tech Inc. 2008), proposed offshore oil development in the Chukchi Basin, and ongoing mineral exploration in the Ambler and Candle mining districts.

The dynamic environment and economy of Northwest Alaska 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 problems included:

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

To manage species where demand may exceed supply, managers needed timely harvest data for selected species, in some cases on a yearly basis. Fortunately, this involved only a handful of fish and big game species in Northwest Alaska at this time. To sustainably allocate fish and wildlife, regulatory bodies needed periodic harvest data over time that accounts for normal variations in harvests, which for some species can mean decades.

To better document Alaska's subsistence economy, policymakers needed substantially complete estimates of harvests and better descriptions of subsistence systems. To assess impacts or to monitor long term

changes, investigators needed an initial comprehensive survey to collect baseline subsistence harvest, social, and economic data; they also needed postimpact surveys to measure changes and assess impacts.

Impact assessment and ecological monitoring were more complex than harvest monitoring, because the nature and scope of potential impacts and the course of human adaptations were not known in advance. For example, residents of Northwest Alaska might adapt to persistent and adverse changes in caribou migration patterns by increasing subsistence moose or 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 caribou migrations would require information on caribou movements, caribou harvests, caribou harvest locations, other species' harvests, employment, wages, other types of income, and perhaps household spending patterns. Thus, impact assessment and ecological monitoring required a greater range of data than basic harvest monitoring.

GENERAL STUDY OBJECTIVES

The objectives of the continuing harvest monitoring program are to:

- Develop a sampling strategy to coordinate data collection in each of the 11 communities in Northwest Alaska on a rotating basis.
- Design a household survey instrument to collect current data about subsistence hunting, fishing, gathering, and other topics that are compatible with information collected in previous rounds of household surveys.
- Identify, obtain, and coordinate funds to conduct the surveys from ADF&G, other State of Alaska agencies, federal agencies, nongovernmental organizations, industry, and other sources.
- Obtain approvals from study communities to conduct comprehensive surveys.
- Maintain lists of all occupied households in each Northwest Arctic Borough community, updated for each community just prior to each administration of the survey.

Within this continuing harvest monitoring program, the Division of Subsistence and cooperating agencies conduct an annual harvest monitoring project. Each year, they select study communities, train community residents in administration of the survey instruments, and attempt to administer surveys to occupied households in each study community. They collaboratively review and interpret survey findings, periodically publish reports of survey findings, and communicate study findings to the communities. Summary results are published online at the Community Subsistence Information System website² maintained by the ADF&G Division of Subsistence.

RATIONALE AND LITERATURE REVIEW

During the past 50 years, 2 different methods have been used to collect subsistence data in Northwest Alaska. Both methods—mandatory reporting and voluntary surveys—have had substantial limitations.

For big game species like 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 supposed to mail a postage paid postcard reporting their efforts and harvest, if any. Unfortunately, only about 20% of the moose harvested by residents of the Northwest Arctic Borough were being reported, and reporting rates were variable and unpredictable.

For comprehensive estimates of subsistence harvests, ADF&G and other researchers have relied on household surveys. Most early survey efforts were not systematic, population sizes were unknown, sampling rates were not recorded, and data analysis methods were not published. As a result, most early

² <http://www.subsistence.adfg.state.ak.us/CSIS/>; hereinafter cited as CSIS.

survey results cannot be reliably compared with more recent survey results. Important exceptions were a U.S. Fish and Wildlife Service salmon survey (Raleigh 1958), Project Chariot related research (Saario and Kessel 1966; Foote and Williamson 1966), surveys of Kivalina in the early 1980s (Burch Jr. 1985), and a 1986 survey of Kotzebue (Georgette and Loon 1993). These efforts were more systematic, better documented, and provided more reliable estimates.

Beginning in the 1990s, the quality and quantity of survey data increased dramatically, as a result of a series of unrelated circumstances. In 1991 and 1992, the Division of Subsistence conducted comprehensive harvest surveys in Kotzebue and Kivalina, which were control communities for Exxon Valdez oil spill impact assessment studies. A series of waterfowl harvest surveys were conducted from 1993 through 1997, to support waterfowl treaty negotiations between the United States, Japan, Mexico, Canada, and the former Soviet Union. The Northwest salmon harvest survey project began in 1994, prompted by crashing chum salmon stocks in western Alaska, and continued through 2004. The National Park Service funded comprehensive harvest surveys in Deering and Noatak for 1994, in Shungnak for 2002, in Buckland for 2004 and in Kiana for 2006, to provide information for management of Western Arctic Parklands. In 1998, the Western Arctic caribou herd harvest survey program began in selected communities, and contributed big game harvest data for 1 or 2 communities in most subsequent years. The Native Village of Kotzebue conducted comprehensive surveys of tribal households in 2002, 2003, and 2004.

As of 2007, comprehensive subsistence harvest data had been collected 5 times for Kivalina, 5 times for Kotzebue, and 1 time for 6 other communities in the Northwest Arctic Borough. Comprehensive data have never been collected for Noorvik, Ambler, and Kobuk. In other words, for a majority of the communities in the Northwest Arctic Borough, comprehensive estimates of subsistence harvests existed for only a single year.

Harvest data for a limited range of species have been collected more often. Salmon harvests were the most thoroughly documented, with annual estimates of harvests for 6 communities (Ambler, Kiana, Kobuk, Noatak, Noorvik, and Shungnak) from 1994 through 2004. Large land mammals (“big game”) surveys were conducted at least once in every NWAB community except Kotzebue since 1998. Waterfowl surveys were conducted at least once in every NWAB community during the 1990s. Of those projects, only the big game surveys were continuing in 2007 (as part of this effort).

Over the last 50 years, substantial funds have been invested in harvest reporting and survey research in Northwest Alaska. Whether harvest data were collected in comprehensive or limited surveys, subsistence harvest monitoring in Northwest Alaska region usually has been driven by the data needs and funding situation of individual agencies and not by a coordinated strategy. Neither mandatory harvest reporting systems nor voluntary community household surveys provided sufficient data to estimate regionwide subsistence harvest of fish and wildlife with reasonable confidence, nor to monitor trends in subsistence harvests and use patterns.

Although mandatory harvest reporting appears to be improving for some big game species, the harvest reporting system does not collect comprehensive harvest data, nor does it collect socioeconomic data. 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 uses survey methods.

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 people were able to harvest what they needed. But historical data are not always available and sometimes harvests are limited by factors other than subsistence demand, 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?”).

More recently, some subsistence surveys adopted a food security protocol to assess whether households were able to obtain the food they needed. 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 (e.g., 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 northern Burkina Faso (Frongillo and Nanama 2007), Bangladesh (Coates et al. 2006), Bolivia and the Philippines (Melgar-Quinonez et al. 2006), and Brazil (Pérez-Escamilla et al. 2004). Although there have been efforts to develop a universal food security measurement protocol (Swindale and Bilinsky 2006), researchers often modify the protocol slightly to respond to community social, cultural, and economic circumstances.

For the Northwest Harvest Monitoring Program, the food security protocol was modified with the addition of several subquestions designed to determine whether food insecurities, if any, were related to subsistence foods or store-bought foods. The wording of some questions was changed slightly. As in Brazil (Pérez-Escamilla et al. 2004:1928), 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.

Extensive, comprehensive survey efforts are possible, as demonstrated in 2007 when Kawerak Inc. successfully conducted comprehensive surveys in 12 Norton Sound–Bering Strait communities. The Kotzebue IRA also successfully conducted comprehensive surveys of tribal member households in 3 successive years, 2002–2004. The keys are well designed survey instruments, efficient data entry, and standard approaches over time.

RELATIONSHIPS WITH ALASKA NATIVE COMMUNITIES

A majority of the residents of Northwest Alaska are Alaska Native or American Indian, who have maintained their subsistence customs and traditions throughout their history. The project is intended to encourage a collaborative, working relationship among state and federal agencies, tribes, communities, nongovernmental organizations, and industries. The ethical conduct of all researchers will meet or exceed 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 are to work in a manner that develops, rather than jeopardizes, relations among the cooperators, and between the cooperators and the public.

METHODS

Each year, the Northwest Alaska Harvest Monitoring Program administers harvest monitoring surveys to households in 2 or 3 of the 11 Northwest communities. Communities are surveyed on a flexible schedule, in which each community is surveyed at least once every 5 years, depending on available funding. Ideally, each year provides a geographically diverse sample of communities. Both the surveyed species and the surveyed communities are adjusted as necessary to meet changing data needs.

The program evolved from, and builds on, earlier efforts in Northwest Alaska, such as the Northwest salmon surveys and the Western Arctic caribou herd (WACH) surveys. The program coordinates efforts of different organizations to maximize efficiency and reduce costs, and relies on a standard survey instrument instead of several instruments. The instrument is based on a series of surveys conducted by the Division of Subsistence for similar studies in Alaska in the 1980s and 1990s. Many survey questions are the same as, or similar to, questions in prior harvest assessment tools, so recent results are comparable with past results.

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. As characterized by Trotter and Schensul:

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. Trotter II. and Schensul 1998:702–703

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 more commonly 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. 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. Except for the principal investigators, 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.

DATA NEEDS IN 2008

There is a continuing need for harvest estimates for high demand, big game species, particularly caribou and moose. The caribou population has been at historical high levels for 15 years, and is expected to decline. Moose populations in Northwest Alaska have declined since the mid 1980s. Increasing numbers of nonlocal hunters are competing for caribou and moose. These factors argued for continued or expanded monitoring of caribou and moose harvests. For the 2008 program, ADF&G planned to conduct WACH harvest surveys planned in Noatak, Kivalina, and Deering.

In October 2007, ADF&G learned of a specific need for subsistence information to assist in the preparation of a supplemental environmental impact statement (SEIS) for a proposed expansion of the Red Dog Mine (Tetra Tech Inc. 2008). For the 2 communities closest to Red Dog Mine, Kivalina and Noatak, systematic, comprehensive, subsistence surveys had not been conducted since 1992 (Kivalina) and 1994 (Noatak).

To prepare the SEIS, the U.S. Environmental Protection Agency (EPA) selected Tetra Tech Inc. Tetra Tech selected SRB&A to prepare the subsistence sections of the SEIS. SRB&A asked the Division of Subsistence to expand its planned WACH survey efforts in Kivalina and Noatak to include harvests of all subsistence resources, maps of search areas and harvest locations, demographic information, and income. SRB&A, funded by Teck Alaska Inc. through Tetra Tech, provided funds to ADF&G to administer surveys, analyze data, and prepare a summary report. SRB&A also provided funds to the Native Village of Noatak and City of Kivalina to help conduct the surveys and review results.

VARIABLES

From each household, researchers collected information 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 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. 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 harvests changed or were insufficient, respondents were asked why this occurred.

To document the areas used for subsistence, the survey asked households to locate on a map of the area where they searched for and where they actually harvested selected subsistence resources. Maps were available at 3 different scales, to accommodate both local and distant searches and harvests. Search area and harvest location maps in this report were produced by SRB&A.

SURVEY INSTRUMENT

The primary purpose of the household survey was to collect information about the harvest and use of edible wild foods. In its simplest form, the survey included a core harvest module that collected, for example, caribou or salmon harvest reports on a single sheet (Figure 2). 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.

LIMITATIONS AND ASSUMPTIONS

The harvest survey collected information on subsistence activities during a single year. This assumed that respondents can remember their important activities during the past 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 often were missing. For Noatak and Kivalina for 2007, earned income data were missing for 42% of the individuals in the sample.

Standardization in data collection procedures was important because many different people gather data. One or more principal investigators were present throughout the administration of the surveys and administered some surveys themselves. Standardization and quality control were accomplished through an initial orientation process, daily reviews of surveys as completed, and post-administration review of all surveys. The principal investigators code most of the surveys and review all coded surveys before data entry.

PROCEDURES

In 2008, the principal investigators were James Magdanz and Nicole Braem, subsistence resource specialists with the Division of Subsistence based in Kotzebue and Fairbanks, respectively. They were assisted by 5 residents of Kivalina, 8 residents of Noatak, 4 SRB&A employees based in Anchorage, and 2 Division of Subsistence employees based in Anchorage (Table 1).

Table 1.–Research teams, Noatak and Kivalina, 2007.

Kivalina	Noatak
Community residents	
Stanley Hawley	Emma Adams
Hilda Knox	Roger Adams
Richard Sage	Lola Arey
Eleanor Swan	Ben Arnold
Nelda Swan	Cheryl Booth
	Hannah Onalik
	Amanda Porter
	Chris Shy
ADF&G Division of Subsistence	
Nicole Braem	Nicole Braem
James Magdanz	Davin Holen
Amy Russell	James Magdanz
	Amy Russell
Stephen R. Braund & Associates	
Paul Lawrence	Raena Schraer
Stephanie Schively	Liz Sears

In December 2007, Magdanz attended a meeting with representatives of the Northwest Arctic Borough and Maniilaq Association, cooperating agencies in the Red Dog SEIS. Maniilaq worked directly with the village councils to review survey instruments, prepare updated household lists, and obtain community approvals.

On February 4, 2008, Magdanz, Braem, Amy Russell, and Davin Holen traveled to Noatak. Two SRB&A employees, Elizabeth Sears and Raena Schraer, were already present in the community, working on a related project to document subsistence use areas and traditional knowledge. Working with Magdanz, the Noatak Traditional Council selected 8 community surveyors: Emma Adams, Roger Adams, Lola Arey, Ben Arnold, Cheryl Booth, Hannah Onalik, Amanda Porter, and Chris Shy. Community contractors were paid \$50 for each completed survey, as well as \$25 per hour to participate in an orientation session, daily 1 hour survey review sessions, and a final debriefing session.

On February 5, Magdanz conducted an orientation meeting attended by all the community and noncommunity surveyors (Figure 3). During orientation, the group verified household lists, reviewed the survey instrument, and practiced administering the survey to one another. Holen, Sears, and Schraer trained the group on administering the mapping portion of the survey. 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.

HARVESTS: SALMON

HOUSEHOLD ID

Do members of your household USUALLY catch SALMON for subsistence?..... N Y

Between JANUARY and DECEMBER, 2007...

... Did members of your household USE or TRY TO CATCH salmon?..... N Y

IF NO, go to the next harvest page.

IF YES, continue on this page...

Please estimate how many salmon ALL MEMBERS OF YOUR HOUSEHOLD CAUGHT for subsistence use this year, including with a rod and reel. INCLUDE salmon you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID YOUR HOUSEHOLD...			HOW MANY OF THOSE WERE CAUGHT JUST FOR DOGS?	UNITS (ind. lbs)	IN 2007...	
	...USE ...?	...TRY TO CATCH ...?	...CATCH WITH GILL NET OR SEINE?	...CATCH WITH ROD AND REEL?	...CATCH WITH OTHER GEAR?			DID YOUR HH SHARE	...DID OTHERS SHARE
	(circle)		(number taken by each gear type)					(number)	(circle)
CHUM SALMON <i>Qalugruaq</i> 111020003	N Y	N Y						N Y	N Y
PINK SALMON <i>Amagtuk</i> 114000003	N Y	N Y						N Y	N Y
COHO SALMON <i>Qalugruaq</i> 112000003	N Y	N Y						N Y	N Y
SOCKEYE SALMON <i>Qalugruaq</i> 115000003	N Y	N Y						N Y	N Y
KING SALMON <i>Qaluaqpuk</i> 113000003	N Y	N Y						N Y	N Y
UNKNOWN SALMON 119000003	N Y	N Y						N Y	N Y

These columns should include all the harvests: salmon HARVESTED by members of this household in 2007.

Between JANUARY and DECEMBER, 2007...

... WHERE did members of your household CATCH salmon?

On MAP, mark all harvest locations for salmon.

NON-COMMERCIAL SALMON: 04

NOATAK: 250

Figure 2.—Salmon harvest page from comprehensive survey, Noatak, 2008.



Figure 3.—Survey orientation session, Noatak, February 2008.

From left to right: Nicole Braem, Cheryl Booth, Amanda Porter, Chris Shy, and Hannah Onalik. On the table in the foreground are full color maps (left) and species identification sheets (right) used during survey administration.

Surveyors were given the option of working in teams of 2—ideally 1 community and 1 noncommunity surveyor—or of working individually. When working in teams, 1 surveyor administered the survey, while the other administered the map instrument. Most surveys were conducted by a team of 2. Surveys were conducted in person, usually at the respondent’s home, at a time selected by the respondent. Community workers, in most cases, administered the surveys. ADF&G and SRB&A employees did the mapping.

Either the male or female head of household answered questions about the household as a whole. Sometimes, both heads of household or other family members would assist the respondent by providing information. Survey durations ranged from 12 minutes to 4 hours and 42 minutes. Average survey administration time was 1 hour and 24 minutes. Surveying began the evening of February 5, 2008, and continued through February 10, 2008. At the conclusion of survey administration, 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.

Procedures in Kivalina were similar. On February 19, 2008, Magdanz, Braem, and Russell traveled to Kivalina with 2 SRB&A employees, Paul Lawrence and Stephanie Schively. Working with Magdanz, the City of Kivalina contracted with 5 community residents: Stanley Hawley, Hilda Knox, Richard Sage,

Eleanor Swan, and Nelda Swan. On February 21, Magdanz conducted an orientation meeting similar to the one held in Noatak (Figure 4). Surveying began that day and continued through February 25, 2008.



Figure 4.—Survey orientation session, Kivalina, February 2008.

From left to right: Nelda Swan (in back), Amy Russell, Paul Lawrence, Richard Sage, Hilda Knox, Eleanor Swan.

Researchers attempted to survey all occupied households in Kivalina and Noatak. Surveys were completed for 90 of 119 households (76%) in Noatak, and for 42 of 81 households (52%) in Kivalina (Table 2).

Surveys were coded for data entry by ADF&G and SRB&A staff during and subsequent to field work, and entered by ADF&G staff in Anchorage. During coding, the principal investigators recorded and then summarized harvest reports for major species by hand. These summaries were later compared with the preliminary results of data analysis, and any significant discrepancies were explored and resolved. Data analysis was conducted by ADF&G research analyst Brad Robbins and ADF&G program coordinator David Koster. Map data were entered into ESRI ArcGIS³ by researcher Raena Schraer at SRB&A. Schraer prepared the maps of subsistence use areas and harvest locations that appear in this report.

³ Product names used in this report are included for scientific completeness; they do not constitute product endorsement.

Table 2.—Comprehensive survey samples, 1964–2007.

	Number of households		
	Total	Surveyed	
Buckland			
2003	84	81	(96%)
Deering			
1994	44	37	(84%)
Kiana			
2006	95	77	(81%)
Kivalina			
1964	26	26	(100%)
1965	26	26	(100%)
1982	47	47	(100%)
1983	47	47	(100%)
1992	73	62	(85%)
2007	81	42	(52%)
Kotzebue			
1986	765	90	(12%)
1991	809	100	(12%)
Noatak			
1994	84	68	(81%)
2007	115	90	(78%)
Shungnak			
2002	54	51	(94%)
All communities			
Median			(85%)
Mean	168	60	(36%)
All communities except Kotzebue			
Median			(90%)
Mean	65	55	(84%)

After survey data and map data had been entered, analyzed, and summarized, Magdanz returned to Noatak on August 14, 2008, and to Kivalina on August 15, 2008, to conduct community review meetings. He provided attendees with summary tables of harvest and income estimates. He showed each community a Microsoft PowerPoint presentation summarizing the results. After the meetings, Braem and Magdanz prepared a draft report, circulated it to the project cooperators, including Noatak and Kivalina governments, for review, and then prepared a final report.

DATA ANALYSIS

Survey responses were coded following standardized codebook conventions used by 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 insure 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 catastrophic failure. All survey data were entered twice and each set 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 the performance of standardized logic checks of the data. Logic checks are often needed in complex data sets where rules, constraints, and referential integrity do not capture all of the possible inconsistencies that may appear. Harvest data collected in numbers or animals, gallons, or buckets were converted to pounds usable weight using standard factors (Appendix B).

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.

When reliable harvest reports for a survey period were available from other sources, those reports were used in this report rather than survey estimates. For 2007, reliable harvest data for Noatak and Kivalina were available for beluga whales (Kathy Frost, Alaska Beluga Whale Commission, personal communication, March 21, 2008) and for polar bears (U.S. Fish and Wildlife Service, personal communication, 2008), and were used in this report.

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

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

where:

$$\bar{h}_i = \frac{h_i}{n_i} \text{ (mean harvest per returned survey),} \quad (2)$$

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

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 an unknown value falls within a certain distance from the mean. In this study, the relative precision of the mean is shown in the tables as a confidence limit (CL), expressed as a percentage. Once the standard error was calculated, the CL was determined by multiplying the SE by a constant that reflected the level of significance desired, based on a normal distribution. The constant for 95% confidence limits is 1.96. Though there are numerous ways to express the formula below, it contains the components of a SD, V, and SE:

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

where:

S = sample standard deviation,

n = sample size,

N = population size, and

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

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

Summaries of results for each community surveyed were added to the Division of Subsistence CSIS. This publicly accessible database included community-level findings only, not household-level information.

Food security responses were analyzed following USDA procedures (Bickel et al. 2000), to provide comparability between the Northwest Harvest Monitoring Program results and USDA results for Alaska and the nation.

COMPREHENSIVE SURVEY RESULTS–KIVALINA 2007

In February 2008, researchers administered comprehensive subsistence harvest surveys to 42 of 81 households (52%) in Kivalina. For the calendar year 2007, the surveyed households reported harvesting 65 different species of fish, wildlife, and plants weighing an estimated 132,401 edible pounds. Average harvests were 3,162 lb per household and 595.6 lb per person. Expanding for 39 unsurveyed households, Kivalina’s estimated total harvest of wild foods in 2007 was 256,088 lb ($\pm 23\%$).

Three species—bearded seals, Dolly Varden (which residents call “trout”) and caribou—contributed 78% to the total community harvest in 2007 (Figure 5). In edible pounds, bearded seals (*ugruk*) contributed more than any other single species to the total community harvest. In 2007, an estimated 229 bearded seals were taken for an estimated total harvest of 96,188 lb ($\pm 27\%$) and contributed 38% to the total community harvest of wild foods.

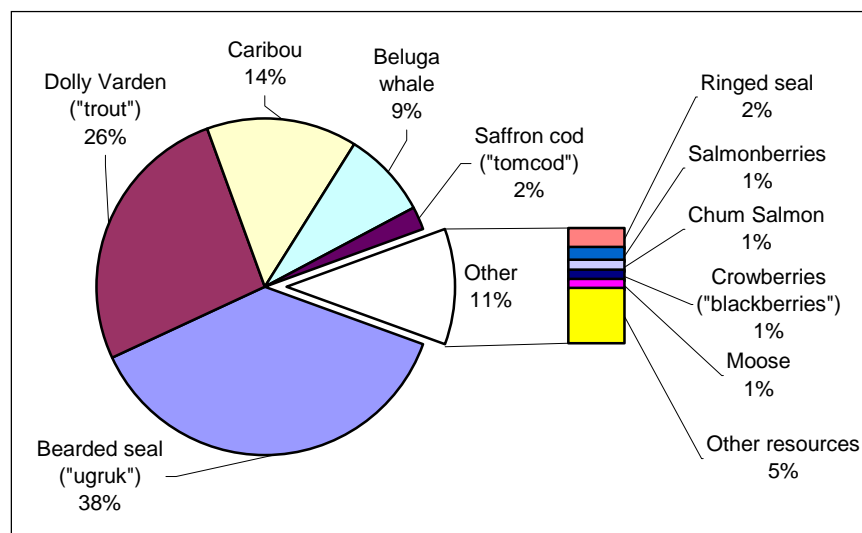


Figure 5.—Top 10 species ranked by estimated edible weight, Kivalina, 2007.

The top 3 species—Dolly Varden, bearded seals, and caribou—were also the top 3 species in the most recent comprehensive Kivalina survey, in 1992.

This chapter summarizes some findings from the household surveys in Kivalina, including demographic characteristics, harvest estimates, responses to harvest assessment questions, employment, income, and food security. Harvests numbers are expanded estimates. Additional tables and maps of search areas and harvest locations appear in the appendices. Summary information from this survey is available online at the Division of Subsistence CSIS.

ABOUT KIVALINA

Kivalina is located at the southern tip of a narrow, 15 km long barrier island on the eastern shore of the Chukchi Sea, near the mouth of the Wulik River (Figure 6). The community lies 125 km northwest of Kotzebue, the regional hub of the Northwest Arctic Borough. Its nearest neighbors are the communities of Noatak, about 70 km east, and Point Hope, about 120 km northwest. The 2000 census reported that 97% of Kivalina's residents were Alaska Native or American Indian (U. S. Census Bureau 2001).

In the 19th century, the Kivalina area was occupied by a traditional *Iñupiaq* society, the *Kivalliñigmiut* (Burch Jr. 1998). Members of the society lived in numerous small settlements spread over 5,000 km² of territory bounded by the Mulgrave Hills to the south and the northern foothills of the DeLong Mountains to the north, and extending as far as 100 km inland. Burch estimates the total human population of the area in the early 19th century ranged from 280–440 persons.

A severe famine lasting several years in the early 1880s emptied out the district as inhabitants starved to death or fled north. In the 1890s, Seward Peninsula people (*Sakmaliagruitch*) leaving the whaling stations at Point Hope settled briefly in the territory, but were gone by 1900. During that same time, some of the remaining *Kivalliñigmiut* returned, and were joined by immigrants from Shishmaref (*Tapqağmiut*), the upper Noatak (*Nuataağmiut*), the lower Noatak (*Napaaqtuğmiut*) and Kotzebue (*Qikiqtağruñmiut*.) Those groups became the founding population of the modern community of Kivalina. Burch, Jr. (1998) marks this time period, which also saw the establishment of reindeer herds, a mission, and school, as the founding of modern Kivalina. Other important events include the construction of a post office in 1940, an airstrip in 1960, and new houses, a high school, and an electrical system in the 1970s.

In 1982, the NANA Regional Corporation signed an operating agreement with Teck Cominco Alaska Inc. to develop and operate a lead–zinc mine on NANA lands about 80 km northeast of Kivalina, in the headwaters of the Wulik River system (Tetra Tech Inc. 2008:1–1). Red Dog Mine began production in 1989, removing ore from an open pit, milling it on site, and then trucking ore concentrate over an 84 km haul road to a terminal facility on the Chukchi Sea coast about 25 km southeast of Kivalina.

By 2003, Red Dog was the world's largest zinc mine and produced 85% of all U.S. zinc (Gilbertsen and Robinson 2003:4). As the original ore body was nearing depletion, NANA and Teck proposed expanding their operation to include the Aqqaluk Deposit, adjacent to the original mine. This subsistence survey was funded in part by Teck to provide information for a supplemental environmental impact statement for development of the Aqqaluk Deposit (Tetra Tech Inc. 2008).



Figure 6.—Kivalina in October 2007, looking northwest towards Point Hope.

Photograph by James Magdanz.

Kivalina’s water supply comes from the Wulik River via a 5 km long transmission line to a raw water storage tank. Water is then treated and stored in a 500,000 gal storage tank. About one-third of homes are plumbed for water; other residents must haul their water from the storage tank. The school and health clinic have sewer systems; most homes do not. Kivalina households without water and sewer service use 5 gal buckets as toilets (“honey buckets”), and haul human waste to a disposal site. In 2007, several respondents reported hauling water from the Kivalina River due to concerns about the quality of the water in the Wulik River.

Like several other coastal western Alaskan communities, Kivalina is threatened by erosion and climate change. Already vulnerable because of its location, recent warm falls have increased the community’s exposure to fall storms (in the past, shore ice limited such damage). In September 2007, a storm prompted the emergency evacuation of the community after a recently completed seawall began to fail. In 2007, plans for an evacuation road were underway, as well as a replacement seawall. Future relocation of the entire community to one of several sites across the lagoon also was being discussed.

DEMOGRAPHICS

The 42 surveyed households included 223 people. Household sizes ranged from 1 to 15 persons, with an average of 5.3 persons per household. The average age was 25.5 years; the oldest person was 83. On average, residents had lived in Kivalina 21.6 years. Heads of households, on average, had lived in Kivalina 38.6 years.

Expanding for unsurveyed households, the estimated population of 430 included 204 males (48%) and 226 females (52%) (Figure 7); 419 were Alaska Natives (97%). For comparisons, the U.S. Census Bureau reported a total population in 2000 of 377 people, including 194 (51%) males and 183 females (49%). For 2007, the Alaska Department of Labor estimated a total population of 398 people, 32 people less than ADF&G, which suggested that larger households were slightly overrepresented in the ADF&G survey.

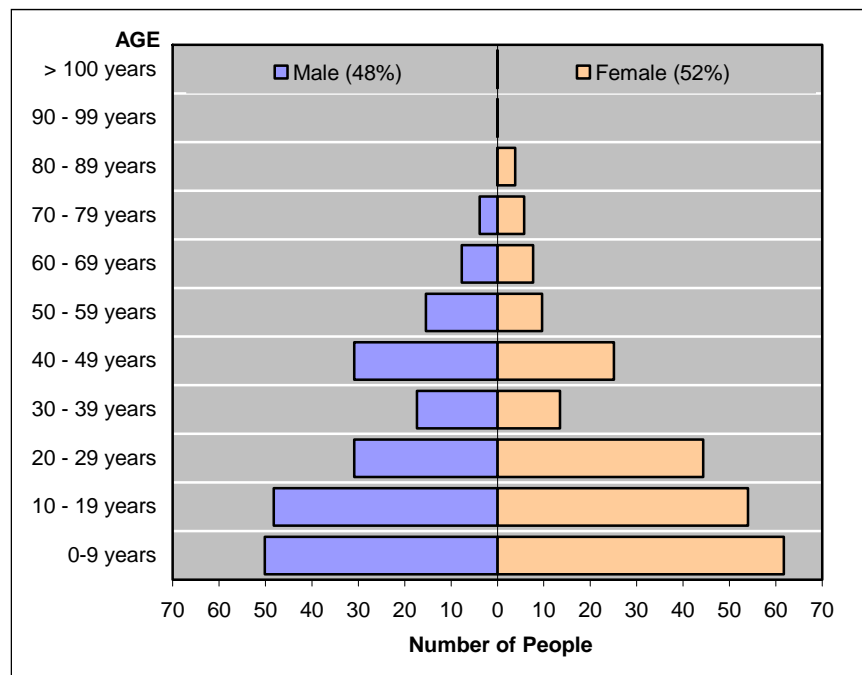


Figure 7.—Population profile, Kivalina, 2007.

The estimated population included 204 males (48%) and 226 females (53%).

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.

Tables and figures in this section summarize responses to the harvest questions. Every household surveyed in Kivalina used some kind of wild food, and 95% of households reported that a household member had harvested wild food (Figure 8). Fish were the most widely used resource category (by 98% of households), followed by marine and land mammals (by 93%). Berries, the most commonly used resource in many communities, were used by 90% of households. In most Northwest communities, households use wild food harvested by others, so the percentages of households harvesting usually are lower than the percentages of households using wild foods. This was the case in Kivalina as well. Nonetheless, in each category, more than 60% of households were active harvesters (range 64% to 95%).

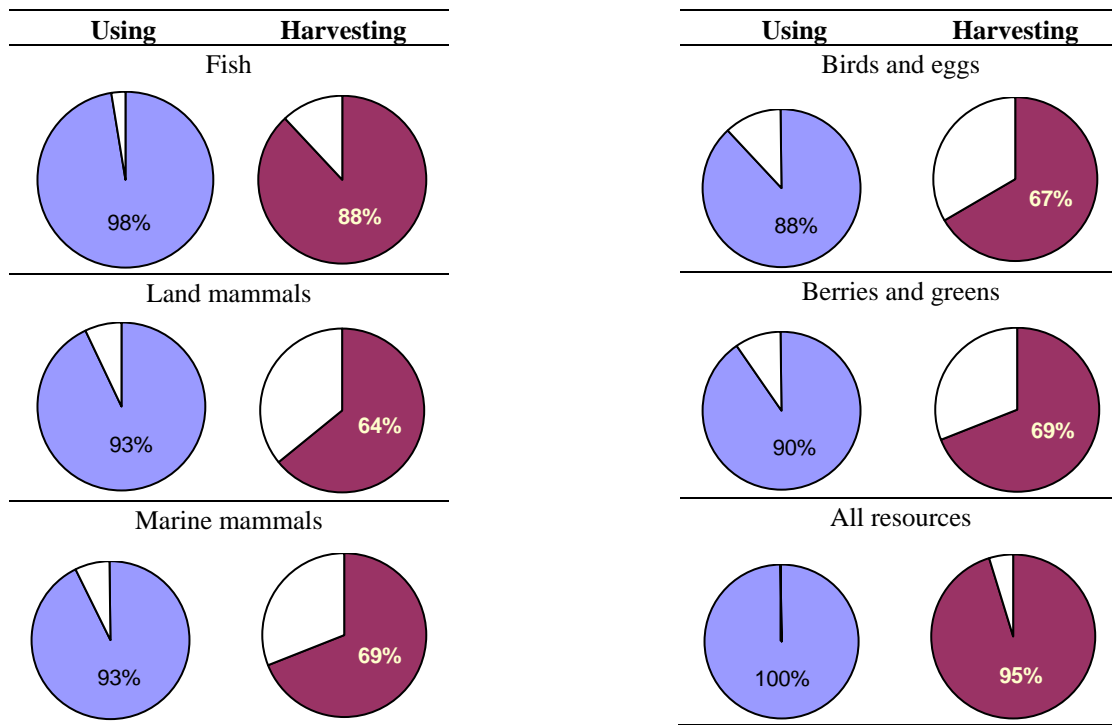


Figure 8.—Percentages of households using or harvesting by species category, Kivalina, 2007.

Every surveyed household reported using at least 1 kind of wild food; 95% reporting harvesting at least 1 kind of wild food.

Figure 9 summarizes harvests by resource category. Marine mammals were the largest part of Kivalina’s subsistence harvest, 126,002 lb or 49% of the total community harvest. Fish were the second largest contributor to community residents’ diets, with 78,780 lb or 31% of the total. Land mammals harvests totaled 38,772 lb, 15% of the total. Vegetation, both berries and plants, contributed 3.1%, birds and eggs, 1.7%, and marine invertebrates, 0.03% of the community total.

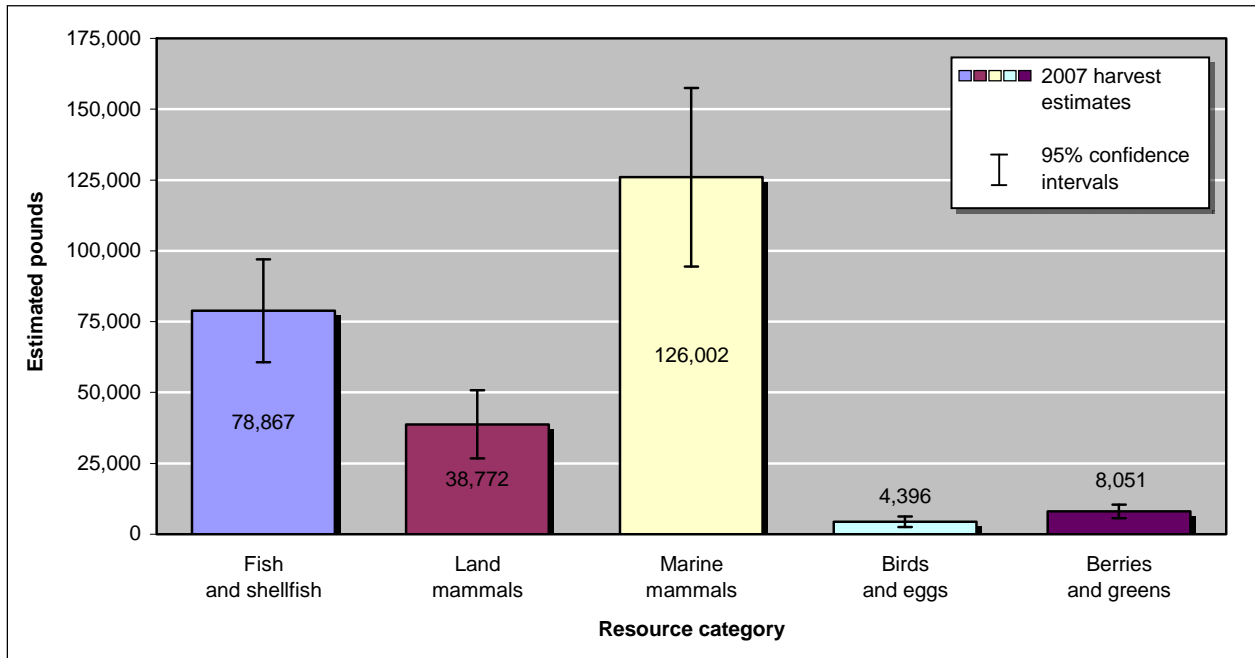


Figure 9.—Estimated pounds harvested by category, Kivalina, 2007.

Table 3 summarizes use and harvests for all the reported resources. In this table, resources are ranked in descending order of edible pounds harvested within each category. Of all wild foods, the most commonly used species, reported by 93% of surveyed households, were Dolly Varden and caribou. Dolly Varden were harvested by 81%, caribou by 64% of households (Table 3). Other frequently used species include: Beluga whales (used by 88%, harvested by 38%), cloudberries (salmonberries) and blueberries (both used by 88% and harvested by 62% and 64%), bearded seals, saffron cod (which residents called “tomcod”), and murre eggs.

Table 3.–Estimated harvests of fish, game, and plant resources, Kivalina, 2007.

Resource name(s)	Percentage of households		Estimated number harvested		Estimated pounds harvested						95% confidence limit
			Community totals		Community totals		Household averages		Per capita		
	Use	Harvest	Number	Unit	Number	Unit	Number	Unit	Number	Unit	
Fish											
<u>Salmon</u>											
Chum salmon	45%	29%	401	ind	2,406	lb	30	lb	5.6	lb	± 50%
Chinook salmon	7%	5%	41	ind	502	lb	6	lb	1.2	lb	± 134%
Pink salmon	19%	5%	120	ind	251	lb	3	lb	0.6	lb	± 105%
Coho salmon	10%	5%	33	ind	170	lb	2	lb	0.4	lb	± 125%
Sockeye salmon	0%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Unknown salmon	5%	2%	19	ind	116	lb	1	lb	0.3	lb	± 141%
Subtotal, salmon	50%	31%	613	ind	3,445	lb	43	lb	8.0	lb	± 59%
<u>Other fish</u>											
Dolly Varden (trout)	93%	81%	20,527	ind	67,739	lb	836	lb	157.5	lb	± 23%
Saffron cod (tomcod)	81%	74%	25,824	ind	5,423	lb	67	lb	12.6	lb	± 28%
Whitefish	40%	19%	338	ind	709	lb	9	lb	1.6	lb	± 65%
Arctic grayling	33%	24%	786	ind	708	lb	9	lb	1.6	lb	± 89%
Arctic cod (blue cod)	31%	21%	6,279	ind	691	lb	9	lb	1.6	lb	± 75%
Burbot (mudshark)	14%	10%	15	ind	65	lb	1	lb	0.2	lb	± 92%
Northern pike	17%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Sheefish	36%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Subtotal, other fish	93%	86%	53,770	ind	75,335	lb	930	lb	175.2	lb	± 24%
Subtotal, all fish resources	98%	88%	54,383	ind	78,780	lb	973	lb	183.2	lb	± 23%

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Table 3. Page 2 of 4.

Resource name(s)	Percentage of households		Estimated number harvested		Estimated pounds harvested						95% confidence limit
			Community totals		Community totals		Household averages		Per capita		
	Use	Harvest	Number	Unit	Number	Unit	Number	Unit	Number	Unit	
Land mammal											
<u>Large land mammal</u>											
Caribou	93%	64%	268	ind	36,458	lb	450	lb	84.8	lb	± 29%
Moose	31%	10%	4	ind	2,075	lb	26	lb	4.8	lb	± 81%
Dall sheep	2%	2%	2	ind	201	lb	2	lb	0.5	lb	± 141%
Brown bear (grizzly bear)	2%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Muskox	5%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Subtotal, large land mammal	93%	64%	274	ind	38,733	lb	478	lb	90.1	lb	± 29%
<u>Small land mammal</u>											
Wolf	29%	17%	24	ind			(not usually eaten)				± 75%
Wolverine	12%	2%	2	ind			(not usually eaten)				
Beaver	10%	2%	2	ind	39	lb	0.5	lb	0.1	lb	± 141%
Arctic fox	0%	0%	0	ind			(not usually eaten)				n/a
Red fox	0%	0%	0	ind			(not usually eaten)				n/a
River otter ^a	2%	0%	0	ind			(not usually eaten)				n/a
Subtotal, small land mammal	31%	19%	28	ind	39	lb	0	lb	0.1	lb	± 70%
Subtotal, all land mammal resources	93%	64%	301	ind	38,772	lb	479	lb	90.2	lb	± 31%
Marine mammal											
Bearded seal	83%	62%	229	ind	96,188	lb	1,188	lb	223.7	lb	± 27%
Beluga whale ^b	88%	38%	22	ind	21,890	lb	270	lb	50.9	lb	± 0%
Ringed seal	48%	33%	71	ind	5,280	lb	65	lb	12.3	lb	± 38%
Walrus	45%	2%	2	ind	1,350	lb	17	lb	3.1	lb	± 141%
Polar bear ^b	-	-	2	ind	744	lb	9	lb	1.7	lb	± 0%
Spotted seal	5%	5%	4	ind	378	lb	5	lb	0.9	lb	± 98%
Ribbon seal ^a	2%	2%	2	ind	172	lb	2	lb	0.4	lb	± 141%
Bowhead whale	64%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Subtotal, all marine mammal resources	93%	69%	332	ind	126,002	lb	1,556	lb	293.0	lb	± 25%

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Table 3. Page 3 of 4.

Resource name(s)	Percentage of households		Estimated number harvested		Estimated pounds harvested						95% confidence limit
			Community totals		Community totals		Household averages		Per capita		
	Use	Harvest	Number	Unit	Number	Unit	Number	Unit	Number	Unit	
Shellfish											
King crab ^a	7%	5%	41	ind	87	lb	1	lb	0.2	lb	± 139%
Subtotal, all shellfish resources	7%	5%	41	ind	87	lb	1	lb	0.2	lb	± 139%
Bird and egg											
<u>Migratory bird</u>											
Canada goose	71%	55%	373	ind	1,277	lb	16	lb	3.0	lb	± 40%
Brant	74%	55%	452	ind	1,032	lb	13	lb	2.4	lb	± 36%
Greater white-fronted goose	38%	31%	107	ind	455	lb	6	lb	1.1	lb	± 49%
Snow goose	60%	33%	95	ind	378	lb	5	lb	0.9	lb	± 42%
King eider	7%	5%	35	ind	93	lb	1	lb	0.2	lb	± 99%
Northern pintail	12%	10%	29	ind	39	lb	0.5	lb	0.1	lb	± 97%
Tundra swan ^a	5%	2%	2	ind	22	lb	0.3	lb	0.1	lb	± 141%
Common eider	10%	2%	4	ind	16	lb	0.2	lb	0.04	lb	± 141%
Mallard	5%	2%	4	ind	8	lb	0.1	lb	0.02	lb	± 141%
Subtotal, migratory bird	81%	64%	1,101	ind	3,319	lb	41	lb	7.7	lb	± 33%
<u>Other bird</u>											
Ptarmigan	29%	17%	233	ind	233	lb	3	lb	0.5	lb	± 70%
Snowy owl	5%	2%	2	ind	6	lb	0.1	lb	0.01	lb	± 141%
Spruce grouse	0%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Subtotal, other bird	31%	17%	235	ind	239	lb	3	lb	0.6	lb	± 71%
<u>Egg</u>											
Gull egg	60%	33%	1,663	ind	416	lb	5	lb	1.0	lb	± 80%
Murre egg	76%	40%	1,626	ind	390	lb	5	lb	0.9	lb	± 60%
Swan egg ^a	7%	7%	33	ind	20	lb	0.2	lb	0.05	lb	± 103%
Goose egg	12%	7%	31	ind	8	lb	0.1	lb	0.02	lb	± 108%
Duck egg	7%	5%	31	ind	5	lb	0.1	lb	0.01	lb	± 102%
Subtotal, egg	76%	45%	3,384	ind	839	lb	10	lb	2.0	lb	± 50%
Subtotal, all bird and egg resources	88%	67%	4,720	ind	4,396	lb	54	lb	10.2	lb	± 42%

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Table 3. Page 4 of 4.

Resource name(s)	Percentage of households		Estimated number harvested		Estimated pounds harvested				95% confidence limit		
			Community totals		Community totals		Household averages			Per capita	
	Use	Harvest	Number	Unit	Number	Unit	Number	Unit		Number	Unit
Vegetation											
<u>Berry</u>											
Cloudberry (salmonberry)	88%	62%	490	gal	3,184	lb	39	lb	7.4	lb	± 38%
Crowberry (blackberry)	69%	50%	357	gal	2,320	lb	29	lb	5.4	lb	± 36%
Blueberry	88%	64%	237	gal	1,543	lb	19	lb	3.6	lb	± 30%
Lingonberry (low bush cranberry)	45%	31%	54	gal	351	lb	4	lb	0.8	lb	± 49%
Raspberry	0%	0%	0	gal	0	lb	0	lb	0.0	lb	n/a
Subtotal, berry	90%	67%	1,138	gal	7,398	lb	91	lb	17.2	lb	± 29%
<u>Greens</u>											
Dock (sour dock)	31%	19%	478	gal	478	lb	6	lb	1.1	lb	± 62%
Labrador tea (<i>Tilaaquiq</i> , Hudson Bay tea)	12%	12%	63	gal	63	lb	1	lb	0.1	lb	± 113%
Eskimo potato (<i>masu</i>)	31%	10%	9	gal	37	lb	0.5	lb	0.1	lb	± 84%
Willow leaf (<i>sura</i>)	24%	14%	22	gal	22	lb	0.3	lb	0.1	lb	± 86%
Wormwood (stinkweed)	26%	14%	16	gal	16	lb	0.2	lb	0.04	lb	± 60%
Other wild greens ^c	12%	7%	38	gal	38	lb	0.5	lb	0.1	lb	± 131%
Subtotal, greens	43%	29%	626	gal	654	lb	8	lb	1.5	lb	± 56%
Subtotal, all vegetation resources	90%	69%	1,764	gal	8,051	lb	99	lb	18.7	lb	± 30%
Total, all resources	100%	95%	–	–	256,088	lb	3,162	lb	595.6	lb	± 23%

Source ADF&G Division of Subsistence household surveys, 2008.

a. Not included on survey, but reported in response to question “Did your household use or harvest any other kind of [wild resource]?”

b. Beluga whale and polar bear harvests in Kivalina were known amounts. Therefore, there is no variance, which results in a confidence level of 0. Polar bear harvest reports were obtained from the U. S. Fish and Wildlife Service. The percentage of households using and harvesting this resource are unknown.

c. Includes *Angelica lucida* (wild celery), *Polygonum alaskanum* (Alaskan rhubarb), and other unknown plants.

Ten species contributed 95% of the wild foods by edible weight. After 229 bearded seals (an estimated 96,188 lb, 37%), the 9 species included: 20,527 Dolly Varden, 268 caribou, 22 beluga whales, 25,824 saffron cod, 71 ringed seals, 490 gal of cloudberrries (salmonberries), 401 chum salmon, 357 gal of crowberries, and 4 moose (all numbers are expanded estimates).

In most Northwest communities, salmon and whitefish are the primary fish resources. In Kivalina in 2007, Dolly Varden filled that niche, providing 27% of the total harvest and 86% of the fish harvest, followed by saffron cod which provided 2.1% of the total harvest. Salmon, primarily chum salmon, comprised just 1.3% of the total community harvest. No other fish, including whitefish (0.3%), provided even 1% of the total community harvest. After Dolly Varden and saffron cod, whitefish and Arctic grayling were the most harvested nonsalmon fish. No harvest of herring, sheefish, or northern pike was reported, however, 36% of households used sheefish and 17% used northern pike, presumably shared by unsurveyed Kivalina households or by households in other communities.

Just over one-half of the fish (54%) and 59% of the Dolly Varden were taken in subsistence seines or gillnets (Figure 10). Rods and reels accounted for 10,760 lb (32%) of the fish harvest, and 4,552 lb (34%) of the Dolly Varden harvest. Rod and reel were the preferred gear for Arctic grayling, Chinook salmon, pink salmon, and coho salmon, but total rod and reel harvests of these fish were relatively small, about 1,200 lb. The remainder of the fish harvest—63% of the burbot (which residents called “mudshark”), 98% of the saffron cod, and 100% of the Arctic cod (which residents called “blue cod”)—was taken with other subsistence gear, usually jigging by hand through the ice.

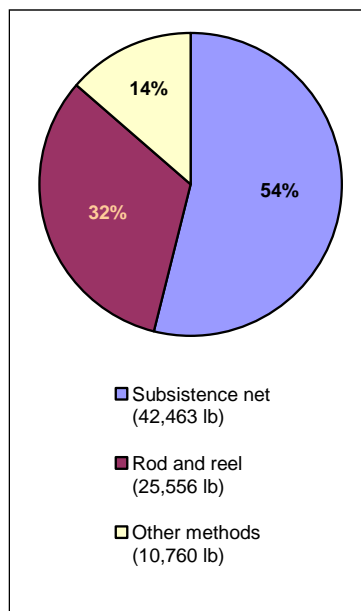


Figure 10.—Fish harvest by gear type, Kivalina, 2007.

Like fish harvests, land mammal harvests were concentrated in a single species: caribou. An estimated 268 caribou contributed an estimated 36,458 lb, 14% of the community total, and 94% of the land mammal harvest. In contrast, Kivalina’s estimated moose harvest totaled just 4 animals, or 2,075 lb and 0.8% of the total harvest. Two Dall sheep provided an estimated 201 lb (0.1% of the total). No brown bear or muskox harvest was reported, although 2% and 5% of households reported use.

Wolves were the most commonly harvested small land mammals; an estimated 24 were taken by 17% of the households. Wolverines accounted for 2 animals and beavers—the only small land mammal eaten for food—also accounted for 2 animals. Both were harvested by 2% of Kivalina households.

Marine mammals were the largest category in the harvest and the second most commonly used wild food after fish; 93% of households reported use of marine mammals. Dried seal meat (“black meat” or *paniqtaq*) is a staple food of traditional *Iñupiaq* diets and is commonly eaten with seal oil (*uqsruq*). Forty-nine percent of the total community harvest came from marine mammals, primarily 229 bearded seals (an estimated 125,258 lb, 28% of the community total). One-third of Kivalina households reported taking an estimated 71 ringed seals (5,280 lb, 2% of the community total.) Very few spotted seals (4 animals) and ribbon seals (2 animals) were taken. Overall, seals contributed 40% of Kivalina’s total subsistence harvest. Two walruses accounted for an estimated 1,350 lb of harvest.

For 2 species—beluga whales and polar bears—harvests in this report come from hunter reports to the U.S. Fish and Wildlife Service rather than from survey estimates.

In late July 2007, a large pod of beluga whales believed to be from an Asian stock moved south along the Chukchi Sea coast near Kivalina. In 2007, Alaska Native residents in Kivalina harvested 22 beluga whales, most from this pod (an estimated 21,890 lb, 17% of the total community harvest). Eighty-eight percent of Kivalina households reported the use of beluga whales in 2007. Alaska Native residents in Kivalina also hunt bowhead whales. Although none were taken in 2007, 64% of Kivalina households reported using bowhead whales in 2007, obtained through sharing and trading networks with other whaling communities.

None of the surveyed households reported harvesting polar bears, but U.S. Fish and Wildlife Service records show that 2 were taken by Kivalina residents in 2007. Because the harvest is a known amount, it is not expanded like the harvest estimates generated from sampled household information.

Birds and eggs (an estimated 4,396 lb) made up 1% of Kivalina residents’ 2007 wild food harvest. Most came from migratory birds. Canada geese (1,277 lb) and brants (1,032 lb) made up the majority of the bird harvest, followed by white-fronted geese (455 lb) and snow geese (378 lb). Less than 100 lb of common eiders, king eiders, mallard ducks, northern pintails, swans, and snowy owls were reported. Ptarmigan contributed 233 lb.

Overall, 88% of households used birds and eggs, although only 67% of households reported harvesting them. Wild bird eggs, while a relatively small portion of the total harvest, were used by 76% of Kivalina households and harvested by 45%.

Wild plants made a significant contribution to Kivalina’s wild food harvest, an estimated 1,764 gal of berries, greens, and roots comprising about 3.2% of the estimated total community harvest of wild foods. The harvest included 490 gal of cloudberries (salmonberries), 357 gal of crowberries, 237 gal of blueberries, and 54 gal of lingonberries (low bush cranberries), a combined total of 7,398 lb of berries.

The survey also asked about wild plants other than berries. Forty-three percent of households used wild plants other than berries; 29% harvested them. In order of amount harvested, the wild plants other than berries included dock (sourdock, *qauḡaq*); followed by Labrador tea (*tilaaquiq*); Eskimo potatoes (*masu*); willow leaves (*sura*); wormwood (stinkweed, *sargiiq*); and wild celery (*ikuusuk*).

HARVEST AREAS

For 11 subsistence resources (e.g. salmon, Dolly Varden, caribou, and moose), and for 4 resource categories (furbearers, waterfowl, eggs, and plants), 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. Figure 11 summarizes all the mapped data collected from Kivalina for 2007. For each resource and category, all households’ search areas and harvest locations were combined to create a series of maps depicting Kivalina subsistence use areas in 2007 (Appendix C).

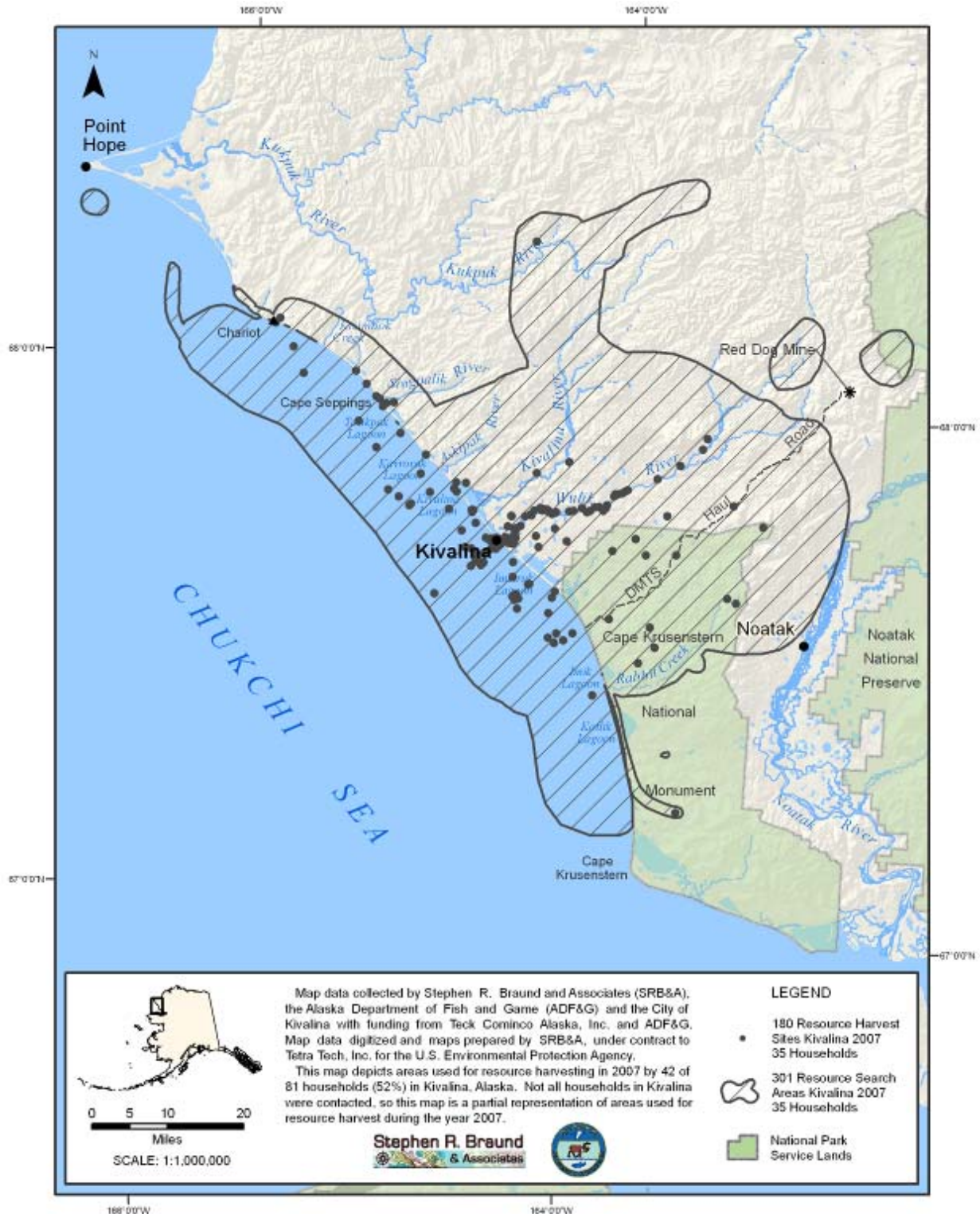


Figure 11.—Harvest locations and search areas, all resources, Kivalina, 2007.

For 2007, Kivalina respondents reported using 8,568 km² for subsistence harvesting activities, including most of the Kivalina River and Wulik River watersheds, as well as coastal waters of the Chukchi Sea in both directions from Kivalina, 70 km northwest to Cape Thompson and 70 km southeast to Cape Krusenstern. For the 14 resources mapped in this study, lands used for subsistence totaled 5,488 km² while marine waters totaled 2,820 km².

The land areas used by respondents in 2007 closely mirrored traditional *Kivalliñigmiut* territory (Burch Jr. 1998), including forays for sheep and furbearers in the upper Kukpuk River valley, with 1 exception. The major exception to the traditional pattern was that 2007 harvest areas extended about 25 km further south than the traditional southern boundary, to include the Rabbit Creek watershed. Traditionally, this area was occupied (especially in spring) by the lower Noatak River society, the *Napaaqtugmiut*. Kivalina's use of this area in 2007 was limited to caribou and furbearer hunting, which occur primarily in winter. In other words, they would have been in the area at a different time than Noatak residents. Further, mapping of Noatak respondents' search areas and harvest locations showed no use of the lower Rabbit Creek area in 2007 (Figure 26).

The importance of the Wulik River was evident in the mapped data. Almost 90% of the Dolly Varden harvest sites reported by surveyed households were in the Wulik River watershed. The Wulik was also a primary source of salmon, whitefishes, caribou, moose, waterfowl, berries, and plants.

No search areas encompassed Red Dog Mine, but caribou and furbearer search areas did include lands on either side of the DeLong Mountains Transportation System (DMTS) road from the mine to the port site. One respondent reported hunting Dall sheep northeast and northwest of the mine site.

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 2007 as in past years, and whether they got “enough” of each of the 6 resource categories. This section discusses responses to those questions. Percentages *do not* include households that did not respond to the question or reported that they never harvested the resource. Subsistence harvest success also can be assessed by comparing current harvest estimates with past harvest estimates; that will be discussed in a later section.

In every resource category, at least 2 out of 3 Kivalina respondents said they harvested the same amount or more in 2007 as they had in past years (Figure 12). For fish, 79% of respondents reported the same or more. For birds, eggs, berries, and greens, 74% reported the same or more, and for land and marine mammals, 68% of respondents reported harvesting the same amount or more in 2007. Responses were consistent across categories, except that 18% of respondents reported harvesting more berries and greens in 2007, more than twice the proportion that reported harvesting more in other categories. This was related to berry abundance; in 2007 Northwest Alaska had one of the best wild berry crops of recent years.

Responses to the “did your household get enough” question were consistent with the less–same–more responses (Figure 12). On the average, 77% of respondents reported that they “got enough” wild foods in 2007.

Respondents most frequently reported shortages of land mammals; 31% of households reported not getting “enough.” All respondents who said their household did not get enough large land mammals said, specifically, they did not get enough caribou. One household also identified moose. When asked why they did not get enough, most respondents cited changes in caribou migration routes. Other responses, by 1 person each, included: lack of transportation, high fuel prices, work, and predation.

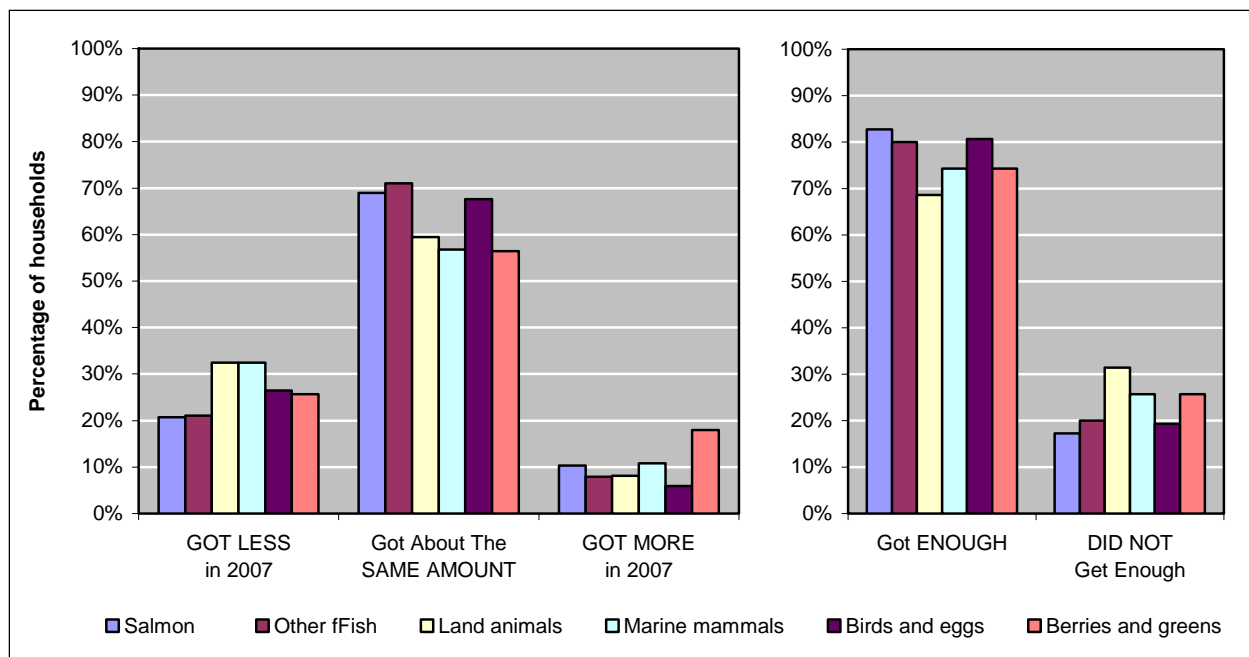


Figure 12.—Harvest assessments, Kivalina, 2007.

Responses to the question “Did your household harvest less, more, or about the same amount in 2007 as in the past?” Responses to the question “Did your household get enough in 2007?”

For marine mammals, 26% said they did not get enough. Bearded seals, *ugruk*, were most frequently mentioned, but walrus, bowhead whales, and beluga whales were mentioned by several households. Asked for reasons, poor ice conditions was the most common response, but lack of transportation, gas prices and abundance were also given as reasons. Kivalina residents did not harvest a bowhead whale in 2007. Interestingly, even though 2007 was a “bumper” berry year, only 74% said they got enough berries and greens in 2007. This may reflect the desirability of berries and greens.

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 2007, Kivalina households earned or received an estimated \$5.3 million, of which \$3.0 million (56%) was from wage employment and \$2.3 million (44%) was from other sources (Table 4). For comparison, the 2000 census reported an average income per person of \$8,360 or approximately \$3.1 million for the community. While Kivalina incomes almost certainly did increase between 2000 and 2007, it is possible that higher income households were overrepresented in the 2007 ADF&G survey sample.

Table 4.—Estimated earned and other income, Kivalina, 2007.

Income source	Number of people	Number of households	Total for community	Mean per household ^a	Percentage of total
Earned income					
Local governments, including tribal	71	66	\$1,625,294	\$20,065	30%
Mining	12	12	\$640,286	\$7,905	12%
Services	27	27	\$457,514	\$5,648	9%
Retail trade	12	10	\$152,699	\$1,885	3%
Transportation, communication, and utilities	10	10	\$133,145	\$1,644	2%
Subtotal, earned income	114	69	\$3,008,939	\$37,147	56%
Other income					
Native Corporation dividend		69	\$814,843	\$10,060	15%
Alaska permanent fund		79	\$590,903	\$7,295	11%
Unemployment		15	\$225,728	\$2,787	4%
Pension / retirement		23	\$182,545	\$2,254	3%
Food stamps		23	\$140,769	\$1,738	3%
Social security		19	\$136,782	\$1,689	3%
Other		10	\$80,277	\$991	2%
Energy assistance		37	\$58,629	\$724	1%
Arctic Slope Regional Corp. (ASRC) Elder Trust		*	*	*	*
Adult Public Assistance (OAA, APD)		4	\$14,850	\$183	0%
Longevity bonus		4	\$12,497	\$154	0%
Supplemental Security Income		*	*	*	*
Child support		*	*	*	*
Disability		*	*	*	*
Subtotal, other income		79	2,319,983	28,642	44%
Total, community income			\$5,328,921	\$65,789	100%

Source ADF&G Division of Subsistence household surveys, 2008.

a. Household mean based on total number of households in community.

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

Figure 13 shows the percentage of estimated income by source. Community government jobs (including the school and the tribal government) were the single largest source of earned income, contributing an estimated \$1.6 million. Native corporation dividends, almost entirely from the NANA Regional Corporation, were the second largest source of income, about \$815,000. Mining, the next largest category, contributed about \$640,000 in wages to Kivalina.

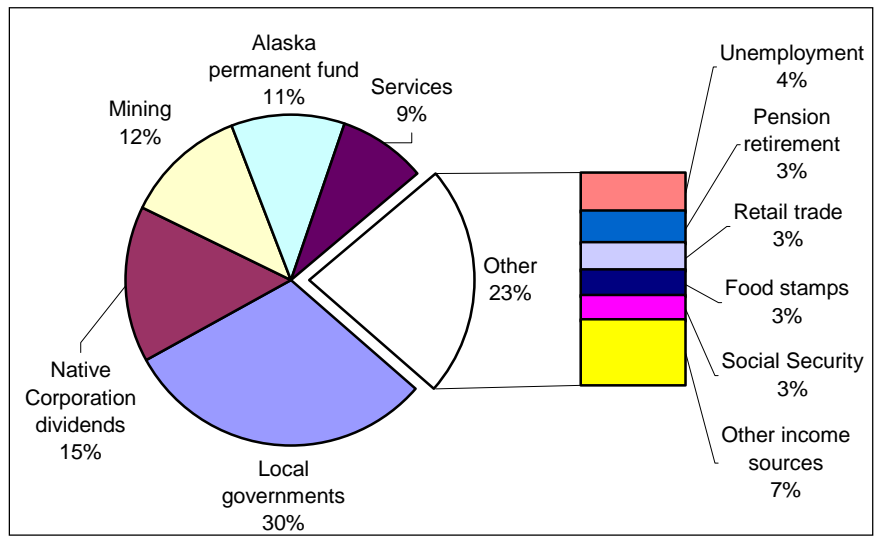


Figure 13.—Top 10 income sources ranked by estimated amount, Kivalina, 2007.

Employment estimates are summarized in Table 5. Forty-four percent of Kivalina adults held at least 1 job in 2007. Employed adults (aged 16 and older) held between 1 and 3 jobs, the average being 1.2 jobs. On average, employed Kivalina residents worked 7.9 months of the year.

Just 35% of employed adults (15% of all adults) worked year-round. Of adults reporting work in 2007, 65% reported full time work and 25% part time. Twelve percent worked on-call or variable schedules that might mean a few hours per day a few days per month. About 5% reported working shift work, which typically meant a 2-week-on, 2-week-off schedule.

NANA dividends issued to shareholders, \$814,843, and the Alaska permanent fund dividends, \$590,903, were the 2 largest source of unearned income, together comprising 60% of the total. A variety of other unearned income sources ranging from pension–retirement payments to energy assistance made up the rest, and are detailed in Table 4.

The average household income estimated for 2007 was \$65,789. For comparison, the 2000 census estimate was \$39,410. While Kivalina incomes almost certainly did increase between 2000 and 2007, it is possible that higher income households were overrepresented in the 2007 ADF&G survey sample. One factor in the much higher estimates for income may have been unusually high levels of community government employment associated with erosion control efforts in the fall of 2007. Community government, which includes the schools, was by far the largest source of earned income, generating more than one-half of the earned income in 2007.

Table 5.–Employment, Kivalina, 2007.

		Kivalina
All adults		
Number		264
Mean weeks employed		8 wks.
Employed adults		
Number		116
Percentage of all adults		44 %
Jobs		
Number		133 jobs
Minimum		1 jobs
Maximum		3 jobs
Mean per employed adult		1.2 jobs
Months employed		
Minimum		1 mos.
Maximum		12 mos.
Mean per employed adult		7.9 mos.
Employed 1–3 months		23 %
Employed 3–6 months		15 %
Employed year-round		35 %
Work schedules		
Full time		62 %
Part time		25 %
Shift work		5 %
On call or variable		12 %
Part time / shift		0 %
Schedule not reported		1.7 %
Mean weeks employed		34 wks.
All households		
Number		81
Mean employed adults		1.5
Employed households		
Number		69
Percentage of all households		85 %
Jobs per employed household		
Mean		1.7 jobs
Minimum		1 jobs
Maximum		4 jobs
Employed adults per employed household		
Minimum		1
Maximum		3
Mean		1.7
Mean weeks employed		25 wks.

Source ADF&G Division of Subsistence household surveys, 2008.

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. 2008:2). The food security questions were modeled on questions developed by the U.S. Department of Agriculture (USDA), modified by ADF&G to account for differences in access to subsistence and store-bought foods. Core questions and responses from Kivalina residents are summarized in Figure 14.

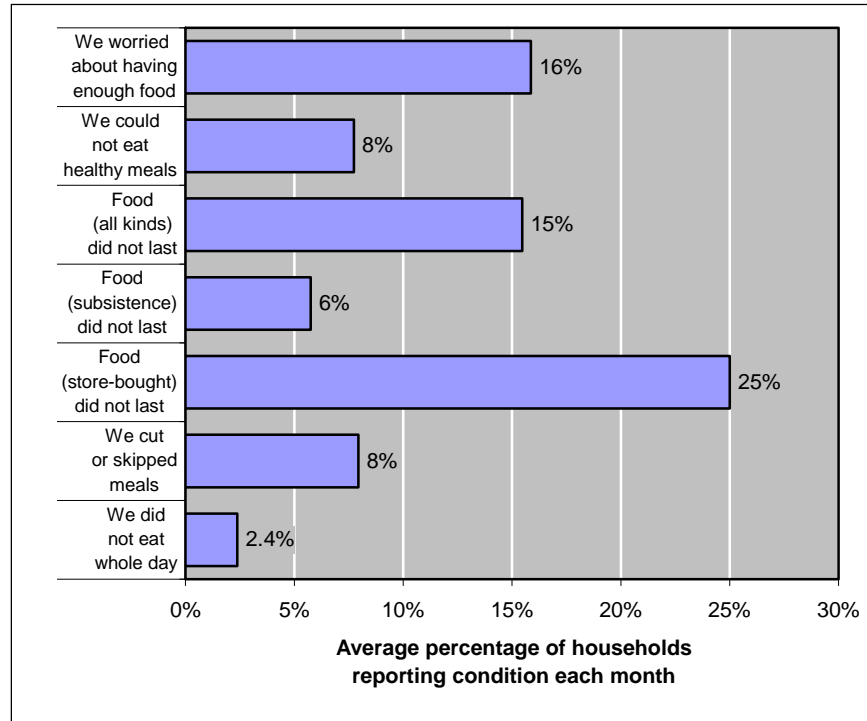


Figure 14.—Food security responses, Kivalina, 2007.

Store-bought food was the most frequently reported source of food insecurity in Kivalina. A monthly average of 25% of Kivalina households said their store-bought food did not last.

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 Kivalina in 2007, 62% of the surveyed households were categorized as having high food security and 26% as having marginal food security; USDA considers households in both categories to be “food secure.” Of the remaining households, 5% had low food security and 7% had very low food security.

Store-bought foods were the biggest source of food insecurity. Respondents were asked to identify months when food insecurities occurred. Reports of insecurity were relatively constant throughout the year, reported by 9 to 41 households of the 42 surveyed households (average 10.5 households per month, or 25%). Food insecurity related to subsistence food was less common and less variable, reported by 2 to 3 households (average 2.4 households per month, 6%).

Reports of food insecurity were most common in January and least common in October. Fall in general was more food secure than other months, which would be expected because Dolly Varden and caribou are commonly harvested just before freeze-up.

Kivalina, rural Alaska, Alaska, and national results are summarized in Figure 15. Kivalina households had slightly higher levels of food security than all surveyed rural Alaska households, but slightly lower than surveyed households in Alaska and the nation as a whole (Nord et al. 2008:21).

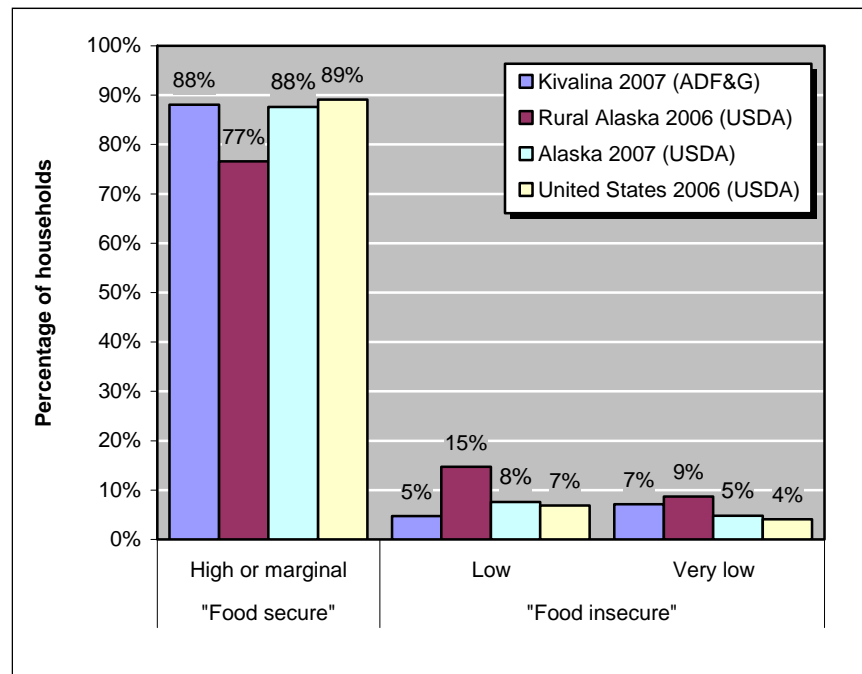


Figure 15.–Food security categories, Kivalina, 2007.

Households in Kivalina reported about the same level of food security as surveyed households in the United States as a whole, and significantly higher levels than in surveyed households in rural Alaska.

COMPARISONS WITH PRIOR RESULTS

Kivalina has one of the longest subsistence harvest records of any community in Alaska, dating back to 1964, with resurveys in 1965, 1983, 1984, 1992, and now 2007 (Saario and Kessel 1966; Burch Jr. 1985; Fall and Utermohle 1995). ADF&G also estimated migratory bird harvests for 1996 (Georgette 2000).

This section discusses the current results, and compares them with prior results. Early survey methods varied and were incompletely documented, so data may not be strictly comparable. The figures in this section include only harvest data collected and reviewed by either Burch or Magdanz, and analyzed and reviewed by ADF&G (Burch Jr. 1985; Fall and Utermohle 1995), which should be comparable.

Figure 16 and Figure 17 summarize the trends in community populations and subsistence harvests from 1960 to 2008. During the nearly 50-year period for which comparable harvest estimates exist, estimates of Kivalina’s total community subsistence harvest were relatively stable, ranging between an estimated 210,497 lb (in 1982) and an estimated 269,497 lb (in 1965). Estimated harvests averaged 247,440 lb per year. The differences in harvest estimates over time were less than the confidence intervals around the point estimates. There was no significant association between time and total community harvest ($r^2=0.144$, $P=0.758$).

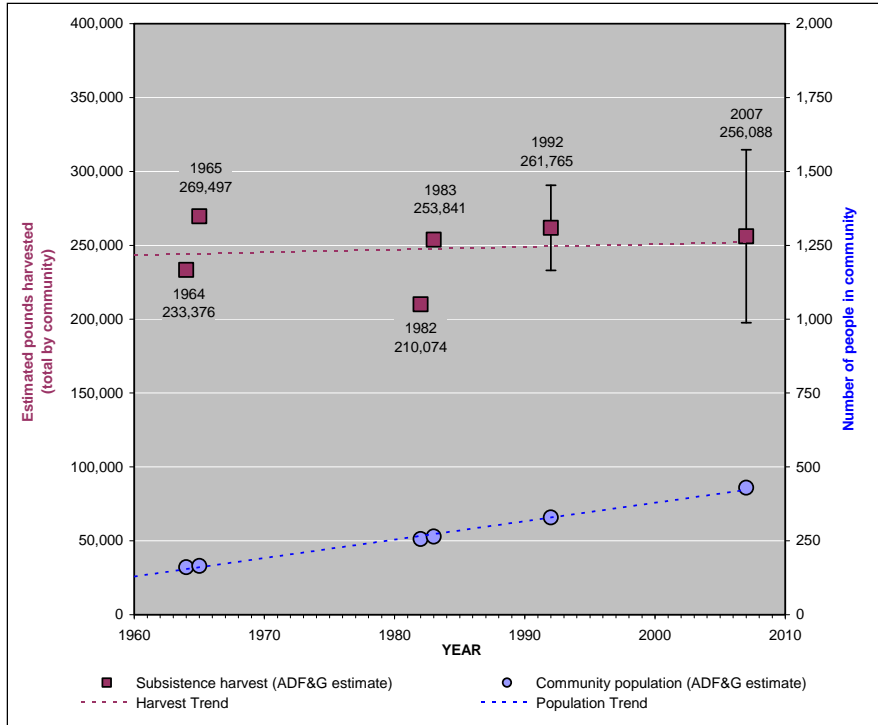


Figure 16.—Estimated total subsistence harvests and community populations, Kivalina, 1964–2007.

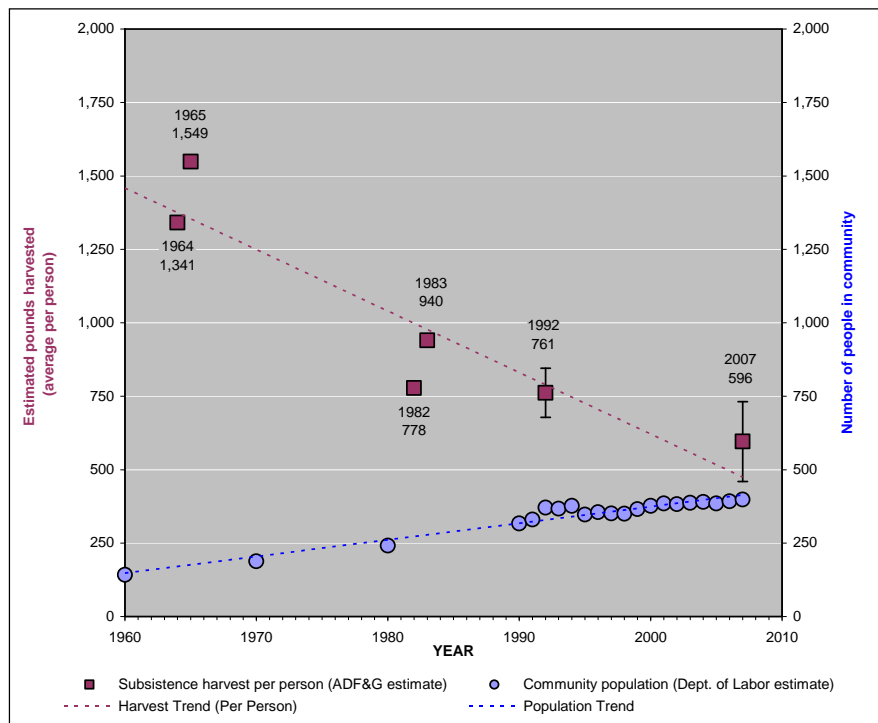


Figure 17.—Estimated per capita subsistence harvests and community population, Kivalina, 1960–2007.

During that same period, Kivalina’s human population more than doubled, from 142 in the 1960 census to an estimated 398 in 2007 (Figure 17) (U.S. Census Bureau 2001; ADLWD 2009). ADF&G also estimated human populations during comprehensive surveys (Figure 16). Although ADF&G’s estimates were 11% less than DOL’s estimate in 1992 and 8% more than DOL’s estimate in 2007, human population trends in the 2 data sets were similar (Figure 16 and Figure 17). Using the more complete DOL data, the community population was increasing by about 6 people per year, or 1.9%, and the association between time and population was significant ($r^2=0.967$, $P<0.001$).

Given a relatively stable total harvest and a steadily increasing population, the average harvest per person must go down, and it did, from an estimated 1,341 lb per person in 1964 to an estimated 596 lb per person in 2007 (Figure 17). The decline in per capita harvests was significant, both in practical terms of how much wild food was available for each person to eat, and statistically ($r^2=0.921$, $P=0.009$). The decline was about -21 lb per person per year. That may not seem like much, but aggregated over 50 years it amounts to approximately 1,000 lb per person.

While one might logically expect an increase in subsistence resource harvests to accompany an increase in population, the available data suggested otherwise. A probable explanation is the replacement of dog teams by snowmachines during the mid-1970s. Harvest estimates include harvests for dog food. Ringed seals were a primary source of dog food. Before snow machines, Kivalina residents harvested about 50,000 lb of ringed seals per year (Figure 18). After snow machines, ringed seal harvests dropped to about 8,000 lb annually.

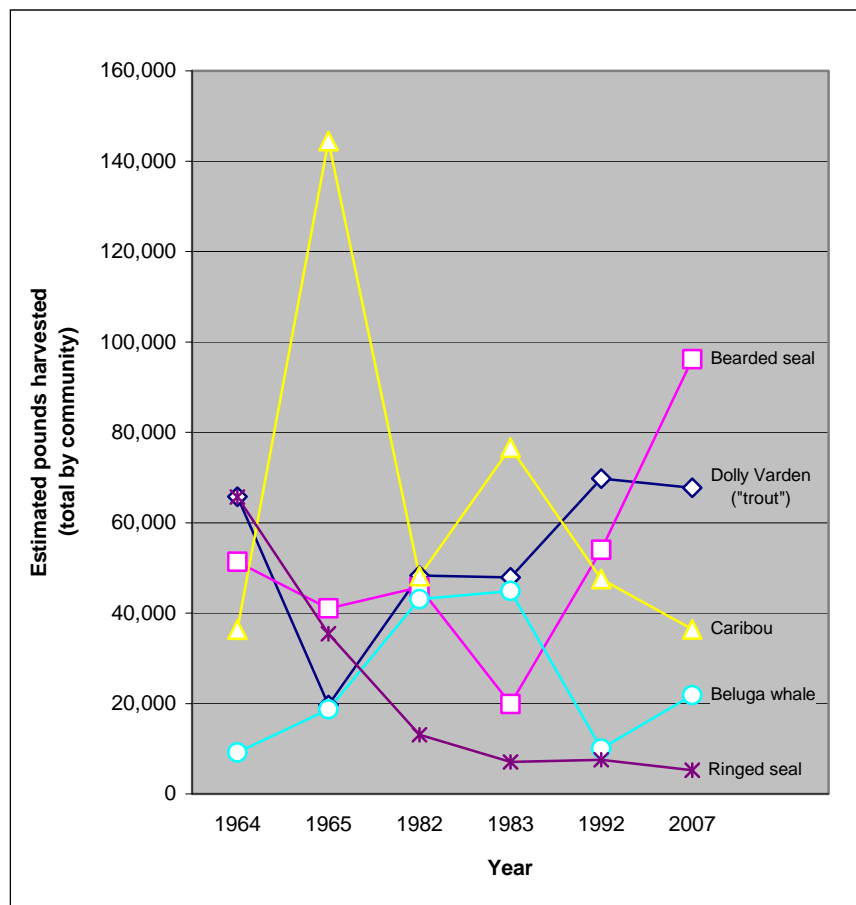


Figure 18.—Estimated subsistence harvests of top 5 species, Kivalina, 1964–2007.

Figure 18 includes the estimated harvests for the 5 species that, on average, contributed the most edible pounds to Kivalina’s subsistence harvest. In addition to showing the decline in ringed seal harvests, Figure 18 also illustrates the variability inherent in subsistence harvesting, and the adjustments people make for that variability. Note in 1965, the high harvest of caribou, but the lower than average harvests of all 4 other top species. The decline in caribou harvests since 1983 was accompanied by an increase in bearded seal harvests in the same period. Dolly Varden harvests in recent surveys were similar to levels reported in 1964. In short, harvests of individual species were highly variable, depending on availability and environmental conditions (Burch Jr. 1985:114–116). As more data are collected, 1965’s high harvest of caribou and low harvest of Dolly Varden seem ever more anomalous.

By category, the least variable harvest estimates were those of marine mammals (Figure 19). As a group, marine mammals not only contributed the most edible pounds to the total community harvest in 5 out of 6 years, marine mammals harvest estimates varied by only about 10% annually. Land mammal and fish harvest estimates were much more variable; even in combination land mammal and fish harvest estimates were about twice as variable as marine mammals. Plant, bird, and egg harvest estimates increased in recent years, although that may be partly an artifact of more attention in recent surveys to species that contribute relatively less to the subsistence diet.

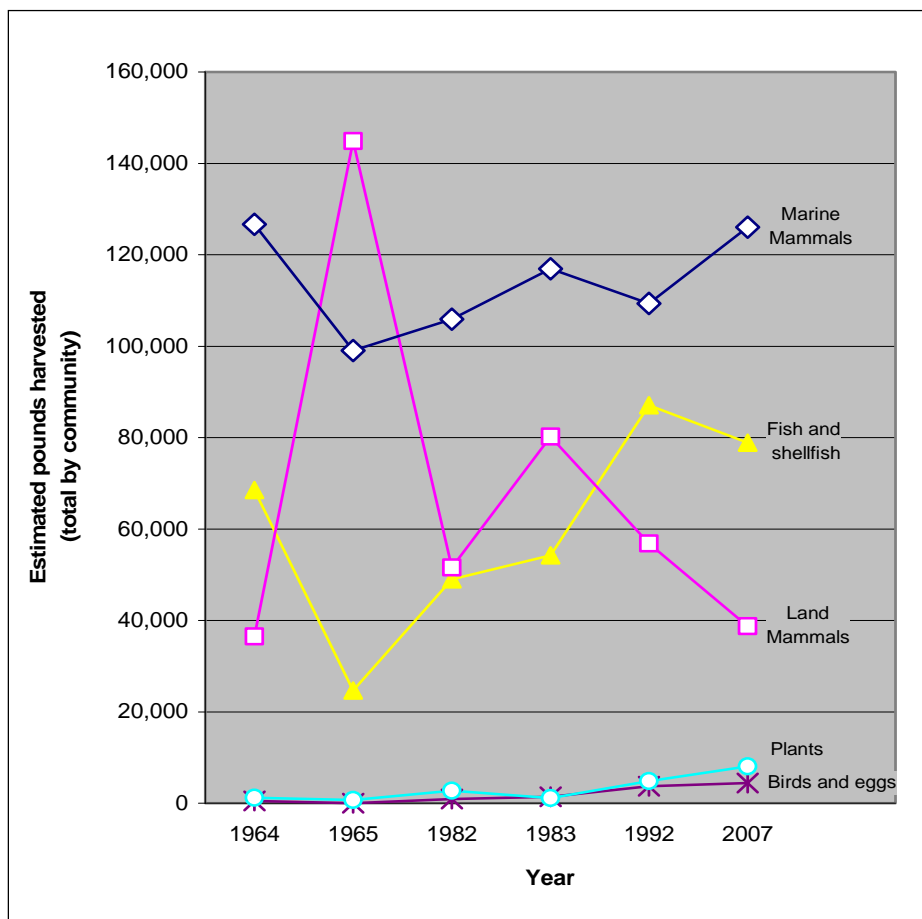


Figure 19.—Estimated total subsistence harvests by category, Kivalina, 1964–2007.

Caribou migrations vary year to year. Spring marine mammal harvests can be disrupted by poor ice conditions. Fish harvests can be hindered by weather; a rainy season makes it difficult to dry fish without spoilage. A dry summer makes rivers low and travel to fish camps difficult. A hot summer can spoil fish on the drying rack. Early ice can interfere with fall harvest of fish.

The changes in Kivalina’s population have been substantial. The changes in Kivalina’s technologies have been even more profound. Even in a stable world, subsistence always has been an unpredictable pursuit. The relative stability of Kivalina’s harvest in these circumstances is remarkable, although it leaves open the question of why harvests have not increased at least modestly with Kivalina’s growing population.

COMPREHENSIVE SURVEY RESULTS–NOATAK 2007

In February 2008, researchers surveyed 90 of 119 households (76%) in Noatak. The surveyed households reported harvesting 144,899 edible pounds of wild foods between January and December 2007. The average harvest per household was 1,610 lb; the average harvest per person was 364 lb. Expanding for the 29 unsurveyed households, Noatak’s estimated total harvest of wild foods in 2007 was 191,589 lb ($\pm 18\%$).

Caribou provided more edible pounds of wild food to the community than any other single species, with an estimated harvest of 60,061 lb, 32% of the total harvest (Figure 20). Fish provided more edible pounds than any other resource category, with an estimated harvest of 78,454 lb in 2007, 41% of the total subsistence harvest. Dolly Varden (with an estimated harvest of 33,771 lb; residents also called them “trout”), chum salmon (25,002 lb), and whitefish (14,234 lb) contributed most of the fish harvest.

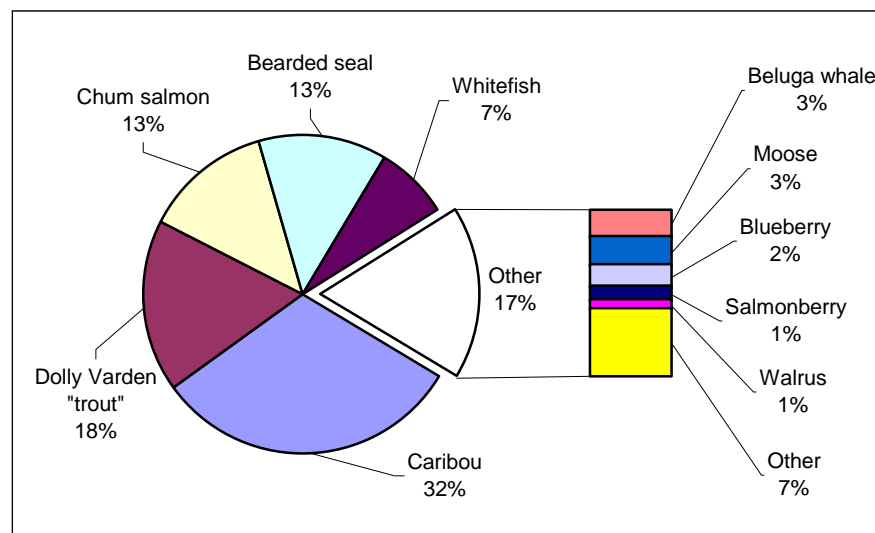


Figure 20.–Top 10 species ranked by estimated edible weight, Noatak, 2007.

The top 3 species–caribou, Dolly Varden, and chum salmon–were also the top 3 species in the most recent Noatak comprehensive survey, in 1994.

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 were available online in the Division of Subsistence Community Subsistence Information System.

ABOUT NOATAK

Noatak is a small *Iñupiaq* community in Northwest Alaska, about 120 km upstream from the mouth of the Noatak River (Figure 21). Its nearest neighbor is Kivalina, 70 km to the west by air. Noatak is about 90 km north of Kotzebue, the regional hub of the Northwest Arctic Borough. To the east are lands contained within the Noatak National Preserve. To the west and extending to the Chukchi Sea coast is the Cape Krusenstern National Monument.

The modern community of Noatak was founded in 1908, when a mission and school were constructed at Noatak's current location (Burch Jr. 1998). The lower Noatak River, where Noatak is now located, was the home of the *Napaaqtuġmiut*. The name "Noatak" is derived from the name of a neighboring society, the *Nuataaġmiut*, who inhabited the upper Noatak region. Descendents of both traditional societies live in the contemporary community of Noatak.

Burch estimates there were 10 *Napaaqtuġmiut* settlements with 264 to 336 people spread throughout their territory in the early 19th century, and 22 settlements with 536 people in the *Nuataaġmiut* territory. Like the other Northwest Alaska societies, the *Napaaqtuġmiut* were devastated by the famine that hit Northwest Alaska in the early 1880s, and either perished, fled north, or moved into the Kobuk River region. In the decade after the famine, as people trickled back into their former territories, the *Napaaqtuġmiut* were joined by people from the upper Noatak, Kivalina, and Kotzebue areas. The *Nuataaġmiut* were spared the disaster of the famine, but as many as two-thirds of the original population headed north in response to the decline of the Western Arctic Caribou herd in the 1880s. Of those remaining, perhaps one-half eventually moved to the North Slope to escape poor conditions in the late 1890s, where they joined relatives.

The contemporary community is governed by a community tribal council, the Native Village of Noatak, established in 1939 under the Indian Reorganization Act. A post office was established in Noatak in 1940. In 2008, the community had 4 general stores, a community hall, and clinic. One police officer, a volunteer fire department, and a search and rescue group served the community. Noatak's water supply comes from treated water from the Noatak River. A piped, recirculating water system and a piped sewer system serve about 90% of the homes in the community. Transportation to and from Noatak is primarily by air. Local travel occurs by small boat, snowmachine and ATV. ADF&G operated a chum salmon hatchery at *Sikasuilag* Springs, a Noatak River tributary, from 1981 until 1995 (Brennan et al. 2002:25).

The primary employers in Noatak were the regional school district, Maniilaq Association, NANA Regional Corporation, Teck Cominco Limited (operator of the Red Dog Mine), and community stores. In 2007, many residents found work on the construction of a new Noatak school, completed in fall 2008. A few residents held limited entry salmon fishing permits for the Kotzebue District commercial salmon fishery, conducted near Kotzebue in July and August.

In 1994, a 50-year flood created a large shoal on the Noatak River several miles below Noatak, ending barge service to the community. Since then, fuel, groceries, and other supplies have been flown to Noatak from Kotzebue or Fairbanks, driving costs upward. In 2008, Noatak residents were paying \$8.00 per gal for gasoline, \$4.89 per lb for frozen ground beef, and \$3.45 per lb for frozen whole chicken.



Figure 21.—Noatak in September 2009, looking northeast towards the Maiyumerak Mountains.

Photograph by James Magdanz

DEMOGRAPHICS

The 90 surveyed households included 398 people. Eighty six percent of the households were headed by Alaska Natives; 90% of the residents were Alaska Natives. Household size ranged from 1 to 9 persons, with an average size of 4.4 people per household. The sampled population included 214 males (54%) and 184 females (46%). The average age was 28.6 years; the oldest community resident was 89. On the average, heads of Noatak households had lived there for 38.2 years. The average length of residency overall was 23.6 years.

Expanding for the 19 unsurveyed households, ADF&G estimated a total 2007 population of 526, including 283 males (54%) and 243 females (46%) (Figure 22). As a comparison, the 2000 census reported 428 people in 100 households, including 219 males and 209 females, a ratio of 52% to 48%. The Alaska Department of Labor (2009) estimated that 489 people lived in Noatak in 2007, which suggested that larger households were slightly over represented in the ADF&G survey.

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.

Tables and figures in this section summarize responses to the harvest questions. Figure 23 summarizes harvests by resource category. Table 6 summarizes uses and harvests for all the reported resources. In this table, resources are ranked in descending order of edible pounds harvested within each category.

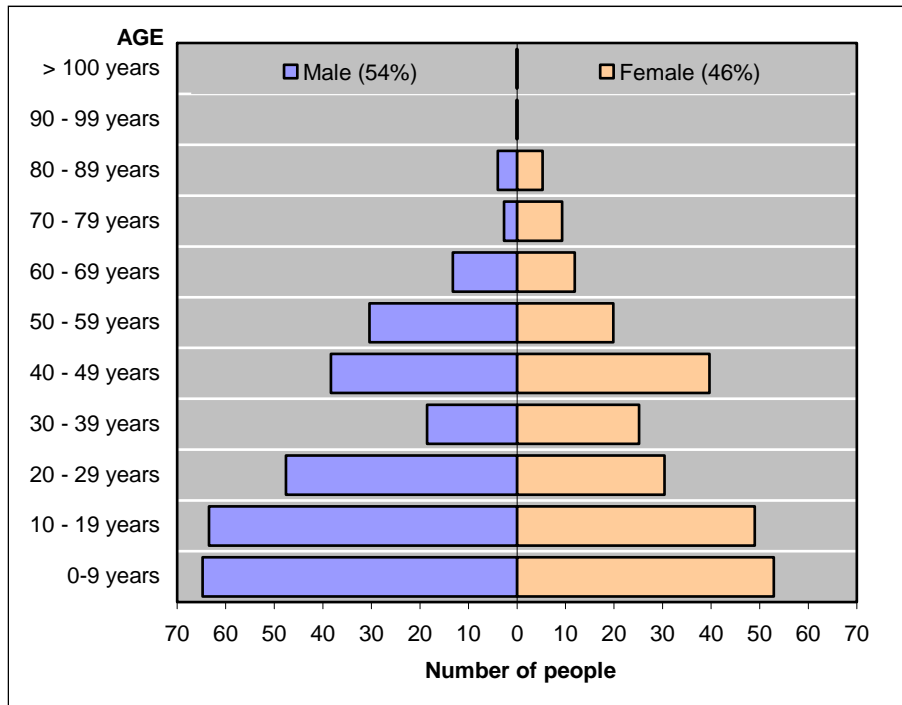


Figure 22.—Population profile, Noatak, 2007.

The estimated population included 283 males (54%) and 243 females (46%).

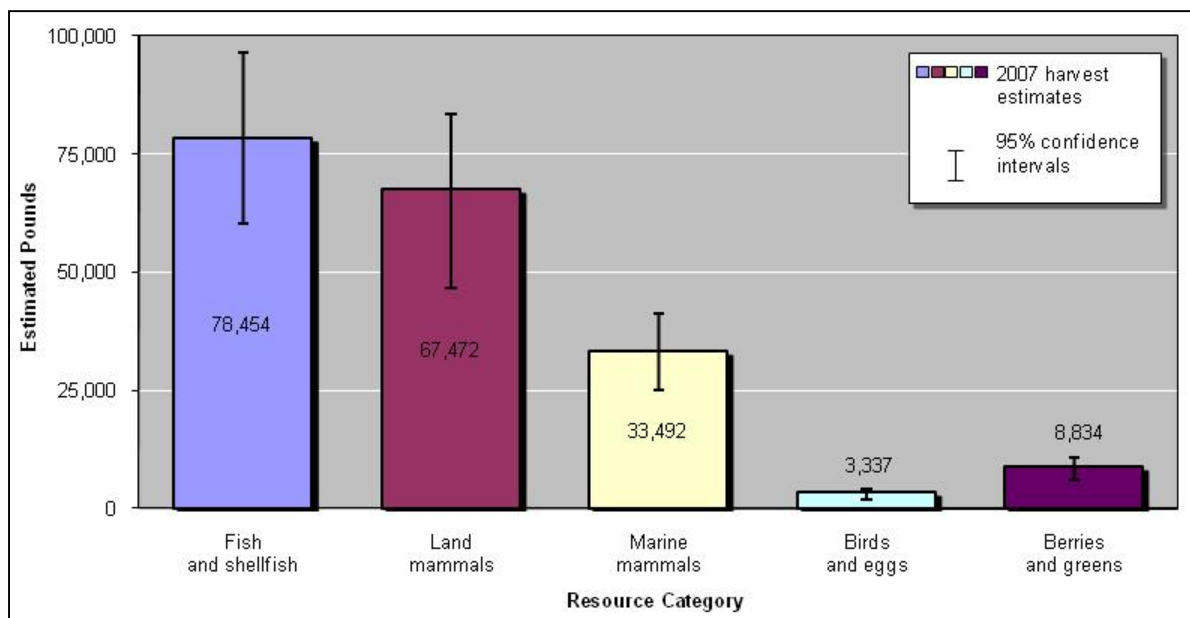


Figure 23.—Estimated pounds harvested by category, Noatak, 2007.

Table 6.—Estimated harvests of fish, game, and plant resources, Noatak, 2007.

Resource name(s)	Percentage of households		Estimated number harvested		Estimated pounds harvested						95% confidence limit
			Community totals		Community totals		Household averages		Per capita		
	Use	Harvest	Number	Unit	Number	Unit	Number	Unit	Number	Unit	
Fish											
<u>Salmon</u>											
Chum salmon	93%	76%	4,167	ind	25,002	lb	210	lb	47.5	lb	± 19%
Coho salmon	27%	19%	247	ind	1,286	lb	11	lb	2.4	lb	± 39%
Pink salmon	6%	6%	163	ind	342	lb	3	lb	0.7	lb	± 53%
Sockeye salmon	11%	4%	42	ind	212	lb	2	lb	0.4	lb	± 65%
Chinook salmon	11%	7%	11	ind	131	lb	1	lb	0.2	lb	± 42%
Subtotal, salmon	94%	77%	4,630	ind	26,973	lb	227	lb	51.3	lb	± 19%
<u>Other fish</u>											
Dolly Varden (trout)	91%	78%	10,234	ind	33,771	lb	284	lb	64.2	lb	± 21%
Whitefish	61%	38%	6,778	ind	14,234	lb	120	lb	27.0	lb	± 28%
Sheefish	51%	3%	99	ind	1,105	lb	9	lb	2.1	lb	± 69%
Arctic grayling ^a	28%	27%	1,222	ind	1,100	lb	9	lb	2.1	lb	± 27%
Northern pike	19%	8%	144	ind	476	lb	4	lb	0.9	lb	± 61%
Lake trout	8%	4%	52	ind	313	lb	3	lb	0.6	lb	± 62%
Arctic char (trout) ^a	1%	1%	80	ind	264	lb	2	lb	0.5	lb	± 99%
Burbot (mudshark)	18%	9%	42	ind	178	lb	1	lb	0.3	lb	± 42%
Saffron cod (tomcod)	58%	4%	192	ind	40	lb	0.3	lb	0.1	lb	± 55%
Herring ^a	6%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Smelt ^a	3%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Subtotal, other fish	92%	80%	18,844	ind	51,481	lb	433	lb	97.8	lb	± 22%
Subtotal, all fish resources	98%	86%	23,474	ind	78,454	lb	659	lb	149.1	lb	± 20%
Land mammal											
<u>Large land mammal</u>											
Caribou	97%	66%	442	ind	60,061	lb	505	lb	114.1	lb	± 16%
Moose	46%	9%	11	ind	5,691	lb	48	lb	10.8	lb	± 33%
Dall sheep	9%	3%	5	ind	550	lb	5	lb	1.0	lb	± 60%
Muskoxen	6%	1%	1	ind	390	lb	3	lb	0.7	lb	± 99%

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Table 6.–Page 2 of 4.

Resource name(s)	Percentage of households		Estimated number harvested		Estimated pounds harvested						95% confidence limit
			Community totals		Community totals		Household averages		Per capita		
	Use	Harvest	Number	Unit	Number	Unit	Number	Unit	Number	Unit	
Black bear ^a	2%	1%	3	ind	233	lb	2	lb	0.4	lb	± 99%
Brown bear	9%	2%	3	ind	227	lb	2	lb	0.4	lb	± 69%
Subtotal, large land mammal	98%	66%	464	ind	67,152	lb	564	lb	127.6	lb	± 16%
Small land mammal											
Red fox	4%	4%	29	ind							± 55%
Marten ^a	2%	2%	21	ind							± 74%
Beaver	8%	8%	15	ind	291	lb	2	lb	0.6	lb	± 42%
Snowshoe hare	2%	2%	12	ind	130	lb	0.3	lb	0.1	lb	± 42%
River otter ^a	2%	2%	8	ind							± 84%
Wolf	9%	2%	3	ind							± 69%
Wolverine	7%	2%	3	ind							± 69%
Muskrat ^a	1%	1%	1	ind							± 99%
Arctic fox	0%	0%	0	ind							n/a
Subtotal, small land mammal	21%	16%	91	ind	321	lb	2	lb	0.1	lb	± 37%
Subtotal, all land mammal resources	98%	66%	555	ind	67,472	lb	567	lb	128.2	lb	± 16%
Marine mammal											
Bearded seal	81%	20%	60	ind	24,990	lb	210	lb	47.5	lb	± 22%
Beluga whale ^b	81%	4%	6	ind	5,773	lb	49	lb	11.0	lb	± 0%
Walrus	23%	1%	3	ind	1,851	lb	16	lb	3.5	lb	± 99%
Ringed seal	14%	6%	7	ind	489	lb	4	lb	0.9	lb	± 43%
Spotted seal	6%	3%	4	ind	389	lb	3	lb	0.7	lb	± 30%
Bowhead whale	1%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Subtotal, all marine mammal resources	91%	22%	79	ind	33,492	lb	281	lb	63.6	lb	± 23%
Shellfish											
King crab ^a	1%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Subtotal, all shellfish resources	1%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a

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Table 6.–Page 3 of 4.

Resource name(s)	Percentage of households		Estimated number harvested		Estimated pounds harvested						95% confidence limit
	Use	Harvest	Community totals		Community totals		Household averages		Per capita		
			Number	Unit	Number	Unit	Number	Unit	Number	Unit	
Bird and egg											
<u>Migratory bird</u>											
Canada goose	52%	32%	332	ind	1,135	lb	10	lb	2.2	lb	± 26%
Greater white-fronted goose	26%	20%	193	ind	816	lb	7	lb	1.6	lb	± 30%
Northern pintail	29%	20%	300	ind	402	lb	3	lb	0.8	lb	± 46%
Mallard	24%	16%	147	ind	287	lb	2	lb	0.5	lb	± 40%
American wigeon	6%	6%	52	ind	68	lb	1	lb	0.1	lb	± 76%
Snow goose ^a	3%	3%	13	ind	53	lb	0.4	lb	0.1	lb	± 66%
Scoter	4%	2%	20	ind	34	lb	0.3	lb	0.1	lb	± 73%
Swan	2%	2%	3	ind	30	lb	0.2	lb	0.1	lb	± 69%
Long-tailed duck (oldsquaw) ^a	2%	2%	29	ind	29	lb	0.2	lb	0.1	lb	± 70%
Red-breasted merganser ^a	1%	1%	20	ind	20	lb	0.2	lb	0.0	lb	± 99%
Brant ^a	2%	1%	5	ind	12	lb	0.1	lb	0.0	lb	± 99%
Northern shoveler ^a	1%	1%	7	ind	3	lb	0.0	lb	0.0	lb	± 99%
Unknown duck ^a	2%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Unknown goose ^a	1%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Subtotal, migratory bird	59%	38%	1,120	ind	2,889	lb	24	lb	5.5	lb	± 31%
<u>Other bird</u>											
Ptarmigan	30%	16%	205	ind	205	lb	2	lb	0.4	lb	± 30%
Spruce grouse	6%	6%	16	ind	11	lb	0.1	lb	0.0	lb	± 44%
Snowy owl	0%	0%	0	ind	0	lb	0	lb	0.0	lb	n/a
Subtotal, other bird	30%	17%	221	ind	216	lb	2	lb	0.4	lb	± 30%
<u>Egg</u>											
Gull egg	32%	26%	632	ind	158	lb	1	lb	0.3	lb	± 24%
Goose egg	12%	12%	184	ind	50	lb	0.4	lb	0.1	lb	± 37%
Unknown egg	2%	1%	73	ind	18	lb	0.2	lb	0.0	lb	± 99%
Swan egg	2%	2%	7	ind	4	lb	0.03	lb	0.0	lb	± 71%
Duck egg	1%	1%	11	ind	2	lb	0.01	lb	0.0	lb	± 99%
Subtotal, egg	36%	28%	906	ind	231	lb	2	lb	0.4	lb	± 50%
Subtotal, all bird and egg resources	69%	50%	2,247	ind	3,337	lb	28	lb	6.3	lb	± 22%

-continued-

Table 6.–Page 4 of 4.

Resource name(s)	Percentage of households		Estimated number harvested		Estimated pounds harvested						95% confidence limit
	Use	Harvest	Community totals		Community totals		Household averages		Per capita		
			Number	Unit	Number	Unit	Number	Unit	Number	Unit	
Vegetation											
<u>Berry</u>											
Blueberry	99%	88%	657	gal	4,268	lb	36	lb	8.1	lb	± 12%
Cloudberry (salmonberry)	92%	68%	410	gal	2,666	lb	22	lb	5.1	lb	± 13%
Crowberry (blackberry)	59%	28%	167	gal	1,085	lb	9	lb	2.1	lb	± 23%
Lingonberry (low bush cranberry)	47%	30%	77	gal	498	lb	4	lb	0.9	lb	± 22%
Raspberry ^a	12%	11%	16	gal	101	lb	1	lb	0.2	lb	± 47%
Other wild berry ^a	3%	2%	0	gal	2	lb	0.01	lb	0.0	lb	± 73%
Subtotal, berry	99%	89%	1,326	gal	8,620	lb	72	lb	16.4	lb	± 11%
<u>Greens/mushroom</u>											
Dock (sour dock) ^a	20%	9%	50	gal	50	lb	0	lb	0.1	lb	± 58%
Wormwood (stinkweed) ^a	16%	14%	44	gal	44	lb	0	lb	0.1	lb	± 60%
Eskimo potato (<i>masu</i>) ^a	19%	11%	11	gal	44	lb	0	lb	0.1	lb	± 45%
Willow leaf (<i>sura</i>) ^a	20%	11%	30	gal	30	lb	0	lb	0.1	lb	± 48%
Labrador tea (<i>tilaaquiq</i> , Hudson Bay tea) ^a	16%	14%	17	gal	17	lb	0	lb	0.0	lb	± 39%
Other wild greens ^c	7%	6%	21	gal	29	lb	0	lb	0.1	lb	–
Subtotal, greens	51%	38%	171	gal	214	lb	2	lb	0.4	lb	± 31%
Subtotal, all vegetation resources	99%	89%	1,500	gal	8,834	lb	74	lb	16.8	lb	± 12%
Total, all resources	100%	97%	–	–	191,589	lb	1,610	lb	364.1	lb	± 18%

Source ADF&G Division of Subsistence household surveys, 2008.

a. Not included in survey, but reported in response to question “Did your household use or harvest any other kind of [wild resource]?”

b. The beluga whale harvest in Noatak was a known amount. Therefore there is no variance, which results in a confidence level of 0.

c. Includes *Angelica lucida* (wild celery), *Polygonum alaskanum* (Alaskan rhubarb), other unknown plants, and unknown mushrooms.

Every surveyed household in Noatak reported using wild foods in 2007, and 97% of the households reported harvesting at least some of that wild food themselves (Figure 24). The most commonly used resource was blueberries, with 99% of households reporting use (Table 6), followed by caribou (97%). Other commonly used resources included cloudberries (salmonberries), used by 92% of the households and harvested by 66%; salmon, used by 94% and harvested by 77%; and Dolly Varden, used by 91% and harvested by 78%.

Thirteen species accounted for 95% of the total harvest. Caribou contributed the most, 32% of the total community harvest in edible pounds. After caribou, the 12 species contributing the most to Noatak's harvests were: Dolly Varden, (18%), chum salmon, (13%), bearded seals, (13%), whitefishes, (7%), beluga whales, (3%), moose, (3%), blueberries, (2%), cloudberries, (1%), walruses, (1%). Coho salmon, Canada geese and sheefish each contributed less than 1%.

Chum salmon were by far the most abundant salmon species in Northwest Alaska; Noatak's harvests reflected that. In 2007, chum salmon contributed an estimated 25,002 edible pounds to Noatak's salmon harvest, 93% of the salmon total. Coho salmon were the next largest portion of salmon harvest, (5%). Pink, sockeye and Chinook salmon combined were just 3% of salmon harvest.

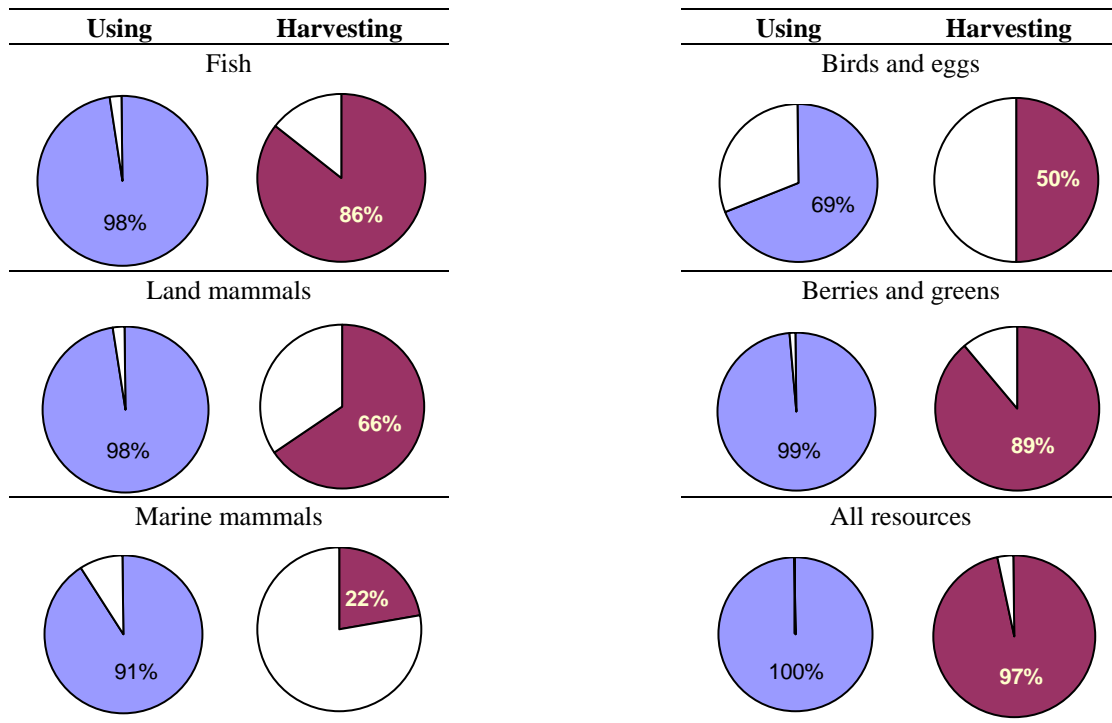


Figure 24.—Percentages of households using or harvesting by species category, Noatak, 2007.

Every surveyed household reported using at least 1 kind of wild food; 97% reported harvesting at least 1 kind of wild food.

Noatak harvested almost two times as much nonsalmon fish (by weight) as salmon in 2007. Dolly Varden made up 66% of the nonsalmon total, followed by whitefishes (28%). While the community reported harvesting sheefish, Arctic grayling, northern pike, lake trout, Arctic char, burbot, and saffron cod (which residents also called “tomcod”), none of these represented more than 2% of total nonsalmon fish harvest. Most species contributed less than 1% to the nonsalmon fish harvest.

The relative shallowness of the Noatak River made seines the preferred net for subsistence harvest of fish, both salmon and other species (Figure 25). However, other methods were used: gillnets, jigging, and rod and reel. In 2007, while 70% of salmon were taken by net, nearly one-half (47%) of nonsalmon fish were taken by means other than a net, primarily a consequence of the Dolly Varden harvest, where only 42% of the total was taken by nets. Forty percent of Dolly Varden were taken by “other gear,” mostly by jigging (known locally as “hooking”). Another 18% were taken by rod and reel. For whitefish and sheefish, though, subsistence nets produced most of fish harvest (86% and 80% respectively.)

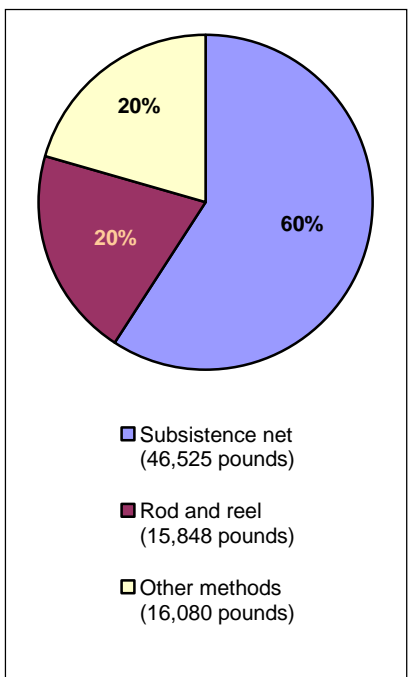


Figure 25.—Fish harvests by gear type, Noatak, 2007.

Caribou were by far the largest source of red meat for Noatak, accounting for 89% of the large land mammal harvest by weight. Moose accounted for 8% of the large land mammal harvest by weight. Dall sheep, muskoxen, black bears and brown bears made up the remainder.

A number of Noatak families travel to the coast to camps at *Sisualik* each spring to hunt marine mammals. Marine mammal hunting was a specialized harvest of a widely used resource; only 22% of households reported harvesting, but 91% reported using marine mammals. Bearded seals were the largest portion of marine mammal harvest, comprising 70% of the harvest in edible pounds. While only 20% of households reported the harvest of bearded seals, 81% of household reported using them in the study year.

An unusually large pod of beluga whales moved through Kotzebue Sound in late July 2007. Harvest reports reflected that abundance. Noatak hunters’ reported take of beluga whales (5,773 lb) was nearly double that estimated for 1994 (2,985 lb.) Only 4% of households reported harvesting beluga whales, but 81% reported using beluga whales. In 2007, Noatak’s beluga whale harvests were reported directly to the Beluga Whale Commission; the reported number and not the survey estimate is used in this report.

About 16% of Noatak households reported harvests of various species of small land mammals, primarily for their fur. A few small land mammals were harvested for fur and food, specifically, snowshoe hares and beavers. Beavers (15 animals) were the most commonly harvested small mammal species for food, by 8% of households. Red foxes (29 animals) and marten (21 animals) were the most commonly harvested furbearers in 2007.

Harvests of migratory birds were nearly double that reported in 1994, perhaps a consequence of the legalization of spring and summer subsistence harvests of certain species of migratory birds in 2004 by the Alaska Migratory Bird Co-management Council. Thirty-eight percent of households reported harvesting migratory birds, and 59% reported using migratory birds. Noatak households took 2,889 lb of waterfowl, the majority of which (70%) were geese, including Canada geese, white-fronted geese, snow geese, and brants. Seven species of duck were harvested, more than one-half of which were mallards and northern pintails. Just 2% of households reported the harvest and use of tundra swans. The harvest of upland game birds, 221 birds, 205 of which were ptarmigan, was similar to 1994. Six percent of households reported taking spruce grouse.

The survey asked about berries by species, as well as a variety of edible plants including willow leaves (*sura*), Eskimo potatoes (*masu*), wormwood (stinkweed, *sargiiq*), Labrador tea (*tilaaquiq*) and others. The most commonly used berries were blueberries and cloudberry (salmonberries); an estimated 1,067 gal were harvested in 2007. Households also reported harvest of crowberries (which residents called “blackberries”), lingonberries (low bush cranberries), and raspberries. Twenty percent of households reported use of dock (sourdock, *qauḡaq*) and willow leaves; 9% and 11% of households, respectively, harvested the plants. Although a relatively small percentage of households reported harvest and use of edible plants, Noatak residents did harvest a wide variety of plant species.

The survey asked about wild foods that were not available locally, but that would likely be received from other communities or through barter and trade. These included bowhead whales, a few marine fish, and shellfish. Four species not harvested locally were used in Noatak in 2007: herring, smelt, bowhead whales (mostly the skin, *muktuk*), and king crabs. Of the species locally available for harvest and included on the survey, only 2 were not reported as harvested or used: Arctic foxes and snowy owls.

HARVEST AREAS

For 11 subsistence resources (e.g. salmon, Dolly Varden, caribou, and moose), and for 4 resource categories (furbearers, waterfowl, eggs, and plants), 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 Noatak’s subsistence use areas in 2007 (Appendix D). Figure 26 summarizes all the mapped data collected from Noatak for 2007.

For 2007, Noatak residents reported using a total of 20,272 km² for subsistence, including the entire Noatak River from the Noatak delta to the mouth of Anisak River, normally beyond the limits of navigability for propeller-driven boats. For the 16 resources mapped in this survey, the lands used for subsistence encompassed 12,624 km²; marine waters totaled 7,379 km².

Search areas and harvest locations were concentrated along the Noatak River, reflecting its importance both as a transportation corridor and as fish and wildlife habitat. Noatak residents ranged widely away from the river as well, more than 150 km east, south, and west, and about 75 km north to the spine of the Brooks Range. Search areas extended east beyond Selawik (for waterfowl and eggs), across Kotzebue Sound from *Sisualik* to the northern Seward Peninsula (for marine mammals), and north to the Kivalina River (for caribou, marine mammals, and plants).

Noatak residents’ spring and summer camps at *Sisualik*, 65 km south of Noatak and 15 km northwest of Kotzebue, were evident in search areas and harvest locations for salmon, whitefish, marine mammals, eggs, and plants.

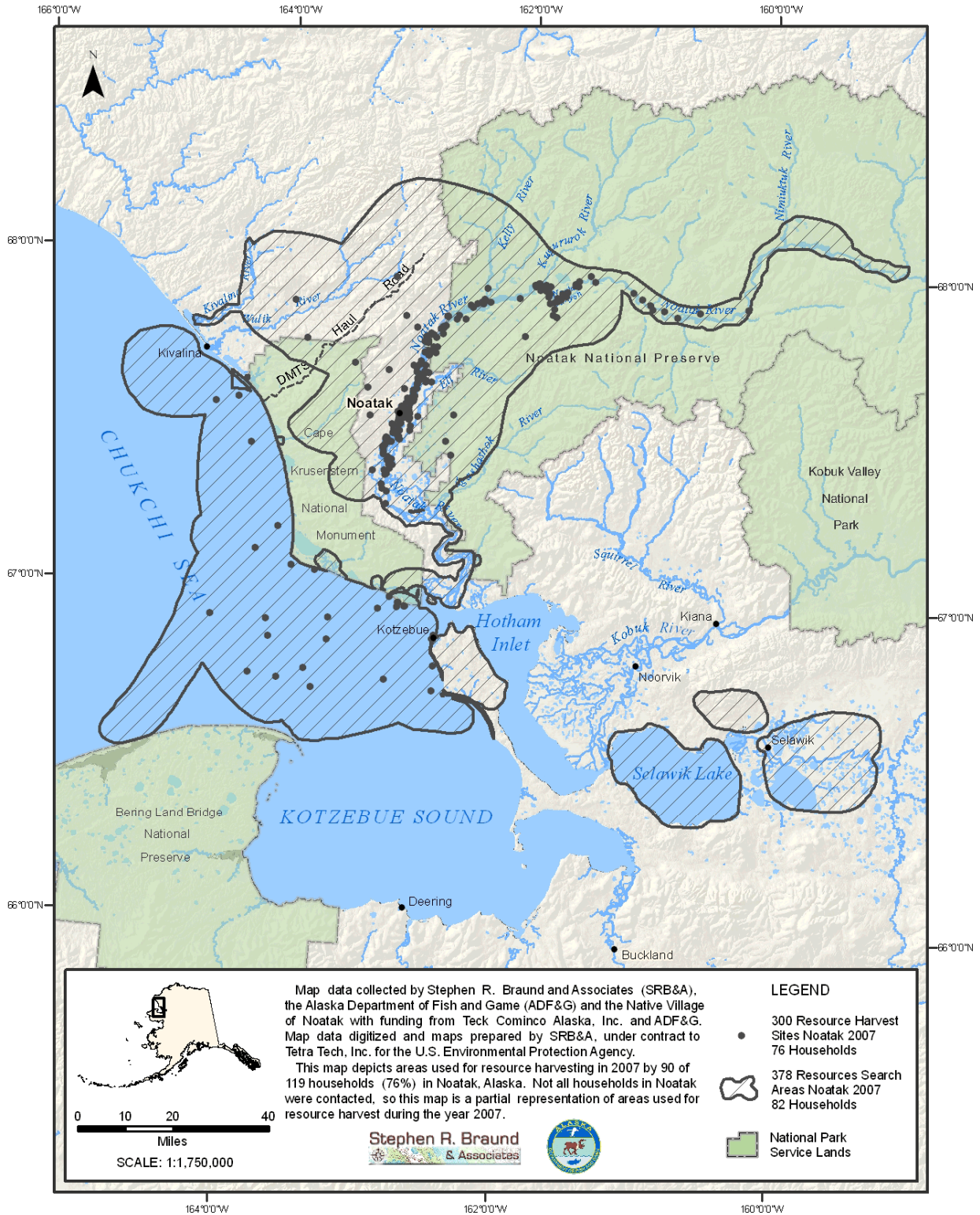


Figure 26.—Harvest locations and search areas, all resources, Noatak, 2007.

A striking feature of the mapping results was the close correspondence between the caribou search area with the Noatak Controlled Use Area during the open water season (May through October) (Appendix D, page 104). Noatak residents harvest caribou primarily in August and September during the southward fall migration of the Western Arctic Caribou Herd. The Alaska Board of Game established the Noatak Controlled Use Area (CUA) in 1989 to alleviate conflicts between mostly noncommunity aircraft supported hunters and mostly community hunters using boats. As of 2008, the Noatak CUA was closed to the use of aircraft for big game hunting from Aug. 25 to Sep. 15 each year. Map data from this survey indicate that the Noatak CUA does indeed encompass a majority of Noatak's fall caribou harvesting area.

Also interesting was an area Noatak residents did not report using, the land areas draining into Kotzebue Sound and the Chukchi Sea from Cape Krusenstern west and north to Kivalina, except in the immediate vicinity of *Sisualik* and *Anigaaq*. Some of this area was used by Kivalina (Figure 11). Presumably the rest of it was used by residents of Kotzebue. In this respect, Noatak's land use patterns reflect the traditional territories of the *Napaaqtugmiut* (Burch Jr. 1998), except for the lack of use of the Rabbit Creek watershed.

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 2007 as in past years, and whether they got "enough" of each of the 6 resource categories. This section discusses responses to those questions. Percentages *do not* include households that did not respond to the question or reported that they never harvested the resource. Subsistence harvest success also can be assessed by comparing current harvest estimates with past harvest estimates; that will be discussed in a later section.

Noatak households' own assessments of their 2007 harvests were mixed. In 4 of the 6 resource categories, households most commonly reported harvesting *about the same or more in 2007* (Figure 27). Although 49% of households reported taking *less* other (nonsalmon) fish in 2007, 42% reported taking about the same amount and 9% reported that they got more for a total of 51%. For marine mammals, 62% of households didn't respond to the question or reported that they didn't usually harvest marine mammals. Of those who responded, 71% reported they got about the same, while only 15% said they got less. For birds and eggs, 40% didn't respond or said they didn't usually harvest birds and eggs. Of those who responded, 46% said they got the same amount of birds and eggs as in years past and 9% reported getting more.

For 2 resource categories, households most frequently reported getting less in 2007. Those were salmon, for which 52% of households reported less, and land mammals, for which by 65% of households reported less.

The harvesting successes in 2007 were plants, where 35% of harvesting households reported harvesting more, and marine mammals, where 15% of harvesting households reported harvesting more. In other categories, 10% or less than of harvesting households reported getting more in 2007 than in past years

In every category, though, a majority of households reported that they "got enough" in 2007 (Figure 27). Land mammals received the most negative responses, with 48% saying they did not get enough in 2007. About one-third of the households said they did not get enough salmon or nonsalmon fish. Responses were the most positive for plants, where 85% of those responding said they got enough berries, and for birds and eggs, where 75% reported getting enough.

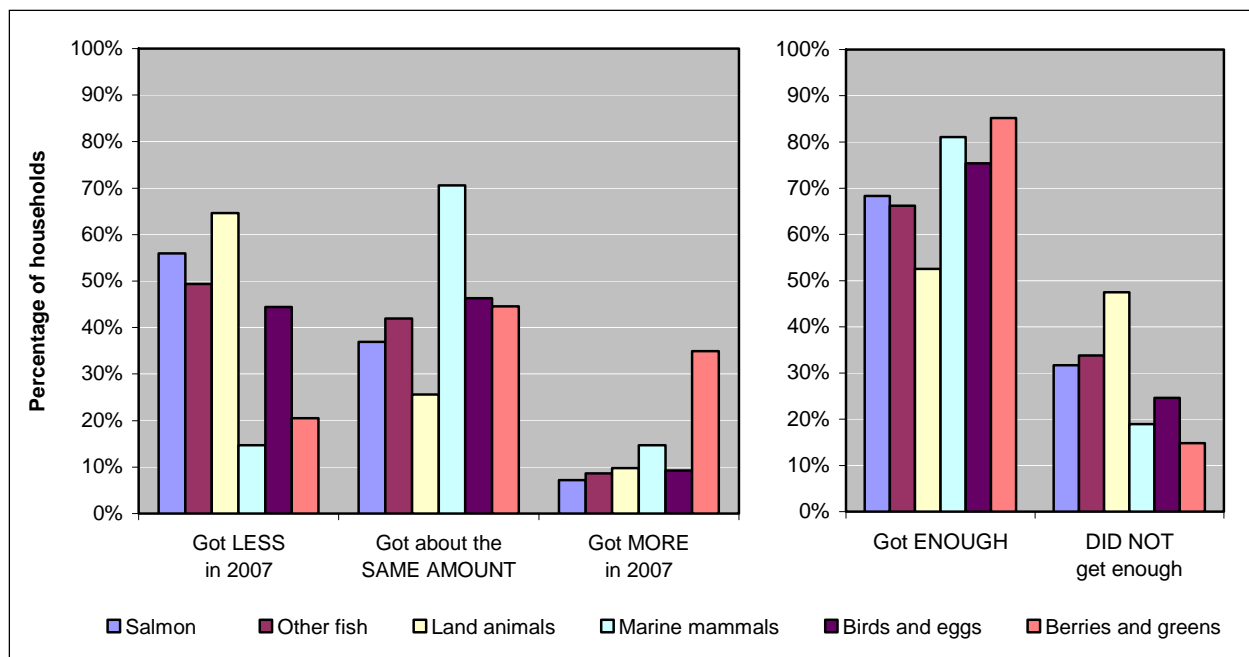


Figure 27.—Harvest assessments, Noatak, 2007.

Responses to the question “Did your household harvest less, more, or about the same amount in 2007 as in the past?” Responses to the question “Did you household get enough in 2007?” Percentages do not include households that did not usually harvest the resource or households that did not respond to the question.

Households that reported not getting “enough” were asked what kind of resource they needed and why they did not get enough. Forty-two households reported not enough land mammals, and all but 1 household named caribou. In the one other instance, the insufficient species was moose. Most households needing more salmon said, logically given their predominance, that they needed chum salmon. For nonsalmon species, the most frequent answer was Dolly Varden. Caribou, Dolly Varden, and chum salmon also were the 3 top species harvested in 2007, by edible weight, comprising 63% of the total subsistence harvest.

Households that said they did not get enough caribou in 2007 most frequently said the caribou were too far away, were scarce, or the migration had changed, reasons that were categorized as relating to abundance. A significant number of households said they lacked the equipment, the money to buy equipment or fuel, or a hunter to get caribou, which were categorized as lacking the “means” to harvest. Residents also cited reasons categorized as competition: too much airplane and boat traffic, too many sport hunters, and caribou being spooked by the noise from ATV, boat, or plane traffic. Several respondents said that the noise from planes and boats (competition) had changed migration routes (abundance) or pushed caribou farther away (abundance.)

For Dolly Varden, respondents most frequently reported lacking the means to fish. They were hampered by the high price of gasoline, a lack of equipment, or no one in the house was available to harvest Dolly Varden. Poor weather was the next most common reason, and a few households named other reasons including a decline in sharing. One respondent said their household did not get enough Dolly Varden to be able to share it with others. For chum salmon, respondents offered a variety of reasons, but no single reason predominated. Weather, luck, working, health, and age were all mentioned.

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 2007, Noatak households earned or received an estimated \$8.2 million, of which \$5.3 million (65%) was from wage employment and \$2.9 million (35%) was from other sources (Table 7). For comparison, the 2000 census reported an average income per person of \$9,659 or approximately \$4.1 million for the community. While Noatak incomes almost certainly did increase between 2000 and 2007, it also was possible that higher income households were overrepresented in the 2007 ADF&G survey sample.

Table 7.—Estimated earned and other income, Noatak, 2007.

Income source	Number of people	Number of households	Total for community	Mean per household ^a	Percentage of total
Earned income					
Local governments, including tribal	103	87	\$2,091,480	\$17,575	25%
Mining	25	24	\$1,075,665	\$9,039	13%
Services	69	57	\$868,646	\$7,300	11%
Construction	24	24	\$525,370	\$4,415	6%
Transportation, communication and utilities	15	15	\$283,282	\$2,381	3%
Other industries	—	—	\$493,180	\$4,144	6%
Subtotal, earned income	153	111	\$5,337,624	\$44,854	65%
Other income					
Native corporation dividend		100	1,004,866	\$8,444	12%
Alaska Permanent Fund		110	728,256	\$6,120	9%
Pension—retirement		22	364,561	\$3,064	4%
Social Security		30	311,964	\$2,622	4%
Food stamps		37	182,567	\$1,534	2%
Energy assistance		46	79,829	\$671	1%
Unemployment		25	63,468	\$533	1%
Adult Public Assistance (OAA, APD)		12	49,985	\$420	1%
Child support		4	37,226	\$313	0%
Longevity bonus		13	22,499	\$189	0%
Workman's comp—insurance		*	*	*	*
Supplemental Security Income		*	*	*	*
Other		*	*	*	*
Subtotal, other income		112	\$2,867,128	\$24,094	35%
Total, community income		119	\$8,204,752	\$68,947	100%

Source ADF&G Division of Subsistence household surveys, 2008.

a. Household mean based on total number of households in community.

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

Figure 28 shows the percentage of estimated income by source. Community government jobs (including the school and the tribal government) were the single largest source of earned income, contributing an estimated \$2.1 million. Mining, the next largest category, contributed an estimated \$1.1 million in wages to Noatak. Native corporation dividends, almost entirely from the NANA Regional Corporation, were the third largest source of income, \$1.0 million. Construction was the sixth largest source of income in Noatak; 24 Noatak residents found work in construction in 2007, earning an estimated \$525,370. But that might not always be the case. The construction of a new K–12 school in Noatak in 2007 increased opportunities for construction employment.

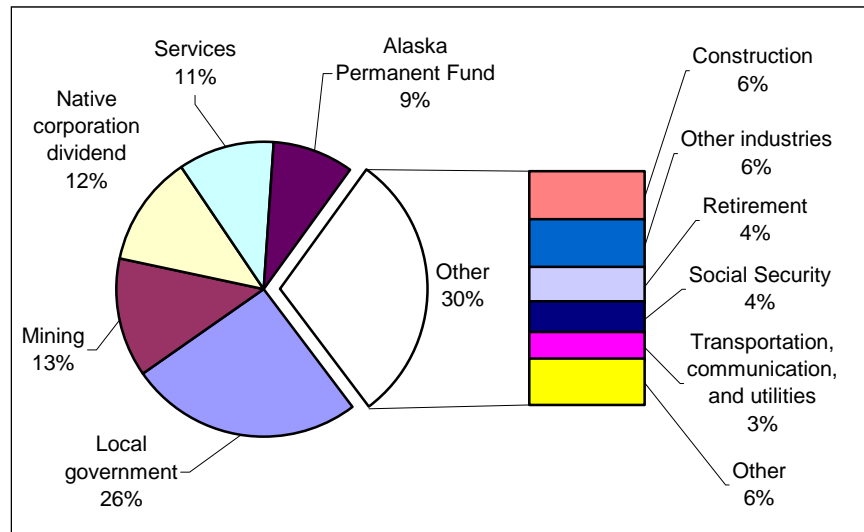


Figure 28.—Top 10 income sources ranked by estimated amount, Noatak, 2007.

Mining jobs and Native corporation dividends, primarily from the Red Dog mine, contributed about 25% of Noatak’s total income.

An estimated 153 of 348 adults (44%) in Noatak held at least 1 job. An estimated 89 adults worked full time (39% of all adults, 67% of employed adults). Employed adults reported from 1 to 4 jobs; on the average working adults held 1.3 jobs (Table 8).

Table 8.–Employment, Noatak, 2007.

	Noatak
All adults	
Number	348
Mean weeks employed	13 wks.
Employed adults	
Number	153
Percentage of all adults	44 %
Jobs	
Number	206 jobs
Minimum	1 jobs
Maximum	4 jobs
Mean per employed adult	1.3 jobs
Months employed	
Minimum	1 mos.
Maximum	12 mos.
Mean per employed adult	9.3 mos.
3 months or less	22 %
3–6 months	9 %
Year-round	58 %
Employed adults, continued	
Work schedules	
Full time	67 %
Part time	21 %
Shift work	15 %
On call or variable	40 %
Part time–shift	1.7 %
Schedule not reported	1.7 %
Mean weeks employed	40 wks.
All households	
Number	119
Mean employed adults	1.8
Employed households	
Number	111
Percentage of all households	93 %
Jobs per employed household	
Mean	2.4 jobs
Minimum	1 jobs
Maximum	6 jobs
Employed adults per employed household	
Minimum	1
Maximum	4
Mean	1.4
Mean weeks employed	39 wks.

Source ADF&G Division of Subsistence household surveys, 2008.

The income and employment data in Table 7 and Table 8 were subject to several caveats. Some households choose not to respond to income questions; missing data reduced confidence in estimates.

Some jobs involved less work than it might seem. The most common job in Noatak was staffing the bingo games for the Lions Club or Search and Rescue. Of the 206 total jobs reported, 46 were bingo jobs. An “employed” adult with such a job might work for only a few hours per day and a few days per month. A substitute teacher might have work 9 months per year, but only work only a few days per month. Forty percent of employed adults held “on call” jobs.

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. 2008:2). The food security questions were modeled on questions developed by the U.S. Department of Agriculture (USDA), modified by ADF&G to account for differences in access to subsistence and store-bought foods. Core questions and Noatak responses are summarized in Figure 29.

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 Noatak in 2007, 60% of the surveyed households had high food security and 22% had marginal food security; USDA considers households in both categories to be “food secure.” Of the remaining households, 14% had low food security and 3% had very low food security.

Store-bought foods were the biggest source of food insecurity. Respondents were asked to identify months when food insecurities occurred. Reports of insecurity were relatively constant throughout the year, reported by 14 to 18 households of the 90 surveyed households (average 15.7 households, or 17%). Food insecurity related to subsistence food was less common and more variable, reported by 4 to 18 households (average 10.2 households, 11%).

The importance of caribou in the diet was evident. Subsistence food insecurity was lowest during the spring and fall migrations of the Western Arctic Caribou Herd. Only 8 households in April and 4 households in September reported subsistence food insecurity. Of all the months, December saw the most reports of food insecurity. Twelve households reported that food of all kinds did not last in December; 18 households reported subsistence food did not last, and 18 households reported store-bought foods did not last in December.

Noatak, rural Alaska, Alaska, and national results are summarized in Figure 30. Noatak households had slightly higher levels of food security than all surveyed rural Alaska households, but slightly lower than surveyed households in Alaska and the nation as a whole (Nord et al. 2008:21). Notably, few Noatak households had “very low” food security scores, a smaller fraction of households in Noatak than in rural Alaska or in the nation as a whole.

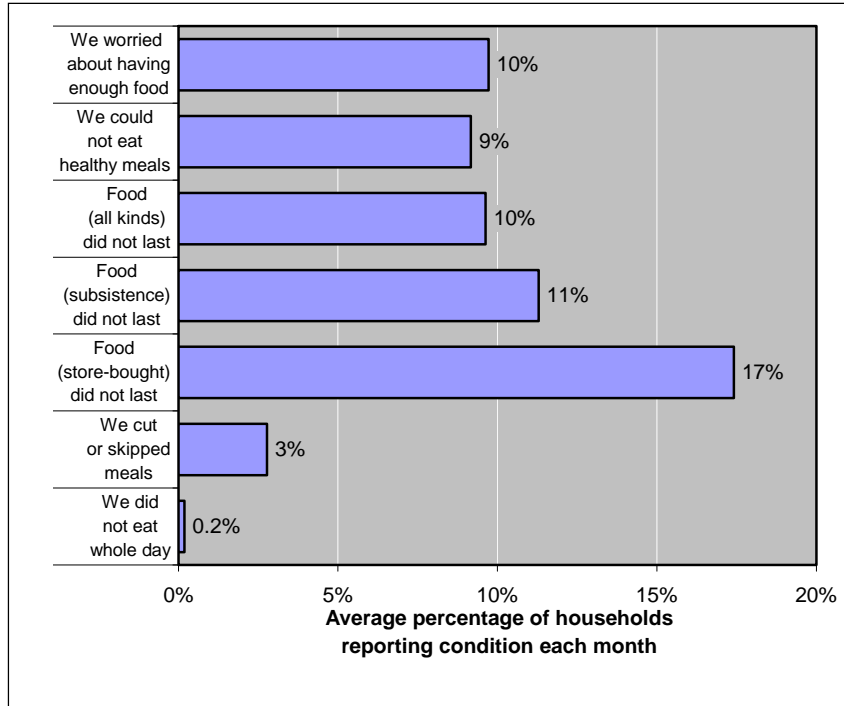


Figure 29.—Food security responses, Noatak, 2007.

Store-bought food was the most frequently reported source of food insecurity in Noatak. A monthly average of 17% of Noatak households said their store-bought food did not last. Only 1 household reported that its adult members did not eat for a whole day because there was not enough food.

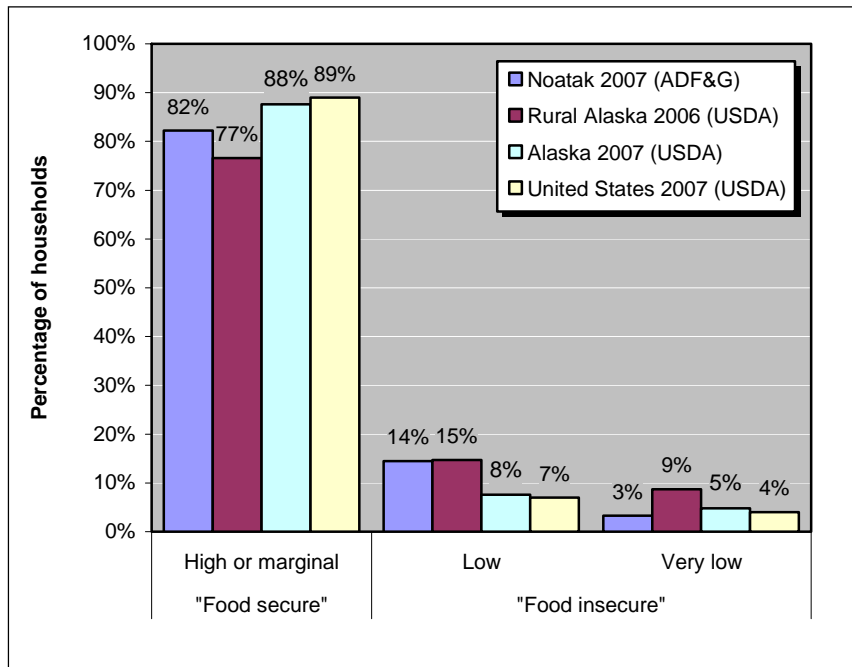


Figure 30.—Food security categories, Noatak, 2007.

Households in Noatak reported slightly higher levels of food security than other surveyed rural Alaska households, but slightly lower than surveyed households in the United States as a whole.

COMPARISONS WITH PRIOR RESULTS

This was the second comprehensive subsistence harvest survey conducted by ADF&G in Noatak; the first was in 1994. ADF&G also conducted subsistence salmon surveys (gathering information on both salmon and nonsalmon species) in Noatak in most years from 1995 to 2004. ADF&G estimated caribou, moose, brown bear and small land mammal harvests as part of the WACH survey program in 1999 and 2002. Migratory bird surveys were conducted in 1997. This section discusses the current results, and compares them with prior results. Figure 31 and Figure 32 summarize the trends in community populations and subsistence harvests from 1990 to 2008.

For 1990, the U.S. Census reported a total population of 333, which increased to 428 in 2000. Alaska Department of Labor (DOL) estimated a population 489 people for Noatak in 2007 (ADLWD 2009). For 2007, this survey estimated a total population of 526 people, which suggests the households surveyed by ADF&G may have been slightly larger than average.

The total community subsistence harvest increased from an estimated 174,851 edible pounds ($\pm 12\%$) in 1994 to an estimated 191,589 edible pounds ($\pm 18\%$) in 2007, an increase of 16,738 edible pounds (10%) (Figure 31). However, both point estimates are within the ranges of the estimates. The average per capita subsistence harvests decreased from an estimated 461 edible pounds per person in 1994 to an estimated 364 edible pounds in 2007, a decrease of 97 edible pounds per person (-21%).

The difference is explained primarily by the increase in community population. From 1994 to 2007, the estimated total subsistence harvest increased by 10%, while the estimated community population increased by 27%. The net result was a 21% decrease in the average harvest per person. In other words, Noatak's population grew almost 3 times as fast as its subsistence harvest. Consequently, there was less subsistence food for each person.

Figure 33 compares estimated total harvests by category from the 1994 and 2007 comprehensive surveys, from 1999 and 2002 WACH surveys, and from a 1997 migratory bird survey. Except for land mammals, 2007 estimated harvests were higher than previous estimates. For marine mammals, birds and eggs, and plants and berries, 2007 estimates were substantially larger than in prior years.

By species, the biggest differences between 1994 and 2007 were caribou (-173 caribou, about 23,603 lb), Dolly Varden ($+5,605$ Dolly Varden, about 18,495 lb), and chum salmon ($-3,031$ salmon, about 18,188 lb).

Of the 10 species or species groups comprising the majority of the harvest by edible weight, only caribou and salmon declined. In addition to Dolly Varden, estimated harvests increased for bearded seals ($+10,849$ lb), whitefishes ($+9,387$ lb), berries ($+6,954$ lb), and moose ($+4,362$ lb). Such annual differences in subsistence harvests by species are often observed, usually related to abundance, weather, access, and personal factors.

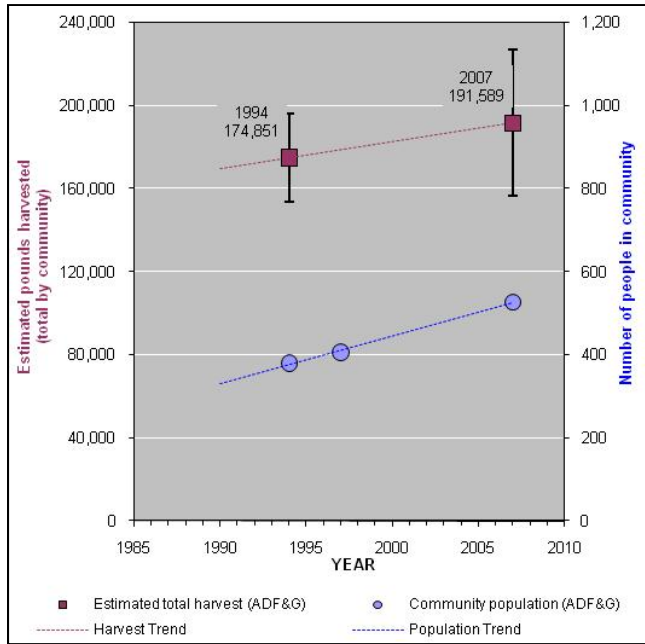


Figure 31.—Estimated total subsistence harvests and community populations, Noatak, 1994–2007.

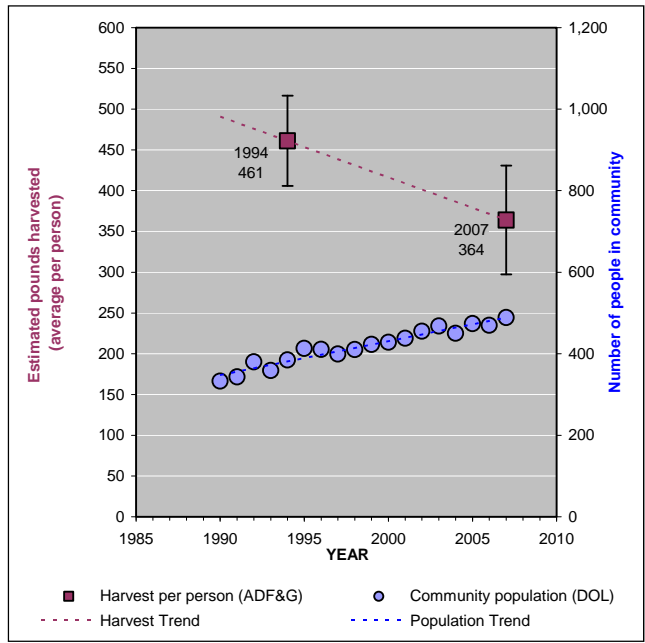


Figure 32.—Estimated per capita subsistence harvests and community populations, Noatak, 1990–2007.

Alaska Department of Labor population estimates (this figure) were slightly lower than ADF&G estimates (Figure 31), but trends were similar.

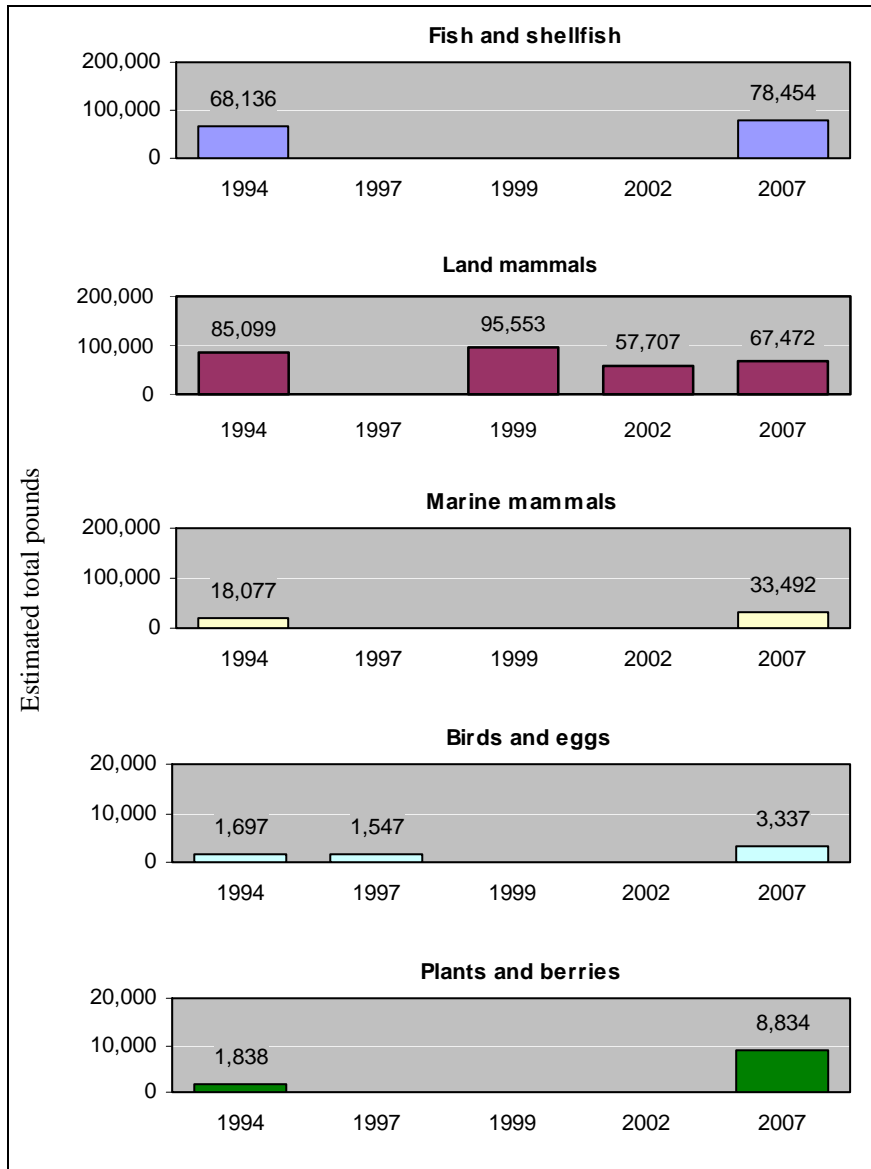


Figure 33.—Estimated total subsistence harvests by category, Noatak, 1994–2007.

SUMMARY AND DISCUSSION

By many measures—social, cultural, economic, nutritional, and even emotional—subsistence harvests of wild foods make major contributions to Arctic life (Ballew et al. [2004]; Goldsmith 2007; Heller and Scott 1967; Johnson et al. 2009; Kruse et al. 2008; McGrath-Hanna et al. 2003; Receveur et al. 1998; Richmond and Ross 2008). Throughout Northwest Alaska, the harvesting, processing, and distribution of wild foods structure human relationships, while sustaining and continuing indigenous traditions (Bodenhorn 2000; Burch Jr. 1975; Langdon and Worl 1981; Magdanz et al. 2002; Wolfe et al. n.d. [2009]). Unfortunately conventional economic indicators do not measure subsistence’s contributions (Goldsmith 2008).

Where reliable, comprehensive estimates were available—at this writing, for 7 of 11 Northwest communities—subsistence harvests provided approximately 500 lb of wild food per person per year. With a regional population of about 7,000 people, the data suggested that subsistence contributed about 3.5 million lb of natural, nutritious food to the Northwest Alaska diet each year. Most of that food was unprocessed or processed in traditional ways. It was high in protein, low in saturated fats, and low in sugars.

This chapter summarizes and reviews subsistence harvest monitoring efforts in Northwest Alaska. The focus is on comprehensive community estimates—comparable to the 2007 estimates for Noatak and Kivalina—although estimates from other survey efforts are incorporated into the discussion.

A REVIEW OF SUBSISTENCE HARVEST ESTIMATES

Since 1980, most subsistence harvest monitoring efforts in Alaska have used standardized methods that provided comparable estimates. In Northwest Alaska, at least 1 community has been surveyed every year since 1991, except in 2005. Counting just subsistence surveys that used ADF&G methods, 14 surveys were comprehensive (researchers asked about every species used by the study communities in the study year) and more than 80 other surveys focused on 1 species group (e.g., salmon, large land mammals, or birds).

Although the Northwest Alaska harvest monitoring program does not yet produce an estimate of total subsistence harvests on an annual basis, the data do provide an increasingly complete assessment of subsistence harvest. In addition to the 7 communities with comprehensive data, each of the 11 Northwest communities had at least 1 year of big game estimates, and 6 communities had at least 10 years of annual fish harvest estimates.

During this time, from 1980 to 2007, community populations in Northwest Alaska increased by 29% (Figure 34). In 2007, the 11 Northwest communities had an estimated population of 7,134 people (ADLWD 2009). Of those, 3,113 (44%) lived in Kotzebue, while 4,001 (56%) lived in 1 of the 10 smaller communities.

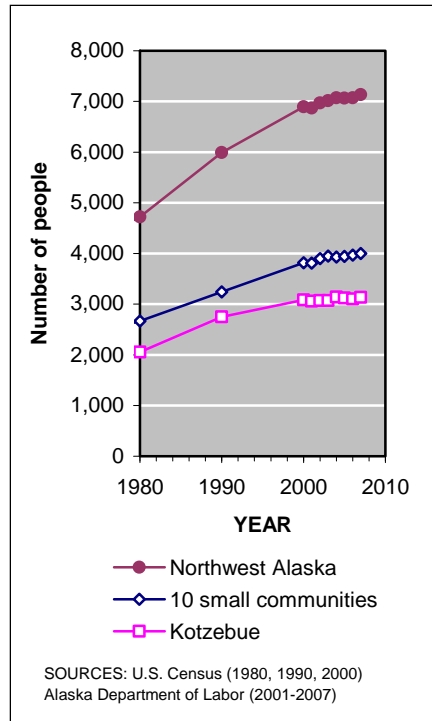


Figure 34.—Community populations, Northwest Alaska, 1980–2007.

The 7 study communities with comprehensive subsistence estimates included 5,274 people, or 74% of the Northwest Alaska population. The study communities included Kotzebue, and 6 of the 10 smaller communities. The smaller study communities averaged 357 people in 2007, ranging in size from 269 in Shungnak to 489 in Noatak. They included 2,141 people, 54% of the small community population in Northwest Alaska and 30% of the total population.

For the 7 communities with at least 1 year of comprehensive data, the combined Northwest data set included 14 comprehensive surveys, 61 salmon surveys, 13 bird surveys, and 9 Western Arctic Caribou Herd (WACH) surveys. From the combined data, researchers calculated the average annual harvest (in edible pounds) for each species in each community, in some cases from 12 annual estimates. Then the averages for each species in each community were summed to create regional estimates by individual species, and ranked in descending order.

Figure 35 shows the 20 wild fish and game species that contributed the most to the subsistence diet in the 7 communities for which comprehensive data were available. In the 7 communities, 10 species provided 87% of the annual harvest in edible pounds. Adding the next 10 species to the cumulative total, 20 species provided 95% of the harvest. Although not shown in Figure 35, 30 species provided 97% of the harvest.

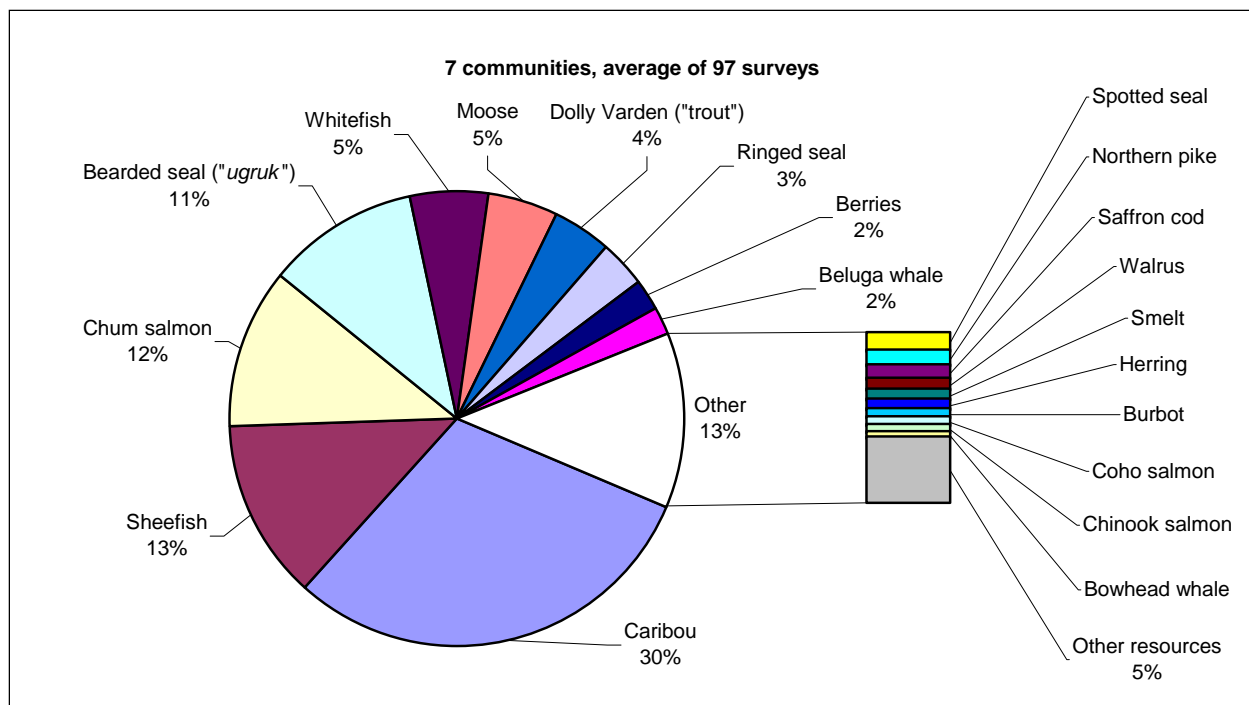


Figure 35.—Top 20 subsistence foods, by average edible weight, 1964–2007.

Estimates from 97 surveys conducted in 7 Northwest Alaska communities since 1964, including 2 in Kotzebue.

The importance of caribou was evident. A dramatic decline in the caribou population—as happened most recently in the 1970s—would have a major impact on the subsistence diet in Northwest Alaska. Sheefish, chum salmon, and whitefish contributed another 30%. Bearded seals, ringed seals, and beluga whales contributed 16%. Other than caribou, no single resource contributed more than 13% to the estimated total, a diversity of harvests that reduced the region’s vulnerability to a decline in a single species.

The following discussion compares the results of comprehensive subsistence surveys in 7 Northwest Alaska communities, in 2 parts. The first part summarizes 12 comprehensive harvest estimates for 6 smaller communities from 1964 through 2007. The second part summarizes 2 comprehensive and 3 tribal harvest estimates for the regional center of Kotzebue.

In the 6 smaller communities, total subsistence harvest estimates have ranged from 99,120 lb in Deering in 1994, to 271,338 lb in Kivalina in 1965 (Figure 36). Of the 12 estimates in Figure 36, six estimates are for Kivalina and 2 estimates are for Noatak. As discussed in the Kivalina chapter, Kivalina’s total estimated harvests have been remarkably stable over time. Noatak’s harvests appear to have been stable as well, although there was insufficient data to identify any trends. The differences among the community estimates can be explained primarily by differences in community sizes and available resources, as discussed below. The smallest estimate was for Deering, the smallest community in the sample. Shungnak and Kiana are inland communities; subsistence marine mammal harvests were not visible at the scale used in Figure 36.

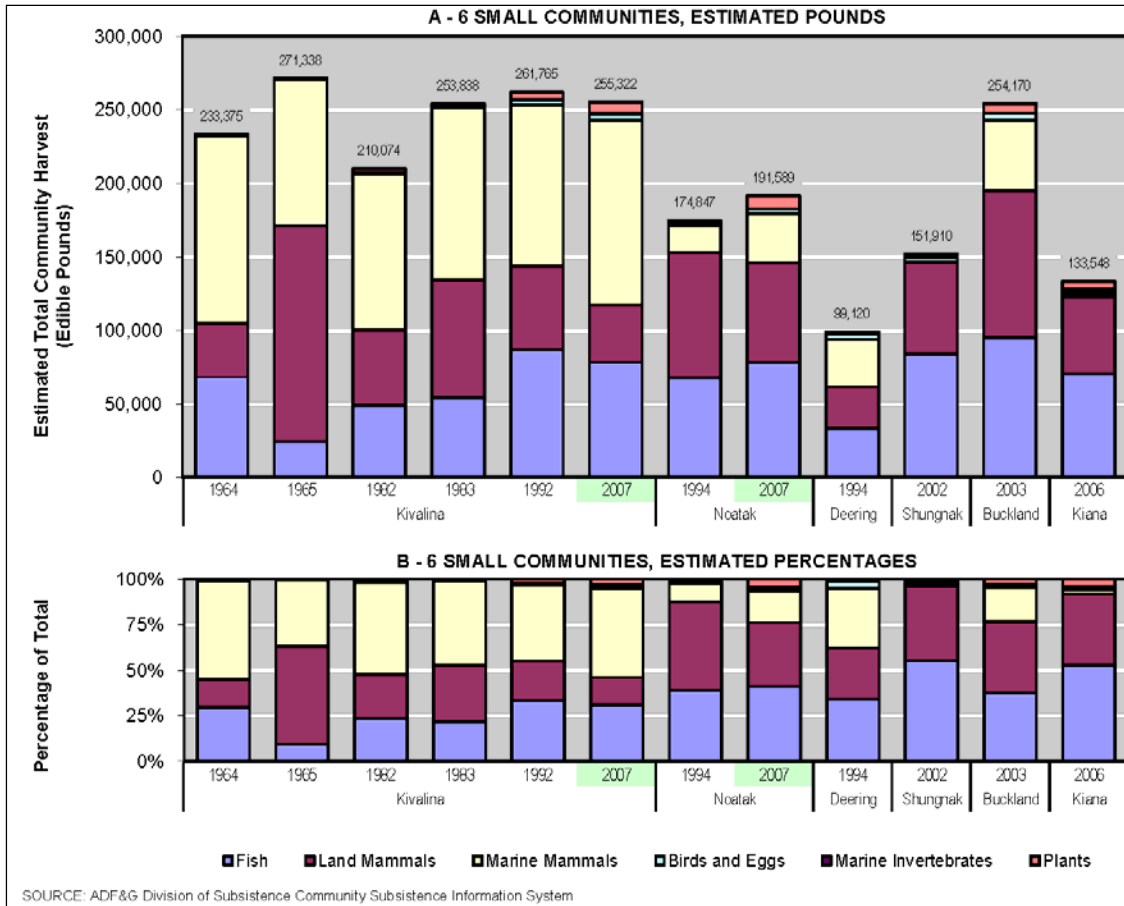


Figure 36.—Subsistence harvest estimates for 6 small communities, Northwest Alaska, 1964–2007.

The most recent comprehensive survey data (Kivalina and Noatak in 2007) are highlighted in green.

For Kotzebue, 2 comprehensive estimates and 3 tribal estimates were available. The comprehensive surveys were conducted by the ADF&G Division of Subsistence (Georgette and Loon 1993; Fall and Utermohle 1995). The tribal surveys were conducted by the Native Village of Kotzebue (Whiting 2006). Figure 37 includes all 5 estimates for Kotzebue.

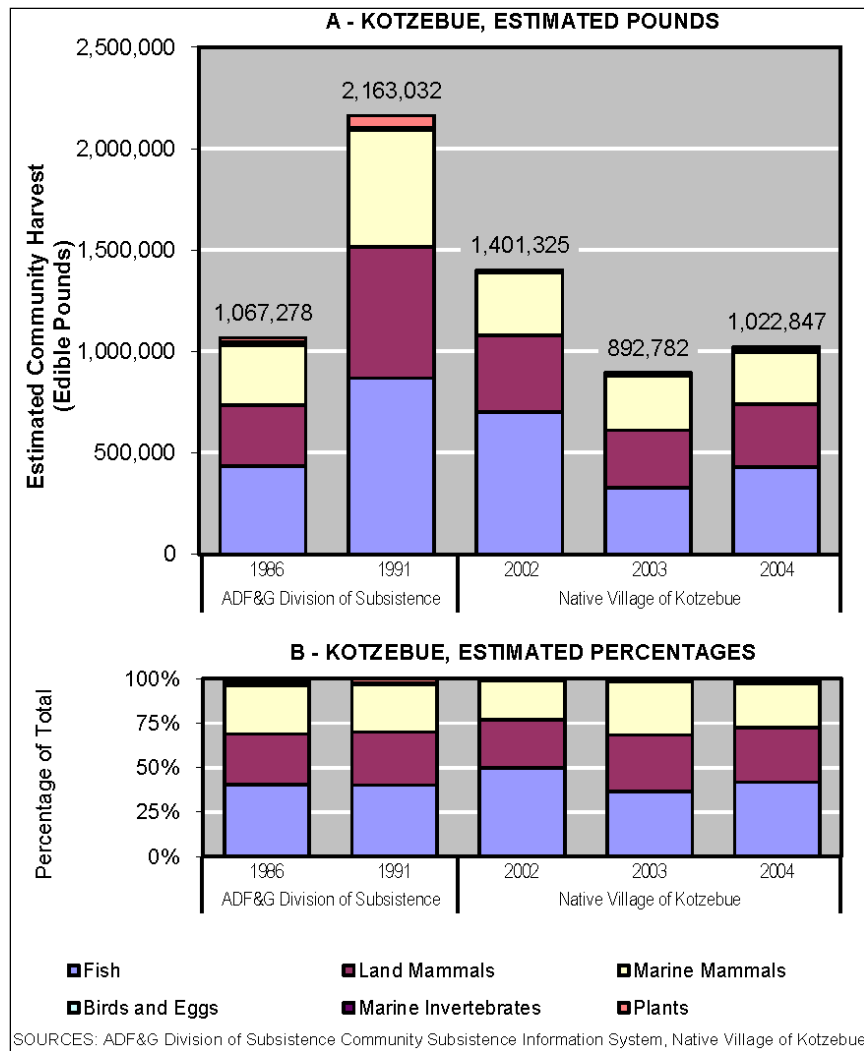


Figure 37.—Subsistence harvest estimates, Kotzebue, 1986–2004.

The 1986 and 1991 ADF&G surveys were comprehensive and generated estimates for the entire community. The 2002, 2003, and 2004 IRA surveys were limited to tribal households, about 60% of the population.

Of the 5 estimates, the 1991 ADF&G estimate was by far the largest, twice the ADF&G estimate for 1986 and almost twice the average tribal estimates for 2002–2004, which merits comment. Four of the surveys (1986, 2002, 2003, and 2004) relied on random samples of occupied households in 3 strata (low-, medium-, and high-harvesting households). The 1991 survey employed a different sampling strategy. The funding agency, the U.S. Minerals Management Survey, directed that the 1991 sample include households previously surveyed for a “Social Indicators” study. As a result, the 1991 sample was biased towards less transient and more stable households (Fall and Utermohle 1995:XIX–7). Moreover, 1 of the long term households reported exceptionally high harvests for 1991, 18% of the total reported harvest (Fall and Utermohle 1995:XIX–14). These 2 factors increased the 1991 Kotzebue estimate, and may account for some of the differences between the estimates for 1991 and the other years. Whiting (2006) also noted that the 2002 tribal sample included, by chance, a few exceptionally high harvesting households.

Especially given the difference between the 1986 and 1991 estimates, the 3 subsequent estimates by the Native Village of Kotzebue (Whiting 2006) were useful in evaluating the earlier estimates. The Native Village of Kotzebue (IRA) used the same 3-strata random sampling procedure employed by ADF&G, but

limited their survey to tribal member households, about 60% of all Kotzebue households. Each year for 3 years, the IRA contacted 108 to 158 of the tribe's 480 households, at least 30 households in each of the 3 harvesting strata. The IRA used the same methods employed by ADF&G to calculate expanded estimates, but just for the tribal member households of Kotzebue.

In 1986, Georgette and Loon found that Native households harvested an average of 518 lb per person per year, while non-Native households harvested an average of 112 lb per year (1993:69). Adjusting the IRA estimates for the households that were not in the tribal population and for plants (which were not in the IRA survey), the IRA data indicated an average annual subsistence harvest for Kotzebue of about 1.5 million lb, similar to the average of the 2 ADF&G estimates, 1.6 million lb. At this point, these averages were the most reliable estimates of Kotzebue's total annual subsistence harvest. It was unlikely that the actual Kotzebue harvests varied as much from year to year as the estimates varied. Note that the estimated contributions of fish, land mammals, and marine mammals to the total harvests were remarkably consistent across the 5 different Kotzebue survey efforts (Figure 37).

Aside from documenting the species and amounts harvested for subsistence, survey data could be used to explore other interesting questions. For example:

- Have harvests changed over time?
- Are subsistence harvests associated with population?

Because community populations in Northwest Alaska have increased 29% since 1980, and because there have been many changes in economic and environmental conditions, these were relevant questions.

To address the first question, harvests for the 7 Northwest communities with comprehensive estimates were compared over time, using per capita harvests to remove the effect of different community sizes (Figure 38). Estimated harvests trended lower over time by about 21 lb per year, and the association between time and per capita harvest was significant ($r^2=0.731$, $P<0.001$).

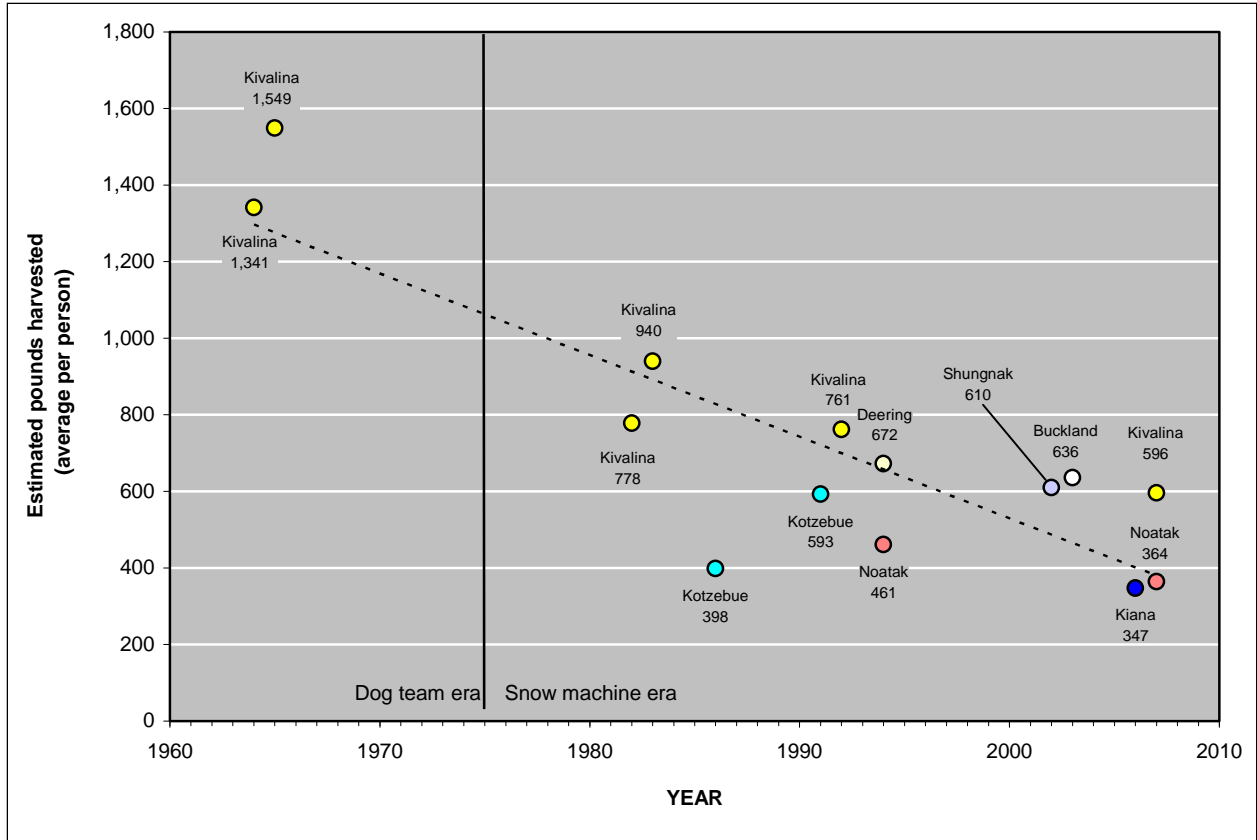


Figure 38.—Estimated harvests per person in Northwest Alaska communities, 1964–2007.

Estimated average subsistence harvest per person (in edible pounds) declined by about one-half from the dog team era to the snow machine era.

When the analysis was limited to the snow machine era (Figure 39), the declining trend was still evident but the association was weaker and not significant ($r^2=0.311$, $P=0.059$). The rate of decline was only about 11 lb per year from 1980–2007, or one-half the rate observed from 1964 to 2010. With only 12 estimates, though, the trend was very sensitive to the removal or addition of a single estimate.

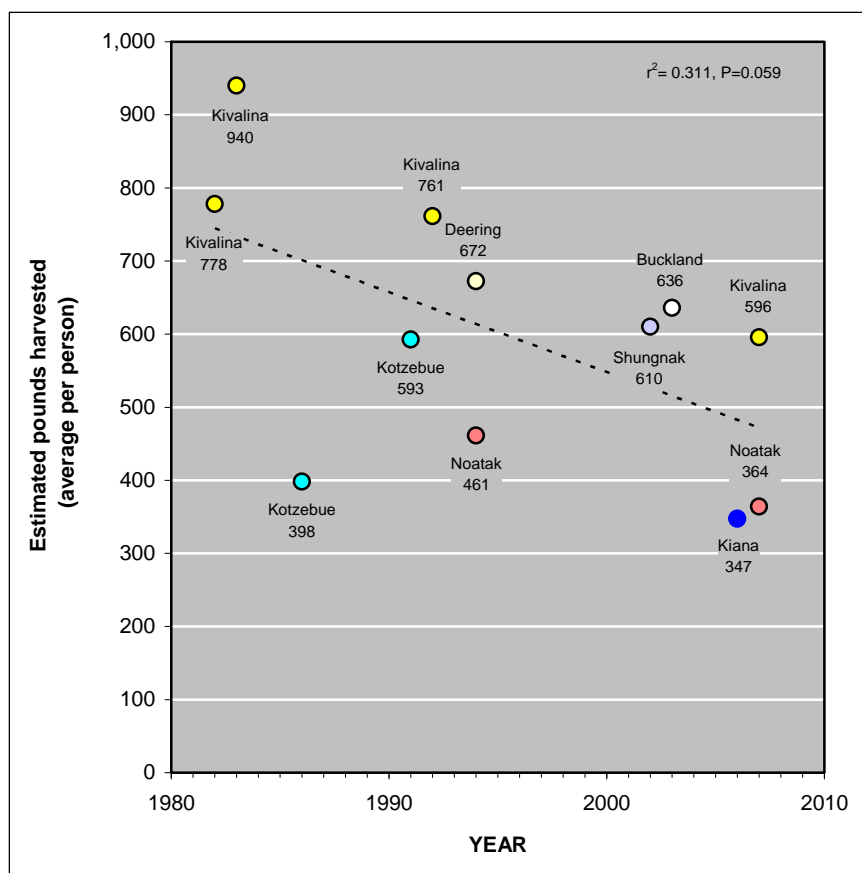


Figure 39.—Estimated harvests per person in Northwest Alaska communities, 1980–2007.

Although per capita harvests appear to be declining, the trend since 1980 is not statistically significant. There are the same data as in Figure 38, with the dog team era estimates removed.

To address the second question, we return to total community harvests. Presumably, total community harvests would be associated with populations; more people would eat more food. But supplies of wild foods were not infinite, alternative food sources were available, and *total* harvests did not increase in Kivalina from 1964 to 2007 despite a doubling of community size.

The dataset included 12 ADF&G comprehensive surveys conducted since 1980 in 7 communities, as well as the IRA surveys of Kotzebue. For the smaller communities, with populations ranging between 148 (Deering in 1994) and 526 (Noatak in 2007), subsistence harvests showed a very weak but not significant association with community populations ($r=0.404$, $P=0.247$) (Figure 40). In Kotzebue, again, subsistence harvests were not associated with community populations ($r=0.402$, $P=0.502$), especially when the IRA estimates were adjusted to account for the nontribal segments of Kotzebue ($r=0.092$, $P=0.883$). For all 15 surveys, though, subsistence harvests were strongly associated with community populations ($r=0.871$, $P<0.001$) (Figure 40). Looked at another way, per capita subsistence harvests in Kotzebue were similar to those in the smaller communities.

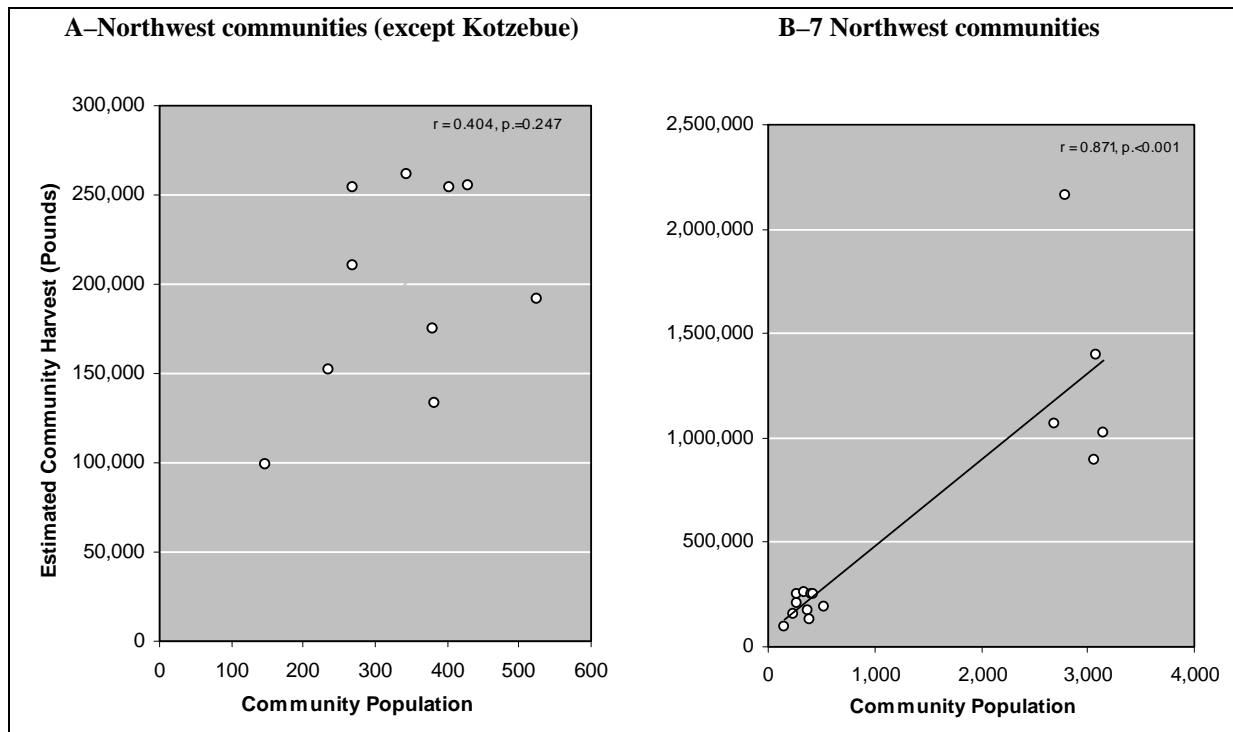


Figure 40.—Associations between community populations and total subsistence harvests, 1982–2007.

(A) Subsistence harvests increased with community size in the smaller communities, but the association was not significant. (B) When Kotzebue was included with the smaller communities, however, subsistence harvests were significantly associated with community size.

DISCUSSION

The results from subsistence harvest surveys provided a unique perspective on the Northwest Alaska economy. In every community, subsistence harvests made a substantial contribution to the diet. Indeed, the differences between the smallest and largest communities were modest. In the 1994 survey in Deering, 148 people harvested an average of 672 lb each. In 2 surveys in Kotzebue, an average of 3,165 people harvested an average of 495 lb each. In the most recent surveys for 2007, every household surveyed reported *using* at least 1 kind of subsistence-caught food, while 95% (Kivalina) and 97% (Noatak) reported *harvesting* subsistence food.

The wide range of Kotzebue results illustrated the challenge of estimating subsistence harvests in a large, culturally and economically diverse regional center. Surveying every household would be inordinately expensive. Estimates from a simple random sample were very sensitive to the inclusion, or exclusion, of high harvesting households. Stratified random samples were a better approach, especially if most high harvesting households could be surveyed. But stratified samples required accurate prior knowledge of the population for stratification and estimation. These issues were not a problem in the 10 smaller Northwest communities, where researchers attempted to contact every household and samples typically included 90% of all occupied households.

Where food security data were available, 88% (Kivalina) and 82% (Noatak) of the surveyed households reported high or marginal levels of food security, compared with 89% in the United States as a whole. Subsistence harvests clearly contributed to that food security, and when food insecurities were reported they were twice as likely to be related to store-bought foods as to subsistence foods. Similar

circumstances prevailed among First Nations in Canada, where “39% of respondents reported having insufficient resources to purchase all the food they would need from the store if traditional food was not available” (Receveur et al. 1998).

Iñupiaq culture places a high value on sharing, particularly of *nikipiaq* or “real food” like frozen fish, seal oil, and dried meat. Some households harvested more than was needed for their own consumption in order to provide for an elder household that no longer hunts, or for a single parent household with 1 working adult and several children. Sharing networks were typically along family lines, but in practice were not limited exclusively to close family households (Bodenhorn 2000; Magdanz et al. 2002). Robust food distribution networks in Northwest Alaska contributed to food security, both by providing wild foods and by reducing anxiety about food supplies.

Although community populations in Northwest Alaska increased by 29% between 1980 and 2007, the region still had one of the lowest population densities in the United States, only about 0.07 people/km². Except for Kotzebue, the communities in Northwest Alaska are only slightly larger than the estimated populations of the traditional societies occupying the same territories (Burch Jr. 1998). Virtually all the lands and waters traditionally available for hunting and fishing were still accessible for community rural residents in 2007.

Subsistence harvests occurred throughout the lands and waters surrounding the communities (Figure 41). For 2007, residents of Kivalina and Noatak reported hunting and fishing and gathering over more than 25,000 km², in some cases ranging more than 150 km away from home. For all resources combined, the 2007 resource use areas for Kivalina and Noatak were smaller and fell mostly within the lifetime resource use areas collected by Schroeder et al. (1987), which is what would be expected. (For detailed comparisons of past and current resource use areas, consult the extensive map collection and discussion that SRB&A prepared for Volume 2 of the Aqqaluk Project SEIS [Tetra Tech Inc. 2008]).

In the previous section, there was evidence that larger communities harvested more wild foods. The strongest evidence came from the regional center of Kotzebue, where both estimated *total* harvests and populations were an order of magnitude larger than in the smaller communities. This suggested that subsistence harvests *were* positively associated with population.

Yet, in the results chapters of this report, it was reported that the estimated *total* harvests for Kivalina did not change significantly despite a doubling of the community population from 1964 to 2007. Although only 2 estimates were available for Noatak, similar trends may have occurred there. Thus, growing human populations did *not* result in growing harvests. Instead, the available evidence suggested total harvests have remained relatively stable over time and were *not* associated with population.

What does one make of these two seemingly contradictory findings? In Kivalina, total harvests and population were *not* associated. Yet among the 11 Northwest communities, harvests and populations *were* associated.

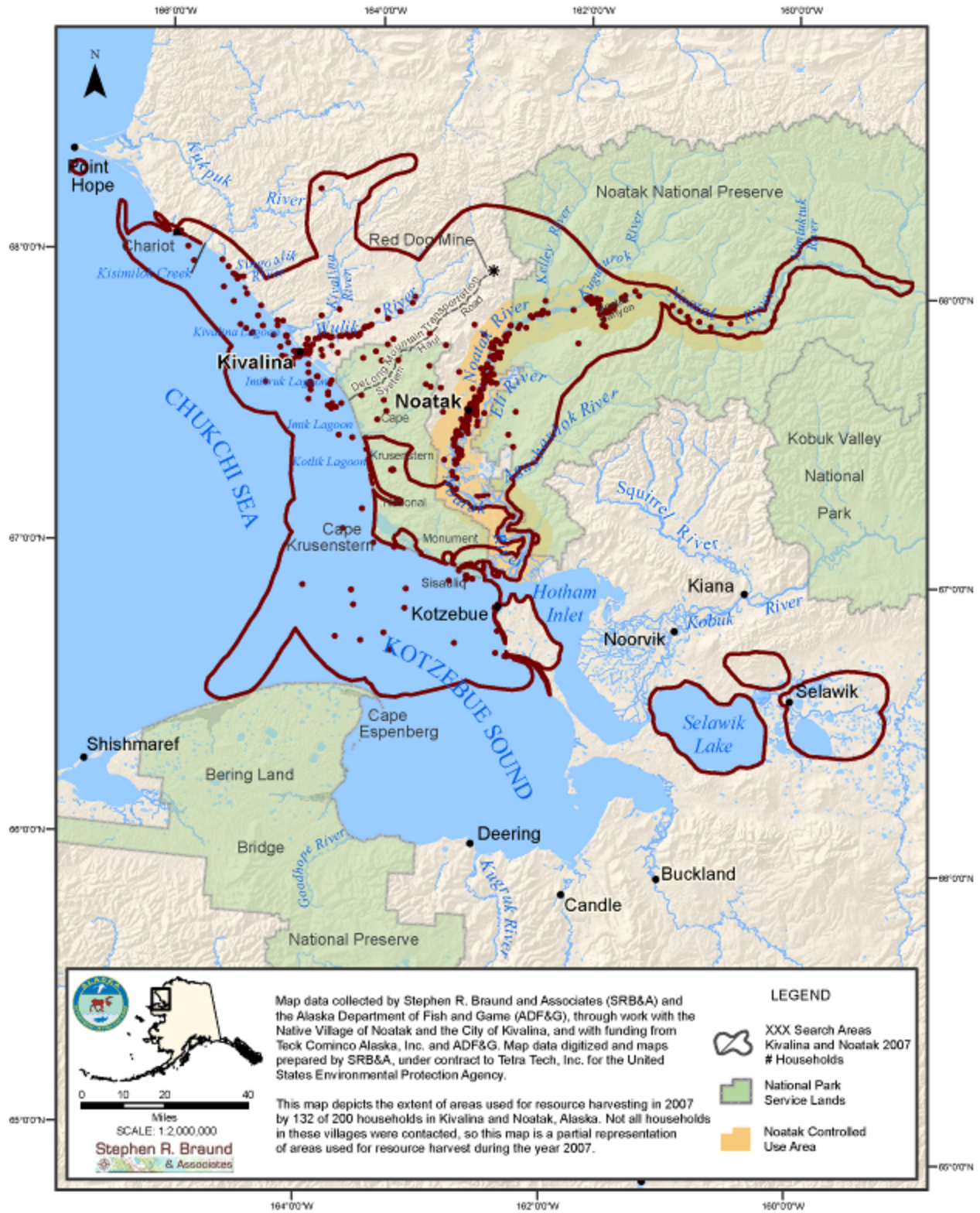


Figure 41.—Search areas and harvest locations, Kivalina and Noatak, 2007.

A possible explanation for stable harvests in Kivalina and Noatak was that residents were harvesting key community resources at or near maximum sustained yield, and *couldn't* harvest more. But that was not a plausible explanation. The only resource in Northwest Alaska consistently harvested at or near maximum sustained yield—harvested under Tier II regulations—was muskoxen. Moose and Dall sheep were somewhat limited by seasons and bag limits, though still liberal compared to roaded areas of the state. Harvestable surpluses of other subsistence resources in the region were well above amounts necessary for subsistence. Subsistence caribou hunting was open year round and the bag limits were 5 caribou per day (state) and 15 caribou per day (federal). Subsistence fishing was open for all species year round, with no bag limits.

Access may help explain both Kotzebue's larger population and high harvests. Kotzebue is located on the coast near the termination of the 3 largest watersheds in the region: the Noatak River, the Kobuk River, and the Selawik River. In addition to the marine resources like bearded seals, Kotzebue residents can harvest salmon bound for either the Noatak or Kobuk, harvest sheefish that spawn in either the Kobuk or the Selawik, and can choose to hunt caribou in 3 different, major watersheds depending on the annual course of the caribou migration. Kotzebue's prime location for subsistence harvesting may have favored its growth over the smaller communities in the region. Immigrants from the smaller Northwest communities to Kotzebue could continue their subsistence activities and work at wage labor in Kotzebue.

In the end, the most important explanation for the declines from the 1960s to the 1980s was obvious: the replacement of dog teams with snowmachines. Other factors may include: increased availability of store-bought foods, increased opportunity for wage work accompanied by less time for subsistence activities, changing food preferences, interannual variability of resource abundance (caribou in particular), and environmental change. So even though populations grew and average per capita harvests declined over time, that does not mean that growing populations caused declining per capita harvests. Most likely, declines in per capita harvests were the result of other factors which, coincidentally, matched the increases in community populations.

Those other factors, however, were still poorly understood. On the one hand, higher fuel prices made it more expensive to travel by boat or snowmachine, suggesting that subsistence harvests might decrease. On the other hand, higher fuel prices were factored into freight charges making imported foods more expensive, suggesting that subsistence harvests might increase. As yet, there are insufficient data to draw any conclusions, not only about the impacts of fuel costs and harvest, but about many facets of rural Alaska's economy. Only recently has it become possible to compare subsistence harvests over time.

In short, the economy of remote rural Alaska is poorly described by existing economic indicators. As Goldsmith commented:

Even with consistency in definitions and improvements in the quality of data currently collected, the standard indicators would not provide a complete or balanced picture of the complexity of the economy. This is because the subsistence and informal sectors are nowhere captured by the indicators which are designed only to measure activity in the cash economy. Because these non-market activities consume a considerable amount of the time and effort of rural residents and contribute significantly to the economic well-being of the region, they should be included for several reasons. Without them the well-being of residents is undervalued, comparisons with urban areas are misleading, and economic development strategies are not grounded in reality. (Goldsmith 2007)

While they are not conventional economic indicators, data from comprehensive socioeconomic surveys can contribute to a better understanding of Alaska's rural economy. At this writing, survey research was the only reliable source of long term, consistent information about households' subsistence harvests, expenses, equipment ownership, and food distribution systems.

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**APPENDIX A: LIST OF SPECIES HARVESTED IN
NORTHWEST ALASKA FOR SUBSISTENCE USES**

Appendix A.—List of species harvested in northwest Alaska for subsistence uses, and their English, Latin, and *Iñupiaq* names.

Common name (local name)	Latin name	Regional <i>Iñupiaq</i> name(s)	
		Coastal name(s)	Kobuk and Selawik name(s)
Fishes			
<u>Salmon</u>			
Chum salmon	<i>Oncorhynchus keta</i>	<i>Qalugraug, aqalugruaq, aqalukraug</i>	<i>Qalugraug</i>
Pink salmon	<i>Oncorhynchus gorbuscha</i>	<i>Amaqtuq</i>	<i>Amaqtuq</i>
Chinook salmon	<i>Oncorhynchus tshawytscha</i>	<i>Iqalsugruuk, tagayukpuk</i>	<i>Iqalsugruuk</i>
Coho salmon	<i>Oncorhynchus kisutch</i>	<i>Qalugraug</i>	<i>Qalugraug</i>
Sockeye salmon	<i>Oncorhynchus nerka</i>	<i>Qalugraug</i>	<i>Aqalugraug</i>
<u>Char (Trout)</u>			
Dolly Varden	<i>Salvelinus malma</i>	<i>Aqalukpiq</i>	<i>Qalukpiq</i>
Arctic char	<i>Salvelinus alpinus</i>	<i>Igalukpiq</i>	<i>Qalukpiq</i>
Lake trout	<i>Salvelinus namaycush</i>	<i>Aqalukpiq</i>	<i>Qalauqpak</i>
<u>Whitefishes</u>			
Sheefish	<i>Stenodus leucichthys</i>	<i>Sii</i>	<i>Sii</i>
Broad whitefish	<i>Coregonus nasus</i>	<i>Siggulīaq, qausīluk</i>	<i>Siyyuīlaq, qausriīluk, qalupiaq</i>
Humpback whitefish	<i>Coregonus pidschian</i>	<i>Qaalgiq, iqalupiaq, iqalutchiaq</i>	<i>Qaalgiq, ikkuiyiq</i>
Least cisco	<i>Coregonus sardinella</i>	<i>Iqalusaaq</i>	<i>Qalusraaq, anjuutituuq, qalutchiaq</i>
Bering cisco	<i>Coregonus laurettae</i>	<i>Tipuk</i>	<i>Tipuk</i>
Round whitefish	<i>Prosopium cylindraceum</i>	<i>Quptik</i>	<i>Quptik, savaigutniq</i>
<u>Other finfishes</u>			
Saffron cod (tomcod)	<i>Eluginus gracilis</i>	<i>Uuaq</i>	<i>Uūgaq</i>
Arctic cod (blue cod)	<i>Boreogadus saida</i>	<i>Qalauq, aqaluaq</i>	<i>Qalauq</i>
Starry flounder	<i>Platichthys stellatus</i>	<i>Nataagnaq</i>	<i>Nataagnaq</i>
Alaska plaice (flounder)	<i>Pleuronectes quadrituberculatus</i>	<i>Ipkaknaylik, ipkignailuk</i>	
Pacific herring	<i>Clupea pallasii</i>	<i>Ugsrugtuuq</i>	
Rainbow smelt	<i>Osmerus mordax</i>	<i>Iqaugniq</i>	
Pond smelt	<i>Hypomesus olidus</i>	—	
Alaska blackfish	<i>Dallia pectoralis</i>	<i>Iluuqiniq</i>	<i>Iluuqiñiq</i>
Burbot	<i>Lota lota</i>	<i>Tittaliq</i>	<i>Tittaliq</i>
Arctic grayling	<i>Thymallus arcticus</i>	<i>Sulukpaugaq</i>	<i>Sulukpaugaq</i>
Northern pike	<i>Esox lucius</i>	<i>Siilik</i>	<i>Siilik</i>
Nine-spined stickleback	<i>Pungitius pungitius</i>	<i>Kakilisaq</i>	
Longnose sucker	<i>Catostomus catostomus</i>	<i>Qaiiqsuaq, Miluaq</i>	<i>Kaiiqsuaq</i>
Fourhorn sculpin (bullhead)	<i>Myoxocephalus quadricornis</i>	<i>Kanayyuq</i>	<i>Kanayūgaq</i>
Coastrange sculpin (bullhead)	<i>Cottus aleuticus</i>	<i>Kanayyuq</i>	

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Appendix A. Page 2 of 5.

Common name (local name)	Latin name	Regional <i>Iñupiaq</i> name(s)	
		Coastal name(s)	Kobuk and Selawik name(s)
Land mammals			
<u>Large land mammals (used primarily for food)</u>			
Caribou	<i>Rangifer tarandus</i>	<i>Tuttu</i>	<i>Tuttu</i>
Moose	<i>Alces alces</i>	<i>Tiniikaq</i>	<i>Tiniikaq</i>
Brown bear	<i>Ursus arctos</i>	<i>Aklaq</i>	<i>Aklaq</i>
Black bear	<i>Ursus americanus</i>		<i>Qiqñiqlaq, pisruktuaq</i>
Dall sheep	<i>Ovis dalli</i>	<i>Ipniaq</i>	<i>Ipniaq</i>
Muskox	<i>Ovibos moschatus</i>		<i>Umikmiaq</i>
Beaver	<i>Castor canadensis</i>	<i>Paluqtaq</i>	<i>Aqu, paluqtaq</i>
Snowshoe hare	<i>Lepus americanus</i>	<i>Ukallaichiak</i>	<i>Ukallaitchiaq, ukalliq</i>
Alaskan hare	<i>Lepus othus</i>	<i>Ukallisugruk</i>	
Porcupine	<i>Erithrizon dorsatum</i>	<i>Iluqutaq</i>	<i>Illuqutaq</i>
<u>Small land mammals (used primarily for fur)</u>			
Red fox	<i>Vulpes vulpes</i>	<i>Kayuqtuq</i>	<i>Kayuqtuq</i>
(Cross fox)		<i>Qiangaq</i>	
(Blue fox)		<i>Qiangaqtulik</i>	
Arctic fox	<i>Vulpes lagopus</i>	<i>Qusrhaaq</i>	<i>Qusrhaaq</i>
Wolverine	<i>Gulo gulo</i>	<i>Qapvik</i>	<i>Qapvik</i>
Wolf	<i>Canis lupus</i>	<i>Amaguq</i>	<i>Amaguq</i>
Ermine	<i>Mustela erminea</i>	<i>Tigiaq</i>	<i>Tigiaq</i>
Mink	<i>Neovision vison</i>	<i>Tigiaqpak</i>	<i>Tigiaqpak</i>
Marten	<i>Martes americana</i>		<i>Qapvaitchiaq</i>
River otter	<i>Lontra canadensis</i>	<i>Pamiuqtuuq</i>	<i>Pamiuqtuuq</i>
Lynx	<i>Lynx canadensis</i>	<i>Niituyiq</i>	<i>Nuutuyiq</i>
Arctic ground squirrel	<i>Spermophilus parryii</i>	<i>Siksrik</i>	<i>Siksrik</i>
Marmot	<i>Marmota spp.</i>	<i>Siksrikpaq</i>	<i>Siksrikpaq</i>
Muskrat	<i>Ondatra zibethicus</i>	<i>Kigvaluq</i>	<i>Kigvaluq</i>
Marine mammals			
Ringed seal	<i>Phoca hispida</i>	<i>Natchiq</i>	
Bearded seal	<i>Erignathus barbatus</i>	<i>Ugruk</i>	
Spotted seal	<i>Phoca largha</i>	<i>Qasigiaq</i>	
Ribbon seal	<i>Histiophoca fasciata</i>	<i>Qaigutlik</i>	
Walrus	<i>Odobenus rosmarus</i>	<i>Aiviq</i>	
Beluga whale	<i>Delphinapterus leucas</i>	<i>Sisuak</i>	<i>Sisuak</i>
Bowhead whale	<i>Balaena mysticetus</i>	<i>Agviq</i>	
Gray whale	<i>Eschrichtius robustus</i>	<i>Agvigluaq</i>	
Killer whale	<i>Orcinus orca</i>	<i>Aaglu</i>	
Polar bear	<i>Ursus maritimus</i>	<i>Nanuq</i>	
Birds			
<u>Migratory birds (used primarily for food)</u>			
Tundra swan	<i>Cygnus columbianus</i>	<i>Qugruk</i>	
Sandhill crane	<i>Grus canadensis</i>	<i>Tatirgaq, tattirgaq</i>	

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Appendix A. Page 3 of 5.

Common name (local name)	Latin name	Regional <i>Iñupiaq</i> name(s)	
		Coastal name(s)	Kobuk and Selawik name(s)
<u>Migratory birds, continued</u>			
Greater white-fronted goose	<i>Anser albifrons</i>	<i>Kigiyuk</i>	
Canada goose	<i>Branta canadensis</i>	<i>Iqsraqutilik</i>	
Cackling goose	<i>Branta hutchinsii</i>	<i>Niglik?</i>	
Snow goose	<i>Chen caerulescens</i>	<i>Kaṇuq</i>	<i>Kaṇuq</i>
Emperor goose	<i>Chen canagica</i>	<i>Ligliqpak</i>	
Brant	<i>Branta bernicula</i>	<i>Nigliṅnaq, niqliqnaurat</i>	
Northern pintail	<i>Anas acuta</i>		<i>Ivugaq, kurugaq</i>
Mallard	<i>Anas platyrhynchos</i>	<i>Kurugasugruk</i>	<i>Ivugasrugruk</i>
American wigeon	<i>Anas americana</i>	<i>Uggihiq</i>	<i>Uggihiq</i>
Shoveler	<i>Anas clypeata</i>	<i>Aluutaq</i>	<i>Aluutaq</i>
Green-winged teal	<i>Anas crecca</i>	<i>Qaiñiq</i>	<i>Qaiñiq</i>
Greater scaup	<i>Aythya marila</i>	<i>Qaqłukpalik, qaqłutuuq</i>	
Canvasback	<i>Aythya valisineria</i>	–	–
Bufflehead	<i>Bucephala albeola</i>	<i>Nunuqsigiiaq</i>	<i>Nunuqsigiilaq</i>
Harlequin duck	<i>Histrionicus histrionicus</i>	<i>Saḡvaq tiṅmiaq</i>	<i>Saḡvam tiṅmiaq</i>
Goldeneye	<i>Bucephala</i> spp.	–	–
Long-tailed duck (oldsquaw)	<i>Clangula hyemalis</i>	<i>Aahaaliq</i>	<i>Aahaaliq</i>
White-winged scoter	<i>Melanitta fusca</i>		
Black scoter	<i>Melanitta nigra</i>	<i>Uviññauyuk</i>	<i>Tuṅḡaaḡruk</i>
Surf scoter	<i>Melanitta perspicillata</i>		<i>Killalik</i>
Common merganser	<i>Mergus merganser</i>	<i>Sugliq, suglitchauraq</i>	<i>Sugliq, suglitchauraq</i>
Red-breasted merganser	<i>Mergus serrator</i>	<i>Paisugruk</i>	<i>Paisugruk</i>
Common eider	<i>Somateria mollissima</i>	<i>Miituk, amautlikruaq</i>	<i>Mitiqligruaq</i>
King eider	<i>Somateria spectabilis</i>	<i>Kiṅalik, qiṅalik</i>	
Spectacled eider	<i>Somateria fischeri</i>	<i>Qavaasuk</i>	
Steller's eider	<i>Polysticta stelleri</i>	<i>Igniqauqtuq</i>	
Yellow-billed loon	<i>Gavia adamsii</i>	<i>Qaqsrauq</i>	<i>Tuutlik</i>
Red-throated loon	<i>Gavia stellata</i>	<i>Qaqsrauq</i>	<i>Qaqsrauq</i>
Common loon	<i>Gavia immer</i>	<i>Taatchiñiq</i>	<i>Taatchiñiq</i>
Pacific loon	<i>Gavia pacifica</i>	<i>Malḡi</i>	<i>Malḡi</i>
Bristle-thighed curlew	<i>Numenius tahitiensis</i>	<i>Siuttuvak</i> (large shorebird)	<i>Siuttuvak</i> (large shorebird)
Bar-tailed godwit	<i>Limosa lapponica</i>	<i>Turraaturaq</i>	<i>Turraaturaq</i>
Whimbrel	<i>Numenius phaeopus</i>	<i>Siuttuvak</i>	<i>Kukukiaq</i>
<u>Migratory birds (used primarily for eggs)</u>			
Auklet	various spp.	–	
Common murre	<i>Uria aalge</i>	<i>Akpaliq</i>	
Thick-billed murre	<i>Uria lomvia</i>	<i>Akpaluuraq</i>	
Cormorant	<i>Phalacrocorax</i> spp.	<i>Injitaq</i>	
Kittiwake	<i>Rissa</i> spp.	–	
Guillemot	<i>Cephus</i> spp.	–	

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Appendix A. Page 4 of 5.

Common name (local name)	Latin name	Regional <i>Iñupiaq</i> name(s)	
		Coastal name(s)	Kobuk and Selawik name(s)
Migratory birds, continued			
Mew gull	<i>Larus canus</i>	<i>Nauyatchiaq</i>	
Sabine's gull	<i>Xema sabini</i>	<i>Aqargiyiaq</i>	<i>Aqargiyiaq</i>
Glaucous gull	<i>Larus hyperboreus</i>	<i>Nauyasugruk</i>	<i>Nauyatchiaq</i>
Arctic tern	<i>Sterna paradisaea</i>	<i>Mitqutaiaq</i>	<i>Mitqutailaq</i>
Horned puffin	<i>Fratercula corniculata</i>	<i>Qilayaq</i>	
American golden plover	<i>Pluvialis dominica</i>	<i>Tullik</i>	<i>Kiiviiq</i>
Small shorebird	various spp.	–	
Resident birds			
Rock ptarmigan	<i>Lagopus mutus</i>	<i>Niksaaktuniq</i>	<i>Niksaaktuniq</i>
Willow ptarmigan	<i>Lagopus lagopus</i>	<i>Aqargiq</i>	<i>Aqargiq</i>
Spruce grouse	<i>Dendragapus canadensis</i>	<i>Napaaqtum aqargiq</i>	<i>Napaaqtum aqargiq</i>
Snowy owl	<i>Bubo scandiaca</i>	<i>Ukpik</i>	<i>Ukpik</i>
Marine invertebrates			
Clams	<i>Macoma</i> spp.	<i>Iviluq</i>	
Arctic surfclam	<i>Mactromeris polynyma</i>	<i>Ivilliq</i>	
Mussels	various spp.	<i>Avyak</i>	
Foolish mussel	<i>Mytilus trossulus</i>	<i>Avvyaq</i>	
Red king crab	<i>Paralithodes camtschaticus</i>	<i>Putuvak</i>	
Tanner crab	<i>Chionoecetes bairdi</i>	<i>Putuvak</i>	
Plants			
Berries			
Cloudberry (salmonberry)	<i>Rubus chamaemorus</i>	<i>Aqpik</i>	<i>Aqpik</i>
Alpine blueberry	<i>Vaccinium uliginosum</i>	<i>Asiavik</i>	<i>Asriavik</i>
Lingonberry (low bush cranberry)	<i>Vaccinium vitis-idaea</i>	<i>Kikmiññaq</i>	<i>Kikmiññaq</i>
Crowberry (blackberry)	<i>Empetrum nigrum</i>	<i>Paungaq</i>	<i>Paungaq</i>
Kinnickinnick, bearberry	<i>Arctostaphylos uva-ursi</i>	<i>Tinnik</i>	<i>Tinnik</i>
(Black bearberry)	<i>Arctostaphylos alpina</i>	<i>Kavlaq</i>	<i>Kavlaq</i>
(Red-fruited bearberry)	<i>Arctostaphylos rubra</i>	<i>Añutvak</i>	<i>Añutvak</i>
Nagoonberry (Raspberry)	<i>Rubus arcticus</i>	<i>Aqpiññaq, ivgun asriaq, tuungaum asriaq</i>	<i>tunñaum asriaq</i>
Northern red currant	<i>Ribes triste</i>	<i>Niviññaqutaq</i>	<i>Niviññaqutaq</i>
High bush cranberry	<i>Viburnum edule</i>	<i>Uqpiññaq</i>	<i>Uqpiññaq</i>
Red raspberry	<i>Rubus idaeus</i>	–	<i>tunñaum asriaq</i>
Rosehip	<i>Rosa</i> spp.	<i>Igruñnaq</i>	<i>Igruñnaq</i>
Cranberry (bog cranberry)	<i>Oxycoccus microcarpus</i>	<i>Qunnum asriaq</i>	<i>Qunñun asriaq, sunmun asriaq</i>

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Appendix A. Page 5 of 5.

Common name (local name)	Latin name	Regional Iñupiaq name(s)	
		Coastal name(s)	Kobuk and Selawik name(s)
Plants, continued			
Common mountain juniper	<i>Juniperus communis</i>	<i>Tulukkam asriaq</i>	<i>Tulukkam asriaq</i>
Soapberry	<i>Shepherdia canadensis</i>	–	–
Swedish dwarf cornel (dwarf dogwood)	<i>Cornus suecica</i>		
Greens			
Willow (diamond-leafed willow, esp. leaf buds)	<i>Salix pulchra</i>	<i>Sura</i>	<i>Sura</i>
Alaska willow (felt-leafed willow)	<i>Salix alaxensis</i>	<i>Uqpik</i>	<i>Uqpik</i>
Beach lovage (sea lovage) (Wild celery)	<i>Ligusticum scoticum</i> <i>Angelica lucida</i>	<i>Tukkaayuk</i> <i>Ikuusuk</i>	<i>Tukkaayuk</i> <i>Ikuusuk</i>
Bistort (pink plume)	<i>Polygonum bistorta</i>	<i>Ippik</i>	<i>Ippik</i>
Cordate-leaved saxifrage	<i>Saxifraga punctata</i>	<i>Asiatchiaq</i>	<i>Asriatchiak, kaujalik</i>
Fireweed	<i>Epilobium angustifolium</i>	<i>Pamiuqtaq, pautnuq</i>	<i>Pamiuqtaq, quppiqtaq</i>
River beauty (dwarf fireweed)	<i>Epilobium latifolium</i>	<i>Pamiuqtaq, pautnuq</i>	<i>Pamiuqtaq, pautnuq</i>
Wild chive	<i>Allium schoenoprasum</i>	<i>Patitaaq</i>	<i>Patitaaq</i>
Dock (sour dock)	<i>Rumex arcticus</i>	<i>Qauḡaq</i>	<i>Qauḡaq</i>
Seabeach sandwort (beach greens)	<i>Honckenya peploides</i>	<i>Atchaaqluq</i>	<i>Atchaaqluq</i>
(Alaskan rhubarb)	<i>Polygonum alaskanum</i>	<i>Qusimmaq</i>	<i>Qusrimmaq</i>
Roseroot	<i>Sedum rosea</i>	<i>Iviaḡluk</i>	–
Lousewort	<i>Pedicularis lanata</i> , <i>P. Kanei</i>	<i>Qutliitaaq</i>	<i>Qutliitaaq</i>
Wormwood (stinkweed)	<i>Artemisia Tilésii</i>	<i>Sargiiq</i>	<i>Sargiiq</i>
Labrador tea (Eskimo tea/ Hudson Bay tea)	<i>Ledum palustre</i>	<i>Tilaaquiq</i>	<i>Tilaaquiq</i>
Sweet coltsfoot	<i>Petasites frigidus</i> , <i>P. hyperboreus</i>	<i>Miḷukutakpak</i>	<i>Kipmimangaun</i>
Pigweed (lamb's quarters)	<i>Chenopodium album</i>		
Mountain sorrel	<i>Oxyria digyna</i>	<i>Kitluq</i>	<i>Kitluq</i>
Roots			
(Eskimo potato)	<i>Hedysarum alpinum</i> <i>americanum</i>	<i>Masu</i>	<i>Masru</i>
Cotton grass	<i>Eriophorium angustifolium</i>	<i>Pikniq</i>	<i>Pitniq</i>
Horsetail	<i>Equisetum pratense</i>	<i>Asiatchiaq</i>	<i>Qaaḡraq</i>
(Yellow oxytrope)	<i>Oxytropis Maydelliana</i>	<i>Aiḡaq, masu aiḡaq</i>	<i>Aiḡaq, masu aiḡaq</i>

Notes Coastal communities include Buckland Deering, Kivalina, Kotzebue, and Noatak. Kobuk communities include Ambler, Kiana, Kobuk, Noorvik, Selawik, and Shungnak.

This table includes species harvested and/or used by study community residents; these species may not be specifically discussed in this report. For some species (such as whitefishes), Iñupiaq name(s) vary from village to village. For other species (such as caribou) the same Iñupiaq name is used throughout Northwest Alaska. This table presents those commonly agreed upon by Native speakers. Blank cells indicate more information is needed.

Sources ADF&G 1999; Armstrong 1995; Bellrose 1976; Georgette and Shiedt 2005; Hultèn 1968; Jones 1983, 2006; Kessel 1989; Lentfer 1988; Mecklenburg et al. 2002; Morrow 1980; Nelson et al. 2004; Schofield 1989.

**APPENDIX B: FACTORS USED TO CONVERT INDIVIDUAL
RESOURCES AND GALLONS TO POUNDS EDIBLE WEIGHT**

Appendix B.—Factors used to convert individual resources and gallons to pounds edible weight.

Resource	Edible pounds per individual	Edible pounds per gallon
Fishes		
Salmon		
Chinook salmon	12.40	
Chum salmon	6.00	
Coho salmon	5.20	
Pink salmon	2.10	
Sockeye salmon	5.00	
Unknown salmon	6.00	
Other fishes		
Arctic grayling	0.90	
Lake trout	6.00	
Northern pike	3.30	
Sheefish	11.14	
Whitefishes	2.10	
Arctic char	3.30	
Arctic cod	0.11	
Burbot	4.20	
Dolly Varden	3.30	
Saffron cod	0.21	
Land mammals		
Large land mammals		
Black bear	88.00	
Brown bear ^a	86.00	
Caribou	136.00	
Dall sheep	104.00	
Moose	538.00	
Muskox	295.00	
Small land mammals		
Beaver	20.00	
Snowshoe hare	2.50	
River otter ^b	0.00	
Martens ^b	0.00	
Muskrat ^b	0.00	
Red fox ^b	0.00	
Wolf ^b	0.00	
Wolverine ^b	0.00	
Marine mammals		
Marine mammals		
Bearded seal	420.00	
Beluga whale	995.00	

-continued-

Appendix Table B. Page 2 of 3.

Resource	Edible pounds per individual	Edible pounds per gallon
Marine mammals, continued		
Polar bear	372.00	
Ribbon seal	89.00	
Ringed seal	74.00	
Spotted seal	98.00	
Walrus	700.00	
Shellfish		
King crabs	2.10	
Birds and eggs		
Migratory birds		
American wigeon	1.31	
Brant	2.28	
Canada geese	3.42	
Common eider	4.15	
King eider	2.67	
Long-tailed duck	1.00	
Mallard	1.95	
Northern pintail	1.34	
Northern shoveler	0.52	
Red-breasted merganser	1.00	
Scoter	1.69	
Snow goose	3.99	
Tundra swan	11.21	
White-fronted geese	4.24	
Other birds		
Ptarmigan	1.00	
Snowy owl	3.00	
Spruce grouse	0.70	
Eggs		
Duck eggs	0.15	
Goose eggs	0.27	
Gull eggs	0.25	
Murre eggs	0.24	
Swan eggs	0.60	
Unknown eggs	0.25	
Plants		
Berries		
Alpine blueberry		6.50
Other wild berries		6.50
Raspberry		6.50
Cloudberry		6.50

-continued-

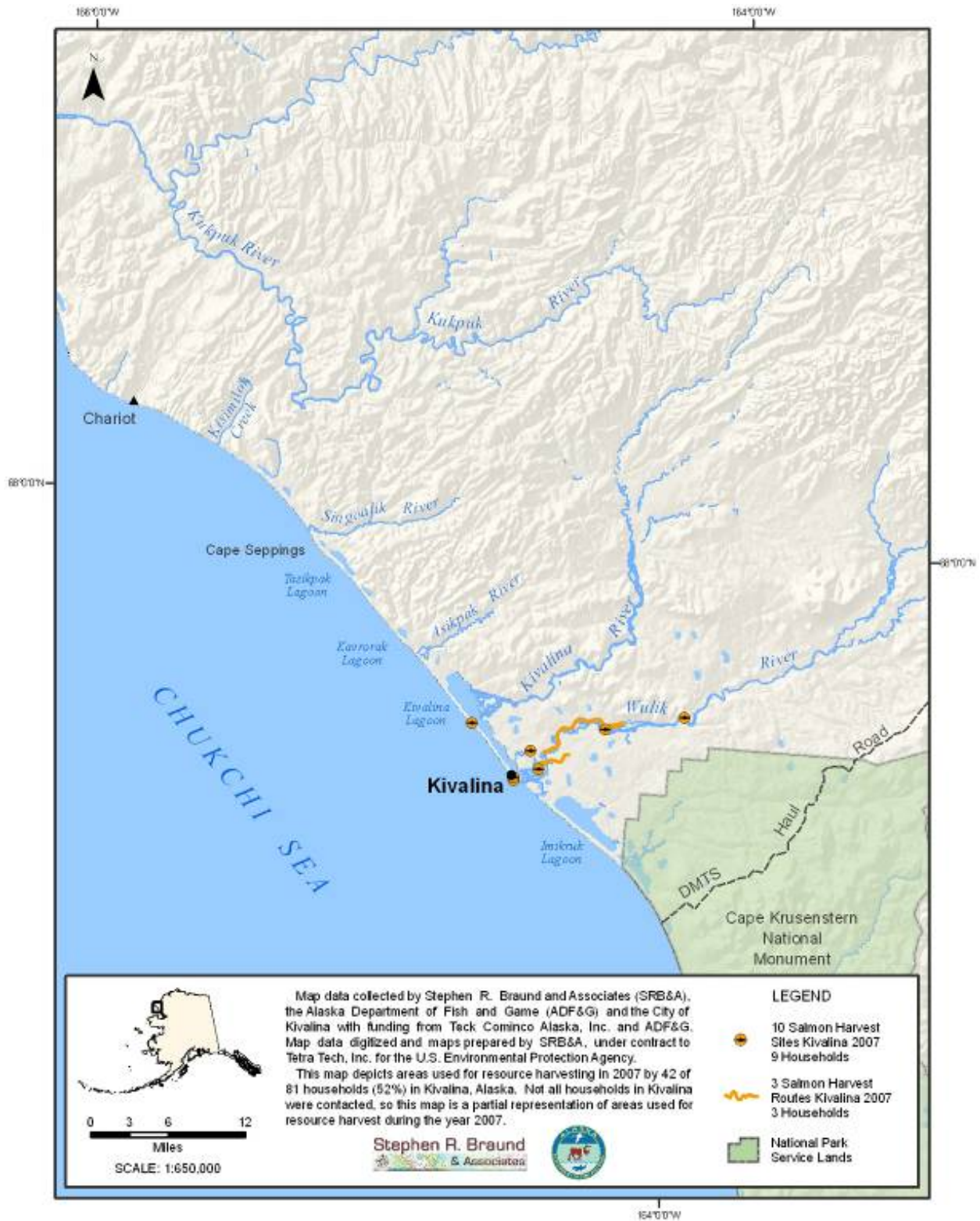
Appendix Table B. Page 3 of 3.

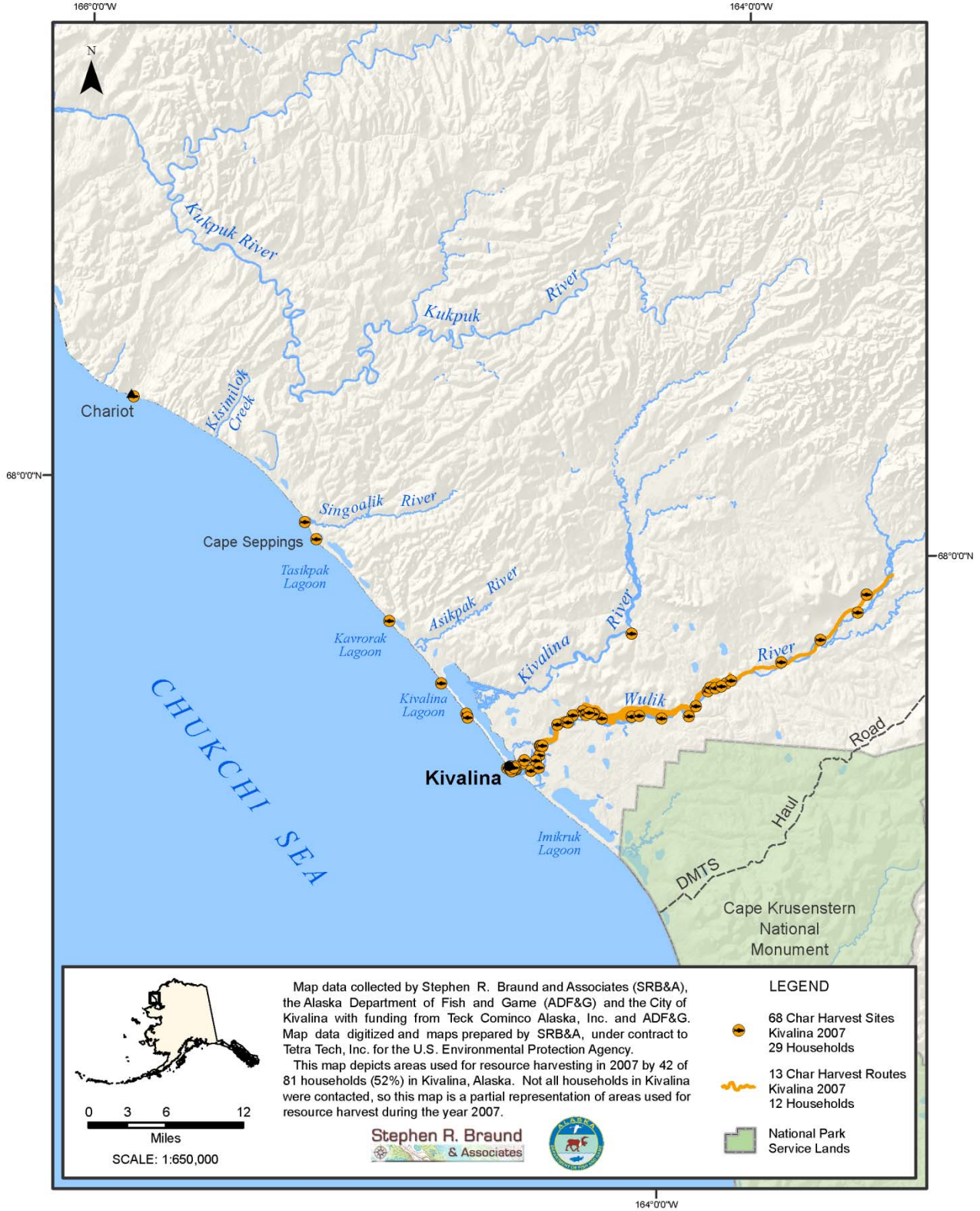
Resource	Edible pounds per individual	Edible pounds per gallon
Plants, continued		
Lingonberry		6.50
Crowberry		6.50
Greens		
“Eskimo potato”		4.00
Labrador tea		1.00
Other wild greens		1.00
Unknown vegetation		4.00
“Wild celery”		1.00
Willow leaf		1.00
Wormwood		1.00
Unknown mushroom		1.00
Docks		1.00

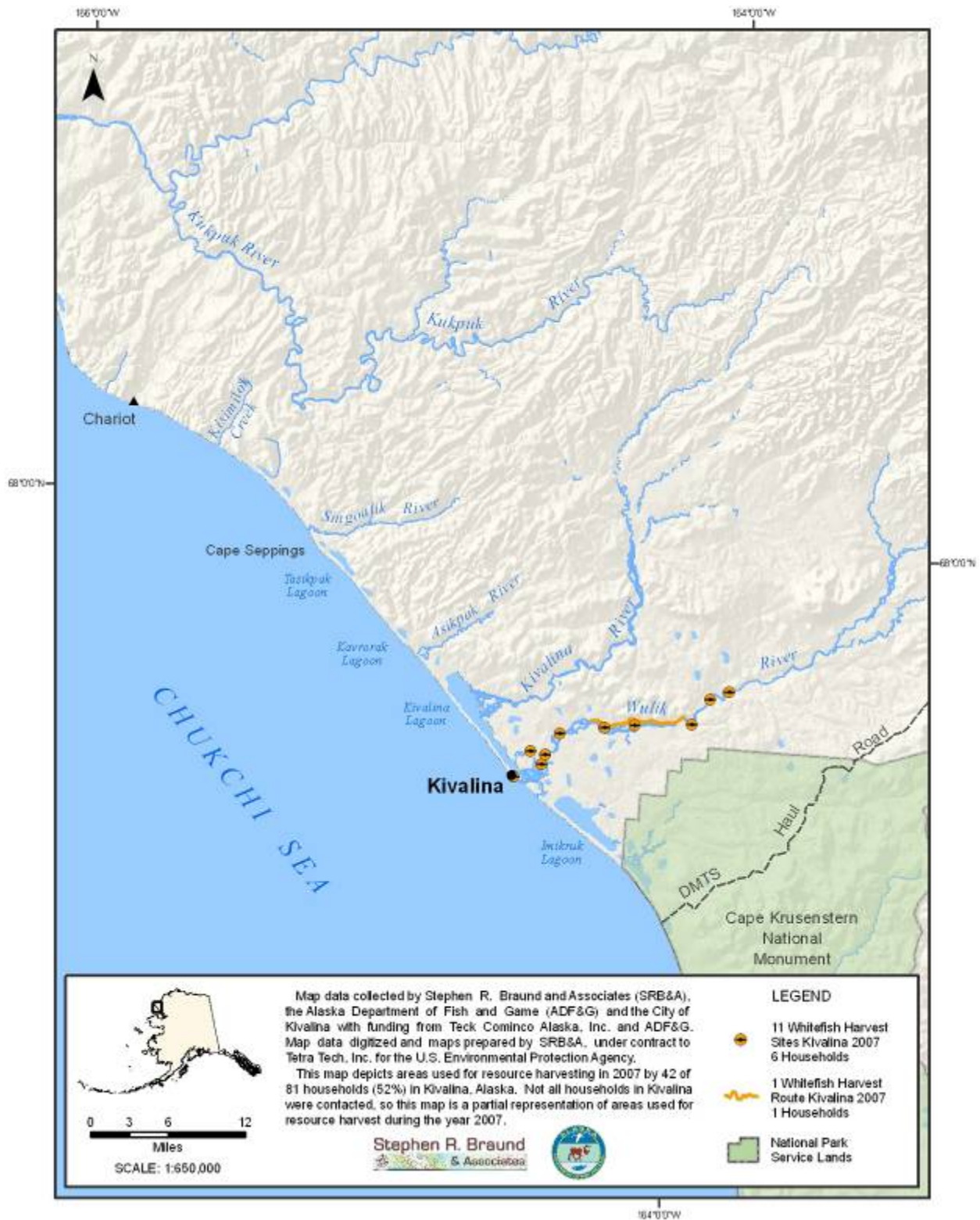
- a. Brown bears may be harvested for their meat, their hides, or both. This conversion factor assumes a live weight of 286 pounds and a conversion factor of 30%, to take into account different levels of use (Georgette and Loon 1993:203)
- b. This species is not usually eaten, so the conversion factor is 0.

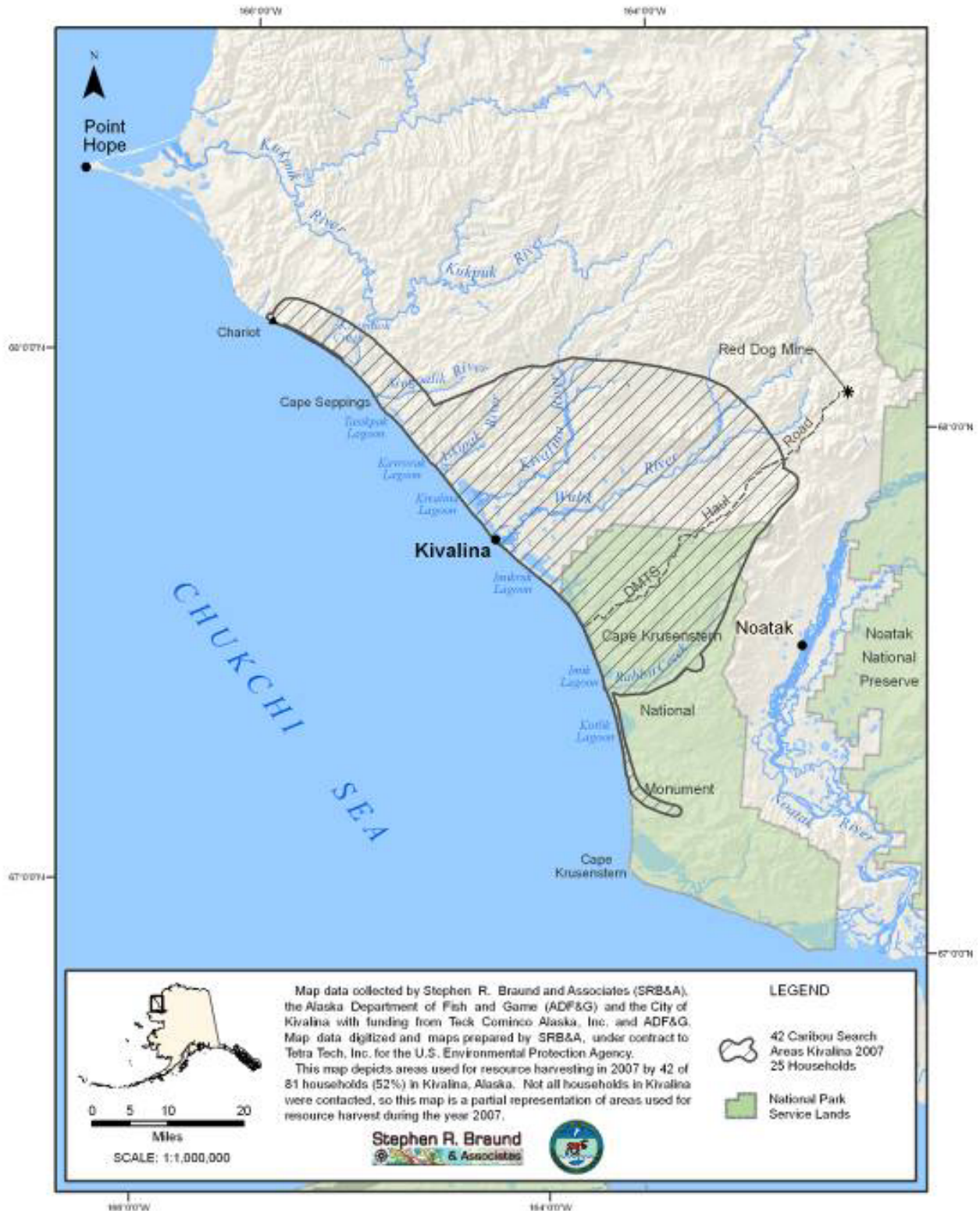
APPENDIX C: KIVALINA MAPS, 2007

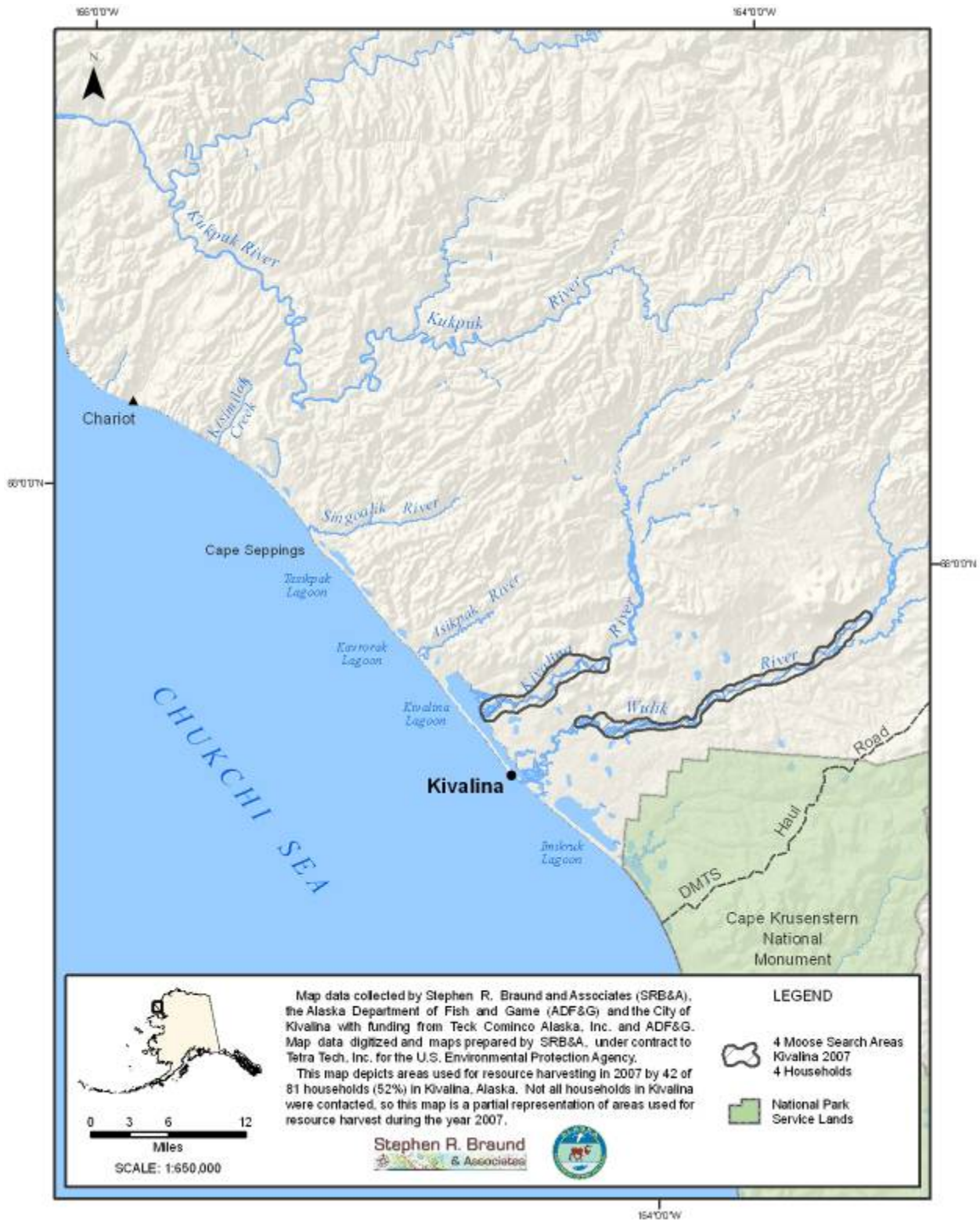
Appendix C.–Kivalina maps, 2007.

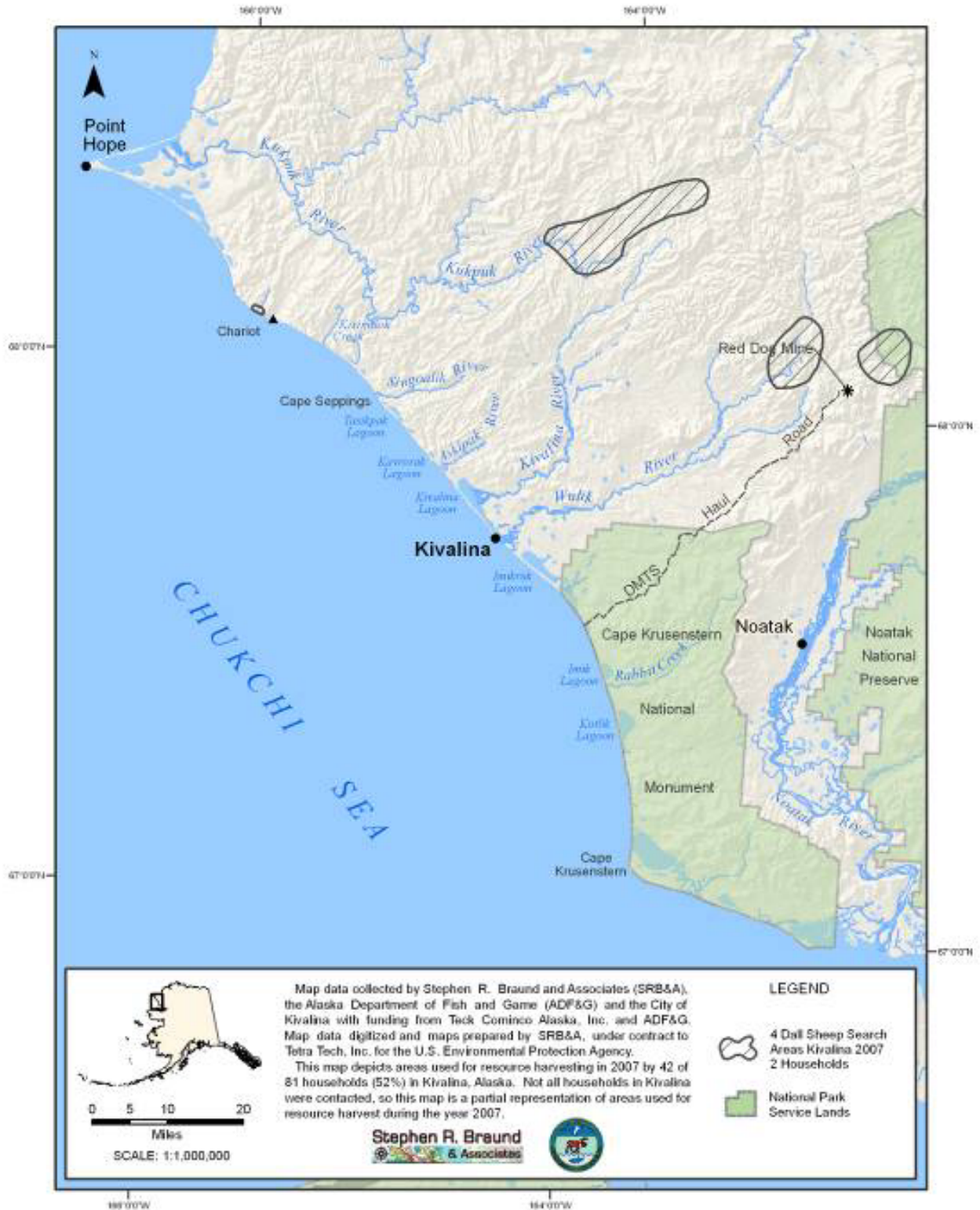


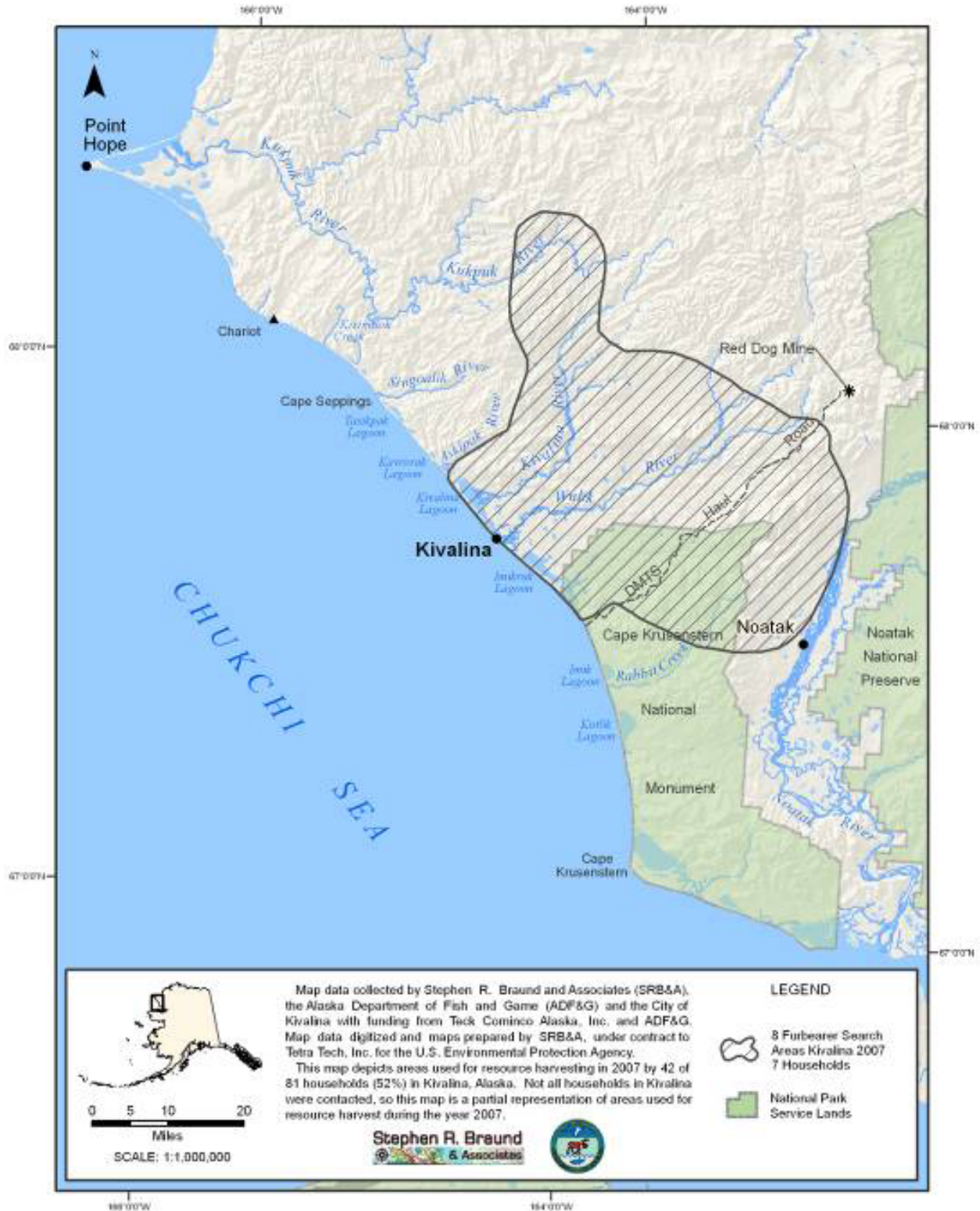


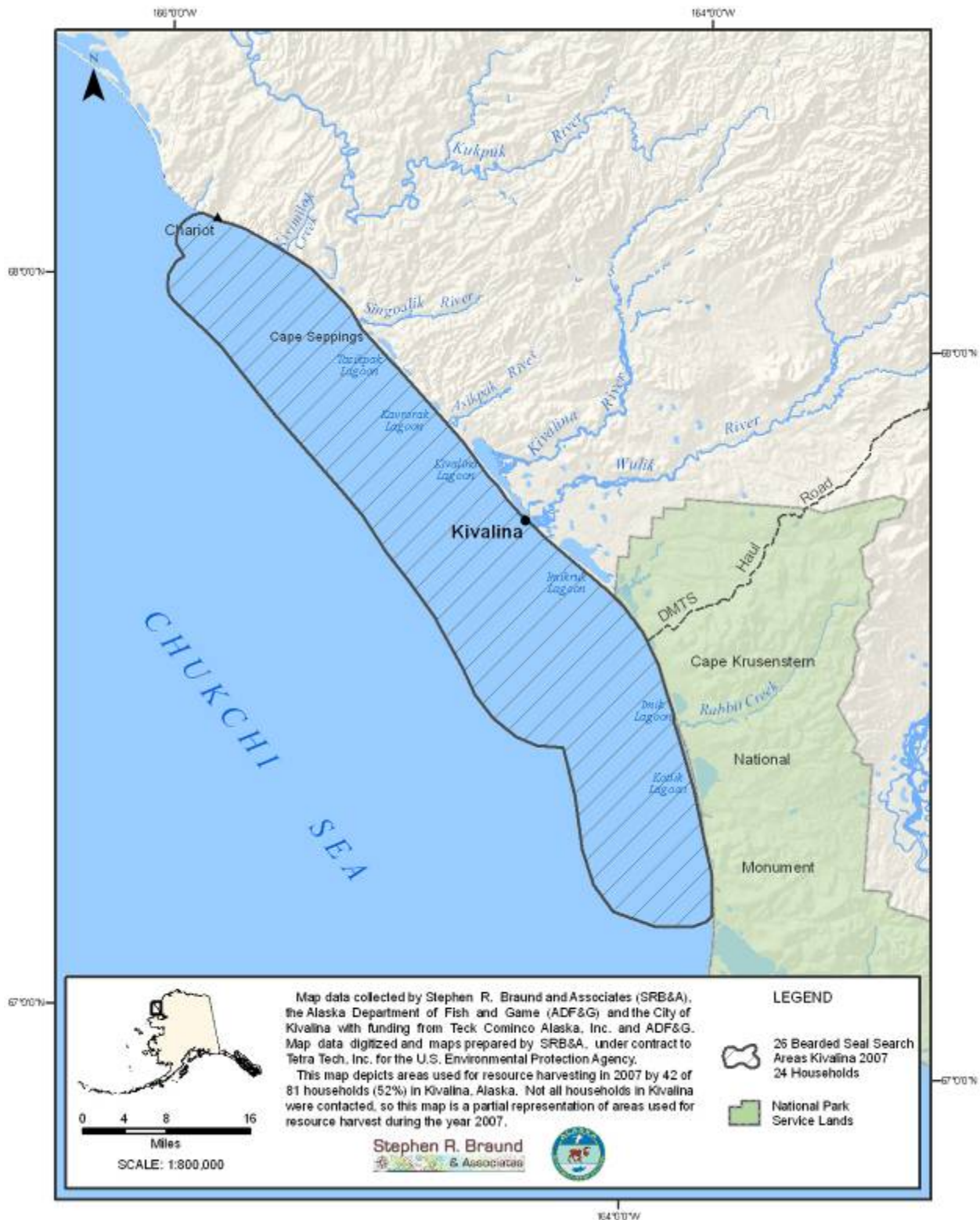


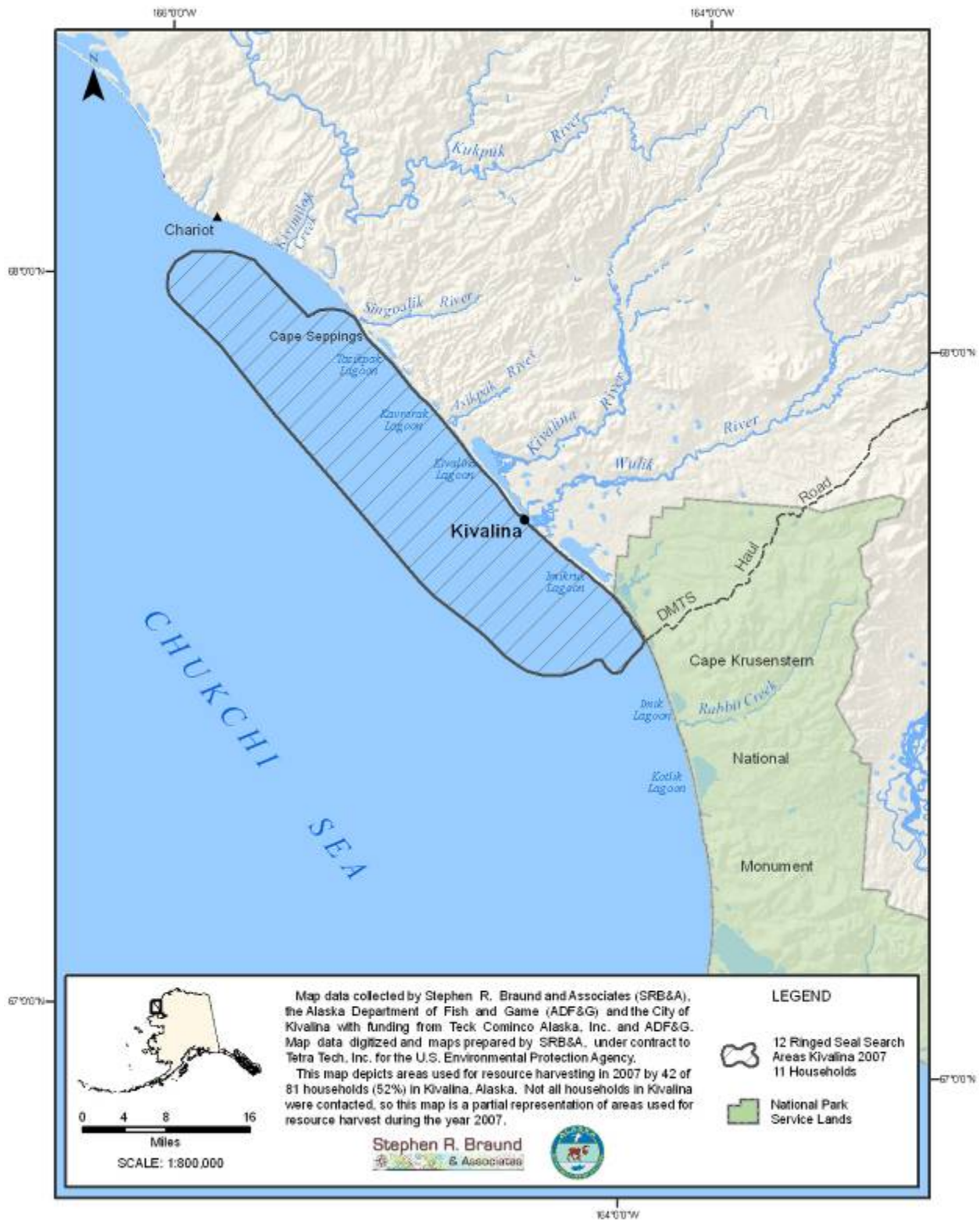


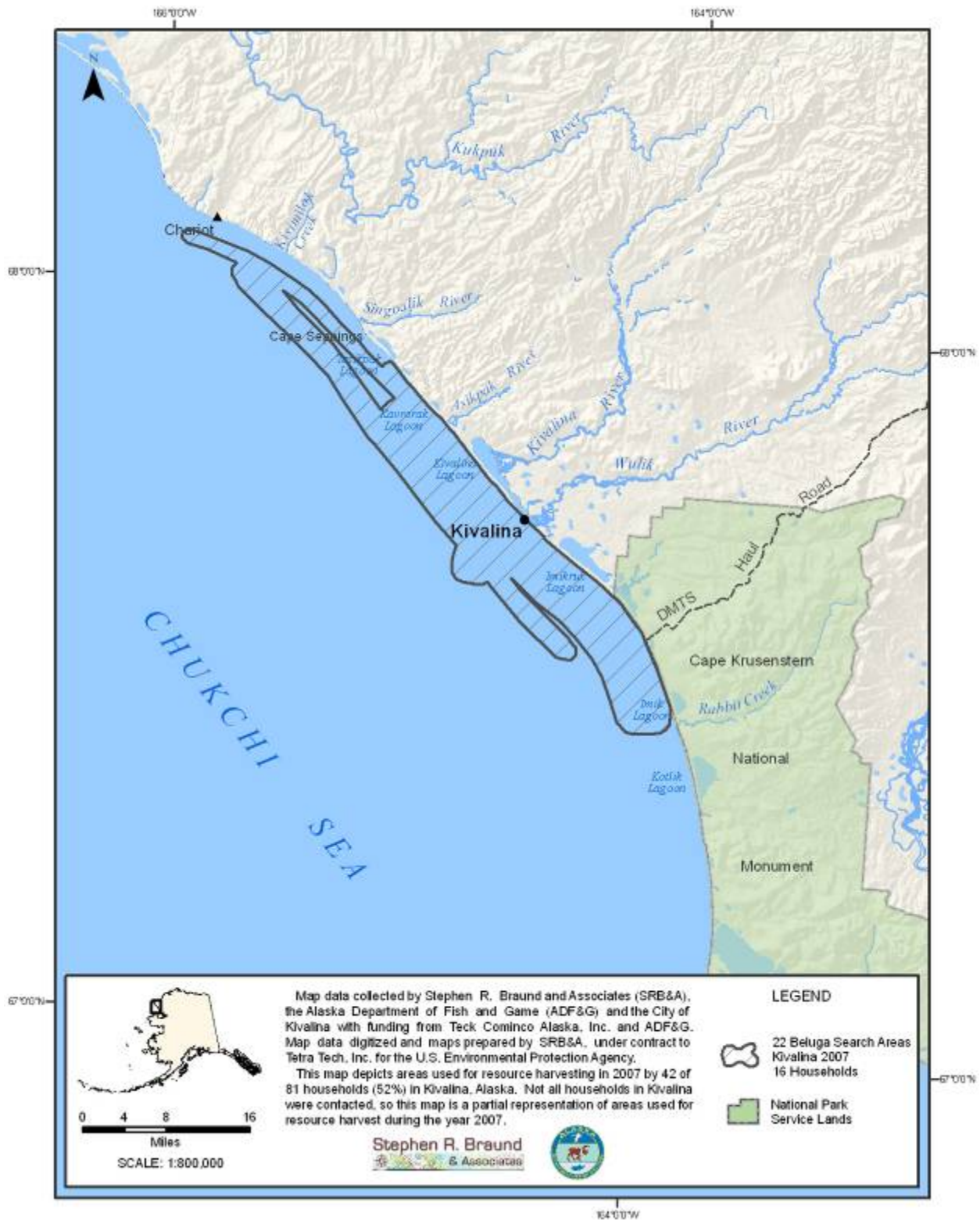


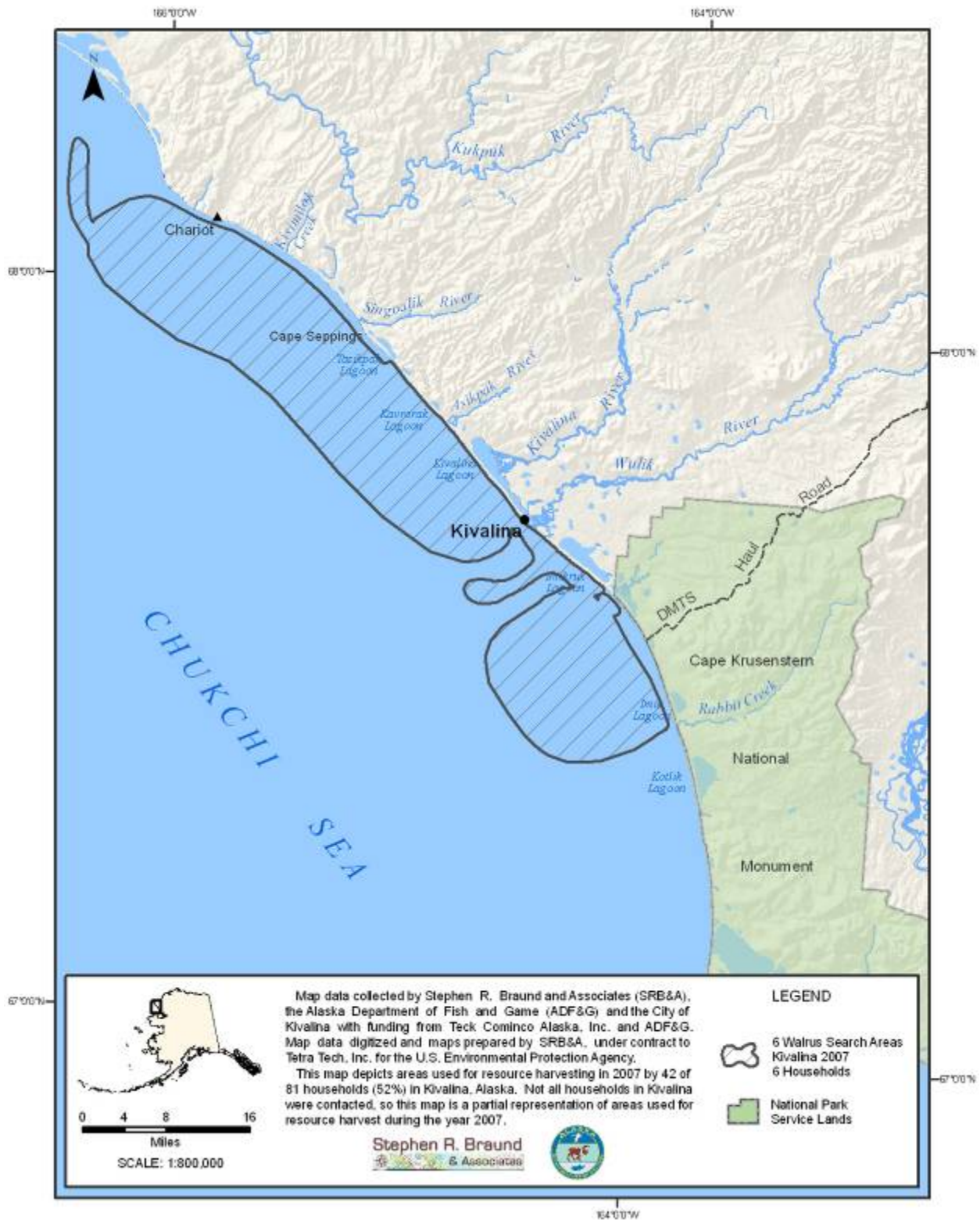


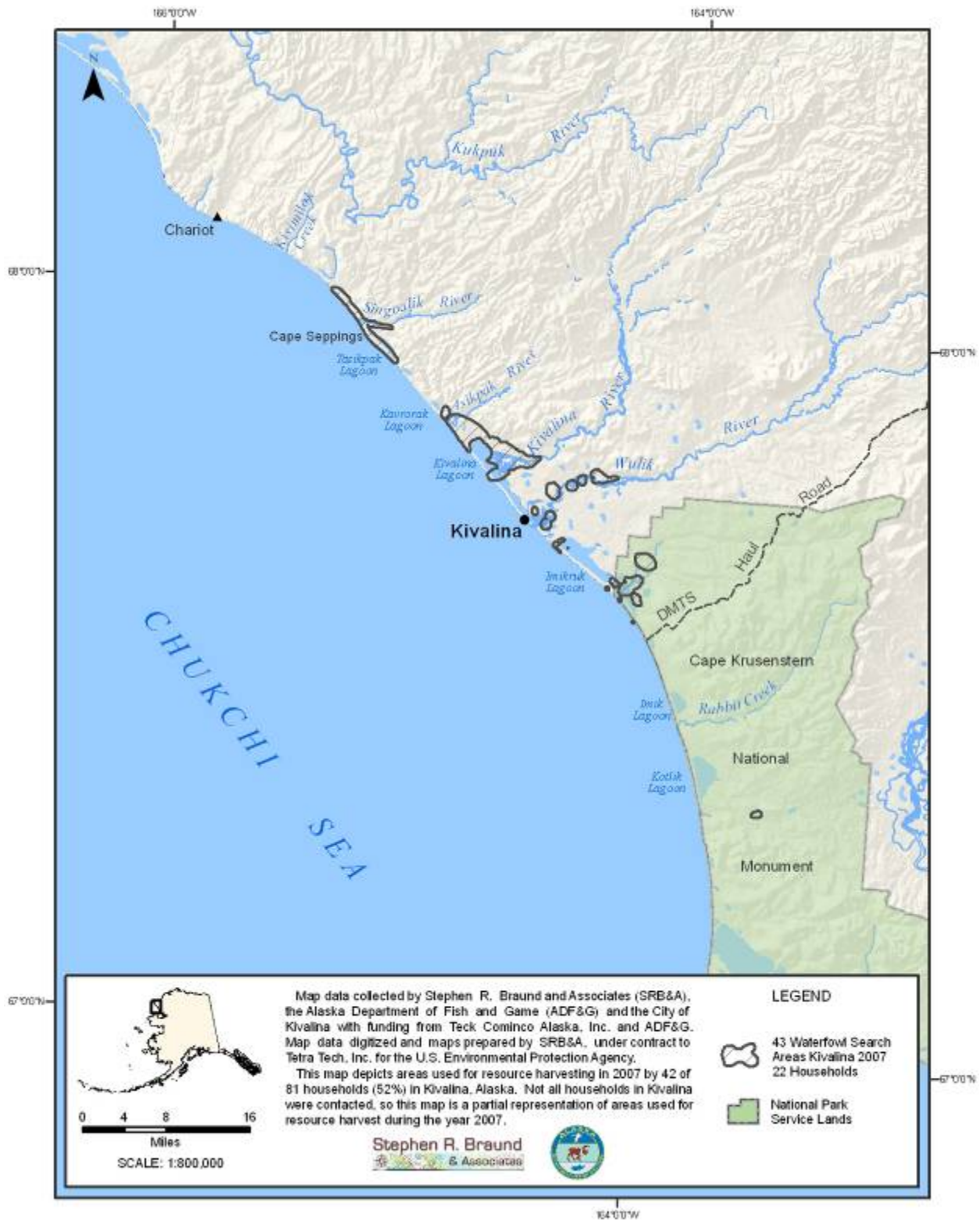


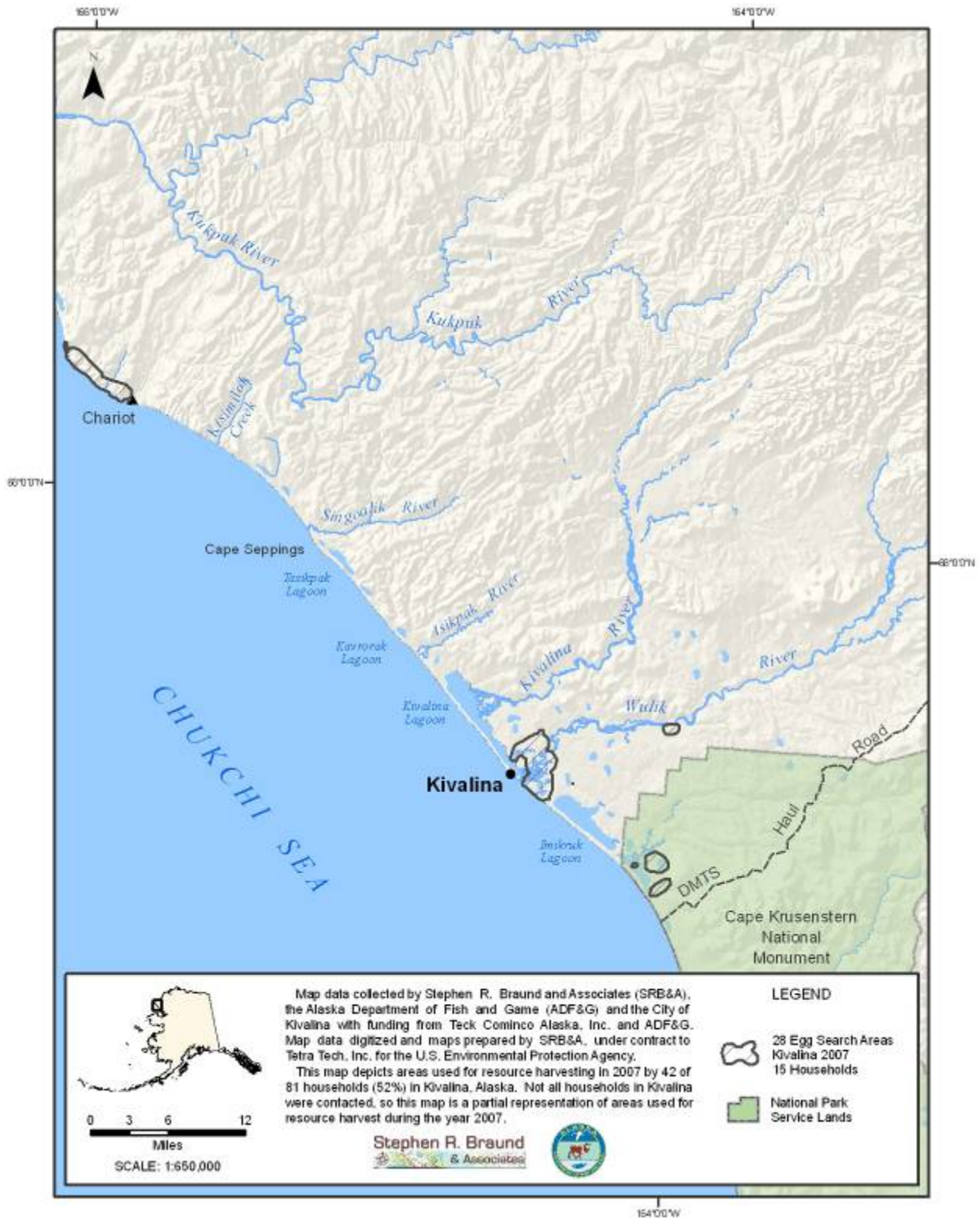


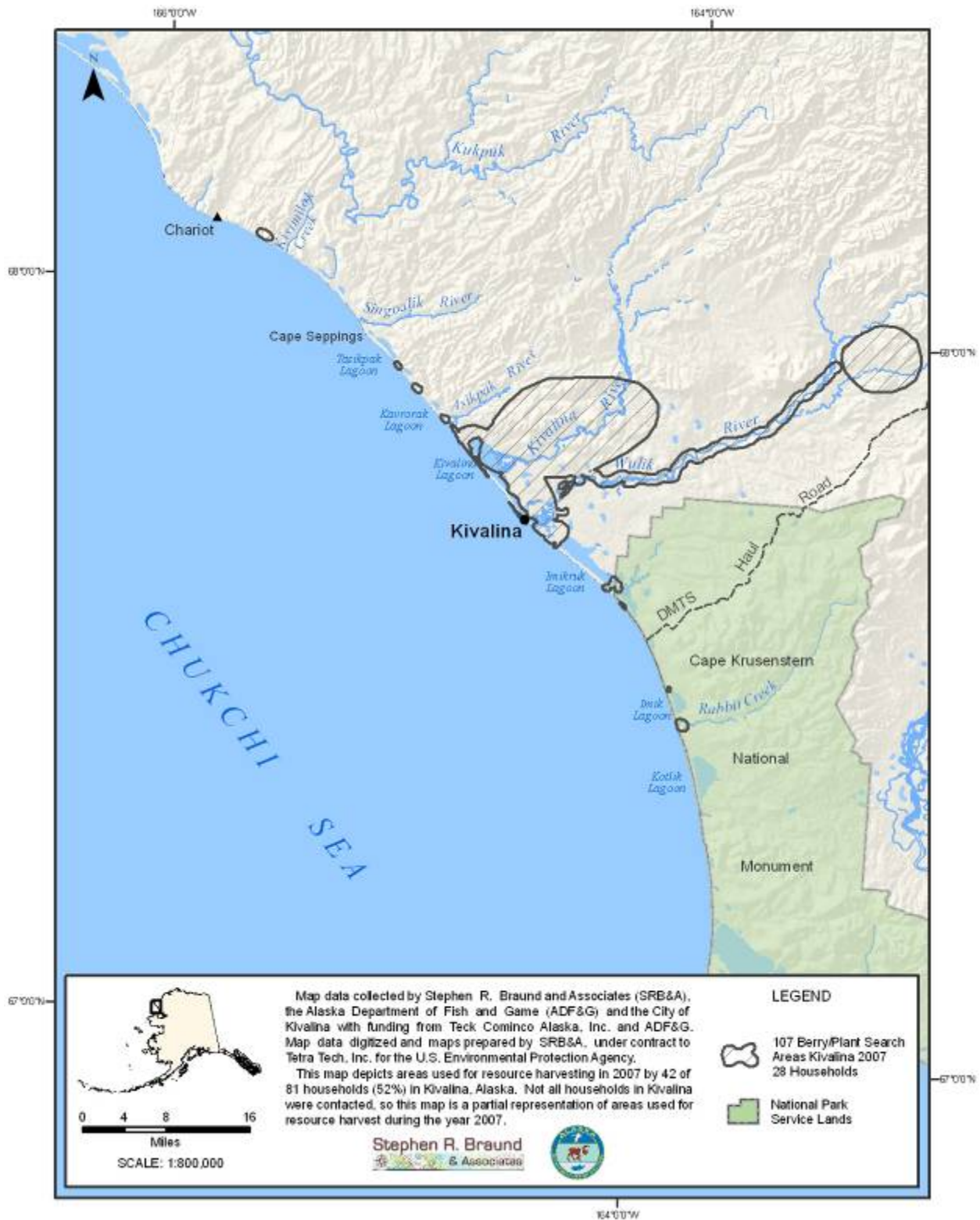






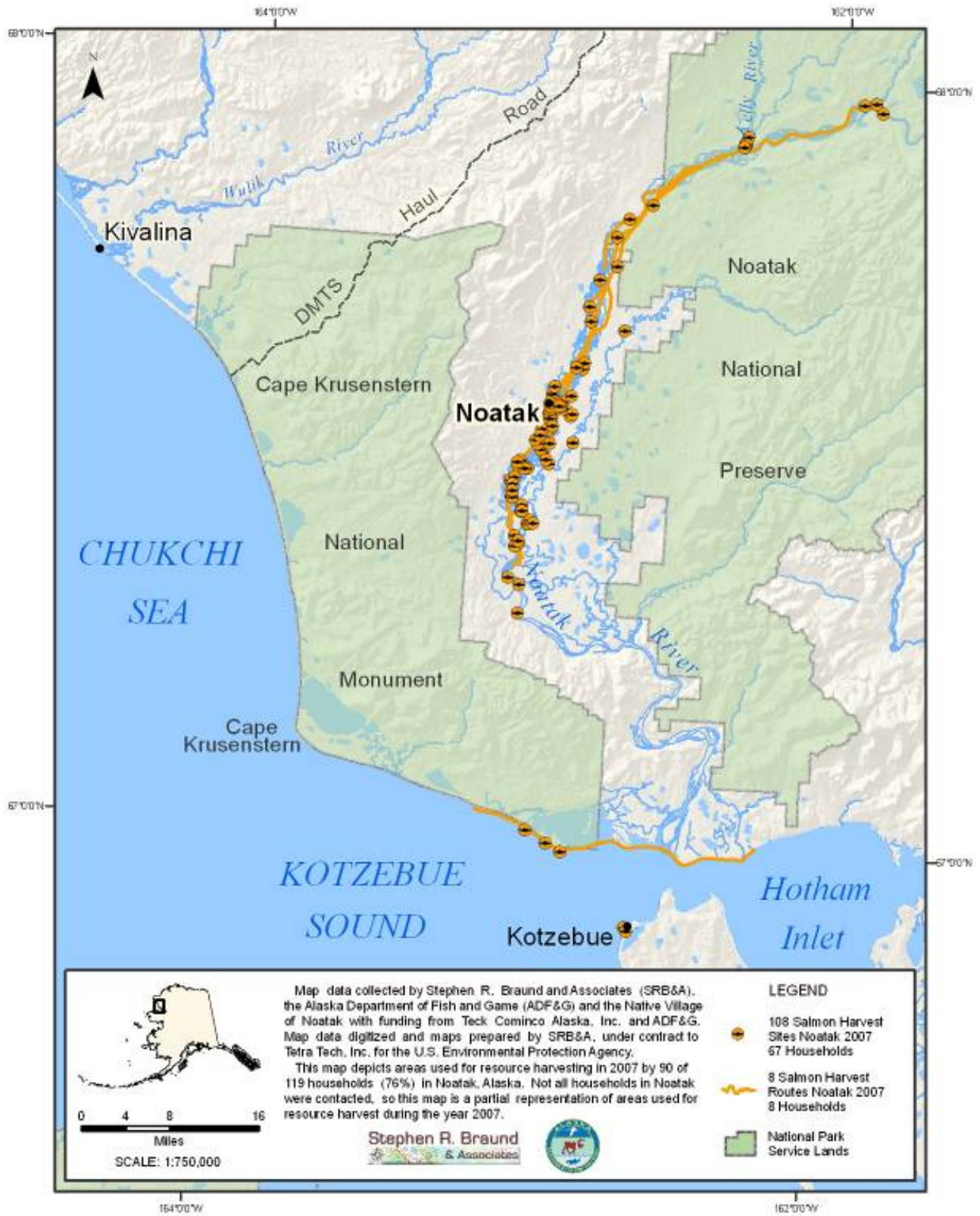


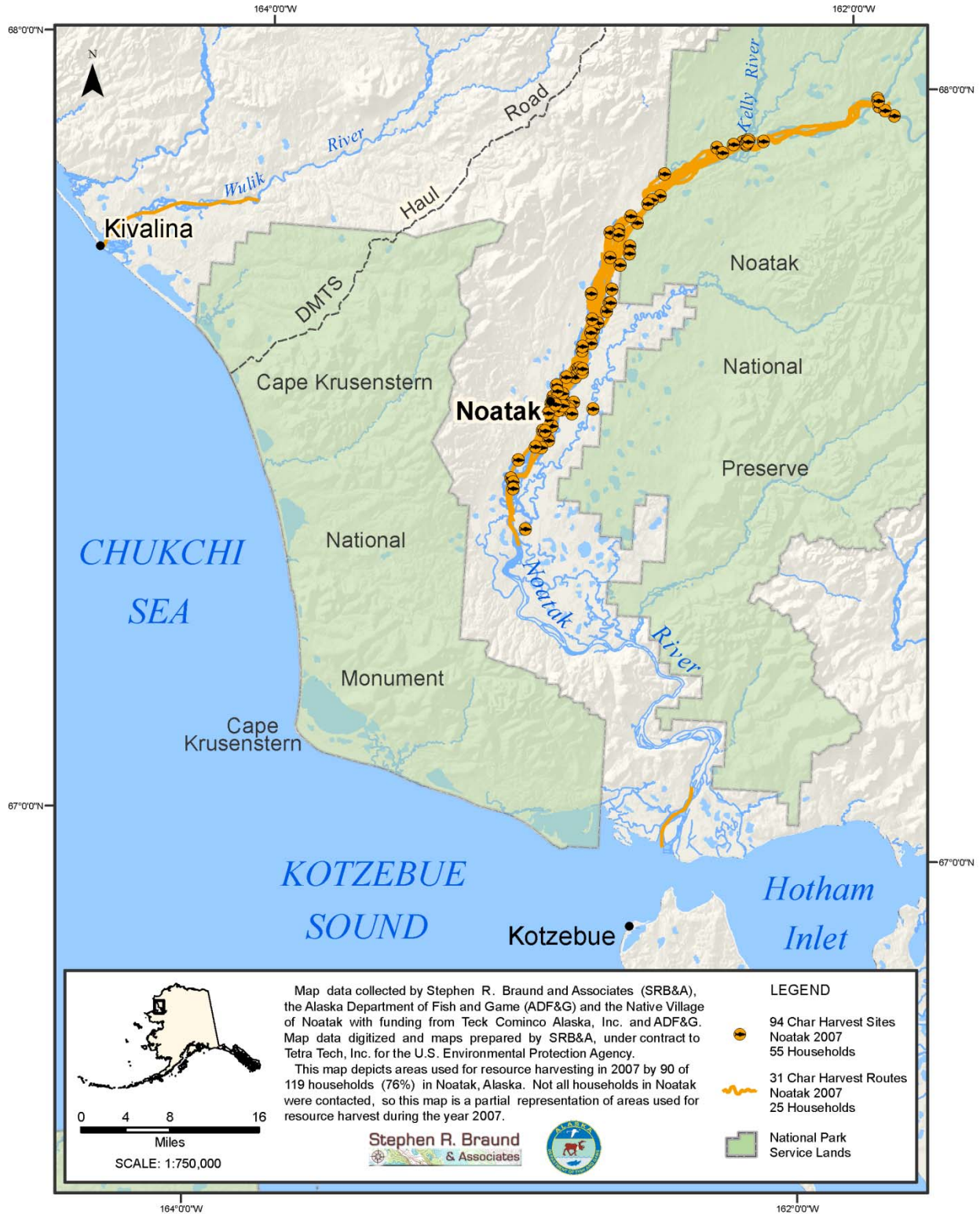


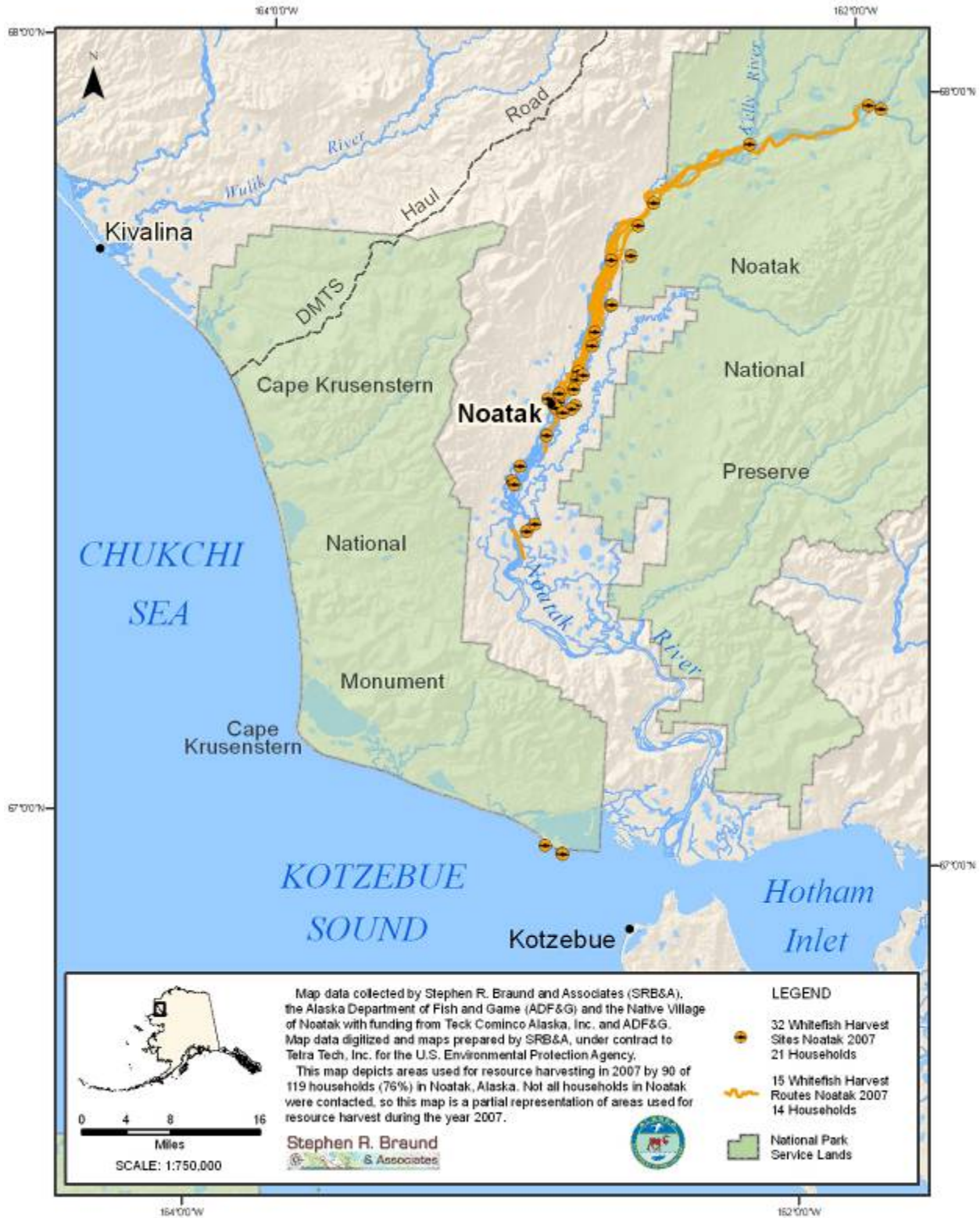


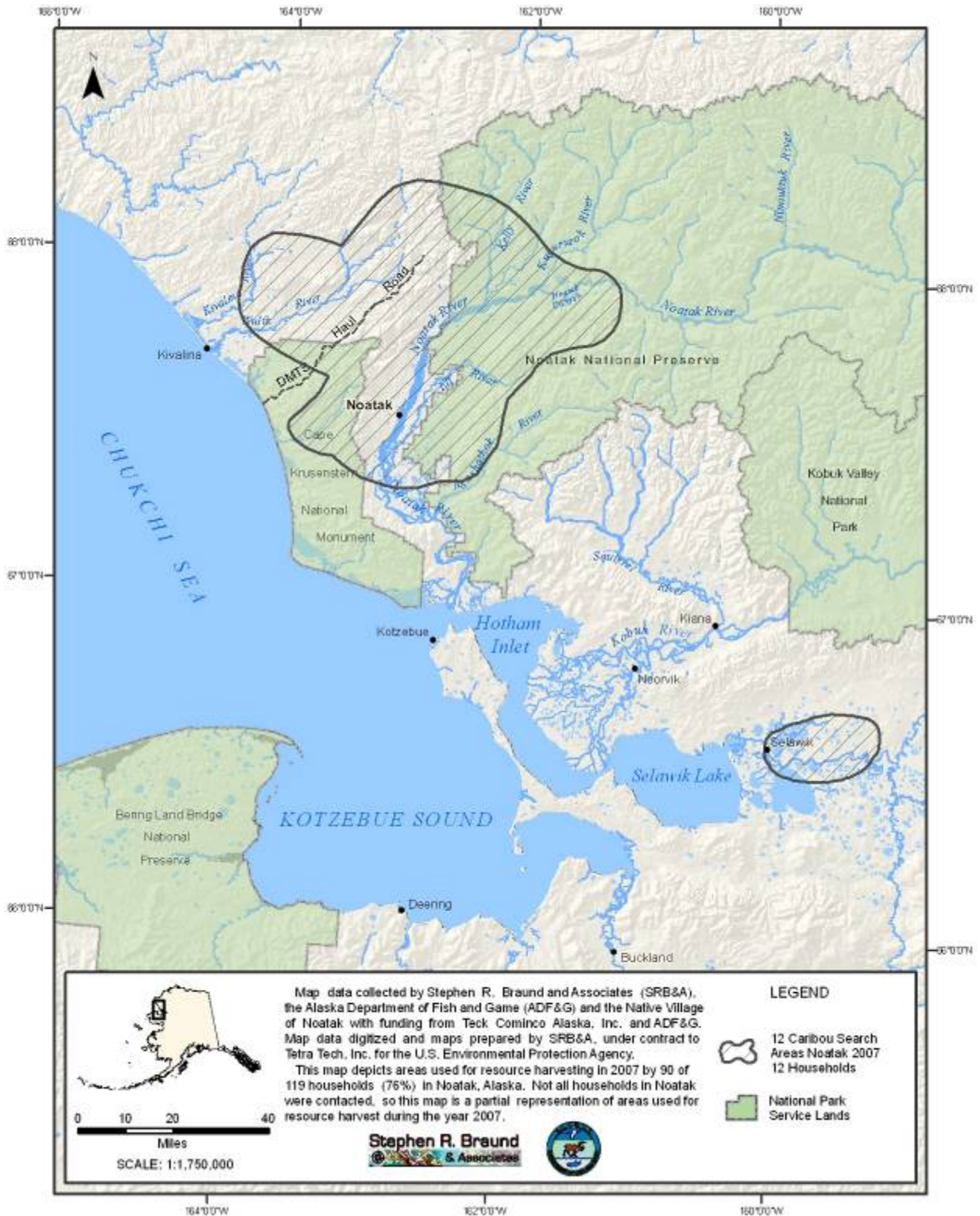
APPENDIX D: NOATAK MAPS, 2007

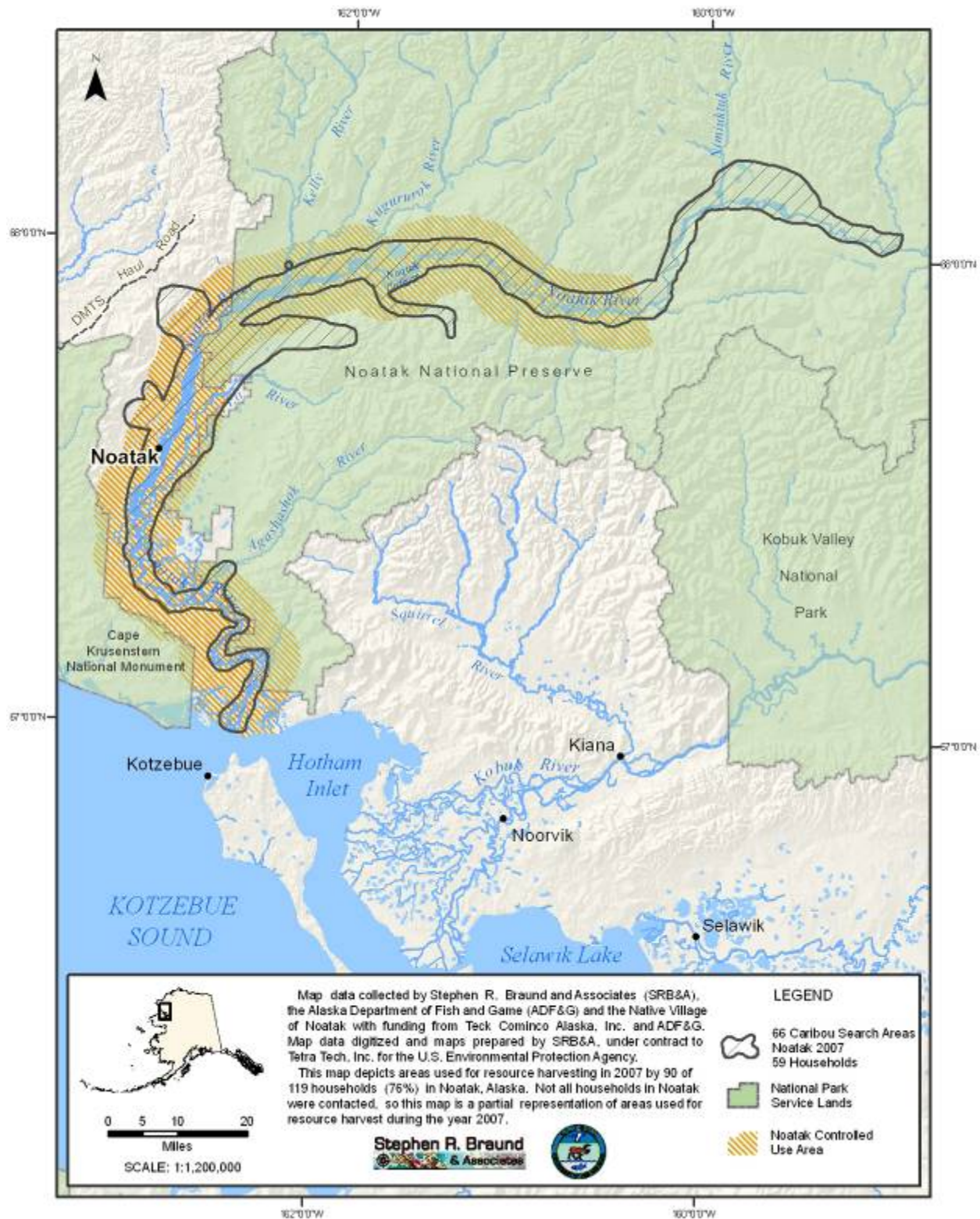
Appendix D.—Noatak maps, 2007.

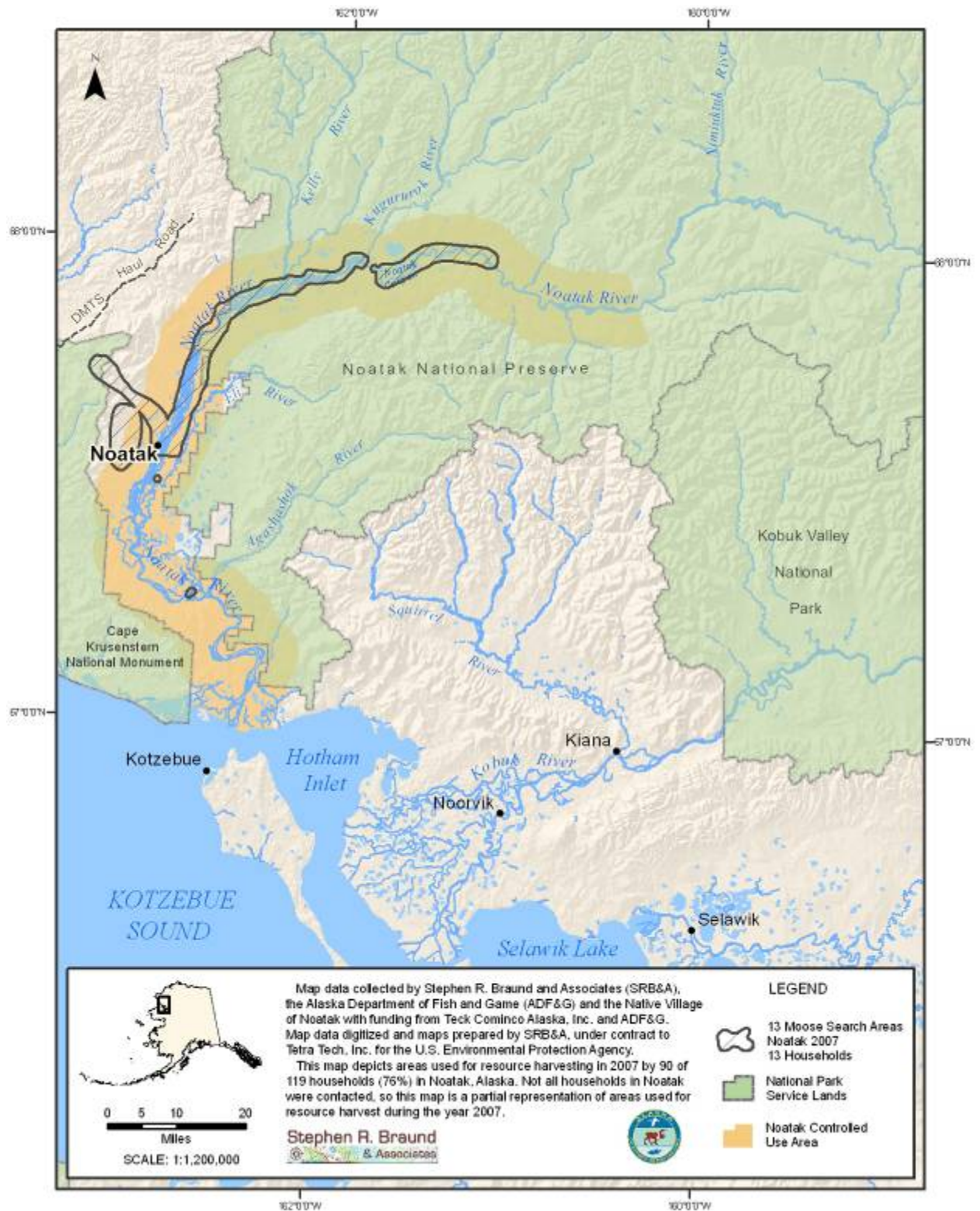


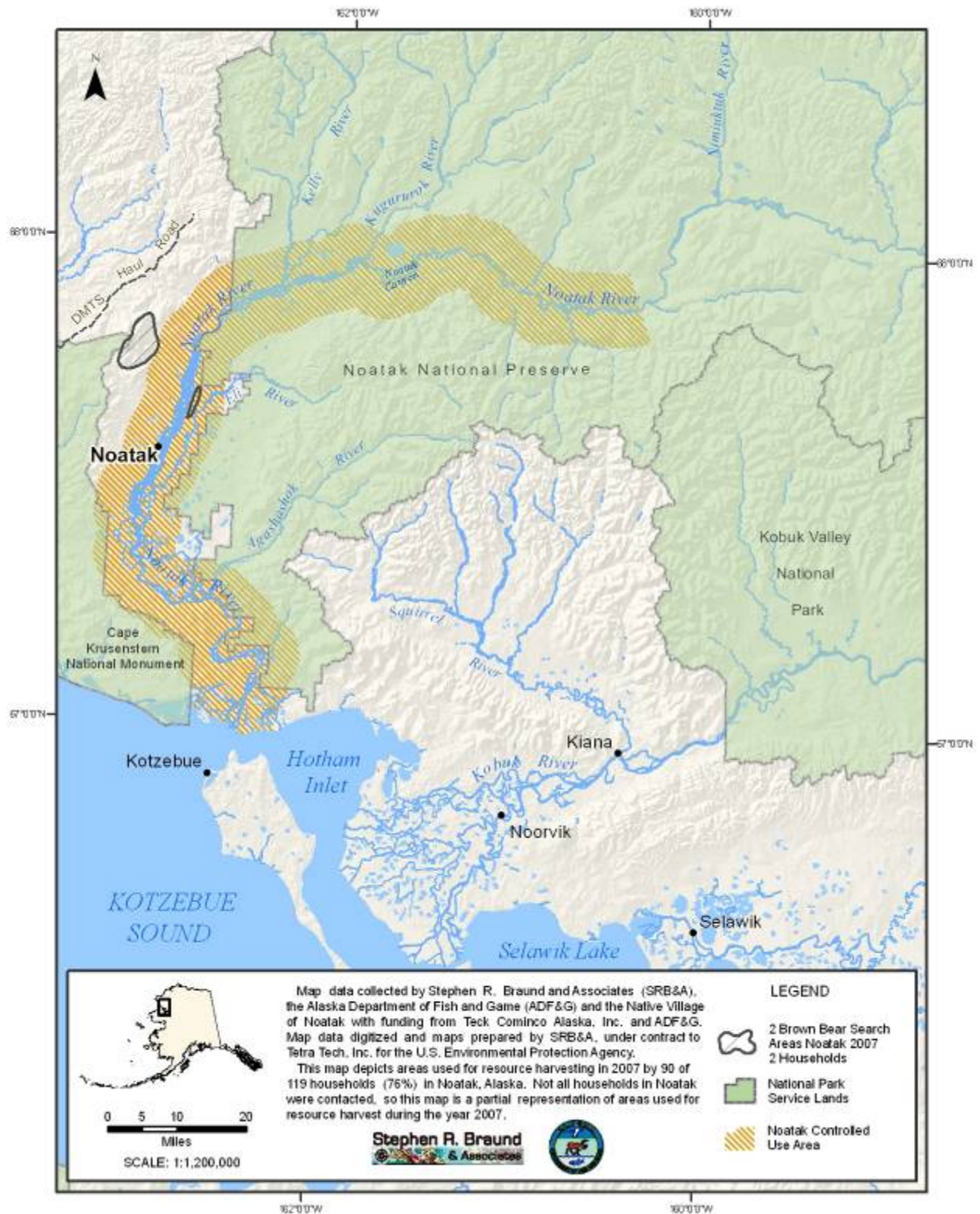


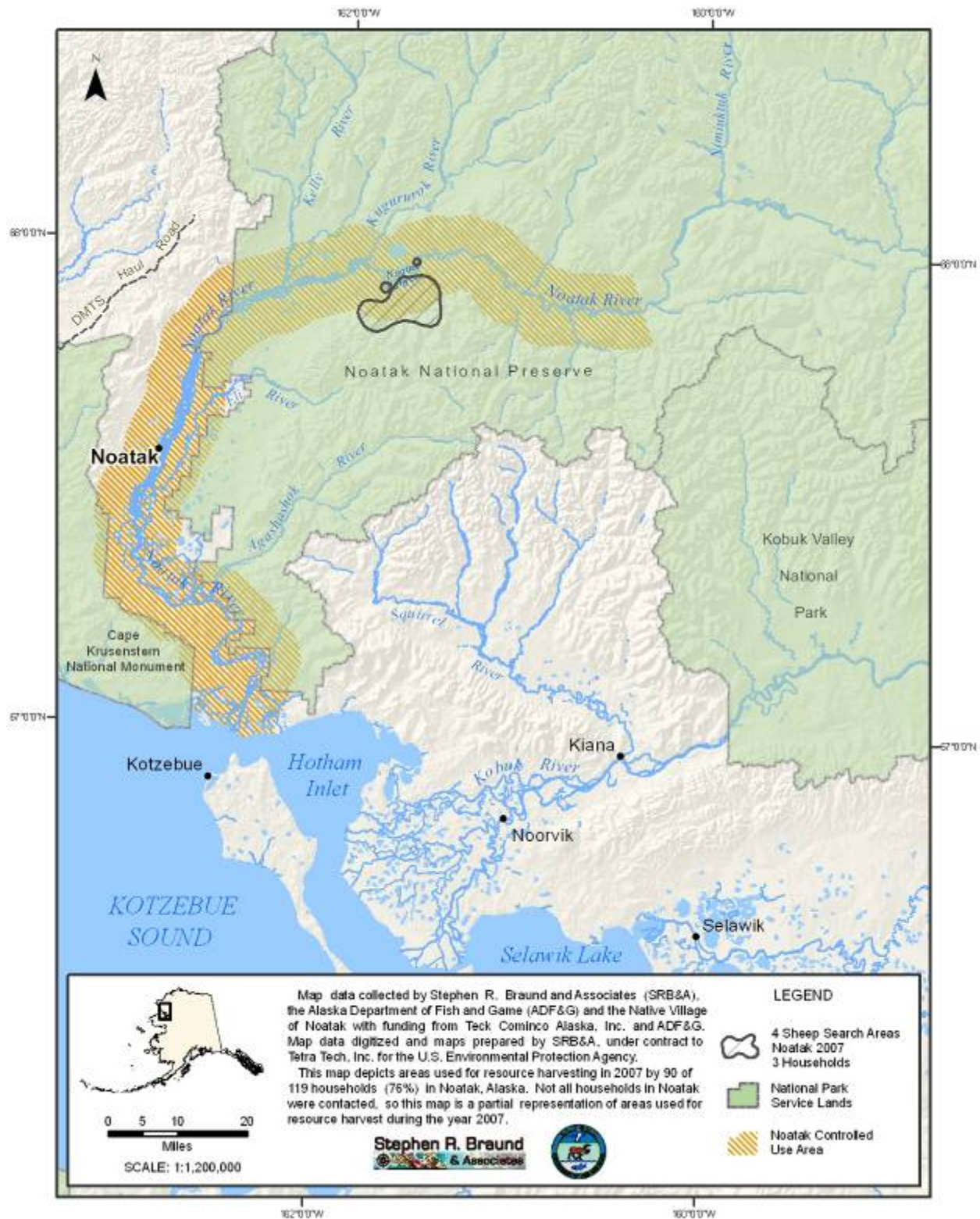




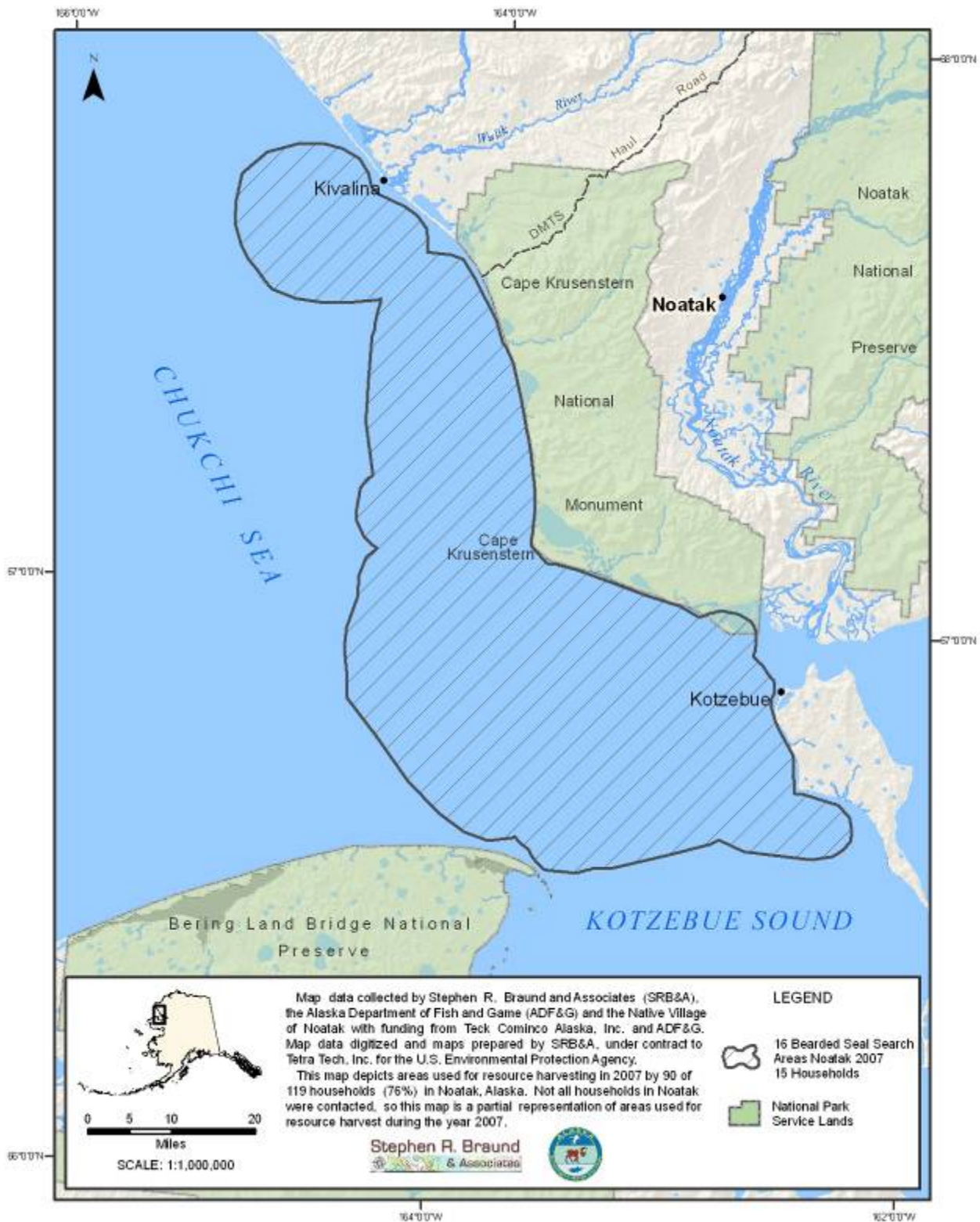


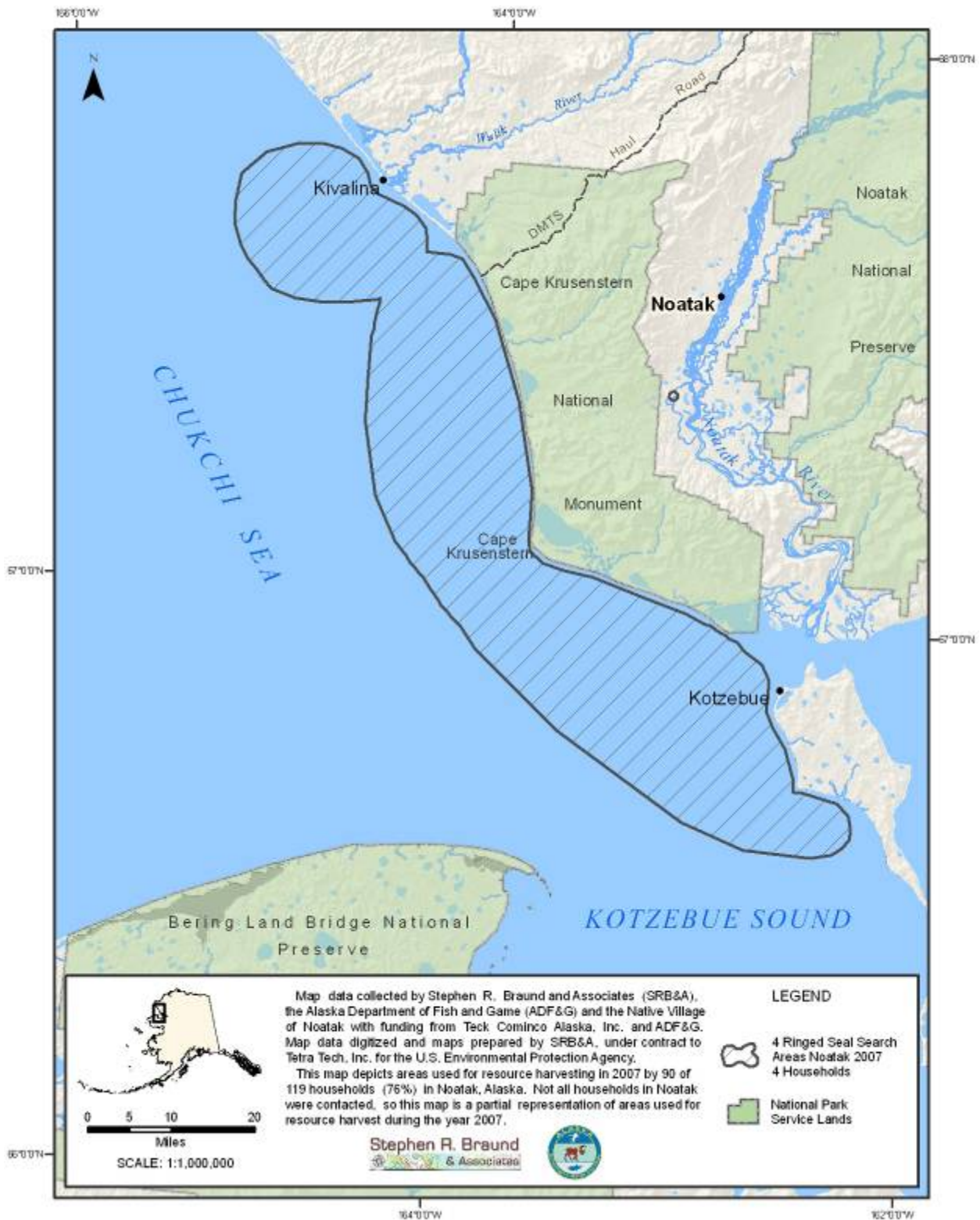


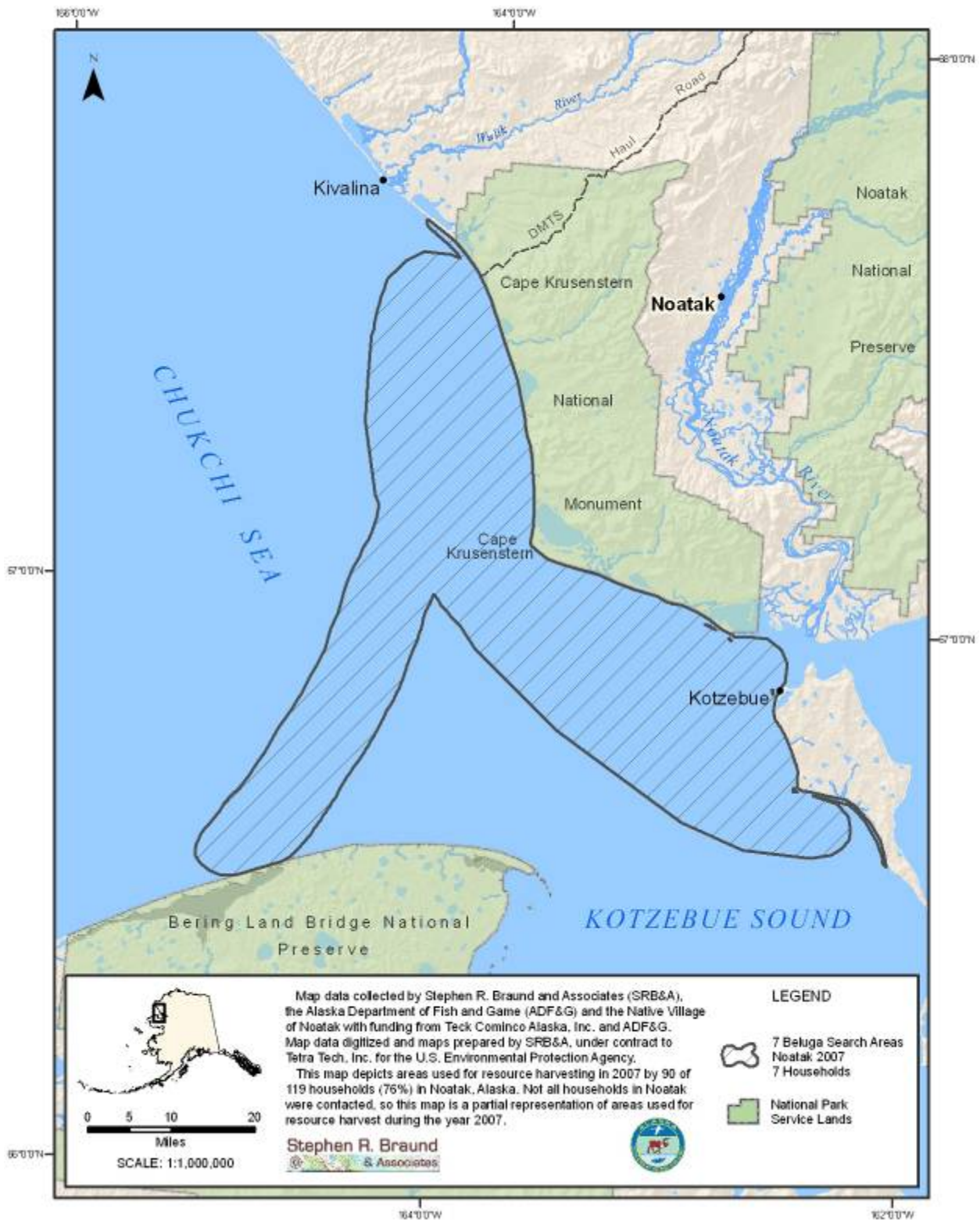


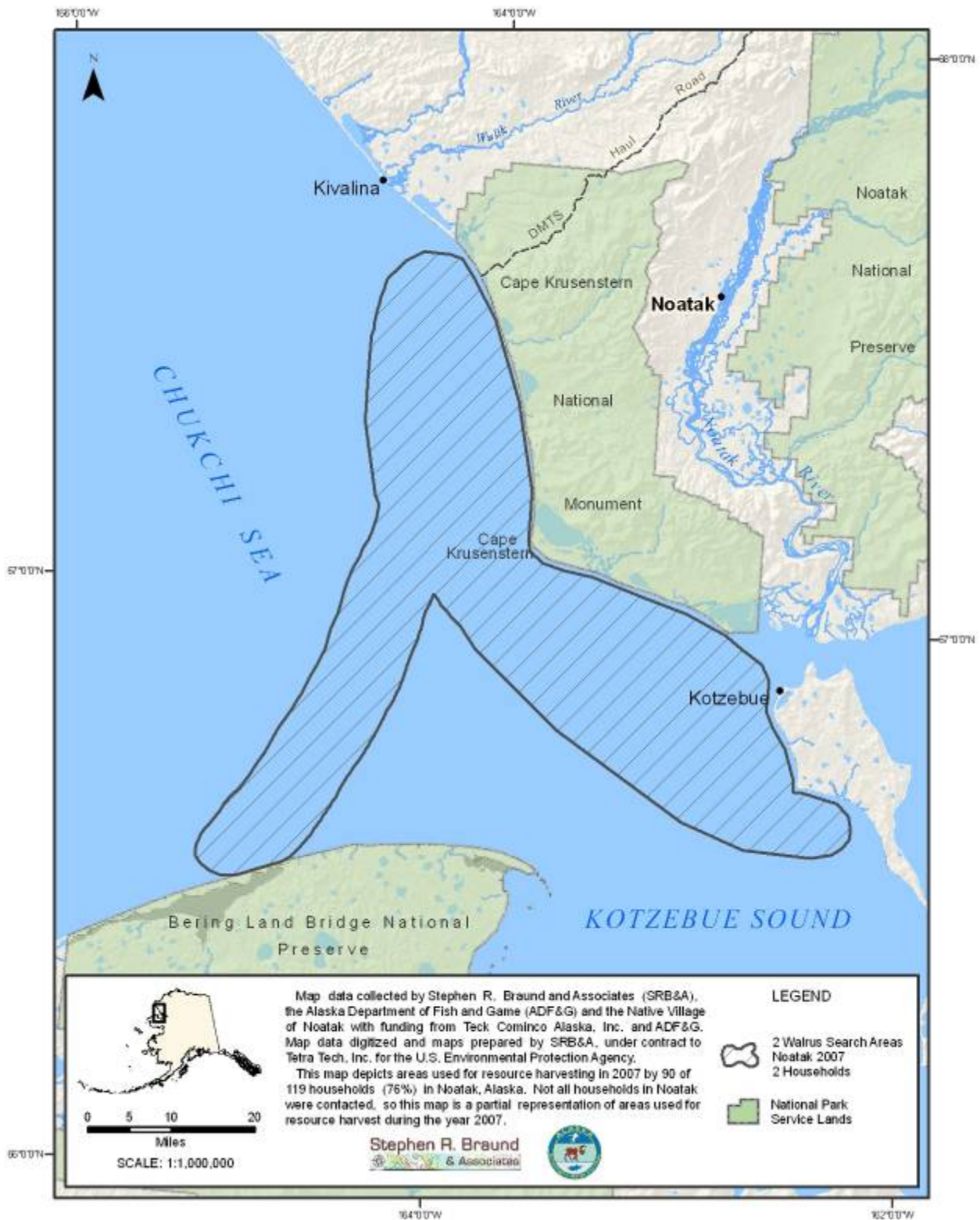


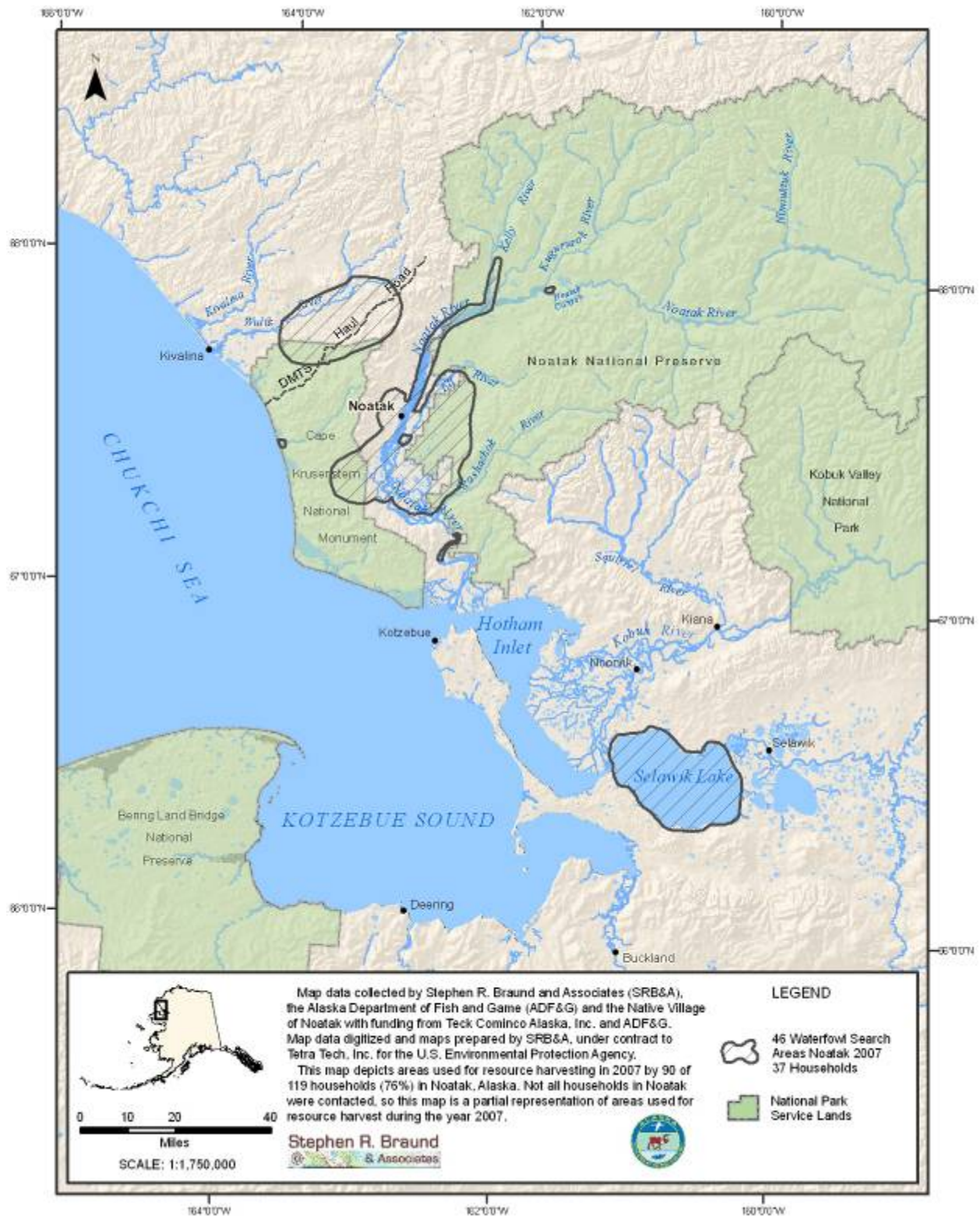


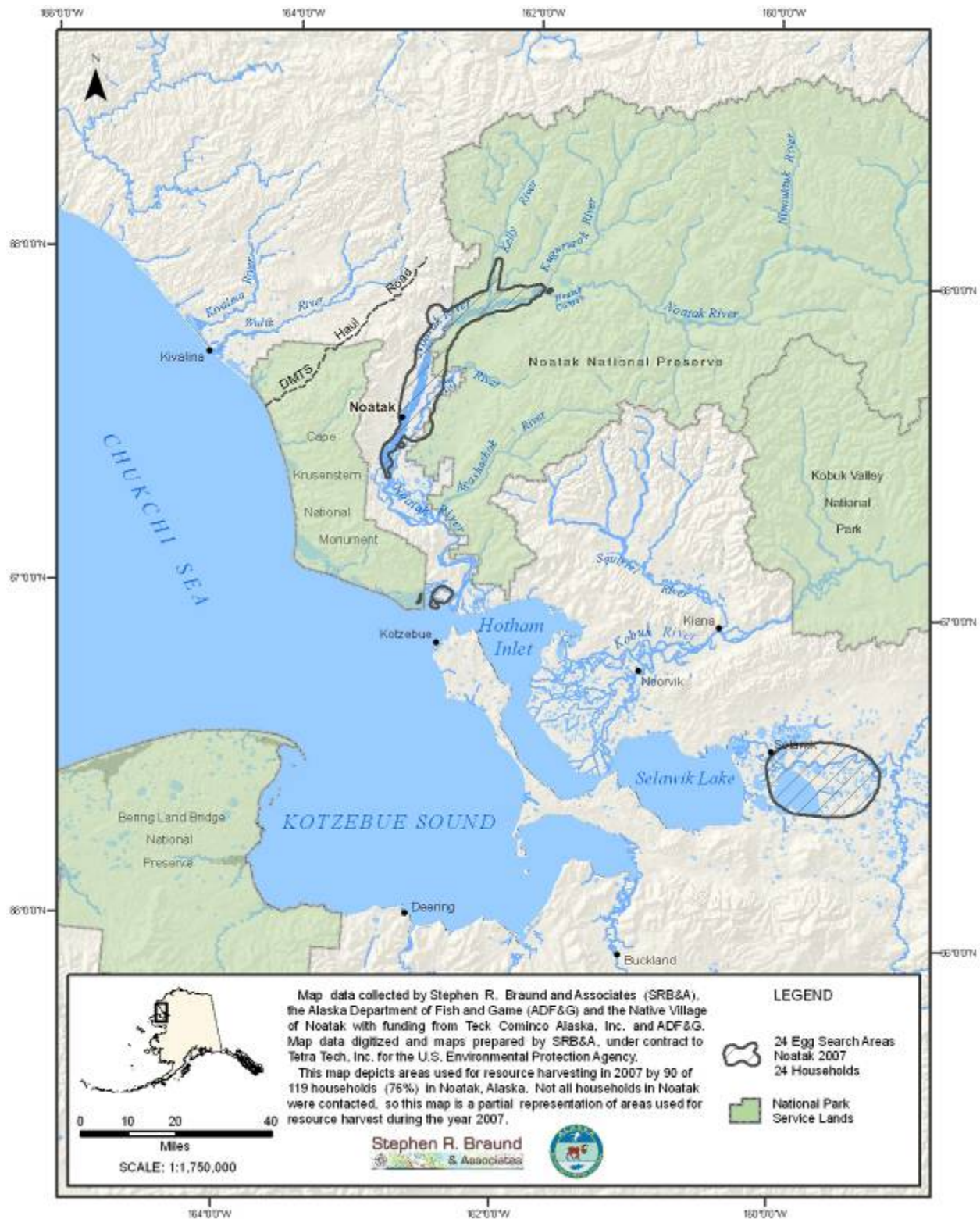


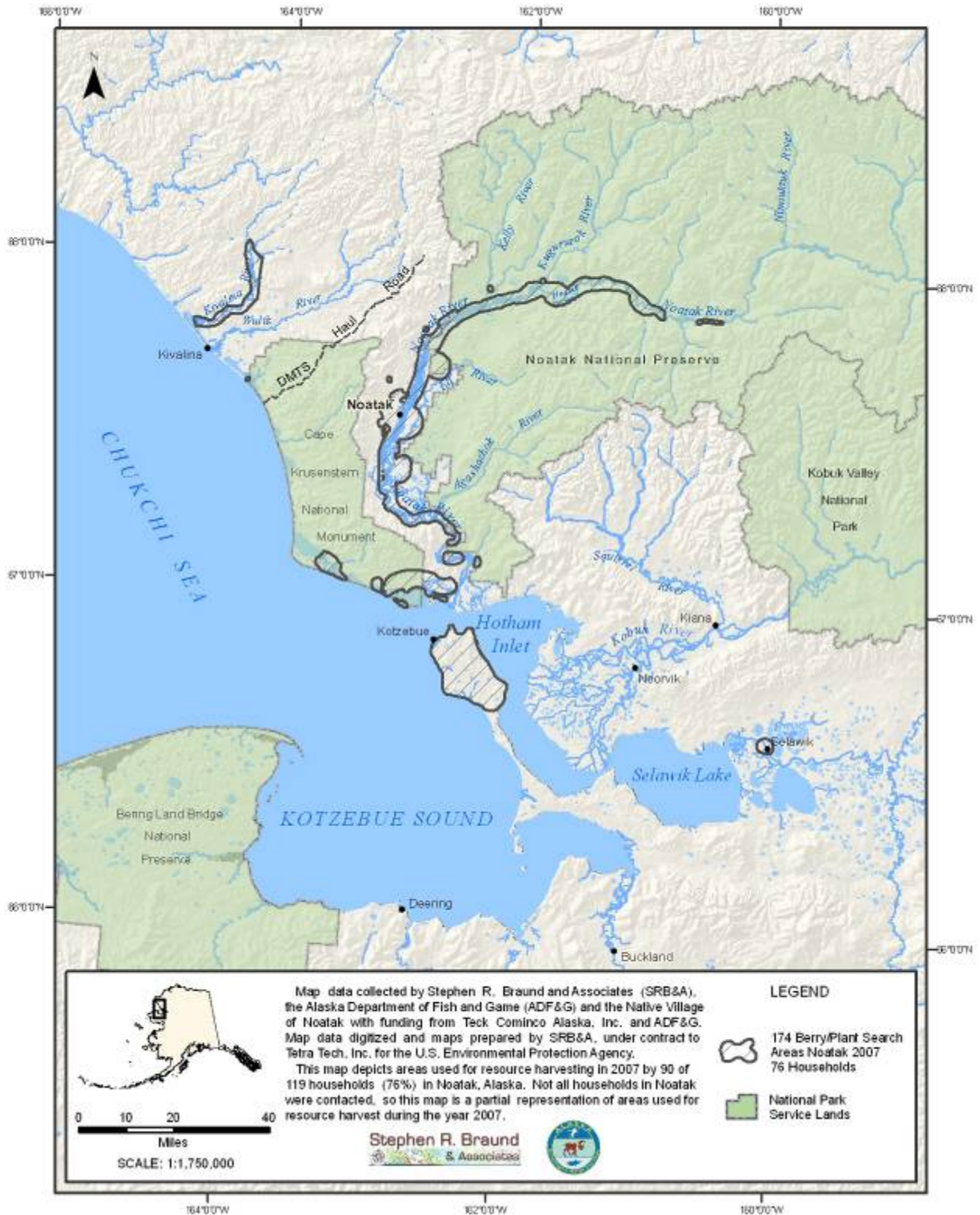












APPENDIX E: KIVALINA SURVEY, 2007

Appendix E.–Kivalina survey, 2007.

NW COMPREHENSIVE SURVEY 2/15/2008

<h2 style="margin: 0;">COMPREHENSIVE SUBSISTENCE SURVEY</h2> <h3 style="margin: 0;">KIVALINA, ALASKA</h3> <p style="margin: 0;">January to December, 2007</p>			
<h4 style="margin: 0;">COOPERATING ORGANIZATIONS</h4>			
DIVISION OF SUBSISTENCE ALASKA DEPT OF FISH & GAME BOX 689 KOTZEBUE, AK 99752 (800) 478-3420	NATIVE VILLAGE OF KIVALINA BOX 51 KIVALINA, AK 99760 (907) 645-2153	TRIBAL AFFAIRS MANILAQ ASSOCIATION BOX 286 KOTZEBUE, AK 99752 (800) 478-3312	PLANNING DEPARTMENT NORTHWEST ARCTIC BOROUGH BOX 1110 KOTZEBUE, AK 99752 (800) 478-1110



We are doing this survey to better understand subsistence in Alaska. Similar surveys have been conducted in more than 100 Alaska communities, including Deering, Buckland, Kotzebue, Kivalina, Noatak, Shungnak, Shishmaref, and Wales. Surveys help us estimate subsistence harvests. Surveys also help us describe the role of subsistence in Alaska's economy.

The survey asks how much fish, game, birds, and plants your household harvested last year. It also asks about who lived in your household, and what kind of jobs they had last year. It asks about your household's income last year.

We will NOT identify your household. We will NOT use this information for enforcement. Participation in this survey is voluntary. If you start a survey, you may stop at any time.

HOUSEHOLD ID:		
COMMUNITY ID:	KIVALINA	191
RESPONDENT ID:		
INTERVIEWER:		
INTERVIEW DATE:		
START TIME:		
STOP TIME:		
	DATA CODED BY:	
	DATA ENTERED BY:	
	SUPERVISOR:	

HOUSEHOLD MEMBERS

HOUSEHOLD ID

First, I would like to know a few things about the people in your household. I want to know only about permanent members of your household, including college or high school students who return home every summer. I am NOT interested in people who lived with you temporarily, even if they stayed several months.

Between JANUARY and DECEMBER, 2007...
...who lived in your household?

ID#	IS THIS PERSON ANSWERING QUESTIONS ON THIS SURVEY? <i>(circle)</i>	MALE OR FEMALE? <i>(circle)</i>	ALASKA NATIVE? <i>(circle)</i>	IN WHAT YEAR WAS THIS PERSON BORN? <i>(year)</i>	HOW IS THIS PERSON RELATED TO HEAD 1? <i>(relation)</i>	HOW MANY YEARS HAS THIS PERSON LIVED IN KIVALINA? <i>(number)</i>	IN 2007, WAS THIS PERSON AN ACTIVE SUBSISTENCE HARVESTER? <i>(circle)</i>	<i>(comments)</i>
HEAD 1	N Y	M F	N Y			YRS	N Y	
01								
<i>Enter spouse or partner (including "play wife" or "play husband") next. If household has a SINGLE HEAD, leave HEAD 2 blank.</i>								
HEAD 2	N Y	M F	N Y			YRS	N Y	
02								
<i>Enter children (oldest to youngest), grandchildren, grandparents, brothers, sisters, and other household members below.</i>								
03	N Y	M F	N Y			YRS	N Y	
04	N Y	M F	N Y			YRS	N Y	
05	N Y	M F	N Y			YRS	N Y	
06	N Y	M F	N Y			YRS	N Y	
07	N Y	M F	N Y			YRS	N Y	
08	N Y	M F	N Y			YRS	N Y	
09	N Y	M F	N Y			YRS	N Y	
10	N Y	M F	N Y			YRS	N Y	
11	N Y	M F	N Y			YRS	N Y	
12	N Y	M F	N Y			YRS	N Y	
13	N Y	M F	N Y			YRS	N Y	
14	N Y	M F	N Y			YRS	N Y	
15	N Y	M F	N Y			YRS	N Y	
16	N Y	M F	N Y			YRS	N Y	

PERMANENT HH MEMBERS: 01

KIVALINA: 191

INSTRUCTIONS

Next, I am going to ask about your subsistence activities. I will be asking the same questions about different kinds of fish and game. Before I continue, I wanted to talk about those questions. I will use salmon as an example, but the questions will be the same for other species, such as caribou or berries.

When I ask...

- **Did members of your household use or try to catch salmon?**

I am asking about all the people we just listed, the permanent residents of your household. Even if I should say:

- **Did YOU use salmon?**

I mean all the people living in your household. In this survey, "you" always means everybody living in your household.

When I ask...

- **Do members of your household usually fish for salmon?**

Answer YES if you fished for salmon in at least five out of the last ten years.

Answer YES even if you just helped someone in another household fish.

When I ask...

- **Last year, did members of your household USE salmon?**

Answer YES if any member of your household caught salmon for subsistence, even if you then gave it all away.

Answer YES if someone shared salmon with your household, even if you then gave it all away.

Answer NO if the only salmon you ate was at someone else's home or at a community feast.

Answer NO if the only salmon you ate was purchased in a store.

When I ask...

- **Last year, did members of your household try to catch salmon?**

Answer YES if any member of your household tried to catch salmon, even if you did not actually get anything.

Answer YES even if you caught salmon accidentally, such as when you were seining for whitefish.

Answer YES if you caught salmon anywhere in Alaska.

Answer NO if the only salmon you caught were released alive.

Answer NO if the only salmon you tried to catch were outside the state of Alaska.

When I ask...

- **Last year, how many salmon did members of your household catch?**

INCLUDE all the salmon caught by all members of your household.

INCLUDE your share of cooperative harvests, such as your share from a seine.

INCLUDE salmon you gave away, even if you never brought any home.

INCLUDE salmon that you retained from your commercial catch for your own use.

DO NOT include salmon given to you by someone in another household or community.

DO NOT include salmon caught by visitors in the household.

DO NOT include salmon that were caught and then released alive.

When I ask...

- **Did your household share salmon with others? or**
- **Did other households share salmon with your household?**

Answer YES if salmon was shared, traded, or bartered with your household.

Answer YES even if all the salmon you received was then given away.

Answer NO if the only salmon you shared was eaten at someone else's home or at a community feast.

Answer NO if the only salmon you shared was bought or sold.

HARVESTS: SALMON HOUSEHOLD ID

Do members of your household USUALLY fish for SALMON for subsistence?..... N Y

Between JANUARY and DECEMBER, 2007...
 ...Did members of your household USE or TRY TO CATCH salmon?..... N Y

IF NO, go to the next harvest page.
IF YES, continue on this page...

Please estimate how many salmon ALL MEMBERS OF YOUR HOUSEHOLD CAUGHT for subsistence use this year, including with a rod and reel. INCLUDE salmon you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID YOUR HOUSEHOLD...			HOW MANY OF THOSE WERE CAUGHT JUST FOR DOGS?	UNITS (ind. lbs)	IN 2007...	
	...USE ? (circle)	...TRY TO CATCH ? (circle)	...CATCH WITH GILL NET OR SEINE?	...CATCH WITH ROD AND REEL?	...CATCH WITH OTHER GEAR?			...DID YOUR HH SHARE	...DID OTHERS SHARE
								WITH OTHERS?	WITH YOUR HH?
CHUM SALMON <i>Oalugruaq</i> 111020003	N Y	N Y						N Y	N Y
PINK SALMON <i>Amagtuk</i> 114000003	N Y	N Y						N Y	N Y
COHO SALMON <i>Oalugruaq</i> 112000003	N Y	N Y						N Y	N Y
SOCKEYE SALMON <i>Oalugruaq</i> 115000003	N Y	N Y						N Y	N Y
KING SALMON <i>Oaluaqpuk</i> 113000003	N Y	N Y						N Y	N Y
UNKNOWN SALMON 119000003	N Y	N Y						N Y	N Y

On map, mark where household CAUGHT salmon.

Comments on this table are welcome!

If person doesn't know how many they caught, but knows how many buckets, sacks, or tubs they caught, use table to estimate number of fish.

	5-Gallon Bucket	Shopping (AC) Bag	Garbage Sack	Gunny Sack	Metal Washtub	Garbage Can	55-Gallon Drum
Salmon (Chum, Sockeye, Coho)	4	2	7	12	15	24	35
Salmon (Pink)	10	5	20	33	42	67	100
Salmon (King)	1	1	2	3	4	7	10
Whitefish (Humpback)	21	11	43	71	89	143	214
Whitefish (Round)	30	15	60	100	125	200	300
Whitefish (Broad)	7	3	13	22	28	44	67
Whitefish (95% HB, 5% Rnd)	22	11	43	72	91	145	217
Whitefish (Unknown Species)	12	6	24	40	50	80	120
Cisco, Bering	24	12	48	80	100	160	240
Sheefish	2	1	4	6	8	13	19
Trout	6	3	13	21	27	43	64
Tomcod (Saffron Cod)	30	15	60	100	125	200	300
Blue Cod (Arctic Cod)	185	92	369	615	769	1231	1846
Flounder	20	10	40	67	83	133	200
Burbot	5	3	10	17	21	33	50
Northern Pike	6	3	13	21	27	43	64
Grayling	24	12	48	80	100	160	240
Smelt	150	75	300	500	625	1000	1500
Herring	115	58	231	385	481	769	1154

NON-COMMERCIAL SALMON: 04

KIVALINA: 191

HARVESTS: OTHER FISH

HOUSEHOLD ID

Do members of your household USUALLY fish for other fish for subsistence, such as TROUT or SHEEFISH?..... N Y

Between JANUARY and DECEMBER, 2007...
 ...Did members of your household USE or TRY TO CATCH other fish?..... N Y

IF NO, go to the next harvest page.
IF YES, continue on this page...

Please estimate how many other fish ALL MEMBERS OF YOUR HOUSEHOLD CAUGHT for subsistence use this year, including with a rod and reel. INCLUDE other fish you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If fishing with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID YOUR HOUSEHOLD...			HOW MANY OF THOSE WERE CAUGHT JUST FOR DOGS?	UNITS <i>(ind. lbs)</i>	IN 2007...	
	...USE ? <i>(circle)</i>	...TRY TO CATCH ? <i>(circle)</i>	...CATCH WITH GILL NET OR SEINE?	...CATCH WITH ROD AND REEL?	...CATCH WITH OTHER GEAR?			...DID YOUR HH SHARE WITH OTHERS?	...DID OTHERS SHARE WITH YOUR HH?
TROUT <i>Qalukpik</i> 125006013	N Y	N Y						N Y	N Y

On map, mark where household CAUGHT trout.

WHITEFISH <i>Oalupiaq</i> 126400000	N Y	N Y						N Y	N Y
---	-----	-----	--	--	--	--	--	-----	-----

On map, mark where household CAUGHT whitefish.

SHEEFISH <i>Sij</i> 125600003	N Y	N Y						N Y	N Y
BURBOT (MUDSHARK) <i>Tittaaliq</i> 124800003	N Y	N Y						N Y	N Y
NORTHERN PIKE <i>Siulik</i> 125400003	N Y	N Y						N Y	N Y
GRAYLING <i>Sulukpaugaq</i> 125200003	N Y	N Y						N Y	N Y
TOMCOD <i>Uugaq, Igaluaq</i> 121010003	N Y	N Y						N Y	N Y
BLUE COD <i>Qaluaq</i> 121002003	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

Between JANUARY and DECEMBER, 2007...
 ...Did your household use or catch any other kind of other fish such as HERRING or CLAMS?..... N Y

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

NON-SALMON FINFISH: 06

KIVALINA: 191

HARVESTS: LARGE LAND ANIMALS

HOUSEHOLD ID

Do members of your household USUALLY hunt for large land animals for subsistence, such as CARIBOU or MOOSE?..... N Y

Between JANUARY and DECEMBER, 2007...
 ...Did members of your household USE or TRY TO CATCH large land animals?..... N Y

IF NO, go to the next harvest page.
IF YES, continue on this page...

Please estimate how many large land animals ALL MEMBERS OF YOUR HOUSEHOLD CAUGHT for subsistence use this year. INCLUDE large land animals you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID MEMBERS OF YOUR HOUSEHOLD CATCH?												IN 2007...						
	...USE ? (circle)	...TRY TO CATCH ? (circle)	SEX	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS (ind...)	...DID YOUR HH SHARE WITH OTHERS? (circle)	...DID OTHERS YOUR HH? (circle)		
CARIBOU <i>Tuttu</i> 211000000	N	Y	N	Y													ind	N	Y	N	Y
211000001																					
211000002																					
211000009																					

On map, mark where household SEARCHED FOR and CAUGHT caribou.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID MEMBERS OF YOUR HOUSEHOLD CATCH?												IN 2007...					
	...USE ? (circle)	...TRY TO CATCH ? (circle)	SEX	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS (ind...)	...DID YOUR HH SHARE WITH OTHERS? (circle)	...DID OTHERS YOUR HH? (circle)	
MOOSE <i>Timmikaq</i> 211800000	N	Y	N	Y												ind	N	Y	N	Y
211800001																				
211800002																				
211800009																				

On map, mark where household SEARCHED FOR and CAUGHT moose.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID MEMBERS OF YOUR HOUSEHOLD CATCH?												IN 2007...					
	...USE ? (circle)	...TRY TO CATCH ? (circle)	SEX	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS (ind...)	...DID YOUR HH SHARE WITH OTHERS? (circle)	...DID OTHERS YOUR HH? (circle)	
GRIZZLY BEAR <i>Aktaq</i> 210800000	N	Y	N	Y												ind	N	Y	N	Y

On map, mark where household SEARCHED FOR and CAUGHT grizzly bear.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID MEMBERS OF YOUR HOUSEHOLD CATCH?												IN 2007...					
	...USE ? (circle)	...TRY TO CATCH ? (circle)	SEX	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS (ind...)	...DID YOUR HH SHARE WITH OTHERS? (circle)	...DID OTHERS YOUR HH? (circle)	
DALL SHEEP <i>Ipnaiq</i> 212200000	N	Y	N	Y												ind	N	Y	N	Y

On map, mark where household SEARCHED FOR and CAUGHT dall sheep.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID MEMBERS OF YOUR HOUSEHOLD CATCH?												IN 2007...					
	...USE ? (circle)	...TRY TO CATCH ? (circle)	SEX	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS (ind...)	...DID YOUR HH SHARE WITH OTHERS? (circle)	...DID OTHERS YOUR HH? (circle)	
MUSKOXEN <i>Uminmak</i> 212000000	N	Y	N	Y												ind	N	Y	N	Y

On map, mark where household SEARCHED FOR and CAUGHT muskoxen.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID MEMBERS OF YOUR HOUSEHOLD CATCH?												IN 2007...					
	...USE ? (circle)	...TRY TO CATCH ? (circle)	SEX	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS (ind...)	...DID YOUR HH SHARE WITH OTHERS? (circle)	...DID OTHERS YOUR HH? (circle)	
	N	Y	N	Y												ind	N	Y	N	Y
	N	Y	N	Y												ind	N	Y	N	Y

Between JANUARY and DECEMBER, 2007...
 ...Did your household use or catch any other kind of large land animals such as BLACK BEAR?..... N Y

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

HARVESTS: SMALL LAND ANIMALS HOUSEHOLD ID

Do members of your household USUALLY hunt or trap small land animals for subsistence, such as WOLF or WOLVERINE?..... N Y

Between JANUARY and DECEMBER, 2007...
 ...Did members of your household USE or TRY TO CATCH small land animals?..... N Y

IF NO, go to the next harvest page.
IF YES, continue on this page...

Please estimate how many small land animals ALL MEMBERS OF YOUR HOUSEHOLD CAUGHT for subsistence use this year. INCLUDE small land animals you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting or trapping with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID MEMBERS OF YOUR HOUSEHOLD CATCH?												UNITS (ind...)	IN 2007...									
	...USE ?	...TRY TO CATCH ?	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER		UNKNOWN	...DID YOUR HH SHARE	...DID OTHERS SHARE							
	(circle)	(circle)	(enter number by sex and month of take)													(circle)	(circle)								
WOLF <i>Amagiq</i> 223200000	N	Y	N	Y																ind	N	Y	N	Y	
WOLVERINE <i>Qapvik</i> 223400000	N	Y	N	Y																	ind	N	Y	N	Y
ARCTIC FOX <i>Ousraaq</i> 220802000	N	Y	N	Y																	ind	N	Y	N	Y
RED FOX <i>Kayuqtuq</i> 220804000	N	Y	N	Y																	ind	N	Y	N	Y
BEAVER <i>Paluqtaq</i> 220200000	N	Y	N	Y																	ind	N	Y	N	Y
	N	Y	N	Y																	ind	N	Y	N	Y
	N	Y	N	Y																	ind	N	Y	N	Y
	N	Y	N	Y																	ind	N	Y	N	Y
	N	Y	N	Y																	ind	N	Y	N	Y
	N	Y	N	Y																	ind	N	Y	N	Y
	N	Y	N	Y																	ind	N	Y	N	Y

On map, mark where household SEARCHED FOR and CAUGHT small land animals.

Between JANUARY and DECEMBER, 2007...
 ...Did your household use or catch any other kind of small land animals such as MARTEN, LYNX, or MUSKRAT?..... N Y
 IF YES, enter the name in a blank row and answer the questions in the table above.

HARVESTS: MARINE MAMMALS

HOUSEHOLD ID

Do members of your household USUALLY hunt for MARINE MAMMALS for subsistence, such as BEARDED SEAL or RINGED SEAL?..... N Y

Between JANUARY and DECEMBER, 2007...
 ...Did members of your household USE or TRY TO CATCH marine mammals?..... N Y

IF NO, go to the next harvest page.

IF YES, continue on this page...

Please estimate how many marine mammals ALL MEMBERS OF YOUR HOUSEHOLD CAUGHT for subsistence use this year. INCLUDE marine mammals you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID MEMBERS OF YOUR HOUSEHOLD CATCH?												IN 2007...				
	...USE ? (circle)	...TRY TO CATCH ? (circle)	SEX	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	UNITS (ind...)	..DID YOUR HH SHARE	..DID OTHERS SHARE
																		WITH OTHERS?	WITH YOUR HH?
BEARDED SEAL <i>Ugruk</i> 300802000	N	Y	N	Y															
300802002																			
300802001																			
300802009																			

On map, mark where household SEARCHED FOR and CAUGHT bearded seal.

RINGED SEAL <i>Natchiq</i> 300810000	N	Y	N	Y															
--	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

On map, mark where household SEARCHED FOR and CAUGHT ringed seal.

BELUGA WHALE <i>Sisuaq</i> 301602000	N	Y	N	Y															
--	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

On map, mark where household SEARCHED FOR and CAUGHT beluga whale.

WALRUS <i>Aiviq</i> 301400000	N	Y	N	Y															
-------------------------------------	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

On map, mark where household SEARCHED FOR and CAUGHT walrus.

SPOTTED SEAL <i>Oasigiaq</i> 300812000	N	Y	N	Y															
	N	Y	N	Y															
	N	Y	N	Y															

Between JANUARY and DECEMBER, 2007...
 ...Did your household use seal oil?..... N Y

...Did your household use black (bowhead) muktuk?..... N Y

...Did your household use or catch any other kind of marine mammals such as RIBBON SEAL or POLAR BEAR?..... N Y

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

MARINE MAMMALS: 12

KIVALINA: 191

HARVESTS: WATERFOWL

HOUSEHOLD ID

Do members of your household USUALLY hunt for waterfowl for subsistence, such as BRANT or CANADA GEESE?..... N Y

Between JANUARY and DECEMBER, 2007...
 ...Did members of your household USE or TRY TO CATCH waterfowl?..... N Y

IF NO, go to the next harvest page.
IF YES, continue on this page...

Please estimate how many waterfowl ALL MEMBERS OF YOUR HOUSEHOLD CAUGHT for subsistence use this year. INCLUDE waterfowl you gave away, ate fresh, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...		IN 2007, HOW MANY () DID MEMBERS OF YOUR HOUSEHOLD CATCH?											IN 2007...				
	...USE ?	...TRY TO CATCH ?	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	UNKNOWN	...DID YOUR HH SHARE	...DID OTHERS SHARE	
	(circle)	(circle)	winter	spring	summer	fall	winter									WITH OTHERS?	WITH YOUR HH?	
BRANT <i>Liglinauraq</i> 410402000	N	Y	N	Y											N	Y	N	Y
CANADA GEESE <i>Iqsragutlik</i> 410404990	N	Y	N	Y											N	Y	N	Y
SNOW GEESE <i>Kanuaq</i> 410408000	N	Y	N	Y											N	Y	N	Y
WHITE-FRONTED GEESE <i>Kigiyuk</i> 410410000	N	Y	N	Y											N	Y	N	Y
KING EIDER 410206040	N	Y	N	Y											N	Y	N	Y
COMMON EIDER 410206020	N	Y	N	Y											N	Y	N	Y
NORTHERN PINTAIL <i>Ivugaq, Kurugaaq</i> 410220000	N	Y	N	Y											N	Y	N	Y
MALLARD <i>Iragusrugruk</i> 410214000	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

On map, mark where household SEARCHED FOR and CAUGHT waterfowl.

Between JANUARY and DECEMBER, 2007...
 ...Did your household use or catch any other kind of waterfowl such as OTHER DUCKS, CRANES, or SWANS?..... N Y

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

HARVESTS: OTHER BIRDS

HOUSEHOLD ID

Do members of your household USUALLY hunt for other birds for subsistence, such as PTARMIGAN or SPRUCE GROUSE?..... N Y

Between JANUARY and DECEMBER, 2007...
 ...Did members of your household USE or TRY TO CATCH other birds?..... N Y

IF NO, go to the next harvest page.
IF YES, continue on this page...

Please estimate how many other birds ALL MEMBERS OF YOUR HOUSEHOLD CAUGHT for subsistence use this year. INCLUDE other birds you gave away, ate fresh, lost to spoilage, or got by helping others. If hunting with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...				IN 2007, HOW MANY DID MEMBERS OF YOUR HOUSEHOLD CATCH? <i>(number)</i>	UNITS <i>(ind)</i>	IN 2007...	
	...USE ? <i>(circle)</i>		...TRY TO CATCH ? <i>(circle)</i>				...DID YOUR HH SHARE WITH OTHERS? <i>(circle)</i>	...DID OTHERS SHARE WITH YOUR HH? <i>(circle)</i>
	N	Y	N	Y			N	Y
PTARMIGAN <i>Aqalgia</i> 421804000	N	Y	N	Y			N	Y
SPRUCE GROUSE <i>Napaagtum Aqalgia</i> 421802020	N	Y	N	Y			N	Y
SNOWY OWL <i>Ukpik</i> 422003000	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y
	N	Y	N	Y			N	Y

Between JANUARY and DECEMBER, 2007...
 ...Did your household use or catch any other kind of other birds ?..... N Y
 IF YES, enter the name in a blank row and answer the questions in the table above.

HARVESTS: EGGS

HOUSEHOLD ID

Do members of your household USUALLY gather eggs for subsistence, such as MURRE EGGS or GULL EGGS?..... N Y

Between JANUARY and DECEMBER, 2007...
 ...Did members of your household USE or TRY TO GATHER eggs?..... N Y

IF NO, go to the next harvest page.
IF YES, continue on this page...

Please estimate how many eggs ALL MEMBERS OF YOUR HOUSEHOLD GATHERED for subsistence use this year. INCLUDE eggs you gave away, ate fresh, lost to spoilage, or got by helping others. If gathering with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...				IN 2007, HOW MANY DID MEMBERS OF YOUR HOUSEHOLD GATHER? <i>(number)</i>	UNITS <i>(ind, tubs)</i>	IN 2007...			
	...USE ? <i>(circle)</i>		...TRY TO GATHER ? <i>(circle)</i>				...DID YOUR HH SHARE WITH OTHERS? <i>(circle)</i>	...DID OTHERS SHARE WITH YOUR HH? <i>(circle)</i>		
	N	Y	N	Y			N	Y	N	Y
MURRE EGGS 431218000	N	Y	N	Y			N	Y	N	Y
GULL EGGS <i>Nauyuaq</i> 431212000	N	Y	N	Y			N	Y	N	Y
GOOSE EGGS 430499000	N	Y	N	Y			N	Y	N	Y
DUCK EGGS 430299000	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	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

On map, mark where household GATHERED eggs last year.

Between JANUARY and DECEMBER, 2007...
 ...Did your household use or gather any other kind of eggs such as SWAN EGGS?..... N Y

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

BIRDS AND EGGS: 15

KIVALINA: 191

HARVESTS: BERRIES

HOUSEHOLD ID

Do members of your household USUALLY pick berries for subsistence, such as SALMONBERRIES or BLUEBERRIES?..... N Y

Between JANUARY and DECEMBER, 2007...
 ...Did members of your household USE or TRY TO PICK berries?..... N Y

IF NO, go to the next harvest page.

IF YES, continue on this page...

Please estimate how many berries ALL MEMBERS OF YOUR HOUSEHOLD PICKED for subsistence use this year. INCLUDE berries you gave away, ate fresh, lost to spoilage, or got by helping others. If picking with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...				IN 2007, HOW MANY DID MEMBERS OF YOUR HOUSEHOLD PICK? <i>(number)</i>	UNITS <i>(gals)</i>	IN 2007...			
	...USE ? <i>(circle)</i>		...TRY TO PICK ? <i>(circle)</i>				...DID YOUR HH SHARE WITH OTHERS? <i>(circle)</i>	...DID OTHERS SHARE WITH YOUR HH? <i>(circle)</i>		
	N	Y	N	Y			N	Y	N	Y
SALMONBERRIES <i>Aqpiq</i> 601022002	N	Y	N	Y			N	Y	N	Y
BLUEBERRIES <i>Qaluq</i> 121002003	N	Y	N	Y			N	Y	N	Y
CRANBERRIES <i>Kikminnaq</i> 601004002	N	Y	N	Y			N	Y	N	Y
BLACKBERRIES <i>Paungaq</i> 601007002	N	Y	N	Y			N	Y	N	Y
RASPBERRIES 601020002	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y
	N	Y	N	Y			N	Y	N	Y

Between JANUARY and DECEMBER, 2007...
 ...Did your household use or pick any other kind of berries such as JUNIPER BERRIES?..... N Y

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

PLANTS: 17

KIVALINA: 191

HARVESTS: GREENS OR ROOTS

HOUSEHOLD ID

Do members of your household USUALLY pick greens or roots for subsistence, such as WILLOW LEAVES or STINKWEED?..... N Y

Between JANUARY and DECEMBER, 2007...
 ...Did members of your household USE or TRY TO PICK greens or roots?..... N Y

IF NO, go to the next harvest page.
IF YES, continue on this page...

Please estimate how many greens or roots ALL MEMBERS OF YOUR HOUSEHOLD PICKED for subsistence use this year. INCLUDE greens or roots you gave away, ate fresh, lost to spoilage, or got by helping others. If picking with others, report ONLY YOUR SHARE of the catch.

	IN 2007 DID MEMBERS OF YOUR HH...				IN 2007, HOW MANY DID MEMBERS OF YOUR HOUSEHOLD PICK? (number)	UNITS (gals)	IN 2007...			
	...USE ?		...TRY TO PICK ?				...DID YOUR HH SHARE			...DID OTHERS SHARE
	(circle)	(circle)	(circle)	(circle)			WITH OTHERS?		WITH YOUR HH?	(circle)
WILLOW LEAVES <i>Sura</i> 602048002	N	Y	N	Y			N	Y	N	Y
STINKWEED <i>Sargiiq</i> 602044002	N	Y	N	Y			N	Y	N	Y
SOURDOCK <i>Quaqaq</i> 602028002	N	Y	N	Y			N	Y	N	Y
ESKIMO TEA <i>Tilaauiq</i> 602018000	N	Y	N	Y			N	Y	N	Y
WILD CELERY <i>Ikuusiq</i> 602032002	N	Y	N	Y			N	Y	N	Y
WILD RHUBARB <i>Ousrimmaq, Ounjuliq</i> 602006002	N	Y	N	Y			N	Y	N	Y
SEA LOVAGE <i>Tukkaayuk</i> 602048002	N	Y	N	Y			N	Y	N	Y
ESKIMO POTATO <i>Masru</i> 604004002	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

On map, mark where household PICKED berries, greens, and roots last year.

Between JANUARY and DECEMBER, 2007...
 ...Did your household use or pick any other kind of greens or roots such as BEACH GREENS?..... N Y

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

PLANTS: 17

KIVALINA: 191

JOBS FOR EACH PERSON IN THE HOUSEHOLD, 16 YEARS OLD AND OLDER HOUSEHOLD ID

Between JANUARY and DECEMBER, 2007...
 ...Did any members of your household earn money from a JOB or from SELF EMPLOYMENT?..... N Y

For each member of this household born before 1992, please list EACH JOB held between JANUARY and DECEMBER, 2007.
 For household members who did not have a job, write: "RETIRED," "UNEMPLOYED," "STUDENT," "HOMEMAKER," etc.
 There should be at least ONE ROW for each member of this household born BEFORE 1992.

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. If one person has more than one job, list each job on a separate line. (One person may have several lines.)

	WHO HAD THIS JOB?	WHAT KIND OF WORK DID HE/SHE DO IN THIS JOB?		FOR WHOM DID HE/SHE WORK IN THIS JOB?		IN 2007, WHAT MONTHS DID HE OR SHE WORK IN THIS JOB?	WORK SCHEDULE...					IN 2007, HOW MUCH DID HE/SHE EARN IN THIS JOB?
		person	job title	SOC	employer		SIC	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							SCHEDULE					
2ND JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
2 6 910100000							SCHEDULE					
3RD JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
3 6 910100000							SCHEDULE					
4TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
4 6 910100000							SCHEDULE					
5TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
5 6 910100000							SCHEDULE					
6TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
6 6 910100000							SCHEDULE					
7TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
7 6 910100000							SCHEDULE					
8TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
8 6 910100000							SCHEDULE					
9TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
9 6 910100000							SCHEDULE					
10TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
10 6 910100000							SCHEDULE					
11TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
11 6 910100000							SCHEDULE					
12TH JOB						J F M A M J J A S O N D	FT	PT	SF	OC	SP	\$ /YR
12 6 910100000							SCHEDULE					

If a person is SELF-EMPLOYED (selling carvings, crafts, bread, etc), list that as a separate job. Enter "sewer," "carver," "baker," etc. as JOB TITLE. Work schedule usually will be "ON CALL." For gross income from self employment ("profit"), enter revenue MINUS expenses.

If a person is UNEMPLOYED, specify retired, unemployed, disabled, student, or homemaker as the JOB TITLE. TRAPPING for barter or sale IS a job.

WORK SCHEDULE
 1 - Fulltime (35+ hours/week)
 2 - Parttime (<35 hours/week)
 3 - Shift (2 wks on/2 off, etc.)
 4 - Irregular, on call
 5 - Shift - part time
 0 - Retired, Unemployed, etc.

GROSS INCOME is the same as TAXABLE INCOME on a W-2 form.

EMPLOYMENT: 23

KIVALINA: 191

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

Between JANUARY and DECEMBER, 2007...

...Did any members of your household receive a dividend from the Permanent Fund or a Native Corporation?..... N Y

IF NO, go to the next section on this page.

If YES, continue below...

DIVIDENDS		DID ANYONE IN YOUR HH RECEIVE INCOME FROM _____ IN 2007? (circle one)		TOTAL AMOUNT ALL MEMBERS OF YOUR HH RECEIVED IN 2007? (dollars)	ALASKA PFD IN 2007	NANA DIVIDENDS IN 2007	
		N	Y			Class A	Class D
	ALASKA PERMANENT FUND DIVIDEND	N	Y	\$ _____ /YR	1 PFD = \$1,654	200 shrs= \$3,000	50 shrs= \$750
					2 PFDs = \$3,308	400 shrs= \$6,000	100 shrs= \$1,500
					3 PFDs = \$4,962	600 shrs= \$9,000	150 shrs= \$2,250
					4 PFDs = \$6,616	800 shrs= \$12,000	200 shrs= \$3,000
					5 PFDs = \$8,270		250 shrs= \$3,750
					6 PFDs = \$9,924		300 shrs= \$4,500
					7 PFDs = \$11,578	Village shareholders born in 1971 or before usually received 200 Class A NANA shares. Shareholders born after 1971 usually have Class D shares, half as many as each parent. Inherited or KIC shares complicate holdings.	
					8 PFDs = \$13,232		
					9 PFDs = \$14,886		
					10 PFDs = \$16,540		
					11 PFDs = \$18,194		
	NATIVE CORPORATION DIVIDENDS	N	Y	\$ _____ /YR			

Between JANUARY and DECEMBER, 2007...

...Did any members of your household receive OTHER income such as UNEMPLOYMENT or ENERGY ASSISTANCE?..... N Y

IF NO, go to the next page.

If YES, continue below...

		RECEIVED IN 2007? (circle one)		TOTAL AMOUNT IN 2007? (dollars)	scratch paper for calculations
		N	Y		
JOB BENEFITS	UNEMPLOYMENT	N	Y	\$ _____ /YR	\$ _____ per week for _____ weeks = \$ _____ per month for _____ months =
ASSISTANCE	WORKERS' COMPENSATION	N	Y	\$ _____ /YR	\$ _____ per week for _____ weeks = \$ _____ per month for _____ months =
ASSISTANCE	FOOD STAMPS (QUEST CARD)	N	Y	\$ _____ /YR	\$ _____ per week for _____ weeks = \$ _____ per month for _____ months =
ASSISTANCE	ADULT PUBLIC ASSISTANCE	N	Y	\$ _____ /YR	\$ _____ per week for _____ weeks = \$ _____ per month for _____ months =
ELDER BENEFITS	ALASKA SENIOR BENEFITS (LONGEVITY)	N	Y	\$ _____ /YR	Depends on Income \$125 per month for 12 months = \$1,500 per elder \$175 per month for 12 months = \$2,100 per elder \$250 per month for 12 months = \$3,000 per elder
	PENSION & RETIREMENT	N	Y	\$ _____ /YR	\$ _____ per week for _____ weeks = \$ _____ per month for _____ months =
ELDER BENEFITS	SOCIAL SECURITY	N	Y	\$ _____ /YR	\$ _____ per week for _____ weeks = \$ _____ per month for _____ months =
CHILD BENEFITS	SUPPLEMENTAL SECURITY	N	Y	\$ _____ /YR	\$ _____ per week for _____ weeks = \$ _____ per month for _____ months =
	FOSTER CARE	N	Y	\$ _____ /YR	\$ _____ per week for _____ weeks = \$ _____ per month for _____ months =
CHILD BENEFITS	CHILD SUPPORT	N	Y	\$ _____ /YR	\$ _____ per week for _____ weeks = \$ _____ per month for _____ months =
OTHER	ENERGY ASSISTANCE	N	Y	\$ _____ /YR	
OTHER	OTHER (describe)	N	Y	\$ _____ /YR	

OTHER INCOME: 24

KIVALINA: 191

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 Kivalina have enough to eat. I am going to read you FIVE statements that Americans have made about their food situation. Please tell me whether EACH statement was true for your household LAST YEAR, that is, between JANUARY and DECEMBER, 2007.

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

Last year, 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...
 ... You couldn't get SUBSISTENCE foods,
 ... You couldn't get STORE-BOUGHT foods, or
 ... You couldn't get BOTH KINDS of food?.....

SUB	STOR	BOTH	
-----	------	------	--

STATEMENT 2. We could not get the food we needed to eat HEALTHY MEALS. HH4

Last year, 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...
 ... You couldn't get SUBSISTENCE foods,
 ... You couldn't get STORE-BOUGHT foods, or
 ... You 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

Last year, 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.

Last year, 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.

Last year, was this ever true for your household?.....

N	Y	?	
---	---	---	--

 If YES, in which months did this happen?.....

J	F	M	A	M	J	J	A	S	O	N	D
---	---	---	---	---	---	---	---	---	---	---	---

If NO statement above WAS TRUE for this household, go to the next page.

If ANY statement above WAS TRUE for this household, continue on this page...

Last year, did you or other adults in your household ever CUT THE SIZE OF YOUR MEALS OR SKIP MEALS because you could not get the food you needed? AD1
 If YES, in which months did this happen?.....

N	Y	?									
J	F	M	A	M	J	J	A	S	O	N	D

Last year, did you or other adults in your household ever EAT LESS THAN YOU FELT YOU SHOULD because you could not get the food you needed? AD2

N	Y	?	
---	---	---	--

Last year, were you ever HUNGRY BUT DID NOT EAT because there was not enough food? AD3

N	Y	?	
---	---	---	--

Last year, did you LOSE WEIGHT because there was not enough food? AD4

N	Y	?	
---	---	---	--

Last year, 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
---	---	---	---	---	---	---	---	---	---	---	---

ASSESSMENTS HOUSEHOLD ID

On this page, I have listed several different kinds of subsistence foods, like SALMON, LAND ANIMALS, and BIRDS...
 For each kind of subsistence food, I am going to ask you to compare your household's harvest LAST YEAR with your harvests in the past.
 Then I am going to ask whether your household GOT ENOUGH of that kind of subsistence food LAST YEAR.

SALMON 110000000

Between JANUARY and DECEMBER, 2007...

...Did your household harvest LESS, MORE, or about the SAME amount of salmon as in the past?..... X L S M

If the household does not usually harvest salmon, then circle the "X".

...Did your household GET ENOUGH salmon?..... N Y

If NO ...what KIND of salmon did you need?.....

...why did your household NOT get enough?.....

1	
2	

OTHER FISH 120000000

Between JANUARY and DECEMBER, 2007...

...Did your household harvest LESS, MORE, or about the SAME amount of other fish as in the past?..... X L S M

If the household does not usually harvest other fish, then circle the "X".

...Did your household GET ENOUGH other fish?..... N Y

If NO ...what KIND of other fish did you need?.....

...why did your household NOT get enough?.....

1	
2	

LAND ANIMALS 200000000

Between JANUARY and DECEMBER, 2007...

...Did your household harvest LESS, MORE, or about the SAME amount of land animals as in the past?..... X L S M

If the household does not usually harvest land animals, then circle the "X".

...Did your household GET ENOUGH land animals?..... N Y

If NO ...what KIND of land animals did you need?.....

...why did your household NOT get enough?.....

1	
2	

MARINE MAMMALS 300000000

Between JANUARY and DECEMBER, 2007...

...Did your household harvest LESS, MORE, or about the SAME amount of marine mammals as in the past?..... X L S M

If the household does not usually harvest marine mammals, then circle the "X".

...Did your household GET ENOUGH marine mammals?..... N Y

If NO ...what KIND of marine mammals did you need?.....

...why did your household NOT get enough?.....

1	
2	

BIRDS 400000000

Between JANUARY and DECEMBER, 2007...

...Did your household harvest LESS, MORE, or about the SAME amount of birds as in the past?..... X L S M

If the household does not usually harvest birds, then circle the "X".

...Did your household GET ENOUGH birds?..... N Y

If NO ...what KIND of birds did you need?.....

...why did your household NOT get enough?.....

1	
2	

BERRIES, GREENS OR ROOTS 600000000

Between JANUARY and DECEMBER, 2007...

...Did your household harvest LESS, MORE, or about the SAME amount of berries, greens or roots as in the past?... X L S M

If the household does not usually harvest berries, greens or roots, then circle the "X".

...Did your household GET ENOUGH berries, greens or roots?..... N Y

If NO ...what KIND of berries, greens or roots did you need?.....

...why did your household NOT get enough?.....

1	
2	

