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Subsistence Harvests and Uses of Wild Resources in Igiugig, Kokhanok, Koliganek, Levelock, and New Stuyahok, Alaska, 2005

by

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

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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

all commonly-accepted abbreviations e.g., Mr., Mrs., AM, PM, etc.

all commonly-accepted professional titles e.g., Dr., Ph.D., R.N., etc.

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

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations

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

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ABSTRACT

This report presents information about subsistence uses of fish, wildlife, and plant resources in 5 communities of Southwest Alaska: Igiugig, Kokhanok, Koliganek, Levelock, and New Stuyahok. The Alaska Department of Fish and Game Division of Subsistence conducted the study in collaboration with Stephen R. Braund & Associates. Phase I of this study, to document subsistence uses and harvests as well as demographic and other economic data for the study year of 2004, took place in the communities of Iliamna, Newhalen, Nondalton, Pedro Bay, and Port Alsworth in 2005, the findings of which are reported in *Subsistence Harvest and Uses of Wild Resources in Iliamna, Newhalen, Nondalton, Pedro Bay, and Port Alsworth, Alaska, 2004* (ADF&G Division of Subsistence Technical Paper No. 302). This report documents findings from phase II, which expanded the study to include 2005 data and 5 additional communities within the watersheds that could be affected by mine development. The Pebble Project is a mineral deposit in an advanced exploration stage located near Frying Pan Lake, which is 70 miles to the northeast of the study community of Koliganek and 35 miles northwest of the study community of Kokhanok. The Pebble Project required updated baseline information about subsistence harvests and uses. Information was collected through systematic household surveys and mapping interviews. Scoping meetings were held in each community to elicit ideas about research questions and to learn more about issues. After preliminary study findings were available, a second round of community meetings took place to review the results. In total, 138 households were interviewed, 73% of the year-round resident households. The study documented the continuing importance of subsistence hunting, fishing, and gathering to the study communities. In 2005, virtually every person in each community participated in subsistence activities and used wild resources. Subsistence harvests were large and diverse. Estimated wild resource harvests were 542 lb usable weight per person in Igiugig, 680 lb usable weight per person in Kokhanok, 899 lb usable weight per person in Koliganek, 527 lb usable weight per person in Levelock, and 389 lb usable weight per person in New Stuyahok. Most participants in this study reported their subsistence uses and harvests have changed in their lifetimes and over the last 5 years, changes which they ascribed to reduced resource populations, shifts in the locations of moose and caribou, competition with nonlocal hunters, and a warming climate. Study community residents voiced concerns about the development of a mine and its impacts on water quality in and near their traditional subsistence harvest areas.

Key words: Harvest survey, subsistence uses, subsistence fishing, subsistence hunting, Lake Iliamna, Igiugig, Kokhanok, Koliganek, Levelock, New Stuyahok, Pebble Project, Kvichak River, Bristol Bay.

CHAPTER 1: INTRODUCTION

STUDY BACKGROUND

This report provides updated information about subsistence uses of fish, wildlife, and wild plant resources by the residents of 5 communities of the Bristol Bay area of Southwest Alaska. The study communities were Igiugig, located at the outlet of Iliamna Lake; Kokhanok, on the south shore of Iliamna Lake; Koliganek, on the Nushagak River; Levelock, on the Kvichak River; and New Stuyahok, on the Nushagak River (Figure 1-1). Table 1-1 reports the population of each community in 2000 and 2005, based on federal (U. S. Census Bureau 2001) and state (ADLWD 2009) estimates, as well as the findings of this study. The sockeye salmon *Oncorhynchus nerka* run in the Kvichak River/Iliamna Lake system is among the world's largest, and the returns of Pacific salmon to both the Kvichak River/Iliamna Lake and Nushagak River systems support important commercial, subsistence, and sport fisheries. In the study year, the residents of all 5 communities relied on subsistence hunting, fishing, and gathering for nutrition and to support their way of life. They utilized a variety of resources, including salmon and other fishes, large land mammals (caribou, moose, brown bears), small land mammals (small game and furbearers), birds and bird eggs, and wild plants (ADF&G Community Subsistence Information System [CSIS[1]]; Morris 1986; Schroeder et al. 1987; Schichnes and Chythlook 1991). Table 1-17 presents a list, including the Linnaean taxonomic names, of resources used in the study communities.

The Pebble Project is a mineral deposit in an advanced exploration phase located near Frying Pan Lake, which is 70 miles to the northeast of the study community of Koliganek, and 35 miles northwest of the study community of Kokhanok. The mineral deposit includes gold, copper, and molybdenum. Northern Dynasty Mines Inc. (NDM) of Vancouver, Canada, the project operator, began environmental baseline studies in 2004 to gather information needed for a feasibility study and applications for federal and state permits (NDM 2005).

Development applications for Pebble Mine created the need for updated baseline information about subsistence harvests and uses in the nearby communities, plus demographic and other economic data. Table 1-2 shows the years of previous studies of subsistence harvests and uses in each community conducted by the Alaska Department of Fish and Game (ADF&G) Division of Subsistence. Phase I of this study took place in the communities of Iliamna, Newhalen, Nondalton, Pedro Bay, and Port Alsworth in 2005, to document subsistence uses and harvests and demographic and other economic data for the study year of 2004 (Fall et al. 2006).

[1] ADF&G CSIS: http://www.subsistence.adfg.state.ak.us/CSIS/. Hereinafter cited as CSIS.

Figure 1-1.–Map of study communities, Bristol Bay, Alaska.

Table 1-1.–Population of the study communities, 2000 and 2005.

	Census year 2000				July 1, 2005, total population	Study findings for 2005[a]			
	Total population		Alaska Native population			Total population		Alaska Native population	
Community	Households	Population	People	Percentage of total		Households	Population	People	Percentage of total
Igiugig	20	53	38	72%	50	13	41	34	83%
Kokhanok	59	174	151	87%	179	42	158	155	98%
Koliganek	77	182	159	87%	167	42	150	144	96%
Levelock	50	122	109	89%	54	19	34	19	56%
New Stuyahok	107	471	437	93%	461	96	421	415	99%
Total	**313**	**1,002**	**894**	**89%**	**911**	**212**	**804**	**767**	**95%**

a. Pertains to estimated population as of December 31, 2005, based on surveys of year-round households; see also Table 1-10 and individual community chapters.

Sources For 2000 – U. S. Census Bureau 2001; ADCCED Community Database Online (http://www.commerce.state.ak.us/dca/commdb/CF_COMDB.htm [Hereinafter cited as CACD]). For July 1, 2005, estimate – ADLWD 2009. For study findings, 2005 – ADF&G Division of Subsistence household surveys, 2005.

Table 1-2.–Comprehensive and other subsistence harvest and use household survey projects: Iliamna Lake, Kvichak and Nushagak River communities.

	Year and study type								
Community	1973	1983	1987	1988	1992	1996	2001	2002	**2005**
Igiugig	ALL	ALL			ALL		LLM	FWF	**ALL**
Kokhanok	ALL	ALL			ALL		LLM	FWF	**ALL**
Levelock	ALL			ALL	ALL	FISHES	LLM	FWF	**ALL**
Koliganek	ALL		ALL				LLM	FWF	**ALL**
New Stuyahok	ALL		ALL				LLM	FWF	**ALL**

ALL = "comprehensive" baseline survey of all resources used for subsistence purposes except that the 1973 study did not include wild plants.

LLM = "large land mammals" only; i.e., caribou, moose, black bears, brown bears, and Dall sheep.

FWF = non-salmon freshwater fishes only.

FISHES = both salmon and non-salmon freshwater fishes.

Column in bold = this study.

Notes Annual estimates of salmon harvested in subsistence fisheries are available for all communities in the Alaska Subsistence Fisheries Database (ADF&G. *Unpublished*. Alaska subsistence fisheries database. Version 3.4 for Microsoft Access 2000. Alaska Department of Fish and Game Division of Subsistence, Juneau. Hereinafter cited as ASFDB).

All studies above were conducted by ADF&G Division of Subsistence (with project partners), except the 1973 study, which was done by the University of Alaska Fairbanks (UAF) (Gasbarro, A. F. and C. Utermohle. *Unpublished*. Unpublished 1974 field data, Bristol Bay subsistence survey. Alaska Department of Fish and Game Division of Subsistence, Juneau. Hereinafter cited as Gasbarro and Utermohle *Unpublished*). ADF&G is the only repository of the data collected in the UAF study.

Phase II expanded the study to 5 additional communities within the watersheds that could be affected by Pebble Project operations. Prior to this phase of the project, no comprehensive systematic household survey had occurred in Igiugig, Kokhanok, or Levelock since 1992 which documented the full range of subsistence harvests and uses by community residents. The last comprehensive household survey for Koliganek and New Stuyahok occurred in 1987. In addition to serving as an updated baseline for an assessment of any socioeconomic changes due to Pebble Project operations, the study results will have broader applicability in resource management and land planning.

ADF&G Division of Subsistence conducted this study (contract number IHP-06-050) in collaboration with Stephen R. Braund & Associates (SRB&A, a contractor for NDM) and the study communities. SRB&A was the sole source of funding for this study. SRB&A is an anthropological consulting firm based in Anchorage, Alaska, that specializes in sociocultural, subsistence uses and subsistence mapping, traditional knowledge, and cultural resource research and analysis.

STUDY OBJECTIVES

The project had the following objectives:

A. Design a survey instrument to produce updated baseline information about subsistence hunting, fishing, gathering, and other topics; and that is compatible with information collected in previous rounds of household interviews.

B. Conduct key respondent interviews to explore key issues in the communities.

C. Train local residents in administration of the systematic household survey.

D. Conduct household surveys to record the following information:

   1. Demographic information.
   2. Involvement in use, harvest, and sharing of fishes, wildlife, and wild plants in 2005.
   3. Estimates of amount of resources harvested in 2005.
   4. Information about jobs and cash income in 2005.
   5. Assessments of changes in subsistence harvest and use patterns.
   6. Location of hunting and harvests of subsistence resources in 2005.

E. Collaboratively review and interpret study findings with the study communities.

F. Produce a final report.

G. Communicate study findings to the communities and the public.

RESEARCH METHODS

ETHICAL PRINCIPLES FOR THE CONDUCT OF RESEARCH

The project was guided by the research principles adopted by the Alaska Federation of Natives in 1993 and the Interagency Arctic Research Policy Committee, June 28, 1990 (see Miraglia 1998). These principles stress community approval of research designs, informed consent, anonymity of study participants, community review of draft study findings, and the provision of study findings to each study community upon completion of the research.

PROJECT PLANNING AND APPROVALS

After approval of the contract, project staff from ADF&G and SRB&A met in February 2006 to refine project objectives, methods, schedules, and responsibilities. The researchers discussed what had been learned while administering the surveys during phase I of the project in order to apply these observations to the upcoming round of household interviews. To meet the information needs of the participating organizations, coordinate research, and minimize respondent burden, the group reached the following decisions:

1. SRB&A would continue to conduct research on respondent households' subsistence activities over the last 10 years using detailed mapping sessions. The results of these interviews do not appear in this report.
2. The Division of Subsistence would use its standard household harvest survey instrument to meet needs for updated baseline data. The survey instrument would be the same as that used in phase I, with the exception that the study year would be updated to 2005.
3. The Division of Subsistence would also use the standard method of collecting subsistence map data, recording on a paper map the locations where members of participating households hunted, fished, and gathered subsistence resources during the 2005 study year.

4. SRB&A would also provide personnel to assist in ADF&G fieldwork. One researcher from SRB&A assisted the ADF&G researchers in each community.

In Igiugig and Kokhanok, ADF&G researchers contacted tribal governments to arrange project scoping meetings for March 6–7, 2006, with fieldwork beginning March 13, 2006. In Koliganek, the community meeting took place on February 27, 2006, with fieldwork commencing on March 6, 2006. In New Stuyahok, the community scoping meeting occurred on February 9, 2006, and fieldwork began on February 17, 2006. In Levelock, the meeting took place on March 21, 2006, with fieldwork commencing immediately following the meeting. The goal of these meetings was to introduce the project, solicit ideas on interview topics, and establish the background for community approvals for the research. Table 1-3 reports the attendance at each scoping meeting. Issues raised during these meetings will be discussed in each community chapter.

Table 1-3.–Community scoping meetings, February–March 2006.

		Attendance	
Community	Date	Community residents	Total
Igiugig	3/6/2006	8	9[a]
Kokhanok	3/6/2006	5	6[a]
Koliganek	2/27/2006	3	4[b]
Levelock	3/21/2006	5	6[b]
New Stuyahok	2/9/2006	10	11[b]

a. Davin Holen (ADF&G) attended the meetings in Igiugig and Kokhanok.

b. Ted Krieg (ADF&G) attended the meetings in Koliganek, Levelock, and New Stuyahok.

ADF&G sent the Ekwok Village Council a letter dated January 27, 2006, which explained the project and the need for council approval before the work could begin. Subsequent phone discussions about the project took place between Division of Subsistence staff and Ekwok Village Council personnel, but on February 13, 2006, the council responded that they did not wish to participate because the project was funded by NDM.

The Portage Creek Village Council was sent a letter dated January 27, 2006, which explained the project. Later, the village council office was contacted by phone. Although several families lived in Portage Creek in years prior to the study year, only one household was living in the village full time during 2005. Other households associated with the community were seasonal residents. Because the results of just one interview could not be released or used to depict a community pattern, no surveys were conducted in Portage Creek.

Following these meetings, each of the 5 participating tribal governments passed resolutions in support of the project. Cooperative agreements for the local hire of research assistants were negotiated between ADF&G and the tribal governments of Kokhanok, Koliganek, Levelock, and New Stuyahok. The Igiugig Village Council chose not to invest the time necessary for administering a small cooperative agreement, and therefore the local assistants in this community were paid directly by ADF&G.

Table 1-4 lists all project staff. The list includes those individuals involved in project management, field research, data entry, data analysis, map production, and report writing.

Table 1-4.–Phase II subsistence harvests and uses project study staff.

Task	Name	Organization
Project design and management	James Fall	ADF&G Division of Subsistence
Data management lead	David Koster	ADF&G Division of Subsistence
Programmer	Jeannie Hetzel	ADF&G Division of Subsistence
Data entry	Jeannie Hetzel	ADF&G Division of Subsistence
	Crystal Wassillie	ADF&G Division of Subsistence
	River Ramuglia	ADF&G Division of Subsistence
Report editor	Lisa Olson	ADF&G Division of Subistence
Cartography	Iris A. Prophet	Stephen R. Braund & Associates
	Raena K. Schraer	Stephen R. Braund & Associates
	Stephen R. Braund	Stephen R. Braund & Associates
	Davin Holen	ADF&G Division of Subsistence
Field research staff	Davin Holen	ADF&G Division of Subsistence
	Ted Krieg	ADF&G Division of Subsistence
	Michael C. Wyngaard	Stephen R. Braund & Associates
	Raena K. Schraer	Stephen R. Braund & Associates
	Paul B. Lawrence	Stephen R. Braund & Associates
	Stephanie A. Schively	Stephen R. Braund & Associates
	Renee Zackar	Igiugig Local Research Assistant
	Ida Nelson	Igiugig Local Research Assistant
	Martha Kernak	Kokhanok Local Research Assistant
	Ramona Batcholder	Kokhanok Local Research Assistant
	Charlie A. Nelson	Koliganek Local Research Assistant
	Mary Lou Olson	Koliganek Local Research Assistant
	Laura Wood	Levelock Local Research Assistant
	Tim Wonhola, Sr.	New Stuyahok Local Research Assistant
	Helen (Chocknok) Pardon	New Stuyahok Local Research Assistant
S.R Braund & Associates liaison	Stephen R. Braund	Stephen R. Braund & Associates

Systematic Household Surveys

The primary method for collecting subsistence harvest and use information in this project was a systematic household survey. Following receipt of comments at the scoping meetings, ADF&G finalized the survey instrument in March 2006. A key goal was to structure the survey instrument so as to collect demographic, resource harvest and use, and other economic data that were compatible with information collected in previous rounds of household surveys in the study communities and with data that appeared in the ADF&G Community Subsistence Information System (CSIS), formerly the Community Profile Database (CPDB[2]). Appendix A is an example of the survey instrument used in this project.

ADF&G personnel trained local research assistants in each community to help administer the household survey. The goal was to interview a representative of each year-round household in all

[2] Scott, C., L. B. Brown, G. B. Jennings, and C. Utermohle. *Unpublished*. ADF&G Division of Subsistence Community Profile Database, 2001, for Microsoft Access 2000. Version 3.12. Alaska Department of Fish and Game Division of Subsistence, Juneau. Hereinafter cited as Scott et al. *Unpublished*.

communities. Participation was voluntary and all individual and household level responses were confidential.

As shown in Table 1-5, the study team interviewed 138 households in the 5 study communities, representing 73% of the final estimated year-round resident households. A census sample was attempted in Igiugig, Kokhanok, Koliganek, and Levelock. A 50% sample was attempted in the larger community of New Stuyahok (Table 1-5). No contact could be made with 18 households during the interviewing period, and 23 households declined to participate. The refusal rate for the project was 12% for all communities combined. No households in Levelock declined to participate in the survey, but one household (8%) declined in Igiugig, 5 households (13%) in Kokhanok, 11 (28%) in Koliganek, and 6 (11%) in New Stuyahok. On average, interviews (including mapping) took approximately 63 minutes to complete. The longest average for interviews was at Koliganek, at about 70 minutes, and the shortest average was about 45 minutes at Kokhanok (Table 1-6).

Mapping of Locations of Subsistence Hunting, Fishing, and Gathering, 2005

During household interviews, the researchers asked respondents to indicate the locations of their hunting, fishing, and gathering activities during the 2005 study year. In addition, interviewers asked the respondents to mark on the maps the sites of each harvest, the species harvested, the amounts harvested, and the months of harvest. ADF&G and SRB&A staff established a standard mapping method. Points were used for harvest locations and polygons (circled areas) were used for harvest effort areas. Some lines were also drawn in order to depict trap lines.

This information supplements and updates findings from earlier mapping studies, including a study of large land mammal hunting conducted by ADF&G and the Bristol Bay Native Association (BBNA) in 2001–2002 (Holen et al. 2005), an ADF&G study of freshwater fishing activities in 2003 (Krieg et al. 2005), and the mapping project conducted as part of ADF&G's "Regional Habitat Management Guides" project in the early 1980s (Wright et al. 1985: Appendix D). Table 1-7 summarizes the household sample data, by community, for the mapping interviews.

The maps used in each community consisted of a set of 3 paper maps covering the areas around 1) western Iliamna Lake, including the upper Kvichak and lower Nushagak rivers; 2) the upper Nushagak River; and 3) the lower Nushagak and Kvichak rivers, including Bristol Bay. The maps were produced by Division of Subsistence staff using ArcGIS 9.1 software on 11″ x 17″ paper at a scale of 1:700,000. Each surveyed household recorded their subsistence activities for 2005 onto 2 sets of maps: subsistence fishing (water-based) activities were recorded on one set of maps, while hunting, trapping, and plant gathering (land-based) activities were recorded on the second set. Maps were organized by writing the household's identification number, the survey date, and the interviewer's initials on each map.

Some mapping procedures differed from researcher to researcher. Some researchers chose to do the mapping while conducting the survey; that is, mapping each resource as it came up in the interview. Others chose to map harvest areas immediately following the survey. For the most part, ADF&G and SRB&A researchers conducted all the mapping portions of the interviews, except in Igiugig, where the local research assistants were trained to conduct the complete interview. Division of Subsistence staff checked all maps for consistency by matching them to the survey forms following completion of fieldwork.

Table 1-5.–Sample achievement for Kvichak and Nushagak watersheds comprehensive subsistence baseline update, 2005.

	Igiugig	Kokhanok	Koliganek	Levelock	New Stuyahok	All communities
Estimated number of dwelling units	13	36	42	19	96	206
Interview goal	13	36	42	19	48	158
Households interviewed	12	35	28	14	49	138
Households failed to contact	0	2	3	5	8	18
Households declined to be interviewed	1	5	11	0	6	23
Moved/nonresident households[a]	2	9	0	0	0	11
Total households attempted to interview	13	42	42	19	63	179
Refusal rate	8%	13%	28%	0%	11%	12%
Final estimate of permanent households	13	42	42	19	96	212
Percentage interviewed	92%	83%	67%	74%	51%	73%
Interview weighting factor	1.08	1.20	1.50	1.36	1.96	1.42
Sampled population	38	132	100	25	215	510
Estimated population	41	158	150	34	421	804

a. Nonresident households had not lived in the community for at least 3 months during the study year.

Table 1-6.–Average length of interviews.

		Length of interviews (hours)		
Community	Number of surveys	Mean	Maximum	Minimum
Igiugig	12	1.14	1.92	0.75
Kokhanok	35	0.78	2.00	0.25
Koliganek	28	1.17	4.00	0.33
Levelock	14	1.03	1.83	0.42
New Stuyahok	49	1.02	2.03	0.27
Total	**138**	**1.03**	**4.00**	**0.25**

Table 1-7.–Summary of map data interviews.

Community	Total number of households interviewed	Number of households that provided geographic use area information about:						
		Salmon	Other fishes	Land mammals	Marine mammals	Birds	Plants	Any category
Igiugig	12	11	10	10	4	8	9	11
Kokhanok	35	28	18	23	9	31	31	31
Koliganek	28	21	27	24	0	20	27	27
Levelock	14	9	12	11	2	10	13	13
New Stuyahok	49	37	38	37	0	34	46	46

Key Respondent Interviews

The initial plan was to conduct key respondent interviews in each study community in December 2005 and during the household survey period in March 2006. ADF&G staff prepared a list of topics (and interview protocol, Appendix B). Due to the late start of this project in March, key respondent interviews occurred during the survey component of the project.

In Kokhanok, Davin Holen of ADF&G, Michael Wyngaard of SRB&A, and the local research assistant conducted 25 household harvest surveys in March 2005, before 2 SRB&A staff took over. During the surveys, Holen asked additional, more in-depth questions about resource population trends, changes in harvest areas, and the subsistence uses of a unique population of freshwater seals found in Iliamna Lake. These observations are detailed in the chapter for Kokhanok. In Igiugig, no key respondent interviews were conducted because the local assistants did most of the surveys.

No formal key respondent interviews were conducted in New Stuyahok, Koliganek, or Levelock. While conducting surveys, Ted Krieg of ADF&G and the SRB&A staff mentioned below, with the help of the local assistants, recorded additional supplemental information similar to the observations described above for Kokhanok.

Household Survey Implementation

IGIUGIG

On March 16, 2006, Holen and Wyngaard (SRB&A) traveled to Igiugig to begin the household surveys. The 2 local assistants, Ida Nelson and Renee Zackar, were trained the next day. Many Igiugig residents were away from the village at the time or were leaving in the morning for a carnival in Levelock, not to return for several days. Therefore, the local assistants needed to conduct interviews on their own over the next 2 weeks when these residents returned. Twelve surveys were completed in Igiugig (see Table 1-5).

KOKHANOK

Holen and Wyngaard traveled to Kokhanok on March 13, 2006, and began the surveys the next day, assisted by Martha Kernak. They completed 3 surveys that day and 5 more the following day. Because Kokhanok is a relatively large community, the researchers hired a second local assistant, Ramona Batcholder, on March 16. Holen and Wyngaard left for Igiugig that day, while Raena Schraer and Paul Lawrence (SRB&A) took over working with the local assistants for 3

more days. The local assistants then completed the interviews on their own. In total, 35 surveys were completed in Kokhanok (Table 1-5).

KOLIGANEK

On March 6, 2006, Krieg, Schraer, and Lawrence traveled to Koliganek to conduct the harvest surveys. Charlie Nelson and Mary Lou Olson were hired on that day as local assistants. A survey training session was held and all researchers observed one entire survey. Over the next 2 days 12 surveys were completed. Krieg returned to Dillingham on March 8, and the remaining team was only able to conduct 2 surveys. At this point, it became apparent that the remaining households were reluctant to do the surveys because of the project's connection to NDM's Pebble Project operations. After consultation, the tribal council again endorsed the need for updated subsistence data. Although the concerns about NDM involvement in the process did not diminish, 13 additional households agreed to participate in the surveys. Over two more trips Krieg was able to answer tribal members' questions about the importance of the survey and complete the project. A total of 28 surveys were conducted in Koliganek (Table 1-5).

LEVELOCK

On March 21, 2006, Krieg traveled to Levelock to begin the harvest surveys. He met with 2 tribal council members and a few interested community members to discuss the project. The local assistant was not able to start work on that day so Krieg proceeded to conduct 4 surveys. Wyngaard arrived on March 22 to help conduct surveys. Laura Wood, the local assistant, was then hired and trained. She observed 3 surveys as Krieg and Wyngaard conducted them. Krieg returned to Dillingham on March 23. Wyngaard and Wood conducted 5 surveys on March 23 and 24. Wyngaard left Levelock on March 24 because all available households had been surveyed. Working independently, Wood was able to conduct 2 additional surveys by April 10, 2006. A total of 14 surveys were conducted in Levelock (Table 1-5).

NEW STUYAHOK

On February 17, 2006, Krieg, Schraer, and Wyngaard traveled to New Stuyahok to begin the harvest surveys. They met with local assistants Tim Wonhola, Sr. and Helen (Chocknok) Pardon, finalized the household list with their assistance, verified the random sample of households to be surveyed, and started the training. Training continued on February 18 and 4 surveys were completed. Krieg returned to Dillingham on February 19 and the survey teams completed an additional 17 surveys through February 21. On that date, Schraer and Wyngaard returned to Anchorage. Krieg returned to New Stuyahok and worked with Pardon February 22–27. They completed an additional 21 surveys. Krieg returned to New Stuyahok on April 5 and 6, and conducted 4 surveys with the assistance of Pardon. From April 12–13, Krieg worked with Wonhola, Sr. to conduct the final 3 surveys, which met the sample goal. A total of 49 households were surveyed in New Stuyahok (Table 1-5).

DATA ANALYSIS AND REVIEW

SURVEY DATA ENTRY AND ANALYSIS

All data were coded for data entry by Division of Subsistence staff in Anchorage and Dillingham. Responses were coded following standardized conventions used by Division of Subsistence to facilitate data entry. Information management staff within the Division of

Subsistence set up database structures within Microsoft SQL Server at ADF&G in Anchorage to hold the survey data. The database structures included rules, constraints, and referential integrity to ensure that data were entered completely and accurately. Data entry screens were available on a secured Internet site. Daily incremental backups of the database occurred, and transaction logs were backed up hourly. Full backups of the database occurred twice weekly. This ensured that no more than one hour of data entry would be lost in the unlikely event of a catastrophic failure. All survey data were entered twice and each set compared in order to minimize data entry errors.

Once data were entered and confirmed, information was processed with the use of Statistical Package for the Social Sciences (SPSS) software, version 11.5. Initial processing included the performance of standardized logic checks of the data. Logic checks are often needed in complex data sets where rules, constraints, and referential integrity do not capture all of the possible inconsistencies that may appear. Harvest data collected as numbers of animals, or in gallons or buckets were converted to pounds usable weight using standard factors (see Appendix C for conversion factors).

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

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

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

where:

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

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 that an unknown value would fall within a certain distance from the mean. In this study, the relative precision of the mean is shown in the tables as a confidence limit (CL), expressed as a percentage. Once the standard error was calculated, the CL was determined by multiplying the SE by a constant that reflected the level of significance desired, based on a

normal distribution. The constant for 95% confidence limits is 1.96. Though there are numerous ways to express the formula below, it contains the components of an SD, V, and SE.

Relative precision of the mean (CL%):

$$C.I.\%(\pm) = \frac{t_{\alpha/2} \times \frac{s}{\sqrt{n}} \times \sqrt{\frac{N-n}{N-1}}}{\bar{x}} \qquad (2)$$

where:

s = sample standard deviation,

n = sample size,

N = population size, and

$t_{\alpha/2}$ = Student's t statistic for alpha level (α=.95) with n–1 degrees of freedom.

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

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

Population Estimates and Other Demographic Information

As noted above, a goal of the research was to collect demographic information for all year-round households in each study community. Because not all households were interviewed, population estimates for each community were calculated by multiplying the average household size of interviewed households by the total number of year-round households, as identified by Division of Subsistence researchers in consultation with community officials and other knowledgeable respondents. There may be several reasons for the differences between the population estimates for each community, as well as other demographic data, generated from the division's household survey (as of December 31, 2005), and estimates developed by the federal census (April 2000), and from by the Alaska Department of Commerce, Community, and Economic Development (CACD; July 1, 2005)(see Table 1-1). The Division survey results may reflect changes in the population of each community since the 2000 federal census and the 2005 CACD. Also, the Division survey took place largely in March 2006, a month when seasonal residents of the community were likely to be absent. Some of these seasonal residents may have been part of the federal and CACD estimates. Differences in the composition of the sample upon which each population estimate was based may also account for some of the differences between the estimates.

MAP DATA ENTRY AND ANALYSIS

As noted, ADF&G staff checked maps for consistency with data recorded on the survey forms. They also removed extraneous marks from the maps to make sure the digitizing process would go as smoothly as possible. The maps were designed with tick marks which marked geographical points that could be recorded for accuracy when digitizing occurred. Each map was registered by

the GIS software using these points and then the SRB&A GIS team digitized the polygons, points, and lines that fieldworkers had hand-drawn on the paper maps during the interviews.

As a follow-up, Davin Holen of ADF&G met with SRB&A to discuss the type of map data that could be displayed in a public document during final map production. This discussion was prompted by community concerns regarding confidentiality of detailed harvest locations. SRB&A used the map template that had been used in the first phase of this project and which had been provided earlier by ADF&G. Using the template, SRB&A produced the maps for this report.

Community Review Meetings

ADF&G staff presented preliminary survey findings at meetings in New Stuyahok and Koliganek on November 3, 2006, and in Igiugig and Kokhanok on November 20, 2006. ADF&G and SRB&A staff traveled to Levelock on November 19, 2006; however, no one from the community attended the review meeting. These meetings were organized in collaboration with the village councils or the community leadership. The results of the community meetings appear in the community chapters. Table 1-8 reports attendance at each meeting.

Table 1-8.–Community meetings to review study findings.

		Attendance[a]	
Community	Date	Community residents	Total
Igiugig	11/20/2006	8	10
Kokhanok	11/20/2006	8	10
Koliganek	11/3/2006	4	2
Levelock	11/2/2006	0	2
New Stuyahok	11/4/2006	9	11

a. Davin Holen presented the findings at all meetings. In Igiugig and Kokhanok, Raena Schraer (SRB&A) attended, and in Koliganek and New Stuyahok, Stephanie Shively (SRB&A) attended. No local residents attended the scheduled meeting in Levelock.

Final Report Organization

ADF&G researchers prepared this final report. It summarizes the results of the key respondent interviews, systematic household surveys, mapping interviews conducted by ADF&G, and community meetings. The findings are organized primarily by study community. Tables with data for all study communities are placed at the end of this chapter and are referred to in subsequent chapters. These include findings on demographic characteristics (Table 1-9), place of birth (Table 1-10), employment characteristics (Table 1-11), job site locations (Table 1-12), cost of food and amount of income spent on food (Table 1-13), individual participation in harvesting and processing of wild resources (Table 1-14), characteristics of resource harvests and uses (Table 1-15), percentage of households harvesting salmon by gear type and species (Table 1-16), and a list of resources used in the study communities, including both commonly used names and Linnaean taxonomic names (Table 1-17). Figure 1-2 shows estimated harvests of wild resources, in pounds usable weight per person by study community, for years when comprehensive household surveys were conducted. Because of the large number of maps of hunting, fishing, and gathering areas used by each community in 2005 that were produced for this project, all maps are

published as Appendix D, “Harvest Use Area Maps by Community” (published in hard copy on a CD-ROM attached to the back cover of this report). Each study community has received sets of paper copies of the maps. The final chapter of the report discusses harvest trends in the study communities for salmon, moose, caribou, and total resources.

ADF&G provided a draft report to SRB&A and to the study communities for their review and comment. After receipt of comments, the report was finalized. ADF&G mailed a short (4 page) summary of the study findings to every household in the 5 study communities (Appendix E).

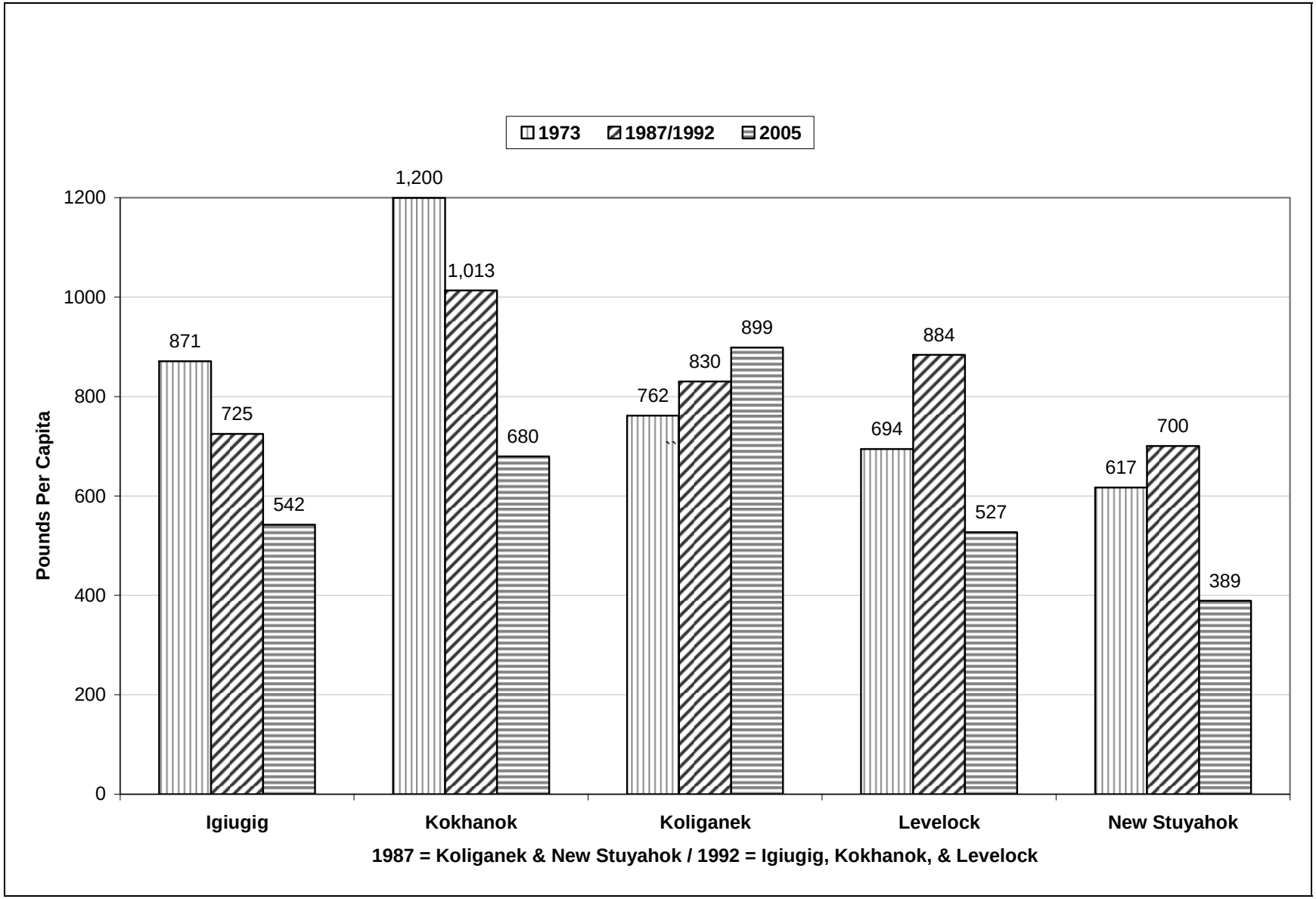

Figure 1-2.–Estimated per capita harvests of wild resources over time, all study communities.

Table 1-9.–Demographic characteristics of households within the Kvichak and Nushagak watersheds comprehensive baseline, updated 2005.

Characteristics		Igiugig	Kokhanok	Koliganek	Levelock	New Stuyahok
Sampled households		12	35	28	14	49
Number of households in the community		13	42	42	19	96
Percentage of households sampled		92.3%	83.3%	66.7%	73.7%	51.0%
Household size						
Mean		3.17	3.77	3.57	1.79	4.39
Minimum		1	1	1	1	1
Maximum		7	11	8	4	10
Sample population		38	132	100	25	215
Estimated community population		41.2	158.4	150.0	33.9	421.2
Age						
Mean		29.5	30.2	31.0	38.8	30.7
Minimum[a]		2	1	1	9.00	1
Maximum		75.0	97.0	87.0	78.0	80.0
Median		27.0	26.5	25.5	42.0	26.0
Length of residency–population						
Mean		19.8	20.5	24.0	29.4	26.5
Minimum		1.00	1.00	1.00	1.00	1
Maximum		71.0	81.0	65.0	77.0	78.0
Length of residency–household heads						
Mean		29.2	26.9	36.0	39.2	40.5
Minimum		2.0	1.0	2.0	1.0	2.0
Maximum		71.0	81.0	65.0	77.0	78.0
Sex						
Males						
	Number	19.5	75.6	72.0	23.1	248.8
	Percentage	47.4%	47.7%	48.0%	68.0%	59.1%
Females						
	Number	21.7	82.8	78.0	10.9	172.4
	Percentage	52.6%	52.3%	52.0%	32.0%	40.9%
Alaska Native						
Households (either head)						
	Number	13.0	40.8	42.0	5.4	96.0
	Percentage	100.0%	97.1%	100.0%	28.6%	100.0%
Estimated population						
	Number	33.6	154.8	144.0	19.0	415.3
	Percentage	81.6%	97.7%	96.0%	56.0%	98.6%

a. Minimum household age of zero indicates newborn in 2005.

Source ADF&G Division of Subsistence household surveys, 2006.

Table 1-10.–Place of birth of household heads: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, 2005.

	Percentage of household heads				
Birthplace[a]	Igiugig	Kokhanok	Koliganek	Levelock	New Stuyahok
Study communities					
Igiugig	36.4%	3.1%	0	12.5%	0
Kokhanok	4.5%	50.0%	0	0	1.2%
Levelock	13.6%	1.6%	0	68.8%	0
Koliganek	0	1.6%	26.7%	0	3.7%
New Stuyahok	0	0	6.7%	0	57.3%
Other Bristol Bay					
Balance of Dillingham census area	0	0	2.2%	0	0
Chignik Lagoon	0	1.6%	0	0	0
Dillingham	0	0	4.4%	0	3.7%
Ekwok	0	0	11.1%	0	6.1%
Iliamna	0	1.6%	0	6.3%	0
Naknek	0	3.1%	0	0	0
Newhalen	9.1%	6.3%	0	0	0
Nondalton	0	6.3%	0	0	0
Portage Creek	0	0	0	0	1.2%
Togiak	0	0	0	0	2.4%
Balance of Lake and Peninsula boroughs	0	0	2.2%	0	0
Branch River	4.5%	0	2.2%	0	0
Kukalek Lake	9.1%	1.6%	0	0	0
Igushik	0	0	0	0	1.2%
Old Koliganek	0	0	13.3%	0	2.4%
Tikchik	0	0	2.2%	0	0
Old Stuyahok	0	0	0	0	6.1%
Nunachuak	0	0	11.1%	0	8.5%
Pope Vannoy	0	1.6%	0	0	0
Other Alaska communities					
Anchorage	4.5%	4.7%	0	0	0
Atka	0	0	2.2%	0	0
Bethel	0	1.6%	2.2%	0	0
Juneau	0	1.6%	0	0	0
Kasigluk	0	1.6%	0	0	0
Kwethluk	0	0	0	0	3.7%
Nome	0	0	2.2%	0	0
Unalakleet	0	0	2.2%	0	0
Nelson Island	0	1.6%	0	0	0
Missing	0	1.6%	0	0	0
Unknown	0	3.1%	0	12.5%	0
Other U.S.	13.6%	6.3%	8.9%	0	2.4%
Foreign	4.5%	0	0	0	0

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

Source ADF&G Division of Subsistence household surveys, 2006.

Table 1-11.–Employment characteristics: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, 2005.

Characteristics	Igiugig	Kokhanok	Koliganek	Levelock	New Stuyahok
All adults					
Number	22.8	100.8	85.5	27.1	266.4
Mean weeks employed	31.0	21.0	25.2	30.1	25.3
Employed adults					
Number	18.4	75.6	72.0	25.8	252.7
Percentage	81.0%	75.0%	84.2%	95.0%	94.9%
Jobs					
Number	29.3	118.8	120.0	44.8	356.6
Mean	1.6	1.6	1.7	1.7	1.4
Minimum	1.0	1.0	1.0	1.0	1.0
Maximum	3.0	3.0	4.0	4.0	6.0
Months employed					
Mean	8.8	6.5	6.7	7.3	6.1
Minimum	0.0	0.0	0.0	0.0	0.0
Maximum	12.0	12.0	12.0	12.0	12.0
Percentage employed year-round	58.8%	15.9%	29.2%	21.1%	27.1%
Mean weeks employed	38.2	28.1	28.9	31.7	26.6
Households					
Number	13	42	42	19	96
Employed					
Number	11.9	42.0	36.0	19.0	96.0
Percentage	91.7%	100.0%	85.7%	100.0%	100.0%
Jobs per employed household					
Mean	2.5	2.8	3.3	2.4	3.7
Minimum	1.0	1.0	1.0	1.0	1.0
Maximum	4.0	6.0	9.0	5.0	14.0
Employed adults					
Minimum	1.0	1.0	1.0	1.0	1.0
Maximum	2.0	3.0	5.0	2.0	8.0
Mean					
Employed households	1.5	1.8	2.0	1.4	2.6
Total households	1.4	1.8	1.7	1.4	2.6
Mean person weeks of employment	59.1	50.5	57.8	43.0	70.1

Source ADF&G Division of Subsistence household surveys, 2006.

Table 1-12.–Location of jobs: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, 2005.

	Igiugig (Estimated 28 jobs)		Kokhanok (Estimated 125 jobs)		Koliganek (Estimated 122 jobs)		Levelock (Estimated 43 jobs)		New Stuyahok (Estimated 300 jobs)	
Location of Job	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Igiugig	21	73.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Kokhanok	1	3.8%	95	76.0%	0	0.0%	0	0.0%	0	0.0%
Koliganek	0	0.0%	0	0.0%	69	56.8%	0	0.0%	0	0.0%
Levelock	0	0.0%	0	0.0%	2	1.2%	22	50.0%	0	0.0%
New Stuyahok	0	0.0%	0	0.0%	0	0.0%	0	0.0%	217	72.5%
Study area subtotal	**22**	**76.9%**	**95**	**76.0%**	**71**	**58.0%**	**22**	**50.0%**	**217**	**72.5%**
Anchorage	1	3.8%	1	0	0	0	3	0	0	0.0%
Dillingham	0	0.0%	0	0.0%	15	12.3%	0	0.0%	47	15.7%
Egegik	0	0.0%	2	1.9%	0	0.0%	5	12.5%	0	0.0%
Ekwok	0	0.0%	0	0.0%	0	0.0%	1	3.1%	4	1.3%
Iliamna	1	3.8%	2	1.9%	0	0.0%	3	6.3%	0	0.0%
King Salmon	0	0.0%	0	0.0%	0	0.0%	1	3.1%	0	0.0%
Moose Pass	0	0.0%	1	1.0%	0	0.0%	0	0.0%	0	0.0%
Naknek	0	0.0%	22	17.3%	0	0.0%	4	9.4%	0	0.0%
Newhalen	0	0.0%	1	1.0%	0	0.0%	0	0.0%	0	0.0%
Nushagak	0	0.0%	0	0.0%	33	27.2%	0	0.0%	25	8.5%
Bristol Bay	0	0.0%	0	0.0%	0	0.0%	4	9.4%	0	0.0%
Bering Sea	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	0.7%
Big Mountain (near Kokhanok)	2	7.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other Alaska	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	0.7%
Other U.S.	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	0.7%
Missing	2	7.7%	0	0.0%	3	2.5%	0	0.0%	0	0.0%
Total	**28**	**100.0%**	**125**	**100.0%**	**122**	**100.0%**	**43**	**100.0%**	**300**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2006.

Table 1-13.–Estimated annual cost of purchasing food: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, 2005.

Community	Mean household cost of annual food purchase	Cost of food per capita	Percentage of annual cash income spent on food
Igiugig	$8,110	$2,561	24.8%
Kokhanok	$7,452	$1,976	24.8%
Koliganek	$7,279	$2,038	20.9%
Levelock	$4,213	$2,359	14.8%
New Stuyahok	$7,104	$1,619	25.8%

Source ADF&G Division of Subsistence household surveys, 2006.

Table 1-14.–Participation in the harvest and processing of wild resources: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, 2005.

			Igiugig	Kokhanok	Koliganek	Levelock	New Stuyahok
Total number of people			41.2	158.4	150.0	33.9	421.2
Birds / game	Hunt	Number	14.1	75.6	63.0	19.0	150.9
		Percentage	34.2%	47.7%	42.0%	56.0%	35.8%
		Missing	0	0	0	0	0
		Missing percentage	0	0	0	0	0
	Process	Number	24.9	99.6	102.0	24.4	215.5
		Percentage	60.5%	62.9%	68.0%	72.0%	51.2%
		Missing	0	0	0	0	0
		Missing percentage	0	0	0	0	0
Fishes	Fish	Number	34.7	123.6	94.5	23.1	237.1
		Percentage	84.2%	78.0%	63.0%	68.0%	56.3%
		Missing	0	0	0	0	0
		Missing percentage	0	0	0	0	0
	Process	Number	32.5	127.2	109.5	28.5	262.5
		Percentage	78.9%	80.3%	73.0%	84.0%	62.3%
		Missing	0	0	0	0	0
		Missing percentage	0	0	0	0	0
Small land mammals/ furbearers	Hunt or trap	Number	10.8	62.4	19.5	9.5	56.8
		Percentage	26.3%	39.4%	13.0%	28.0%	13.5%
		Missing	0	0	0	0	0
		Missing percentage	0	0	0	0	0
	Process	Number	7.6	86.4	48.0	12.2	66.6
		Percentage	18.4%	54.5%	32.0%	36.0%	15.8%
		Missing	0	0	0	0	0
		Missing percentage	0	0	0	0	0
Plants	Gather	Number	39.0	138.0	109.5	24.4	303.7
		Percentage	94.7%	87.1%	73.0%	72.0%	72.1%
		Missing	0	0	0	0	0
		Missing percentage	0	0	0	0	0

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Table 1-14. Page 2 of 2.

			Igiugig	Kokhanok	Koliganek	Levelock	New Stuyahok
Plants, continued							
	Process	Number	39.0	144.0	106.5	24.4	307.6
		Percentage	94.7%	90.9%	71.0%	72.0%	73.0%
		Missing	0	0	0	0	0
		Missing percentage	0	0	0	0	0
Any resource							
	Attempt	Number	40.1	145.2	123.0	27.1	358.5
		Percentage	97.4%	91.7%	82.0%	80.0%	85.1%
	Process	Number	40.1	146.4	121.5	28.5	356.6
		Percentage	97.4%	92.4%	81.0%	84.0%	84.7%

Source ADF&G Division of Subsistence household surveys, 2006.

Table 1-15.–Resource harvest and use characteristics: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, 2005.

	Igiugig	Kokhanok	Koliganek	Levelock	New Stuyahok
Mean number of resources used /household	20.9	14.0	20.5	16.6	18.3
Minimum	9.0	1.0	1.0	3.0	2.0
Maximum	43.0	38.0	36.0	34.0	34.0
95% confidence limit (±)	9.0%	7.7%	8.7%	15.8%	9.2%
Median	22.0	13.0	20.0	15.0	18.0
Mean number of resources attempted to harvest /household	17.1	11.9	15.3	12.9	14.0
Minimum	3.0	1.0	1.0	0.0	1.0
Maximum	41.0	36.0	36.0	32.0	30.0
95% confidence limit (±)	12.3%	9.4%	11.6%	19.3%	12.0%
Median	15.0	10.0	14.5	13.0	13.0
Mean number of resources harvested/household	15.8	10.7	14.3	11.8	13.3
Minimum	3.0	0.0	1.0	0.0	1.0
Maximum	41.0	32.0	34.0	32.0	30.0
95% confidence limit (±)	12.7%	9.5%	12.5%	21.3%	12.3%
Median	14.5	9.0	13.0	13.0	12.0
Mean number of resources received /household	9.9	5.7	8.1	8.0	7.5
Minimum	2.0	0.0	0.0	0.0	0.0
Maximum	20.0	21.0	28.0	28.0	25.0
95% confidence limit (±)	11.1%	13.6%	16.9%	28.3%	15.0%
Median	8.5	3.0	7.0	6.0	6.0
Mean number of resources given away/household	10.5	6.3	8.8	9.0	6.9
Minimum	1.0	0.0	0.0	0.0	0.0
Maximum	24.0	27.0	24.0	25.0	29.0
95% confidence limit (±)	12.2%	13.4%	18.3%	26.1%	21.7%
Median	9.0	5.0	7.0	7.5	5.0

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Table 1-15. Page 2 of 2.

	Igiugig	Kokhanok	Koliganek	Levelock	New Stuyahok
Mean household harvest, pounds	1,584.2	2,135.8	2,139.3	693.1	871.6
Minimum	34.8	0.0	28.1	0.0	11.5
Maximum	4,791.0	13,296.5	31,598.9	2,444.6	5,083.4
Total pounds harvested	20,594.2	89,703.8	89,852.7	13,168.4	83,671.2
Community per capita harvest, pounds	542.0	679.6	898.5	526.7	389.2
Percentage using any resource	100.0%	100.0%	100.0%	100.0%	100.0%
Percentage attempting to harvest any resource	100.0%	100.0%	100.0%	92.9%	100.0%
Percentage harvesting any resource	100.0%	97.1%	100.0%	92.9%	100.0%
Percentage receiving any resource	100.0%	94.3%	89.3%	92.9%	98.0%
Percentage giving away any resource	100.0%	82.9%	92.9%	85.7%	73.5%
Number of households in sample	12	35	28	14	49
Number of resources available	119	119	120	120	120

Source ADF&G Division of Subsistence household surveys, 2006.

Table 1-16.–Percentage of households harvesting salmon by gear type and species: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, 2005.

	Removed from commercial catch[a]	Subsistence methods					
Resource		Setnet	Dip net	Other	Subsistence gear, any method	Rod and reel	Any method
Igiugig							
Salmon	0.0%	66.7%	0.0%	0.0%	66.7%	33.3%	83.3%
Chum salmon	0.0%	25.0%	0.0%	0.0%	25.0%	0.0%	25.0%
Coho salmon	0.0%	25.0%	0.0%	0.0%	25.0%	33.3%	50.0%
Chinook salmon	0.0%	33.3%	0.0%	0.0%	33.3%	0.0%	33.3%
Pink salmon	0.0%	8.3%	0.0%	0.0%	8.3%	0.0%	8.3%
Sockeye salmon	0.0%	66.7%	0.0%	0.0%	66.7%	33.3%	83.3%
Landlocked salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spawning sockeye salmon	0.0%	33.3%	0.0%	0.0%	33.3%	25.0%	50.0%
Unknown salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Kokhanok							
Salmon	8.6%	62.9%	2.9%	2.9%	62.9%	8.6%	65.7%
Chum salmon	2.9%	11.4%	0.0%	0.0%	11.4%	0.0%	14.3%
Coho salmon	2.9%	11.4%	0.0%	0.0%	11.4%	5.7%	20.0%
Chinook salmon	5.7%	14.3%	0.0%	2.9%	17.1%	0.0%	20.0%
Pink salmon	2.9%	8.6%	0.0%	0.0%	8.6%	0.0%	11.4%
Sockeye salmon	8.6%	62.9%	2.9%	0.0%	62.9%	5.7%	65.7%
Landlocked salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spawning sockeye salmon	0.0%	48.6%	2.9%	0.0%	51.4%	8.6%	57.1%
Unknown salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Koliganek							
Salmon	32.1%	53.6%	3.6%	0.0%	53.6%	42.9%	78.6%
Chum salmon	7.1%	39.3%	0.0%	0.0%	39.3%	3.6%	50.0%
Coho salmon	7.1%	32.1%	0.0%	0.0%	32.1%	42.9%	67.9%

-continued-

Table 1-16. Page 2 of 2.

Resource	Removed from commercial catch[a]	Subsistence methods					
		Setnet	Dip net	Other	Subsistence gear, any method	Rod and reel	Any method
Koliganek, continued							
Chinook salmon	21.4%	50.0%	0.0%	0.0%	50.0%	14.3%	71.4%
Pink salmon	0.0%	3.6%	0.0%	0.0%	3.6%	7.1%	10.7%
Sockeye salmon	32.1%	53.6%	0.0%	0.0%	53.6%	3.6%	78.6%
Landlocked salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spawning sockeye salmon	0.0%	25.0%	3.6%	0.0%	28.6%	14.3%	42.9%
Unknown salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Levelock							
Salmon	21.4%	42.9%	0.0%	0.0%	42.9%	28.6%	57.1%
Chum salmon	0.0%	21.4%	0.0%	0.0%	21.4%	0.0%	21.4%
Coho salmon	7.1%	21.4%	0.0%	0.0%	21.4%	28.6%	50.0%
Chinook salmon	14.3%	21.4%	0.0%	0.0%	21.4%	0.0%	35.7%
Pink salmon	0.0%	7.1%	0.0%	0.0%	7.1%	0.0%	7.1%
Sockeye salmon	21.4%	42.9%	0.0%	0.0%	42.9%	0.0%	57.1%
Landlocked salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spawning sockeye salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unknown salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Stuyahok							
Salmon	6.1%	63.3%	0.0%	0.0%	63.3%	44.9%	71.4%
Chum salmon	4.1%	30.6%	0.0%	0.0%	30.6%	6.1%	36.7%
Coho salmon	0.0%	34.7%	0.0%	0.0%	34.7%	44.9%	69.4%
Chinook salmon	6.1%	63.3%	0.0%	0.0%	63.3%	28.6%	71.4%
Pink salmon	0.0%	2.0%	0.0%	0.0%	2.0%	0.0%	2.0%
Sockeye salmon	6.1%	49.0%	0.0%	0.0%	49.0%	8.2%	55.1%
Landlocked salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spawning sockeye salmon	0.0%	26.5%	0.0%	0.0%	26.5%	12.2%	34.7%
Unknown salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2006.

a. Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

Table 1-17.–Resources used in the study communities, 2005.

Common name(s)[a]	Linnaean taxonomic name
Fishes	
Pacific salmon	
Chum salmon	*Oncorhynchus keta*
Coho salmon	*Oncorhynchus kisutch*
Chinook salmon	*Oncorhynchus tshawytscha*
Pink salmon	*Oncorhynchus gorbuscha*
Sockeye salmon–fresh and spawning	*Oncorhynchus nerka*
Pacific herring–all life stages	*Clupea pallasi*
Rainbow smelt	*Osmerus mordax*
Cods	
Pacific (gray) cod	*Gadus macrocephalus*
Walleye pollock (whiting)	*Theragra chalcogramma*
Flounders /soles	
Starry flounder	*Platichthys stellatus*
Yellowfin sole	*Limanda aspera*
Greenlings	
Lingcod	*Ophiodon elongatus*
Pacific halibut	*Hippoglossus stenolepis*
Rockfishes[b]	*Sebastes* spp.
Sablefish (black cod)	*Anoplopoma fimbria*
Slimy sculpin (bullhead)	*Cottus cognatus*
Salmon shark	*Lamna ditropis*
(Threespine) stickleback (needlefish)	*Gasterosteus aculeatus*
Bering wolffish	*Anarhichas orientalis*
Alaska blackfish	*Dallia pectoralis*
Burbot	*Lota lota*
Chars[c]	
Arctic char–resident and anadromous	*Salvelinus alpinus*
Dolly Varden–resident and anadromous	*Salvelinus malma*
Lake trout	*Salvelinus namaycush*
Arctic grayling	*Thymallus arcticus*
Northern pike	*Esox lucius*
Sturgeons	
White sturgeon	*Acipenser transmontanus*
Longnose sucker	*Catostomus catostomus*
Trout	
Rainbow trout (resident)/steelhead trout (anadromous)	*Oncorhynchus mykiss*
Whitefishes	
Broad whitefish	*Coregonus nasus*
Least cisco	*Coregonus sardinella*
Humpback whitefish	*Coregonus pidschian*
Round whitefish	*Prosopium cylindraceum*

-continued-

Table 1-17. Page 2 of 4.

Common name(s)[a]	Linnaean taxonomic name
Land mammals	
Large land mammals	
Black bear	*Ursus americanus*
Brown bear	*Ursus arctos*
Caribou	*Rangifer tarandus*
Moose	*Alces alces*
Dall sheep	*Ovis dalli*
Small land mammals/furbearers	
Beaver	*Castor canadensis*
Coyote	*Canis latrans*
Red fox	*Vulpes vulpes*
Snowshoe hare	*Lepus americanus*
River (land) otter	*Lontra canadensis*
Lynx	*Lynx canadensis*
Alaska marmot	*Marmota broweri*
Marten	*Martes americana*
Mink	*Mustela vison*
Muskrat	*Ondatra zibethicus*
Porcupine	*Erethizon dorsatum*
Arctic ground (parka) squirrel	*Spermophilus parryii*
Red (tree) squirrel	*Tamiasciurus hudsonicus*
Short-tailed weasel (ermine)	*Mustela erminea*
Gray wolf	*Canis lupus*
Wolverine	*Gulo gulo*
Marine mammals	
Bearded seal	*Erignathus barbatus*
Harbor seal–fresh water and salt water	*Phoca vitulina*
Ringed seal	*Phoca hispida*
Sea otter	*Enhydra lutris*
Steller sea lion	*Eumetopias jubatus*
Beluga whale	*Delphinapterus leucas*
Birds and eggs	
Migratory birds and eggs	
Ducks and eggs	
Bufflehead	*Bucephala albeola*
Goldeneyes	*Bucephala* spp.
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Northern shoveler	*Anas clypeata*
American wigeon	*Anas americana*
Geese and eggs	
Canada geese	
Dusky Canada goose	*Branta canadensis occidentalis*

-continued-

Table 1-17. Page 3 of 4.

Common name(s)[a]	Linnaean taxonomic name
Geese and eggs, continued	
Lesser Canada goose	*Branta canadensis parvipes*; *B. canadensis taverner*
Snow goose	*Chen caerulescens*
White-fronted geese	*Anser* spp.
Tundra (whistling) swan	*Cygnus columbianus*
Sandhill crane	*Grus canadensis*
Seabirds and loons and eggs	
Gulls	*Larus* spp.
Terns	*Sterna* and *Chlidonias* spp.
Loons	*Gavia* spp.
Upland game birds	
Ruffed grouse	*Bonasa umbellus*
Spruce grouse	*Dendragapus canadensis*
Ptarmigan	*Lagopus* spp.
Marine invertebrates	
Butter clam	*Saxidomus giganteus*
Freshwater clams	*Anodonta* spp.
Horse clam (gaper)	*Tresus capax*
Pacific littleneck (steamer) clam	*Protothaca staminea*
Pinkneck (surf) clam	*Mactromeris polynyma*
Pacific razor clam	*Siliqua patula*
Nuttall cockle	*Clinocardium nuttallii*
Crabs	
Dungeness crab	*Cancer magister*
King crabs	*Paralithodes* spp.; *Lithodes* spp.
Tanner crabs	
Tanner crab, bairdi	*Chionoecetes bairdi*
Mussels	*Mytilus* spp.
Octopus	*Octopus vulgaris*
Weathervane scallop	*Patinopecten caurinus*
Shrimps	*Pandalus* spp.; *Penaeus* spp.
Plants and fungi	
Berries	
Crowberry (blackberry)	*Empetrum nigrum*
Alpine blueberry	*Vaccinium uliginosum*
Bog cranberry	*Oxycoccus microcarpus*
High bush cranberry	*Viburnum edule*
Cranberry (lingonberry)	*Vaccinium vitus-idaea*
Northern black currant	*Ribes hudsonianum*
Northern red currant	*Ribes triste*
Nagoonberry	*Rubus arcticus*
Raspberry	*Rubus idaeus*
Salmonberry, cloudberry	*Rubus chamaemorus*

-continued-

Table 1-17. Page 4 of 4.

Common name(s)[a]	Linnaean taxonomic name
Plants and fungi, continued	
Other plants	
Chickweeds	*Stellaria* spp.
Coltsfoot, wild spinach	*Petasites hyperboreus*
Ferns (fiddleheads)	Various spp.
Fireweed	*Epilobium angustifolium*
Grasses	*Graminea family*
Horsetails	*Equisetum* spp.
Labrador tea	*Ledum palustre*
Common mountain juniper	*Juniperus communis*
Pineapple weed	*Matricaria matricarioides*
Rose hips	*Rosa acicularis*
Roseroot	*Sedum rosea*
Sour dock, wild rhubarb	*Rumex fenestratus*
Cinquefoil (tundra rose)	*Potentilla fruticosa*
Cow parsnip (wild celery)	*Heracleum lanatum*
Flag (wild iris)	*Iris setosa*
Chive (wild onion)	*Allium schoenoprasm*
Wild pea	*Hedysarum mackenzii*
Wooly lousewort	*Pedicularis kanei*
Wormwood	*Artemisia tilesii*
Yarrow	*Achillea borealis*
Fungi	Various spp.
Trees	
White spruce	*Picea glauca*
Paper birch	*Betula papyrifera*
Balsam poplar (cottonwood)	*Populus balsamifera*
Mountain ash	*Sorbus scopulina*
Alder	*Alnus incana*

a. This table lists species harvested and / or used by study community residents, but that may not be specifically discussed in this report.

b. The household survey specified black rockfish species as dark dusky, black, light dusky, silvergray, widow and yellowtail and gave their common name as "sea bass" or "black bass." The household survey specified red rockfish species as yelloweye (for which "red snapper" was given as a common name), rougheye, Pacific ocean perch, darkblotched, harlequin, northern, copper, quillback, rosethorn, redstripe, canary, shortraker, blackquill, red banded and tiger, as well as shortspine thornyhead (*Sebastolobus alascanus*), for which "idiotfish" was given as a common name.

c. The household survey specified Arctic char, Dolly Varden, and sea-run Dolly Varden.

Source ADF&G Division of Subsistence household harvest survey. See Appendix A.

CHAPTER 2: IGIUGIG

COMMUNITY BACKGROUND

The residents of the western and southern shores of Iliamna Lake and the Nushagak and Kvichak river watersheds once consisted of 2 distinct Central Yup'ik groups, the *Kiatagmiut*, who were the more northern group, and the *Aglurmiut*. The *Aglurmiut* territory may have included most of the Alaska Peninsula as far south as Port Moller, as well as the western two-thirds of Iliamna Lake (VanStone 1967). According to VanStone (1984:224–225), the diversity of intra-Yup'ik ethnicity became blurred with European contact "as epidemic diseases, the establishment of schools and missions, and particularly the emergence of the fur trade and an important commercial salmon-fishing industry in Bristol Bay resulted in considerable movement of Eskimos throughout the region, the coalescence of some populations and the dispersal of others." Igiugig is a village at the mouth of the Kvichak River at the outlet of Iliamna Lake. One factor of cultural change that especially affected some residents of Igiugig was reindeer herding. Today, a few elders in Igiugig remember working with the reindeer as children as they moved from camp to camp with their parents, working with the reindeer.

Descendents of the residents of the region, who once moved with the seasons from camp to camp following a patterned seasonal round, or who once moved with their reindeer herds, today are settled in Igiugig. There are many lodges nearby for sport hunting and fishing, and this small village has 2 guest houses for fishers and hunters run by year-round residents.

DEMOGRAPHY, CASH EMPLOYMENT, AND MONETARY INCOME

DEMOGRAPHY

According to the federal census, Igiugig had 53 residents in 2000, of which 72% (38 residents) were Alaska Native (U. S. Census Bureau 2001) (Table 1-1). The household survey in 2005 found a population of 41 residents, of which 83% (34 residents) were Alaska Native (Table 1-1). Local residents interviewed for this project attributed the population decline to young people moving away and to the death of elders. Also, some of the people counted in the federal census may have been seasonal residents of the community, such as teachers.

There were an estimated 13 year-round households in Igiugig (Table 1-5). Of these, 12 households (92%) were interviewed. Interviewers contacted all households. One household declined to be interviewed (8%).

The mean number of years of residency in Igiugig was 20 years, with the maximum residence at 71 years (Table 1-9). The largest age cohort for both males and females was youth between the ages of 4 and 14 years of age (Table 2-1 and Figure 2-1). Other age categories were fairly evenly distributed. As Igiugig is a small community, a single individual can change the frequency dramatically, a point to keep in mind while reviewing Figure 2-1.

Of the Igiugig household heads interviewed, 82% were born in Alaska (Table 1-10). Most were born in Igiugig (36%) or in nearby Levelock (14%). In addition, 9% were born at Kukalek Lake, a winter seasonal residence before the local population consolidated in permanent, year-round villages.

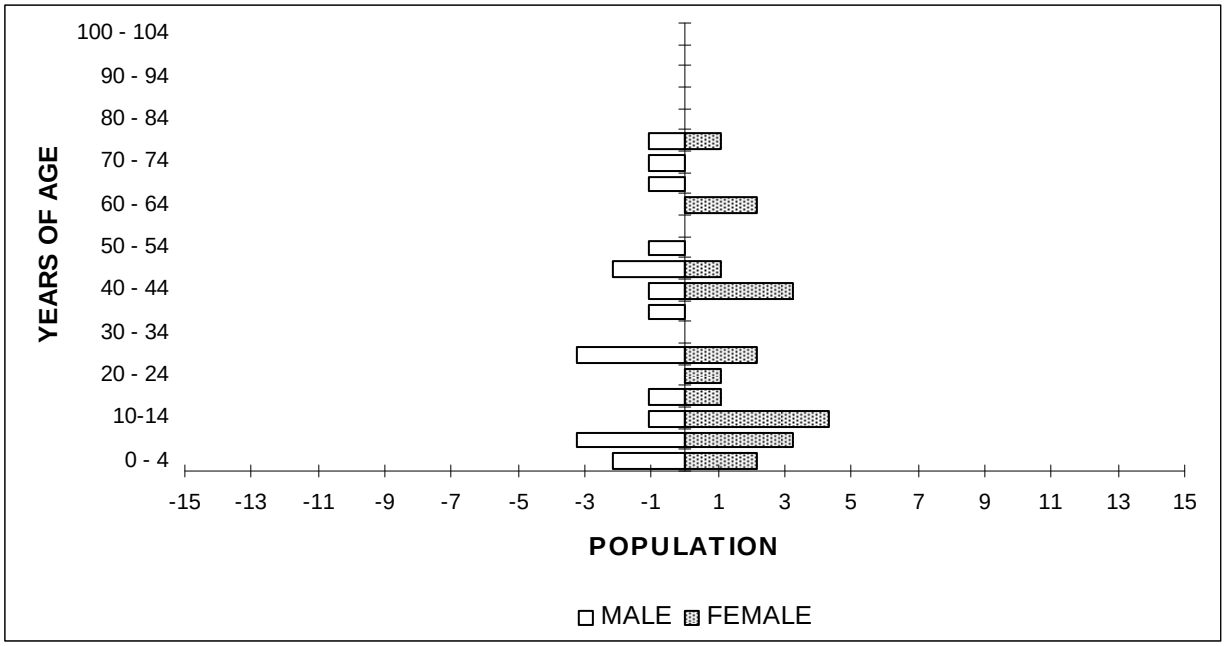

Figure 2-1.–Population profile, Igiugig, 2005.
Source ADF&G Division of Subsistence household surveys, 2005.

Table 2-1.–Population profile, Igiugig, 2005.

	Male			Female			Total		
Age	Number	Percentage	Cum. percentage	Number	Percentage	Cum. percentage	Number	Percentage	Cum. percentage
0 – 4	2.17	11.11%	11.11%	2.17	10.00%	10.00%	4.33	10.53%	10.53%
5 – 9	3.25	16.67%	27.78%	3.25	15.00%	25.00%	6.50	15.79%	26.32%
10 – 14	1.08	5.56%	33.33%	4.33	20.00%	45.00%	5.42	13.16%	39.47%
15 – 19	1.08	5.56%	38.89%	1.08	5.00%	50.00%	2.17	5.26%	44.74%
20 – 24	0.00	0.00%	38.89%	1.08	5.00%	55.00%	1.08	2.63%	47.37%
25 – 29	3.25	16.67%	55.56%	2.17	10.00%	65.00%	5.42	13.16%	60.53%
30 – 34	0.00	0.00%	55.56%	0.00	0.00%	65.00%	0.00	0.00%	60.53%
35 – 39	1.08	5.56%	61.11%	0.00	0.00%	65.00%	1.08	2.63%	63.16%
40 – 44	1.08	5.56%	66.67%	3.25	15.00%	80.00%	4.33	10.53%	73.68%
45 – 49	2.17	11.11%	77.78%	1.08	5.00%	85.00%	3.25	7.89%	81.58%
50 – 54	1.08	5.56%	83.33%	0.00	0.00%	85.00%	1.08	2.63%	84.21%
55 – 59	0.00	0.00%	83.33%	0.00	0.00%	85.00%	0.00	0.00%	84.21%
60 – 64	0.00	0.00%	83.33%	2.17	10.00%	95.00%	2.17	5.26%	89.47%
65 – 69	1.08	5.56%	88.89%	0.00	0.00%	95.00%	1.08	2.63%	92.11%
70 – 74	1.08	5.56%	94.44%	0.00	0.00%	95.00%	1.08	2.63%	94.74%
75 – 79	1.08	5.56%	100.00%	1.08	5.00%	100.00%	2.17	5.26%	100.00%
80 – 84	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
85 – 89	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
90 – 94	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
95 – 99	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
100 – 104	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
Missing	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
Total	**19.50**	**100.00%**		**21.67**	**100.00%**		**41.17**	**100.00%**	

Source ADF&G Division of Subsistence household surveys, 2005.

CASH EMPLOYMENT CHARACTERISTICS AND MONETARY INCOME

In 2005, 57% of the earned income in Igiugig resulted from jobs with the local government (Table 2-2). Construction jobs added 27% of earned income. Of jobs held by residents, local government provided 54%, construction 15%, the service sector 12%, commercial fishing 8%, and mining 8%. Most jobs were located in Igiugig (73%), with the rest located outside the study area, such as construction and mining jobs based in neighboring Iliamna (Table 1-12).

Fifty-nine percent of adults in Igiugig were employed year-round in 2005 while 81% of all adults were employed at some time during the year (Table 1-11). As there were a number of retired residents in Igiugig, it appeared that everyone of working age had had a job at some point during the year. The mean for months employed was 9. On average, in 2005, households contained 1.5 employed adults, and 92% of households contained at least one adult who was employed.

Table 2-2.–Employment by industry, Igiugig, 2005.

	Jobs	Households	Individuals	Percentage of income
Estimated total number[a]	**28.2**	**10.8**	**17.3**	
Federal government	0.0%	0.0%	0.0%	0.0%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Natural scientists and mathematicians	0.0%	0.0%	0.0%	0.0%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
State government	0.0%	0.0%	0.0%	0.0%
Teachers, librarians, and counselors	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Local government	53.8%	66.7%	68.8%	56.9%
Executive, administrative and managerial	7.7%	16.7%	12.5%	12.9%
Social scientists, social workers, religious workers and lawyers	3.8%	8.3%	6.3%	13.0%
Teachers, librarians, and counselors	19.2%	25.0%	18.8%	6.0%
Health diagnosing and treating practitioners	3.8%	8.3%	6.3%	8.4%
Registered nurses, pharmacists, dietitians, therapists and P.A.s	0.0%	0.0%	0.0%	0.0%
Health technologists and technicians	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Marketing and sales occupations	0.0%	0.0%	0.0%	0.0%
Administrative support occupations, including clerical	3.8%	8.3%	6.3%	7.5%
Service occupations	7.7%	16.7%	12.5%	5.4%
Agricultural, forestry and fishing occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	7.7%	16.7%	12.5%	3.7%
Construction and extractive occupations	0.0%	0.0%	0.0%	0.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Production working occupations	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%

-continued-

Table 2-2. Page 2 of 3.

	Jobs	Households	Individuals	Percentage of income
Agriculture, forestry & fishing	7.7%	16.7%	12.5%	0.0%
Service occupations	0.0%	0.0%	0.0%	0.0%
Agricultural, forestry and fishing occupations	7.7%	16.7%	12.5%	0.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Mining	7.7%	16.7%	12.5%	7.1%
Service occupations	3.8%	8.3%	6.3%	0.9%
Construction and extractive occupations	3.8%	8.3%	6.3%	6.2%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Construction	15.4%	16.7%	12.5%	26.5%
Service occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	15.4%	16.7%	12.5%	26.5%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Manufacturing	0.0%	0.0%	0.0%	0.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Transportation, communication & utilities	3.8%	8.3%	6.3%	2.0%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	3.8%	8.3%	6.3%	2.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Wholesale trade	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Retail trade	0.0%	0.0%	0.0%	0.0%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Marketing and sales occupations	0.0%	0.0%	0.0%	0.0%
Service occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Services	11.5%	25.0%	18.8%	7.5%
Executive, administrative and managerial	3.8%	8.3%	6.3%	0.9%
Natural scientists and mathematicians	3.8%	8.3%	6.3%	4.7%
Writers, artists, entertainers, and athletes	0.0%	0.0%	0.0%	0.0%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%

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Table 2-2. Page 3 of 3.

	Jobs	Households	Individuals	Percentage of income
Services, continued				
Health diagnosing and treating practitioners	0.0%	0.0%	0.0%	0.0%
Health technologists and technicians	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Agricultural, forestry and fishing occupations	0.0%	0.0%	0.0%	0.0%
Production working occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Miscellaneous occupations	3.8%	8.3%	6.3%	1.9%

a. Estimated number of households and individuals includes only those that were employed during the study period.

Source ADF&G Division of Subsistence household surveys, 2006.

LEVELS OF PARTICIPATION IN THE HARVESTS AND USES OF WILD RESOURCES

Table 1-14 reports levels of individual participation in the harvest and processing of wild resources by Igiugig residents in 2005. Most of the residents fished (84%) and processed fish (79%). Thirty-four percent of Igiugig residents hunted birds and large land mammals and 61% processed game and birds. Twenty-six percent of residents trapped or hunted furbearers and 18% processed furbearing animals. Picking berries and other wild plants involved almost everyone in the community: 95% of the residents harvested and processed wild plants. In total, 97% of Igiugig residents attempted to harvest or processed wild resources in 2005.

RESOURCE HARVEST AND USE PATTERNS

Table 1-15 summarizes resource harvest and use characteristics for Igiugig in 2005. All households (100%) used, attempted to harvest, and harvested at least one wild resource. The average harvest was 1,716 lb usable weight per household, or 542 lb per capita. During the study year, Igiugig households harvested an average of 16 different kinds of resources and used an average of 21 different kinds of resources. The maximum number of resources used by any household was 43. In addition, households gave away an average of 11 different kinds of resources.

Species Used and Seasonal Round

Fish were by far the most commonly harvested resource in Igiugig in 2005, which is typical of communities of Southwest Alaska. In 2005, 100% of the households in Igiugig harvested sockeye salmon. In the spring, community residents set gillnets along the Kvichak River beach in front of the community in order to harvest the abundant sockeye salmon. Coho and Chinook salmon were also harvested. In late summer, Igiugig residents harvested spawning sockeye salmon at fish camps located downstream from the community. Late summer also saw the

ripening of berries on the low bushes of the surrounding tundra; 100% of the households reported harvesting and using berries (Table 2-3).

Iliamna Lake and surrounding smaller lakes and streams that branch off the Kvichak River support numerous freshwater fish species which were harvested throughout the 2005 study year. Ice fishing was a major subsistence activity in the winter, with residents targeting Dolly Varden, Arctic grayling, trout, and northern pike. In 2005, 83% of Igiugig households harvested freshwater fishes, and 100% of households used non-salmon fishes.

A fall activity that often stretched into the winter was caribou hunting. In 2005, the second major source of subsistence foods by weight at Igiugig (after sockeye salmon) was caribou (see Table 2-4 for a list of the top 10 resources harvested and used by Igiugig residents). During the study year, 100% of households used caribou and 75% hunted caribou (Table 2-3). In addition to caribou, moose were the other large land mammals that contributed to the diet of residents of Igiugig, with 100% of residents using moose and 50% of residents hunting moose (Table 2-3).

Migratory birds traveled through the Iliamna Lake area in the fall and spring, stopping to rest on the marsh and tundra areas that surround Igiugig. In 2005, 83% of the households used migratory birds and 58% harvested them. Bird eggs were also important, and were found on the islands near the south shore of Iliamna Lake and on the islands in the Kvichak River downstream of the village. Sixty-eight percent of residents harvested bird eggs and 83% reported using eggs in 2005 (Table 2-3).

Both beluga whales and freshwater seals (a distinct population of harbor seal; *Phoca vitulina*)[3] were important to the diet as well (see Table 2-4). Beluga whales were hunted near the mouth of the Kvichak River near Levelock and seals within the Kvichak River itself.

Harvest Quantities

Table 2-3 reports estimated wild resource harvests and uses by Igiugig residents in 2005 and is organized first by general category and then by species. All resources are reported in pounds usable weight (see Appendix C for conversion factors). The "harvest" category includes resources taken by any member of the surveyed household during the study year. The "use" category includes all resources taken and given away by a household, and resources acquired after a harvest, either as gifts, by trade, through hunting partnerships, or as meat given to hunting guides by their clients. Purchased foods are not included. Differences between harvest and use percentages reflect sharing between households, which resulted in a wider distribution of wild foods.

The total harvest for all subsistence resources during 2005 for Igiugig was 22,310 lb, or 542 lb per person (Table 2-3). Table 2-4 lists the top 10 resources harvested, in terms of pounds per capita, and the 10 resources used by the most Igiugig households.

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[3] Iliamna Lake's resident harbor seal population is one of two harbor seal populations worldwide that is resident in fresh waters year round (Smith et al. 1996:272). The other, *Phoca vitulina mellonae*, is found in Lacs de Loups Marins, or Lower Seal Lakes, on the Ungava Peninsula in northern Quebec.

Table 2-3.–Estimated harvests and uses of fish, game, and plant resources, Igiugig, 2005.

	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
Resource name(s)	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
All resources	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**22,310.3**	**1,716.2**	**542.0**				**16.9%**
Fishes	100.0%	91.7%	91.7%	91.7%	91.7%	10,892.6	837.9	264.6				19.1%
Pacific salmon	100.0%	91.7%	91.7%	83.3%	83.3%	8,447.3	649.8	205.2	1,952.2	Ind	150.2	19.1%
Chum salmon	33.3%	33.3%	25.0%	16.7%	25.0%	472.1	36.3	11.5	89.9	Ind	6.9	42.6%
Coho salmon	58.3%	50.0%	50.0%	25.0%	0.0%	729.7	56.1	17.7	154.9	Ind	11.9	40.3%
Chinook salmon	50.0%	41.7%	33.3%	33.3%	16.7%	220.4	17.0	5.4	18.4	Ind	1.4	35.5%
Pink salmon	8.3%	8.3%	8.3%	0.0%	0.0%	109.2	8.4	2.7	43.3	Ind	3.3	63.5%
Sockeye salmon	100.0%	91.7%	91.7%	75.0%	83.3%	6,915.9	532.0	168.0	1,645.6	Ind	126.6	20.4%
Fresh sockeye salmon	100.0%	83.3%	83.3%	50.0%	75.0%	6,231.0	479.3	151.4	1,331.4	Ind	102.4	22.0%
Spawning sockeye salmon	75.0%	50.0%	50.0%	50.0%	41.7%	684.9	52.7	16.6	314.2	Ind	24.2	24.6%
Landlocked salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Non-salmon fishes	100.0%	83.3%	83.3%	91.7%	58.3%	2,445.4	188.1	59.4				29.4%
Pacific herring	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring roe	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring sac roe	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring spawn on kelp	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Rainbow smelt	58.3%	16.7%	16.7%	50.0%	33.3%	630.5	48.5	15.3	105.1	Gal	8.1	62.1%
Cods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Pacific (gray) cod	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Walleye pollock (whiting)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown cods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Flounders	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 2-3. Page 2 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Non-salmon fishes, flounders, continued												
Unknown flounders	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Greenlings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Lingcod	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown greenlings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Pacific halibut	25.0%	0.0%	0.0%	25.0%	8.3%	0.0	0.0	0.0	0.0	Lb	0.0	0.0%
Rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
"Black" rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
"Red" rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sablefish (black cod)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sculpins	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Slimy sculpin (bullhead)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sharks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown sharks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Soles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown soles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Threespine stickleback (needlefish)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Wolffish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Alaska blackfish	25.0%	25.0%	16.7%	8.3%	0.0%	2.7	0.2	0.1	37.9	Ind	2.9	54.4%
Burbot	16.7%	16.7%	16.7%	8.3%	8.3%	18.4	1.4	0.4	18.4	Ind	1.4	55.9%

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Table 2-3. Page 3 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Non-salmon fishes, continued												
Chars	58.3%	50.0%	50.0%	25.0%	16.7%	166.8	12.8	4.1	119.2	Ind	9.2	26.8%
Arctic char–resident and anadromous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Dolly Varden	41.7%	41.7%	41.7%	8.3%	8.3%	125.9	9.7	3.1	89.9	Ind	6.9	29.1%
Dolly Varden–anadromous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Dolly Varden–resident												
Lake trout	25.0%	16.7%	16.7%	16.7%	8.3%	41.0	3.2	1.0	29.3	Ind	2.3	43.2%
Arctic grayling	75.0%	66.7%	66.7%	16.7%	16.7%	73.6	5.7	1.8	105.1	Ind	8.1	40.3%
Northern pike	50.0%	50.0%	50.0%	16.7%	16.7%	667.3	51.3	16.2	238.3	Ind	18.3	44.3%
Sturgeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown sturgeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Longnose sucker	25.0%	25.0%	25.0%	8.3%	0.0%	136.5	10.5	3.3	91.0	Ind	7.0	40.5%
Trout	83.3%	66.7%	58.3%	58.3%	25.0%	517.2	39.8	12.6	369.4	Ind	28.4	28.3%
Rainbow trout–resident	83.3%	66.7%	58.3%	58.3%	25.0%	439.8	33.8	10.7	314.2	Ind	24.2	28.6%
Steelhead trout–anadromous	25.0%	25.0%	25.0%	8.3%	8.3%	65.2	5.0	1.6	46.6	Ind	3.6	41.0%
Unknown trout	8.3%	8.3%	8.3%	0.0%	8.3%	12.1	0.9	0.3	8.7	Ind	0.7	63.5%
Whitefishes	66.7%	50.0%	50.0%	41.7%	16.7%	232.4	17.9	5.6	139.8	Ind	10.8	32.1%
Broad whitefish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Ciscos	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Least cisco	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Humpback whitefish	58.3%	41.7%	41.7%	33.3%	16.7%	216.1	16.6	5.3	123.5	Ind	9.5	35.0%
Round whitefish	8.3%	8.3%	8.3%	8.3%	0.0%	16.3	1.3	0.4	16.3	Ind	1.3	63.5%

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Table 2-3. Page 4 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Land mammals	100.0%	75.0%	58.3%	91.7%	83.3%	8,555.1	658.1	207.8				21.2%
Large land mammals	100.0%	75.0%	58.3%	91.7%	83.3%	8,352.5	642.5	202.9	34.7	Ind	2.7	21.2%
Black bear	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Brown bear	50.0%	33.3%	25.0%	41.7%	41.7%	1,105.0	85.0	26.8	3.3	Ind	0.3	33.2%
Caribou	100.0%	75.0%	58.3%	83.3%	75.0%	3,737.5	287.5	90.8	24.9	Ind	1.9	22.5%
Moose	100.0%	50.0%	41.7%	66.7%	75.0%	3,510.0	270.0	85.3	6.5	Ind	0.5	24.7%
Dall sheep	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Small land mammals/furbearers	50.0%	41.7%	33.3%	16.7%	41.7%	202.6	15.6	4.9	73.7	Ind	5.7	37.1%
Beaver	33.3%	33.3%	33.3%	8.3%	16.7%	113.8	8.8	2.8	13.0	Ind	1.0	82.1%
Coyote	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Foxes	16.7%	16.7%	16.7%	0.0%	8.3%	0.0	0.0	0.0	23.8	Ind	1.8	57.5%
Red fox	16.7%	16.7%	16.7%	0.0%	8.3%	0.0	0.0	0.0	23.8	Ind	1.8	57.5%
Hares	8.3%	8.3%	8.3%	0.0%	0.0%	10.8	0.8	0.3	5.4	Ind	0.4	63.5%
Snowshoe hare	8.3%	8.3%	8.3%	0.0%	0.0%	10.8	0.8	0.3	5.4	Ind	0.4	63.5%
River (land) otter	16.7%	25.0%	16.7%	0.0%	0.0%	0.0	0.0	0.0	6.5	Ind	0.5	45.6%
Lynx	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Alaska marmot	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Marten	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Mink	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Muskrat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Porcupine	50.0%	41.7%	33.3%	16.7%	33.3%	78.0	6.0	1.9	9.8	Ind	0.8	33.2%
Squirrels	0.0%	8.3%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Arctic ground (parka) squirrel	0.0%	8.3%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Red (tree) squirrel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 2-3. Page 5 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Small land mammals/furbearers, continued												
Short-tailed weasel	8.3%	8.3%	8.3%	0.0%	0.0%	0.0	0.0	0.0	5.4	Ind	0.4	63.5%
Gray wolf	16.7%	16.7%	16.7%	0.0%	8.3%	0.0	0.0	0.0	5.4	Ind	0.4	43.9%
Wolverine	16.7%	25.0%	16.7%	0.0%	8.3%	0.0	0.0	0.0	4.3	Ind	0.3	48.8%
Marine mammals	66.7%	33.3%	33.3%	58.3%	41.7%	1,203.6	92.6	29.2				50.1%
Seals	50.0%	33.3%	33.3%	41.7%	33.3%	303.3	23.3	7.4	5.4	Ind	0.4	29.4%
Bearded seal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Harbor seal – fresh water	50.0%	33.3%	33.3%	41.7%	33.3%	303.3	23.3	7.4	5.4	Ind	0.4	29.4%
Harbor seal– salt water	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Ringed seal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sea otter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Steller sea lion	8.3%	0.0%	0.0%	8.3%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Whales	41.7%	8.3%	8.3%	33.3%	25.0%	900.3	69.3	21.9	1.1	Ind	0.1	63.5%
Beluga whale	41.7%	8.3%	8.3%	33.3%	25.0%	900.3	69.3	21.9	1.1	Ind	0.1	63.5%
Birds and eggs	91.7%	83.3%	83.3%	50.0%	66.7%	486.9	37.5	11.8				28.2%
Migratory birds	83.3%	58.3%	58.3%	41.7%	41.7%	233.7	18.0	5.7	151.7	Ind	11.7	39.9%
Ducks	58.3%	50.0%	50.0%	25.0%	33.3%	90.4	7.0	2.2	102.9	Ind	7.9	43.6%
Bufflehead	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Goldeneyes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown goldeneyes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Mallard	58.3%	50.0%	50.0%	25.0%	33.3%	53.1	4.1	1.3	53.1	Ind	4.1	44.5%
Northern pintail	41.7%	41.7%	41.7%	8.3%	25.0%	29.5	2.3	0.7	36.8	Ind	2.8	37.5%
Northern shoveler	8.3%	8.3%	8.3%	0.0%	0.0%	7.8	0.6	0.2	13.0	Ind	1.0	63.5%
Wigeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 2-3. Page 6 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Migratory birds, ducks, continued												
American wigeon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown ducks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Geese	75.0%	58.3%	58.3%	16.7%	41.7%	74.4	5.7	1.8	39.0	Ind	3.0	88.5%
Canada geese	66.7%	58.3%	58.3%	8.3%	41.7%	27.6	2.1	0.7	19.5	Ind	1.5	20.0%
Dusky Canada geese	8.3%	8.3%	8.3%	0.0%	8.3%	3.9	0.3	0.1	1.1	Ind	0.1	63.5%
Lesser Canada geese[b]	50.0%	41.7%	41.7%	8.3%	25.0%	19.5	1.5	0.5	16.3	Ind	1.3	28.1%
Unknown Canada geese	8.3%	8.3%	8.3%	0.0%	8.3%	4.2	0.3	0.1	2.2	Ind	0.2	63.5%
Snow goose	8.3%	0.0%	0.0%	8.3%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
White-fronted geese	8.3%	8.3%	8.3%	0.0%	0.0%	46.8	3.6	1.1	19.5	Ind	1.5	63.5%
Unknown geese	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Swans	41.7%	41.7%	41.7%	8.3%	25.0%	32.5	2.5	0.8	5.4	Ind	0.4	22.7%
Tundra (whistling) swan	41.7%	41.7%	41.7%	8.3%	25.0%	32.5	2.5	0.8	5.4	Ind	0.4	22.7%
Cranes	16.7%	16.7%	16.7%	0.0%	8.3%	36.4	2.8	0.9	4.3	Ind	0.3	48.8%
Sandhill crane	16.7%	16.7%	16.7%	0.0%	8.3%	36.4	2.8	0.9	4.3	Ind	0.3	48.8%
Seabirds and loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Other birds	50.0%	41.7%	41.7%	25.0%	25.0%	67.5	5.2	1.6	96.4	Ind	7.4	39.1%
Upland game birds	50.0%	41.7%	41.7%	25.0%	25.0%	67.5	5.2	1.6	96.4	Ind	7.4	39.1%
Unknown grouse	25.0%	25.0%	25.0%	8.3%	16.7%	11.4	0.9	0.3	16.3	Ind	1.3	38.1%
Ptarmigan	50.0%	41.7%	41.7%	16.7%	25.0%	56.1	4.3	1.4	80.2	Ind	6.2	42.3%
Unknown ptarmigan	50.0%	41.7%	41.7%	16.7%	25.0%	56.1	4.3	1.4	80.2	Ind	6.2	42.3%

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Table 2-3. Page 7 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Birds, continued												
Bird eggs	83.3%	75.0%	66.7%	41.7%	58.3%	185.7	14.3	4.5				21.2%
Duck eggs	33.3%	33.3%	25.0%	16.7%	25.0%	9.1	0.7	0.2	60.7	Gal	4.7	33.4%
Unknown duck eggs	33.3%	33.3%	25.0%	16.7%	25.0%	9.1	0.7	0.2	60.7	Gal	4.7	33.4%
Goose eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown goose eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Seabird eggs	83.3%	75.0%	66.7%	41.7%	58.3%	176.6	13.6	4.3	715.0	Gal	55.0	21.6%
Gull eggs	75.0%	66.7%	58.3%	41.7%	58.3%	169.0	13.0	4.1	563.3	Gal	43.3	22.7%
Tern eggs	58.3%	58.3%	50.0%	16.7%	33.3%	7.6	0.6	0.2	151.7	Gal	11.7	28.3%
Unknown eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Marine invertebrates	16.7%	0.0%	0.0%	16.7%	0.0%	0.0	0.0	0.0				0.0%
Clams	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Butter clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Freshwater clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Horse clam (gapers)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pacific littleneck (steamer) clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pinkneck (surf) clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pacific razor clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown clams	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Cockles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown cockles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Crabs	16.7%	0.0%	0.0%	16.7%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Dungeness crab	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
King crabs	16.7%	0.0%	0.0%	16.7%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 2-3. Page 8 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Marine invertebrates, king crabs, continued												
Unknown king crabs	16.7%	0.0%	0.0%	16.7%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Tanner crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Tanner crab, Bairdi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown tanner crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Octopus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Scallops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown scallops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Shrimps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Plants and fungi	100.0%	100.0%	100.0%	66.7%	83.3%	1,172.2	90.2	28.5				20.7%
Berries	91.7%	83.3%	83.3%	33.3%	58.3%	983.7	75.7	23.9	245.9	Gal	18.9	18.2%
Other plants / mushrooms	50.0%	50.0%	50.0%	8.3%	8.3%	188.5	14.5	4.6	47.1	Gal	3.6	44.4%
Trees (wood)	75.0%	66.7%	66.7%	33.3%	50.0%	0.0	0.0	0.0	106.2	Crd	8.2	32.4%

Note Differences between harvest and use percentages reflect sharing between households.

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

b. Both *B. canadensis taverner* and *B. canadensis parvipes.*

Source ADF&G Division of Subsistence household surveys, 2005.

Table 2-4.–Top 10 resources harvested and used, Igiugig, 2005.

Harvest			Use		Percentage
Rank	Resource	Pounds per capita	Rank	Resource	households using
1	Fresh sockeye salmon	151.4	1	Fresh sockeye salmon	100%
2	Caribou	90.8	1	Caribou	100%
3	Moose	85.3	1	Moose	100%
4	Brown bear	26.8	4	Berries	92%
5	Berries	23.9	5	Rainbow trout	83%
6	Beluga whale	21.9	6	Arctic grayling	75%
7	Spawning sockeye salmon	16.6	6	Spawning sockeye salmon	75%
8	Northern pike	16.2	6	Gull eggs	75%
9	Rainbow smelt	15.3	9	Canada geese	67%
10	Freshwater seals	7.4	10	Humpback whitefish	58%
			10	Coho salmon	58%
			10	Smelt	58%
			10	Mallard	58%
			10	Tern eggs	58%

Source ADF&G Division of Subsistence household surveys, 2005.

Fishes constituted the largest portion of the subsistence harvest, which totaled 10,893 lb (50%), or 265 lb per person (Figure 2-2). Based upon harvest timing, both earlier fresh and later spawning sockeye salmon were used. The most common single resource harvested was sockeye salmon, totaling 6,231 lb, or 151 lb per person (Table 2-3). These salmon arrived in June and July and were harvested fresh. Sockeye salmon were caught mainly near the community and along the Kvichak River at fish camps. Post-spawn sockeye salmon were caught in September and October. These were referred to as "spawning reds" due to their dark red color. Harvest of spawning sockeye salmon totaled 685 lb, or 17 lb per person. Also important were coho salmon which were caught in nets along with sockeye salmon (see Figure 2-3). In 2005, Igiugig residents harvested 728 lb of coho salmon, or 18 lb per person.

Non-salmon fishes were also an important resource at Igiugig in 2005, making up 11% of the total harvest of wild resources (Table 2-3 and Figure 2-2). In 2005, Igiugig residents harvested 2,445 lb of non-salmon fishes, or 59 lb per person. Figure 2-4 shows the harvest of freshwater fishes by species in Igiugig in 2005. The major species harvested included northern pike (667 lb, or 16 lb per person) at 27% of the harvest, and smelt with 26% (630 lb, or 15 lb per person) of the total harvest of non-salmon fishes (Table 2-3). Other important fishes included rainbow trout at 18% of the non-salmon fish harvest (440 lb, or 11 lb per person) and whitefishes at 10% of the non-salmon fish harvest (232 lb, or 6 lb per person).

Large land mammals (Table 2-3) were the other major source of wild foods at Igiugig in 2005, with 8,353 lb harvested, or 203 lb per person. Forty-five percent of this was caribou, with 3,738 lb harvested, or 91 lb per person. Moose provided an almost equal weight in terms of meat, and made up 42% of the harvest of large land mammals with 3,510 lb, or 85 lb per person.

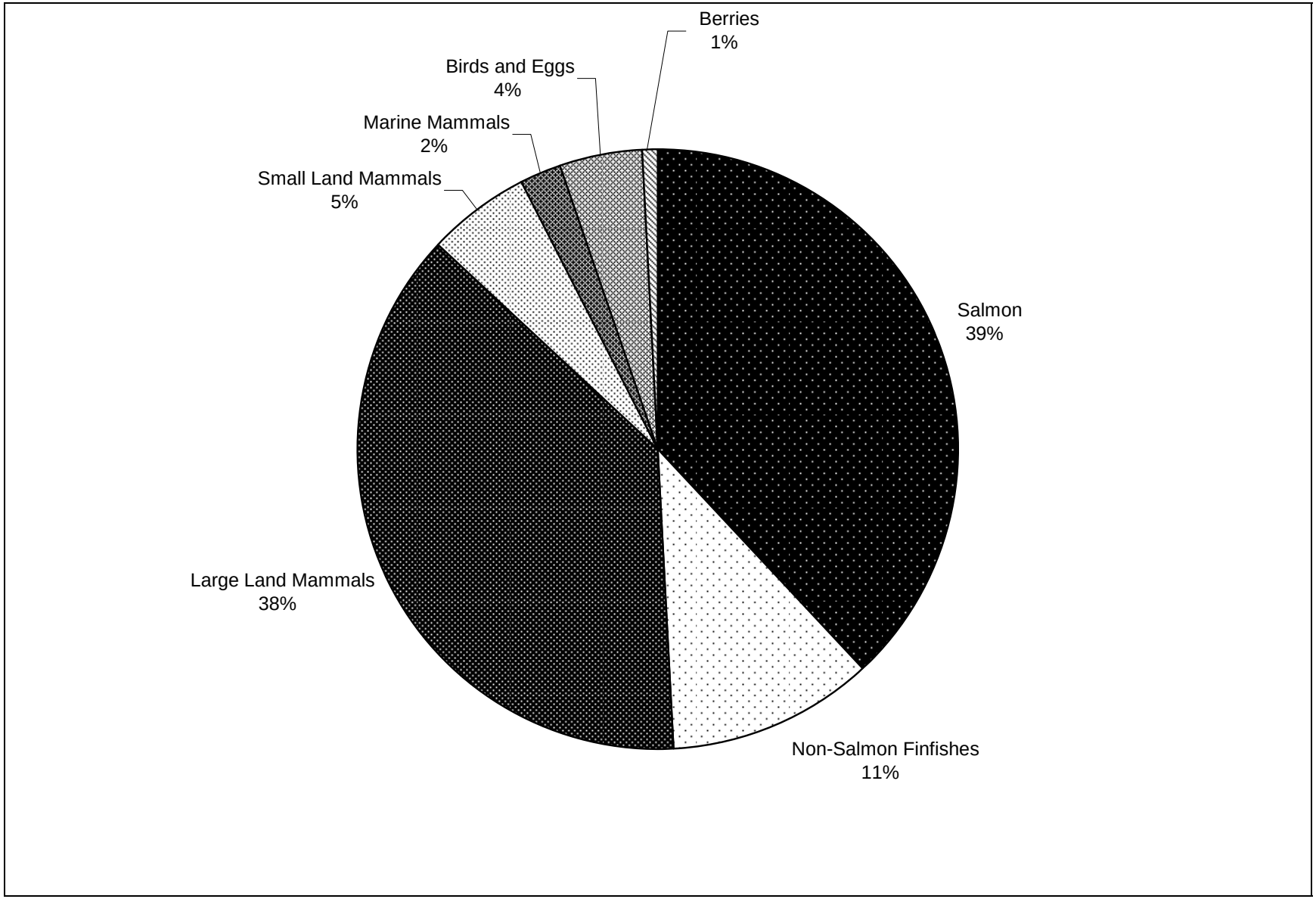

Figure 2-2.–Igiugig composition of wild resource harvests, pounds usable weight, 2005.

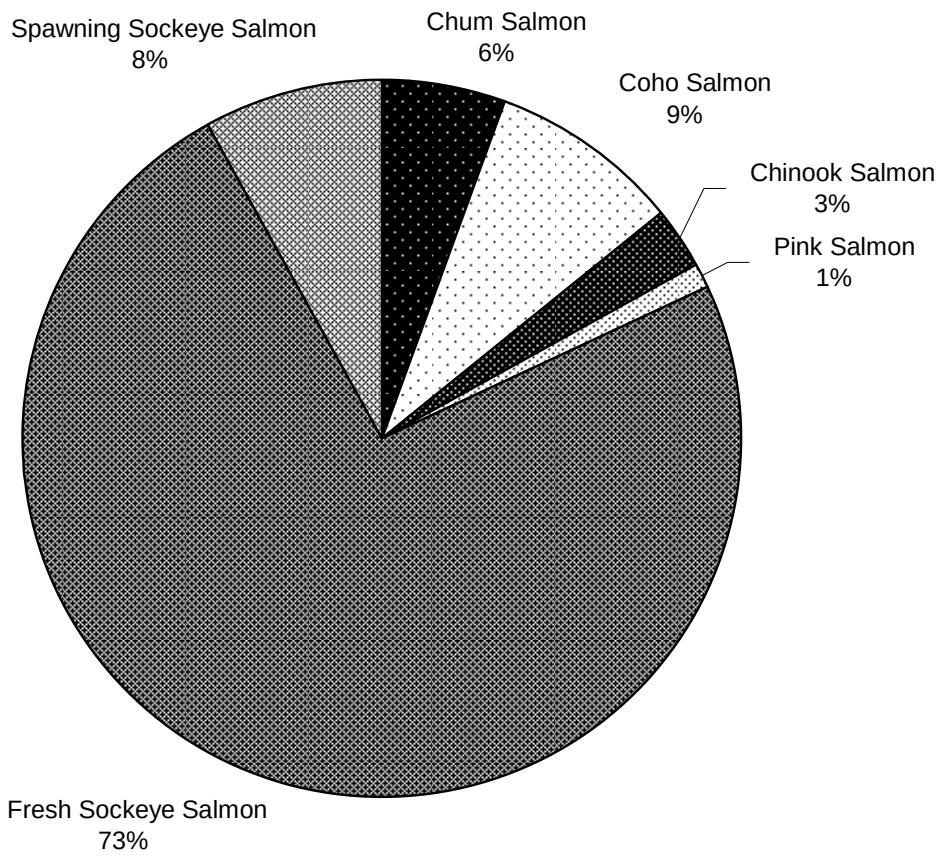

Figure 2-3.–Igiugig composition of salmon harvests, pounds usable weight, 2005.

In 2005, beavers and porcupines were important small land mammal resources. Igiugig residents harvested 114 lb of beaver, or 3 lb per person and 78 lb of porcupine or 2 lb per person (Table 2-3). Residents of Igiugig harvested large numbers gull eggs in 2005, for 169 usable pounds, or 4 lb per person.

As noted earlier, late summer harvests of berries were important in the 2005 seasonal round in Igiugig. Berry harvests totaled 984 lb, or 24 lb per person (Table 2-3).

General Hunting, Fishing, and Gathering Areas

Igiugig residents' wild resource harvests in 2005 were concentrated almost exclusively on the western shore of Iliamna Lake and along the Kvichak River downstream of the village (Figures 2-5 through 2-8).[4] The braided channels of the Kvichak River were especially important for the harvest of salmon and freshwater fishes, which were caught in nets from spring until fall. Egg gathering took place on the river as well (Figure 2-8). By far the largest area of use was for small land mammals; this area spread north from the Koktuli River, south through the Kaskanak Flats and its adjacent streams, and east into Katmai National Preserve.

SHARING AND RECEIVING WILD RESOURCES

In Igiugig in 2005, estimates of sharing indicated that 100% of households received wild resources from other households and 100% of households gave resources away (Tables 1-15 and 2-3). Households received an average of 10 resources and gave away an average of 11 resources (Table 1-15). Fish was the most abundantly used resource, and was among the most commonly shared resources, with 92% of households giving away and receiving fish (Table 2-3).

Large land mammals also were widely shared. Seventy-five percent of households gave away caribou and moose, 83% received caribou, and 67% received moose (Table 2-3).

More Igiugig households received marine mammals than gave them away, which suggests that a few harvesters were sharing with others in the community. In 2005, 33% of Igiugig households gave away freshwater seals and 42% received seals. In addition, 25% gave away beluga whales and 33% received this resource (Table 2-3).

The pattern for birds and eggs was the opposite of that for marine mammals, with more households giving away these resources than receiving them: 67% gave away birds and eggs and 50% received them (Table 2-3). Of special note are bird eggs: 58% of Igiugig households gave away bird eggs and 42% of households received them. This pattern is similar to that of wild plants, especially berries: 58% of households gave away berries and 33% received berries.

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[4] For the complete set of maps of Igiugig residents' hunting, fishing, and gathering areas in 2005, see Appendix D, "Harvest Use Area Maps by Community" (published in hard copy on a CD-ROM attached to the back cover of this report).

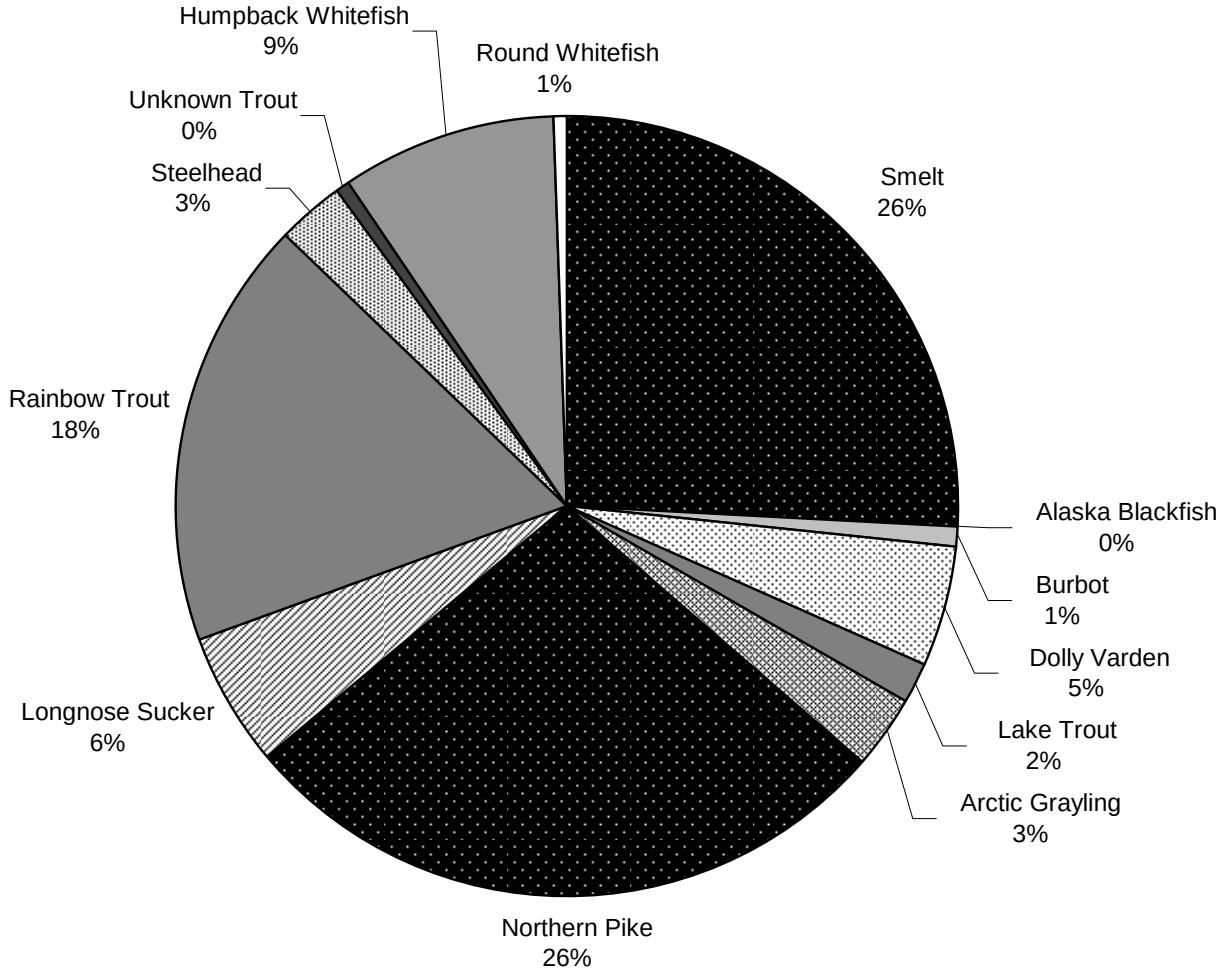

Figure 2-4.–Igiugig composition of freshwater fish harvests, pounds usable weight, 2005.

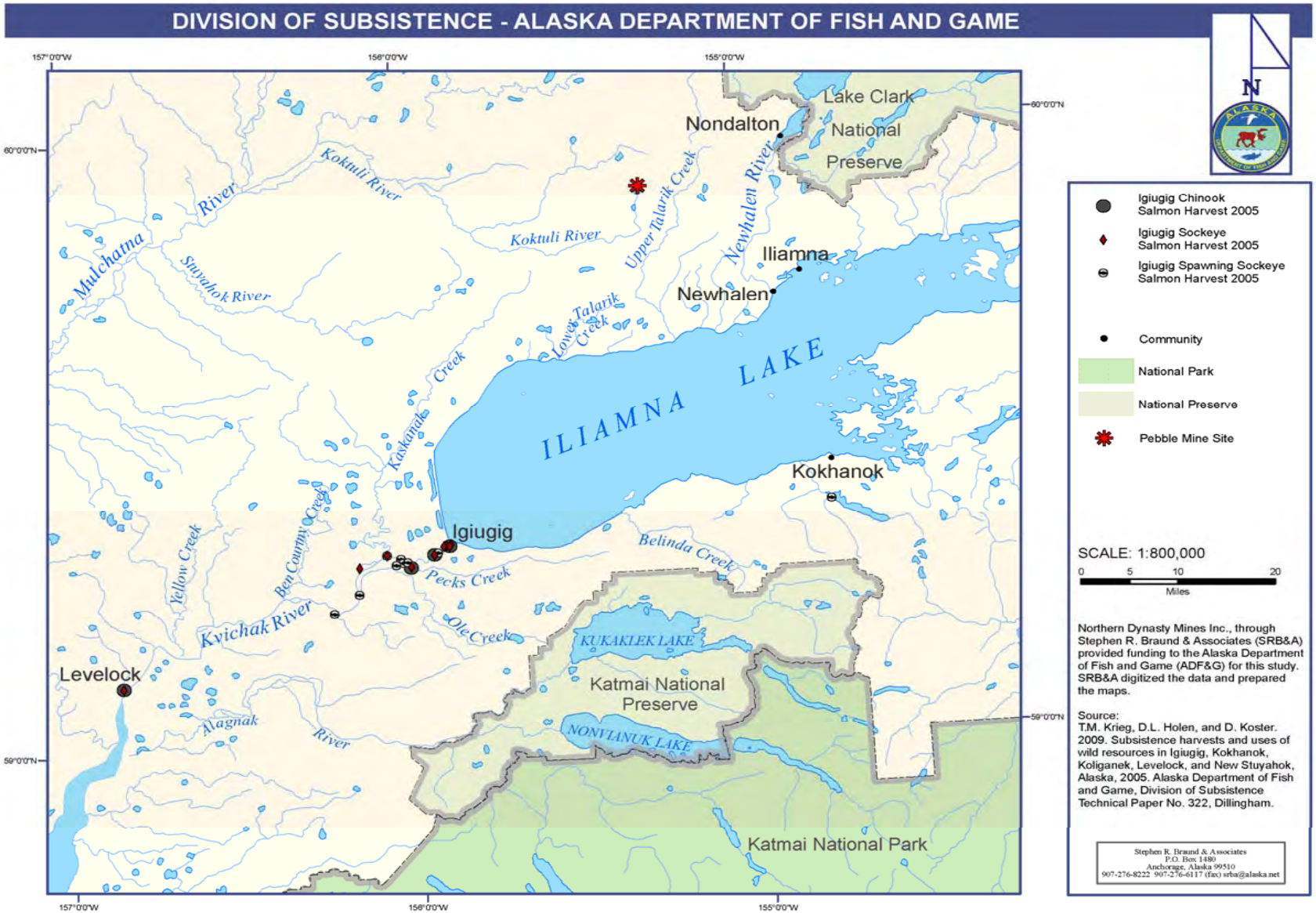

Figure 2-5.–Chinook, sockeye, and spawning sockeye salmon harvest locations, Igiugig, 2005.

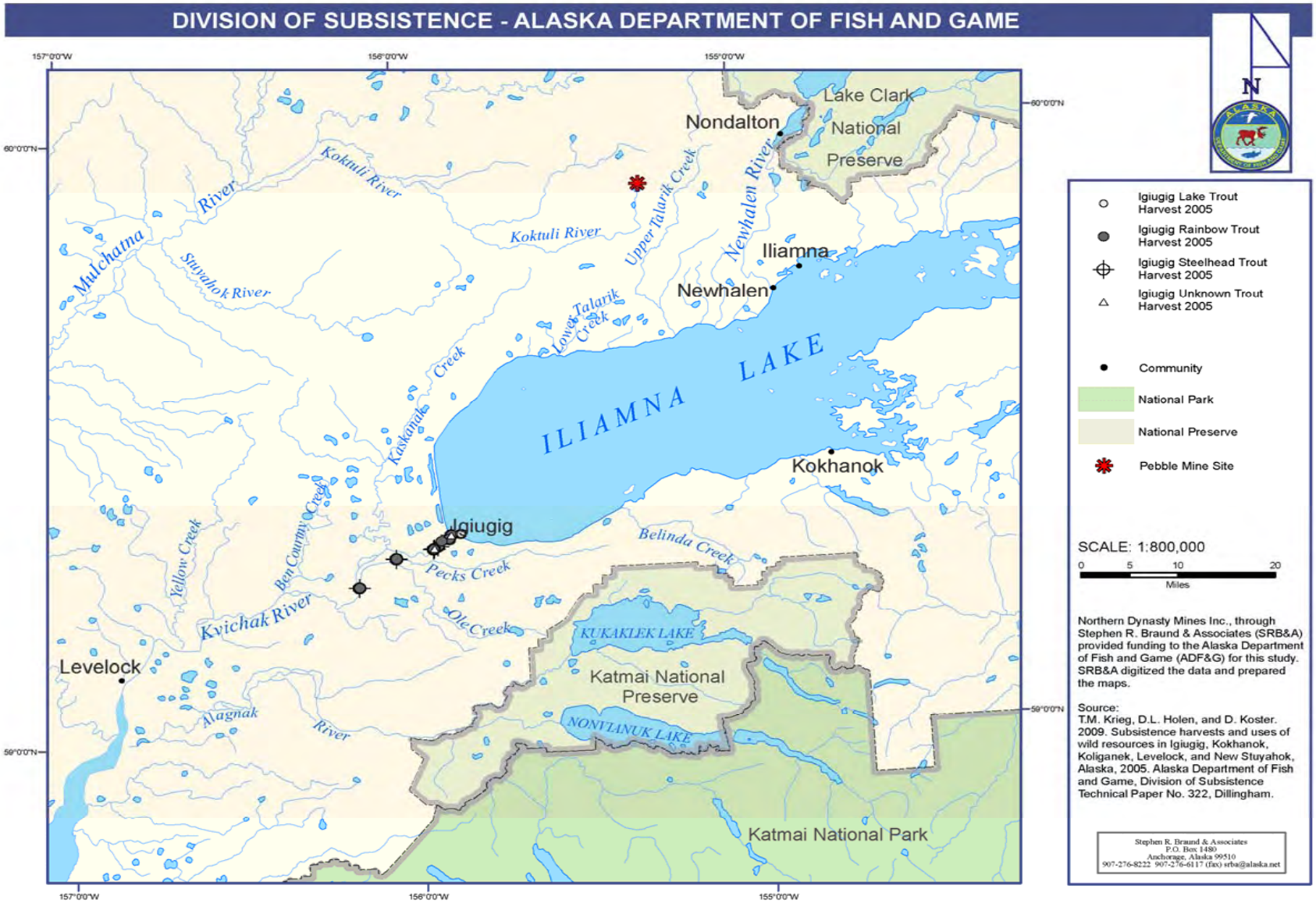

Figure 2-6.–Lake trout, rainbow trout, steelhead trout, and unknown trout harvest locations, Igiugig, 2005.

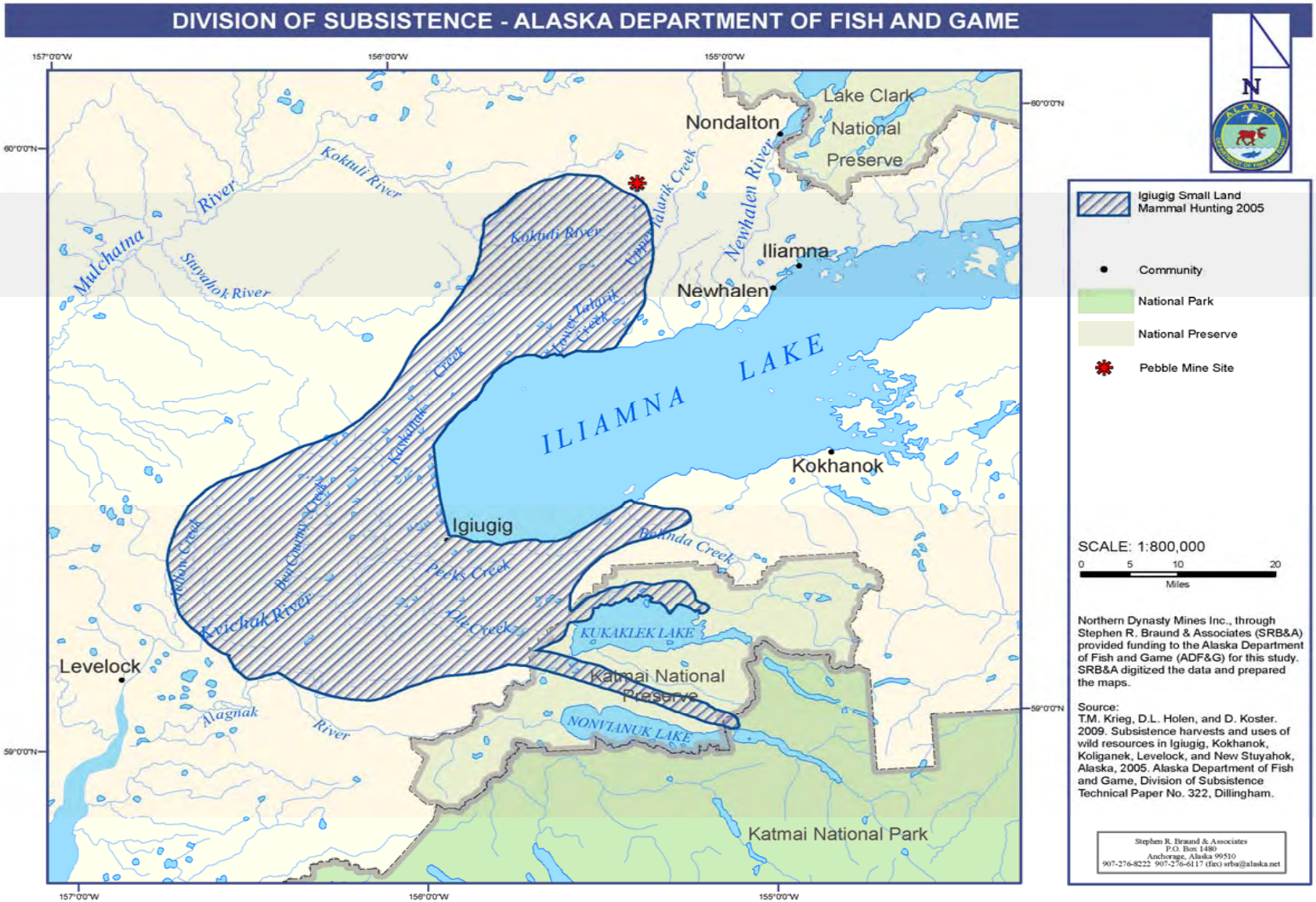

Figure 2-7.–Small land mammal hunting locations, Igiugig, 2005.

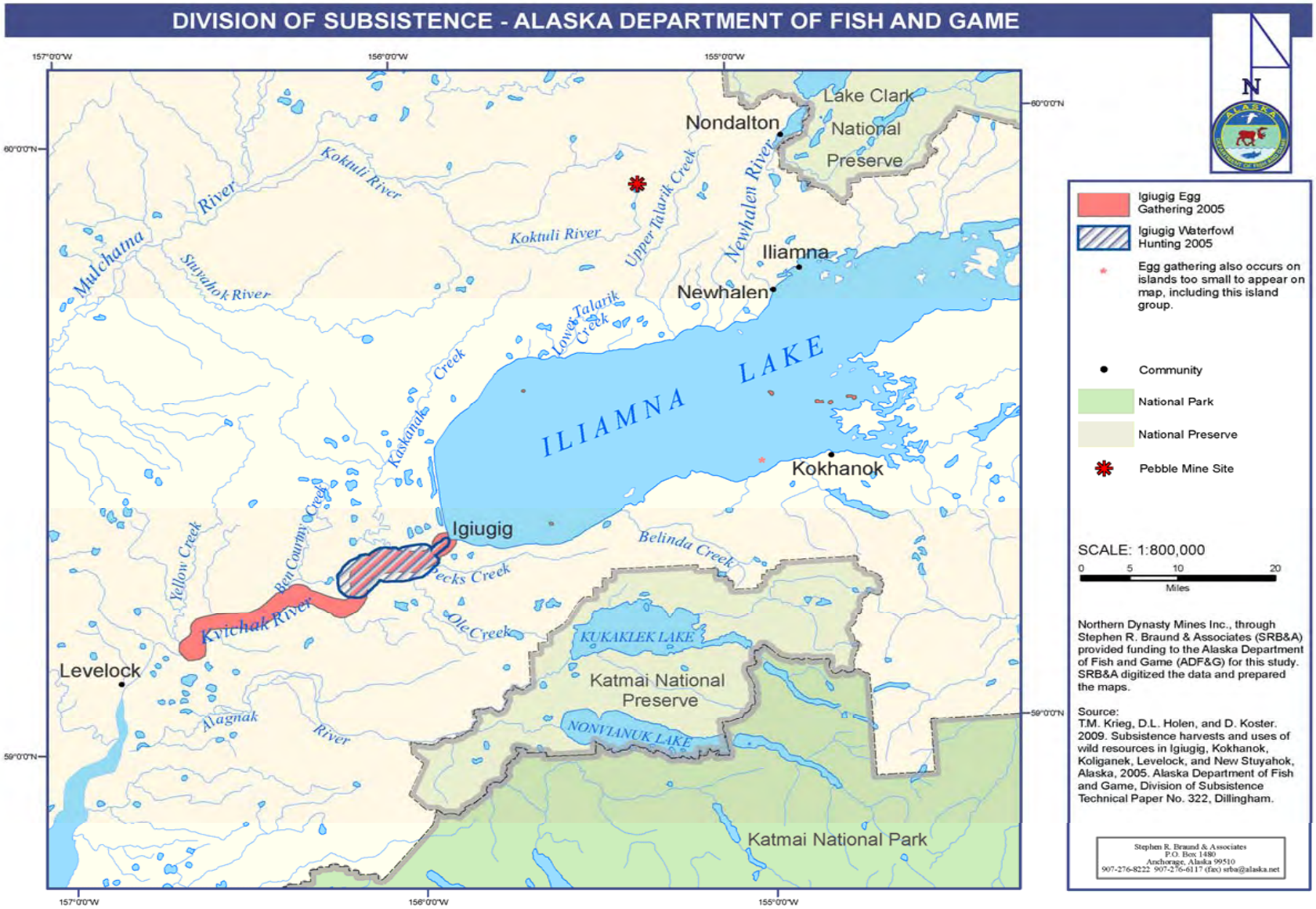

Figure 2-8.–Egg gathering and waterfowl hunting locations, Igiugig, 2005.

USE AND HARVEST CHARACTERISTICS BY RESOURCE CATEGORY

SALMON

Igiugig residents harvested most of their salmon (91%) in 2005 by using setnets along the Kvichak River near the community (Table 2-5). In addition to setnets, 9% of the harvest of salmon on the Kvichak River was taken with rod and reel gear. Sockeye salmon were the primary species harvested (Table 2-3), with 97% taken in setnets and 3% taken with rod and reel. No sockeye salmon were removed from commercial catches (Tables 1-15 and 2-5).

Other salmon, such as coho and Chinook salmon, were also primarily taken with setnets (80% and 100%, respectively). Twenty percent of the coho salmon harvest was caught with rod and reel (Table 2-5). Igiugig residents noted that salmon runs were strong in 2005, and they were seeing more coho salmon and other species of salmon in their nets. In the past, setnet harvests were almost all sockeye salmon.

FRESHWATER FISHES

Table 2-6 lists the percentage of each non-salmon fish species harvested by Igiugig residents in 2005 by gear type. Residents usually harvested other fishes besides salmon in setnets (Table 2-6). For example, 100% of burbot, humpback whitefish, and round whitefish were harvested in setnets. Ice fishing accounted for 72% of the rainbow trout harvest. Rod and reel fishing was an important method for catching some freshwater fishes such as Arctic grayling (57%) and Alaska blackfish (85%), although only 17% of Igiugig residents harvested blackfish (Tables 2-3 and 2-6). Harvest locations of freshwater fish species included the braided channels of the Kvichak River and the Kaskanak Flats area (Figure 2-6; see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

LARGE LAND MAMMALS

In 2005, large land mammals made up 38% of the total Igiugig harvest, ranking a close second to salmon (39%; Figure 2-2). Residents noted that the harvests of moose and caribou were down compared to recent years, forcing an increased reliance on salmon. Considerable effort was invested in hunting moose and caribou. In 2005, 75% of the households in Igiugig attempted to harvest caribou, and 58% were successful. Fifty percent of households attempted to harvest moose, and 42% were successful. Although smaller than moose and scarce in 2005, caribou were the top large land mammals harvested in terms of usable weight, with 45% of the harvest of large land mammals compared to 42% for moose (25 caribou harvested compared to 7 moose). In addition, 3 brown bears were harvested, accounting for 13% of the large land mammal harvest (Table 2-3). The hunting areas for these 3 large land mammal species were concentrated to the west of Igiugig, with moose and caribou hunting extending north into the Kaskanak Flats (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

Table 2-5.–Estimated percentages of salmon harvest by gear type, resource, and total salmon harvest, Igiugig, 2005.

				Subsistence methods											
		Removed from commercial catch[a]		Setnet		Seine		Other		Subsistence gear, any method		Rod and reel		Any method	
Resource	Percentage base	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	Gear type	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Resource	0.0%	0.0%	91.2%	93.2%	0.0%	0.0%	0.0%	0.0%	91.2%	93.2%	8.8%	6.8%	100.0%	100.0%
	Total	0.0%	0.0%	91.2%	93.2%	0.0%	0.0%	0.0%	0.0%	91.2%	93.2%	8.8%	6.8%	100.0%	100.0%
Chum salmon	Gear type	0.0%	0.0%	5.1%	6.0%	0.0%	0.0%	0.0%	0.0%	5.1%	6.0%	0.0%	0.0%	4.6%	5.6%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	4.6%	5.6%	0.0%	0.0%	0.0%	0.0%	4.6%	5.6%	0.0%	0.0%	4.6%	5.6%
Coho salmon	Gear type	0.0%	0.0%	7.0%	8.6%	0.0%	0.0%	0.0%	0.0%	7.0%	8.6%	17.6%	28.6%	7.9%	10.0%
	Resource	0.0%	0.0%	80.4%	80.4%	0.0%	0.0%	0.0%	0.0%	80.4%	80.4%	19.6%	19.6%	100.0%	100.0%
	Total	0.0%	0.0%	6.4%	8.0%	0.0%	0.0%	0.0%	0.0%	6.4%	8.0%	1.6%	2.0%	7.9%	10.0%
Chinook salmon	Gear type	0.0%	0.0%	1.0%	2.8%	0.0%	0.0%	0.0%	0.0%	1.0%	2.8%	0.0%	0.0%	0.9%	2.6%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.9%	2.6%	0.0%	0.0%	0.0%	0.0%	0.9%	2.6%	0.0%	0.0%	0.9%	2.6%
Pink salmon	Gear type	0.0%	0.0%	2.4%	1.8%	0.0%	0.0%	0.0%	0.0%	2.4%	1.8%	0.0%	0.0%	2.2%	1.6%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	2.2%	1.6%	0.0%	0.0%	0.0%	0.0%	2.2%	1.6%	0.0%	0.0%	2.2%	1.6%
Sockeye salmon	Gear type	0.0%	0.0%	72.3%	75.0%	0.0%	0.0%	0.0%	0.0%	72.3%	75.0%	25.8%	35.3%	68.2%	72.3%
	Resource	0.0%	0.0%	96.7%	96.7%	0.0%	0.0%	0.0%	0.0%	96.7%	96.7%	3.3%	3.3%	100.0%	100.0%
	Total	0.0%	0.0%	65.9%	69.9%	0.0%	0.0%	0.0%	0.0%	65.9%	69.9%	2.3%	2.4%	68.2%	72.3%
Landlocked salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spawning sockeye	Gear type	0.0%	0.0%	12.2%	5.9%	0.0%	0.0%	0.0%	0.0%	12.2%	5.9%	56.6%	36.1%	16.1%	8.0%
	Resource	0.0%	0.0%	69.0%	69.0%	0.0%	0.0%	0.0%	0.0%	69.0%	69.0%	31.0%	31.0%	100.0%	100.0%
	Total	0.0%	0.0%	11.1%	5.5%	0.0%	0.0%	0.0%	0.0%	11.1%	5.5%	5.0%	2.5%	16.1%	8.0%
Unknown salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2005.

a. Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

SMALL LAND MAMMALS/FURBEARERS

The total harvest of small land mammals by Igiugig residents in 2005 was 203 lb, or 5 lb per person, most of which were beavers and porcupines (Table 2-3). The hunting area for small land mammals included a large area on the western shores of Iliamna Lake (Figure 2-7).

MARINE MAMMALS

For the study year, Igiugig hunters harvested 5 harbor seals and one beluga whale, for 22 lb of marine mammals per capita. This harvest was widely shared (Table 2-3). Seal hunting took place on the Kvichak River downstream almost as far as Levelock. The beluga whale harvest took place near Levelock (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

MARINE INVERTEBRATES

All marine invertebrates used by Igiugig households in 2005 were received. There were no reported harvests of marine invertebrates.

BIRDS AND EGGS

In 2005, Igiugig residents harvested waterfowl along the shores of the Kvichak River downstream from the community (Figure 2-8). Egg gathering also took place along the Kvichak River (Figure 2-8). Igiugig residents harvested 233 lb of migratory birds, or 6 lb per person, and 68 lb of upland birds, or 2 lb per person (Table 2-3). Bird eggs were important, accounting for 186 lb of the harvest of wild resources, or 5 lb per person (Table 2-3).

WILD PLANTS

Igiugig residents traveled long distances by boat to harvest plants and berries in 2005 (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report). The berry harvests were concentrated on the western shore of Iliamna Lake. The gathering of other plants took place in this area and extended far down the Kvichak River as well. Residents noted that they often gathered plants while at fish camp; their camps are located downstream from the village along the Kvichak River and its tributaries. In addition, residents traveled to areas around Kokhanok to gather plants. In all, residents of Igiugig harvested 984 lb of berries, or 24 lb per person, and 186 lb of other plants, or 5 lb per person (Table 2-3).

COMPARING HARVESTS AND USES IN 2005 WITH PREVIOUS YEARS

All interviewed Igiugig households reported that, in total, their harvests and uses of resources in 2005 were about the same as in the recent past (the last 5 years). Table 2-7 summarizes respondents' assessments for each major resource category (see also Figure 2-9). For example, 58% of households reported that their use of salmon in 2005 was the same in recent years, while only 8% of households reported that they used more salmon in 2005, and 33% used fewer. Wild plants and large land mammals, 2 resource categories with high levels of use, had similar responses: 50% of households said they used the same, 17% said they used more, and 33% said they used fewer.

Table 2-6.–Estimated percentages of fishes other than salmon harvested by gear type, resource, and total harvest, Igiugig, 2005.

			Subsistence gear								
Resource	Percentage base	Removed from commercial catch[a]	Setnet	Seine	Hand line gear	Dip net	Ice fishing	Subsistence gear (other)	Subsistence gear, any gear	Rod and reel	Any method
Non-salmon fishes	Gear type	0.0%	100.0%	0.0%	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%	100.0%
	Resource	0.0%	23.2%	0.0%	2.3%	0.0%	65.5%	0.0%	91.0%	8.5%	100.0%
	Total	0.0%	23.2%	23.2%	2.3%	0.0%	65.5%	0.0%	91.0%	8.5%	100.0%
Rainbow smelt	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	38.5%	0.0%	27.8%	0.0%	25.8%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	97.9%	0.0%	97.9%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	25.3%	0.0%	25.3%	0.0%	25.8%
Alaska blackfish	Gear type	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	1.1%	0.1%
	Resource	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	14.3%	85.7%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Burbot	Gear type	0.0%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.8%
	Resource	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.8%	0.8%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.8%
Dolly Varden	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	5.7%	0.0%	4.1%	16.8%	5.1%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	72.3%	0.0%	72.3%	27.7%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	3.7%	0.0%	3.7%	1.4%	5.1%
Lake trout	Gear type	0.0%	0.0%	0.0%	41.2%	0.0%	1.1%	0.0%	1.8%	0.0%	1.7%
	Resource	0.0%	0.0%	0.0%	55.6%	0.0%	44.4%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.9%	0.0%	0.7%	0.0%	1.7%	0.0%	1.7%
Arctic grayling	Gear type	0.0%	0.5%	0.0%	0.0%	0.0%	1.8%	0.0%	1.4%	20.1%	3.0%
	Resource	0.0%	4.1%	0.0%	0.0%	0.0%	39.2%	0.0%	43.3%	56.7%	100.0%
	Total	0.0%	0.1%	0.1%	0.0%	0.0%	1.2%	0.0%	1.3%	1.7%	3.0%
Northern pike	Gear type	0.0%	26.7%	0.0%	0.0%	0.0%	31.6%	0.0%	29.6%	4.4%	27.3%
	Resource	0.0%	22.7%	0.0%	0.0%	0.0%	75.9%	0.0%	98.6%	1.4%	100.0%
	Total	0.0%	6.2%	6.2%	0.0%	0.0%	20.7%	0.0%	26.9%	0.4%	27.3%
Longnose sucker	Gear type	0.0%	18.3%	0.0%	58.8%	0.0%	0.0%	0.0%	6.1%	0.0%	5.6%
	resource	0.0%	76.2%	0.0%	23.8%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	4.3%	4.3%	1.3%	0.0%	0.0%	0.0%	5.6%	0.0%	5.6%

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Table 2-6. Page 2 of 2.

Resource	Percentage base	Removed from commercial catch[a]	Subsistence gear: Setnet	Seine	Hand line gear	Dip net	Ice fishing	Subsistence gear (other)	Subsistence gear any gear	Rod and reel	Any method
Rainbow trout	Gear type	0.0%	6.2%	0.0%	0.0%	0.0%	19.9%	0.0%	15.9%	41.6%	18.0%
	Resource	0.0%	7.9%	0.0%	0.0%	0.0%	72.4%	0.0%	80.3%	19.7%	100.0%
	Total	0.0%	1.4%	1.4%	0.0%	0.0%	13.0%	0.0%	14.5%	3.5%	18.0%
Steelhead trout	Gear type	0.0%	3.5%	0.0%	0.0%	0.0%	0.9%	0.0%	1.6%	14.6%	2.7%
	Resource	0.0%	30.2%	0.0%	0.0%	0.0%	23.3%	0.0%	53.5%	46.5%	100.0%
	Total	0.0%	0.8%	0.8%	0.0%	0.0%	0.6%	0.0%	1.4%	1.2%	2.7%
Unknown trout	Gear type	0.0%	0.5%	0.0%	0.0%	0.0%	0.4%	0.0%	0.4%	1.5%	0.5%
	Resource	0.0%	25.0%	0.0%	0.0%	0.0%	50.0%	0.0%	75.0%	25.0%	100.0%
	Total	0.0%	0.1%	0.1%	0.0%	0.0%	0.2%	0.0%	0.4%	0.1%	0.5%
Humpback whitefish	Gear type	0.0%	38.1%	0.0%	0.0%	0.0%	0.0%	0.0%	9.7%	0.0%	8.8%
	Resource	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	8.8%	8.8%	0.0%	0.0%	0.0%	0.0%	8.8%	0.0%	8.8%
Round whitefish	Gear type	0.0%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.7%
	Resource	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.7%

Note This table lists only those resources for which there was a harvest in the 2005 study year.

a. Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

Source ADF&G Division of Subsistence household surveys, 2005.

Table 2-8 lists the reasons residents of Igiugig gave for changes in harvests and uses by resource category. This was an open-ended question, and respondents could provide more than one reason for changes. Project staff grouped the responses into categories, such as competition for resources, regulations hindering or helping residents harvest resources, sharing of harvests, effects of weather on animals and subsistence activities, changes in the animal populations, personal reasons such as work and health, and other outside effects on residents' opportunities to engage in subsistence activities. Personal reasons and changes in animal populations were 2 of the major reasons for change. Personal reasons accounted for 75% of households using fewer salmon, and 50% of households using fewer non-salmon fishes, birds and eggs, and wild plants. Residents attributed these declines mainly to a need for fewer resources due to smaller families. All households (100%) reported using fewer furbearers for personal reasons. Trapping was declining in many communities in the Bristol Bay area because of lower fur prices and higher costs of fuel for transportation. Competition and regulations were not cited as factors by Igiugig residents for changes in harvests and uses of wild resources.

Figure 2-10 displays the percentage of Igiugig households that cited particular reasons for lower uses of any resource category. As noted above, changes due to personal reasons, such as work and health, and changes to animal populations were the most frequent answers, with 56% reporting lower uses of at least one resource category in 2005 for personal reasons, and 44% citing animal population changes as a cause of less use. In 2005, caribou were scarce near Igiugig and were seen only in small numbers. Caribou were a traditional resource for Igiugig residents and scarcity of the resource was the reason given by many, upon further questioning, for why they believed their harvests were down for large land mammal species in 2005. In addition, 22% of residents stated that people were sharing less. Table 2-8 demonstrates that this decline in sharing is primarily related to marine invertebrates; only crab were received and used in 2005 (Table 2-3).

Changes in the resource harvest by Igiugig residents can also be discerned through comparisons with findings from other study years. Comprehensive household harvest surveys were administered in Igiugig for 1973–1974, 1983, and 1992, as well as this 2005 study (Tables 1-2, 2-9, and 2-10; Figure 2-11). Surveys of just large land mammal harvests took place for 2001 (Holen et al. 2005) and non-salmon fishes use information was gathered for 2003 (Krieg et al. 2005) (Table 1-2). Figure 2-11 summarizes the per capita harvests in pounds usable weight for each major resource category from the 4 comprehensive studies. In 1973–1974, the harvests of some major resources such as salmon, non-salmon fishes, and large land mammals were higher than in 2005. Harvests of small land mammals, marine mammals, and birds and eggs were higher in 1992 than in other study years. In 1983, salmon dominated the overall harvest (72% of the total) more than in any other study year (Figure 2-11). Table 2-9 illustrates a gradual decline in overall harvests over the 4 study years, with per capita harvests going from 871 lb in 1973–1974, to 618 lb in 1983, 725 lb in 1992, and 542 lb in 2005. Salmon and non-salmon fishes made up less of the harvest in 2005 compared to 1973–1974 and 1983, while the contribution of marine mammals and birds and eggs was higher in 2005 than in either the 1973–1974 or 1983 study years. With the exception of 1983, the contribution of large land mammals has been fairly steady at 36% (1973–1974), 37% (2005), and 41% (1992) (Table 2-10).

Table 2-7.–Comparison of household harvests and uses in recent years: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, Igiugig, 2005.

Resource	Estimated households	No response		Valid responses		Fewer		Same		More	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Salmon	13	0.0	0.0%	13.0	100.0%	4.3	33.3%	7.6	58.3%	1.2	8.3%
Non-salmon finfishes	13	0.0	0.0%	13.0	100.0%	4.3	33.3%	5.4	41.7%	3.3	25.0%
Marine invertebrates	13	3.3	25.0%	9.8	75.0%	0.0	0.0%	8.7	88.9%	1.2	11.1%
Large land mammals	13	0.0	0.0%	13.0	100.0%	4.3	33.3%	6.5	50.0%	2.2	16.7%
Small land mammals/furbearers	13	0.0	0.0%	13.0	100.0%	2.2	16.7%	10.8	83.3%	0.0	0.0%
Marine mammals	13	1.1	8.3%	11.9	91.7%	0.0	0.0%	10.8	90.9%	1.1	9.1%
Birds and eggs	13	0.0	0.0%	13.0	100.0%	2.2	16.7%	10.8	83.3%	0.0	0.0%
Wild plants	13	0.0	0.0%	13.0	100.0%	4.3	33.3%	6.5	50.0%	2.2	16.7%
Overall	13	0.0	0.0%	13.0	100.0%	3.3	25.0%	9.8	75.0%	0.0	0.0%
Any resource	13	0.0	0.0%	13.0	100.0%	9.8	75.0%	13.0	100.0%	7.6	58.3%

Source ADF&G Division of Subsistence household surveys, 2005.

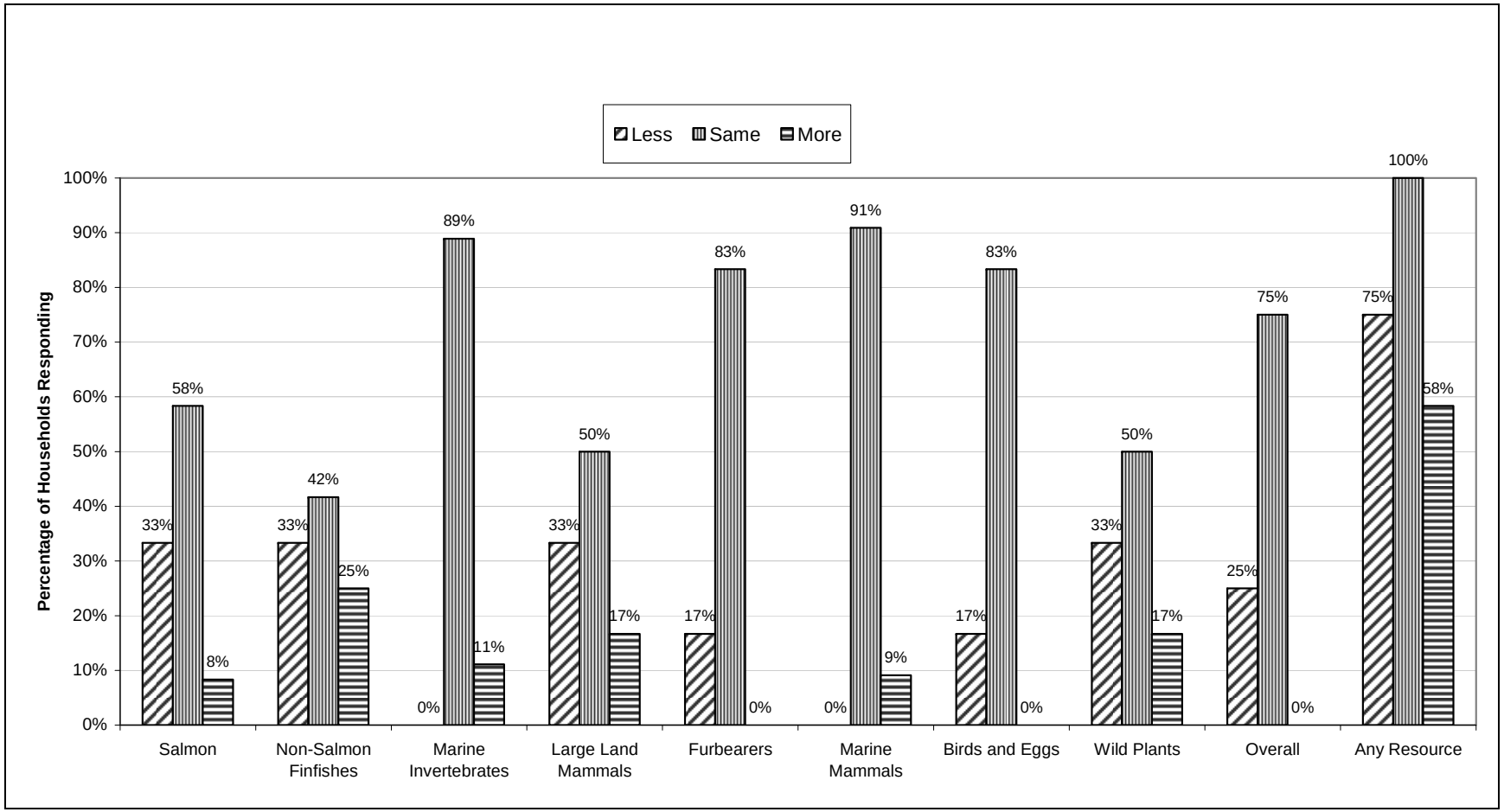

Figure 2-9.–Igiugig households' assessment of harvests and uses of wild resources in 2005 compared to recent years.

Table 2-8.–Igiugig respondents' reasons for change in harvests and uses in recent years.

			Percentage of responses by category[a]							
Resource category	Use fewer or more	Estimated number of households[b]	No reason given	Competition	Regulations	People are sharing less	Weather	Animal population changes[c]	Personal reasons (work/health)	Other outside effects
Salmon	Fewer	4.3	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	75.0%	0.0%
Salmon	More	1.1	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Non-salmon finfishes	Fewer	4.3	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	0.0%
Non-salmon finfishes	More	3.3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	66.7%	33.3%
Marine invertebrates	More	1.1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Large land mammals	Fewer	4.3	0.0%	0.0%	0.0%	25.0%	0.0%	50.0%	25.0%	0.0%
Large land mammals	More	2.2	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	0.0%
Small land mammas/furbearers	Fewer	2.2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Marine mammals	More	1.1	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Birds and eggs	Fewer	2.2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%
Wild plants	Fewer	4.3	0.0%	0.0%	0.0%	0.0%	25.0%	25.0%	50.0%	0.0%
Wild plants	More	2.2	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	0.0%
Overall	Fewer	3.3	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	66.7%	0.0%
Any resource	Fewer	9.8	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	66.7%	0.0%

a. Percentage of estimated number of households that reported less or more uses of the resource category who cited this reason.

b. Estimated number of households citing a change in uses. For number of valid responses, see Table 2-7. Estimated total households in community = 13.

c. Includes changes in abundance of population and/or changes in geographic distribution of animals during hunting seasons that affected harvest opportunities

Source ADF&G Division of Subsistence household surveys, 2006.

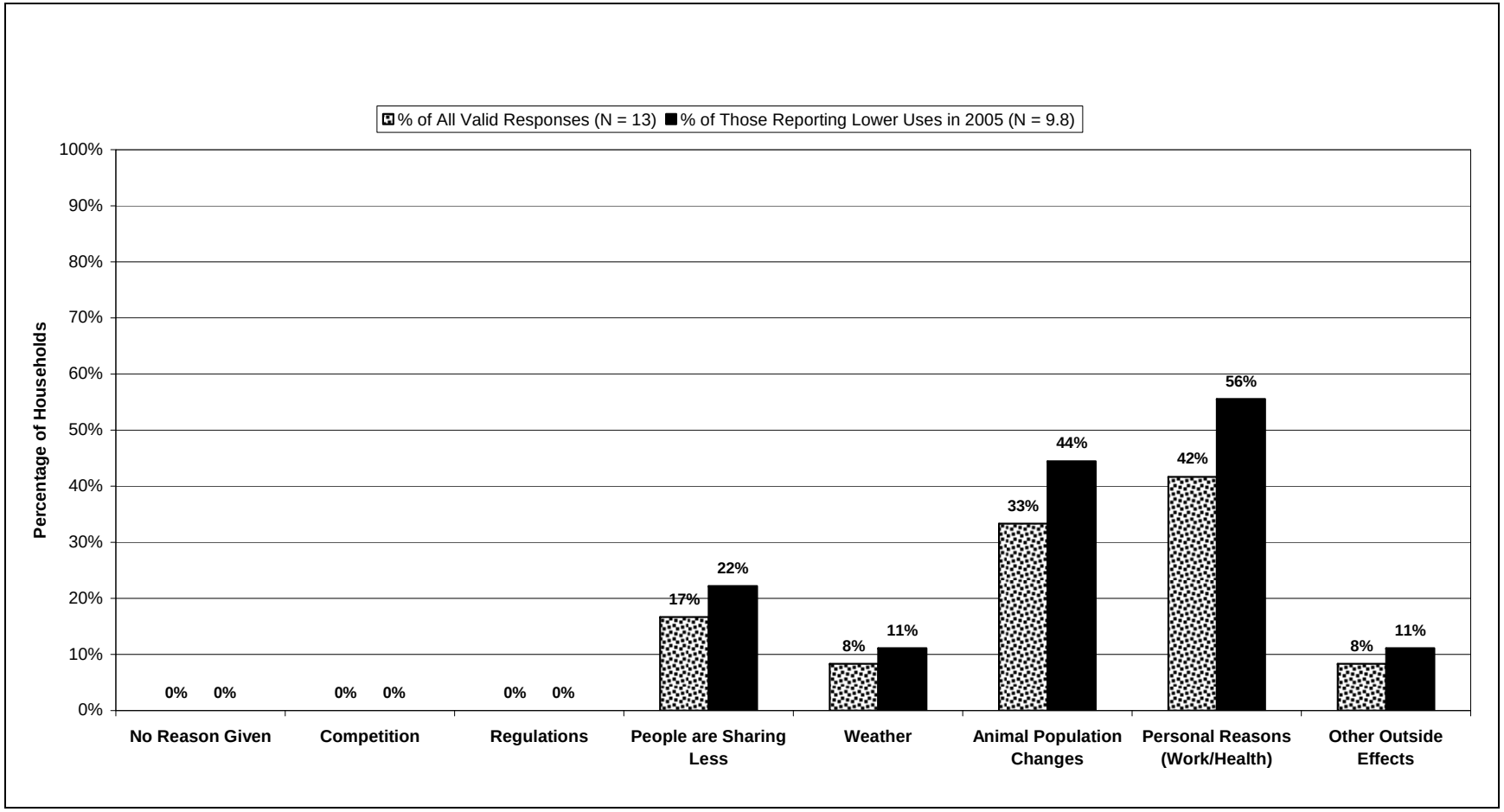

Figure 2-10.–Reasons cited by Igiugig households for lower uses of any resource in 2005 compared to other recent years.

LOCAL OBSERVATIONS OF RESOURCE POPULATIONS AND TRENDS

During household surveys and the community meetings organized for this project, residents of Igiugig reported more difficulty finding caribou than they had 3 or 4 years earlier. Igiugig is located near the ranges of both the Northern Alaska Peninsula caribou herd and the Mulchatna caribou herd. Both herds have declined in recent years (Woolington 2007:17,37). Residents voiced concerns about how the development of a mine could potentially bring further declines in caribou numbers, or changes in seasonal patterns of movement. In addition, they reported noticing that helicopter traffic is of concern to other area residents who live closer to the Pebble Project. They said that they suspected the helicopter activity associated with exploratory work near the Pebble Project site was affecting caribou movements to Igiugig residents' traditional hunting areas.

Table 2-9.–Igiugig wild resource harvests by resource category, all study years.

	Pounds usable weight per capita harvest			
Resource	1973	1983	1992	2005
Salmon	386.8	444.4	177.9	205.2
Non-salmon fishes	141.3	78.1	100.5	59.4
Large land mammals	314.4	49.5	296.9	202.9
Small land mammals	19.5	12.7	27.3	4.9
Marine mammals	1.9	2.6	72.5	29.2
Birds and eggs	7.0	7.0	17.5	11.8
Vegetation		23.4	32.0	28.5
All resources	870.9	617.6	724.7	542.0

Table 2-10.–Composition of wild resource harvests by category, Igiugig, all study years.

	Percentage of total harvest			
Resource	1973	1983	1992	2005
Salmon	44.4%	72.0%	24.5%	37.9%
Non-salmon fishes	16.2%	12.6%	13.9%	11.0%
Large land mammals	36.1%	8.0%	41.0%	37.4%
Small land mammals	2.2%	2.1%	3.8%	0.9%
Marine mammals	0.2%	0.4%	10.0%	5.4%
Birds and eggs	0.8%	1.1%	2.4%	2.2%
Vegetation		3.8%	4.4%	5.3%
All resources	100.0%	100.0%	100.0%	100.0%

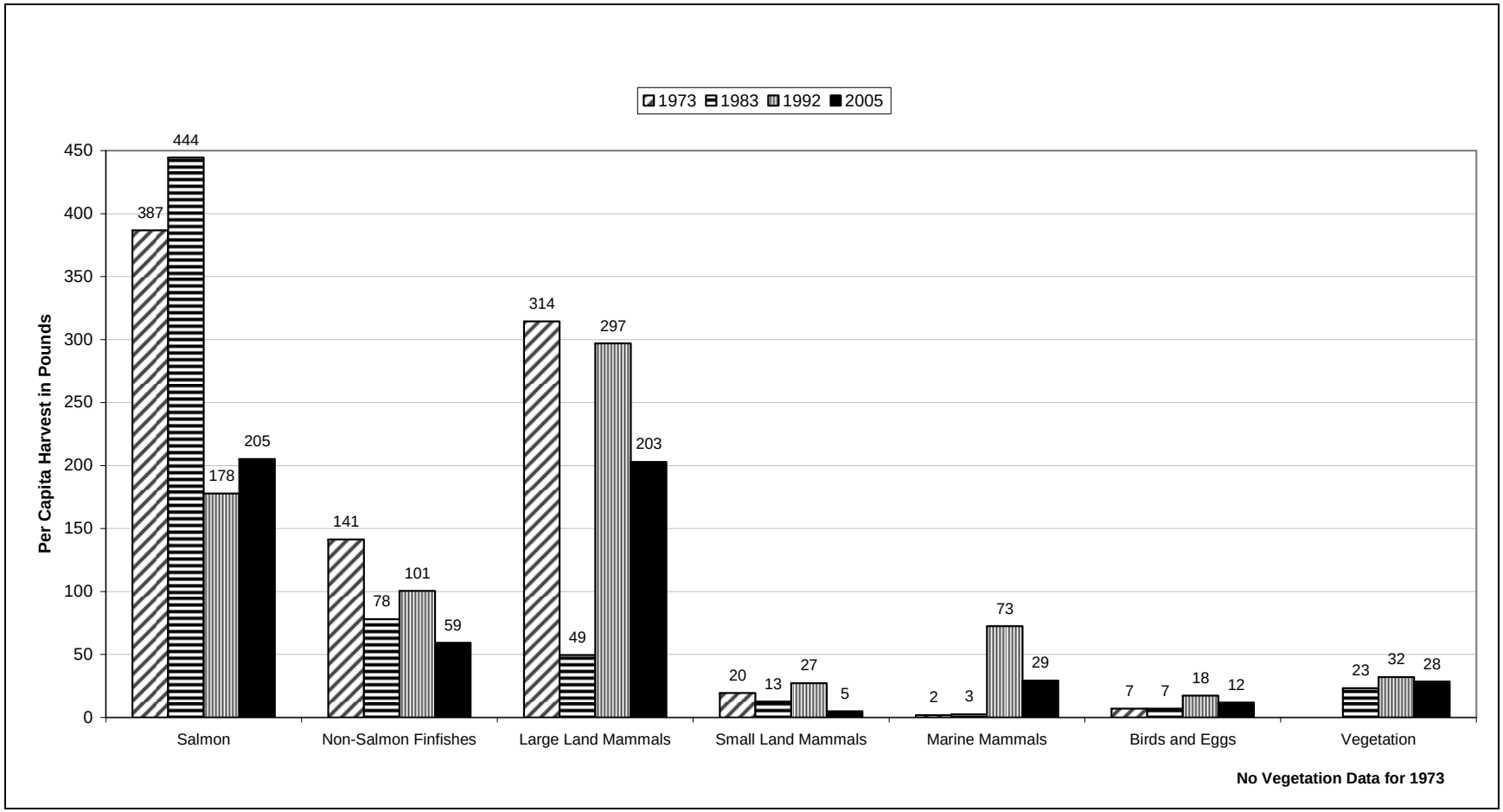

Figure 2-11.–Igiugig wild resource harvests over time.

The health of the local river systems was of paramount importance to Igiugig residents contacted for this project. In their view, the 2005 salmon returns were abundant but not as large as they once were. They said that salmon species other than sockeye and Chinook salmon were caught more often in their subsistence nets. Igiugig residents expressed concerns that ocean warming trends may affect the overall health of the resources that reach their community through Bristol Bay.

Picking berries was an activity that Igiugig residents pursued long into their retirement years. Just about everyone in the community, from infants to elders, picked berries. According to residents, fluctuating rainfall over the last several years affected berry production. Residents expressed concerns that changing weather patterns could affect berry production in the future.

LOCAL CONCERNS REGARDING RESOURCES

Residents of Igiugig were expressed concerns about the potential effects of a mine within the Kvichak watershed. In their view, clean water and unpolluted land were key to the continuation of subsistence hunting, fishing, and gathering by the present and future residents of their community.

The household survey findings demonstrated that residents of Igiugig harvested a wide variety of resources in 2005. They invested a great deal of time and effort in harvesting fishes, land mammals, bird eggs, and wild plants. Nevertheless, per capita harvests, while substantial, were lower than in previous study years. A major concern voiced by community residents who commented on the survey findings, was that one year of harvest data should not be viewed as necessarily representing adequate or desirable levels of harvests. For example, they explained, when abundance of salmon or caribou dropped, these resources did not necessarily diminish in importance to the community. Rather, they said, harvest effort generally increased when a resource was scarce, reflecting the continuing significance of these resources to the community's economy and way of life. In short, Igiugig residents expressed the view that they did not want comparatively lower harvests to be perceived by others as indicating less interest in, or dependence upon, these resources.

Community residents who reviewed the maps of hunting, fishing, and gathering areas for 2005 raised 2 concerns. First, they said, some important harvest areas may have been missing from the maps because not all households were interviewed (one household declined to participate in the survey). Second, community residents pointed out that they did not use the same hunting, fishing, and gathering areas every year. They felt strongly that one year of mapped information would not be an adequate depiction of all the areas that Igiugig residents depended upon for subsistence resources. In their view, all areas that have been traditionally used were still important. They insisted that a historical perspective be considered when important subsistence harvest areas are identified in future resource and land management planning and development.

CHAPTER 3: KOKHANOK

COMMUNITY BACKGROUND

The community of Kokhanok surrounds a lagoon on the south shore of Iliamna Lake (Figure 1-1). It has been the home of a predominately Aglurmiut Central Yup'ik population, as described in the previous chapter (VanStone 1967). Reindeer herding and commercial fishing became mainstays of the economy in the early 20th century. Reindeer eventually joined the nearby Mulchatna and Alaska Peninsula caribou herds. Commercial fishing remained important for Kokhanok residents, many of whom traveled to Bristol Bay in the spring in order to fish during the summer. Transportation in and out of Kokhanok was primarily by air, through Iliamna.

DEMOGRAPHY, CASH EMPLOYMENT, AND MONETARY INCOME

DEMOGRAPHY

According to the federal census, Kokhanok had 174 residents in 2000 (U. S. Census Bureau 2001), of which 87% (151 residents) were Alaska Native (Table 1-1). The household survey in 2005 found a population of 158 residents, of which 98% (155 residents) were Alaska Native (Table 1-1). Kokhanok had a fairly steady population in recent years. Many community members stated that they remained in Kokhanok in order to live a subsistence way of life. Differences between the federal census and survey data, in regards to community size and the proportion of the non-Alaska Native population, may have been due to the inclusion, in the former case, of seasonal residents such as teachers, who are predominately Euro-American. They were not included in the ADF&G household survey.

There were an estimated 42 year-round households in Kokhanok in 2005 (Table 1-5). Of these, 35 (83%) were interviewed. Interviewers contacted all but 2 households. Five households declined to be interviewed (13%).

The mean number of years of residency in Kokhanok was 21 years, with a maximum residency of 81 years (Table 1-9). The largest age cohort for both males and females was youth between the ages of 14 and 20 years of age (Table 3-1 and Figure 3-1). The second largest age cohort for both males and females was between 40 and 44 years of age. Most age cohorts contained about the same number of males and females.

Of all household heads, 89% were born in Alaska, and 50% were born in Kokhanok (Table 1-9). Newhalen and Nondalton, each, were the birthplaces of 6% of household heads.

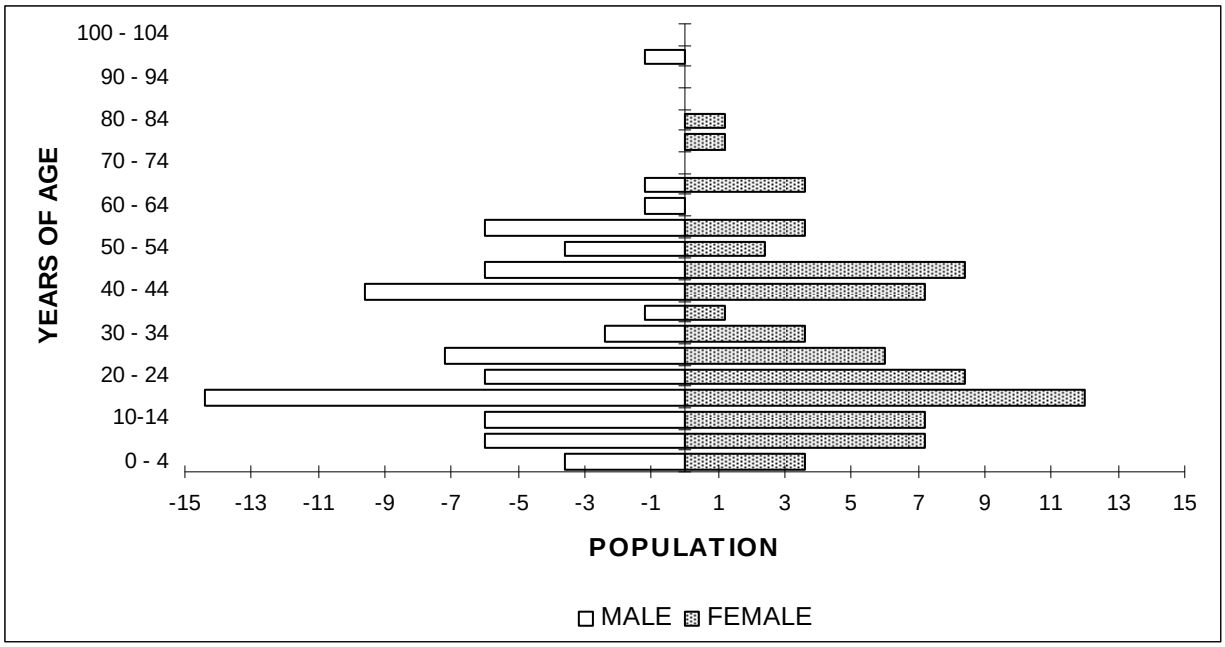

Figure 3-1.–Population profile, Kokhanok, 2005.

Source ADF&G Division of Subsistence household surveys, 2005.

Table 3-1.–Population profile, Kokhanok, 2005.

	Male			Female			Total		
Age	Number	Percentage	Cum. percentage	Number	Percentage	Cum. percentage	Number	Percentage	Cum. percentage
0 – 4	3.60	4.76%	4.76%	3.60	4.35%	4.35%	7.20	4.55%	4.55%
5 – 9	6.00	7.94%	12.70%	7.20	8.70%	13.04%	13.20	8.33%	12.88%
10 – 14	6.00	7.94%	20.63%	7.20	8.70%	21.74%	13.20	8.33%	21.21%
15 – 19	14.40	19.05%	39.68%	12.00	14.49%	36.23%	26.40	16.67%	37.88%
20 – 24	6.00	7.94%	47.62%	8.40	10.14%	46.38%	14.40	9.09%	46.97%
25 – 29	7.20	9.52%	57.14%	6.00	7.25%	53.62%	13.20	8.33%	55.30%
30 – 34	2.40	3.17%	60.32%	3.60	4.35%	57.97%	6.00	3.79%	59.09%
35 – 39	1.20	1.59%	61.90%	1.20	1.45%	59.42%	2.40	1.52%	60.61%
40 – 44	9.60	12.70%	74.60%	7.20	8.70%	68.12%	16.80	10.61%	71.21%
45 – 49	6.00	7.94%	82.54%	8.40	10.14%	78.26%	14.40	9.09%	80.30%
50 – 54	3.60	4.76%	87.30%	2.40	2.90%	81.16%	6.00	3.79%	84.09%
55 – 59	6.00	7.94%	95.24%	3.60	4.35%	85.51%	9.60	6.06%	90.15%
60 – 64	1.20	1.59%	96.83%	0.00	0.00%	85.51%	1.20	0.76%	90.91%
65 – 69	1.20	1.59%	98.41%	3.60	4.35%	89.86%	4.80	3.03%	93.94%
70 – 74	0.00	0.00%	98.41%	0.00	0.00%	89.86%	0.00	0.00%	93.94%
75 – 79	0.00	0.00%	98.41%	1.20	1.45%	91.30%	1.20	0.76%	94.70%
80 – 84	0.00	0.00%	98.41%	1.20	1.45%	92.75%	1.20	0.76%	95.45%
85 – 89	0.00	0.00%	98.41%	0.00	0.00%	92.75%	0.00	0.00%	95.45%
90 – 94	0.00	0.00%	98.41%	0.00	0.00%	92.75%	0.00	0.00%	95.45%
95 – 99	1.20	1.59%	100.00%	0.00	0.00%	92.75%	1.20	0.76%	96.21%
100 – 104	0.00	0.00%	100.00%	0.00	0.00%	92.75%	0.00	0.00%	96.21%
Missing	0.00	0.00%	100.00%	6.00	7.25%	100.00%	6.00	3.79%	100.00%
Total	**75.60**	**100.00%**		**82.80**	**100.00%**		**158.40**	**100.00%**	

Source ADF&G Division of Subsistence household surveys, 2005.

CASH EMPLOYMENT CHARACTERISTICS AND MONETARY INCOME

Fifty-five percent of the earned income in Kokhanok in 2005 derived from jobs in the local government (Table 3-2) and 89% of households contained someone who worked for the local government in 2005. Another key income source was commercial fishing, with 16% of earned income. Significantly, 37% of households and 32% of the total population participated in commercial fishing in 2005 (Table 3-2). Most jobs were located in Kokhanok (95 out of 125) with 24 commercial fishing jobs located in Naknek or Egegik, on Bristol Bay (Table 1-12). Some construction and some service jobs were located in nearby Iliamna.

Only 16% of employed adults in Kokhanok were employed year-round in 2005 (Table 1-11). However, 75% of adults were employed for at least a portion of the study year. Many adults worked seasonally for the local government or engaged in commercial fishing in the summer. The mean number of months employed was 6.5. On average, in 2005, households contained 1.8 employed adults, and 100% of households contained at least one adult who was employed.

LEVELS OF PARTICIPATION IN THE HARVESTS AND USES OF WILD RESOURCES

Table 1-14 reports levels of individual participation in the harvest and processing of wild resources by Kokhanok residents in 2005. Forty-eight percent hunted birds and large land mammals and 63% processed game and birds. Seventy-eight percent fished and 80% processed fish. Compared to the other study communities, a relatively large number (39%) of Kokhanok residents hunted or trapped furbearers and 55% processed furbearers. Picking berries and other wild plants involved 87% of the community population. In total, 92% of Kokhanok residents attempted to harvest or processed resources in 2005.

Table 3-2.–Employment by industry, Kokhanok, 2005.

	Jobs	Households	Individuals	Percentage of income
Estimated total number[a]	**124.8**	**42.0**	**79.2**	
Federal government	1.9%	5.7%	3.0%	1.0%
Executive, administrative and managerial	1.9%	5.7%	3.0%	1.0%
Natural scientists and mathematicians	0.0%	0.0%	0.0%	0.0%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
State government	1.0%	2.9%	1.5%	1.0%
Teachers, librarians, and counselors	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	1.0%	2.9%	1.5%	1.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Local government	51.9%	88.6%	69.7%	54.6%
Executive, administrative and managerial	6.7%	17.1%	10.6%	9.1%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Teachers, librarians, and counselors	9.6%	25.7%	15.2%	14.4%
Health diagnosing and treating practitioners	0.0%	0.0%	0.0%	0.0%
Registered nurses, pharmacists, dietitians, therapists and P.A.s	0.0%	0.0%	0.0%	0.0%
Health technologists and technicians	1.0%	2.9%	1.5%	4.2%
Technologists and technicians, except health	1.0%	2.9%	1.5%	0.8%
Marketing and sales occupations	0.0%	0.0%	0.0%	0.0%
Administrative support occupations, including clerical	2.9%	8.6%	4.5%	1.0%
Service occupations	6.7%	20.0%	10.6%	6.3%
Agricultural, forestry and fishing occupations	0.0%	0.0%	0.0%	0.0%

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Table 3-2. Page 2 of 3.

	Jobs	Households	Individuals	Percentage of income
Mechanics and repairers	2.9%	5.7%	3.0%	4.8%
Construction and extractive occupations	2.9%	8.6%	4.5%	3.2%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Production working occupations	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	18.3%	42.9%	27.3%	10.9%
Agriculture, forestry & fishing	21.2%	40.0%	33.3%	16.1%
Service occupations	1.0%	2.9%	1.5%	0.1%
Agricultural, forestry and fishing occupations	20.2%	37.1%	31.8%	16.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Mining	2.9%	8.6%	4.5%	3.3%
Service occupations	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	1.0%	2.9%	1.5%	1.9%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	1.9%	5.7%	3.0%	1.4%
Construction	13.5%	34.3%	21.2%	10.1%
Service occupations	1.0%	2.9%	1.5%	0.4%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	8.7%	22.9%	13.6%	6.7%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	3.8%	8.6%	6.1%	3.1%
Manufacturing	0.0%	0.0%	0.0%	0.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Transportation, communication & utilities	1.0%	2.9%	1.5%	0.1%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	1.0%	2.9%	1.5%	0.1%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Wholesale trade	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Retail trade	1.9%	2.9%	3.0%	3.9%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Marketing and sales occupations	0.0%	0.0%	0.0%	0.0%
Service occupations	1.9%	2.9%	3.0%	3.9%

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Table 3-2. Page 3 of 3.

	Jobs	Households	Individuals	Percentage of income
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Services	4.8%	14.3%	7.6%	9.9%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Natural scientists and mathematicians	0.0%	0.0%	0.0%	0.0%
Writers, artists, entertainers, and athletes	0.0%	0.0%	0.0%	0.0%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Health diagnosing and treating practitioners	0.0%	0.0%	0.0%	0.0%
Health technologists and technicians	1.9%	5.7%	3.0%	7.1%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Agricultural, forestry and fishing occupations	1.9%	5.7%	3.0%	2.6%
Production working occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Miscellaneous occupations	1.0%	2.9%	1.5%	0.3%

a. Estimated number of households and individuals includes only those that were employed during the study period.

Source ADF&G Division of Subsistence household surveys, 2006.

RESOURCE HARVEST AND USE PATTERNS

Table 1-14 summarizes the estimated resource harvest and use characteristics of Kokhanok in 2005 at the household level. All households in Kokhanok (100%) used and attempted to harvest at least one kind of wild resource; 97% of households harvested at least one wild resource. The average household harvest was 2,563 lb usable weight, or 680 lb per capita. During the study year, Kokhanok households harvested an average of 11 different kinds of resources and used an average of 14 kinds. The maximum number of resources used by any household was 38. Households, on average, gave away 6 kinds of resources.

Species Used and Seasonal Round

The following is a brief overview of subsistence activities and household participation that occurred throughout the study year (Table 3-3 and Figure 3-2). Fish were the most commonly harvested resource in Kokhanok in 2005, with 83% of Kokhanok households harvesting salmon, and 66% harvesting other fishes. Community residents set gillnets for salmon along the beach west of the community in spring and summer. Most of the harvest in pounds was sockeye salmon (Figure 3-3). In addition, coho salmon were harvested at fish camps on Gibraltar Lake in late fall; spawning sockeye salmon were harvested there as well. In late summer, berries ripened on the low bushes of the surrounding tundra. Ninety-seven percent of households used berries and 91% harvested them (Table 3-3).

The bays east of Kokhanok on Iliamna Lake, as well as the surrounding smaller lakes and streams, supported numerous freshwater fish species; 66% of Kokhanok households harvested these fishes in 2005 (Table 3-3). Ice fishing, especially for Arctic grayling and northern pike, was a major spring subsistence activity.

Kokhanok hunters sought caribou and moose in the fall and throughout the winter. In 2005, harvests of moose in pounds usable weight ranked second after fresh sockeye salmon. Table 3-4 presents a list of the top 10 resources harvested and used by Kokhanok residents. Caribou was the fourth-ranked subsistence food by weight. During the study year, 83% of households used moose, 60% hunted moose, and 37% harvested moose (Table 3-3). Eighty percent of households used caribou, 46% hunted caribou, and 26% harvested caribou. In 2005, most survey respondents reported that caribou were scarce or too distant to hunt from the community.

Migratory birds traveled through the Iliamna Lake area in the fall and spring, stopping to rest on the marsh and tundra areas to the west of Kokhanok. Sixty-three percent of the community's households used migratory birds in 2005, with 43% of households harvesting them. More important than the birds were their eggs. The eggs of gulls, and, to a much lesser extent, ducks, were an important subsistence resource harvested in spring: 83% of households used eggs in 2005 and 77% harvested them (Table 3-3).

Freshwater harbor seals were an important subsistence food in Kokhanok in 2005, with 5 seals harvested in Iliamna Lake by Kokhanok residents (Table 3-3). Kokhanok residents hunted seals on the islands and in the leads in the ice just north of the community.

Harvest Quantities

Table 3-3 reports estimated wild resource harvests and uses by Kokhanok residents in 2005 and is organized by general category and by species. All resources are reported in pounds usable weight (see Appendix C for conversion factors). The harvest category includes resources taken by any member of the surveyed household during the study year. The use category includes resources harvested and used by a household, harvested and given away by a household, and resources acquired from other harvesters, either as gifts, by trade, through hunting partnerships, or as meat given to hunting guides by their clients. Purchased foods are not included in the table. Differences between harvest and use percentages reflect sharing between households, which resulted in a wide distribution of wild foods.

The total harvest for all subsistence resources during 2005 for Kokhanok was 107,645 lb, or 2,563 lb per household and 680 lb per person (Table 3-3). Table 3-4 lists the top 10 resources harvested, in terms of pounds per capita, and the 10 resources used by the most Kokhanok households in 2005. Fishes constituted the largest portion of the harvest, with 86,974 lb (81%), or 549 lb per person. Most of the fish harvest was salmon, constituting 76% of the total harvest of all resources (Figure 3-2). Based upon harvest timing, sockeye salmon were taken fresh or later in the season ("spawning reds"). Of the salmon that arrived in June and July, and which were harvested fresh, a total of 69,419 lb, or 438 lb per person, were harvested, more by far than any other single resource (Table 3-3). These salmon were caught at fish camps west of the community. Spawning sockeye salmon were harvested at Gibraltar Lake in September and October. These were referred to as "spawning reds" due to their dark red color. Harvests of spawning sockeye salmon totaled 6,673 lb, or 42 lb per person. Smaller numbers of Chinook, coho, chum, and pink salmon were also harvested (Figure 3-3).

Table 3-3.–Estimated harvests and uses of fish, game, and plant resources, Kokhanok, 2005.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
All resources	**100.0%**	**100.0%**	**97.1%**	**94.3%**	**82.9%**	**107,644.5**	**2,563.0**	**679.6**				15.2%
Fishes	97.1%	91.4%	88.6%	77.1%	77.1%	86,974.1	2,070.8	549.1				15.9%
Pacific salmon	97.1%	88.6%	82.9%	60.0%	62.9%	81,222.1	1,933.9	512.8	18,944.4	Ind	451.1	15.9%
Chum salmon	14.3%	14.3%	14.3%	0.0%	5.7%	1,990.8	47.4	12.6	89.9	Ind	9.0	6.7%
Coho salmon	25.7%	22.9%	20.0%	11.4%	5.7%	2,260.8	53.8	14.3	480.0	Ind	11.4	13.2%
Chinook salmon	31.4%	25.7%	20.0%	11.4%	5.7%	502.7	12.0	3.2	42.0	Ind	1.0	6.5%
Pink salmon	11.4%	11.4%	11.4%	2.9%	2.9%	375.0	8.9	2.4	148.8	Ind	3.5	6.3%
Sockeye salmon	97.1%	85.7%	80.0%	51.4%	60.0%	76,092.8	1,811.7	480.4	17,894.4	Ind	426.1	12.5%
Fresh sockeye salmon	85.7%	71.4%	65.7%	34.3%	42.9%	69,419.4	1,652.8	438.3	14,833.2	Ind	353.2	11.7%
Spawning sockeye salmon	71.4%	60.0%	57.1%	28.6%	40.0%	6,673.4	158.9	42.1	3,061.2	Ind	72.9	7.5%
Landlocked salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Non-salmon fishes	74.3%	65.7%	65.7%	51.4%	57.1%	5,752.0	137.0	36.3				13.1%
Pacific herring	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring roe	2.9%	0.0%	0.0%	2.9%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring sac roe	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring spawn on kelp	2.9%	0.0%	0.0%	2.9%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Rainbow smelt	17.1%	11.4%	11.4%	11.4%	8.6%	1,418.4	33.8	9.0	236.4	Gal	5.6	5.9%
Cods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Pacific (gray) cod	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Walleye pollock (whiting)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown cods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Flounders	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 3-3. Page 2 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Non-salmon fishes, flounders, continued												
Unknown flounders	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Greenlings	2.9%	2.9%	2.9%	0.0%	2.9%	4.8	0.1	0.0	1.2	Ind	0.0	0.0%
Lingcod	2.9%	2.9%	2.9%	0.0%	2.9%	4.8	0.1	0.0	1.2	Ind	0.0	0.0%
Unknown greenlings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Pacific halibut	14.3%	8.6%	8.6%	5.7%	2.9%	16.8	0.4	0.1	16.8	Lb	0.4	3.0%
Rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
"Black" rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
"Red" rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sablefish (black cod)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sculpins	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Slimy sculpin (bullhead)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sharks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown sharks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Soles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown soles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Threespine stickleback (needlefish)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Wolffish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Alaska blackfish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Burbot	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 3-3. Page 3 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Non-salmon fishes, continued												
Chars	51.4%	45.7%	45.7%	25.7%	31.4%	826.6	19.7	5.2	590.4	Ind	14.1	9.1%
Arctic char–resident and anadromous	51.4%	45.7%	45.7%	22.9%	31.4%	556.1	13.2	3.5	397.2	Ind	9.5	11.8%
Dolly Varden	41.7%	41.7%	41.7%	8.3%	8.3%	125.9	9.7	3.1	89.9	Ind	6.9	29.1%
Dolly Varden–anadromous	28.6%	22.9%	22.9%	8.6%	14.3%	257.0	6.1	1.6	183.6	Ind	4.4	5.1%
Dolly Varden–resident												
Lake trout	11.4%	11.4%	11.4%	2.9%	5.7%	145.3	3.5	0.9	207.6	Ind	4.9	7.6%
Arctic grayling	34.3%	31.4%	31.4%	11.4%	14.3%	342.7	8.2	2.2	122.4	Ind	2.9	7.7%
Northern pike	34.3%	31.4%	31.4%	11.4%	14.3%	342.7	8.2	2.2	122.4	Ind	2.9	7.7%
Sturgeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown sturgeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Longnose sucker	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Trout	65.7%	62.9%	62.9%	20.0%	45.7%	1,711.9	40.8	10.8	1,222.8	Ind	29.1	13.6%
Rainbow trout–resident	65.7%	62.9%	62.9%	17.1%	45.7%	1,711.9	40.8	10.8	1,222.8	Ind	29.1	13.6%
Steelhead trout–anadromous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown trout	2.9%	0.0%	0.0%	2.9%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Whitefishes	34.3%	28.6%	25.7%	17.1%	22.9%	1,285.5	30.6	8.1	732.0	Ind	17.4	7.3%
Broad whitefish	2.9%	2.9%	2.9%	0.0%	2.9%	384.0	9.1	2.4	96.0	Ind	2.3	0.0%
Ciscos	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Least cisco	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Humpback whitefish	11.4%	11.4%	11.4%	8.6%	11.4%	619.5	14.8	3.9	354.0	Ind	8.4	3.5%
Round whitefish	25.7%	20.0%	17.1%	14.3%	14.3%	282.0	6.7	1.8	282.0	Ind	6.7	7.1%

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Table 3-3. Page 4 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Land mammals	91.4%	65.7%	60.0%	71.4%	48.6%	15,195.9	361.8	95.9				12.4%
Large land mammals	88.6%	62.9%	45.7%	71.4%	40.0%	14,956.8	356.1	94.4				12.3%
Black bear	2.9%	2.9%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Brown bear	14.3%	8.6%	8.6%	8.6%	11.4%	1,224.0	29.1	7.7	3.6	Ind	0.1	0.0%
Caribou	80.0%	45.7%	25.7%	62.9%	25.7%	3,240.0	77.1	20.5	21.6	Ind	0.5	12.9%
Moose	82.9%	60.0%	37.1%	65.7%	34.3%	10,368.0	246.9	65.5	19.2	Ind	0.5	10.0%
Dall sheep	2.9%	2.9%	2.9%	0.0%	0.0%	124.8	3.0	0.8	1.2	Ind	0.0	0.0%
Small land mammals/furbearers	42.9%	40.0%	37.1%	14.3%	20.0%	239.1	5.7	1.5				10.9%
Beaver	11.4%	11.4%	8.6%	2.9%	5.7%	73.5	1.8	0.5	8.4	Ind	0.2	4.1%
Coyote	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Foxes	8.6%	8.6%	8.6%	0.0%	0.0%	0.0	0.0	0.0	7.2	Ind	0.2	3.0%
Red fox	8.6%	8.6%	8.6%	0.0%	0.0%	0.0	0.0	0.0	7.2	Ind	0.2	3.0%
Hares	11.4%	11.4%	8.6%	2.9%	5.7%	12.0	0.3	0.1	6.0	Ind	0.1	3.2%
Snowshoe hare	11.4%	11.4%	8.6%	2.9%	5.7%	12.0	0.3	0.1	6.0	Ind	0.1	3.2%
River (land) otter	5.7%	5.7%	5.7%	0.0%	0.0%	0.0	0.0	0.0	2.4	Ind	0.1	0.0%
Lynx	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Alaska marmot	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Marten	2.9%	2.9%	2.9%	0.0%	0.0%	0.0	0.0	0.0	1.2	Ind	0.0	0.0%
Mink	2.9%	2.9%	2.9%	0.0%	0.0%	0.0	0.0	0.0	1.2	Ind	0.0	0.0%
Muskrat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Porcupine	25.7%	22.9%	20.0%	11.4%	11.4%	153.6	3.7	1.0	19.2	Ind	0.5	10.5%
Squirrels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Arctic ground (parka) squirrel	0.0%	8.3%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Red (tree) squirrel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 3-3. Page 5 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Small land mammals/furbearers, continued												
Short-tailed weasel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Gray wolf	2.9%	2.9%	2.9%	0.0%	0.0%	0.0	0.0	0.0	3.6	Ind	0.1	0.0%
Wolverine	2.9%	2.9%	2.9%	0.0%	2.9%	0.0	0.0	0.0	1.2	Ind	0.0	0.0%
Marine mammals	40.0%	22.9%	11.4%	22.9%	14.3%	268.8	6.4	1.7				6.9%
Seals	50.0%	33.3%	33.3%	41.7%	33.3%	303.3	23.3	7.4	5.4	Ind	0.4	29.4%
Bearded seal	40.0%	22.9%	11.4%	22.9%	14.3%	268.8	6.4	1.7	4.8	Ind	0.1	6.9%
Harbor seal – fresh water	40.0%	22.9%	11.4%	22.9%	14.3%	268.8	6.4	1.7	4.8	Ind	0.1	6.9%
Harbor seal– salt water	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Ringed seal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sea otter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Steller sea lion	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Whales	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Beluga whale	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Birds and eggs	91.4%	88.6%	88.6%	42.9%	68.6%	1,237.3	29.5	7.8				12.7%
Migratory birds	62.9%	48.6%	42.9%	31.4%	31.4%	194.3	4.6	1.2	168.0	Ind	4.0	12.0%
Ducks	57.1%	42.9%	40.0%	25.7%	31.4%	128.1	3.0	0.8	140.4	Ind	3.3	11.6%
Bufflehead	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Goldeneyes	8.6%	5.7%	5.7%	2.9%	2.9%	5.8	0.1	0.0	9.6	Ind	0.2	1.7%
Unknown goldeneyes	2.9%	2.9%	2.9%	0.0%	2.9%	5.8	0.1	0.0	7.2	Ind	0.2	0.0%
Mallard	42.9%	31.4%	31.4%	20.0%	22.9%	90.0	2.1	0.6	90.0	Ind	2.1	9.3%
Northern pintail	17.1%	11.4%	11.4%	8.6%	8.6%	19.2	0.5	0.1	24.0	Ind	0.6	2.5%
Northern shoveler	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Wigeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 3-3. Page 6 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Migratory birds, ducks, continued												
American wigeon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown ducks	14.3%	14.3%	11.4%	5.7%	11.4%	13.1	0.3	0.1	16.8	Ind	0.4	3.1%
Geese	42.9%	34.3%	25.7%	22.9%	22.9%	59.0	1.4	0.4	26.4	Ind	0.6	9.4%
Canada geese	8.6%	8.6%	8.6%	2.9%	5.7%	4.3	0.1	0.0	3.6	Ind	0.1	0.0%
Dusky Canada geese	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Lesser Canada geese[b]	8.6%	8.6%	8.6%	2.9%	5.7%	4.3	0.1	0.0	3.6	Ind	0.1	0.0%
Unknown Canada geese	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Snow goose	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
White-fronted geese	31.4%	22.9%	17.1%	17.1%	14.3%	54.7	1.3	0.3	22.8	Ind	0.5	6.6%
Unknown geese	2.9%	2.9%	0.0%	2.9%	2.9%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Swans	11.4%	11.4%	2.9%	8.6%	5.7%	7.2	0.2	0.0	1.2	Ind	0.0	42.6%
Tundra (whistling) swan	11.4%	11.4%	2.9%	8.6%	5.7%	7.2	0.2	0.0	1.2	Ind	0.0	42.6%
Cranes	2.9%	5.7%	0.0%	2.9%	2.9%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sandhill crane	2.9%	5.7%	0.0%	2.9%	2.9%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Seabirds and loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Other birds	65.7%	57.1%	54.3%	17.1%	48.6%	273.8	6.5	1.7	391.2	Ind	9.3	12.0%
Upland game birds	65.7%	57.1%	54.3%	17.1%	48.6%	273.8	6.5	1.7	391.2	Ind	9.3	12.0%
Unknown grouse	48.6%	42.9%	40.0%	14.3%	34.3%	110.9	2.6	0.7	158.4	Ind	3.8	8.2%
Ptarmigan	48.6%	40.0%	37.1%	14.3%	28.6%	163.0	3.9	1.0	232.8	Ind	5.5	11.6%
Unknown ptarmigan	48.6%	40.0%	37.1%	14.3%	28.6%	163.0	3.9	1.0	232.8	Ind	5.5	11.6%

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Table 3-3. Page 7 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Birds, continued												
Bird eggs	82.9%	77.1%	77.1%	31.4%	51.4%	769.1	18.3	4.9				11.9%
Duck eggs	11.4%	11.4%	11.4%	2.9%	8.6%	5.6	0.1	0.0	37.2	Gal	0.9	1.6%
Unknown duck eggs	11.4%	11.4%	11.4%	2.9%	8.6%	5.6	0.1	0.0	37.2	Gal	0.9	1.6%
Goose eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown goose eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Seabird eggs	82.9%	77.1%	77.1%	31.4%	51.4%	763.6	18.2	4.8	2,617.2	Gal	62.3	11.8%
Gull eggs	82.9%	77.1%	77.1%	31.4%	51.4%	759.2	18.1	4.8	2,530.8	Gal	60.3	12.0%
Tern eggs	20.0%	20.0%	20.0%	2.9%	5.7%	4.3	0.1	0.0	86.4	Gal	2.1	2.0%
Unknown eggs	2.9%	2.9%	2.9%	0.0%	2.9%	0.0	0.0	0.0	24.0	Gal	0.6	0.0%
Marine invertebrates	8.6%	8.6%	8.6%	2.9%	5.7%	74.4	1.8	0.5				2.8%
Clams	5.7%	5.7%	5.7%	2.9%	5.7%	57.6	1.4	0.4	19.2	Gal	0.5	3.0%
Butter clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Freshwater clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Horse clam (gapers)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pacific littleneck (steamer) clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pinkneck (surf) clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pacific razor clam	5.7%	5.7%	5.7%	2.9%	5.7%	57.6	1.4	0.4	19.2	Gal	0.5	3.0%
Unknown clams	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Cockles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown cockles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Crabs	2.9%	2.9%	2.9%	0.0%	0.0%	16.8	0.4	0.1	24.0	Ind	0.6	0.0%
Dungeness crab	2.9%	2.9%	2.9%	0.0%	0.0%	16.8	0.4	0.1	24.0	Ind	0.6	0.0%
King crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

-continued-

Table 3-3. Page 8 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Marine invertebrates, king crabs, continued												
Unknown king crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Tanner crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Tanner crab, Bairdi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown tanner crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Octopus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Scallops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown scallops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Shrimps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Plants and fungi	97.1%	97.1%	97.1%	34.3%	34.3%	3,894.0	92.7	24.6				11.1%
Berries	97.1%	91.4%	91.4%	25.7%	28.6%	3,429.6	81.7	21.7	857.4	Gal	20.4	10.4%
Other plants / mushrooms	42.9%	42.9%	42.9%	11.4%	5.7%	464.4	11.1	2.9	116.1	Gal	2.8	7.5%
Trees (wood)	80.0%	77.1%	77.1%	11.4%	5.7%	0.0	0.0	0.0	173.4	Crd	4.1	10.8%

Note Differences between harvest and use percentages reflect sharing between households.

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

b. Both *B. canadensis taverner* and *B. canadensis parvipes*.

Source ADF&G Division of Subsistence household surveys, 2005.

Table 3-4.–Top 10 resources harvested and used, Kokhanok, 2005.

Harvest			Use		Percentage
Rank	Resource	Pounds per capita	Rank	Resource	households using
1	Fresh sockeye salmon	438.3	1	Berries	97.1%
2	Moose	65.5	2	Fresh sockeye salmon	85.7%
3	Berries	21.7	3	Moose	82.9%
4	Caribou	20.5	3	Gull eggs	82.9%
5	Coho salmon	14.3	5	Caribou	80.0%
6	Chum salmon	12.6	6	Spawning sockeye salmon	71.4%
7	Rainbow trout	10.8	7	Rainbow trout	65.7%
8	Rainbow smelt	9.0	8	Dolly Varden	51.4%
9	Brown bear	7.7	9	Unknown grouse	48.6%
10	Gull eggs	4.8	9	Ptarmigan	48.6%

Source ADF&G Division of Subsistence household surveys, 2005.

Non-salmon fishes were an important resource, making up 5% of the total harvest of wild resources in 2005 (Table 3-3 and Figure 3-2). Kokhanok residents harvested 5,752 lb of non-salmon fishes, or 36 lb per person. Figure 3-4 shows the harvest of freshwater fishes at Kokhanok in 2005 by species. The major species harvested included rainbow trout (1,712 lb, or 11 lb per person) at 30% of the non-salmon fish harvest; rainbow smelt, with 25% (1,418 lb, or 9 lb per person); and whitefishes, with 22% (1,286 lb, or 8 lb per person). Rainbow trout ranked seventh among all resources in terms of usable pounds harvested and seventh in terms of percentage of households using particular resources.

Large land mammals (Table 3-3) were another major source of wild foods at Kokhanok in 2005, with 14,957 lb harvested (362 lb per household, or 94 lb per person). By weight, 70% of this was moose (10,368 lb, or 66 lb per person). Caribou contributed 22% of the total large land mammal harvest (3,240 lb, or 21 lb per person). The 2005 harvest included 22 caribou and 19 moose.

Beavers and porcupines were important small land mammal resources. In 2005, Kokhanok residents harvested 154 lb of porcupine (1 lb per person) and 76 lb of beaver (<1 lb per person) (Table 3-3).

In 2005, Kokhanok residents harvested a total of 764 lb of seabird eggs, or 5 lb per person (Table 3-3). Some marine invertebrates were collected from west Cook Inlet, including 58 lb of razor clams, or <1 lb per person (Table 3-3). Berry harvests were significant, totaling 3,430 lb, or 22 lb per person. Harvests of a variety of other plants were also important (465 total lb, or 3 lb per person) (Table 3-3).

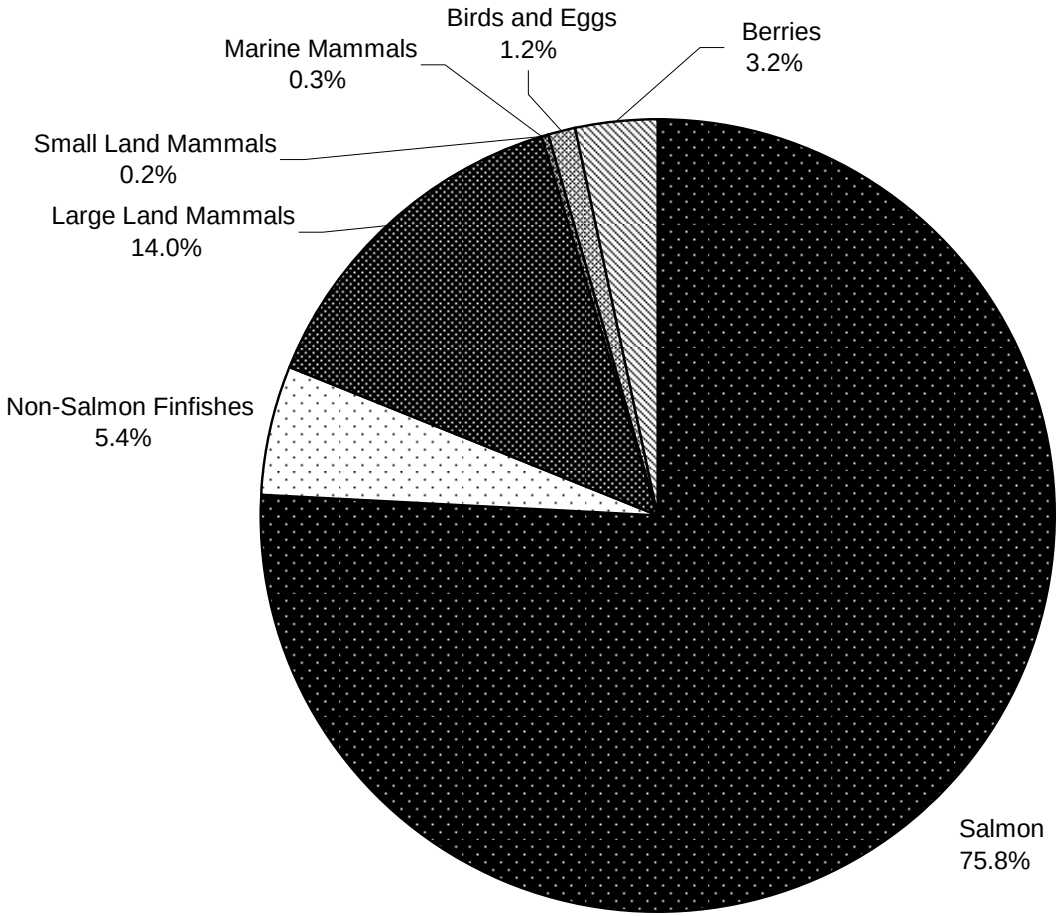

Figure 3-2.–Kokhanok composition of wild resource harvests, pounds usable weight, 2005.

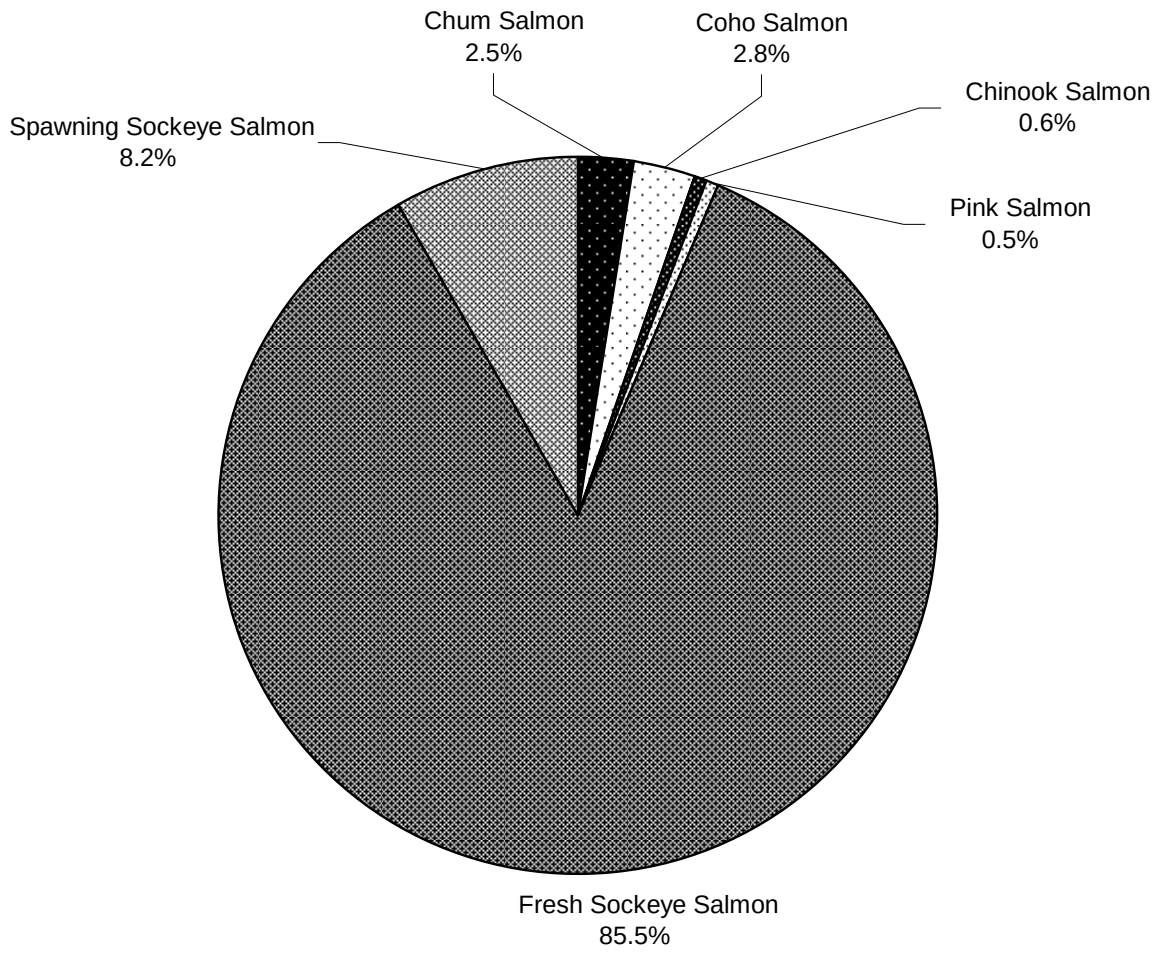

Figure 3-3.–Kokhanok composition of salmon harvests, pounds usable weight, 2005.

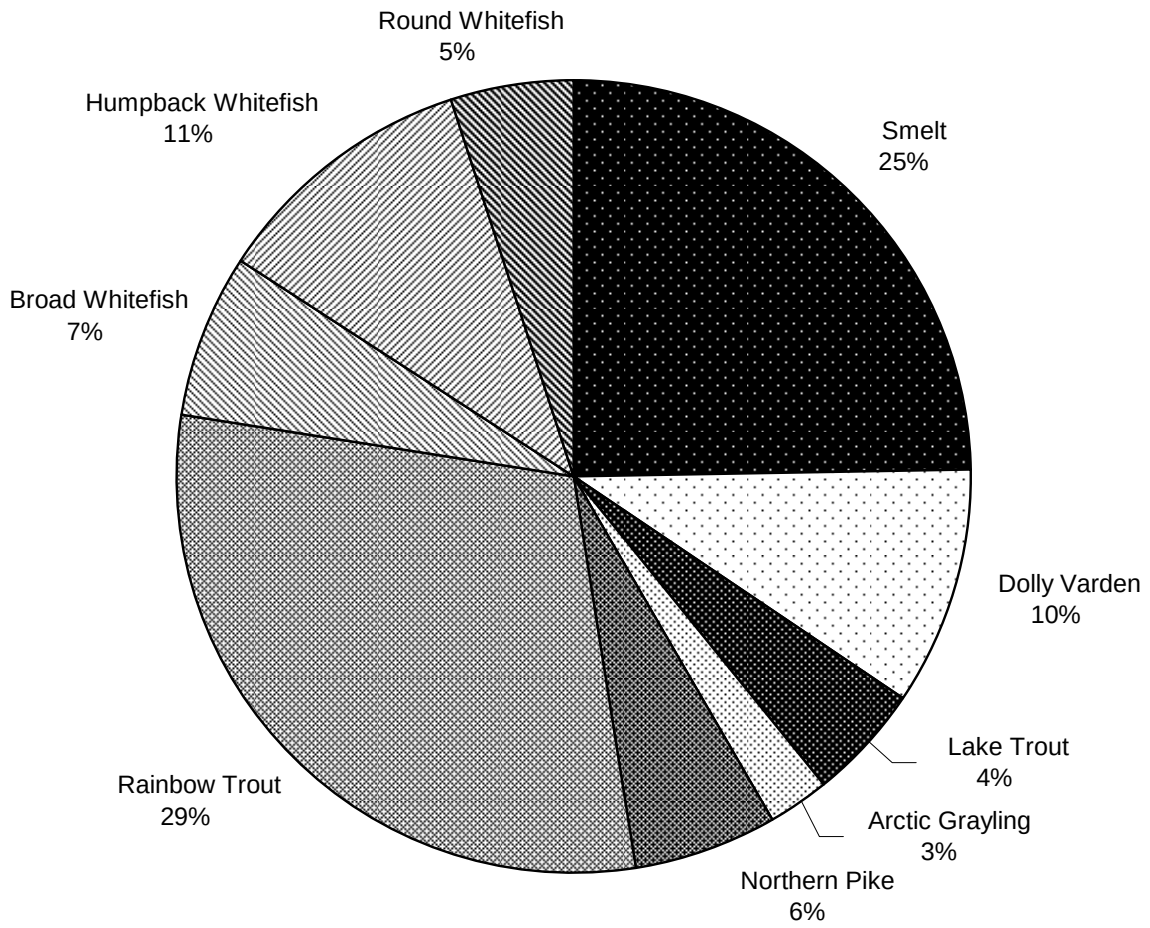

Figure 3-4.–Kokhanok composition of freshwater fish harvests, pounds usable weight, 2005.

General Hunting, Fishing, and Gathering Areas

Kokhanok residents' fish harvests in 2005 were concentrated in the area surrounding the community (Figures 3-5 and 3-6)[5] Caribou and moose hunting, however, occurred on the western shores of Iliamna Lake as far as the Kaskanak Flats and north towards Lake Clark National Park and Preserve (Figures 3-7 and 3-8). They also hunted caribou well into Katmai National Preserve, a traditional hunting territory, as far as the borders of Katmai National Park and Preserve (which, by federal law, was closed to all hunting).

Kokhanok residents also traveled a considerable distance for berries and other plants, going to areas near Lower and Upper Talarik creeks, as well as to the lands south of the village. Egg gathering occurred on many of the islands of Iliamna Lake (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report, for more harvest and use maps).

SHARING AND RECEIVING WILD RESOURCES

The household surveys documented widespread sharing of wild resources in Kokhanok in 2005; 94% of households received wild resources from other households and 83% of households gave resources away (Tables 1-15 and 3-3). Households received an average of 6 resources and gave away an average of 6 resources (Table 1-15). The maximum number of resources given away by any household was 27 and the maximum number received was 21 (Table 1-14). Fishes were the most widely used resource, and they were among the most commonly shared resources, with 77% of households giving and receiving fish (Table 3-3).

Large land mammals also were widely shared in 2005: 71% of Kokhanok households received large land mammals and 40% gave them away. Moose were the most widely shared game resource, with 66% giving moose and 34% receiving moose (Table 3-3). This finding demonstrated that moose were harvested by a smaller number of hunters and widely shared.

More households gave away eggs (51%) than received them (31%), likely reflecting the widespread participation in egg harvesting activities (77% of households) (Table 3-3). The upland birds harvest and use data displayed a similar pattern, with 49% of households giving away these birds, and 17% receiving them. During the survey, researchers learned that the recipients of eggs and upland birds were mostly elders.

[5] For the complete set of maps of Kokhanok residents' residents' hunting, fishing, and gathering areas in 2005, see Appendix D, "Harvest Use Area Maps by Community" (published in hard copy on a CD-ROM attached to the back cover of this report).

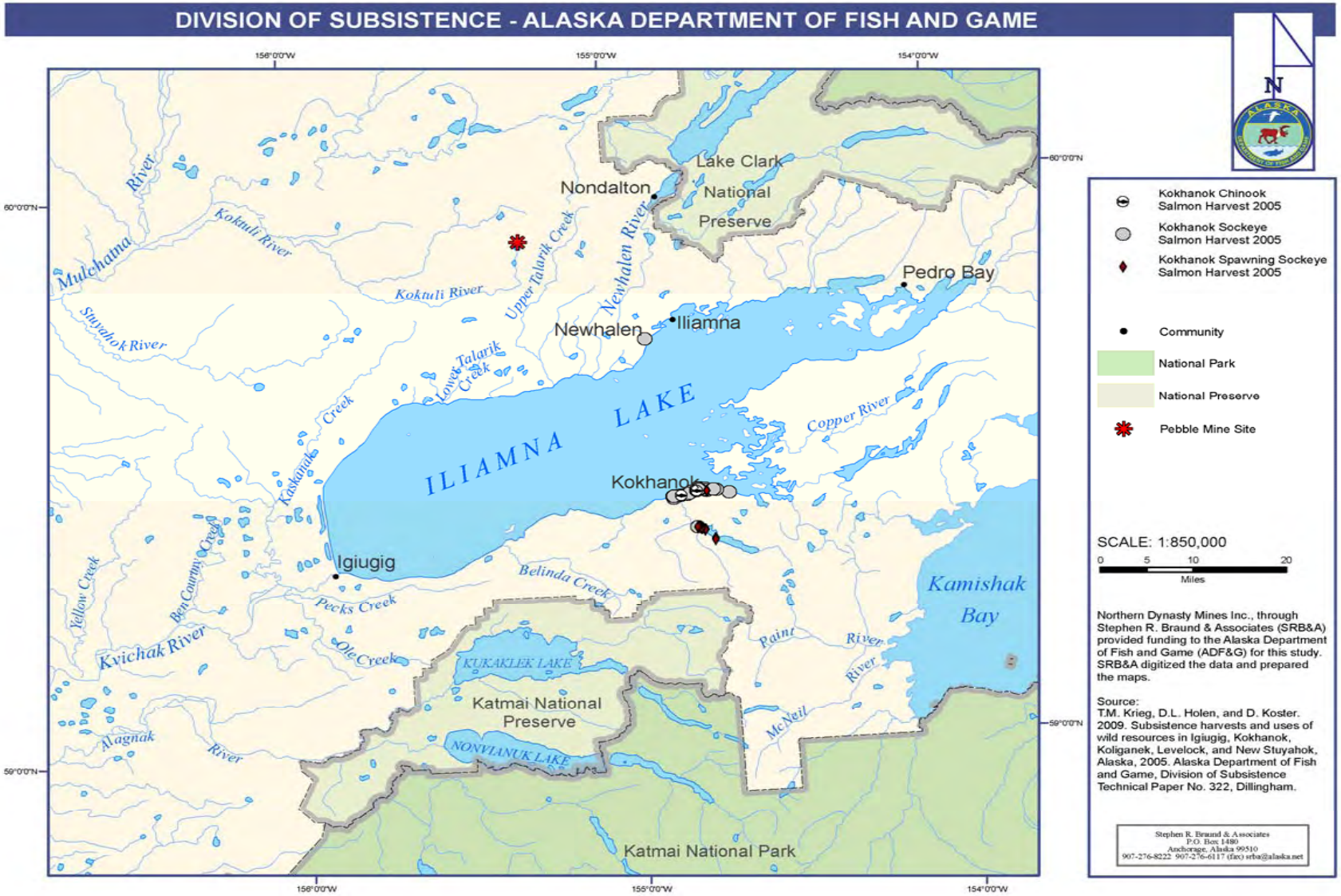

Figure 3-5.–Chinook, sockeye, and spawning sockeye salmon harvest locations, Kokhanok, 2005.

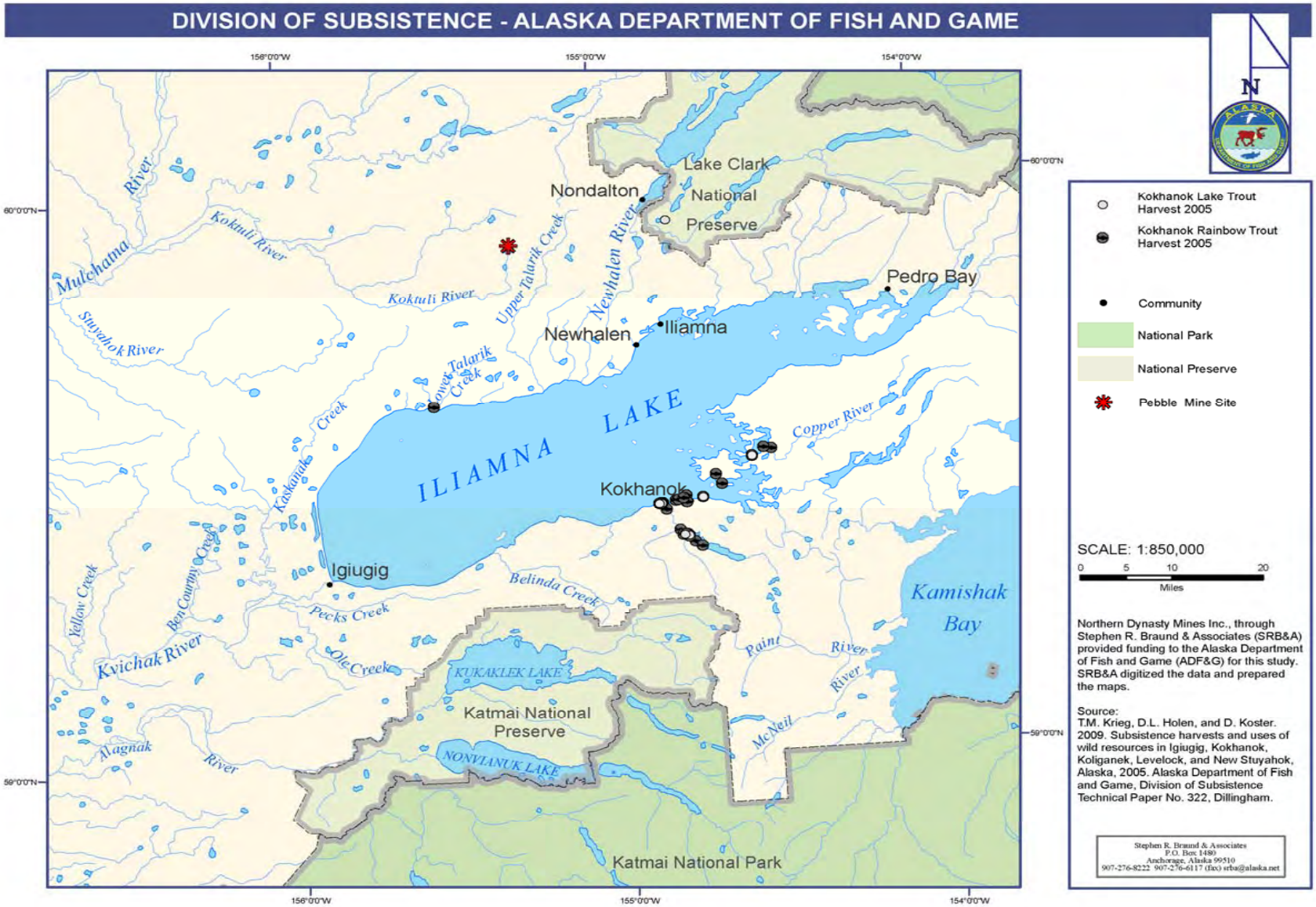

Figure 3-6.–Lake trout and rainbow trout harvest locations, Kokhanok, 2005.

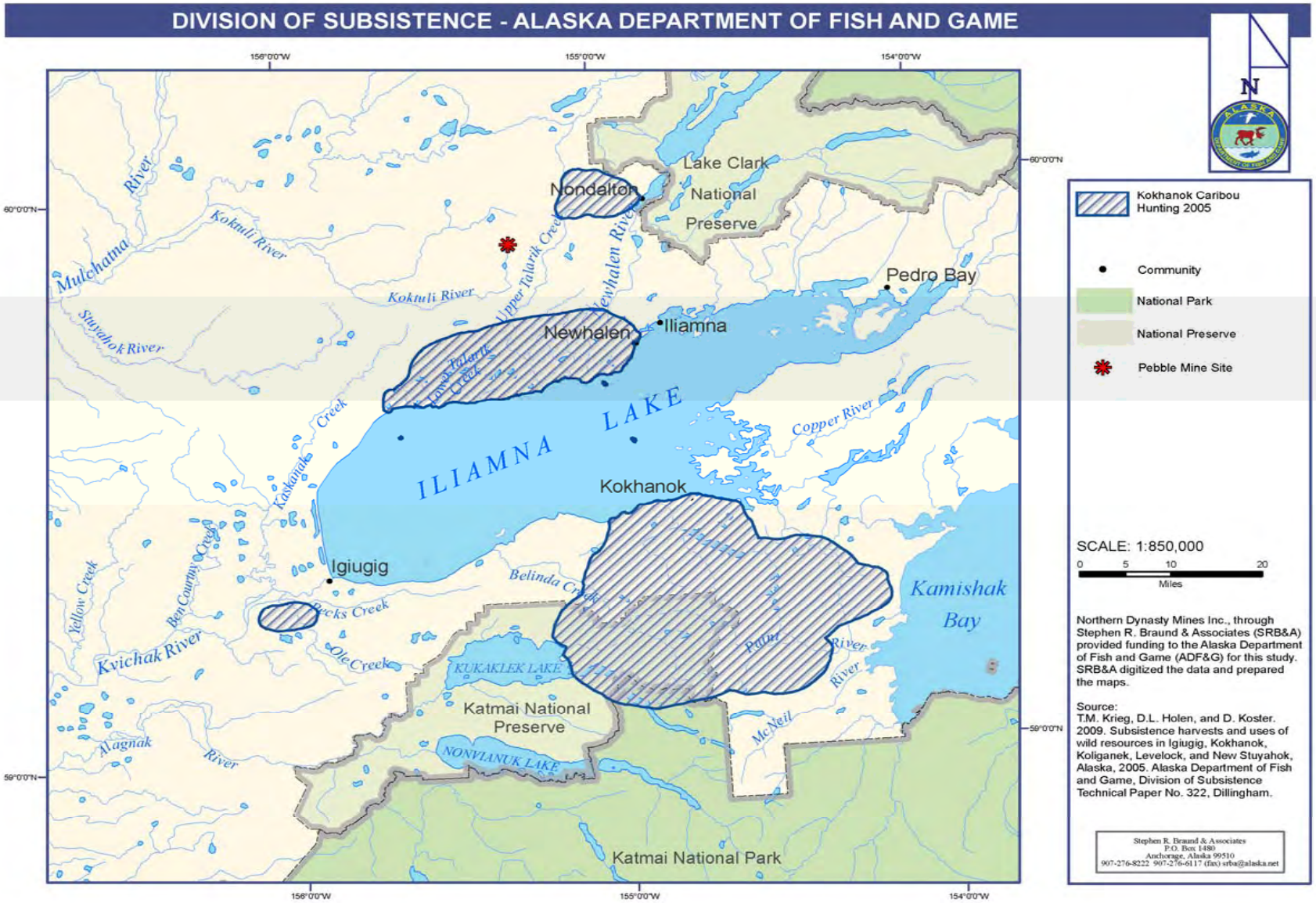

Figure 3-7.–Caribou hunting locations, Kokhanok, 2005.

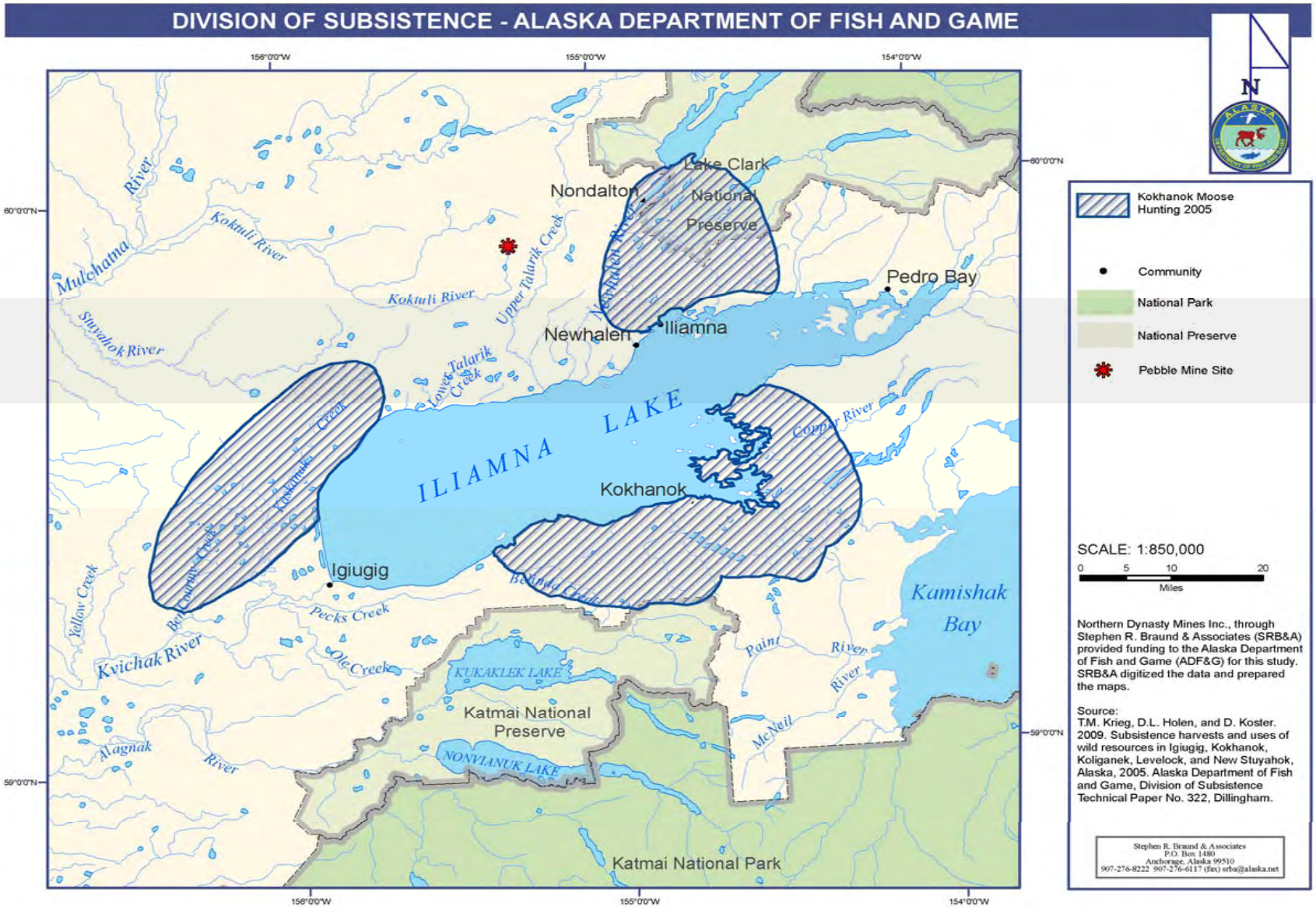

Figure 3-8.–Moose hunting locations, Kokhanok, 2005.

USE AND HARVEST CHARACTERISTICS BY RESOURCE CATEGORY

SALMON

In 2005, Kokhanok residents harvested 97% of their salmon by using setnets along the beaches near the community and on Gibraltar Lake just south of the community (Table 3-5 and Figure 3-5). In addition, 1% of the salmon were removed from commercial catches (Tables 1-16 and 3-5). Sockeye salmon were the primary species harvested (Table 3-3), with 98% taken in subsistence setnets. Fifty-four percent of Chinook salmon were taken in subsistence setnets and 29% were removed from the commercial catches for home use (Table 3-5). Kokhanok residents related that in recent years they have caught more chum, coho, and pink salmon in Iliamna Lake in their subsistence nets.

FRESHWATER FISHES

Table 3-6 lists the percentages of non-salmon fishes harvested by Kokhanok residents in 2005 by gear type. Non-salmon species of fish made up 5% of the total harvest of wild foods in 2005 (Figure 3-2). Residents fishing for salmon often caught trout and whitefishes in their setnets. In 2005, 100% of broad whitefish were harvested with setnets, as were 47% of round whitefish, and 23% of rainbow trout. Ice fishing, especially during the late winter and early spring months, was a popular activity in 2005. Of the 343 lb of northern pike harvested, 75% were harvested during ice fishing, as was 61% of the total Arctic grayling harvest of 145 lb (Tables 3-3 and 3-6). Rainbow smelt, which made up 25% of the total non-salmon fish harvest, were taken with dip nets on a peninsula just north of the community (Figure 3-4; see also Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

LARGE LAND MAMMALS

In 2005, large land mammals made up an estimated 14% of the total harvest at Kokhanok (Figure 3-2). Residents noted that the harvest of large land mammals was considerably less, compared to other recent years, due to a lack of caribou migrating into the area. However, as demonstrated in Figures 3-7 and 3-8, hunters from Kokhanok traveled a considerable distance from the community to find caribou and moose, including well into Katmai National Park and Preserve, and north as far as Nondalton. Moose were more accessible than caribou, but successful hunting required considerable effort and travel of long distances.

In total, Kokhanok residents harvested 15,196 lb of large land mammals, or 96 lb per person, in 2005 (Table 3-3). Moose made up 70% of the harvest (10,368 lb, or 66 lb per person), caribou 22% (3,240 lb, or 21 lb per person), and brown bears 8% (1,224 lb, or 8 lb per person).

SMALL LAND MAMMALS/FURBEARERS

The estimated total harvest of small land mammals by Kokhanok residents in 2005 was 239 lb, or 2 lb per person (Table 3-3). Small land mammals made up 0.2% of the total harvest of wild resources in 2005. Porcupines, which made up most of the small land mammal harvests, at 154 lb (1 lb per person), were taken opportunistically near the community and during trips down the Kvichak River (Table 3-3; see also Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

Table 3-5.–Estimated percentages of salmon harvest by gear type, resource, and total salmon harvest, Kokhanok, 2005.

				Subsistence methods											
	Percentage	Removed from commercial catch[a]		Setnet		Seine		Other		Subsistence gear, any method		Rod and reel		Any method	
Resource	base	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	Gear type	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Resource	1.2%	1.4%	96.5%	97.1%	1.5%	0.8%	0.0%	0.1%	98.0%	98.0%	0.9%	0.6%	100.0%	100.0%
	Total	1.2%	1.4%	96.5%	97.1%	1.5%	0.8%	0.0%	0.1%	98.0%	98.0%	0.9%	0.6%	100.0%	100.0%
Chum salmon	Gear type	2.2%	2.2%	2.0%	2.5%	0.0%	0.0%	0.0%	0.0%	2.0%	2.5%	0.0%	0.0%	2.0%	2.5%
	Resource	1.3%	1.3%	98.7%	98.7%	0.0%	0.0%	0.0%	0.0%	98.7%	98.7%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	2.0%	2.4%	0.0%	0.0%	0.0%	0.0%	2.0%	2.4%	0.0%	0.0%	2.0%	2.5%
Coho salmon	Gear type	6.5%	7.0%	2.5%	3.2%	0.0%	0.0%	0.0%	0.0%	2.5%	3.2%	5.8%	11.5%	2.5%	3.3%
	Resource	3.0%	3.0%	95.0%	95.0%	0.0%	0.0%	0.0%	0.0%	95.0%	95.0%	2.0%	2.0%	100.0%	100.0%
	Total	0.1%	0.1%	2.4%	3.1%	0.0%	0.0%	0.0%	0.0%	2.4%	3.1%	0.1%	0.1%	2.5%	3.3%
Chinook salmon	Gear type	5.4%	12.7%	0.1%	0.3%	0.0%	0.0%	100.0%	100.0%	0.2%	0.5%	0.0%	0.0%	0.2%	0.6%
	Resource	28.6%	28.6%	54.3%	54.3%	0.0%	0.0%	17.1%	17.1%	71.4%	71.4%	0.0%	0.0%	100.0%	100.0%
	Total	0.1%	0.2%	0.1%	0.3%	0.0%	0.0%	0.0%	0.1%	0.2%	0.4%	0.0%	0.0%	0.2%	0.6%
Pink salmon	Gear type	2.2%	1.4%	0.8%	0.6%	0.0%	0.0%	0.0%	0.0%	0.8%	0.6%	0.0%	0.0%	0.8%	0.6%
	Resource	3.2%	3.2%	96.8%	96.8%	0.0%	0.0%	0.0%	0.0%	96.8%	96.8%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.8%	0.6%	0.0%	0.0%	0.0%	0.0%	0.8%	0.6%	0.0%	0.0%	0.8%	0.6%
Sockeye salmon	Gear type	83.9%	76.7%	79.8%	85.9%	13.0%	24.3%	0.0%	0.0%	78.8%	85.3%	17.5%	29.1%	78.3%	84.9%
	Resource	1.3%	1.3%	98.3%	98.3%	0.2%	0.2%	0.0%	0.0%	98.5%	98.5%	0.2%	0.2%	100.0%	100.0%
	Total	1.0%	1.1%	77.0%	83.4%	0.2%	0.2%	0.0%	0.0%	77.2%	83.6%	0.2%	0.2%	78.3%	84.9%
Landlocked salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spawning sockeye	Gear type	0.0%	0.0%	14.7%	7.4%	87.0%	75.7%	0.0%	0.0%	15.8%	8.0%	76.6%	59.4%	16.2%	8.2%
	Resource	0.0%	0.0%	88.0%	88.0%	7.8%	7.8%	0.0%	0.0%	95.9%	95.9%	4.1%	4.1%	100.0%	100.0%
	Total	0.0%	0.0%	14.2%	7.2%	1.3%	0.6%	0.0%	0.0%	15.5%	7.8%	0.7%	0.3%	16.2%	8.2%
Unknown salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2005.

a. Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

Table 3-6.–Estimated percentages of fishes other than salmon harvested by gear type, resource, and total harvest, Kokhanok, 2005.

Resource	Percentage base	Removed from commercial catch[a]	Subsistence gear							Rod and reel	Any method
			Setnet	Seine	Hand line gear	Dip net	Ice fishing	Subsistence gear (other)	Subsistence gear, any gear		
Non-salmon fishes	Gear type	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%	100.0%
	Resource	0.0%	18.5%	12.5%	7.4%	23.9%	20.2%	0.0%	82.5%	17.1%	100.0%
	Total	0.0%	18.5%	18.5%	7.4%	23.9%	20.2%	0.0%	82.5%	17.1%	100.0%
Rainbow smelt	Gear type	0.0%	3.4%	0.0%	0.0%	99.5%	0.0%	0.0%	29.6%	0.0%	24.7%
	Resource	0.0%	2.5%	0.0%	0.0%	96.4%	0.0%	0.0%	99.0%	0.0%	100.0%
	Total	0.0%	0.6%	0.6%	0.0%	23.8%	0.0%	0.0%	24.4%	0.0%	24.7%
Lingcod	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.1%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Pacific halibut	Gear type	0.0%	1.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.3%	0.5%	0.3%
	Resource	0.0%	64.3%	0.0%	7.1%	0.0%	0.0%	0.0%	71.4%	28.6%	100.0%
	Total	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%	0.3%
Arctic char	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.1%	0.2%	0.2%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	25.0%	12.5%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.2%
Dolly Varden	Gear type	0.0%	4.1%	1.2%	20.5%	0.0%	9.0%	0.0%	5.1%	31.8%	9.7%
	Resource	0.0%	7.9%	1.5%	15.7%	0.0%	18.7%	0.0%	43.8%	56.2%	100.0%
	Total	0.0%	0.8%	0.8%	1.5%	0.0%	1.8%	0.0%	4.2%	5.4%	9.7%
Lake trout	Gear type	0.0%	3.2%	0.0%	0.0%	0.0%	5.6%	0.0%	2.1%	16.1%	4.5%
	Resource	0.0%	13.1%	0.0%	0.0%	0.0%	25.5%	0.0%	38.6%	61.4%	100.0%
	Total	0.0%	0.6%	0.6%	0.0%	0.0%	1.1%	0.0%	1.7%	2.7%	4.5%
Arctic grayling	Gear type	0.0%	0.0%	0.0%	5.9%	0.0%	7.6%	0.0%	2.4%	3.3%	2.5%
	Resource	0.0%	0.0%	0.0%	17.3%	0.0%	60.7%	0.0%	78.0%	22.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.4%	0.0%	1.5%	0.0%	2.0%	0.6%	2.5%
Northern pike	Gear type	0.0%	0.6%	0.0%	3.2%	0.5%	21.9%	0.0%	5.9%	6.2%	6.0%
	Resource	0.0%	2.0%	0.0%	3.9%	2.0%	74.5%	0.0%	82.4%	17.6%	100.0%
	Total	0.0%	0.1%	0.1%	0.2%	0.1%	4.4%	0.0%	4.9%	1.1%	6.0%

-continued-

Table 3-6. Page 2 of 2.

Resource	Percentage base	Removed from commercial catch[a]	Subsistence gear: Set net	Seine	Hand line gear	Dipnet	Ice Fishing	Subsistence gear (other)	Subsistence gear any gear	Rod and reel	Any method
Rainbow trout	Gear type	0.0%	36.9%	0.0%	70.2%	0.0%	55.3%	0.0%	28.1%	38.5%	29.8%
	Resource	0.0%	22.9%	0.0%	17.5%	0.0%	37.6%	0.0%	77.9%	22.1%	100.0%
	Total	0.0%	6.8%	6.8%	5.2%	0.0%	11.2%	0.0%	23.2%	6.6%	29.8%
Broad whitefish	Gear type	0.0%	36.2%	0.0%	0.0%	0.0%	0.0%	0.0%	8.1%	0.0%	6.7%
	Resource	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	6.7%	6.7%	0.0%	0.0%	0.0%	0.0%	6.7%	0.0%	6.7%
Humpback whitefish	Gear type	0.0%	2.0%	80.0%	0.0%	0.0%	0.0%	0.0%	12.6%	2.1%	10.8%
	Resource	0.0%	3.4%	93.2%	0.0%	0.0%	0.0%	0.0%	96.6%	3.4%	100.0%
	Total	0.0%	0.4%	0.4%	0.0%	0.0%	0.0%	0.0%	10.4%	0.4%	10.8%
Round whitefish	Gear type	0.0%	12.7%	18.8%	0.0%	0.0%	0.3%	0.0%	5.8%	0.9%	4.9%
	Resource	0.0%	47.7%	48.1%	0.0%	0.0%	1.3%	0.0%	97.0%	3.0%	100.0%
	Total	0.0%	2.3%	2.3%	0.0%	0.0%	0.1%	0.0%	4.8%	0.1%	4.9%

Note This table lists only those resources for which there was a harvest in the 2005 study year.

a. Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

Source ADF&G Division of Subsistence household surveys, 2005.

MARINE MAMMALS

Kokhanok hunters harvested 5 freshwater seals in 2005. They noted that they usually did more seal hunting, but weather conditions were not conducive to seal hunting in 2005. The 5 seals taken by Kokhanok residents in 2005 yielded 269 lb of usable meat, or 2 lb per person (Table 3-3). Hunting occurred just north of the village, on the islands as well as in the open water leads in the ice of Iliamna Lake (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

MARINE INVERTEBRATES

Razor clams were the only marine invertebrate harvest reported by interviewed Kokhanok households for 2005. The clams were harvested from Spring Point, at the head of Chinitna Bay on Cook Inlet. In the past, residents have also traveled to Iliamna Bay, as well as to other locations along western Cook Inlet in order to harvest clams.

BIRDS AND EGGS

In 2005, Kokhanok residents harvested migratory birds along the southern shore of Iliamna Lake; estimated harvests totaled 194 lb, about 1 lb per person. Upland birds, such as grouse and ptarmigan, were harvested along the shores of nearby Gibraltar Lake, for a harvest of 274 lb, or 2 lb per person. Collecting eggs from the nearby islands of Iliamna Lake was important. In 2005, 770 lb, or 5 lb per person, of bird eggs were harvested (Table 3-3).

WILD PLANTS

Berries and other wild plants were very important to residents of Kokhanok, and they spent considerable time collecting them in 2005. Harvest estimates totaled 3,430 lb, or 22 lb per person, of berries, and 464 lb, or 3 lb per person, of other wild plants (Table 3-3). Berries made up 3.2% of the total harvest and other plants 0.4% (Figure 3-2). Kokhanok residents traveled across the lake to Iliamna and north to the boundaries of Lake Clark National Park and Preserve to collect berries and plants. In addition, they traveled well south of the community in order to harvest these resources (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

COMPARING HARVESTS AND USES IN 2005 WITH PREVIOUS YEARS

Of all interviewed Kokhanok households, 57% reported that, in total, their harvests and uses of resources in 2005 were about the same as in the recent past (the last 5 years). Table 3-7 summarizes respondents' assessments for each major resource category (see also Figure 3-9). Two of the key resource categories were salmon and large land mammals. Fifty-one percent of households said that they used more salmon than in recent years, while 49% said they used fewer large land mammals (Table 3-7 and Figure 3-9). A small percentage (17%) of households said they harvested fewer salmon; only 3% of households said they harvested more large land mammals. This is consistent with responses to more in-depth questions about resource abundance that will be discussed in the next section.

Table 3-7.–Comparison of household harvests and uses in recent years: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, Kokhanok, 2005.

Resource	Estimated households	No response		Valid responses		Fewer		Same		More	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Salmon	42	0.0	0.0%	42.0	100.0%	7.2	17.1%	13.2	31.4%	21.6	51.4%
Non-salmon finfishes	42	1.2	2.9%	40.8	97.1%	6.0	14.7%	28.8	70.6%	6.0	14.7%
Marine invertebrates	42	7.2	17.1%	34.8	82.9%	2.4	6.9%	28.8	82.8%	3.6	10.3%
Large land mammals	42	0.0	0.0%	42.0	100.0%	20.4	48.6%	20.4	48.6%	1.2	2.9%
Small land mammals/furbearers	42	1.2	2.9%	40.8	97.1%	16.8	41.2%	20.4	50.0%	3.6	8.8%
Marine mammals	42	1.2	2.9%	40.8	97.1%	4.8	11.8%	31.2	76.5%	4.8	11.8%
Birds and eggs	42	0.0	0.0%	42.0	100.0%	3.6	8.6%	31.2	74.3%	7.2	17.1%
Wild plants	42	0.0	0.0%	42.0	100.0%	7.2	17.1%	21.6	51.4%	13.2	31.4%
Overall	42	0.0	0.0%	42.0	100.0%	8.4	20.0%	24.0	57.1%	9.6	22.9%
Any resource	42	0.0	0.0%	42.0	100.0%	30.0	71.4%	42.0	100.0%	32.4	77.1%

Source ADF&G Division of Subsistence household surveys, 2005.

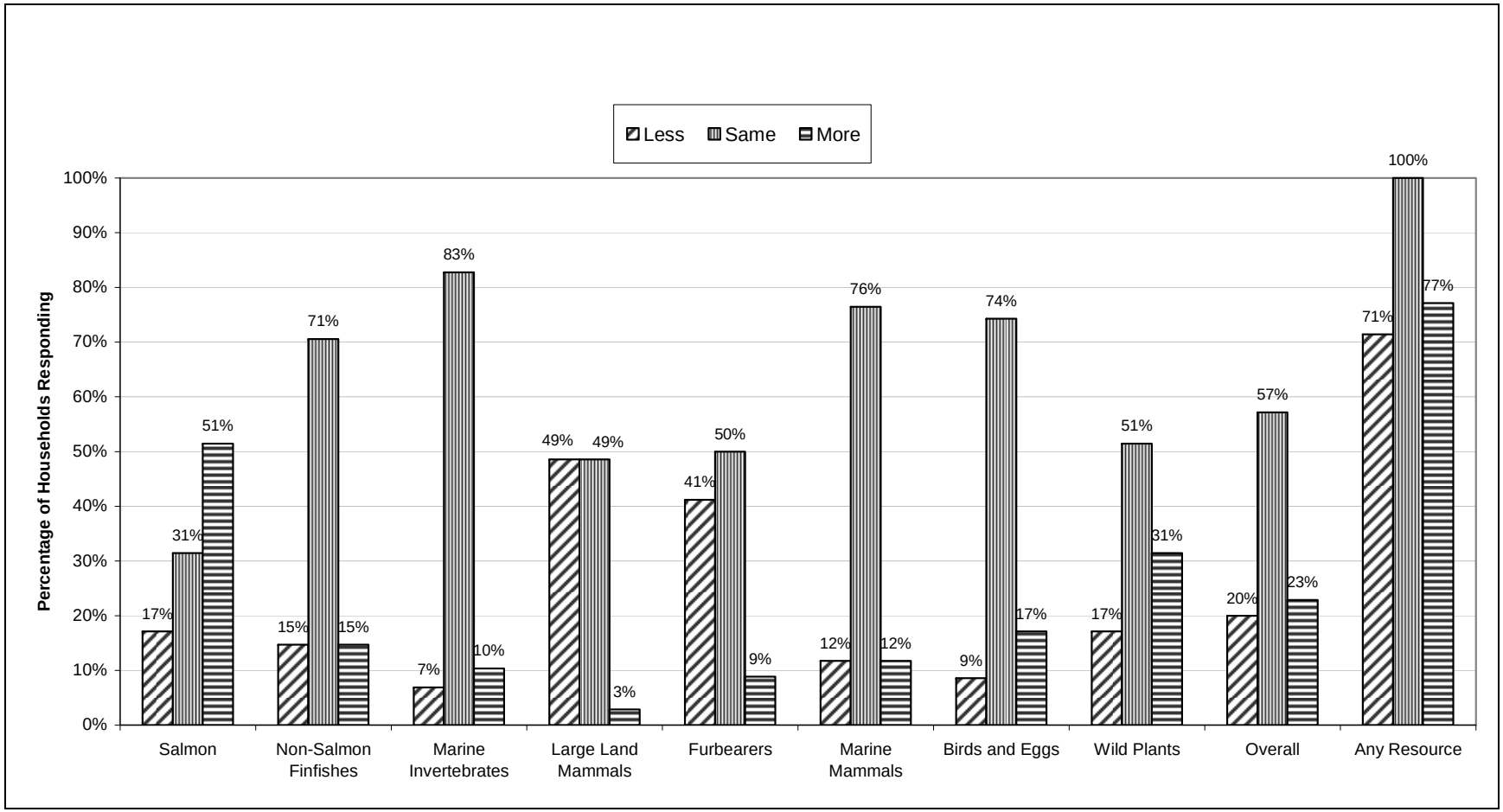

Figure 3-9.–Kokhanok households' assessment of harvests and uses of wild resources in 2005 compared to recent years.

Table 3-8 lists the reasons residents of Kokhanok gave for changes in harvests and uses, by resource category. This was an open-ended question, and respondents could provide more than one reason for changes. Project staff grouped the responses into categories, such as competition for resources, regulations hindering or helping residents harvest resources, sharing of harvests, effects of weather on animals and subsistence activities, changes in the animal populations, personal reasons such as work and health, and other outside effects on residents' opportunities to engage in subsistence activities. Animal population changes was the most frequently cited reason; specifically, scarcities of moose and caribou (see Figure 3-10). Fifty-nine percent of the 20 households that used fewer large land mammals said this was due to animal population changes and 12% related this to competition (Table 3-8 and Figure 3-10). Weather was a major factor in the harvest of wild plants, with 33% of respondents stating that they used fewer plants due to weather and 36% saying they used more due to weather. Residents noted that weather affected not only the abundance of the resources, but also travel conditions.

The overall harvest of wild resources in Kokhanok was lower in 2005 than in previous study years. This was due primarily to declines in large land mammal harvests. Comprehensive household harvest surveys were administered in Kokhanok for 1973, 1983, 1992, and 2005 (Tables 1-2, 3-9, and 3-10; Figure 3-11). Surveys pertaining specifically to large land mammals took place for 2001 and for non-salmon fishes for 2003 (Table 1-2). Table 3-9 summarizes the per capita harvests in pounds usable weight for each major resource category from these studies. Salmon harvests in 1973 were considerably higher than in any other year, but their proportionate contribution in 1973 was nearly the same as that in 2 other years (Table 3-10), ranging from 73% to 77%. The large harvest (929 lb usable weight per capita) appeared to be an exception since the range in pounds usable weight per capita in the other 3 years was 508 to 563 lb, and the average was 529 lb.

Harvests of non-salmon fishes, large land mammals, and small land mammals varied considerably across these years. In 2005, harvests of each of these categories diminished considerably compared to harvests in 1992, the next earlier date for which harvest data are available (Table 3-9). Notably, there was an especially sharp decline in 2005 in the category of small land mammals.

In spite of these differences, the total harvest of 680 lb usable weight per person in 2005 was considerable and very close to the estimate for 1983 of 679 lb usable weight per person.

Table 3-8.–Kokhanok respondents' reasons for change in harvests and uses in recent years.

			Percentage of responses by category[a]							
Resource category	Use fewer or more	Estimated number of households[b]	No reason given	Competition	Regulations	People are sharing less	Weather	Animal population changes[c]	Personal reasons (work/health)	Other outside effects
Salmon	Fewer	7.2	16.7%	0.0%	0.0%	0.0%	16.7%	0.0%	66.7%	0.0%
Salmon	More	21.6	16.7%	0.0%	16.7%	0.0%	0.0%	61.1%	5.6%	0.0%
Non-salmon finfishes	Fewer	6.0	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	80.0%	0.0%
Non-salmon finfishes	More	6.0	40.0%	0.0%	0.0%	0.0%	0.0%	20.0%	40.0%	0.0%
Marine invertebrates	Fewer	2.4	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%
Marine invertebrates	More	3.6	33.3%	0.0%	33.3%	0.0%	0.0%	0.0%	33.3%	0.0%
Large land mammals	Fewer	20.4	0.0%	11.8%	0.0%	5.9%	0.0%	58.8%	5.9%	17.6%
Large land mammals	More	1.2	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Small land mammals/furbearers	Fewer	16.8	14.3%	7.1%	0.0%	7.1%	0.0%	64.3%	0.0%	7.1%
Small land mammals/furbearers	More	3.6	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Marine mammals	Fewer	4.8	25.0%	0.0%	0.0%	0.0%	0.0%	75.0%	0.0%	0.0%
Marine mammals	More	4.8	50.0%	25.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%
Birds and eggs	Fewer	3.6	33.3%	0.0%	0.0%	0.0%	0.0%	66.7%	0.0%	0.0%
Birds and eggs	More	7.2	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Wild plants	Fewer	7.2	0.0%	0.0%	0.0%	0.0%	33.3%	50.0%	16.7%	0.0%
Wild plants	More	13.2	0.0%	0.0%	0.0%	0.0%	36.4%	45.5%	18.2%	0.0%
Overall	Fewer	8.4	28.6%	0.0%	0.0%	14.3%	14.3%	0.0%	42.9%	0.0%
Overall	More	9.6	25.0%	0.0%	0.0%	0.0%	12.5%	12.5%	37.5%	12.5%
Any resource	Fewer	30.0	24.0%	8.0%	0.0%	4.0%	8.0%	76.0%	32.0%	16.0%
Any resource	More	32.4	22.2%	3.7%	14.8%	3.7%	14.8%	77.8%	14.8%	0.0%

a. Percentage of estimated number of households that reported less or more uses of the resource category who cited this reason.

b. Estimated number of households citing a change in uses. For number of valid responses, see Table 3-7. Estimated total households in community = 42.

c. Includes changes in abundance of population and/or changes in geographic distribution of animals during hunting seasons that affected harvest opportunities and success.

Source ADF&G Division of Subsistence household surveys, 2006.

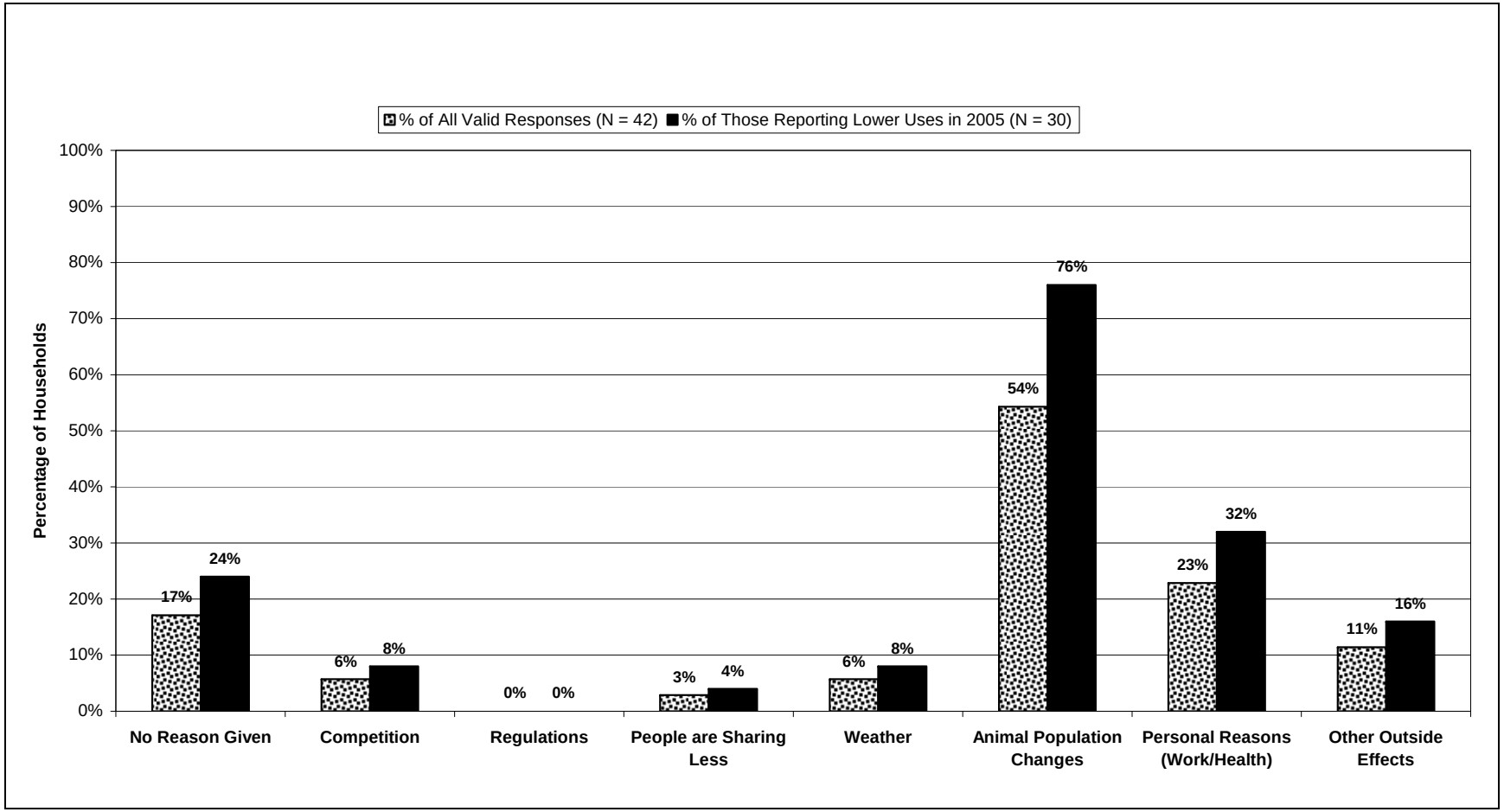

Figure 3-10.–Reasons cited by Kokhanok households for lower uses of any resource in 2005 compared to other recent years.

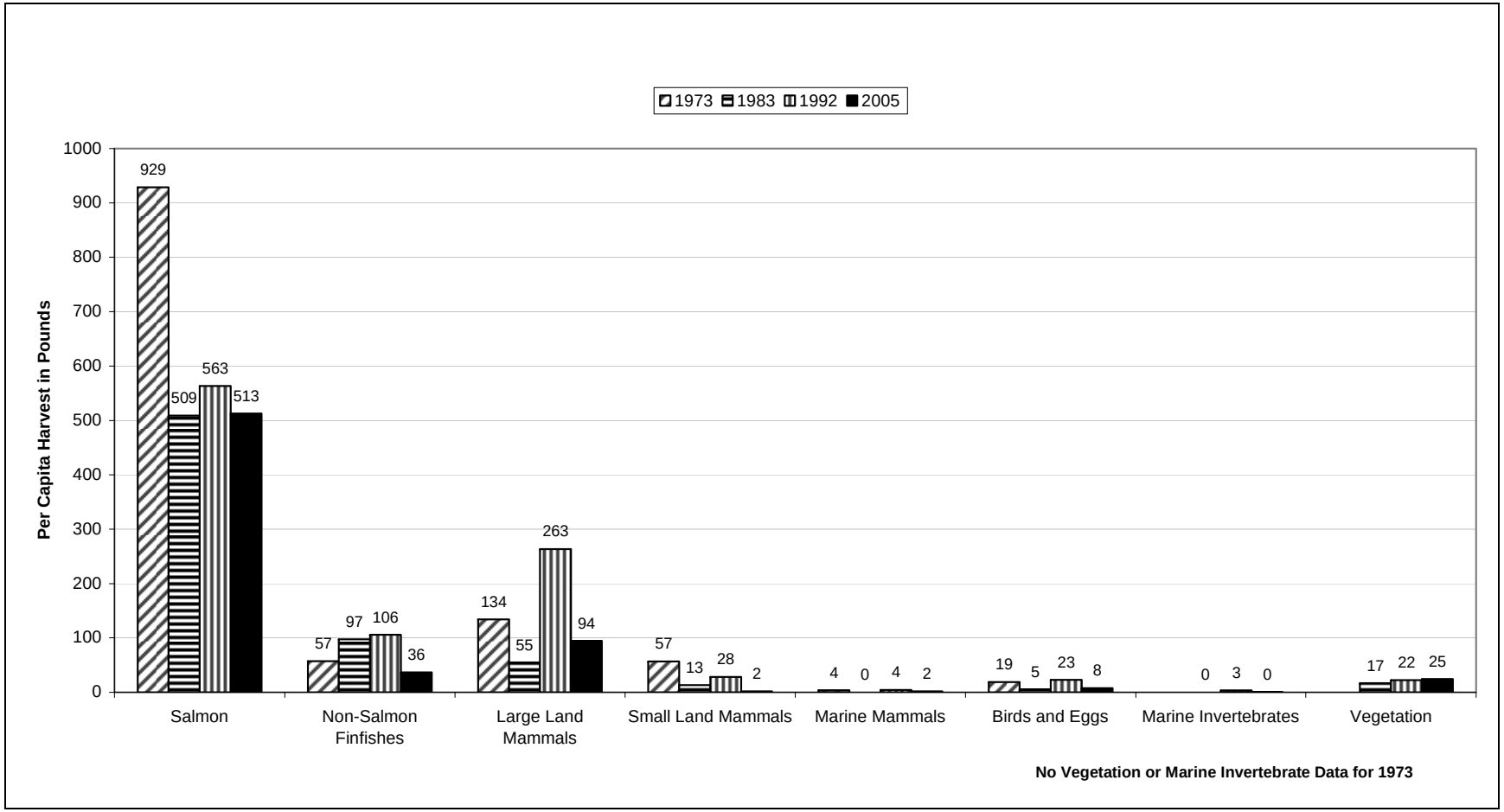

Figure 3-11.–Kokhanok wild resource harvests over time.

Table 3-9.–Kokhanok wild resource harvests by resource category, all study years.

	Pounds usable weight per capita harvest			
Resource	1973	1983	1992	2005
Salmon	928.5	508.7	563.2	512.8
Non-salmon fishes	57.1	97.4	105.7	36.3
Large land mammals	134.2	55.0	263.4	94.4
Small land mammals	56.7	13.4	28.5	1.5
Marine mammals	4.0	0.0	4.2	1.7
Birds and eggs	19.0	5.5	22.7	7.8
Marine invertebrates		0.0	3.3	0.5
Vegetation		16.9	22.2	24.6
All resources	1,199.5	696.9	1,013.3	679.6

Table 3-10.–Composition of wild resource harvests by category, Kokhanok, all study years.

	Percentage of total harvest			
Resource	1973	1983	1992	2005
Salmon	77.4%	73.0%	55.6%	75.5%
Non-salmon fishes	4.8%	14.0%	10.4%	5.3%
Large land mammals	11.2%	7.9%	26.0%	13.9%
Small land mammals	4.7%	1.9%	2.8%	0.2%
Marine mammals	0.3%	0.0%	0.4%	0.2%
Birds and eggs	1.6%	0.8%	2.2%	1.1%
Marine invertebrates		0.0%	0.3%	0.1%
Vegetation		2.4%	2.2%	3.6%
All resources	100.0%	100.0%	100.0%	100.0%

Note: Blank cells indicate data not collected for that study year.

Source ADF&G Division of Subsistence household surveys, 2005.

LOCAL OBSERVATIONS OF RESOURCE POPULATIONS AND TRENDS

According to survey respondents, weather conditions in Kokhanok have been unusually unpredictable in recent years. In the winter of 2004–2005, respondents said that many residents were unable to reach locations for harvesting freshwater fishes or for hunting because of a cycle of snow, rain, and freezing temperatures. They said that travel conditions during that winter were so bad that one hunter said he put a total of only 5 miles on his snowmobile. Slushy, wet snow, they added, also made it difficult to use all-terrain vehicles (4-wheelers, ATVs) or snowmobiles to reach favorite sites for spring fishing.

Survey respondents also reported that salmon species other than sockeye and the occasional Chinook salmon were becoming more common in subsistence setnets in Iliamna Lake. One

fisher reported that coho salmon were now fairly common. Respondents said that although salmon returns were strong in 2005 and in the few years prior to this study, the salmon returns were very late in 2005, not arriving in streams near Kokhanok until July. Sockeye salmon usually arrive in June, according to residents. Kokhanok residents attributed the stronger sockeye salmon returns to less commercial fishing in Bristol Bay.

Freshwater fishing was a popular activity in Kokhanok, according to respondents, who related considerable knowledge of the best harvest locations for specific species of fish. For example, respondents said that ice fishing for northern pike was a popular winter activity on the small lakes south of Kokhanok. Residents also said there were lakes good for northern pike fishing near Dennis Creek and Big Mountain. They said that the northern pike in some of these lakes were up to 3 feet in length, even in the small lakes.

Respondents' perceptions of a decline in caribou numbers in 2005 was a major topic during interviews. One respondent said Kokhanok residents no longer saw caribou around the village. Caribou were sometimes found south of the village, the respondent said, in the mountains towards Katmai National Park and Preserve, or to the west, towards Igiugig. The respondent added that when they did migrate east, the caribou usually traveled on the north side of the lake, instead of on the south shore, towards Kokhanok. Therefore, to reach the caribou, Kokhanok residents said they had to travel close to Katmai National Park and Preserve, or to the north side of Iliamna Lake and then towards the Mulchatna River. With rising fuel costs, such travel was no longer an option for many hunters, respondents said.

Hunters also reported that moose were more difficult to find near Kokhanok than in the past. They said that more moose were available to harvest nearer to Igiugig and Levelock, along Iliamna Lake and the Kvichak River. Kokhanok residents reported invested considerable time hunting moose from boats in these areas.

One small land mammal species respondents reported favoring for harvest was porcupine, but they said that porcupine numbers have declined over the last 5–7 years. In the past, respondents said, porcupines were harvested in or near the village, but they were more difficult to find at the time of their interviews.

Freshwater seals were an important traditional resource for Kokhanok, according to respondents, who displayed considerable knowledge about the locations for harvesting seals, knowledge which included knowing the locations of the islands where pupping occurs. Hunting did not usually occur on these islands, they said, but there were other seal haul-out islands near Kokhanok, including 2 islands hunters referred to as "seal islands" where much of the hunting for freshwater seals occurred. Respondents said there were seal islands near Pedro Bay, but because seals were abundant on the 2 seal islands near Kokhanok, hunters did not find it necessary to travel further for seals. Respondents said that the summer of 2005 was hot, and they found many dead seals on the beaches near the community and on other beaches around the lake. They reported finding the highest numbers of dead seals when the air temperature was highest. Respondents could not offer an explanation for the death of the seals. Nevertheless, hunters related that the seal population was still fairly high and this die-off evidently did not noticeably reduce the population.

Survey respondents reported that duck hunting had not been actively pursued the past few years. In 2005, they reported that ducks were fairly scarce near Kokhanok and therefore hunting took place near Igiugig. Because of the distance, they said, Kokhanok hunters concentrated on hunting

upland birds in the hills near Katmai National Park and Preserve. Residents noted that gull eggs were abundant every June. One resident said that there were always lots of eggs to harvest near Kokhanok and that they were particularly abundant in 2005.

Residents also reported that the amount of summer rainfall affected the abundance of berries. The summer of 2005 was too dry, they said: the snow pack had quickly melted, resulting in dry conditions for most of the summer. Consequently, they said, berries in general were scarce, especially salmonberries. Blackberries and cranberries were more available, according to respondents. Respondents also said that the weather was too hot for them to travel to the mountains to pick the more abundant berries. In addition to berries, elders reported collecting wild spinach, wild celery, and ferns, which they said were abundant enough to satisfy their harvest goals.

LOCAL CONCERNS REGARDING RESOURCES

Concerns voiced by Kokhanok residents can be summarized in 3 categories: economic concerns, concerns about mine development, and concerns about the community's relationship with nearby Katmai National Park and Preserve.

The cost of gasoline was of major concern to Kokhanok residents who said it directly affected their ability to travel by 4-wheeler, snowmachine, and boat to harvest subsistence resources. For example, residents reported that moose were hard to find in September 2005 and that the price of gasoline limited the amount of time they could spend looking for moose. One hunter said that each time he hunted moose it cost $100 for fuel. Therefore, he said, residents spent less time hunting large land mammals and more time concentrating on those resources closer to home, including resources available by traveling in skiffs on the lake. During the planning phase of this project, one resident of Kokhanok expressed apprehension about the final reported harvest amounts. He said that knew that not as many people as usual were hunting large land mammals due to the high cost of fuel. When the survey results were available, he observed that residents had compensated for the lower large land mammal harvests amounts by expending more fishing effort, or by taking more of the other local resources.

Another issue respondents found important was commercial fishing. For a century, Kokhanok residents had actively participated in the Bristol Bay commercial salmon fishery. However, in the past few years, respondents said that low prices for salmon had driven many to let their boats sit idle, or even to sell their boats and commercial fishing permits. One respondent stated that in the past few years many people have said "The hell with it. We're leaving [commercial fishing] and not coming back," after the salmon prices declined and stayed low. Other families reported biding their time, continuing to fish in the hopes that if they just kept at it, the price of fish would eventually improve, but barely breaking even. Some expressed optimism that the price of fish would rise to a point such that a few people could return to commercial fishing and make a living.

Expressed concerns about the Pebble Project were related to impacts to the commercial fishing industry. Several Kokhanok residents voiced concerns about the effect that a mine would have on fishes and other wildlife. They said they were especially worried about damage to fish spawning habitat. Another concern they voiced was about a potential decline in water quality in Iliamna Lake and surrounding streams. As one resident noted, "We drink this water … not just the animals … but we drink this water."

Respondents expressed several points of view regarding the Pebble Project. One respondent said he never went to presentations given by NDM about the project because he was "not interested in the propaganda of the mining company." On the other hand, other community members who opposed the project said that they did attend these meetings. Furthermore, several Kokhanok residents reported that they had taken jobs with NDM, and it appeared that they had not been personally admonished by other community members.

Some Kokhanok residents expressed the view that "the mine is already here." They reported adverse effects on their caribou hunting near Newhalen because, in their view, there was "too much air traffic [e.g., helicopter traffic between the project site and the airport] displacing the caribou."

Katmai National Park and Preserve was close to Kokhanok and it represented part of some resident's traditional hunting and fishing territory. The park was closed to all hunting while the preserve remained open to subsistence and recreational hunting. Some elders grew up at seasonal camps that were located in an area which is now part of the preserve. For example, one elder recalled that, in his youth, his family lived at Kukaklek Lake. In his view, this area was his traditional hunting and fishing territory, but, at the time of his interview, his subsistence activities had been restricted by National Park Service (NPS) rules.

Some residents of Kokhanok continued to subsistence hunt near Katmai National Park and Preserve. In their view, the presence of NPS enforcement personnel had increased along the boundary between the preserve and the park. One Kokhanok resident reported that he had a caribou confiscated by NPS enforcement officers because it was allegedly killed within the park. He wondered what was done with this caribou, which he needed to feed his family.

Kokhanok respondents and tribal officials said that Kokhanok hunters and other residents had had no involvement with Katmai National Park and Preserve. The relationship they described was one of animosity. Several said that Katmai National Park officials did not visit the community except to accuse residents of killing game in the park. Respondents offered the following incident as an example. *Dahni* is a traditional medicinal plant that is brewed as a tea to treat colds and arthritis, according to residents. The spring and late fall were the best times to harvest this plant because the medicine is near the surface of the plant, and is more readily extracted by boiling as tea, they said. One elder in particular depended on the plant to relieve her arthritis, so residents said she gathered large amounts of *dahni* and kept it in large bags in her home. When several brown bears were illegally killed in Katmai National Park, Kokhanok residents said federal law enforcement officers came to Kokhanok and searched people's homes. They said that all of this elder's medicinal plants were seized and were never returned, which resulted in many community members' resentment towards NPS officials. Kokhanok residents reported that they would like to see improvement in the relations with the administrators of Katmai National Park and Preserve, so that incidents such as this one could be prevented through better communication.

CHAPTER 4: KOLIGANEK

COMMUNITY BACKGROUND

Koliganek is located on the Nushagak River, approximately 100 river miles upstream from Dillingham (Figure 1-1). In the past, there was a distinction between the Yup'ik people inhabiting the Nushagak River, and those inhabiting the coastal area, including Nushagak Bay. The *Kiatagmiut* inhabited the Nushagak and lower Mulchatna rivers while the *Aglurmiut* inhabited the coastal areas of Nushagak Bay and areas to the east (VanStone 1984:224). According to VanStone (1984:224–225), linguistic and cultural differences between these 2 groups became blurred with European contact:

> Epidemic diseases, the establishment of schools and missions, and particularly the emergence of the fur trade and an important commercial salmon-fishing industry in Bristol Bay resulted in considerable movement of Eskimos throughout the region, the coalescence of some populations and the dispersal of others.

The present location of Koliganek, also called "New Koliganek," was established about 1964. Prior to that, the residents lived at another site called "Koliganek" and, before that, in Old Koliganek, on the lower Nuyakuk River. The village of Old Koliganek was occupied until the early 1940s, when residents relocated. This next site was occupied only for about 20 years when, because of frequent flooding, residents moved to the New Koliganek location (VanStone 1967:144). In 1963, at about the time that the decision was being made to move to the New Koliganek location, VanStone (1967:145) recorded that "a number of Koliganek families moved to the mouth of Portage Creek where a new community had been established in that year." Koliganek first appeared in the federal census in 1950 and a Bureau of Indian Education school was established at Koliganek in 1954 (VanStone 1967:144). The school at New Koliganek was completed in the summer of 1965 (VanStone 1967:145).

DEMOGRAPHY, CASH EMPLOYMENT, AND MONETARY INCOME

DEMOGRAPHY

According to the federal census, Koliganek had 182 residents in 2000 (U. S. Census Bureau 2001), of which 87% (159 residents) were Alaska Native (Table 1-1). The baseline household survey in 2005 resulted in a population estimate of 150 residents, of which 96% (144 residents) were Alaska Native (Table 1-1). This comparison suggests that the population declined between 2005 and the 2000 census. Survey respondents noted that some households had moved out of Koliganek. Another explanation for a portion of the difference could be that some people counted in the federal census may have been seasonal residents of the community, such as teachers.

In 2005, there were an estimated 42 year-round households in Koliganek (Table 1-5). Of these, 28 (67%) were interviewed. Interviewers attempted to contact all of the households. Three

households were unavailable or could not be contacted and 11 (28%) households declined to be interviewed.

The mean length of residency in Koliganek was 24 years, with the maximum residence at 65 years (Table 1-8). The largest age cohort for males was that between the ages of 45 and 49, while for females it was the age cohort between 10 and 14 years of age (Table 4-1 and Figure 4-1). About 44% of the population of Koliganek was less than 20 years old.

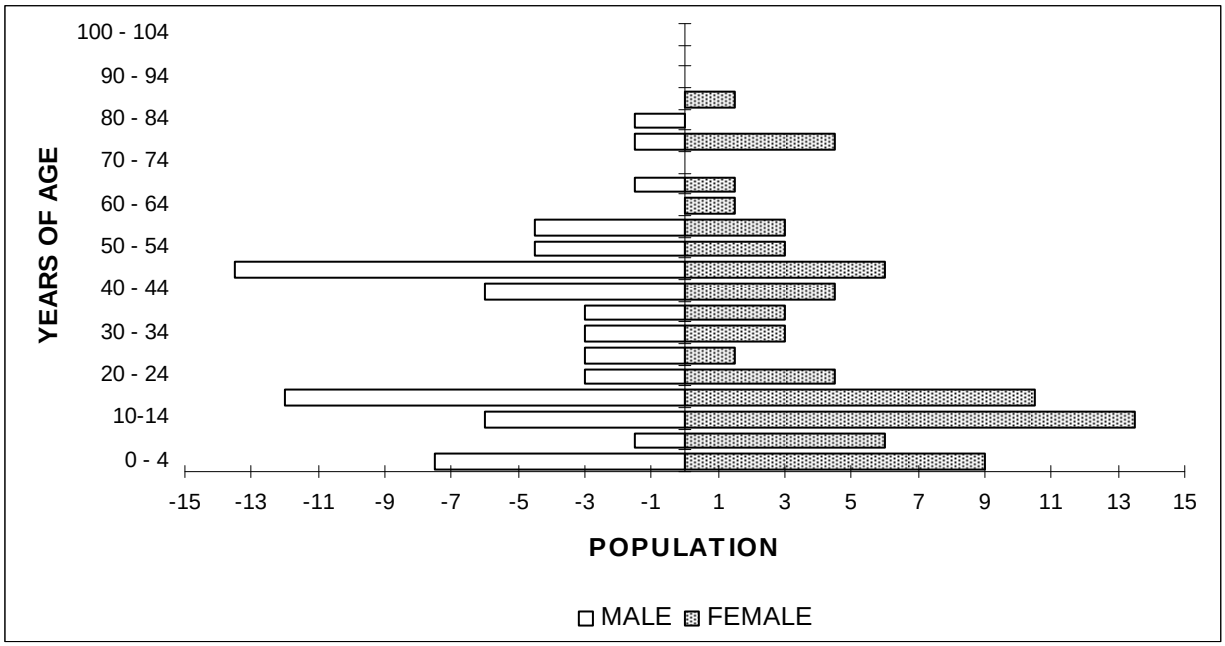

Figure 4-1.–Population profile, Koliganek, 2005.

Table 4-1.–Population profile, Koliganek, 2005.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0 – 4	7.50	10.42%	10.42%	9.00	11.54%	11.54%	16.50	11.00%	11.00%
5 – 9	1.50	2.08%	12.50%	6.00	7.69%	19.23%	7.50	5.00%	16.00%
10 – 14	6.00	8.33%	20.83%	13.50	17.31%	36.54%	19.50	13.00%	29.00%
15 – 19	12.00	16.67%	37.50%	10.50	13.46%	50.00%	22.50	15.00%	44.00%
20 – 24	3.00	4.17%	41.67%	4.50	5.77%	55.77%	7.50	5.00%	49.00%
25 – 29	3.00	4.17%	45.83%	1.50	1.92%	57.69%	4.50	3.00%	52.00%
30 – 34	3.00	4.17%	50.00%	3.00	3.85%	61.54%	6.00	4.00%	56.00%
35 – 39	3.00	4.17%	54.17%	3.00	3.85%	65.38%	6.00	4.00%	60.00%
40 – 44	6.00	8.33%	62.50%	4.50	5.77%	71.15%	10.50	7.00%	67.00%
45 – 49	13.50	18.75%	81.25%	6.00	7.69%	78.85%	19.50	13.00%	80.00%
50 – 54	4.50	6.25%	87.50%	3.00	3.85%	82.69%	7.50	5.00%	85.00%
55 – 59	4.50	6.25%	93.75%	3.00	3.85%	86.54%	7.50	5.00%	90.00%
60 – 64	0.00	0.00%	93.75%	1.50	1.92%	88.46%	1.50	1.00%	91.00%
65 – 69	1.50	2.08%	95.83%	1.50	1.92%	90.38%	3.00	2.00%	93.00%
70 – 74	0.00	0.00%	95.83%	0.00	0.00%	90.38%	0.00	0.00%	93.00%
75 – 79	1.50	2.08%	97.92%	4.50	5.77%	96.15%	6.00	4.00%	97.00%
80 – 84	1.50	2.08%	100.00%	0.00	0.00%	96.15%	1.50	1.00%	98.00%
85 – 89	0.00	0.00%	100.00%	1.50	1.92%	98.08%	1.50	1.00%	99.00%
90 – 94	0.00	0.00%	100.00%	0.00	0.00%	98.08%	0.00	0.00%	99.00%
95 – 99	0.00	0.00%	100.00%	0.00	0.00%	98.08%	0.00	0.00%	99.00%
100 – 104	0.00	0.00%	100.00%	0.00	0.00%	98.08%	0.00	0.00%	99.00%
Missing	0.00	0.00%	100.00%	1.50	1.92%	100.00%	1.50	1.00%	100.00%
Total	**72.00**	**100.00%**		**78.00**	**100.00%**		**150.00**	**100.00%**	

Source ADF&G Division of Subsistence household surveys, 2005.

Of the household heads interviewed, almost all (91%) were born in Alaska, and most (82%) were born in the Bristol Bay area (Table 1-9). Twenty-seven percent were born in Koliganek. In addition, 13% were born at Old Koliganek, 11% at Nunachuak, 11% at Ekwok, and 7% at New Stuyahok (Table 1-9).

CASH EMPLOYMENT CHARACTERISTICS AND MONETARY INCOME

Fifty percent of the earned income in Koliganek in 2005 resulted from jobs with local governments (Table 4-2). Another key source of earned income was commercial fishing, which accounted for 32% of the annual total (Table 4-2). Local government provided 42% of available jobs, commercial fishing made up 32%, services accounted for 11%, and retail trade provided 9% (Table 4-2). Other jobs were in state government; fishing service occupations; mining; construction; transportation, communication, and utilities; and services. Fifty-seven percent of all jobs were located in Koliganek, 12% in Dillingham, and 27% at "Nushagak," which meant Nushagak Bay. The jobs in Nushagak were in the commercial fishing industry and the Dillingham jobs were salmon cannery work and commercial fishing. Just over 1% of the residents' jobs were located in Levelock and 3% of the locations were not reported (Table 1-11).

Twenty-nine percent of adults in Koliganek were employed year-round (Table 1-10). However, a much larger number (84%) were employed at some time during 2005. The mean number of months employed was 6.7. On average, in 2005, households contained 2 employed adults; 86% of all households contained at least one adult who was employed for at least part of the year.

LEVELS OF PARTICIPATION IN THE HARVESTS AND USES OF WILD RESOURCES

Table 1-13 reports levels of individual participation in the harvest and processing of wild resources by Koliganek residents in 2005. Forty-two percent of Koliganek residents hunted birds and large land mammals and 68% processed those harvests. More than one-half of the people in the community fished (63%) and processed fish (73%). Only about 13% trapped or hunted furbearers and 32% processed furbearing animals. Seventy-three percent picked berries and other wild plants, and slightly fewer (71%) were involved in the processing of wild plants. In total, about 82% of Koliganek residents attempted to harvest and 81% processed resources in the 2005 study year.

Table 4-2.–Employment by industry, Koliganek, 2005.

	Jobs	Households	Individuals	Percentage of Income
Estimated total number[a]	**121.5**	**34.5**	**76.5**	
Federal government	0.0%	0.0%	0.0%	0.0%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Natural scientists and mathematicians	0.0%	0.0%	0.0%	0.0%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
State government	1.2%	3.6%	2.0%	2.3%
Teachers, librarians, and counselors	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	1.2%	3.6%	2.0%	2.3%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Local government	42.0%	67.9%	49.0%	50.1%
Executive, administrative and managerial	3.7%	10.7%	5.9%	7.4%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Teachers, librarians, and counselors	7.4%	17.9%	9.8%	16.2%
Health diagnosing and treating practitioners	0.0%	0.0%	0.0%	0.0%
Registered nurses, pharmacists, dietitians, therapists and P.A.s	0.0%	0.0%	0.0%	0.0%

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Table 4-2. Page 2 of 3.

	Jobs	Households	Individuals	Percentage of Income
Health technologists and technicians	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Marketing and sales occupations	0.0%	0.0%	0.0%	0.0%
Administrative support occupations, including clerical	3.7%	10.7%	5.9%	4.6%
Service occupations	9.9%	17.9%	11.8%	8.2%
Agricultural, forestry and fishing occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	1.2%	3.6%	2.0%	0.3%
Construction and extractive occupations	3.7%	7.1%	3.9%	1.5%
Precision production occupations	4.9%	10.7%	5.9%	7.5%
Production working occupations	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	3.7%	10.7%	5.9%	2.3%
Handlers, equipment cleaners, helpers and laborers	3.7%	7.1%	3.9%	2.3%
Agriculture, forestry & fishing	33.3%	57.1%	51.0%	32.9%
Service occupations	1.2%	3.6%	2.0%	0.7%
Agricultural, forestry and fishing occupations	32.1%	57.1%	49.0%	32.2%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Mining	1.2%	3.6%	2.0%	1.1%
Service occupations	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	0.0%	0.0%	0.0%	0.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	1.2%	3.6%	2.0%	1.1%
Construction	1.2%	3.6%	2.0%	2.4%
Service occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	1.2%	3.6%	2.0%	2.4%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Manufacturing	0.0%	0.0%	0.0%	0.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Transportation, communication & utilities	1.2%	3.6%	2.0%	1.4%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	1.2%	3.6%	2.0%	1.4%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%

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Table 4-2. Page 3 of 3.

	Jobs	Households	Individuals	Percentage o income
Wholesale trade	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Retail trade	8.6%	21.4%	13.7%	5.4%
Executive, administrative and managerial	1.2%	3.6%	2.0%	1.2%
Marketing and sales occupations	6.2%	17.9%	9.8%	4.1%
Service occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	1.2%	3.6%	2.0%	0.1%
Services	11.1%	14.3%	13.7%	4.3%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Natural scientists and mathematicians	0.0%	0.0%	0.0%	0.0%
Writers, artists, entertainers, and athletes	0.0%	0.0%	0.0%	0.0%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Health diagnosing and treating practitioners	0.0%	0.0%	0.0%	0.0%
Health technologists and technicians	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support	2.5%	3.6%	3.9%	2.1%
Clerical service occupations	8.6%	14.3%	9.8%	2.2%
Agricultural, forestry and fishing occupations	0.0%	0.0%	0.0%	0.0%
Production working occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Miscellaneous occupations	0.0%	0.0%	0.0%	0.0%

a. Estimated number of households and individuals includes only those that were employed during the study period.

Source ADF&G Division of Subsistence household surveys, 2006.

RESOURCE HARVEST AND USE PATTERNS

Table 1-14 summarizes the resource harvest and use characteristics of Koliganek residents in 2005. All community households used and harvested wild foods. The average harvest was 2,139 lb usable weight per household, or 899 lb per capita. During the study year, Koliganek households harvested an average of 14 different kinds of resources and used an average of 21 kinds of resources. In addition, households gave away, on average, 9 kinds of resources and received about 8 kinds.

SPECIES USED AND SEASONAL ROUND

In Koliganek in 2005, fish were the most commonly harvested resource (Figure 4-2). Salmon alone accounted for 63% of the subsistence foods harvested by Koliganek residents (Figure 4-2). Chinook salmon (almost always called “kings” by local residents) accounted for 35% of the

salmon harvested. Fresh sockeye salmon were the next most harvested salmon species at 33%, followed by chum, coho, and pink salmon, respectively (Figure 4-3). The pink salmon (locally called "humpies") harvest was small. Because of their lifecycle, most pink salmon returned to spawn only on even-numbered years, with only a small fraction returning in odd-numbered years.

Chinook salmon, the first salmon to return to the Nushagak River, starting in late May, were the most desirable of the 5 salmon species available on the Nushagak River. Dried and smoked strips of Chinook salmon were especially valued. Chinook salmon were harvested at locations on the Nushagak River, near Koliganek, and downstream as far as the historical location of the village of Nushagak at Nushagak Point, and Ekuk, where some households relocated for the commercial salmon season. The goals, for ease and efficiency, in processing Chinook salmon was to process as many as possible at the same time, and to fill the smokehouse with processed strips as early in the season as possible and in the shortest period of time. To facilitate this, some households traveled downstream to locations where they knew they could harvest the amount of Chinook salmon that they needed, and then they returned to Koliganek to process them. One advantage to early season preservation of Chinook salmon was that cooler weather kept the flies from becoming active and attempting to lay eggs on the fish, which had been placed on racks for drying and smoking.

Sockeye salmon (locally called "reds") and chum salmon (or "dog salmon") were the next salmon to return to the Nushagak River, followed by coho salmon ("silvers") and pink salmon ("humpies"). Pink and chum salmon were usually not targeted, but were utilized when caught. Sockeye salmon were dried and smoked, with most prepared for this process by splitting the fish along the backbone and then removing the backbone, leaving both fillets attached at the tail. Each fillet was sliced vertically, in even increments about 2 inches apart, across its width, and remained attached to the skin which helped the fillet to open and increased the drying surface of the meat. The fillets were then draped over the poles in the smokehouse for the drying and smoking process. Traditionally, the peak of the sockeye salmon run in Bristol Bay occurs July 4. In the latter half of July, coho and pink salmon arrive in Nushagak Bay and start moving upriver. In late summer, spawning (or "spawned-out") sockeye salmon were caught along the Nushagak River.

Late summer was also the time to start picking berries, beginning with salmonberries at the end of July. Harvesting berries was a favorite activity in Koliganek: 93% of the households reported using berries and 82% of the households reported harvesting berries (Table 4-3).

The Nushagak River and its tributaries supported numerous freshwater fish species, which were harvested throughout the year. Whitefishes were caught with nets, mainly in the fall. Ice fishing was a major subsistence activity in the winter, with residents targeting northern pike and Arctic grayling. In 2005, 93% of Koliganek households harvested non-salmon fishes; 96% of households used non-salmon fishes (Table 4-3).

In 2005, after Chinook, sockeye, and chum salmon, caribou contributed the next highest harvest level, by weight, of subsistence foods at Koliganek (see Table 4-4 for a list of the top 10 resources harvested and used by Koliganek residents**).** During the study year, 89% of households used caribou and 75% hunted caribou (Table 4-3). In addition to caribou, the other large land mammal that contributed greatly to the diet of residents of Koliganek was moose, with 86% of households using moose and 68% hunting moose in 2005 (Table 4-3).

Table 4-3.–Estimated harvests and uses of fish, game, and plant resources, Koliganek, 2005.

	Percentage of households					Pounds harvested			Amount harvested[a]			
Resource name(s)	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	95% confidence limit (±) harvest
All resources	100.0%	100.0%	100.0%	89.3%	92.9%	134,779.0	3,209.0	898.5				41.4%
Fishes	100.0%	100.0%	100.0%	89.3%	75.0%	98,263.3	2,339.6	655.1				55.3%
Pacific salmon	100.0%	92.9%	85.7%	53.6%	60.7%	84,699.8	2,016.7	564.7	14,303.3	Ind	340.6	63.2%
Chum salmon	60.7%	60.7%	50.0%	17.9%	28.6%	20,652.6	491.7	137.7	3,933.8	Ind	93.7	101.4%
Coho salmon	85.7%	75.0%	67.9%	21.4%	39.3%	4,655.8	110.9	31.0	988.5	Ind	23.5	30.4%
Chinook salmon	92.9%	82.1%	71.4%	39.3%	50.0%	29,087.1	692.6	193.9	2,430.0	Ind	57.9	40.2%
Pink salmon	10.7%	10.7%	10.7%	0.0%	3.6%	1,425.1	33.9	9.5	565.5	Ind	13.5	113.7%
Sockeye salmon	96.4%	92.9%	85.7%	42.9%	50.0%	28,879.1	687.6	192.5	6,385.5	Ind	152.0	66.9%
Fresh sockeye salmon	96.4%	92.9%	78.6%	35.7%	42.9%	28,002.8	666.7	186.7	5,983.5	Ind	142.5	68.8%
Spawning sockeye salmon	53.6%	50.0%	42.9%	17.9%	17.9%	876.4	20.9	5.8	402.0	Ind	9.6	34.3%
Landlocked salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Non-salmon fishes	96.4%	92.9%	92.9%	75.0%	67.9%	13,563.5	322.9	90.4				27.0%
Pacific herring	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring roe	3.6%	3.6%	3.6%	0.0%	3.6%	270.0	6.4	1.8	45.0	Gal	1.1	119.9%
Herring sac roe	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring spawn on kelp	32.1%	0.0%	0.0%	32.1%	7.1%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Rainbow smelt	60.7%	0.0%	0.0%	60.7%	17.9%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Cods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Pacific (gray) cod	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Walleye pollock (whiting)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown cods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Flounders	3.6%	3.6%	3.6%	0.0%	0.0%	180.0	4.3	1.2	60.0	Ind	1.4	119.9%

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Table 4-3. Page 2 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Non-salmon fishes, flounders, continued												
Unknown flounders	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Greenlings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Lingcod	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown greenlings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Pacific halibut	17.9%	7.1%	3.6%	14.3%	0.0%	525.0	12.5	3.5	525.0	Lb	12.5	119.9%
Rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
“Black” rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
“Red” rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sablefish (black cod)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sculpins	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Slimy sculpin (bullhead)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sharks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown sharks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Soles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown soles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Threespine stickleback (needlefish)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Wolffish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Alaska blackfish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Burbot	10.7%	7.1%	7.1%	3.6%	0.0%	22.5	0.5	0.2	22.5	Ind	0.5	85.0%

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Table 4-3. Page 3 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Non-salmon fishes, continued												
Chars	46.4%	35.7%	35.7%	14.3%	10.7%	218.4	5.2	1.5	156.0	Ind	3.7	51.0%
Arctic char–resident and anadromous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Dolly Varden	35.7%	32.1%	32.1%	3.6%	3.6%	134.4	3.2	0.9	96.0	Ind	2.3	43.7%
Dolly Varden–anadromous	7.1%	7.1%	7.1%	0.0%	0.0%	31.5	0.8	0.2	22.5	Ind	0.5	98.0%
Dolly Varden–resident												
Lake trout	14.3%	3.6%	3.6%	10.7%	7.1%	84.0	2.0	0.6	60.0	Ind	1.4	119.9%
Arctic grayling	75.0%	67.9%	67.9%	17.9%	35.7%	1,199.1	28.6	8.0	1,713.0	Ind	40.8	31.5%
Northern pike	96.4%	85.7%	85.7%	28.6%	53.6%	5,292.0	126.0	35.3	1,890.0	Ind	45.0	31.1%
Sturgeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown sturgeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Longnose sucker	46.4%	46.4%	46.4%	10.7%	28.6%	1,575.0	37.5	10.5	1,050.0	Ind	25.0	34.7%
Trout	50.0%	39.3%	39.3%	10.7%	14.3%	228.9	5.5	1.5	163.5	Ind	3.9	47.2%
Rainbow trout–resident	50.0%	39.3%	39.3%	10.7%	14.3%	228.9	5.5	1.5	163.5	Ind	3.9	47.2%
Steelhead trout–anadromous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown trout	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Whitefishes	78.6%	57.1%	57.1%	35.7%	39.3%	4,052.6	96.5	27.0	1,783.5	Ind	42.5	52.6%
Broad whitefish	21.4%	10.7%	10.7%	10.7%	7.1%	1,656.0	39.4	11.0	414.0	Ind	9.9	89.7%
Ciscos	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Least cisco	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Humpback whitefish	75.0%	57.1%	57.1%	25.0%	39.3%	2,396.6	57.1	16.0	1,369.5	Ind	32.6	37.2%
Round whitefish	0.0%	3.6%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Land mammals	96.4%	85.7%	78.6%	64.3%	71.4%	27,922.5	664.8	186.2				24.1%
Large land mammals	96.4%	78.6%	75.0%	60.7%	67.9%	26,685.0	635.4	177.9	115.5	Ind	2.8	24.6%

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Table 4-3. Page 4 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Large land mammals, continued												
Black bear	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Brown bear	0.0%	3.6%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Caribou	89.3%	75.0%	60.7%	46.4%	57.1%	13,725.0	326.8	91.5	91.5	Ind	2.2	28.9%
Moose	85.7%	67.9%	50.0%	46.4%	53.6%	12,960.0	308.6	86.4	24.0	Ind	0.6	27.4%
Dall sheep	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Small land mammals/furbearers	64.3%	57.1%	53.6%	28.6%	35.7%	1,237.5	29.5	8.3				51.8%
Beaver	50.0%	42.9%	42.9%	25.0%	28.6%	971.3	23.1	6.5	111.0	Ind	2.6	65.4%
Coyote	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Foxes	3.6%	3.6%	3.6%	0.0%	0.0%	0.0	0.0	0.0	19.5	Ind	0.5	119.9%
Red fox	3.6%	3.6%	3.6%	0.0%	0.0%	0.0	0.0	0.0	19.5	Ind	0.5	119.9%
Hares	10.7%	3.6%	3.6%	7.1%	0.0%	12.0	0.3	0.1	6.0	Ind	0.1	119.9%
Snowshoe hare	10.7%	3.6%	3.6%	7.1%	0.0%	12.0	0.3	0.1	6.0	Ind	0.1	119.9%
River (land) otter	7.1%	7.1%	7.1%	0.0%	0.0%	0.0	0.0	0.0	9.0	Ind	0.2	101.2%
Lynx	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Alaska marmot	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Marten	7.1%	7.1%	7.1%	0.0%	0.0%	0.0	0.0	0.0	18.0	Ind	0.4	83.2%
Mink	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Muskrat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Porcupine	35.7%	35.7%	32.1%	10.7%	17.9%	252.0	6.0	1.7	31.5	Ind	0.8	36.4%
Squirrels	3.6%	3.6%	3.6%	0.0%	0.0%	2.3	0.1	0.0	4.5	Ind	0.1	119.9%
Arctic ground (parka) squirrel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Red (tree) squirrel	3.6%	3.6%	3.6%	0.0%	0.0%	2.3	0.1	0.0	4.5	Ind	0.1	119.9%

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Table 4-3. Page 5 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Small land mammals/furbearers, continued												
Short-tailed weasel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Gray wolf	14.3%	14.3%	14.3%	0.0%	3.6%	0.0	0.0	0.0	36.0	Ind	0.9	63.0%
Wolverine	3.6%	3.6%	3.6%	0.0%	0.0%	0.0	0.0	0.0	3.0	Ind	0.1	119.9%
Marine mammals	64.3%	0.0%	0.0%	60.7%	28.6%	0.0	0.0	0.0				0.0%
Seals	57.1%	0.0%	0.0%	53.6%	21.4%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Bearded seal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Harbor seal – fresh water	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Harbor seal– salt water	57.1%	0.0%	0.0%	53.6%	21.4%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Ringed seal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sea otter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Steller sea lion	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Whales	17.9%	0.0%	0.0%	17.9%	3.6%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Beluga whale	17.9%	0.0%	0.0%	17.9%	3.6%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Birds and eggs	92.9%	71.4%	71.4%	53.6%	50.0%	1,372.2	32.7	9.1				29.9%
Migratory birds	89.3%	57.1%	57.1%	35.7%	42.9%	1,041.2	24.8	6.9	711.0	Ind	16.9	30.4%
Ducks	75.0%	46.4%	46.4%	28.6%	32.1%	350.1	8.3	2.3	424.5	Ind	10.1	34.9%
Bufflehead	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Goldeneyes	14.3%	10.7%	10.7%	3.6%	10.7%	44.4	1.1	0.3	55.5	Ind	1.3	74.4%
Unknown goldeneyes	10.7%	10.7%	10.7%	0.0%	10.7%	44.4	1.1	0.3	55.5	Ind	1.3	74.4%
Mallard	57.1%	39.3%	39.3%	17.9%	21.4%	135.0	3.2	0.9	135.0	Ind	3.2	37.0%
Northern pintail	42.9%	32.1%	32.1%	10.7%	21.4%	81.6	1.9	0.5	102.0	Ind	2.4	35.8%
Northern shoveler	10.7%	10.7%	10.7%	0.0%	7.1%	18.9	0.5	0.1	31.5	Ind	0.8	88.0%
Wigeons	10.7%	10.7%	10.7%	0.0%	3.6%	10.5	0.3	0.1	15.0	Ind	0.4	79.5%

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Table 4-3. Page 6 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Migratory birds, ducks, continued												
American wigeon	10.7%	10.7%	10.7%	0.0%	3.6%	10.5	0.3	0.1	15.0	Ind	0.4	79.5%
Unknown ducks	28.6%	14.3%	14.3%	14.3%	10.7%	59.7	1.4	0.4	76.5	Ind	1.8	65.3%
Geese	75.0%	50.0%	50.0%	28.6%	35.7%	583.1	13.9	3.9	271.5	Ind	6.5	34.8%
Canada geese	32.1%	25.0%	25.0%	7.1%	10.7%	64.9	1.5	0.4	48.0	Ind	1.1	50.3%
Dusky Canada geese	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Lesser Canada geese[b]	10.7%	7.1%	7.1%	3.6%	3.6%	9.0	0.2	0.1	7.5	Ind	0.2	85.0%
Unknown Canada geese	17.9%	14.3%	14.3%	3.6%	7.1%	55.9	1.3	0.4	28.5	Ind	0.7	58.2%
Snow goose	3.6%	3.6%	3.6%	0.0%	3.6%	3.5	0.1	0.0	1.5	Ind	0.0	119.9%
White-fronted geese	46.4%	39.3%	39.3%	10.7%	25.0%	406.8	9.7	2.7	169.5	Ind	4.0	40.2%
Unknown geese	25.0%	10.7%	10.7%	14.3%	10.7%	108.0	2.6	0.7	45.0	Ind	1.1	97.2%
Swans	10.7%	10.7%	10.7%	3.6%	7.1%	45.0	1.1	0.3	7.5	Ind	0.2	69.5%
Tundra (whistling) swan	10.7%	10.7%	10.7%	3.6%	7.1%	45.0	1.1	0.3	7.5	Ind	0.2	69.5%
Cranes	7.1%	3.6%	3.6%	0.0%	3.6%	63.0	1.5	0.4	7.5	Ind	0.2	119.9%
Sandhill crane	7.1%	3.6%	3.6%	0.0%	3.6%	63.0	1.5	0.4	7.5	Ind	0.2	119.9%
Seabirds and loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Other birds	64.3%	46.4%	46.4%	28.6%	32.1%	263.6	6.3	1.8	376.5	Ind	9.0	38.4%
Upland game birds	64.3%	46.4%	46.4%	28.6%	32.1%	263.6	6.3	1.8	376.5	Ind	9.0	38.4%
Unknown grouse	35.7%	21.4%	21.4%	14.3%	3.6%	46.2	1.1	0.3	66.0	Ind	1.6	50.5%
Ptarmigan	60.7%	42.9%	42.9%	21.4%	32.1%	217.4	5.2	1.4	310.5	Ind	7.4	39.2%
Unknown ptarmigan	60.7%	42.9%	42.9%	21.4%	32.1%	217.4	5.2	1.4	310.5	Ind	7.4	39.2%

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Table 4-3. Page 7 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Birds, continued												
Bird eggs	46.4%	14.3%	10.7%	39.3%	14.3%	67.5	1.6	0.5				67.6%
Duck eggs	3.6%	0.0%	0.0%	3.6%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown duck eggs	33.3%	33.3%	25.0%	16.7%	25.0%	9.1	0.7	0.2	60.7	Gal	4.7	0.0%
Goose eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown goose eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Seabird eggs	39.3%	14.3%	10.7%	32.1%	14.3%	67.5	1.6	0.5	225.0	Gal	5.4	67.6%
Gull eggs	39.3%	14.3%	10.7%	32.1%	14.3%	67.5	1.6	0.5	225.0	Gal	5.4	67.6%
Tern eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown eggs	3.6%	0.0%	0.0%	3.6%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Marine invertebrates	7.1%	0.0%	0.0%	7.1%	3.6%	0.0	0.0	0.0				0.0%
Clams	7.1%	0.0%	0.0%	7.1%	3.6%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Butter clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Freshwater clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Horse clam (gapers)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pacific littleneck (steamer) clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pinkneck (surf) clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pacific razor clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown clams	7.1%	0.0%	0.0%	7.1%	3.6%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Cockles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown cockles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Dungeness crab	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
King crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 4-3. Page 8 of 8.

Resource name(s)	Percentage of households: Use	Attempt	Harvest	Receive	Give	Pounds harvested: Total	Mean household	Per capita	Amount harvested[a]: Total	Unit	Mean household	95% confidence limit (±) harvest
Marine invertebrates, king crabs, continued												
Unknown king crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Tanner crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Tanner crab, Bairdi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown tanner crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Octopus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Scallops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown scallops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Shrimps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Plants and fungi	96.4%	96.4%	96.4%	50.0%	64.3%	7,221.0	171.9	48.1				22.7%
Berries	92.9%	82.1%	82.1%	39.3%	42.9%	4,806.0	114.4	32.0	1,201.5	Gal	28.6	25.0%
Other plants / mushrooms	71.4%	67.9%	67.9%	14.3%	17.9%	2,415.0	57.5	16.1	603.8	Gal	14.4	39.7%
Trees (wood)	89.3%	75.0%	75.0%	14.3%	32.1%	0.0	0.0	0.0	235.5	Crd	5.6	56.1%

Note Differences between harvest and use percentages reflect sharing between households.

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

b. Both *B. canadensis taverner* and *B. canadensis parvipes*.

Source ADF&G Division of Subsistence household surveys, 2005.

Table 4-4–Top 10 resources harvested and used, Koliganek, 2005.

Harvest			Use		Percentage
Rank	Resource	Pounds per capita	Rank	Resource	of households using
1	Chinook salmon	193.9	1	Fresh sockeye salmon	96.4%
2	Fresh sockeye salmon	186.7	1	Northern pike	96.4%
3	Chum salmon	137.7	3	Chinook salmon	92.9%
4	Caribou	91.5	3	Berries	92.9%
5	Moose	86.4	5	Caribou	89.3%
6	Northern pike	35.3	6	Coho salmon	85.7%
7	Berries	32.0	6	Moose	85.7%
8	Coho salmon	31.0	8	Arctic grayling	75.0%
9	Plants/greens/mushrooms	16.1	8	Humpback whitefish	75.0%
10	Humpback whitefish	16.0	10	Plants/greens/mushrooms	71.4%

Source ADF&G Division of Subsistence household surveys, 2005.

The moose population along the Nushagak River was generally healthy although there were concerns by the residents of Koliganek about fewer moose in Game Management Unit (GMU) 17B. Residents thought a diminished moose population was due in part to non-Alaska-resident hunting pressure along the waterways in GMU 17B. The Alaska Board of Game adopted more restrictive regulations for nonresident hunters which became effective July 1, 2005. GMU 17B was the only subunit within GMU 17 that allowed nonresident hunting for moose. Koliganek was the only village located within GMU 17B, and the vast majority of traditional hunting areas were located within the boundaries of this subunit. Under the new regulations, only 75 nonresident moose permits were available and they had to be obtained at the ADF&G office in Dillingham no fewer than 5 days before September 5, the start of the nonresident hunt. This permit allowed nonresident hunters to hunt within the corridors extending 2 miles on either side of the major waterways in GMU 17B. Without this permit, nonresident moose hunters had to hunt outside these corridors in the remainder of GMU 17B.

The Alaska resident bull-only hunting season opened on August 20 and continued through September 20. There was also a bull-only hunting season during the month of December, but residents said that river ice conditions limited effort in this hunt. Unless the river was completely frozen or mostly ice-free, they said, travel on the river, either by snowmobile or skiff, was not possible, thus limiting the hunting area that could be accessed from the village. Koliganek hunters said they preferred to harvest a bull early in the fall season, before moose entered the rut in September, citing the inedible quality ("stink") of the meat as their reason.

New nonresident hunting regulations for caribou were also enacted for the season, effective July 1, 2005, following concerns expressed by Koliganek residents about nonresident hunting pressure in their traditional hunting areas. The major waterway corridors described above for nonresident moose hunting in GMU 17B were also closed to all nonresident caribou hunting. The nonresident season for caribou prior to and during the study year overlapped the August 1 to April 15 resident caribou hunting season. According to residents, this led to nonresident hunting pressure in their traditional caribou hunting areas during the resident caribou season as well as during the shorter moose seasons. During the fall, while hunting moose, hunters harvested caribou, if available, along the local waterways. It was difficult to hunt caribou outside of the river corridors in the fall, resident said; hunting resumed from snowmobiles when they thought

that winter travel across the tundra was good. The population of the Mulchatna caribou herd dropped from a high in 1996 of about 200,000 animals to a 2006 population of about 45,000 animals. For the 2004–2005 regulatory year, the population of the Mulchatna caribou herd was estimated to be at about 85,000 animals (Woolington 2007:27). At its peak population, the range of the herd expanded into areas that had not been used in historical times. In the study year, Koliganek hunters reported a scarcity of caribou near the community and suggested that when the herd was larger caribou were more accessible. Some of this perception of scarcity might have been the result of travel conditions and timing of caribou movements. If conditions were good, residents said hunters could travel a long way to harvest caribou by snowmobile, but if the caribou arrived near the community after the close of the hunting season, regulations did not allow their harvest.[6]

Migratory birds traveled through the Nushagak River area in the fall and spring and were extensively hunted by the residents of Koliganek, usually along the Nushagak, Mulchatna, Nuyakuk, and Kvichak rivers. Outlying tundra lakes, away from the main waterways, were also used to access geese in the spring. Grassy Island, on the opposite side of the Nushagak River from Dillingham, was a duck and goose hunting area. Sheep Island, at the lower end of the Wood River, was used to harvest gull eggs, as were areas closer to Koliganek. In 2005, 89% of Koliganek households used migratory birds, with 57% of households hunting and harvesting them. Forty-six percent of residents reported using eggs and 11% reported harvesting bird eggs. All of the harvesters reported sharing eggs with other households (Table 4-3).

HARVEST QUANTITIES

Table 4-3 reports estimated wild resource harvests and uses by Koliganek residents in 2005 and is organized first by category and then by species. All resources are reported in pounds usable weight (see Appendix C for conversion factors). The "harvest" category includes resources taken by any member of the surveyed household during the study year. The "use" category includes all resources taken and given away by a household, as well as resources acquired after a harvest, either as gifts, by trade, through hunting partnerships, or as meat given to hunting guides by their clients. Purchased foods are not included. Differences between harvest and use percentages reflect sharing between households, which results in a wider distribution of wild foods.

The total harvest for all subsistence resources in 2005 for Koliganek was 134,779 lb, or 899 lb per person (Table 4-3). Table 4-4 lists the top 10 resources harvested, in terms of pounds per capita, and the 10 resources used by the most Koliganek households. Salmon constituted the largest portion of the harvest, with 84,700 lb (63%, or 565 lb per person) (Table 4-3 and Figure 4-2). In 2005, 100% of Koliganek households used salmon and 86% harvested salmon. Included in the total of salmon were 29,087 lb of Chinook salmon, or 194 lb per person; 28,003 lb of fresh sockeye salmon, or 187 lb per person; 20,653 lb of chum salmon, or 138 lb per person; 4,656 lb of coho salmon, or 31 lb per person; 1,425 lb of pink salmon, or 10 lb per person; and 876 lb of spawning sockeye salmon, or 6 lb per person (Table 4-3 and Figure 4-3).

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[6] At the start of the caribou season in 2006, the bag limit for caribou in this area was reduced from 5 to 3 caribou. The season had previously closed on April 15, but in 2006 the closure date was changed to March 15. Subsequent actions taken by the Alaska Board of Game in March 2007 reduced the bag limit to 2 caribou and eliminated the provision that allowed hunting the same day as aircraft travel ("same-day airborne") in GMU 17B (Koliganek), as well as GMUs 9B and 17C east of the Nushagak River.

Non-salmon fishes were also an important resource, making up 10% of the total harvest of wild resources (Table 4-3 and Figure 4-2). In 2005, Koliganek residents harvested 13,564 lb of non-salmon fishes, or 90 lb per person. Figure 4-4 shows the harvest of non-salmon fishes, by percentage of total pounds, in Koliganek in 2005. The major species harvested included northern pike (5,292 lb, or 35 lb per person) at 41% of the harvest of all non-salmon fishes, humpback whitefish (2,397 lb, or 16 lb per person) at 19%, broad whitefish (1,656 lb, or 11 lb per person) at 13%, longnose sucker (1,575 lb, or 11 lb per person) at 13%, and Arctic grayling at 10% (1,199 lb, or 8 lb per person) (Table 4-3). Other important freshwater fishes included rainbow trout (229 lb, or 1.5 lb per person), Dolly Varden (134 lb, or 1 lb per person), and lake trout (84 lb, or 1 lb per person). Longnose suckers were frequently caught in nets while targeting other species; they were most often used for dog food because they were more difficult to debone.

Large land mammals (Table 4-3) were another major source of wild foods at Koliganek in 2005, with 26,685 lb harvested (178 lb per person). Fifty-one percent of this was caribou (13,725 lb, or 92 lb per person). Forty-nine percent of usable large land mammal meat by weight was moose at 49% (12,960 lb, or 86 lb per person).

Beavers and porcupines were important small land mammal resources. In 2005, Koliganek residents harvested 971 lb of beaver (7 lb per person), 252 lb of porcupine (2 lb per person), and 12 lb of snowshoe hare (Table 4-3).

In addition, harvests of waterfowl by residents of Koliganek in 2005 included 583 lb of geese, or 4 lb per person and 350 lb of ducks, or 2 lb per person (Table 4-3). Tundra swans (45 lb) and sandhill cranes (63 lb) were also harvested. Berries were an important resource, with a harvest of 4,806 lb, or 32 lb per person. Other plants and greens accounted for a harvest of 2,415 lb, or 16 lb per person in 2005.

GENERAL HUNTING, FISHING, AND GATHERING AREAS

Koliganek residents' wild resource harvests in 2005 were focused along the Nushagak River, upstream from Koliganek approximately 100 miles to Big Bend (USGS quadrangle map, 1:250,000, Taylor Mountains, Alaska)[7]. The Nushagak River upstream from its confluence with the Nuyakuk River was referred to by residents as "main river." Harvests of salmon took place along the Nuyakuk River and Nushagak River downstream to Nushagak Bay (Figure 4-5). A large portion of the land mammal hunting and trapping area was used for other resources as well. This included a large area around Koliganek, with residents traveling along rivers and overland to hunt for moose and caribou (Figure 4-6). Waterways noted above were important for access to migratory bird hunting areas and other resources, including bird eggs, berries, other plants, and firewood (Figures 4-7 and 4-8).

[7] For the complete set of maps of Koliganek residents' hunting, fishing, and gathering areas in 2005, see Appendix D, "Harvest Use Area Maps by Community" (published in hard copy on a CD-ROM attached to the back cover of this report).

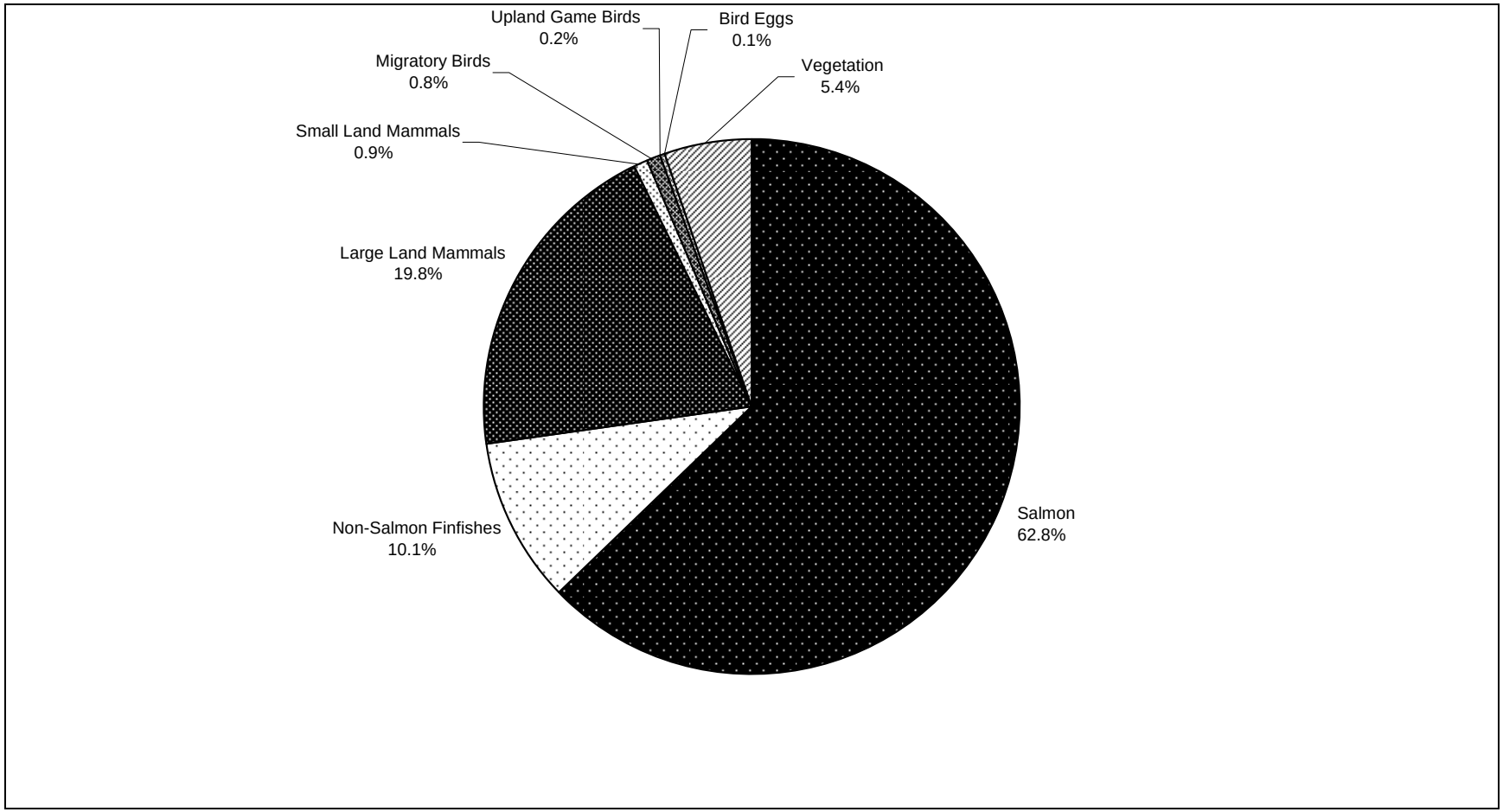

Figure 4-2.–Koliganek composition of wild resource harvests, pounds usable weight, 2005.

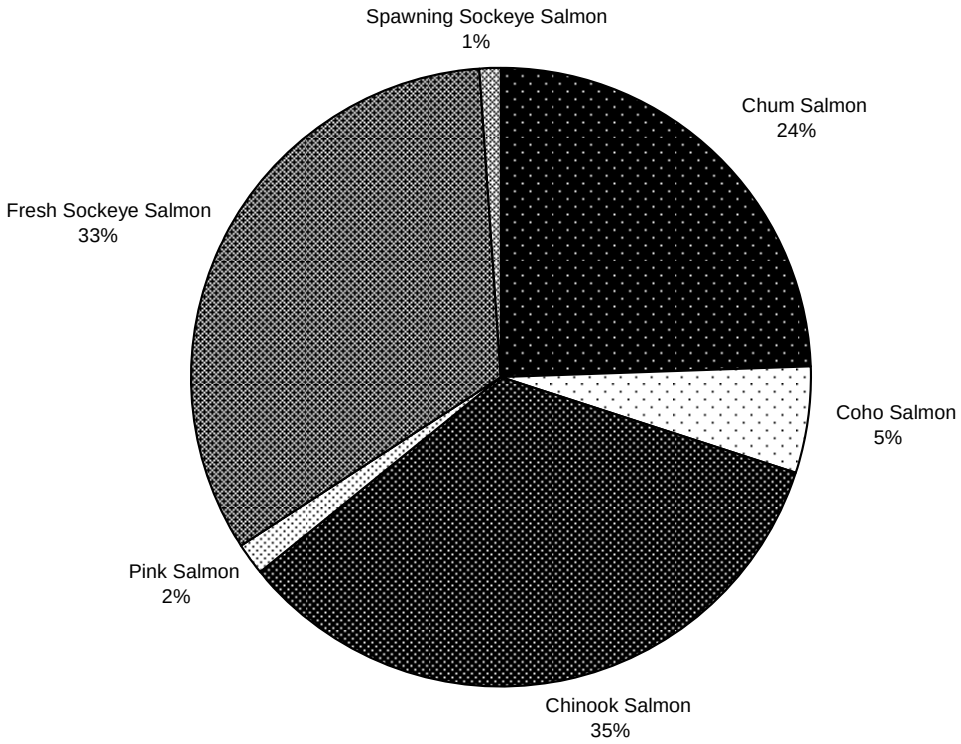

Figure 4-3.–Koliganek composition of salmon harvests, pounds usable weight, 2005.

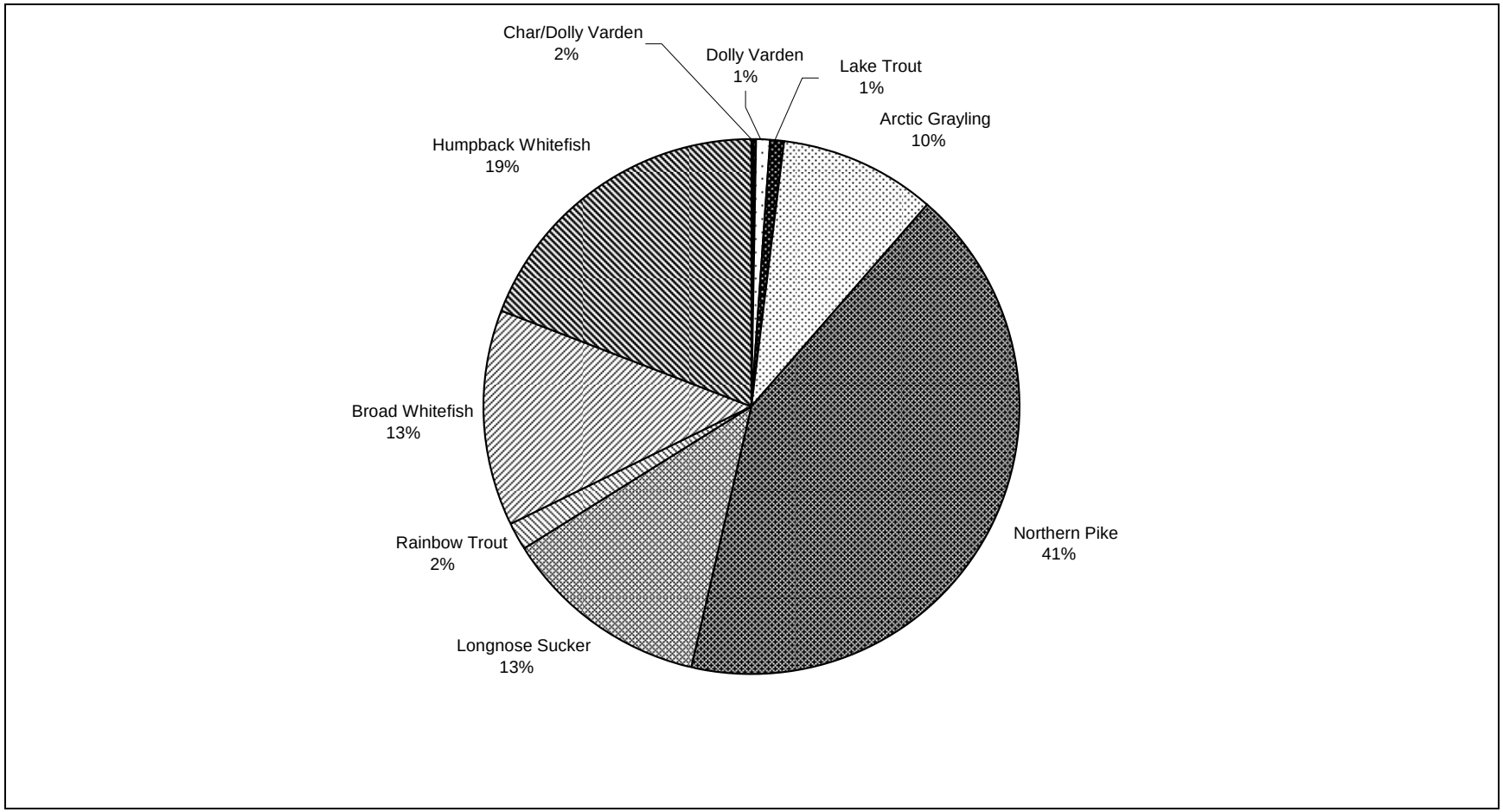

Figure 4-4.–Koliganek composition of freshwater fish harvests, pounds usable weight, 2005.

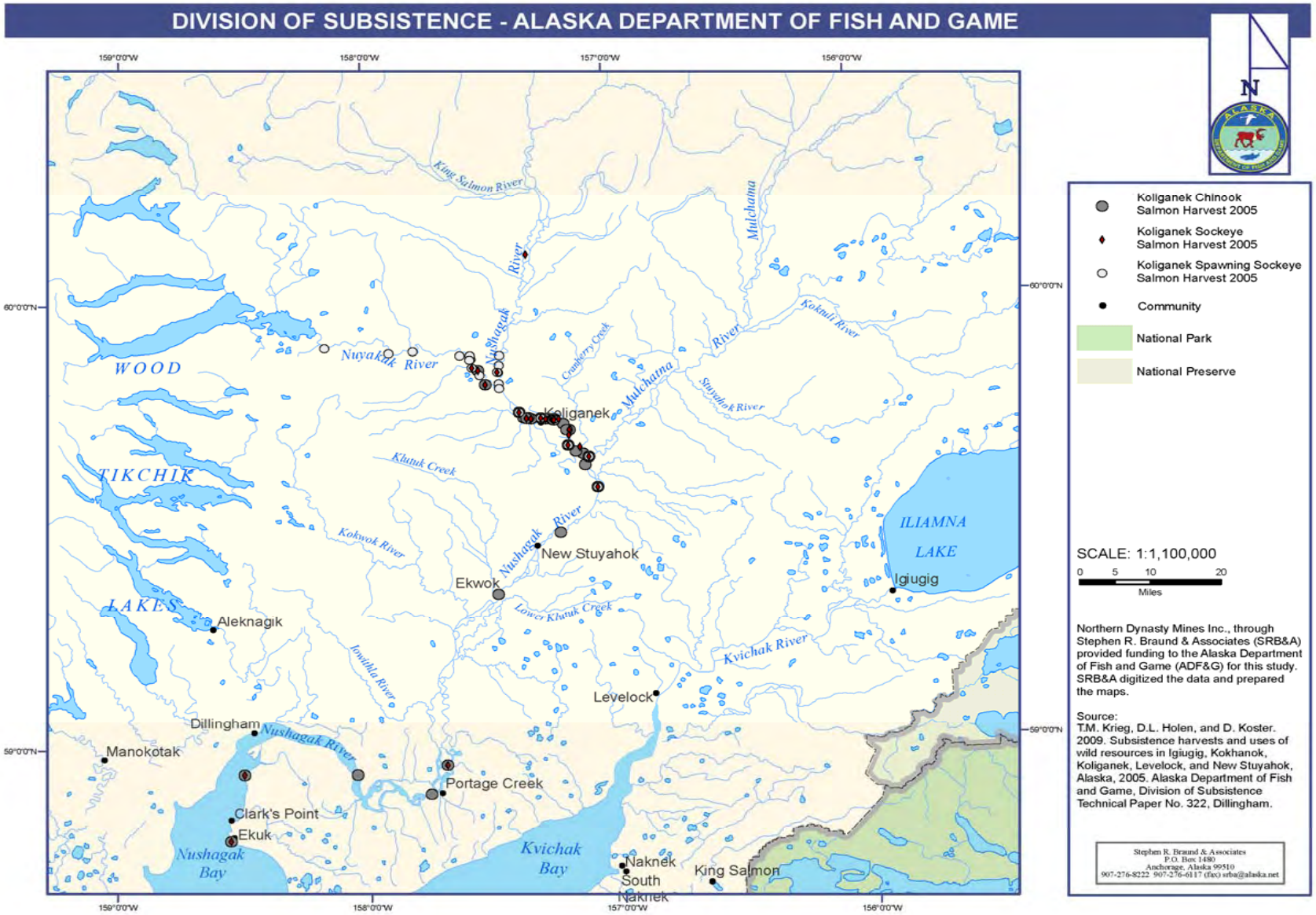

Figure 4-5.–Chinook, sockeye, and spawning sockeye salmon harvest locations, Koliganek, 2005.

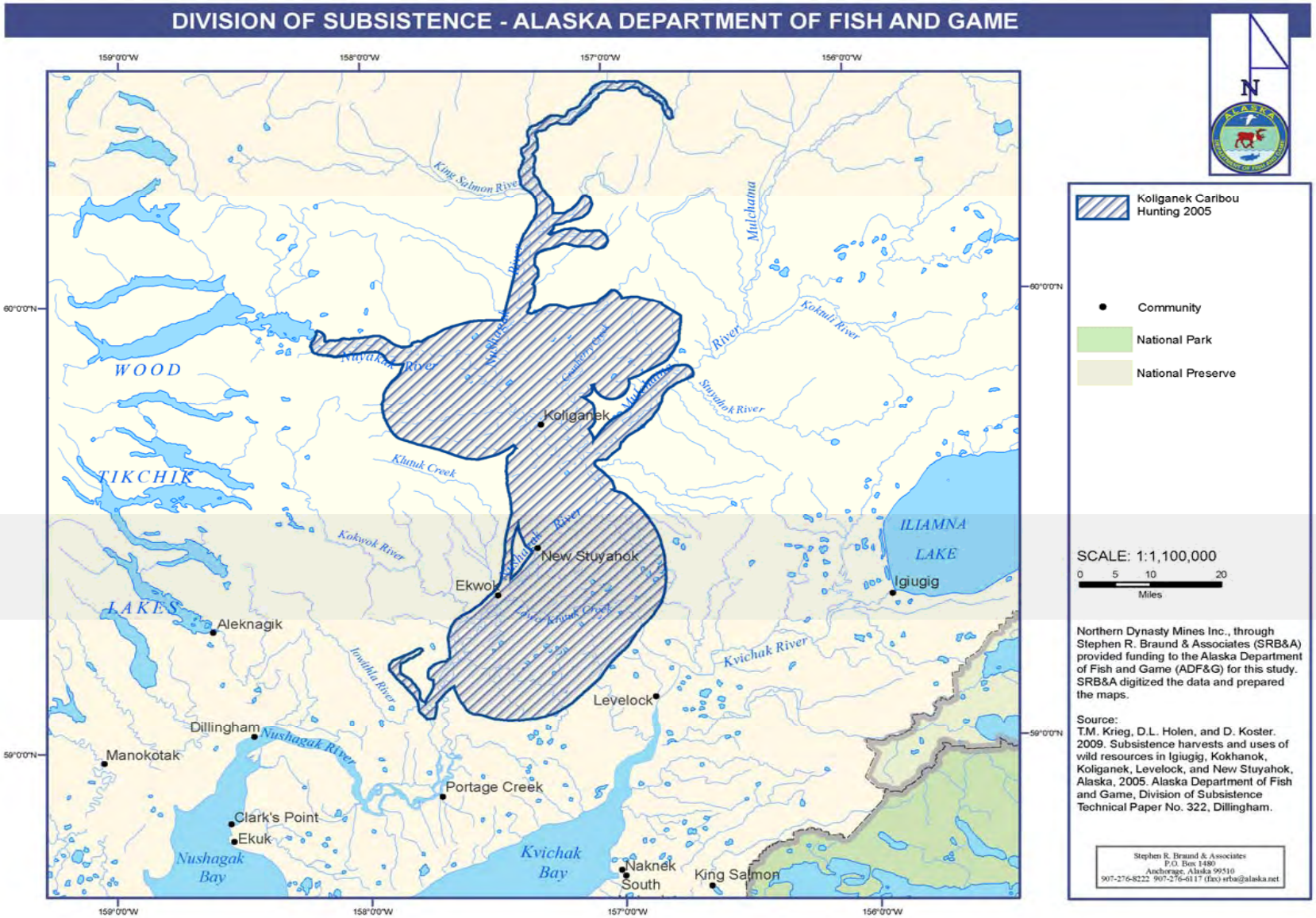

Figure 4-6.–Caribou hunting locations, Koliganek, 2005.

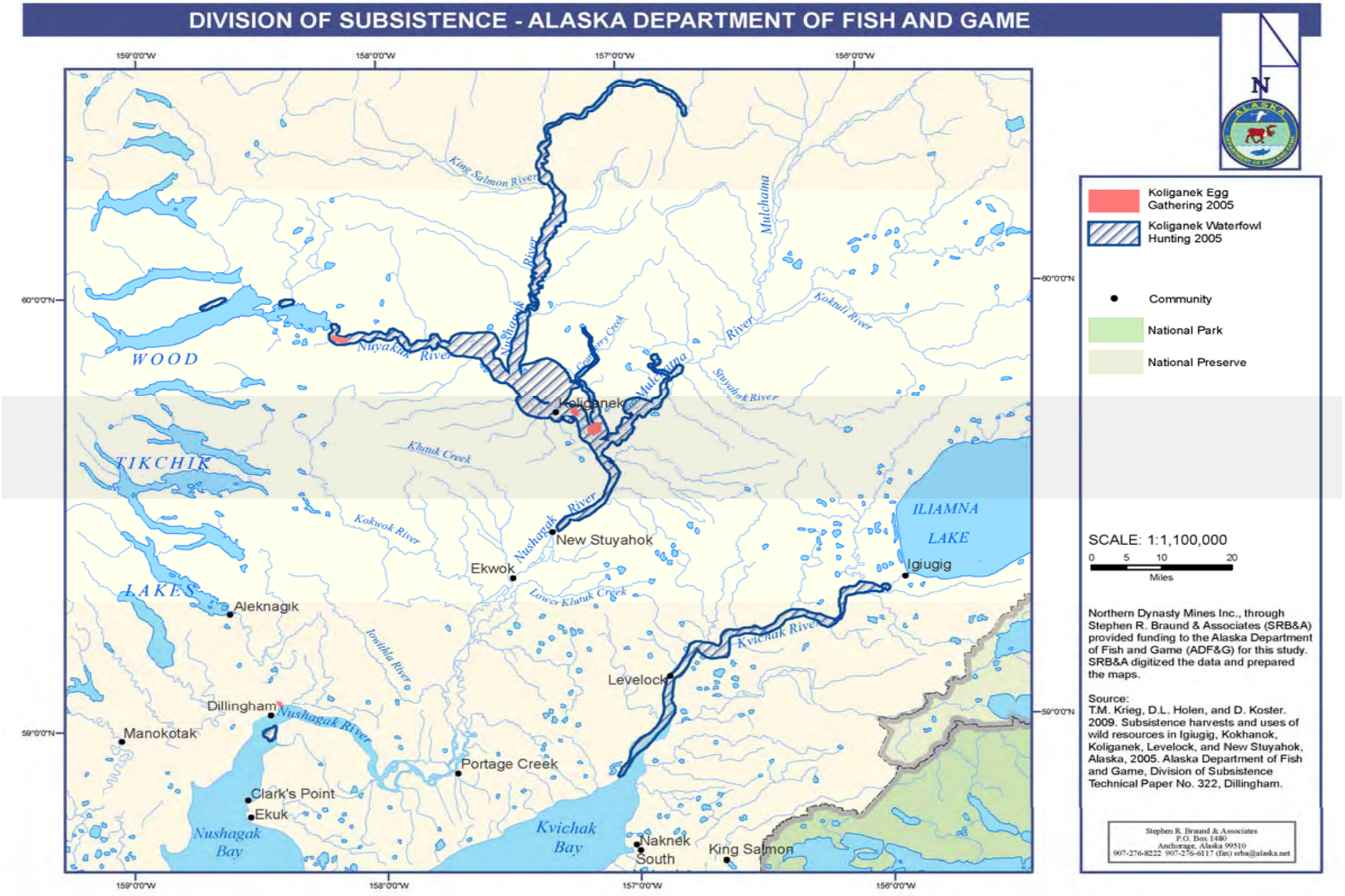

Figure 4-7.–Egg gathering and waterfowl hunting locations, Koliganek, 2005.

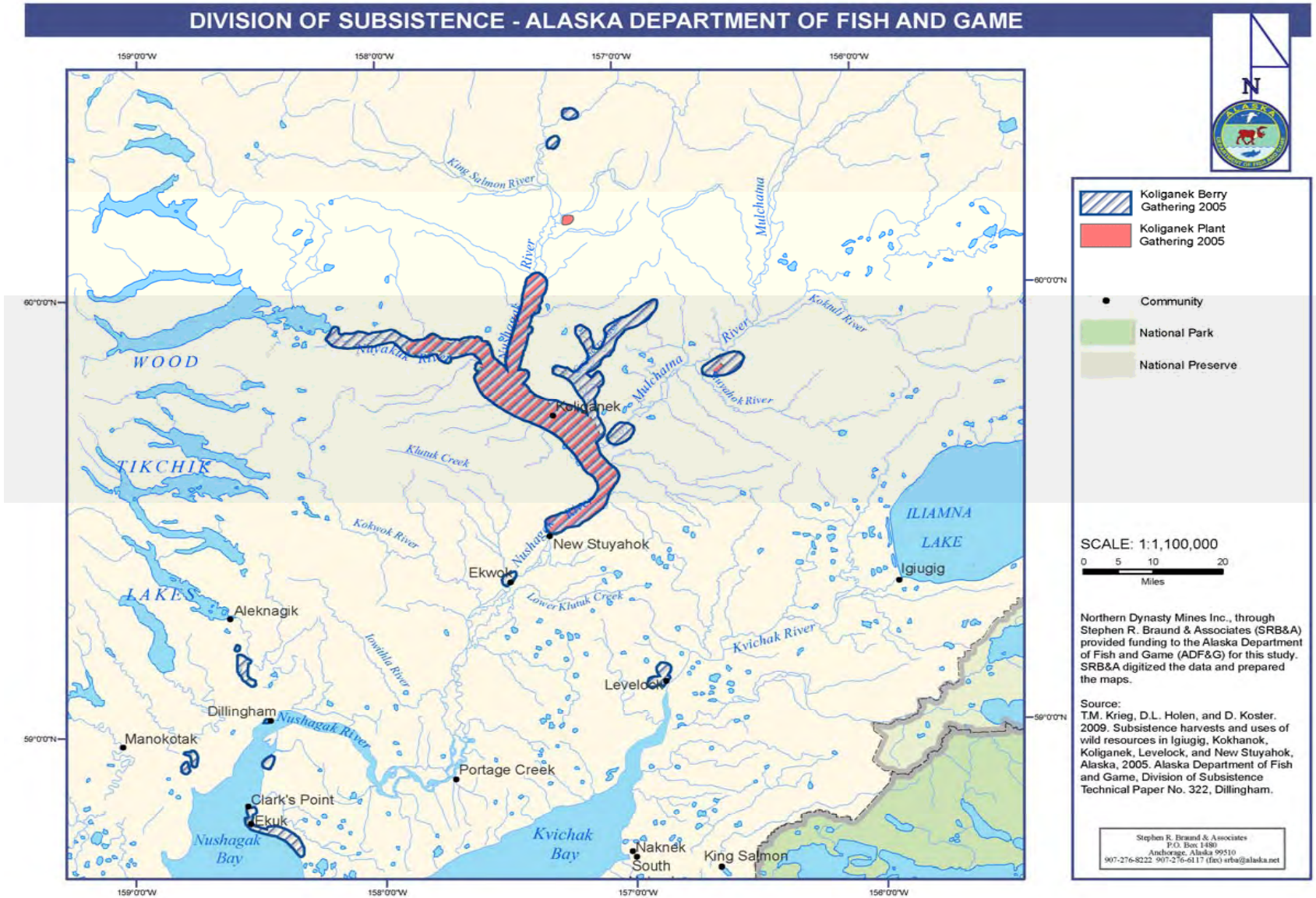

Figure 4-8.–Berry and plant gathering locations, Koliganek, 2005.

SHARING AND RECEIVING WILD RESOURCES

In Koliganek in 2005, an estimated 89% of households received wild resources from other households and 93% of households gave resources away (Tables 1-14 and 4-3). Households received an average of 8 resources and gave away an average of 9 resources (Table 1-14). Fish were used by 100% of the households and were among the most commonly shared resources, with 89% receiving and 75% giving fish (Table 4-3). Large land mammals, used by 96% of the households, also were widely shared, with 68% of the households giving to other households and 61% receiving large land mammals (Table 4-3).

In 2005, interviewed Koliganek households reported no marine mammal harvests, yet 64% of the households used marine mammals. Marine mammal products were received from residents of other communities. Sixty-one percent of Koliganek households received and 29% gave marine mammals to other households. In 2005, 57% used seals, 54% of Koliganek households received seals, and 29% gave away seals (examples of redistribution of received resources). Eighteen percent received beluga whale meat and 4% gave it to other households. Walruses were received by 7% of the households and given away by 4% of the households (Table 4-3).

Fifty percent of the households gave away resources within the category "birds and eggs" and 54% received them. Fourteen percent of Koliganek households gave bird eggs away and 39% received them. Forty-three percent of the households gave migratory birds away and 36% received them. Unlike New Stuyahok (see next chapter), where migratory birds were the only major category characterized by more giving than receiving, giving exceeded receiving in Koliganek in the majority of the major resource categories. For wild plants, including berries, 64% of the households gave them to other households and 50% received them. For plants other than berries, 18% of the households gave and 14% received them (Table 4-3).

USE AND HARVEST CHARACTERISTICS BY RESOURCE CATEGORY

SALMON

In 2005, Koliganek residents harvested 92% of their estimated salmon harvest for home use with setnets (Table 4-5). A portion of each of the total harvests of chum salmon (<1%), coho salmon (12%), Chinook salmon (almost 7%), and sockeye salmon (5%) was removed from commercial catches for use by Koliganek residents. Seven percent of all Koliganek households removed chum and coho salmon from their commercial catches, 21% of the households removed Chinook salmon, and 32% removed sockeye salmon (Tables 1-15 and 4-5). In addition to subsistence setnets and removal from commercial catches, 3% of the harvest of usable pounds of salmon by Koliganek residents was taken using rod and reel gear (Table 4-5). Chinook salmon was the main species harvested (Table 4-3 and Figure 4-3), with 91% taken in setnets and 2% taken with rod and reel. Sockeye salmon, second only to Chinook salmon, were mostly taken by setnet (95%), as were chum salmon (almost 99%). Coho salmon were harvested by setnet (61%) and rod and reel (27%). Post-spawned sockeye salmon were taken by setnet (63%) and rod and reel (35%).

NON-SALMON FINFISHES

Table 4-6 lists the percentage of each non-salmon fish harvested, by gear type, by Koliganek residents in 2005. Residents usually caught fish other than salmon by ice fishing. For example,

100% of lake trout were harvested while ice fishing. Northern pike were by far the most harvested non-salmon fish by weight (Table 4-3 and Figure 4-4). Eighty-one percent of northern pike and 98% of Arctic grayling were caught while ice fishing (Table 4-6). Species caught mainly with setnets were starry flounder (100%), broad whitefish (100%), humpback whitefish (99%), and longnose sucker (96%). Most of the flounder harvest was incidentally caught by one household who used them, because of their rough skins, primarily "as sandpaper to scrub the skiff." Forty percent of burbot and 20% of northern pike were harvested by setnet (Table 4-6). The most prominent gear used for Dolly Varden and rainbow trout (61% and 60% of the harvests, respectively) was rod and reel (Table 4-6). Most of the remainder of the harvest of Dolly Varden and rainbow trout was obtained by ice fishing gear. Harvest locations for non-salmon fishes were focused in 2005 along the Nushagak River, Nushagak "main river," and the Nuyakuk Rivers, some tributaries to those rivers, and Tikchik Lake (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

LARGE LAND MAMMALS

In 2005, large land mammals made up an estimated 20% of the harvest in pounds for Koliganek residents (Figure 4-2). In 2005, 75% of the households in Koliganek attempted to harvest caribou, while 61% were successful. Moose hunting followed a similar pattern, with 68% of households attempting to harvest moose, and 50% successful. Caribou made up 51% of the large land mammal harvest in terms of usable weight and moose made up 49% (Figure 4-2). An estimated 92 caribou were harvested, compared to 24 moose (Table 4-3). The 2005 Koliganek caribou hunting area along the major waterways covered about the same area as the moose hunting areas, but was much larger away from the waterways. The Nushagak River from Big Bend to the mouth of the Iowithla, all of the Nuyakuk River, and the Mulchatna River upstream to the Stuyahok River were hunted for caribou and moose. Additional moose hunting occurred along the Stuyahok River, upstream on the Mulchatna River, and along about 20 miles of the Koktuli River (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

SMALL LAND MAMMALS/FURBEARERS

The total harvest of edible meat from small land mammals by Koliganek residents in 2005 was 1,238 lb, or 8 lb per person. All of this harvest was from beavers (971 lb), porcupines (252 lb), and snowshoe hares (12 lb; Table 4-3). Four percent of the households harvested red foxes, red (tree) squirrels, and wolverines. Seven percent harvested river (land) otters and martens. Gray wolves were harvested by 14% of the households. The hunting area for small land mammals included a large area around Koliganek, the Nushagak River from the King Salmon River to about 5 miles downstream from the mouth of the Mulchatna River, the Nuyakuk River, and the Mulchatna River up to the mouth of the Koktuli River (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

Table 4-5.–Estimated percentages of salmon harvest by gear type, resource, and total salmon harvest, Koliganek, 2005.

				Subsistence methods											
	Percentage	Removed from commercial catch[a]		Setnet		Seine		Other		Subsistence gear; any method		Rod and reel		Any method	
Resource	base	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	Gear type	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Resource	4.1%	4.8%	92.3%	92.3%	0.1%	0.0%	0.0%	0.0%	92.3%	92.3%	3.6%	3.0%	100.0%	100.0%
	Total	4.1%	4.8%	92.3%	92.3%	0.1%	0.0%	0.0%	0.0%	92.3%	92.3%	3.6%	3.0%	100.0%	100.0%
Chum salmon	Gear type	4.0%	3.0%	29.4%	25.9%	0.0%	0.0%	0.0%	0.0%	29.4%	25.9%	5.8%	6.2%	27.5%	24.2%
	Resource	0.6%	0.6%	98.6%	98.6%	0.0%	0.0%	0.0%	0.0%	98.6%	98.6%	0.8%	0.8%	100.0%	100.0%
	Total	0.2%	0.1%	27.1%	23.9%	0.0%	0.0%	0.0%	0.0%	27.1%	23.9%	0.2%	0.2%	27.5%	24.2%
Coho salmon	Gear type	20.6%	16.2%	4.6%	4.2%	0.0%	0.0%	0.0%	0.0%	4.6%	4.2%	51.6%	57.7%	6.9%	6.4%
	Resource	12.1%	12.1%	61.0%	61.0%	0.0%	0.0%	0.0%	0.0%	61.0%	61.0%	26.9%	26.9%	100.0%	100.0%
	Total	0.8%	0.8%	4.2%	3.9%	0.0%	0.0%	0.0%	0.0%	4.2%	3.9%	1.9%	1.7%	6.9%	6.4%
Chinook salmon	Gear type	29.3%	50.2%	16.8%	33.6%	0.0%	0.0%	0.0%	0.0%	16.8%	33.6%	7.6%	18.4%	17.0%	34.0%
	Resource	7.0%	7.0%	91.4%	91.4%	0.0%	0.0%	0.0%	0.0%	91.4%	91.4%	1.6%	1.6%	100.0%	100.0%
	Total	1.2%	2.4%	15.5%	31.0%	0.0%	0.0%	0.0%	0.0%	15.5%	31.0%	0.3%	0.5%	17.0%	34.0%
Pink salmon	Gear type	0.0%	0.0%	4.1%	2.2%	0.0%	0.0%	0.0%	0.0%	4.1%	2.2%	5.5%	3.6%	4.0%	2.1%
	Resource	0.0%	0.0%	95.0%	95.0%	0.0%	0.0%	0.0%	0.0%	95.0%	95.0%	5.0%	5.0%	100.0%	100.0%
	Total	0.0%	0.0%	3.8%	2.0%	0.0%	0.0%	0.0%	0.0%	3.8%	2.0%	0.2%	0.1%	4.0%	2.1%
Sockeye salmon	Gear type	46.1%	30.5%	43.2%	33.4%	0.0%	0.0%	0.0%	0.0%	43.2%	33.4%	2.3%	2.2%	41.8%	32.3%
	Resource	4.5%	4.5%	95.3%	95.3%	0.0%	0.0%	0.0%	0.0%	95.3%	95.3%	0.2%	0.2%	100.0%	100.0%
	Total	1.9%	1.5%	39.9%	30.8%	0.0%	0.0%	0.0%	0.0%	39.9%	30.8%	0.1%	0.1%	41.8%	32.3%
Landlocked salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spawning sockeye	Gear type	0.0%	0.0%	1.9%	0.7%	100.0%	100.0%	0.0%	0.0%	2.0%	0.7%	27.1%	11.9%	2.8%	1.0%
	Resource	0.0%	0.0%	63.4%	63.4%	1.9%	1.9%	0.0%	0.0%	65.3%	65.3%	34.7%	34.7%	100.0%	100.0%
	Total	0.0%	0.0%	1.8%	0.6%	0.1%	0.0%	0.0%	0.0%	1.8%	0.7%	1.0%	0.4%	2.8%	1.0%
Unknown salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2005.

a. Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

Table 4-6.–Estimated percentages of fishes other than salmon harvested by gear type, resource, and total harvest, Koliganek, 2005.

			Subsistence gear								
Resource	Percentage base	Removed from commercial catch[a]	Setnet	Seine	Hand line gear	Dip net	Ice fishing	Subsistence gear (other)	Subsistence gear, any gear	Rod and reel	Any method
Non-salmon fishes	Gear type	100.0%	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	100.0%	100.0%
	Resource	6.1%	49.9%	0.0%	0.0%	0.0%	42.2%	0.0%	92.1%	1.7%	100.0%
	Total	6.1%	49.9%	49.9%	0.0%	0.0%	42.2%	0.0%	92.1%	1.7%	100.0%
Herring	Gear type	32.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%
	Resource	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Total	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%
Flounder	Gear type	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%	1.3%
	Resource	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	1.3%	1.3%	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%	1.3%
Pacific halibut	Gear type	63.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%
	Resource	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Total	3.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%
Burbot	Gear type	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.2%
	Resource	0.0%	40.0%	0.0%	0.0%	0.0%	0.0%	0.0%	40.0%	0.0%	100.0%
	Total	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.2%
Dolly Varden	Gear type	0.0%	0.1%	0.0%	0.0%	0.0%	0.6%	0.0%	0.3%	27.0%	0.8%
	Resource	0.0%	6.1%	0.0%	0.0%	0.0%	32.7%	0.0%	38.8%	61.2%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.3%	0.5%	0.8%
Dolly Varden–saltwater	Gear type	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
	Resource	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Total	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
Lake trout	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	0.7%	0.0%	0.6%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.6%	0.0%	0.6%
Arctic grayling	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	20.6%	0.0%	9.4%	9.0%	8.8%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	98.2%	0.0%	98.2%	1.8%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	8.7%	0.0%	8.7%	0.2%	8.8%

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Table 4-6. Page 2 of 2.

Resource	Percentage base	Removed from commercial catch[a]	Subsistence gear: Setnet	Seine	Hand line gear	Dip net	Ice fishing	Subsistence gear (other)	Subsistence gear any gear	Rod and reel	Any method
Northern pike	Gear type	0.0%	15.3%	0.0%	0.0%	0.0%	74.4%	0.0%	42.4%	0.0%	39.0%
	Resource	0.0%	19.5%	0.0%	0.0%	0.0%	80.5%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	7.6%	7.6%	0.0%	0.0%	31.4%	0.0%	39.0%	0.0%	39.0%
Longnose sucker	Gear type	0.0%	22.3%	0.0%	0.0%	0.0%	1.2%	0.0%	12.6%	0.0%	11.6%
	Resource	0.0%	95.7%	0.0%	0.0%	0.0%	4.3%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	11.1%	11.1%	0.0%	0.0%	0.5%	0.0%	11.6%	0.0%	11.6%
Rainbow trout	Gear type	0.0%	0.1%	0.0%	0.0%	0.0%	1.5%	0.0%	0.7%	58.4%	1.7%
	Resource	0.0%	1.8%	0.0%	0.0%	0.0%	38.5%	0.0%	40.4%	59.6%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.7%	1.0%	1.7%
Broad whitefish	Gear type	0.0%	24.5%	0.0%	0.0%	0.0%	0.0%	0.0%	13.3%	0.0%	12.2%
	Resource	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	12.2%	12.2%	0.0%	0.0%	0.0%	0.0%	12.2%	0.0%	12.2%
Humpback whitefish	Gear type	0.0%	35.0%	0.0%	0.0%	0.0%	0.2%	0.0%	19.1%	5.6%	17.7%
	Resource	0.0%	98.9%	0.0%	0.0%	0.0%	0.5%	0.0%	99.5%	0.5%	100.0%
	Total	0.0%	17.5%	17.5%	0.0%	0.0%	0.1%	0.0%	17.6%	0.1%	17.7%

Note This table lists only those resources for which there was a harvest in the 2005 study year.

a. Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

Source ADF&G Division of Subsistence household surveys, 2005.

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MARINE MAMMALS

Although there were no attempted harvests of marine mammals reported for Koliganek in 2005, 64% of the households used marine mammals, including harbor seals, walruses, beluga whales, and unknown whales (Table 4-3). The most reported seal use was as seal oil, with Togiak frequently mentioned as the source. Walruses were used by 7% of the households, beluga whales by 18%, and whales of unknown species by 4%.

MARINE INVERTEBRATES

No harvests of marine invertebrates were reported by the residents of Koliganek in 2005. Clams of unknown species were received from residents of other communities and used by 7% of the households (Table 4-3).

BIRDS AND EGGS

In 2005, Koliganek residents harvested waterfowl along the Nushagak, Mulchatna, Nuyakuk, and Kvichak rivers. These rivers were used to access smaller waterways and tundra lakes in order to hunt waterfowl. Additionally, locations on the lower Nushagak River, as well as the Nuyakuk and Tikchik lakes were also used to hunt waterfowl. Egg gathering took place along the Nushagak River near Koliganek, along the upper Nuyakuk River, and at the lower end of the Wood River. Koliganek residents harvested 1,041 lb of migratory birds, or 7 lb per person, and 264 lb of upland birds (almost 2 lb per person) in 2005 (Table 4-3). Bird eggs accounted for 68 lb of the harvest of wild resources, or <1 lb per person (Table 4-3).

WILD PLANTS

Koliganek residents traveled long distances to harvest plants and berries in 2005 (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report). The berry harvest was concentrated along the major rivers around Koliganek, but berries were also harvested in numerous locations, including the Nushagak Bay area, the lower Nushagak River area around Dillingham, near Levelock, and locations along the Mulchatna River and the Nushagak "main river." Other plant gathering areas overlapped the berry areas, with residents gathering other plants from the Nushagak River from New Stuyahok to halfway up the Nuyakuk River, from the Nushagak "main river" upstream to Harris Creek, and from a specific location on the Mulchatna River. One location on the Nushagak "main river," just downstream of the King Salmon River, was used exclusively for plant gathering. Residents of Koliganek harvested an estimated 4,806 lb of berries, or 32 lb per person, and 2,415 lb of other plants, or 16 lb per person (Table 4-3).

COMPARING HARVESTS AND USES IN 2005 WITH PREVIOUS YEARS

Fifty-seven percent of Koliganek households indicated that their overall harvests and uses of resources in 2005 were about the same as in recent years (the last 5 years), while 29% said their harvest was less than in recent years (Table 4-7). Table 4-7 summarizes respondents' assessments for each major resource category (see also Figure 4-9). For example, 52% of households reported that their harvests and uses of salmon in 2005 were the same in recent years, while 19% reported that they used more salmon in 2005 and 30% used fewer salmon (Figure 4-9). None of the households said that they harvested and used more large land mammals while

one-half (50%) said they used the same and one-half (50%) said that they used fewer. For the wild plants category, 46% of the households said that they harvested and used fewer wild plants, the same proportion of households said they used the same amount, and 7% said that they used more wild plants.

The reasons that residents of Koliganek gave for changes in their harvests and uses are listed by resource category in Table 4-8 and Figure 4-10. This was an open-ended question, and respondents could offer more than one reason for changes. Project staff grouped the responses into categories, such as competition for resources, regulations hindering or helping residents harvest resources, sharing of harvests, effects of weather on animals and subsistence activities, changes in the animal populations, personal reasons such as work and health, and other outside effects on residents' opportunities to engage in subsistence activities. Changes in animal populations (or plant availability), personal reasons, weather, and competition emerged as 4 major reasons for changes. Some households gave a combination of reasons.

Fifty percent of households that had reported less use and lower harvests of salmon compared to the recent past cited personal reasons for this difference (Table 4-8). "Other outside effects" was the only other response: it was given by 13% of these households. Many households that had said they used and harvested fewer non-salmon fishes cited personal reasons (43%). Smaller proportions identified competition and changes in fish populations (14% in both cases).

Fifty-seven percent of the households that said they harvested and used fewer large land mammals than in the recent past related this to animal population changes. Respondents who harvested and used fewer small land mammals and furbearers most commonly (50%) cited personal reasons for the change (Table 4-8).

Of those households that said that they harvested and used fewer birds and eggs, 40% gave personal reasons and 33% said that the reason was due to changes in animal populations. Sixty-two percent of the households said fewer berries and wild plants were available which accounted for their reduced harvest and use (Table 4-8).

Figure 4-10 reports the percentage of Koliganek households that cited particular reasons for lower uses of any resource category in 2005, compared to recent years. Lower uses of any resource in 2005 were related to animal population changes (60%), personal reasons (52%), weather (16%), less sharing (16%), other outside effects (8%), competition (4%), and regulations (4%).

Changes in Koliganek residents' resource harvests can also be clarified through comparisons with findings from other study years. Comprehensive household harvest surveys were administered in Koliganek in 1973 (Gasbarro and Utermohle *Unpublished*), 1987 (Schichnes and Chythlook 1991), and in this study for 2005 (Figure 4-7). Surveys of only large land mammal harvests took place for 2001 (Holen et al. 2005) but the results are not reported here. Figure 4-11 summarizes the per capita harvests in pounds usable weight for each major resource category from these studies.

Table 4-7.–Comparison of household harvests and uses in recent years: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, Koliganek, 2005.

	Estimated	No response		Valid responses		Fewer		Same		More	
Resource	households	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Salmon	42	1.5	3.6%	40.5	96.4%	12.0	29.6%	21.0	51.9%	7.5	18.5%
Non-salmon finfishes	42	0.0	0.0%	42.0	100.0%	10.5	25.0%	25.5	60.7%	6.0	14.3%
Marine invertebrates	42	7.5	17.9%	34.5	82.1%	1.5	4.4%	33.0	95.7%	0.0	0.0%
Large land mammals	42	0.0	0.0%	42.0	100.0%	21.0	50.0%	21.0	50.0%	0.0	0.0%
Small land mammals/furbearers	42	1.5	3.6%	40.5	96.4%	6.0	14.8%	34.5	85.2%	0.0	0.0%
Marine mammals	42	0.0	0.0%	42.0	100.0%	7.5	17.9%	33.0	78.6%	1.5	3.6%
Birds and eggs	42	0.0	0.0%	42.0	100.0%	22.5	53.6%	18.0	42.9%	1.5	3.6%
Wild plants	42	0.0	0.0%	42.0	100.0%	19.5	46.4%	19.5	46.4%	3.0	7.1%
Overall	42	0.0	0.0%	42.0	100.0%	12.0	28.6%	24.0	57.1%	6.0	14.3%
Any resource	42	0.0	0.0%	42.0	100.0%	37.5	89.3%	40.5	96.4%	9.0	21.4%

Source ADF&G Division of Subsistence household surveys, 2005.

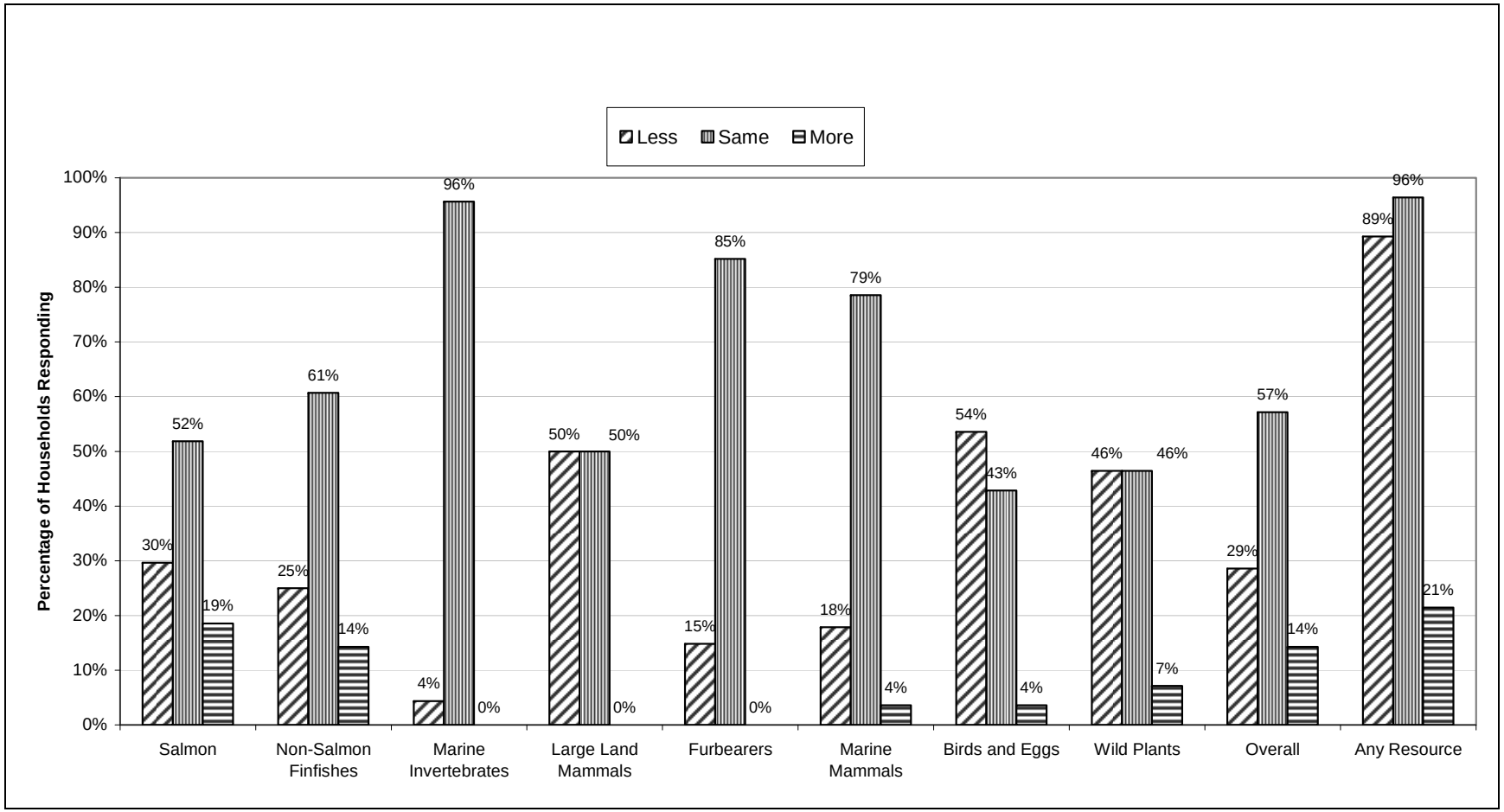

Figure 4-9.–Koliganek households' assessment of harvests and uses of wild resources in 2005 compared to recent years.

Table 4-8.–Koliganek respondents' reasons for change in harvests and uses in recent years.

			Percentage of responses by category[a]							
Resource category	Use fewer or more	Estimated number of households[b]	No reason given	Competition	Regulations	People are sharing less	Weather	Animal population changes[c]	Personal reasons (work/health)	Other outside effects
Salmon	Fewer	12.0	37.5%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	12.5%
Salmon	More	7.5	0.0%	0.0%	0.0%	0.0%	0.0%	80.0%	20.0%	0.0%
Non-salmon finfishes	Fewer	10.5	28.6%	14.3%	0.0%	0.0%	0.0%	14.3%	42.9%	0.0%
Non-salmon finfishes	More	6.0	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	25.0%	0.0%
Marine invertebrates	Fewer	1.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Large land mammals	Fewer	21.0	7.1%	0.0%	7.1%	7.1%	14.3%	57.1%	21.4%	7.1%
Small land mammals/furbearers	Fewer	6.0	25.0%	0.0%	0.0%	0.0%	0.0%	25.0%	50.0%	0.0%
Marine mammals	Fewer	7.5	0.0%	0.0%	0.0%	40.0%	0.0%	0.0%	60.0%	0.0%
Marine mammals	More	1.5	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Birds and eggs	Fewer	22.5	13.3%	0.0%	0.0%	13.3%	0.0%	33.3%	40.0%	6.7%
Birds and eggs	More	1.5	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	0.0%
Wild plants	Fewer	19.5	7.7%	0.0%	0.0%	0.0%	23.1%	61.5%	30.8%	0.0%
Wild plants	More	3.0	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	0.0%
Overall	Fewer	12.0	12.5%	25.0%	0.0%	0.0%	37.5%	50.0%	37.5%	12.5%
Overall	More	6.0	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	75.0%	0.0%
Any resource	Fewer	37.5	32.0%	4.0%	4.0%	16.0%	16.0%	60.0%	52.0%	8.0%
Any resource	More	9.0	16.7%	0.0%	0.0%	16.7%	33.3%	66.7%	33.3%	0.0%

a. Percentage of estimated number of households that reported less or more uses of the resource category who cited this reason.

b. Estimated number of households citing a change in uses. For number of valid responses, see Table 4-7. Estimated total households in community = 42.

c. Includes changes in size of population and/or changes in geographic distribution of animals during hunting seasons that affected harvest opportunities and success.

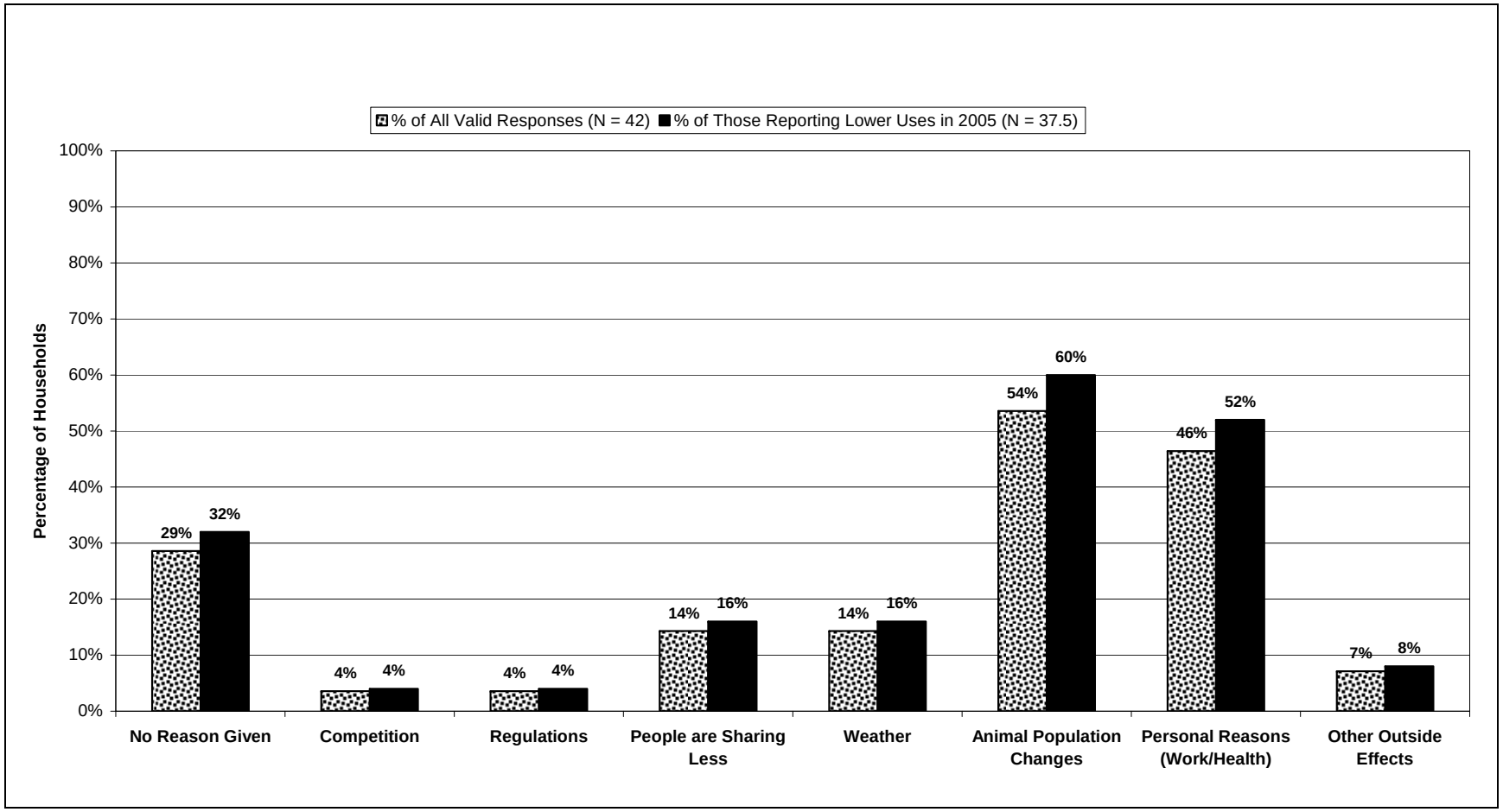

Figure 4-10.–Reasons cited by Koliganek households for lower uses of any resource in 2005 compared to other recent years.

In 2005, harvest amounts of salmon and vegetation were larger, especially the amount of salmon harvested, than in any previous year for which comprehensive data are available. In contrast, 2005 harvests of large land mammals were considerably lower than harvests in 1987 and 1973, 2 years that had harvests nearly identical to each other (294 and 293 lb per capita, respectively). Harvest amounts of small land mammals, birds, and eggs in 2005 were also lower than previous years. The decline in small land mammal harvest amounts since 1987 has been considerable. Non-salmon fish harvest amounts in 2005 were less than the previous year, but the difference was only 5 lb per person and it is probably reasonable to view these harvests as fairly stable. In 1973 and 1987, salmon and large mammal harvest amounts (the 2 major resource categories) were very similar in pounds usable weight per capita (Table 4-9).

Table 4-9 demonstrates differences in harvests in the 3 study years, with pounds usable weight per capita harvests ranging from 762 lb in 1973, 831 lb in 1987, to 899 lb in 2005. Large land mammals and small land mammals appeared to be making up less of the harvest over time. (Table 4-10). The reduction in the harvest of large land mammals may have been due, in large part, to the decline in the size of the Mulchatna caribou herd and to the changes in its movements. As indicated earlier, by 2005, the abundance of the Mulchatna caribou herd had declined to a low that had not been seen in well over a decade. Residents also reported that moose were harder to harvest despite changes to hunting regulations (described above) that were designed to allow more opportunity for local hunters. According to residents, small land mammal harvests declined largely because of the drop in value of furs and the rise in the expense of harvesting them, especially the rising price of gasoline. Bird and egg harvests did not decline as dramatically as the above 2 resource categories. Reasons given on the survey for less harvest and use of birds and eggs, and described above, indicated that, for some households, harvests were down because hunters were not able to spend as much time hunting and that resources did not appear to be as abundant.

Table 4-9.–Koliganek wild resource harvests by resource category, all study years.

	Pounds usable weight per capita harvest		
Resource	1973	1987	2005
Salmon	369.5	362.5	564.7
Non-salmon fishes	51.4	95.3	90.4
Large land mammals	293.2	293.6	177.9
Small land mammals	36.3	45.9	8.3
Birds and eggs	11.2	11.5	9.1
Vegetation		20.8	48.1
All resources	761.6	830.5	898.5

Source ADF&G Division of Subsistence household surveys, 2005.

Table 4-10.–Composition of wild resource harvests by category, Koliganek, all study years.

	Percentage of total harvest		
Resource	1973	1987	2005
Salmon	48.5%	43.6%	62.8%
Non-salmon fishes	6.7%	11.5%	10.1%
Large land mammals	38.5%	35.4%	19.8%
Small land mammals	4.8%	5.5%	0.9%
Birds and eggs	1.5%	1.4%	1.0%
Vegetation		2.5%	5.4%
All resources	100.0%	100.0%	100.0%

Note Blank cells indicate data not collected for that study year.

Source ADF&G Division of Subsistence household surveys, 2005.

LOCAL OBSERVATIONS OF RESOURCE POPULATIONS AND TRENDS

SALMON

Generally, observations concerning the salmon runs by Koliganek survey respondents indicated that 2005 was a good year for salmon. One household reported that there were more salmon and that nets could be set anywhere, not just in the traditional locations, and catch fish. Another household said that it was a good salmon year compared to the recent past, but that salmon were more abundant when he was a child. One respondent said that there were more Chinook salmon in 2005 than have usually returned in the past.

At the community meeting in Koliganek, held on November 3, 2006, in order to review the data collected for the 2005 study year, one respondent stated, in reference to a question about the amount of harvest of post-spawn sockeye salmon, "There are a few, a couple of people, who get the red salmon. Most people get the fresh sockeye. I think a lot of people get whitefish and pike … they get a lot of Arctic grayling and they get just as much whitefish and pike."

NON-SALMON FINFISHES

A number of households offered observations about northern pike. One stated that there were more northern pike and the fish were larger than in years before 2005. Before 2005, the respondent said, the water was low in the rivers, so northern pike could not enter sloughs and creeks that had dried up; however, in 2005 there was more water in the river and the northern pike could swim into the smaller sloughs. Conversely, 2 households stated that northern pike were less abundant and smaller in 2005, and were the only non-salmon fish that was less abundant. "They are getting harder and harder to get," one household member said. This respondent also thought that the northern pike population might be "in a down cycle." One household commented that it was unclear from the harvest survey how good the harvest was for 2005, since ice fishing in the study year 2005 was split over 2 winters; he said "last year" (starting January 1, 2005) was good, but "this year" (starting in fall 2005) was not good.

Respondents' observations of northern pike abundance and size could also be related to differences in the fish harvested by different gear types and the timing and location of harvest.

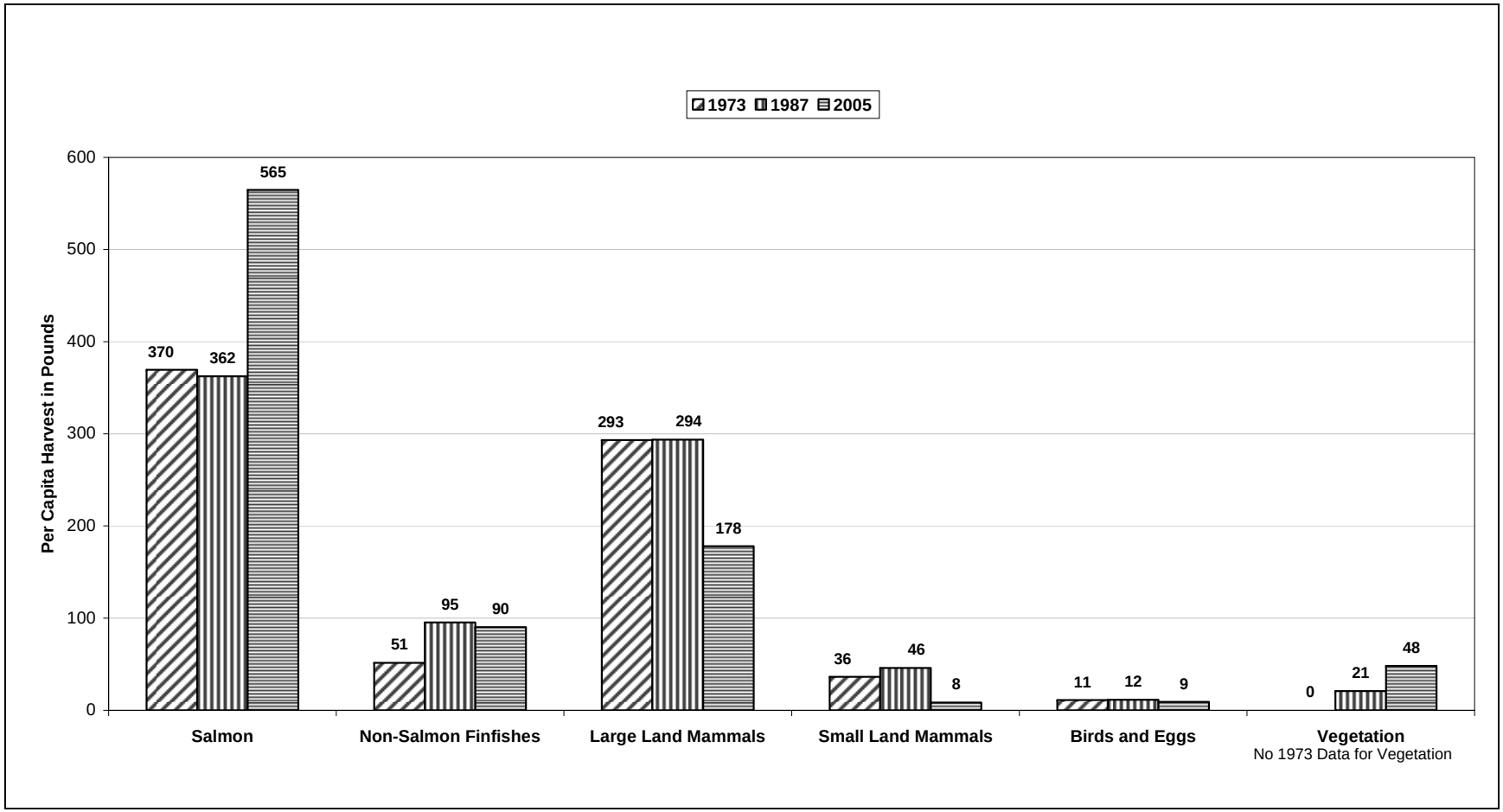

Figure 4-11.–Koliganek wild resource harvests over time.

The 2 gear types used to harvest northern pike were setnet (20% of the harvest) and ice fishing with a hook and line (80% of the harvest). Harvest activities occurred at different times of the year, and, in most cases, different locations (Table 4-6).

One household reported having a particularly good day of ice fishing last winter, harvesting more non-salmon fishes than usual. Another household reported that the weather was better, so they fished more often during 2005.

LARGE LAND MAMMALS

A considerable number of Koliganek hunters observed that caribou had not been in the area in substantial numbers during the last few years. One hunter stated that caribou migratory patterns had changed. Another commented that there were no caribou in the area last winter and, as a result, hunters did not devote much effort to hunting. One respondent stated that he had not gone caribou hunting lately because the animals were not around, perhaps because the travel conditions were bad, or perhaps there were too many wolves. Lack of browse was also identified as a reason that caribou were not in the area.

One household explained that they had been able to harvest caribou in the spring but had to travel farther to find them. They further explained that there have not been many caribou near Koliganek in the fall, when they used to hunt them, and that the caribou were arriving later and could not be hunted due to traveling conditions.

Residents reported that there had been low numbers of moose during the last couple of years, which required more hunting time. Some households reported that, after the hunting season had closed, they had observed more moose near Koliganek. The reduction in moose numbers was attributed to an increase in the abundance of wolves and bears in the area and to too many sport hunters. One respondent made this comment: “Moose are getting more difficult to get in the areas where we used to go. On the upper main [Nushagak] river and Harris Creek, the moose are gone, hunted out by sport hunters and the increase of predators.” One household reported that moose numbers were fewer so they had harvested fewer than usual, and they attributed the decline in moose abundance to sport hunting. Another household said that they harvested moose near Koliganek this year. They had not harvested moose upstream on the Nushagak River in the fall for “a long time” because of the large number of hunters and the low numbers of moose. This household had observed an increasing number of moose near the village, which was unusual, they said. They told of bulls emerging from the brush along the river near Koliganek in the fall, after their household had harvested a moose.

One household reported that although they had not hunted brown bears that year, “every three or four years we get a bear.”

SMALL LAND MAMMALS/FURBEARERS

Several respondents offered observations about porcupines:

- “Hardly any porcupine. Fewer porcupines now than in the past.”
- “Fewer porcupine. Possible down cycle.”

BIRDS AND EGGS

Respondents reported that there were fewer numbers of ducks and geese coming through the area. One respondent specifically said that there were not as many geese in the area. He also

related that 3 years ago, he observed 600–800 geese in one flock, which was unusual. He went on to say that snow geese traveled in flocks of that size only once in a decade (or longer).

Some households reported that there were no ptarmigan or spruce hens in the area in recent years and one household said that they saw none at all while traveling by snowmobile between Koliganek and Dillingham. One respondent said that he hunted only ptarmigan near the village and that he did not travel to "the mountain" (Ketok) in 2005 because there was not much snow.

WILD PLANTS

The observations of respondents in Koliganek were that there were fewer berries in 2005, which required more effort and which resulted in less harvest. Weather, in particular less snowfall and drier conditions, was the reason given for the poor growth of berries in 2005. Only one household said that it was a good blueberry year. The following observations were made by respondents concerning the availability of berries for Koliganek residents in 2005:

- "Way less for salmonberries, blueberries, and cranberries, because of the weather."
- "No salmon-, blue-, or blackberries around here last year. Picked cranberries at Levelock."
- "Not as many berries around in 2005. A couple of years ago there were a lot of berries around the village that I picked. A lot of geese came in to eat the berries."

Respondents had two comments about the additional effort that was required to harvest firewood:

- "Going farther and farther away for wood."
- "Low water [makes it hard] to get to dry wood – have to go in the sloughs – walk and pack out the wood."

At the community meeting on November 3, 2006, attendees were asked if they were collecting more wild plants than in prior years. One respondent stated, "Yes, in the springtime. Mostly in the spring, after everything starts growing … like the fiddlehead fern and the wild celery."

LOCAL CONCERNS REGARDING RESOURCES

Koliganek respondents voiced the following concerns about their perceptions of the effects of predators on the moose population:

- "The moose population is being reduced by predators, wolves and bears, at an alarming rate – I'm afraid that in three or four years we're not going to have any moose left in the country."
- "Lots of wolves in the winter eating moose … lots of wolves around. They don't have the caribou to eat so they eat the moose."

Hunters from Koliganek also expressed the view that sport hunters negatively affected the availability of moose and caribou to local subsistence hunters. Seasons had been closed by regulation by the time that caribou were near the village.

- "Lots of airplanes in the area in the past, dropping off hunters in front of caribou coming through. Haven't seen any big bull caribou recently."

- "They should think about the Natives more: we live off the land. When the sports hunters come around, it's hard for us to get the moose and caribou."
- Hunters also said that the weather inhibited their hunting efforts.

One individual reported that he observed a great deal of aircraft flying at night during his fall moose hunt and that this seemed suspicious to him:

- "Too many planes flying the river, and we have to travel a long way to get a moose. Less ability to harvest, including weather, no water, and no snow. Floatplanes on the river are disruptive. Sports hunters are using GPS units while flying to get on-the-ground locations for caribou and moose."

The increasing price of gasoline was an often expressed concern in terms of the future of subsistence hunting and fishing.

- One household explained their smaller harvest of salmon: "I haven't been out subsistence fishing due to lack of gas. Gas prices are high. We don't go to the places we used to go when gas was cheaper."
- "It's easier to pike fish. The fishing location is close by so we don't have to use as much gas."
- "Because of the price of gas it was harder to get out."
- "Overall [it was] harder to subsist because of the price of gas and the shortage of water on the river."
- "I'm not hunting as much [because] price of gas and ammo has gone up."

One household's respondent stated that even though she or he understood that ducks and geese were not safe to eat because of avian influenza, the sons harvested some anyway. The respondent said that the members of this household were not eating birds like they had in the past.

Respondents offered numerous comments about the Pebble Project. For example, one Koliganek resident stated that he was worried about the effects the mine might have if it were to be developed. "There is no gold mine in the world that hasn't polluted the surrounding land to date." Another offered the following comment concerning the possible pollution of groundwater.

- "We always harvest about the same amount of non-salmon fish because of the fresh water, and it's not contaminated … good nutrients for food. We don't pollute the river so we have all of the freshwater fish and salmon. As long as we don't pollute with open pit mines, we'll always have the fish. We need the fresh, clean water and plankton. It's a renewable resource that is given to us by our Creator, and, as long as we take care of it, it will take care of us. The last 25 years in the Bristol Bay area, because of the way Fish and Game [ADF&G] manages it, we have plenty of renewable resources. Overall use and harvest has a lot to do with need; sometimes we need to go out and get some for families in need of meat. All renewable resources in the Bristol Bay area are essential for our subsistence way of life. Without clean water, our land means nothing for our way of life and our renewable resources. The location where they want to put the Northern Dynasty mine, on the headwaters of the Koktuli, is very environmentally sensitive. The proposed mine is only 900 feet above sea level. It is said that the open pit mine can go down to 2,500 feet below sea level, and that is how the groundwater will

accumulate and be contaminated, and that is how it will be hazardous to our Bristol Bay. Renewable resources are far more usable than nonrenewable resources."

Another respondent stated that mining exploration and development were likely to increase beyond the Pebble Project. He said that in May 2006, a helicopter left Koliganek at 8 a.m. every day, for mining exploration in the mountains northwest of Koliganek.

Several survey respondents wondered about how the information from this research might be used by NDM.

- "Why is this survey being paid for by Northern Dynasty? I'd like to see this survey done but don't want to see Northern Dynasty Mines using it to say that you don't use this area or that area so [therefore] it's not important."
- Another household stated that they were concerned about the mine and asked: "What's the purpose of the survey?" "What's the purpose of the mapping?"

At the community review meeting in Koliganek on November 3, 2006, the following statements were made concerning this project and how it might be used in the Pebble Project permitting process:

- "I am still skeptical about this [study] because of the funding [from Northern Dynasty Mines], and they have to do it to get their permits. It is a good thing and a bad thing. You are damned if you do and you are damned if you don't."
- "They [Northern Dynasty Mines] can take the bar graphs and change them to look good for them. I was at a meeting and they were talking about the salmon in the Bristol Bay area and they made a bar graph of the Koktuli and the other areas and they made it look really small. So I am worried."

CHAPTER 5: LEVELOCK

COMMUNITY BACKGROUND

Levelock, as of 2005, an unincorporated village managed by a traditional village council, is located in the Bristol Bay area, on the west side the Kvichak River, near its mouth at Kvichak Bay (Figure 1-1). Traditionally, coastal people ranging from Nushagak Bay to the Alaska Peninsula as far as Port Moller were *Aglurmiut* (VanStone 1984:224). Based on Russian Orthodox Church records, Eskimo groups in the southern Iliamna Lake region and on the Newhalen and Kvichak rivers were considered to be *Kiatagmiut* (Dumond 1981). As was true of most of Bristol Bay communities, the way of life in Levelock was heavily impacted by the fur trade and the commercial salmon fishing industry. In 2005, Levelock residents and those of Igiugig on Lake Iliamna were often interrelated.

A village at the site of present-day Levelock existed in the early 1800s (CACD) the federal census first listed Levelock in 1890. In 1837, the village was decimated by smallpox. The village, as well as settlements on the Alagnak River, a tributary of the Kvichak River, was affected by several other epidemics in the early 1900s. The Alagnak River, commonly called the Branch River by area residents, was the location of semipermanent and seasonal camps built by people from other villages, and who later moved to Levelock. In 1915, Koggiung Packers began operating the nearby Libby, McNeil, & Libby fish cannery. In 1926, the cannery burned, and, in 1928, a second cannery began operation. The first school opened in Levelock in 1929. In 1935, reindeer were introduced from the Kuskokwim area. In 1939, the first post office in Levelock, which was referred to as "Kvichak," opened. A third cannery started operations around 1950. An 8 mile road was constructed along the Kvichak River in 1973 and the high school was built in 1978. A grocery store opened in the village in 1990, and a few other commercial businesses also began operations. As of 2006, the time of the activities for this project, the grocery store was no longer in operation.

DEMOGRAPHY, CASH EMPLOYMENT, AND MONETARY INCOME

DEMOGRAPHY

According to the federal census, Levelock had 122 residents in 2000 (U. S. Census Bureau 2000), of which 89% (109 residents) were Alaska Native (Table 1-1). The baseline household survey in 2005 resulted in a population estimate of 34 residents, of which 56% (19 residents) were Alaska Native (Table 1-1). This comparison suggests that the population had declined markedly since the 2000 census. Survey respondents generally noted that some households had left Levelock, and may have been living temporarily in another community. One possible explanation for a proportion of the difference between the population estimates for 2000 and 2005 is that some people counted in the federal census may have been seasonal residents of the community, such as teachers.

In 2005, there were an estimated 19 year-round households in Levelock (Table 1-5). Of these, 14 (74%) were interviewed. Interviewers attempted to contact all households. Five were unavailable or could not be contacted. None of the households that were contacted declined to be interviewed.

The mean length of residency in Levelock was 29 years, with the maximum residence at 77 years (Table 1-8). The largest age cohort for males was between the ages of 15 and 19 and for females between 40 and 44 years of age (Table 5-1 and Figure 5-1). About 28% of the population of Levelock was less than 20 years old.

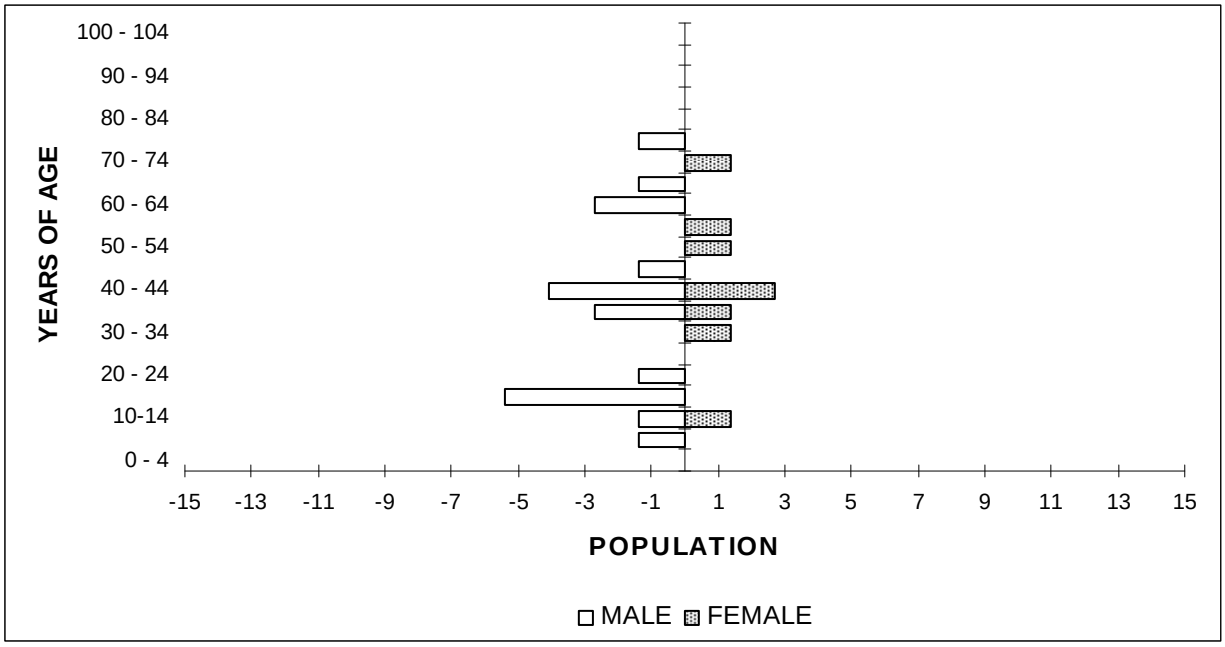

Figure 5-1.–Population profile, Levelock, 2005.

Source ADF&G Division of Subsistence household surveys, 2005.

Table 5-1.–Population profile, Levelock, 2005.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0 – 4	0.00	0.00%	0.00%	0.00	0.00%	0.00%	0.00	0.00%	0.00%
5 – 9	1.36	5.88%	5.88%	0.00	0.00%	0.00%	1.36	4.00%	4.00%
10 – 14	1.36	5.88%	11.76%	1.36	12.50%	12.50%	2.71	8.00%	12.00%
15 – 19	5.43	23.53%	35.29%	0.00	0.00%	12.50%	5.43	16.00%	28.00%
20 – 24	1.36	5.88%	41.18%	0.00	0.00%	12.50%	1.36	4.00%	32.00%
25 – 29	0.00	0.00%	41.18%	0.00	0.00%	12.50%	0.00	0.00%	32.00%
30 – 34	0.00	0.00%	41.18%	1.36	12.50%	25.00%	1.36	4.00%	36.00%
35 – 39	2.71	11.76%	52.94%	1.36	12.50%	37.50%	4.07	12.00%	48.00%
40 – 44	4.07	17.65%	70.59%	2.71	25.00%	62.50%	6.79	20.00%	68.00%
45 – 49	1.36	5.88%	76.47%	0.00	0.00%	62.50%	1.36	4.00%	72.00%
50 – 54	0.00	0.00%	76.47%	1.36	12.50%	75.00%	1.36	4.00%	76.00%
55 – 59	0.00	0.00%	76.47%	1.36	12.50%	87.50%	1.36	4.00%	80.00%
60 – 64	2.71	11.76%	88.24%	0.00	0.00%	87.50%	2.71	8.00%	88.00%
65 – 69	1.36	5.88%	94.12%	0.00	0.00%	87.50%	1.36	4.00%	92.00%
70 – 74	0.00	0.00%	94.12%	1.36	12.50%	100.00%	1.36	4.00%	96.00%
75 – 79	1.36	5.88%	100.00%	0.00	0.00%	100.00%	1.36	4.00%	100.00%
80 – 84	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
85 – 89	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
90 – 94	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
95 – 99	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
100 – 104	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
Missing	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
Total	**23.07**	**100.00%**		**10.86**	**100.00%**		**33.93**	**100.00%**	

Source ADF&G Division of Subsistence household surveys, 2005.

Of the household heads interviewed, all that responded (87% of all household heads) were born in the Bristol Bay area (Table 1-9). Sixty-nine percent were born in Levelock. In addition, 13% were born at Igiugig, 6% were born in Iliamna, and the birthplaces of the remaining household heads (13%) were not documented in the survey (Table 1-9).

CASH EMPLOYMENT CHARACTERISTICS AND MONETARY INCOME

Fifty-one percent of the earned income in Levelock in 2005 resulted from jobs with local governments (Table 5-2). Another key source of earned income was commercial fishing, with 27% of the annual total (Table 5-2). Local government and commercial fishing provided 31% of available jobs, state government accounted for 16%, and services 9% (Table 5-2). Other jobs were in mining; construction; transportation, communication, and utilities; and retail trade. Fifty percent of all jobs were located in Levelock, 13% in Egegik, 9% each in Naknek and Bristol Bay, 6% in Iliamna, and 3% each in Ekwok and King Salmon. The Bristol Bay and Egegik job locations were connected to commercial fishing activities and the Naknek job location was also most likely in the commercial fishing industry (Table 1-11).

Twenty-one percent of adults in Levelock were employed year-round (Table 1-10). However, 95% of adults were employed at some time during 2005. The mean number of months employed was 7.3. On average in 2005, households contained 1.4 employed adults and all (100%) households contained at least one adult who was employed at least some time during 2005.

Table 5-2–Employment by industry, Levelock, 2005.

	Jobs	Households	Individuals	Percentage of income
Estimated total number[a]	**43.4**	**16.3**	**24.4**	
Federal government	0.0%	0.0%	0.0%	0.0%
Natural scientists and mathematicians	0.0%	0.0%	0.0%	0.0%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
State government	15.6%	35.7%	27.8%	4.3%
Teachers, librarians, and counselors	3.1%	7.1%	5.6%	0.1%
Administrative support, including clerical service occupations	9.4%	21.4%	16.7%	1.9%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	3.1%	7.1%	5.6%	2.3%
Local government	31.3%	50.0%	50.0%	50.8%
Executive, administrative and managerial	9.4%	14.3%	11.1%	7.9%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Teachers, librarians, and counselors	3.1%	7.1%	5.6%	0.6%
Health diagnosing and treating practitioners	0.0%	0.0%	0.0%	0.0%
Registered nurses, pharmacists, dietitians, therapists and P.A.s	6.3%	14.3%	11.1%	29.5%
Health technologists and technicians	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Marketing and sales occupations	0.0%	0.0%	0.0%	0.0%
Administrative support occupations, including clerical	0.0%	0.0%	0.0%	0.0%
Service occupations	3.1%	7.1%	5.6%	4.9%
Agricultural, forestry and fishing occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	3.1%	7.1%	5.6%	0.2%
Construction and extractive occupations	0.0%	0.0%	0.0%	0.0%
Precision production occupations	6.3%	14.3%	11.1%	7.7%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Agriculture, forestry & fishing	31.3%	50.0%	50.0%	31.5%
Service occupations	0.0%	0.0%	0.0%	0.0%
Agricultural, forestry and fishing occupations	28.1%	50.0%	50.0%	27.2%
Precision production occupations	3.1%	7.1%	5.6%	4.3%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Mining	3.1%	7.1%	5.6%	3.2%
Service occupations	3.1%	7.1%	5.6%	3.2%
Construction and extractive occupations	0.0%	0.0%	0.0%	0.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Construction	3.1%	7.1%	5.6%	3.4%
Service occupations	7.1%	5.6%	3.4%	0.4%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	0.0%	0.0%	0.0%	6.7%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%

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Table 5-2. Page 2 of 2.

	Jobs	Households	Individuals	Percentage of income
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	3.1%
Manufacturing	0.0%	0.0%	0.0%	0.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Transportation, communication & utilities	3.1%	7.1%	5.6%	3.0%
Executive, administrative and managerial	3.1%	7.1%	5.6%	3.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Wholesale trade	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Retail trade	1.9%	2.9%	3.0%	3.9%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Marketing and sales occupations	0.0%	0.0%	0.0%	0.0%
Service occupations	1.9%	2.9%	3.0%	3.9%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Services	9.4%	21.4%	16.7%	2.1%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Natural scientists and mathematicians	0.0%	0.0%	0.0%	0.0%
Writers, artists, entertainers, and athletes	0.0%	0.0%	0.0%	0.0%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Health diagnosing and treating practitioners	0.0%	0.0%	0.0%	0.0%
Health technologists and technicians	1.9%	5.7%	3.0%	7.1%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	9.4%	21.4%	16.7%	2.1%
Agricultural, forestry and fishing occupations	1.9%	5.7%	3.0%	2.6%
Production working occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Miscellaneous occupations	1.0%	2.9%	1.5%	0.3%

a. Estimated number of households and individuals includes only those who were employed during the study period.

Source ADF&G Division of Subsistence household surveys, 2006.

LEVELS OF PARTICIPATION IN THE HARVESTS AND USES OF WILD RESOURCES

Table 1-13 reports levels of individual participation in the harvest and processing of wild resources by Levelock residents in 2005. Fifty-six percent hunted birds and large land mammals and 72% processed those harvests. Sixty-eight percent of the community fished and 84% processed fish. Twenty-eight percent trapped or hunted furbearers and 36% processed furbearing animals. Seventy-two percent picked berries and other wild plants and 72% were involved in the processing of wild plants. In total, about 80% of Levelock residents attempted to harvest wild resources and 84% processed resources in the 2005 study year.

RESOURCE HARVEST AND USE PATTERNS

Table 1-14 summarizes the resource harvest and use characteristics of Levelock in 2005. All community households used and harvested wild foods. The average harvest was 693 lb usable weight per household, or 527 lb per capita. During the study year, Levelock households harvested an average of 12 different kinds of resources and used an average of 17 kinds of resources. In addition, households gave away an average of 9 kinds of resources and received about 8 kinds.

Species Used and Seasonal Round

In Levelock in 2005, large land mammals were the most commonly harvested resource, accounting for 47% of the subsistence foods harvested by Levelock for the year (Figure 5-2). Moose harvests were 51%, caribou 48%, and black bears 1% of the total large land mammal harvest during the study year (Table 5-3). Caribou and moose were hunted mainly during the fall and winter.

The study year, which was the calendar year 2005, contained 2 state of Alaska hunting regulatory years: the 2004–2005 year, which ended June 30, 2005, and the 2005–2006 year, which began July 1, 2005. During those 2 regulatory years, the state regulations for Alaska residents hunting caribou in GMU 9B, where Levelock is located, remained the same. The open season for caribou was July 1–April 15. Five caribou per person could be harvested but only one bull was allowed to be taken during the July 1–November 30 time period. During the study year, the open season for Alaska residents hunting moose in GMU 9B fell within the 2005–2006 regulatory year, which, like caribou, also included 2 time periods: September 1–15 and December 15–January 15. There was a harvest limit of one bull per person taken in either of the seasons. Moose harvested in 2006 were not included in this study. For black bears, there was no closed season and 3 bears per person could be harvested.[8]

Salmon accounted for 29% of the total harvest of subsistence resources for Levelock in 2005 (Figure 5-2). Of the 5 salmon species, sockeye salmon was harvested in the largest quantities, at 57% of the total salmon harvest, followed by Chinook salmon with 28%, coho salmon at 13%, chum salmon at 2%, and pink salmon at less than 1% (Figure 5-3).

Traditionally, the peak of the sockeye salmon run for Bristol Bay occurred on July 4. Sockeye and Chinook salmon in 2005 were harvested on the Kvichak River adjacent to Levelock and downstream. Sockeye salmon were harvested at one location on the Alagnak River (or "Branch River," as it is known locally). Chum and pink salmon were caught on the Kvichak River near Levelock. Coho salmon were caught on the Kvichak River, Alagnak River, and on one tributary to the Kvichak River.

Late summer was the time to start picking berries, beginning with salmonberries at the end of July. Harvesting berries was a favorite activity in Levelock; 79% of the households reported using and harvesting berries (Table 5-3).

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[8] Due to the declining population of the Mulchatna caribou herd, the regulations for hunting caribou in GMU 9B for the 2006-2007 hunting season were changed so that they were similar to those for GMU 17 (see "Koliganek," above). The new caribou season extended from August 1–March 15 and 3 caribou could be harvested per person, only one of which could be a bull. See below for more details.

The Kvichak River and its tributaries support numerous freshwater fish species, which were harvested throughout the year. Humpback and broad whitefish were caught with nets mostly in the fall. Ice fishing was a major subsistence activity in the winter, with residents targeting northern pike and rainbow smelt. In 2005, 86% of Levelock households harvested non-salmon fishes, and the same percentage of households used non-salmon fishes (Table 5-3).

In 2005, after moose and caribou, sockeye salmon, Chinook salmon, and beluga whales, in that order, ranked the highest among subsistence foods in terms of usable pounds harvested at Levelock. (See Table 5-4 for a list of the top 10 resources harvested and used by Levelock residents.) During the study year, 93% of the households used moose and 43% hunted moose. All (100%) households used caribou and 71% hunted caribou (Table 5-3).

During the fall, while hunting moose, hunters harvested caribou if they were available along the local waterways. It was difficult to hunt caribou away from the river corridors in the fall unless they were close enough to access with ORVs (4-wheelers). Hunting resumed using snow machines or 4-wheelers during the winter when travel across the frozen and snow covered tundra was good.

Table 5-3.–Estimated harvests and uses of fish, game, and plant resources, Levelock, 2005.

	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
Resource name(s)	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
All resources	**100.0%**	**92.9%**	**92.9%**	**92.9%**	**85.7%**	**17,871.4**	**940.6**	**526.7**				**27.4%**
Fishes	92.9%	85.7%	85.7%	78.6%	64.3%	6,504.5	342.3	191.7				45.8%
Pacific salmon	92.9%	64.3%	64.3%	78.6%	35.7%	5,150.6	271.1	151.8	909.3	Ind	47.9	54.2%
Chum salmon	21.4%	21.4%	21.4%	0.0%	0.0%	114.0	6.0	3.4	21.7	Ind	1.1	74.5%
Coho salmon	64.3%	50.0%	50.0%	42.9%	21.4%	645.6	34.0	19.0	131.1	Ind	7.2	39.5%
Chinook salmon	50.0%	35.7%	35.7%	28.6%	21.4%	1,462.1	77.0	43.1	122.1	Ind	6.4	79.4%
Pink salmon	7.1%	7.1%	7.1%	0.0%	0.0%	13.7	0.7	.04	5.4	Ind	0.3	113.9%
Sockeye salmon	85.7%	57.1%	57.1%	57.1%	21.4%	2,915.3	153.4	85.9	622.9	Ind	32.8	52.9%
Fresh sockeye salmon	85.7%	57.1%	57.1%	57.1%	21.4%	2,915.3	153.4	85.9	622.9	Ind	32.8	52.9%
Spawning sockeye salmon	21.4%	0.0%	0.0%	21.4%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Landlocked salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Non-salmon fishes	85.7%	85.7%	85.7%	50.0%	57.1%	1,353.9	71.3	39.9				27.0%
Pacific herring	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring roe	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring sac roe	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring spawn on kelp	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Rainbow smelt	71.4%	64.3%	64.3%	21.4%	50.0%	402.4	21.2	11.9	67.1	Gal	3.5	31.1%
Cods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Pacific (gray) cod	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Walleye pollock (whiting)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown cods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Flounders	7.1%	7.1%	7.1%	0.0%	0.0%	24.4	1.3	0.7	8.1	Ind	0.4	113.9%

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Table 5-3. Page 2 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Non-salmon fishes, flounders, continued												
Unknown flounders	7.1%	7.1%	7.1%	0.0%	0.0%	24.4	1.3	0.7	8.1	Ind	0.4	113.9%
Greenlings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Lingcod	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown greenlings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Pacific halibut	35.7%	0.0%	0.0%	35.7%	7.1%	0.0	0.0	0.0	0.0	Lb	0.0	0.0%
Rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
“Black” rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
“Red” rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sablefish (black cod)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sculpins	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Slimy sculpin (bullhead)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sharks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown sharks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Soles	7.1%	7.1%	7.1%	0.0%	0.0%	8.1	0.4	0.2	8.1	Ind	0.4	113.9%
Unknown soles	7.1%	7.1%	7.1%	0.0%	0.0%	8.1	0.4	0.2	8.1	Ind	0.4	113.9%
Threespine stickleback (needlefish)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Wolffish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Alaska blackfish	25.0%	25.0%	16.7%	8.3%	0.0%	2.7	0.2	0.1	37.9	Ind	2.9	54.4%
Burbot	16.7%	16.7%	16.7%	8.3%	8.3%	18.4	1.4	0.4	18.4	Ind	1.4	55.9%

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Table 5-3. Page 3 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Chars	21.4%	14.3%	14.3%	7.1%	14.3%	11.4	0.6	0.3	8.1	Ind	0.4	82.2%
Arctic char–resident and anadromous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Dolly Varden	7.1%	7.1%	7.1%	0.0%	7.1%	7.6	0.4	0.2	5.4	Ind	0.3	113.9%
Dolly Varden–anadromous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Dolly Varden–resident												
Lake trout	14.3%	7.1%	7.1%	7.1%	7.1%	3.8	0.2	0.1	2.7	Ind	0.1	113.9%
Arctic grayling	21.4%	21.4%	21.4%	7.1%	14.3%	32.3	1.7	1.0	46.1	Ind	2.4	83.9%
Northern pike	78.6%	71.4%	71.4%	28.6%	42.9%	471.2	24.8	13.9	168.3	Ind	8.9	44.3%
Sturgeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown sturgeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Longnose sucker	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Trout	64.3%	71.4%	64.3%	14.3%	21.4%	129.2	6.8	3.8	92.3	Ind	4.9	50.8%
Rainbow trout–resident	50.0%	57.1%	50.0%	0.0%	14.3%	115.9	6.1	3.4	82.8	Ind	4.4	57.8%
Steelhead trout–anadromous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown trout	14.3%	14.3%	14.3%	14.3%	7.1%	13.3	0.7	0.4	9.5	Ind	0.5	85.2%
Whitefishes	35.7%	28.6%	28.6%	14.3%	28.6%	274.8	14.5	8.1	122.1	Ind	6.4	54.4%
Broad whitefish	7.1%	7.1%	7.1%	0.0%	7.1%	108.6	5.7	3.2	27.1	Ind	1.4	113.9%
Ciscos	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Least cisco	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Humpback whitefish	28.6%	21.4%	21.4%	14.3%	21.4%	166.3	8.8	4.9	95.0	Ind	5.0	62.0%
Round whitefish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 5-3. Page 4 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Land mammals	100.0%	78.6%	71.4%	78.6%	64.3%	8,733.2	459.6	257.4				41.5%
Large land mammals	100.0%	71.4%	64.3%	78.6%	64.3%	8,547.3	449.9	251.9				42.0%
Black bear	14.3%	7.1%	7.1%	7.1%	7.1%	78.7	4.1	2.3	1.4	Ind	0.1	113.9%
Brown bear	0.0%	7.1%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Caribou	100.0%	71.4%	64.3%	64.3%	57.1%	4,071.4	214.3	120.0	27.1	Ind	1.4	33.1%
Moose	92.9%	42.9%	28.6%	78.6%	42.9%	4,397.1	231.4	129.6	8.1	Ind	0.4	53.7%
Dall sheep	7.1%	7.1%	0.0%	7.1%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Small land mammals/furbearers	57.1%	50.0%	50.0%	14.3%	42.9%	185.9	9.8	5.5				55.1%
Beaver	35.7%	21.4%	21.4%	14.3%	21.4%	142.5	7.5	4.2	16.3	Ind	0.9	70.8%
Coyote	7.1%	7.1%	7.1%	0.0%	0.0%	0.0	0.0	0.0	2.7	Ind	0.1	113.9%
Foxes	21.4%	21.4%	21.4%	0.0%	7.1%	0.0	0.0	0.0	25.8	Ind	1.4	77.5%
Red fox	21.4%	21.4%	21.4%	0.0%	7.1%	0.0	0.0	0.0	25.8	Ind	1.4	77.5%
Hares	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Snowshoe hare	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
River (land) otter	7.1%	7.1%	7.1%	0.0%	7.1%	0.0	0.0	0.0	9.5	Ind	0.5	113.9%
Lynx	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Alaska marmot	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Marten	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Mink	7.1%	7.1%	7.1%	0.0%	0.0%	0.0	0.0	0.0	1.4	Ind	0.1	113.9%
Muskrat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Porcupine	35.7%	28.6%	28.6%	14.3%	28.6%	43.4	2.3	1.3	5.4	Ind	0.3	49.9%
Squirrels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Arctic ground (parka) squirrel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Red (tree) squirrel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 5-3. Page 5 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Small land mammals/furbearers, continued												
Short-tailed weasel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Gray wolf	14.3%	14.3%	14.3%	0.0%	7.1%	0.0	0.0	0.0	5.4	Ind	0.3	77.4%
Wolverine	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Marine mammals	50.0%	21.4%	14.3%	42.9%	28.6%	1,279.8	67.4	37.7				100.2%
Seals	35.7%	7.1%	7.1%	21.4%	21.4%	152.0	8.0	4.5	2.7	Ind	0.1	113.9%
Bearded seal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Harbor seal – fresh water	35.7%	7.1%	7.1%	21.4%	21.4%	152.0	8.0	4.5	2.7	Ind	0.1	113.9%
Harbor seal– salt water	28.6%	7.1%	7.1%	14.3%	21.4%	152.0	8.0	4.5	2.7	Ind	0.1	113.9%
Ringed seal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sea otter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Steller sea lion	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Whales	42.9%	14.3%	7.1%	35.7%	14.3%	1,127.8	59.4	33.2	1.4	Ind	0.1	113.9%
Beluga whale	42.9%	14.3%	7.1%	35.7%	14.3%	1,127.8	59.4	33.2	1.4	Ind	0.1	113.9%
Birds and eggs	85.7%	71.4%	64.3%	64.3%	64.3%	498.9	26.3	14.7				35.2%
Migratory birds	71.4%	57.1%	42.9%	42.9%	50.0%	183.6	9.7	5.4	146.6	Ind	7.7	41.4%
Ducks	64.3%	57.1%	42.9%	35.7%	50.0%	101.8	5.4	3.0	109.9	Ind	5.8	40.7%
Bufflehead	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Goldeneyes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown goldeneyes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Mallard	57.1%	57.1%	42.9%	28.6%	42.9%	69.2	3.6	2.0	69.2	Ind	3.6	49.2%
Northern pintail	35.7%	42.9%	28.6%	7.1%	28.6%	32.6	1.7	1.0	40.7	Ind	2.1	51.6%
Northern shoveler	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Wigeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 5-3. Page 6 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Migratory birds, ducks, continued												
American wigeon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown ducks	7.1%	0.0%	0.0%	7.1%	7.1%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Geese	71.4%	57.1%	42.9%	42.9%	35.7%	73.7	3.9	2.2	35.3	Ind	1.9	44.0%
Canada geese	28.6%	14.3%	14.3%	21.4%	14.3%	15.1	0.8	0.4	10.9	Ind	0.6	81.2%
Dusky Canada geese	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Lesser Canada geese[b]	21.4%	7.1%	7.1%	21.4%	7.1%	9.8	0.5	0.3	8.1	Ind	0.4	113.9%
Unknown Canada geese	7.1%	7.1%	7.1%	0.0%	7.1%	5.3	0.3	0.2	2.7	Ind	0.1	113.9%
Snow goose	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
White-fronted geese	42.9%	50.0%	35.7%	21.4%	35.7%	55.4	2.9	1.6	23.1	Ind	1.2	44.2%
Unknown geese	14.3%	7.1%	7.1%	7.1%	0.0%	3.3	0.2	0.1	1.4	Ind	0.1	113.9%
Swans	7.1%	7.1%	7.1%	0.0%	0.0%	8.1	0.4	0.2	1.4	Ind	0.1	113.9%
Tundra (whistling) swan	7.1%	7.1%	7.1%	0.0%	0.0%	8.1	0.4	0.2	1.4	Ind	0.1	113.9%
Cranes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sandhill crane	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Seabirds and loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Other birds	50.0%	42.9%	42.9%	28.6%	35.7%	79.8	4.2	2.4	114.0	Ind	6.0	57.2%
Upland game birds	50.0%	42.9%	42.9%	28.6%	35.7%	79.8	4.2	2.4	114.0	Ind	6.0	57.2%
Unknown grouse	35.7%	35.7%	35.7%	21.4%	28.6%	42.8	2.3	1.3	61.1	Ind	3.2	49.3%
Ptarmigan	42.9%	28.6%	28.6%	14.3%	21.4%	37.1	2.0	1.1	52.9	Ind	2.8	75.7%
Unknown ptarmigan	42.9%	28.6%	28.6%	14.3%	21.4%	37.1	2.0	1.1	52.9	Ind	2.8	75.7%

-continued-

Table 5-3. Page 7 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Birds, continued												
Bird eggs	71.4%	64.3%	57.1%	50.0%	50.0%	235.5	12.4	6.9				48.1%
Duck eggs	28.6%	21.4%	21.4%	14.3%	21.4%	13.2	0.7	0.4	88.2	Gal	4.6	73.2%
Unknown duck eggs	28.6%	21.4%	21.4%	14.3%	21.4%	13.2	0.7	0.4	88.2	Gal	4.6	73.2%
Goose eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown goose eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Seabird and eggs	71.4%	64.3%	57.1%	50.0%	50.0%	222.2	11.7	6.6	817.0	Gal	43.0	48.5%
Gull eggs	71.4%	64.3%	57.1%	50.0%	50.0%	217.8	11.5	6.4	728.8	Gal	38.4	48.9%
Tern eggs	42.9%	35.7%	28.6%	21.4%	42.9%	4.4	0.2	0.1	88.2	Gal	4.6	58.4%
Unknown eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Marine invertebrates	28.6%	14.3%	14.3%	14.3%	14.3%	97.7	5.1	2.9				80.1%
Clams	21.4%	14.3%	14.3%	7.1%	14.3%	97.7	5.1	2.9	32.6	Gal	1.7	80.1%
Butter clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Freshwater clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Horse clam (gapers)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pacific littleneck (steamer) clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pinkneck (surf) clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pacific razor clam	7.1%	7.1%	7.1%	0.0%	0.0%	16.3	0.9	0.5	5.4	Gal	0.3	113.9%
Unknown clams	21.4%	14.3%	14.3%	7.1%	14.3%	81.4	4.3	2.4	27.1	Gal	1.4	87.9%
Cockles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown cockles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Crabs	14.3%	0.0%	0.0%	14.3%	7.1%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Dungeness crab	7.1%	0.0%	0.0%	7.1%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
King crabs	7.1%	0.0%	0.0%	7.1%	7.1%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

-continued-

Table 5-3. Page 8 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Marine invertebrates, king crabs, continued												
Unknown king crabs	7.1%	0.0%	0.0%	7.1%	7.1%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Tanner crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Tanner crab, Bairdi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown tanner crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Octopus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Scallops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown scallops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Shrimps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Plants and fungi	92.9%	92.9%	92.9%	28.6%	71.4%	757.3	39.9	22.3				27.7%
Berries	78.6%	78.6%	78.6%	21.4%	64.3%	627.0	33.0	18.5	156.8	Gal	8.3	28.9%
Other plants / mushrooms	35.7%	35.7%	35.7%	7.1%	28.6%	130.3	6.9	3.8	32.6	Gal	1.7	58.8%
Trees (wood)	64.3%	71.4%	64.3%	7.1%	28.6%	0.0	0.0	0.0	36.6	Crd	1.9	30.0%

Note Differences between harvest and use percentages reflect sharing between households.

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

b. Both *B. canadensis taverner* and *B. canadensis parvipes.*

Source ADF&G Division of Subsistence household surveys, 2005.

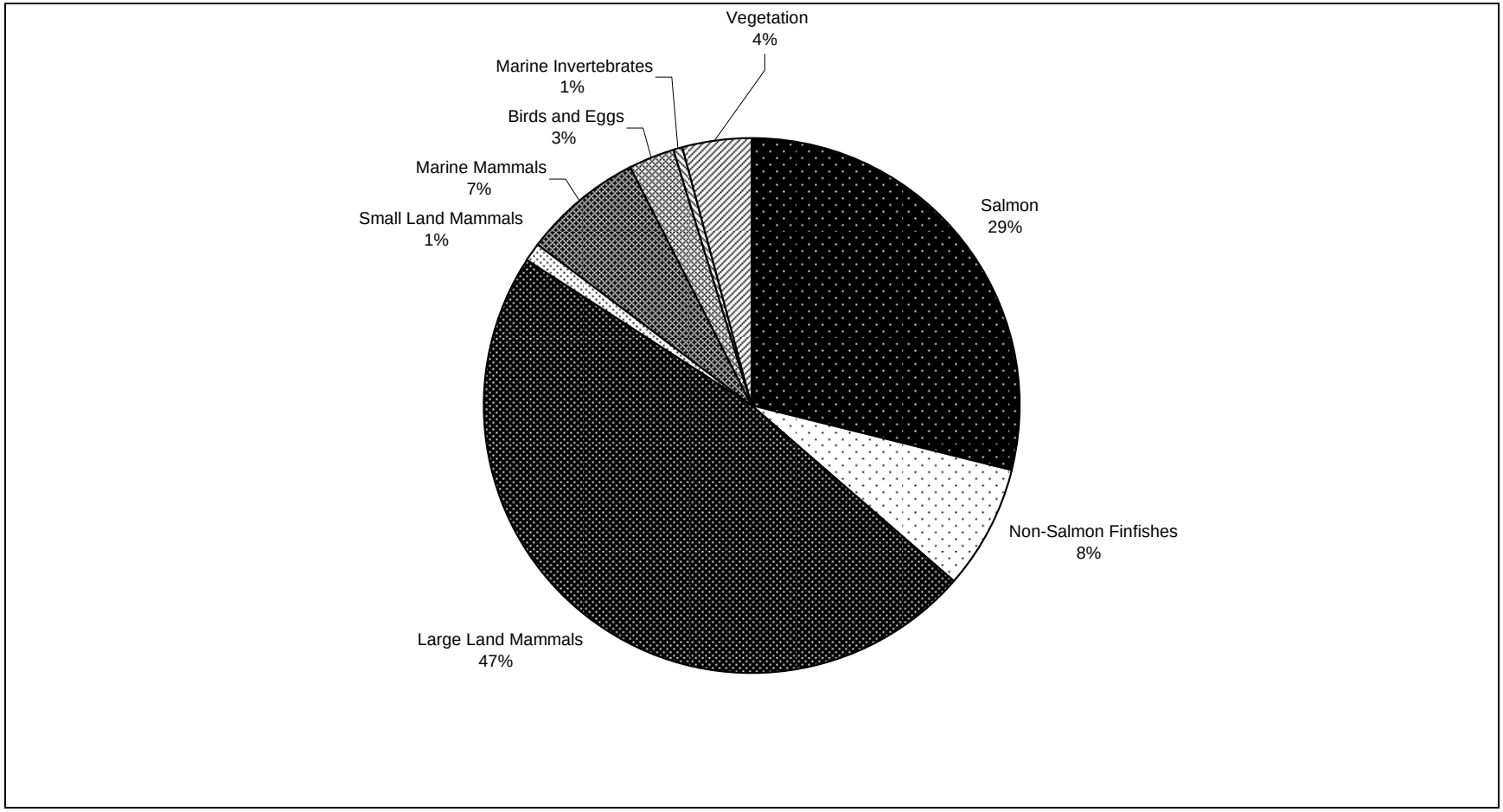

Figure 5-2.–Levelock composition of wild resource harvests, pounds usable weight, 2005.

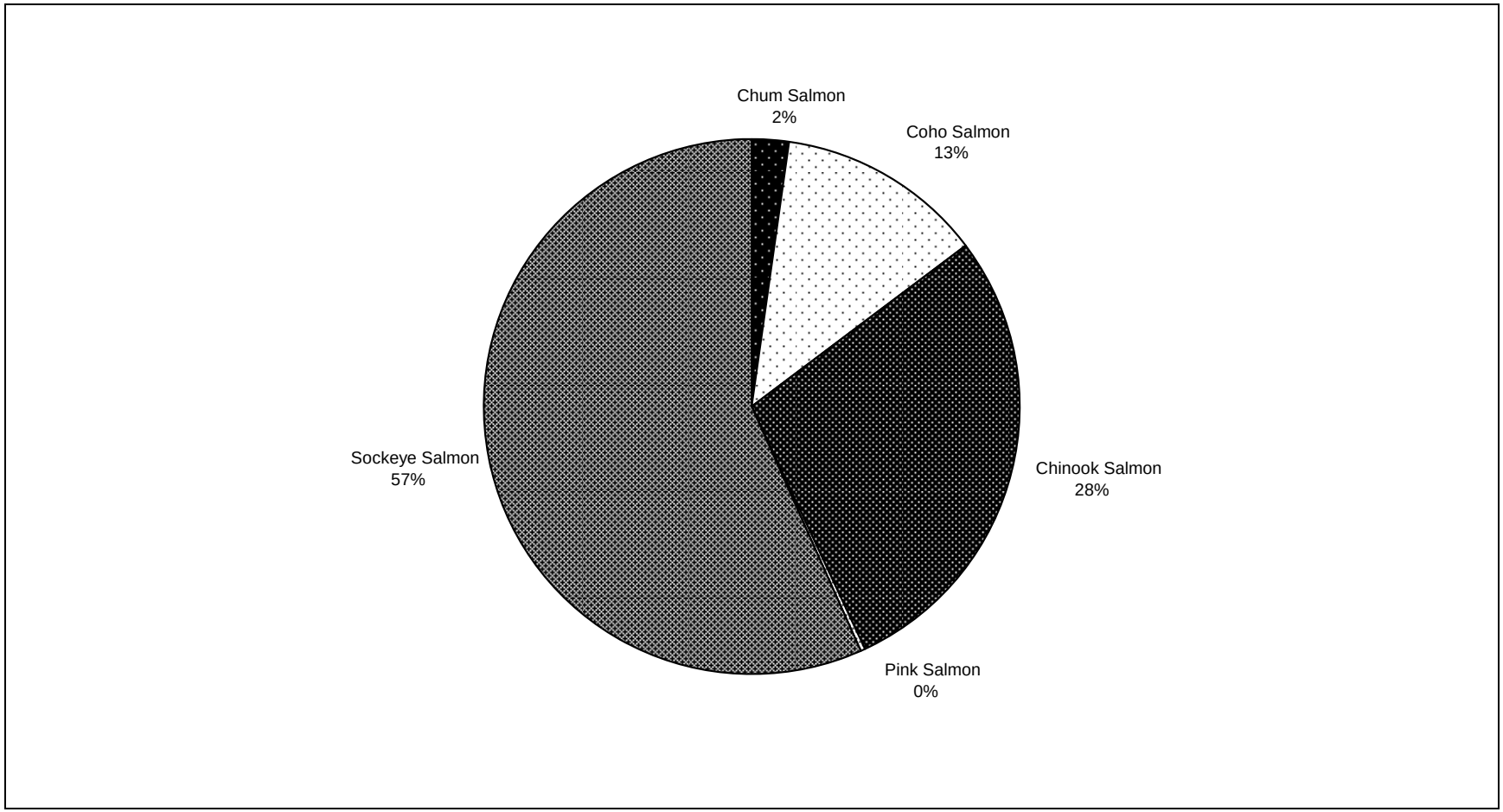

Figure 5-3.–Levelock composition of salmon harvests, pounds usable weight, 2005.

The population of the Mulchatna caribou herd dropped from a high in 1996 of about 200,000 animals in 1996 to a population in 2006 of about 45,000 animals. For the 2004–2005 regulatory year the population of the Mulchatna caribou herd was estimated to be at about 85,000 animals (Woolington 2007:27). At its peak population, the range of the herd was greatly expanded into areas that were not used in historic times. In recent years caribou were near Levelock in late winter where they could be accessed from the community.[9]

Migratory birds traveled through the Kvichak River area in the fall and spring and were extensively hunted by the residents of Levelock along the Kvichak and Branch rivers. The land area west and north of Levelock was also used to hunt migratory birds while numerous islands in Iliamna Lake are used to harvest eggs. In 2005, 71% of Levelock households used migratory birds, with 57% of households hunting them. Seventy-one percent of residents reported using eggs and 57% reported harvesting bird eggs. Fifty percent of all households reported sharing and receiving eggs (Table 5-3).

Harvest Quantities

Table 5-3 reports wild resource harvests and uses by Levelock residents in 2005, and is organized by category and species. All resources are reported in pounds usable weight. (See Appendix C for conversion factors.) The "harvest" category includes resources taken by any member of the surveyed household during the study year. The "use" category includes all resources taken and given away by a household, and resources acquired after a harvest, either as gifts, by trade, through hunting partnerships, or meat given to hunting guides by their clients. Purchased foods are not included. Differences between harvest and use percentages reflect sharing between households, which resulted in a wider distribution of wild foods.

The total harvest for all subsistence resources in 2005 for Levelock was 17,871 lb or 527 lb per person (Table 5-3). Table 5-4 lists the top 10 resources harvested, in terms of pounds per capita, and the 10 resources used by the most Levelock households. Large land mammals constituted the largest portion of the harvest with 8,547 lb (47%, or 252 lb per person) (Table 5-3 and Figure 5-2). In 2005, 100% of Levelock households used large land mammals and 64% harvested large land mammals. Large land mammal harvests included 4,397 lb of moose, or 130 lb per person; 4,071 lb of caribou, or 120 lb per person; and 79 lb of black bears, or 2 lb per person (Table 5-3).

The salmon harvest totaled 5,151 lb or 29% of the total harvest and 152 lb per person (Table 5-3 and Figure 5-2). The salmon harvest included fresh sockeye salmon with 2,915 lb, or 86 lb per person; 1,462 lb of Chinook salmon, or 43 lb per person; 646 lb of coho salmon, or 19 lb per person; 114 lb of chum salmon, or over 3 lb person; and 14 lb of pink salmon, or <1 lb per person.

Non-salmon fishes were also an important resource, making up 8% of the total harvest of wild resources (Table 5-3 and Figure 5-2). In 2005 Levelock residents harvested 1,354 lb of non-salmon fishes or 40 lb per person. Figure 5-4 shows the harvest of non-salmon fishes by

[9] At the start of the caribou season in 2006, the bag limit for caribou in this area was reduced from 5 to 3 caribou. The season had previously closed on April 15, but in 2006 the closure date was changed to March 15. Subsequent actions taken by the Alaska Board of Game in March 2007 reduced the bag limit to 2 caribou and eliminated the provision that allowed hunting the same day as aircraft travel ("same-day airborne") in GMU 9B (Levelock), as well as GMUs 17B and 17C east of the Nushagak River.

percentage of total pounds in Levelock in 2005. The major species harvested included northern pike (471 lb, or 14 lb per person) at 37% of the harvest of all non-salmon fishes, smelt (402 lb, or 12 lb per person) at 31%, humpback whitefish (166 lb, or 5 lb per person) at 13%, rainbow trout (116 lb, or 3 lb per person) at 9%, broad whitefish (109 lb, or 3 lb per person) at 8%, and Arctic grayling at 2% (32 lb, or 1 lb per person). A small amount (<1 lb per person) of flounder, sole, Dolly Varden, lake trout, and trout not identified during the survey were also harvested (Table 5-3).

Marine mammals (Table 5-3) were another source of wild foods at Levelock in 2005, with 1,280 lb harvested, or 38 lb per person. Eighty-eight percent of this was beluga whale (1,128 lb, or 33 lb per person). Twelve percent of usable marine mammal meat by weight was saltwater harbor seal at 12% (152 lb, or 5 lb per person).

Beaver and porcupine were important small land mammal resources (Table 5-3). In 2005, Levelock residents harvested 143 lb of beaver, or 4 lb per person, and 43 lb of porcupine, or 1+ lb per person.

In addition, harvests of waterfowl by residents of Levelock in 2005 included 102 lb of ducks, or 3 lb per person, and 74 lb of geese, or 2 lb per person (Table 5-3). Spruce grouse (43 lb) and ptarmigan (37 lb) were also harvested. Berries were an important resource with a harvest of 627 lb, or almost 19 lb person. Other plants and greens accounted for a harvest of 130 lb, or 4 lb per person in 2005.

Table 5-4.–Top 10 resources harvested and used, Levelock, 2005.

Harvest			Use		
Rank	Resource	Pounds per capita	Rank	Resource	Percentage of households using
1	Moose	129.6	1	Caribou	100.0%
2	Caribou	120.0	2	Moose	92.9%
3	Fresh sockeye salmon	85.9	3	Fresh sockeye salmon	85.7%
4	Chinook salmon	43.1	4	Northern pike	78.6%
5	Beluga whales	33.2	4	Berries	78.6%
6	Coho salmon	19.0	6	Rainbow smelt	71.4%
7	Berries	18.5	6	Gull eggs	71.4%
8	Northern pike	13.9	8	Coho salmon	64.3%
9	Rainbow smelt	11.9	8	Mallard	57.1%
10	Gull eggs	6.4	10	Chinook salmon	50.0%
			10	Rainbow trout	50.0%

Source ADF&G Division of Subsistence household surveys, 2005.

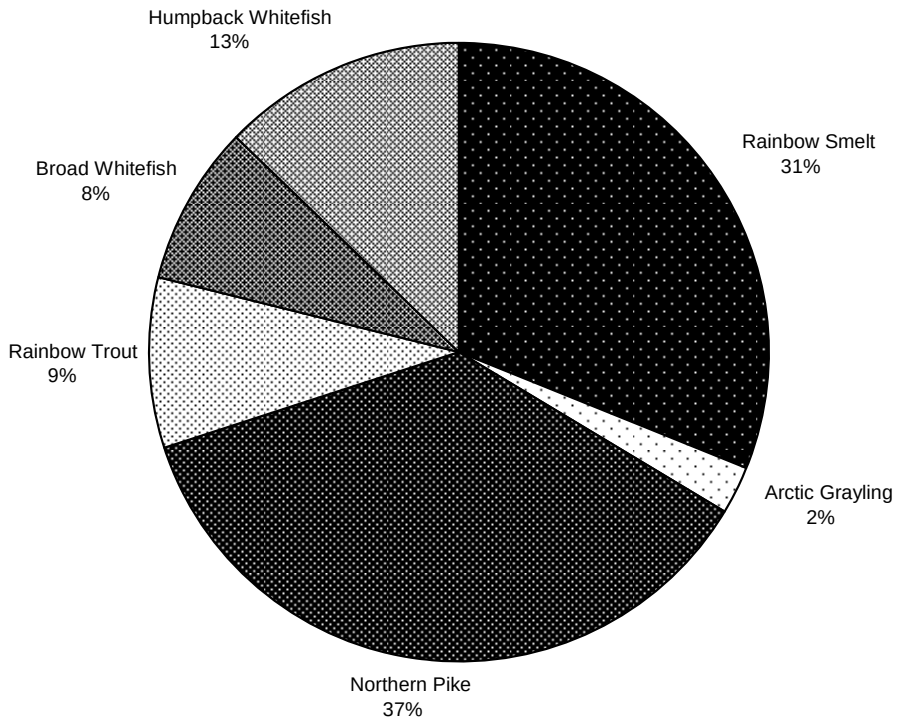

Figure 5-4.–Levelock composition of freshwater fish harvests, pounds usable weight, 2005.

General Hunting, Fishing, and Gathering Areas

Levelock residents' wild resource harvests in 2005 were focused along the entire length of the Kvichak River.[10] The lower end of the Kvichak River downstream from Levelock, and the east side of Kvichak Bay to the mouth of the Naknek River were used for migratory bird and marine mammal harvests (Figure 5-5). The Branch River, Kaskanak, Yellow,[11] and Bear creeks, and their adjacent land areas, were important resource harvest areas, especially for hunting small land mammals, caribou, and moose (Figure 5-6). A large area between Kaskanak and Ben Courtny creeks, along the western edge of Iliamna Lake, and a southern land area adjacent to Iliamna Lake, extending towards Igiugig, were also important resource harvest areas in 2005. Numerous islands on the western half of Iliamna Lake were accessed for egg gathering in 2005 (Figure 5-7).

Salmon harvest locations are described above. Non-salmon fish harvest areas were focused on the Kvichak and Branch rivers and Kaskanak and Pecks creeks, as demonstrated by the harvests of northern pike, an important non-salmon fish species (Figure 5-8). Additionally, the waterways noted above were important for access to migratory bird hunting areas and other resources; including berries, other plants, and firewood (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report, for harvest maps).

SHARING AND RECEIVING WILD RESOURCES

In Levelock in 2005, 93% of households received wild resources from other households and 86% of households gave resources away (Tables 1-14 and 5-3). Households received an average of 8 resources and gave away an average of 9 resources (Table 1-14). Large land mammals, used by 100% of the households, were widely shared, with 64% of the households giving to other households and 79% receiving large land mammals (Table 5-3). Fish were used by 93% of the households and they were shared at the same rate as large land mammals, with 79% receiving and 64% giving fish (Table 5-3).

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[10] For the complete set of maps of Levelock residents' hunting, fishing, and gathering areas in 2005, see Appendix D, "Harvest Use Area Maps by Community" (published in hard copy on a CD-ROM attached to the back cover of this report).

[11] Yellow Creek is mislabeled on the USGS maps. The correct location is presented on the maps in Appendix D, "Harvest Use Area Maps by Community" (published in hard copy on a CD-ROM attached to the back cover of this report).

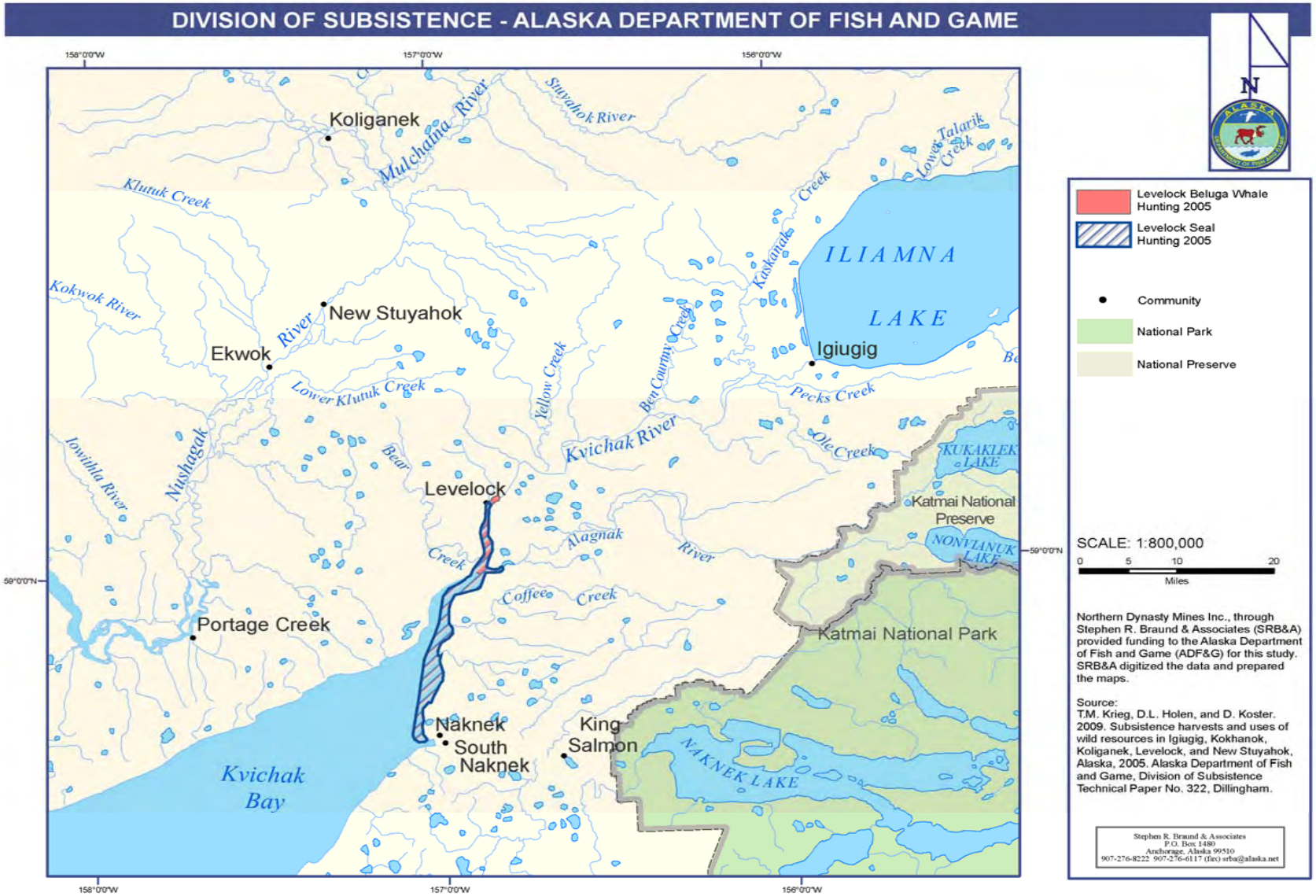

Figure 5-5.–Beluga whale and seal hunting locations, Levelock, 2005.

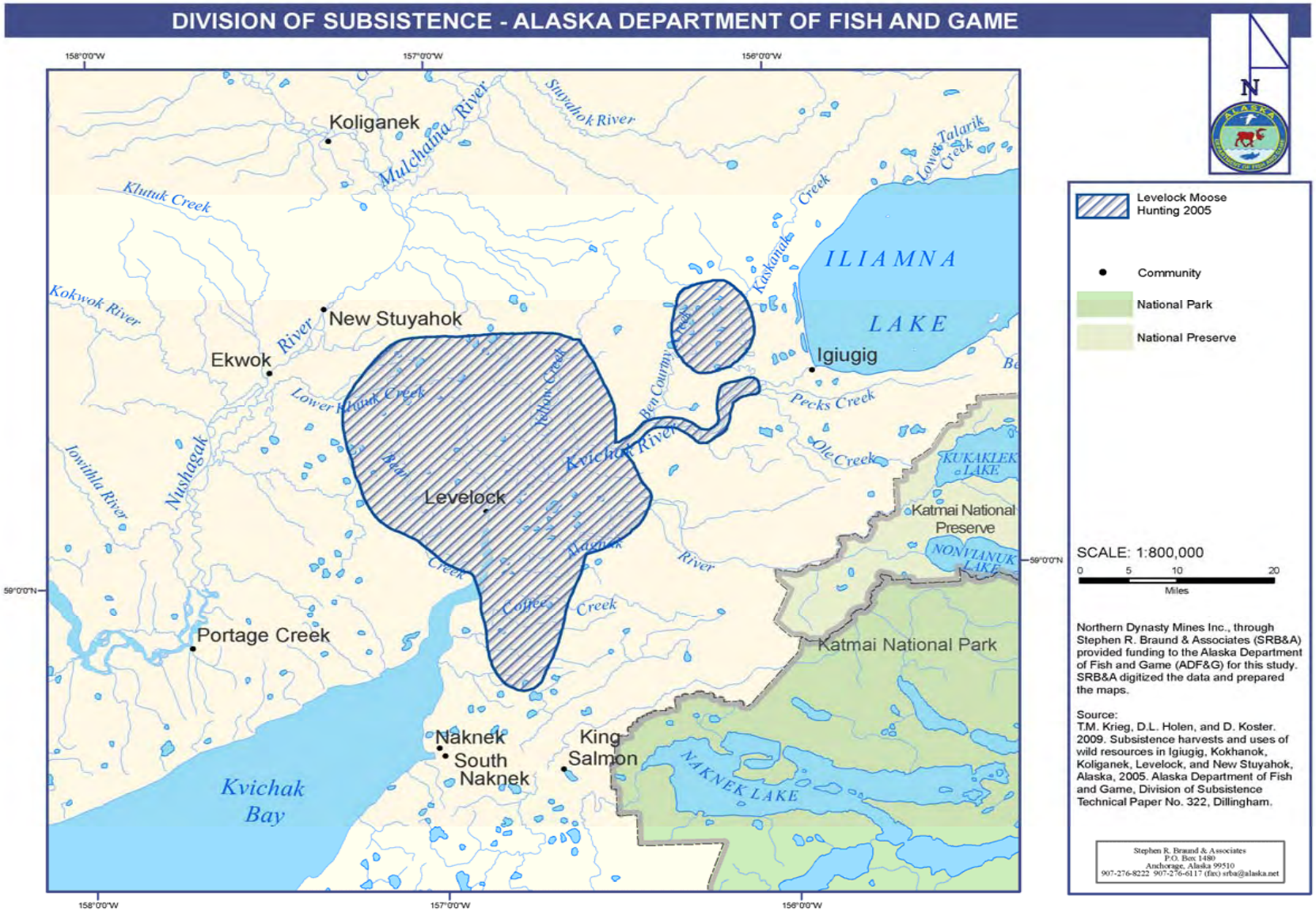

Figure 5-6.–Moose hunting locations, Levelock, 2005.

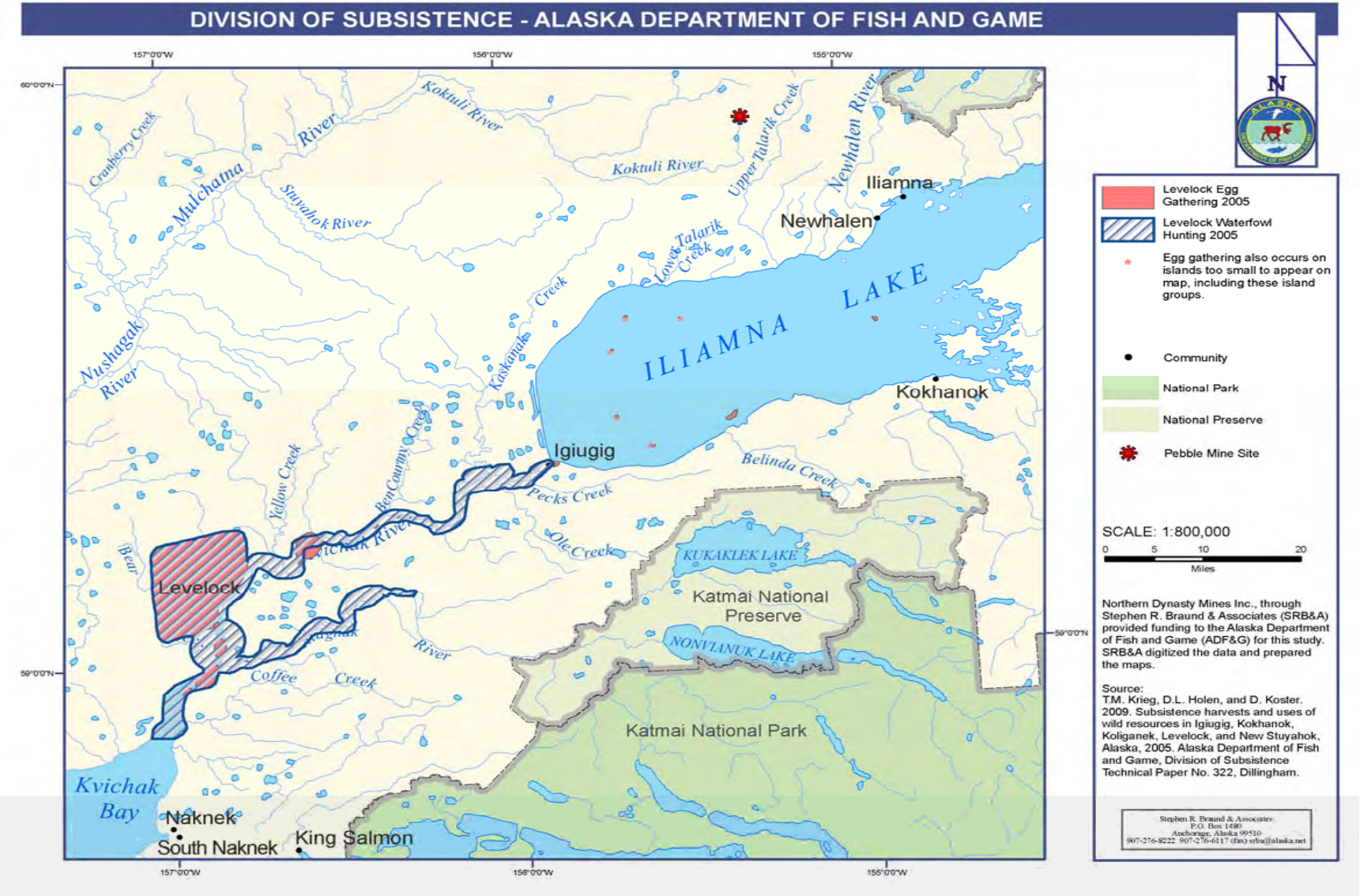

Figure 5-7.–Egg gathering and waterfowl hunting locations, Levelock, 2005.

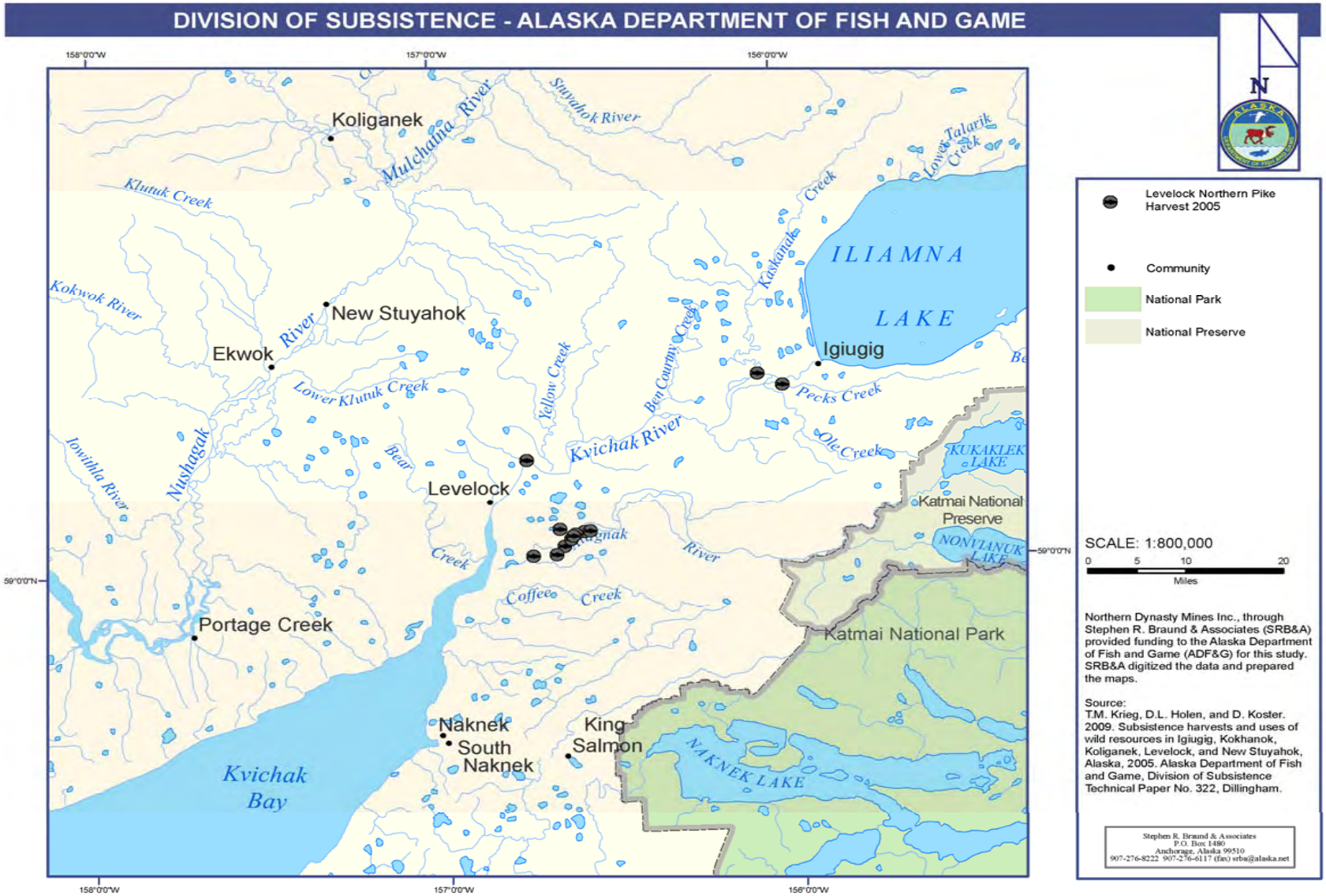

Figure 5-8.–Northern pike harvest locations, Levelock, 2005.

Marine mammals, specifically beluga whales and saltwater harbor seals, were harvested by Levelock households in 2005. Fifty percent of the households reported using marine mammals, with 29% giving and 43% receiving marine mammals from other households. Beluga whale was used by 43% of the households, with 14% of the households giving and 36% receiving beluga whales from other households. Seals were used by 36% of the households with 21% giving and receiving seals (Table 5-3).

Eighty-six percent of households used birds and eggs and 64% received and gave birds and eggs to other households. Fifty percent of the Levelock households gave and received bird eggs, 50% gave migratory birds, and 43% received them. For wild plants, including berries, 71% of the households gave them to other households and 29% received them. For plants other than berries, 64% of the households gave and 21% received them (Table 5-3).

USE AND HARVEST CHARACTERISTICS BY RESOURCE CATEGORY

SALMON

In 2005, Koliganek residents harvested 78% of their total salmon harvest for home use with setnets (Table 5-5). This gear was used for sockeye salmon (83%, the primary salmon resource), Chinook salmon (70%), all chum and pink salmon, and more than one-half of coho salmon. A fair amount (17% of all salmon harvested) was removed from commercial catches, including 30% of Chinook salmon, 17% of sockeye salmon, and 10% of coho salmon. Twenty-one percent of households removed sockeye salmon from their commercial catch (Tables 1-15 and 5-5). One-third of coho salmon harvests were obtained with rod and reel, and this was the only use of rod and reel for salmon.

NON-SALMON FINFISHES

Levelock residents usually caught fishes other than salmon by ice fishing (Table 5-6). All rainbow smelt and Dolly Varden were obtained while ice fishing, as was the majority of northern pike (86%, the most prominent non-salmon fish resource), 72% of the unknown trout, 27% of Arctic grayling, and 5% of the rainbow trout. Of all non-salmon fishes, 62% were caught while ice fishing (Table 5-6).

All broad whitefish were taken with setnets. Catches of humpback whitefish were also taken mainly (71%) with setnets and the remainder with seines (Table 5-5). All lake trout were caught in setnets while fishing for other species. The use of rod and reel was most prominent for rainbow trout and Arctic grayling (95% and 74% of harvests, respectively). In 2005, harvest locations for non-salmon fishes were focused along the Kvichak and Branch rivers and Kaskanak and Pecks creeks (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

LARGE LAND MAMMALS

In 2005, large land mammals made up 47% of the total harvest in pounds for Levelock (Figure 5-2). Seventy-one percent of households attempted to harvest caribou and 64% were successful. Forty-three percent of households attempted to harvest moose and 29% were successful. Seven percent of households attempted to harvest black bears and they all were successful.

Table 5-5.–Estimated percentages of salmon harvest by gear type, resource, and total salmon harvest, Levelock, 2005.

				Subsistence methods											
	Percentage	Removed from commercial catch[a]		Setnet		Seine		Other		Subsistence gear; any method		Rod and reel		Any method	
Resource	base	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	Gear type	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Resource	17.0%	19.1%	78.1%	76.2%	0.0%	0.0%	0.0%	0.0%	78.1%	76.2%	4.9%	4.7%	100.0%	100.0%
	Total	17.0%	19.1%	78.1%	76.2%	0.0%	0.0%	0.0%	0.0%	78.1%	76.2%	4.9%	4.7%	100.0%	100.0%
Chum salmon	Gear type	0.0%	0.0%	3.1%	2.9%	0.0%	0.0%	0.0%	0.0%	3.1%	2.9%	0.0%	0.0%	2.4%	2.2%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	2.4%	2.2%	0.0%	0.0%	0.0%	0.0%	2.4%	2.2%	0.0%	0.0%	2.4%	2.2%
Coho salmon	Gear type	8.8%	7.5%	11.1%	10.9%	0.0%	0.0%	0.0%	0.0%	11.1%	10.9%	100.0%	100.0%	15.1%	14.4%
	Resource	9.9%	9.9%	57.4%	57.4%	0.0%	0.0%	0.0%	0.0%	57.4%	57.4%	32.7%	32.7%	100.0%	100.0%
	Total	1.5%	1.4%	8.7%	8.3%	0.0%	0.0%	0.0%	0.0%	8.7%	8.3%	4.9%	4.7%	15.1%	14.4%
Chinook salmon	Gear type	23.7%	44.0%	12.0%	25.7%	0.0%	0.0%	0.0%	0.0%	12.0%	25.7%	0.0%	0.0%	13.4%	27.9%
	Resource	30.0%	30.0%	70.0%	70.0%	0.0%	0.0%	0.0%	0.0%	70.0%	70.0%	0.0%	0.0%	100.0%	100.0%
	Total	4.0%	8.4%	9.4%	19.6%	0.0%	0.0%	0.0%	0.0%	9.4%	19.6%	0.0%	0.0%	13.4%	27.9%
Pink salmon	Gear type	0.0%	0.0%	0.8%	0.4%	0.0%	0.0%	0.0%	0.0%	0.8%	0.4%	0.0%	0.0%	0.6%	0.3%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.6%	0.3%	0.0%	0.0%	0.0%	0.0%	0.6%	0.3%	0.0%	0.0%	0.6%	0.3%
Sockeye salmon	Gear type	67.5%	48.5%	73.0%	60.2%	0.0%	0.0%	0.0%	0.0%	73.0%	60.2%	0.0%	0.0%	68.5%	55.1%
	Resource	16.8%	16.8%	83.2%	83.2%	0.0%	0.0%	0.0%	0.0%	83.2%	83.2%	0.0%	0.0%	100.0%	100.0%
	Total	11.5%	9.2%	57.0%	45.9%	0.0%	0.0%	0.0%	0.0%	57.0%	45.9%	0.0%	0.0%	68.5%	55.1%
Landlocked salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spawning sockeye	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unknown salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2005.

a. Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

Moose were 51% (8) of the large land mammal harvest, caribou were 48% (27), and black bears (1) accounted for 1% in terms of usable weight (Table 5-3). The large land mammal hunting area fell within the Levelock use area described above (see also Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

SMALL LAND MAMMALS/FURBEARERS

The total harvest of edible meat from small land mammals by Levelock residents in 2005 was 186 lb, or almost 6 lb per person; all of this was from beavers (143 lb) and porcupines (43 lb) (Table 5-3). Additionally, 21% of the households harvested red foxes, 14% harvested wolves, and 7% each harvested coyotes, river (land) otters, and minks. The small land mammal hunting and trapping area also fell within the greater Levelock use area described above (see also Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

MARINE MAMMALS

The total harvest of edible meat from marine mammals reported for Levelock in 2005 was 1,280 lb, or almost 38 lb per person. Included in the harvest of marine mammals were beluga whales (1,128 lb, or 33 lb per person) and salt water harbor seals (152 lb, or 5 lb person) (Table 5-3). Beluga whales were hunted from Levelock to the mouth of the Branch River and seals were also hunted in this area as well as on the east side of upper Kvichak Bay as far as the mouth of the Naknek River (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

MARINE INVERTEBRATES

The total harvest of edible meat from marine invertebrates, all of which were clams, for Levelock in 2005 was 98 lb, or 3 lb per person. Razor clams accounted for over 16 lb (<1 lb per person). Clams that the respondents did not identify at the time of the survey amounted to over 81 lb, or about 2 lb per person (Table 5-3). Harvests took place at Port Heiden on the Alaska Peninsula and at 2 Kenai Peninsula locations, Clam Gulch and Whiskey Gulch.

BIRDS AND EGGS

In 2005, Levelock residents harvested waterfowl along the Kvichak and Branch rivers, in the upper Kvichak Bay area, and from a land area that extended from the village to the north, west, and south. The rivers were used to access smaller waterways and land areas in order to hunt waterfowl. Egg gathering also took place at locations along the Kvichak River; in the upper Kvichak Bay; in the same land area to the north, west and south used for waterfowl hunting; as well as in the islands in Iliamna Lake previously described. Levelock residents harvested 184 lb of migratory birds (5 lb per person) and 80 lb of upland birds (2 lb per person) in 2005 (Table 5-3). Bird eggs accounted for 236 lb of the harvest of wild resources, or 7 lb per person (Table 5-3). Upland birds were harvested in the areas north, west, and south of Levelock, around the mouth of the Branch River adjacent to upper Kvichak Bay, and along the Kvichak River and lower Kaskanak and Pecks creeks (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

Table 5-6.–Estimated percentages of fishes other than salmon harvested by gear type, resource, and total harvest, Levelock, 2005.

			Subsistence gear								
Resource	Percentage base	Removed from commercial catch[a]	Setnet	Seine	Hand line gear	Dip net	Ice fishing	Subsistence gear (other)	Subsistence gear, any gear	Rod and reel	Any method
Non-salmon fishes	Gear type	100.0%	100.0%	100.0%	0.0%	0.0%	100.0%	0.0%	100.0%	100.0%	100.0%
	Resource	2.4%	17.1%	3.5%	0.0%	0.0%	61.8%	0.0%	82.4%	15.2%	100.0%
	Total	2.4%	17.1%	17.1%	0.0%	0.0%	61.8%	0.0%	82.4%	15.2%	100.0%
Rainbow smelt	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	48.1%	0.0%	36.1%	0.0%	29.7%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	29.7%	0.0%	29.7%	0.0%	29.7%
Unknown flounder	Gear type	75.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%
	Resource	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Total	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%
Unknown sole	Gear type	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
	Resource	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Total	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
Dolly Varden	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.7%	0.0%	0.6%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.6%	0.0%	0.6%
Lake trout	Gear type	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.3%
	Resource	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.3%
Arctic grayling	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.8%	11.5%	2.4%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	26.5%	0.0%	26.5%	73.5%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.6%	1.8%	2.4%
Northern pike	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	48.2%	0.0%	36.1%	33.2%	34.8%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	85.5%	0.0%	85.5%	14.5%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	29.8%	0.0%	29.8%	5.1%	34.8%
Rainbow trout	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.5%	53.5%	8.6%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	0.0%	4.9%	95.1%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.4%	8.1%	8.6%

-continued-

Table 5-6. Page 2 of 2.

Resource	Percentage base	Removed from commercial catch[a]	Subsistence gear: Setnet	Seine	Hand line gear	Dip net	Ice fishing	Subsistence gear (other)	Subsistence gear, any gear	Rod and reel	Any method
Unknown trout	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%	0.9%	1.8%	1.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	71.4%	0.0%	71.4%	28.6%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.7%	0.3%	1.0%
Broad whitefish	Gear type	0.0%	47.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.7%	0.0%	8.0%
	Resource	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	8.0%	8.0%	0.0%	0.0%	0.0%	0.0%	8.0%	0.0%	8.0%
Humpback whitefish	Gear type	0.0%	51.4%	100.0%	0.0%	0.0%	0.0%	0.0%	14.9%	0.0%	12.3%
	Resource	0.0%	71.4%	28.6%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	8.8%	8.8%	0.0%	0.0%	0.0%	0.0%	12.3%	0.0%	12.3%

Note This table lists only those resources for which there was a harvest in the 2005 study year.

a Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

Source ADF&G Division of Subsistence household surveys, 2005.

WILD PLANTS

Levelock residents traveled long distances to harvest plants, especially berries, in 2005 (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report). The berry harvest was concentrated in the area to the north, west, and south of Levelock; near Yellow Creek; in a large area bordering the middle and lower Branch River; along the southernmost edge of Iliamna Lake to the east of Igiugig; and near Intricate Bay northeast of Kokhanok on Iliamna Lake. Other plant gathering areas were the immediate area around Levelock, and the Kvichak River from just upstream of Levelock to upstream of the mouth of Kaskanak Creek. In all, the residents of Koliganek harvested 627 lb of berries, or 19 lb per person, and 130 lb of other plants, or 4 lb per person (Table 5-3).

COMPARING HARVESTS AND USES IN 2005 WITH PREVIOUS YEARS

Sixty-two percent of Levelock households indicated that their overall harvest and uses of resources in 2005 was about the same as in recent years (the last 5 years) and 38% said their harvest was less than in recent years. No one reported an overall harvest higher in 2005 than in the past. Table 5-7 summarizes respondents' assessments for each major resource category (see also Figure 5-9). For example, 70% of households reported that their harvest and uses of salmon in 2005 was the same in recent years, while 10% reported that they used more salmon in 2005, and 20% used fewer. For large land mammals, 57% of the households said that they harvested and used the same amount, 29% said fewer, and 14% of the households said that they used more. For the wild plants category, 77% of the households said that they harvested and used the same, 15% used fewer, and 8% said that they used more.

Table 5-8 lists the reasons that residents of Levelock gave for changes in harvests and uses by resource category. This was an open-ended question and respondents could provide more than one reason for changes. Project staff grouped the responses into categories, such as competition for resources, regulations hindering or helping residents to harvest resources, sharing of harvests, effects of weather on animals and subsistence activities, changes in the animal populations, personal reasons such as work and health, and other outside effects on residents' opportunities to engage in subsistence activities.

Personal reasons, other outside effects, and unspecified reasons were the 3 reasons cited to explain changes. Some households gave a combination of reasons. Of the households that said they harvested and used fewer salmon, personal reasons were cited by 50% while another 50% gave no reason. For non-salmon finfishes, none of the households said that they used or harvested fewer. For large land mammals, 50% of the household responses that said they harvested and used fewer cited personal reasons, 50% were unspecified reasons, and 25% were animal population changes. For small land mammals/furbearers, 100% of those responding said that animal population changes were the reason for less uses and harvest. For birds and eggs, of those households that said that they harvested and used fewer, 50% gave personal reasons, 50% said other outside effects, and 50% said that the reason was because people were sharing less. For wild plants and berries, 50% of the households responding said that personal reasons prevented them from using or harvesting more and 50% did not specify a reason for less use and harvest of wild plants and berries.

Table 5-7.–Comparison of household harvest and use in recent years: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, Levelock, 2005.

Resource	Estimated households	No response		Valid responses		Fewer		Same		More	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Salmon	19	5.4	28.6%	13.6	71.4%	2.7	20.0%	9.5	70.0%	1.4	10.0%
Non-salmon finfishes	19	2.7	14.3%	16.3	85.7%	0.0	0.0%	14.9	91.7%	1.4	8.3%
Marine invertebrates	19	1.4	7.1%	17.6	92.9%	1.4	7.7%	14.9	84.6%	1.4	7.7%
Large land mammals	19	0.0	0.0%	19.0	100.0%	5.4	28.6%	10.9	57.1%	2.7	14.3%
Small land mammals/furbearers	19	2.7	14.3%	16.3	85.7%	1.4	8.3%	14.9	91.7%	0.0	0.0%
Marine mammals	19	2.7	14.3%	16.3	85.7%	1.4	8.3%	14.9	91.7%	0.0	0.0%
Birds and eggs	19	2.7	14.3%	16.3	85.7%	2.7	16.7%	10.9	66.7%	2.7	16.7%
Wild plants	19	1.4	7.1%	17.6	92.9%	2.7	15.4%	13.6	76.9%	1.4	7.7%
Overall	19	1.4	7.1%	17.6	92.9%	6.8	38.5%	10.9	61.5%	0.0	0.0%
Any resource	19	0.0	0.0%	19.0	100.0%	9.5	50.0%	17.6	92.9%	5.4	28.6%

Source ADF&G Division of Subsistence household surveys, 2005.

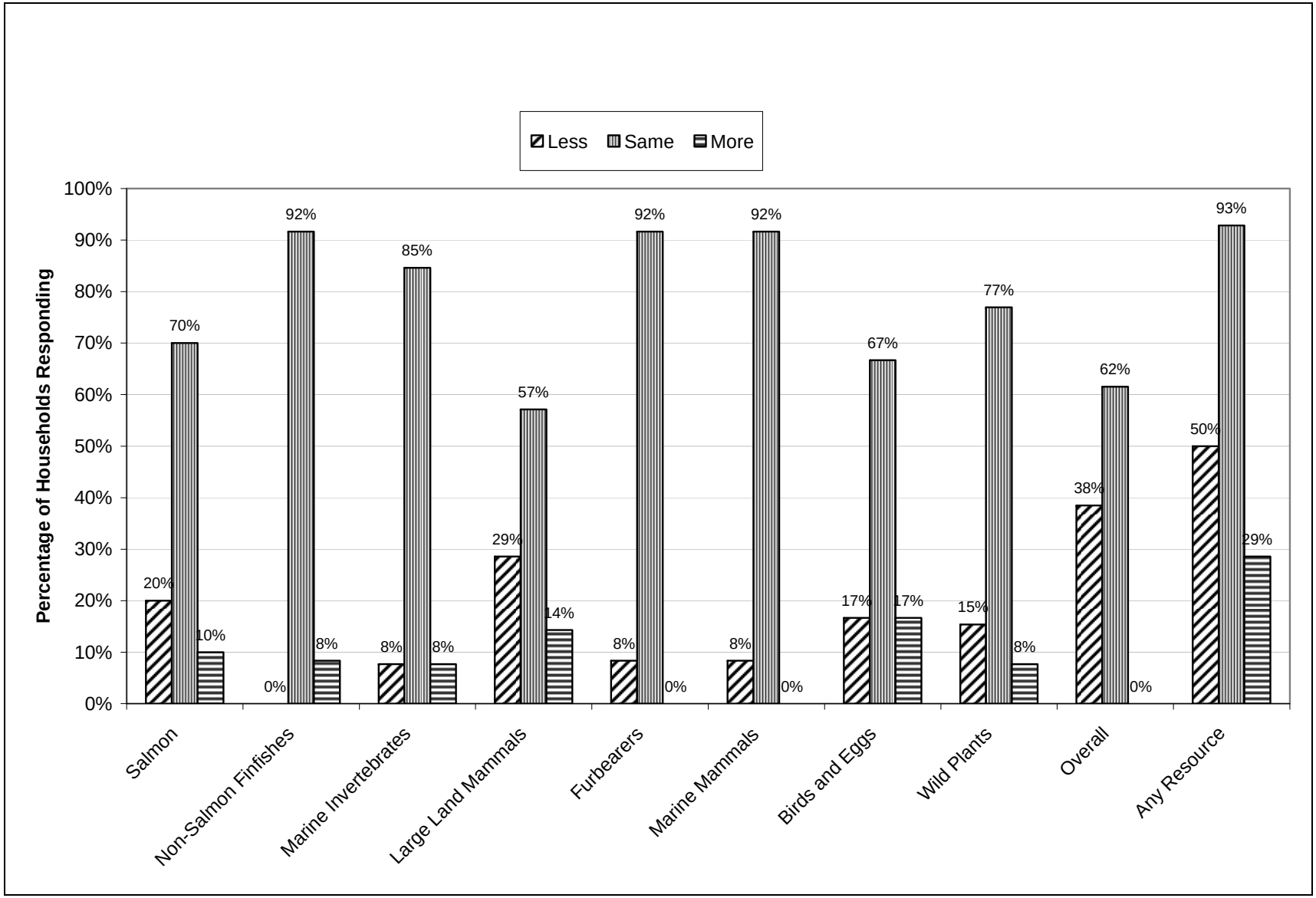

Figure 5-9.–Levelock households' assessment of harvests and uses of wild resources in 2005 compared to recent years.

Figure 5-10 illustrates the percentage of Levelock households that cited particular reasons for lower uses of any resource category in 2005 compared to other recent years. As noted above, less harvest and use were due to personal reasons, other outside effects, and "unspecified," i.e., no reason given. Forty-three percent reported less uses of any resource in 2005 due to animal population changes, 29% for personal reasons, 14% because people are sharing less, and 14% did not give a reason for less use.

Changes in Levelock residents' resource harvests were also explored through comparisons with findings from other study years. Comprehensive household harvest surveys were administered in Levelock in 1973 (Gasbarro and Utermohle *Unpublished*), 1988, and 1992 (CSIS), as well as this study for 2005 (Table 1-2 and Figure 5-11). Surveys pertaining just to large land mammal harvests took place for 2001 (Holen et al. 2005). Figure 5-11 summarizes the per capita harvests, in pounds usable weight, for each major resource category from these studies.

In 2005, estimated harvests of salmon by Levelock residents were considerably lower, at 152 lb per person, than in the previous study years of 1973 (366 lb per person), 1988 (661 lb per person), and 1992 (468 lb per person) (Table 5-9). Correspondingly, salmon made up only about 29% of the total harvest in 2005, compared to about 53% in 1973, 1988, and 1992 (Table 5-10 and Figure 5-11). In 2005, Levelock residents were allowed to retain fish from the ADF&G Division of Commercial Fisheries' test fishery, a management tool for Kvichak River sockeye salmon. Salmon received from the test fishery were not identified as harvest, and thus may explain the lower harvest amount for that year. Likewise, harvests of non-salmon fishes in 2005 (40 lb per person) were the lowest of the 4 years for which data were available. There was also a notable drop in harvests of small land mammals in 2005 to 6 lb per person, compared to 17 lb per person in 1973, 37 lb per person in 1988, and 22 lb per person in 1992. Small land mammal harvests have declined according to respondents because of the drop in value of furs and the expense of harvesting them, especially due to the price of gasoline. On the other hand, harvests of large land mammals by Levelock hunters in 2005, at 252 lb per person, were very similar to harvest estimates for big game for 1988 (243 lb per person) and 1992 (251 lb per person), and slightly higher than the estimate for 1973 (208 lb per person). Large land mammals made up 48% of the total wild resource harvest by Levelock residents in 2005, up from 30% in 1973, 19% in 1988, and 28% in 1992. Harvests of marine mammals totaled about 38 lb per person in 2005, not unlike estimates for 1973 (39 lb per person) and 1992 (50 lb per person), but far below the estimate for 1988 (223 lb person), when marine mammals made up 18% of Levelock resident's total wild resource harvest, compared to about 6%–7% in the other study years.

Table 5-8.–Levelock respondents' reasons for change in harvests and uses in recent years.

			Percentage of responses by category[a]							
Resource category	Use fewer or more	Estimated number of households[b]	No reason given	Competition	Regulations	People are sharing less	Weather	Animal population changes[c]	Personal reasons (work/health)	Other outside effects
Salmon	Fewer	2.7	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%
Salmon	More	1.4	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Non-salmon finfishes	More	1.4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Marine invertebrates	Fewer	1.4	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marine invertebrates	More	1.4	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Large land mammals	Fewer	5.4	50.0%	0.0%	0.0%	0.0%	0.0%	25.0%	50.0%	0.0%
Large land mammals	More	2.7	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	0.0%
Small land mammals/furbearers	Fewer	1.4	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Marine mammals	Fewer	1.4	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	0.0%
Birds and eggs	Fewer	2.7	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	50.0%	50.0%
Birds and eggs	More	2.7	50.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%
Wild plants	Fewer	2.7	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%
Wild plants	More	1.4	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Overall	Fewer	6.8	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	40.0%	40.0%
Any resource	Fewer	9.5	42.9%	0.0%	0.0%	14.3%	0.0%	42.9%	71.4%	14.3%
Any resource	More	5.4	25.0%	0.0%	0.0%	25.0%	0.0%	75.0%	50.0%	0.0%

a. Percentage of estimated number of households that reported less or more uses of the resource category who cited this reason.

b. Estimated number of households citing a change in uses. For number of valid responses, see Table 5-7. Estimated total households in community =19.

c. Includes changes in size of population and/or changes in geographic distribution of animals during hunting seasons that affected harvest opportunities and success.

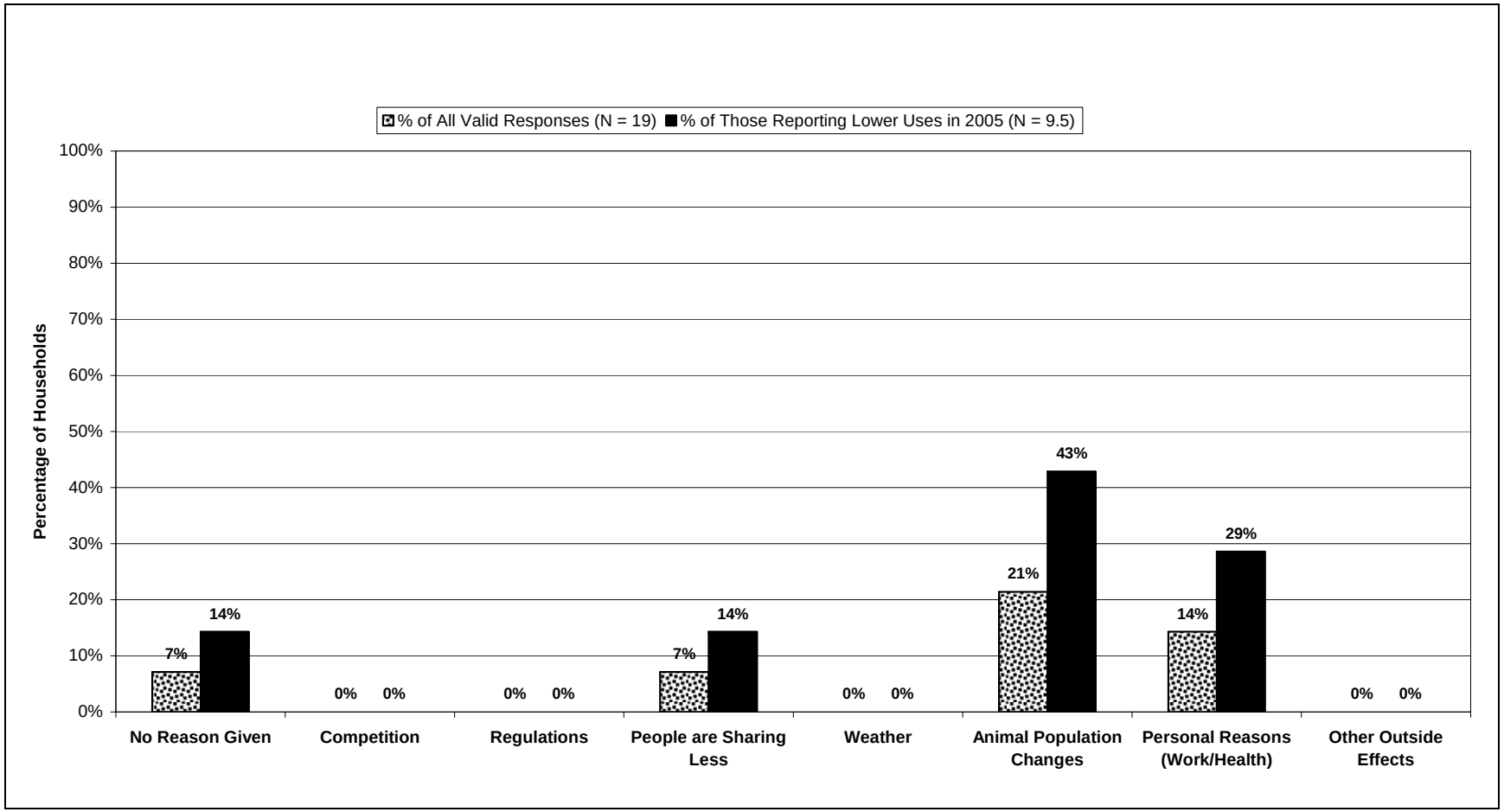

Figure 5-10.–Reasons cited by Levelock households for lower uses of any resource in 2005 compared to other recent years.

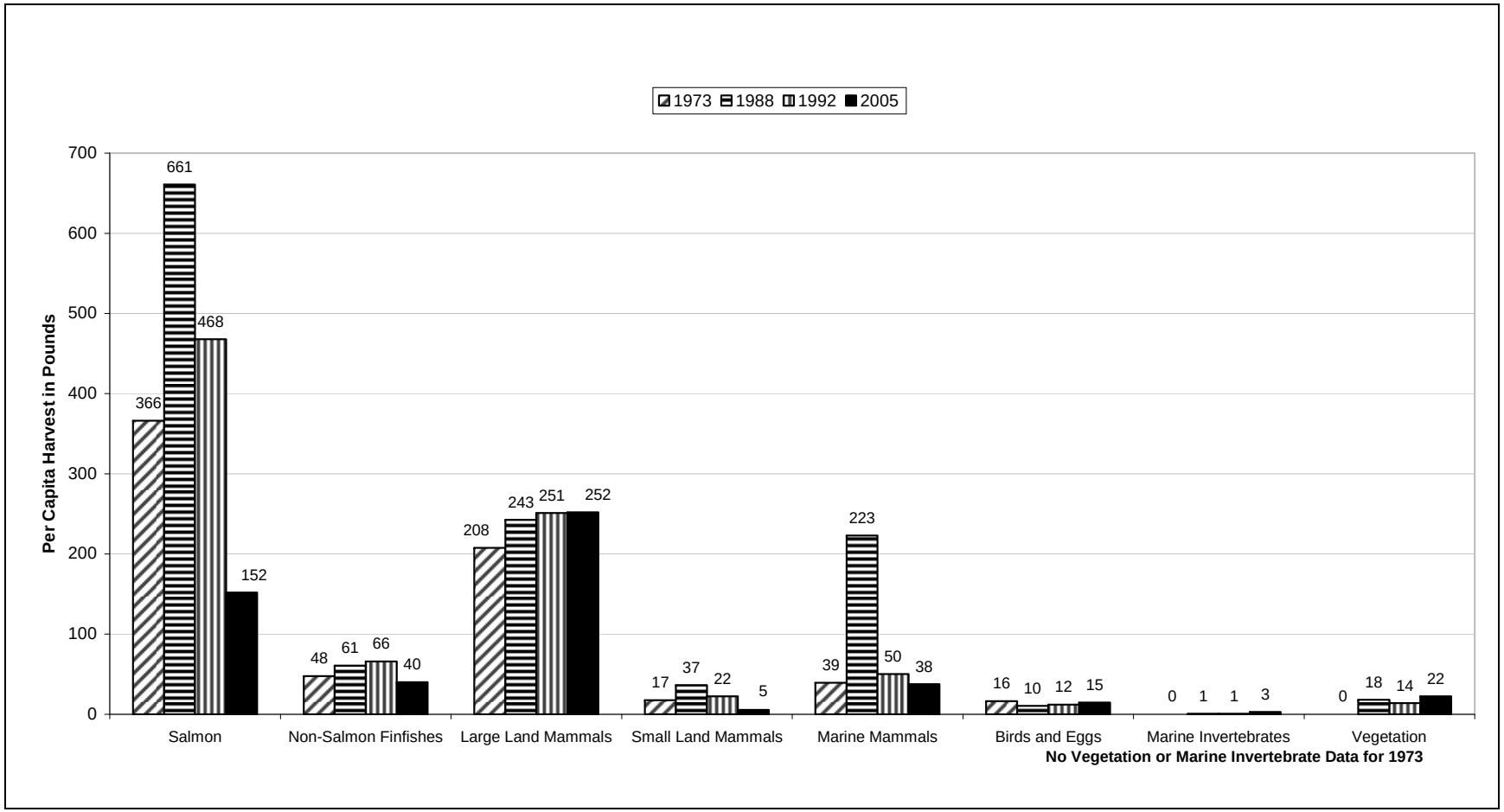

Figure 5-11.–Levelock wild resource harvests over time.

Regarding total harvests, the estimate of 517 lb per person for Levelock for 2005, while considerable, was lower than the previous 3 years for which data were available: 1973 (694 lb per person), 1988 (1,253 lb per person), and 1992 (884 lb per person) (Table 5-9). Lower harvests of salmon, fishes other than salmon, and small land mammals accounted for most of this difference. In summary, reasons given for less harvest and uses than in recent years indicated that residents thought that harvests were down because hunters were not able to spend as much time hunting and that the resources were not as abundant as in the past.

Table 5-9.–Levelock wild resource harvests by resource category, all study years.

	Pounds usable weight per capita harvest			
Resource	1973	1988	1992	2005
Salmon	366.2	660.9	468.0	151.8
Non-salmon fishes	47.6	60.5	65.9	39.9
Large land mammals	207.5	242.7	251.1	251.9
Small land mammals	17.4	36.5	22.3	5.5
Marine mammals	39.3	223.0	50.2	37.7
Birds and eggs	16.3	10.4	11.9	14.7
Marine invertebrates		0.5	0.6	2.9
Vegetation		18.1	14.0	22.3
All resources	694.3	1,252.5	884.0	526.7

Table 5-10.–Composition of wild resource harvests by category, Levelock, all study years.

	Percentage of total harvest			
Resource	1973	1988	1992	2005
Salmon	52.7%	52.8%	52.9%	28.8%
Non-salmon fishes	6.9%	4.8%	7.5%	7.6%
Large land mammals	29.9%	19.4%	28.4%	47.8%
Small land mammals	2.5%	2.9%	2.5%	1.0%
Marine mammals	5.7%	17.8%	5.7%	7.2%
Birds and eggs	2.3%	0.8%	1.3%	2.8%
Marine invertebrates		0.0%	0.1%	0.5%
Vegetation		1.4%	1.6%	4.2%
All resources	100.0%	100.0%	100.0%	100.0%

Note Blank cells indicate data not collected for that study year.

Source ADF&G Division of Subsistence household surveys, 2005

LOCAL OBSERVATIONS OF RESOURCE POPULATIONS AND TRENDS

SALMON AND NON-SALMON FINFISHES

One household observed that more salmon were returning. An unusual event was reported to have occurred on February 14, 2006, when a Levelock household caught a bright coho salmon from the Branch River. One household related that in the past, in the month of February, Levelock residents used to catch threespine sticklebacks in Kaskanak Creek

LARGE AND SMALL LAND MAMMALS

Residents reported that they observed an abundance of wolves chasing the moose in the area, which resulted in the moose moving closer to and into Levelock because the human activity kept the wolves away. One household related that, with the moose closer to the village, they were easier to hunt. During the study year, residents said that caribou were not as abundant as in the recent past, and one household observed that caribou were moving a "great deal" due to predation by wolves. Respondents said that the best time to harvest brown bears for edible meat was in the fall, when the bears stopped eating fish and had switched to berries, or in the spring, when the bears first emerged from their dens. One household reported that porcupines were hard to find around Levelock during the study year.

MARINE MAMMALS

One household reported that there were more beluga whales in the area. One respondent was disappointed that no one had given her beluga whale products during the study year. She also said that she liked beluga whale flippers and that they used to eat beluga whale livers.

One household reported that a Steller sea lion swam up the Kvichak River past Levelock about 5 or 6 years ago, and that no one tried to harvest it. Another household said that there used to be a cannery in the area, and, when it was operating, sea lions were frequently around it.

WILD PLANTS

Residents reported that the abundance of berries varied from year to year:

- "Some years are good … some years, no berries"
- "The snow this year will bring good berries"
- "Hopefully the salmonberries will come back"
- "No more swamp around now, the ground is changing, so, no salmonberries."

One household provided the following observations concerning berries:

- "There were more blueberries and cranberries in 2005; the blueberries were small in 2005; berries were smaller if conditions were dry; snowfall was good over the winter of 2005–2006, and then there was rain in April."

The household predicted that there would be a good berry crop in 2006.

LOCAL CONCERNS REGARDING RESOURCES

One Levelock individual shared his household's concerns regarding resources in 2005.[12] This individual did not harvest a moose because he saw too many hunters around. In 2005, he could not travel as much to harvest non-salmon fishes. He was concerned about bag limits for the subsistence-caught freshwater fishes because he did not want to exceed the limits. He was also concerned that there might be a limit on seagull eggs. Evidently, someone had told him "to be

[12] As noted in Chapter 1, no local residents attended the meeting in Levelock held to review the study findings. Therefore, the comments reported in this section are limited to those that were expressed during the household survey.

careful about Fish and Game" before his egg harvesting trip to Iliamna Lake, even though the subsistence harvest of these eggs was legal. He said that during the trip, as the household members were harvesting the eggs, they heard a helicopter in the distance, which made them concerned that they might "get in trouble" if the helicopter crew spotted them. He also asked about avian influenza, wondering if people could die from it. These concerns illustrated the continuing need for better communication of information about hunting and fishing regulations and other natural resource issues to residents of Levelock and other rural communities.

Another household said that they went trapping 3 years ago, but have not gone trapping since that time because of low fur prices. They said gasoline was too expensive to "go out much" for ducks and geese. This household's overall harvest in 2005 was down, they said, because of the cost of gasoline and because of a poor fishing season. One household member said that his grandparents had died within the last 2 years and that he had hunted and fished for them, but since their deaths, he was less motivated to harvest subsistence foods.

Additional general reported concerns were that there should be more opportunity, longer seasons, and increased bag limits for subsistence harvests because gasoline was expensive. "People need to be able to do more subsistence," one person said. Mining was also a concern for this respondent, who stated, "Do anything in ADF&G's power to stop mining."

CHAPTER 6: NEW STUYAHOK

COMMUNITY BACKGROUND

New Stuyahok is located on the Nushagak River approximately 80 river miles upstream from Dillingham (Figure 1-1). In the past, there was a distinction between the Yup'ik people inhabiting the Nushagak River and those inhabiting the coastal area, including Nushagak Bay. The *Kiatagmiut* inhabited the Nushagak and lower Mulchatna rivers; the *Aglurmiut* inhabited the coastal areas of Nushagak Bay and areas to the east (VanStone 1984:224). According to VanStone (1984:224–225), linguistic and cultural differences between these 2 groups became blurred with European contact:

> Epidemic diseases, the establishment of schools and missions, and particularly the emergence of the fur trade and an important commercial salmon-fishing industry in Bristol Bay resulted in considerable movement of Eskimos throughout the region, the coalescence of some populations and the dispersal of others.

The present location of New Stuyahok was established about 1940, and the community first appeared in the federal census in 1950. The first inhabitants moved from Stuyahok, which was referred to as "Old Stuyahok," and which was located at the confluence of the Stuyahok and Mulchatna rivers. Residents also came from the old village of Nunachuak, which was located on the Nushagak River approximately 15 river miles upstream from New Stuyahok. A Bureau of Indian Education school was established in New Stuyahok in 1954, and a larger school was constructed in 1960 (VanStone 1967:147). VanStone also lists 1962 population information for New Stuyahok, which illustrated the communities in which New Stuyahok family heads and their spouses were born:

Community of birth	Number	Community of birth	Number
Ekwok	4	Platinum	1
Nunachuak	8	Kokwok	1
Kanakanak	3	Snake River	1
Nushagak	3	Mulchatna River	2
Wood River Village	6	Koliganek	2
Old Stuyahok	6	Igushik	3
Togiak	2	Angle Bay[a]	1
Dillingham	4		

Source VanStone 1967:147.

a. Although "Angle" Bay in the source, this may be a spelling error for "Angel Bay," also locally known as "Six Angel Bay."

This information could be compared to a similar list recorded for this project in 2005 (see Table 1-9). It may also be of interest to note that construction of the next new school in New Stuyahok was slated to start in summer 2007.

DEMOGRAPHY, CASH EMPLOYMENT, AND MONETARY INCOME

DEMOGRAPHY

According to the federal census, New Stuyahok had 471 residents in 2000 (U. S. Census Bureau 2001), of which 93% (437 residents) were Alaska Native (Table 1-1). The baseline household survey in 2005 resulted in a population estimate of 421 residents, of which 99% (415 residents) were Alaska Native (Table 1-1). This comparison suggests that the population declined somewhat from 2000 to 2005, but survey respondents did not report a conspicuous outmigration of local residents. One explanation for the difference may be that some people counted in the federal census may have been seasonal residents of the community, such as teachers.

In 2005, there were an estimated 96 year-round households in New Stuyahok (Table 1-5). Due to the larger population size of New Stuyahok, a 50% random sample of all identified households was selected to be interviewed. Interviewers attempted to contact 63 households to meet the sample goal. Of these, 49 (51% of the year-round households) were interviewed. Eight households were unavailable or could not be contacted and 6 households (11%) that were contacted declined to be interviewed.

The mean length of residency in New Stuyahok was about 27 years, with the maximum residency 78 years (Table 1-8). The largest age cohort for both males and females was teenagers between the ages of 15 and 19 years of age (Table 6-1 and Figure 6-1). About 42% of the population of New Stuyahok in 2005 was less than 20 years old.

Of the household heads interviewed, almost all (98%) were born in Alaska and 94% were born in the Bristol Bay area (Table 1-9). Fifty-seven percent were born in New Stuyahok. In addition, 6% were born at Old Stuyahok and 9% were born at Nunachuak, the 2 villages that were the origin of the founders of New Stuyahok (Table 1-9).

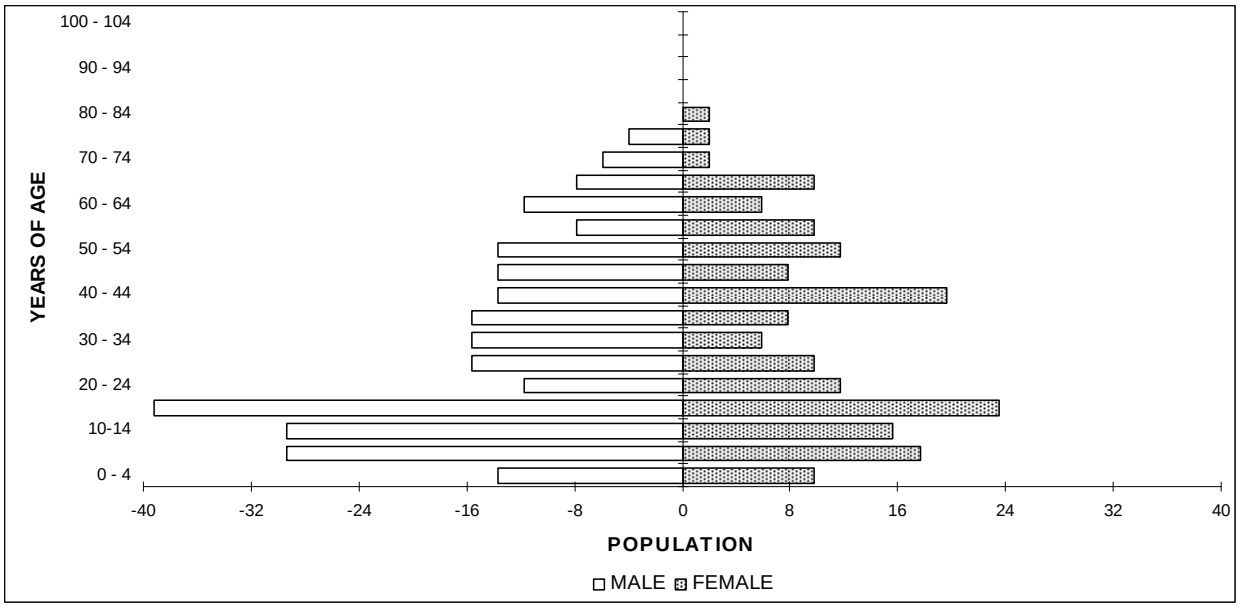

Figure 6-1.–Population profile, New Stuyahok, 2005.

Source ADF&G Division of Subsistence household surveys, 2005.

Table 6-1.–Population profile, New Stuyahok, 2005.

	Male			Female			Total		
Age	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage	Number	Percentage	Cumulative percentage
0 – 4	13.71	5.51%	5.51%	9.80	5.68%	5.68%	23.51	5.58%	5.58%
5 – 9	29.39	11.81%	17.32%	17.63	10.23%	15.91%	47.02	11.16%	16.74%
10 – 14	29.39	11.81%	29.13%	15.67	9.09%	25.00%	45.06	10.70%	27.44%
15 – 19	39.18	15.75%	44.88%	23.51	13.64%	38.64%	62.69	14.88%	42.33%
20 – 24	11.76	4.72%	49.61%	11.76	6.82%	45.45%	23.51	5.58%	47.91%
25 – 29	15.67	6.30%	55.91%	9.80	5.68%	51.14%	25.47	6.05%	53.95%
30 – 34	15.67	6.30%	62.20%	5.88	3.41%	54.55%	21.55	5.12%	59.07%
35 – 39	15.67	6.30%	68.50%	7.84	4.55%	59.09%	23.51	5.58%	64.65%
40 – 44	13.71	5.51%	74.02%	19.59	11.36%	70.45%	33.31	7.91%	72.56%
45 – 49	13.71	5.51%	79.53%	7.84	4.55%	75.00%	21.55	5.12%	77.67%
50 – 54	13.71	5.51%	85.04%	11.76	6.82%	81.82%	25.47	6.05%	83.72%
55 – 59	7.84	3.15%	88.19%	9.80	5.68%	87.50%	17.63	4.19%	87.91%
60 – 64	11.76	4.72%	92.91%	5.88	3.41%	90.91%	17.63	4.19%	92.09%
65 – 69	7.84	3.15%	96.06%	9.80	5.68%	96.59%	17.63	4.19%	96.28%
70 – 74	5.88	2.36%	98.43%	1.96	1.14%	97.73%	7.84	1.86%	98.14%
75 – 79	3.92	1.57%	100.00%	1.96	1.14%	98.86%	5.88	1.40%	99.53%
80 – 84	0.00	0.00%	100.00%	1.96	1.14%	100.00%	1.96	0.47%	100.00%
85 – 89	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
90 – 94	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
95 – 99	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
100 – 104	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
Missing	0.00	0.00%	100.00%	0.00	0.00%	100.00%	0.00	0.00%	100.00%
Total	**248.82**	**100.00%**		**172.41**	**100.00%**		**421.22**	**100.00%**	

Source ADF&G Division of Subsistence household surveys, 2005.

CASH EMPLOYMENT CHARACTERISTICS AND MONETARY INCOME

Sixty percent of the earned income in New Stuyahok in 2005 resulted from jobs with local governments (Table 6-2). Another key source of earned income was commercial fishing, with 18% of the annual total (Table 6-2). Local government provided 51% of available jobs, commercial fishing made up 27%, and retail trade accounted for 9% (Table 6-2). Other jobs were in construction (4%), services (3%), federal government (3%), and state government (2%). Seventy-three percent of all jobs were located in New Stuyahok, 16% in Dillingham, and 9% at "Nushagak" (meaning Nushagak Bay). The Nushagak job location was commercial fishing and the Dillingham jobs were salmon cannery work and commercial fishing. The 2 Ekwok jobs were in construction and guiding. The 4 Bering Sea and "outside of Alaska" jobs were in the commercial fishing industry (Table 1-11).

Twenty-seven percent of adults in New Stuyahok were employed year-round (Table 1-10). However, 95% of adults were employed at some time during 2005. The mean number of months employed was 6. On average in 2005, households contained 2.6 employed adults and all households contained at least one adult who was employed at some point in 2005. The distribution of employment throughout the community was a planned effort of the local

governments to ensure that jobs were evenly distributed so as to provide income for as many households as possible.

LEVELS OF PARTICIPATION IN THE HARVESTS AND USES OF WILD RESOURCES

Table 1-13 reports the levels of individual participation in the harvest and processing of wild resources by New Stuyahok residents in 2005. Thirty-six percent of New Stuyahok residents hunted birds and large land mammals and 51% processed those harvests. More than one-half of the people in the community fished (56%) and processed fish (62%). Only about 14% trapped or hunted furbearers and 16% processed furbearing animals. Seventy-two percent picked berries and other wild plants and slightly more (73%) were involved in processing wild plants. In total, about 85% of New Stuyahok residents attempted to harvest and process wild resources in the 2005 study year.

Table 6-2.–Employment by industry, New Stuyahok, 2005.

	Jobs	Households	Individuals	Percentage of income
Estimated total number[a]	**121.5**	**34.5**	**76.5**	
Federal government	0.7%	2.0%	1.0%	1.1%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Natural scientists and mathematicians	0.0%	0.0%	0.0%	0.0%
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support, including clerical service occupations	2.0%	6.1%	3.0%	4.3%
Construction and extractive occupations	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
State government	2.0%	4.1%	2.0%	1.6%
Teachers, librarians, and counselors	0.7%	2.0%	1.0%	0.3%
Administrative support	0.7%	2.0%	1.0%	0.2%
Clerical service occupations	0.7%	2.0%	1.0%	1.1%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Local government	51.0%	67.3%	63.6%	60.3%
Executive, administrative and managerial	7.2%	20.4%	10.1%	18.1%
Social scientists, social workers, religious workers and lawyers	0.7%	2.0%	1.0%	0.3%
Teachers, librarians, and counselors	9.8%	22.4%	15.2%	14.0%
Health diagnosing and treating practitioners	0.0%	0.0%	0.0%	0.0%
Registered nurses, pharmacists, dietitians, therapists and P.A.s	0.0%	0.0%	0.0%	0.0%
Health technologists and technicians	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.7%	2.0%	1.0%	1.5%
Marketing and sales occupations	0.7%	2.0%	1.0%	0.5%
Administrative support occupations, including clerical	2.6%	8.2%	4.0%	3.1%
Service occupations	15.7%	34.7%	20.2%	9.7%

-continued-

Table 6-2. Page 2 of 3.

	Jobs	Households	Individuals	Percentage of income
Agricultural, forestry and fishing occupations	0.7%	2.0%	1.0%	0.2%
Mechanics and repairers	0.7%	2.0%	1.0%	0.2%
Construction and extractive occupations	1.3%	4.1%	2.0%	0.2%
Precision production occupations	2.0%	6.1%	3.0%	3.0%
Production working occupations	0.7%	2.0%	1.0%	0.2%
Transportation and material moving occupations	2.6%	6.1%	3.0%	7.5%
Handlers, equipment cleaners, helpers and laborers	5.9%	12.2%	9.1%	1.7%
Agriculture, forestry & fishing	26.8%	57.1%	40.4%	17.7%
Service occupations	0.0%	0.0%	0.0%	0.0%
Agricultural, forestry and fishing occupations	25.5%	55.1%	38.4%	17.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	1.3%	4.1%	2.0%	0.7%
Mining	0.7%	2.0%	1.0%	1.0%
Service occupations	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	0.7%	2.0%	1.0%	1.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Construction	3.9%	12.2%	6.1%	6.3%
Service occupations	0.7%	2.0%	1.0%	0.8%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Construction and extractive occupations	0.7%	2.0%	1.0%	0.5%
Transportation and material moving occupations	1.3%	4.1%	2.0%	1.9%
Handlers, equipment cleaners, helpers and laborers	1.3%	4.1%	2.0%	3.1%
Manufacturing	0.0%	0.0%	0.0%	0.0%
Precision production occupations	0.0%	0.0%	0.0%	0.0%
Transportation, communication & utilities	1.3%	4.1%	2.0%	1.1%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.7%	2.0%	1.0%	0.5%
Administrative support, including clerical service occupations	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.7%	2.0%	1.0%	0.5%
Wholesale trade	0.0%	0.0%	0.0%	0.0%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Retail trade	8.5%	20.4%	12.1%	4.2%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Marketing and sales occupations	2.0%	6.1%	3.0%	1.6%
Service occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	6.5%	14.3%	9.1%	2.6%
Services	3.3%	10.2%	5.1%	2.5%
Executive, administrative and managerial	0.0%	0.0%	0.0%	0.0%
Natural scientists and mathematicians	0.0%	0.0%	0.0%	0.0%
Writers, artists, entertainers, and athletes	0.7%	2.0%	1.0%	0.0%

-continued-

Table 6-2. Page 3 of 3.

	Jobs	Households	Individuals	Percentage of income
Social scientists, social workers, religious workers and lawyers	0.0%	0.0%	0.0%	0.0%
Health diagnosing and treating practitioners	0.0%	0.0%	0.0%	0.0%
Health technologists and technicians	0.0%	0.0%	0.0%	0.0%
Technologists and technicians, except health	0.0%	0.0%	0.0%	0.0%
Administrative support	0.0%	0.0%	0.0%	0.0%
Clerical service occupations	1.3%	4.1%	2.0%	1.1%
Agricultural, forestry and fishing occupations	0.7%	2.0%	1.0%	0.6%
Production working occupations	0.7%	2.0%	1.0%	0.8%
Mechanics and repairers	0.0%	0.0%	0.0%	0.0%
Transportation and material moving occupations	0.0%	0.0%	0.0%	0.0%
Handlers, equipment cleaners, helpers and laborers	0.0%	0.0%	0.0%	0.0%
Miscellaneous occupations	0.0%	0.0%	0.0%	0.0%

a. Estimated number of households and individuals includes only those that were employed during the study period.
Source ADF&G Division of Subsistence household surveys, 2006.

RESOURCE HARVEST AND USE PATTERNS

Table 1-14 summarizes the resource harvest and use characteristics of New Stuyahok in 2005. All community households used and harvested wild foods. The average harvest was 1,708 lb usable weight per household (389 lb per capita). During the study year, New Stuyahok households harvested an average of 13 different kinds of resources and used an average of 18 kinds of resources. In addition, households gave away an average of 7 kinds of resources and received about 8 kinds.

SPECIES USED AND SEASONAL ROUND

In New Stuyahok in 2005, fishes were the most commonly harvested resource (Table 6-3 and Figure 6-2). Salmon accounted for almost one-half of the subsistence foods harvested by New Stuyahok for the year. Chinook salmon (almost always called "kings" by local residents) accounted for more than one-half of the salmon harvested and fresh sockeye salmon were the next most harvested salmon species, followed by coho, chum, and pink salmon, respectively (Figure 6-3). The pink salmon (locally called "humpies") harvest was very small. Because of their lifecycle, most pink salmon returned to spawn every even-numbered year, with only a small fraction returning in odd-numbered years.

Chinook salmon were the first salmon to return to the Nushagak River, starting in late May, and were the most desirable of the 5 salmon species available on the Nushagak River. Dried and smoked Chinook salmon strips were especially valued. Three fish camps at Lewis Point (referred to by residents, from furthest downstream to nearest, as "First Place," "Second Place," and "Third Place") on the lower Nushagak River were used by the residents of New Stuyahok to harvest and process (or "put up") subsistence-caught salmon. The Lewis Point fish camps, while still an important location, had not been used quite as extensively as in the past when nearly the entire village moved downriver for the summer salmon run. Chinook salmon were still commonly harvested at the fish camps. Chinook salmon were also harvested at locations on the Nushagak River upstream from Lewis Point.

Table 6-3.–Estimated harvests and uses of fish, game, and plant resources, New Stuyahok, 2005.

	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
Resource name(s)	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
All resources	100.0%	100.0%	100.0%	98.0%	73.5%	163,927.2	1,707.6	389.2				17.2%
Fishes	93.9%	83.7%	81.6%	81.6%	63.3%	91,128.3	949.3	216.3				20.9%
Pacific salmon	89.8%	75.5%	73.5%	63.3%	55.1%	79,316.2	826.2	188.3	10,900.2	Ind	113.5	22.3%
Chum salmon	42.9%	38.8%	36.7%	8.2%	18.4%	7,519.1	78.3	17.9	1,432.2	Ind	14.9	61.8%
Coho salmon	73.5%	69.4%	69.4%	20.4%	30.6%	9,061.7	94.4	21.5	1,923.9	Ind	20.0	25.9%
Chinook salmon	85.7%	73.5%	71.4%	40.8%	42.9%	47,433.9	494.1	112.6	3,962.7	Ind	41.3	22.4%
Pink salmon	6.1%	6.1%	2.0%	0.0%	2.0%	4.9	0.1	0.0	2.0	Ind	0.0	141.4%
Sockeye salmon	77.6%	61.2%	59.2%	46.9%	36.7%	15,296.6	159.3	36.3	3,579.3	Ind	37.3	30.2%
Fresh sockeye salmon	71.4%	59.2%	55.1%	28.6%	28.6%	14,028.2	146.1	33.3	2,997.5	Ind	31.2	32.3%
Spawning sockeye salmon	59.2%	36.7%	34.7%	28.6%	24.5%	1,268.5	13.2	3.0	581.9	Ind	6.1	39.7%
Landlocked salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Non-salmon fishes	87.8%	77.6%	77.6%	67.3%	46.9%	11,812.0	123.0	28.0				21.8%
Pacific herring	4.1%	0.0%	0.0%	4.1%	2.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring roe	6.1%	0.0%	0.0%	6.1%	2.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring sac roe	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Herring spawn on kelp	6.1%	0.0%	0.0%	6.1%	2.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Rainbow smelt	40.8%	2.0%	2.0%	40.8%	10.2%	352.7	3.7	0.8	58.8	Gal	0.6	141.4%
Cods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Pacific (gray) cod	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Walleye pollock (whiting)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown cods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Flounders	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 6-3. Page 2 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Non-salmon fishes, flounders, continued												
Unknown flounders	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Greenlings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Lingcod	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown greenlings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Pacific halibut	10.2%	0.0%	0.0%	10.2%	6.1%	0.0	0.0	0.0	0.0	Lb	0.0	0.0%
Rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
"Black" rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
"Red" rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown rockfishes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sablefish (black cod)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sculpins	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Slimy sculpin (bullhead)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sharks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown sharks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Soles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown soles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Threespine stickleback (needlefish)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Wolffish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Alaska blackfish	25.0%	25.0%	16.7%	8.3%	0.0%	2.7	0.2	0.1	37.9	Ind	2.9	54.4%
Burbot	6.1%	6.1%	6.1%	0.0%	0.0%	56.8	0.6	0.1	56.8	Ind	0.6	88.7%

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Table 6-3. Page 3 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Non-salmon fishes, continued												
Chars	49.0%	46.9%	42.9%	10.2%	16.3%	362.1	3.8	0.9	258.6	Ind	2.7	36.0%
Arctic char–resident and anadromous	4.1%	4.1%	4.1%	0.0%	2.0%	60.3	0.6	0.1	43.1	Ind	0.4	128.9%
Dolly Varden	49.0%	46.9%	42.9%	10.2%	16.3%	293.5	3.1	0.7	209.6	Ind	2.2	31.0%
Dolly Varden–anadromous	4.1%	4.1%	4.1%	0.0%	0.0%	5.5	0.1	0.0	3.9	Ind	0.0	99.0%
Dolly Varden–resident												
Lake trout	2.0%	2.0%	2.0%	0.0%	0.0%	8.2	0.1	0.0	5.9	Ind	0.1	141.4%
Arctic grayling	81.6%	71.4%	69.4%	34.7%	32.7%	2,757.9	28.7	6.5	3,939.9	Ind	41.0	35.7%
Northern pike	75.5%	63.3%	61.2%	28.6%	28.6%	3,883.9	40.5	9.2	1,387.1	Ind	14.4	24.3%
Sturgeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown sturgeons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Longnose sucker	20.4%	20.4%	20.4%	2.0%	16.3%	1,998.4	20.8	4.7	1,332.2	Ind	13.9	55.1%
Trout	32.7%	26.5%	24.5%	14.3%	4.1%	181.0	1.9	0.4	129.3	Ind	1.3	55.3%
Rainbow trout–resident	32.7%	26.5%	24.5%	12.2%	4.1%	172.8	1.8	0.4	123.4	Ind	1.3	52.3%
Steelhead trout–anadromous	2.0%	0.0%	0.0%	2.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown trout	4.1%	2.0%	2.0%	4.1%	0.0%	8.2	0.1	0.0	5.9	Ind	0.1	141.4%
Whitefishes	59.2%	44.9%	44.9%	26.5%	22.4%	2,219.3	23.1	5.3	1,289.1	Ind	13.4	39.1%
Broad whitefish	2.0%	2.0%	2.0%	0.0%	0.0%	235.1	2.4	0.6	58.8	Ind	0.6	141.4%
Ciscos	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Least cisco	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Humpback whitefish	53.1%	38.8%	38.8%	26.5%	20.4%	1,758.9	18.3	4.2	1,005.1	Ind	10.5	45.8%
Round whitefish	8.2%	8.2%	8.2%	0.0%	2.0%	225.3	2.3	0.5	225.3	Ind	2.3	81.1%

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Table 6-3. Page 4 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Land mammals	100.0%	75.5%	69.4%	85.7%	53.1%	60,410.4	629.3	143.4				19.6%
Large land mammals	100.0%	73.5%	65.3%	81.6%	51.0%	58,481.6	609.2	138.8				19.8%
Black bear	2.0%	0.0%	0.0%	2.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Brown bear	2.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Caribou	91.8%	69.4%	59.2%	61.2%	40.8%	26,742.9	278.6	63.5	178.3	Ind	1.9	20.6%
Moose	93.9%	65.3%	51.0%	65.3%	42.9%	31,738.8	330.6	75.3	58.8	Ind	0.6	23.2%
Dall sheep	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Small land mammals/furbearers	59.2%	44.9%	38.8%	36.7%	24.5%	1,928.8	20.1	4.6				46.1%
Beaver	55.1%	34.7%	30.6%	34.7%	20.4%	925.7	9.6	2.2	105.8	Ind	1.1	46.3%
Coyote	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Foxes	2.0%	2.0%	2.0%	0.0%	0.0%	0.0	0.0	0.0	29.4	Ind	0.3	141.4%
Red fox	2.0%	2.0%	2.0%	0.0%	0.0%	0.0	0.0	0.0	29.4	Ind	0.3	141.4%
Hares	2.0%	0.0%	0.0%	2.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Snowshoe hare	2.0%	0.0%	0.0%	2.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
River (land) otter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Lynx	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Alaska marmot	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Marten	2.0%	2.0%	2.0%	0.0%	0.0%	0.0	0.0	0.0	19.6	Ind	0.2	141.4%
Mink	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Muskrat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Porcupine	49.0%	38.8%	34.7%	22.4%	14.3%	1,003.1	10.4	2.4	125.4	Ind	1.3	51.2%
Squirrels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Arctic ground (parka) squirrel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Red (tree) squirrel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

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Table 6-3. Page 5 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Small land mammals/furbearers, continued												
Short-tailed weasel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Gray wolf	4.1%	4.1%	4.1%	0.0%	0.0%	0.0	0.0	0.0	21.6	Ind	0.2	128.9%
Wolverine	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Marine mammals	51.0%	0.0%	0.0%	51.0%	10.2%	0.0	0.0	0.0				0.0%
Seals	44.9%	0.0%	0.0%	42.9%	6.1%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Bearded seal	12.2%	0.0%	0.0%	12.2%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Harbor seal – fresh water	30.6%	0.0%	0.0%	28.6%	4.1%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Harbor seal– salt water	30.6%	0.0%	0.0%	28.6%	4.1%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Ringed seal	4.1%	0.0%	0.0%	4.1%	2.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Sea otter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Steller sea lion	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Whales	16.3%	0.0%	0.0%	16.3%	8.2%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Beluga whale	16.3%	0.0%	0.0%	16.3%	8.2%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Birds and eggs	89.8%	71.4%	71.4%	57.1%	42.9%	2,625.9	27.4	6.2				23.5%
Migratory birds	81.6%	67.3%	67.3%	30.6%	40.8%	2,208.5	23.0	5.2	1,833.8	Ind	19.1	24.5%
Ducks	81.6%	65.3%	65.3%	26.5%	40.8%	1,103.7	11.5	2.6	1,351.8	Ind	14.1	24.1%
Bufflehead	16.3%	14.3%	14.3%	2.0%	10.2%	12.5	0.1	0.0	31.3	Ind	0.3	54.2%
Goldeneyes	32.7%	32.7%	32.7%	2.0%	20.4%	94.0	1.0	0.2	131.3	Ind	1.4	38.9%
Unknown goldeneyes	28.6%	28.6%	28.6%	0.0%	16.3%	94.0	1.0	0.2	117.6	Ind	1.2	38.9%
Mallard	67.3%	57.1%	57.1%	16.3%	30.6%	499.6	5.2	1.2	499.6	Ind	5.2	26.4%
Northern pintail	44.9%	42.9%	42.9%	4.1%	28.6%	208.5	2.2	0.5	260.6	Ind	2.7	31.5%
Northern shoveler	14.3%	14.3%	14.3%	0.0%	12.2%	57.6	0.6	0.1	96.0	Ind	1.0	67.8%
Wigeons	26.5%	26.5%	26.5%	0.0%	22.4%	113.8	1.2	0.3	162.6	Ind	1.7	39.9%

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Table 6-3. Page 6 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Migratory birds, ducks, continued												
American wigeon	26.5%	26.5%	26.5%	0.0%	22.4%	113.8	1.2	0.3	162.6	Ind	1.7	39.9%
Unknown ducks	22.4%	14.3%	14.3%	10.2%	6.1%	117.7	1.2	0.3	150.9	Ind	1.6	66.5%
Geese	73.5%	59.2%	57.1%	22.4%	22.4%	949.6	9.9	2.3	458.4	Ind	4.8	30.2%
Canada geese	38.8%	32.7%	32.7%	8.2%	10.2%	178.4	1.9	0.4	137.1	Ind	1.4	41.0%
Dusky Canada geese	2.0%	2.0%	2.0%	0.0%	2.0%	14.1	0.1	0.0	3.9	Ind	0.0	141.4%
Lesser Canada geese[b]	30.6%	28.6%	28.6%	2.0%	8.2%	152.8	1.6	0.4	127.3	Ind	1.3	46.4%
Unknown Canada geese	8.2%	4.1%	4.1%	6.1%	2.0%	11.5	0.1	0.0	5.9	Ind	0.1	104.5%
Snow goose	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
White-fronted geese	44.9%	42.9%	40.8%	6.1%	16.3%	630.1	6.6	1.5	262.5	Ind	2.7	37.7%
Unknown geese	20.4%	12.2%	12.2%	10.2%	4.1%	141.1	1.5	0.3	58.8	Ind	0.6	77.6%
Swans	14.3%	18.4%	12.2%	2.0%	6.1%	105.8	1.1	0.3	17.6	Ind	0.2	62.2%
Tundra (whistling) swan	14.3%	18.4%	12.2%	2.0%	6.1%	105.8	1.1	0.3	17.6	Ind	0.2	62.2%
Cranes	4.1%	4.1%	4.1%	0.0%	2.0%	49.4	0.5	0.1	5.9	Ind	0.1	104.5%
Sandhill crane	4.1%	4.1%	4.1%	0.0%	2.0%	49.4	0.5	0.1	5.9	Ind	0.1	104.5%
Seabirds and loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown loons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Other birds	53.1%	40.8%	40.8%	18.4%	20.4%	353.8	3.7	0.8	505.5	Ind	5.3	35.8%
Upland game birds	53.1%	40.8%	40.8%	18.4%	20.4%	353.8	3.7	0.8	505.5	Ind	5.3	35.8%
Unknown grouse	30.6%	22.4%	22.4%	8.2%	12.2%	137.1	1.4	0.3	195.9	Ind	2.0	52.3%
Ptarmigan	40.8%	32.7%	32.7%	14.3%	16.3%	216.7	2.3	0.5	309.6	Ind	3.2	38.8%
Unknown ptarmigan	40.8%	32.7%	32.7%	14.3%	16.3%	216.7	2.3	0.5	309.6	Ind	3.2	38.8%

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Table 6-3. Page 7 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Birds, continued												
Bird eggs	51.0%	14.3%	12.2%	40.8%	12.2%	63.6	0.7	0.2				73.5%
Duck eggs	4.1%	2.0%	2.0%	2.0%	2.0%	2.1	0.0	0.0	13.7	Gal	0.1	141.4%
Unknown duck eggs	4.1%	2.0%	2.0%	2.0%	2.0%	2.1	0.0	0.0	13.7	Gal	0.1	141.4%
Goose eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown goose eggs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Seabird eggs	51.0%	12.2%	10.2%	40.8%	12.2%	61.5	0.6	0.1	221.4	Gal	2.3	76.0%
Gull eggs	51.0%	12.2%	10.2%	40.8%	12.2%	60.5	0.6	0.1	201.8	Gal	2.1	76.9%
Tern eggs	4.1%	2.0%	2.0%	2.0%	0.0%	1.0	0.0	0.0	19.6	Gal	0.2	141.4%
Unknown eggs	2.0%	0.0%	0.0%	2.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Marine invertebrates	4.1%	2.0%	2.0%	2.0%	0.0%	88.2	0.9	0.2				141.4%
Clams	4.1%	2.0%	2.0%	2.0%	0.0%	88.2	0.9	0.2	29.4	Gal	0.3	141.4%
Butter clam	4.1%	2.0%	2.0%	2.0%	0.0%	88.2	0.9	0.2	29.4	Gal	0.3	141.4%
Freshwater clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Horse clam (gapers)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pacific littleneck (steamer) clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pinkneck (surf) clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Pacific razor clam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown clams	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Cockles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown cockles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Dungeness crab	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
King crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%

-continued-

Table 6-3. Page 8 of 8.

Resource name(s)	Percentage of households					Pounds harvested			Amount harvested[a]			95% confidence limit (±) harvest
	Use	Attempt	Harvest	Receive	Give	Total	Mean household	Per capita	Total	Unit	Mean household	
Marine invertebrates, king crabs, continued												
Unknown king crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Tanner crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Tanner crab, Bairdi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown tanner crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Unknown crabs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown mussels	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Octopus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Ind	0.0	0.0%
Scallops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Unknown scallops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Shrimps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Gal	0.0	0.0%
Plants and fungi	100.0%	100.0%	100.0%	38.8%	34.7%	9,674.4	100.8	23.0				19.8%
Berries	98.0%	93.9%	93.9%	34.7%	20.4%	7,723.1	80.4	18.3	1,930.8	Gal	20.1	18.5%
Other plants / mushrooms	61.2%	59.2%	59.2%	8.2%	12.2%	1,951.3	20.3	4.6	4,87.8	Gal	5.1	40.0%
Trees (wood)	63.3%	61.2%	61.2%	8.2%	14.3%	0.0	0.0	0.0	411.4	Crd	4.3	24.8%

Note Differences between harvest and use percentages reflect sharing between households.

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

b. Both *B. canadensis taverner* and *B. canadensis parvipes.*

Source ADF&G Division of Subsistence household surveys, 2005.

For ease and efficiency when harvesting Chinook salmon, the goal was to harvest enough to fill the smokehouse with processed strips as early in the season as possible, and in the shortest period of time as possible, ideally in one tide, so that all the fish could be processed at the same time. One advantage to the early preservation of Chinook salmon was that cooler weather prevented the flies from becoming active and laying eggs on the fish hanging on racks for drying and smoking. Sockeye salmon (locally called "reds") and chum salmon ("dog salmon") were the next to return to the Nushagak River, followed by coho salmon ("silvers") and pink salmon ("humpies"). Pink and chum salmon were usually not targeted, but were utilized when caught. Sockeye salmon were dried and smoked, most commonly by splitting the fish along the backbone and then removing the backbone, leaving both fillets attached at the tail. Each fillet was sliced vertically, in even increments about 2 inches apart, across its width. The meat remained attached to the skin and the slices increased the drying surface of the fillet. The fillets were then draped over the poles in the smokehouse for the drying and smoking process. Traditionally, the peak of the sockeye salmon run in Bristol Bay occurred on July 4. In the later half of July, coho and pink salmon arrived in Nushagak Bay and started moving upriver. In late summer spawning (or post-spawn) sockeye salmon were caught along the Nushagak River.

Late summer was the time to start picking berries, beginning with salmonberries at the end of July. Harvesting berries was a favorite activity in New Stuyahok: 98% of the households reported using berries and 94% of the households reported harvesting berries (Table 6-3).

The Nushagak River and its tributaries supported numerous freshwater fish species which were harvested throughout the year. Whitefishes were mainly caught with nets in the fall. Ice fishing was a major subsistence activity, with residents targeting Arctic grayling and northern pike. In 2005, 78% of New Stuyahok households harvested non-salmon fishes and 88% of households used non-salmon fishes (Table 6-3).

In 2005, the second major source of subsistence foods by weight at New Stuyahok (after Chinook salmon) was moose (see Table 6-4 for a list of the top 10 resources harvested and used by New Stuyahok residents). During the study year, 94% of households used moose and 65% hunted moose (Table 6-3). The other large land mammal that contributed greatly to the diet of residents of New Stuyahok was caribou, with 92% of households using caribou and 70% hunting caribou in 2005 (Table 6-3).

Table 6-4.–Top 10 resources harvested and used, New Stuyahok, 2005.

Harvest			Use		
Rank	Resource	Pounds per capita	Rank	Resource	Percentage of households using
1	Chinook salmon	112.6	1	Berries	98.0%
2	Moose	75.3	2	Moose	93.9%
3	Caribou	63.5	3	Caribou	91.8%
4	Fresh sockeye salmon	33.3	4	Chinook salmon	85.7%
5	Coho salmon	21.5	5	Arctic grayling	81.6%
6	Berries	18.3	6	Northern pike	75.5%
7	Chum salmon	17.9	7	Coho salmon	73.5%
8	Northern pike	9.2	8	Fresh sockeye salmon	71.4%
9	Arctic grayling	6.5	9	Mallard	67.3%
10	Longnose sucker	4.7	10	Other plants	61.2%

Source ADF&G Division of Subsistence household surveys, 2005.

The moose population along the Nushagak River in GMU 17C is "stable to increasing," according to recent ADF&G analysis (Woolington 2006:245). The bull-only hunting season opened on August 20 and continued through September 20. There was also a bull-only hunting season during the month of December, but residents said river ice conditions limited effort in this hunt. Unless the river was completely frozen, they said, or mostly ice-free, travel on the river, either by snowmobile or skiff, was not possible, thus limiting the hunting area that could be accessed from the village. New Stuyahok hunters said they preferred to harvest a moose early in the fall season before the bulls entered the rut in September, citing the inedible quality ("stink") of the meat as their reason.

The 2005 caribou season was August 1–April 15. During the fall, while hunting moose, hunters harvested caribou if the animals were encountered along the local waterways. Residents said it was difficult to access caribou outside the river corridors in the fall, so during the winter, hunting resumed on snowmobiles when travel across the tundra was good. The abundance of the Mulchatna caribou herd dropped from a high in 1996 of about 200,000 animals to about 45,000 animals in 2006. For the 2004–2005 regulatory year, the abundance of the Mulchatna caribou herd was estimated to be about 85,000 animals (Woolington 2007:27). At its peak abundance, the range of the herd greatly expanded into areas that it had not used in historical times. In the study year, New Stuyahok hunters reported a scarcity of caribou near the community. They recalled that when the herd was larger, caribou were more accessible. They said that accessibility is dependent on favorable traveling conditions and the timing of caribou movements during the hunting season. If favorable traveling conditions prevailed, hunters said they could travel a long way to harvest caribou by snowmobile, but if the caribou arrived near the community after the close of the hunting season regulations prohibited their harvest.[13]

[13] At the start of the caribou season in 2006, the bag limit for caribou in this area was reduced from 5 to 3 caribou. The season had previously closed on April 15, but in 2006 the closure date was changed to March 15. Subsequent actions taken by the Alaska Board of Game in March 2007 reduced the bag limit to 2 caribou and eliminated the

Migratory birds traveled through the Nushagak River area in the fall and spring and were extensively hunted by the residents of New Stuyahok along the Mulchatna, Nuyakuk, and Kokwok rivers, and along the Nushagak River from well upstream of Koliganek downstream to Nushagak Bay. Lesser waterways were used to access areas away from the main river corridors. In 2005, 82% of New Stuyahok households used migratory birds, with 67% of households harvesting them. Fifty-one percent of residents reported using eggs and 12% reported harvesting bird eggs. All of the harvesters reported sharing eggs with other households (Table 6-3).

HARVEST QUANTITIES

Table 6-3 reports wild resource harvests and uses by New Stuyahok residents in 2005, organized first by category and then by species. All resources are reported in pounds usable weight. (See Appendix C for conversion factors.) The "harvest" category includes resources taken by any member of the surveyed household during the study year. The "use" category includes all resources taken and given away by a household and resources acquired after a harvest, either as gifts, by trade, through hunting partnerships, or as meat given to hunting guides by their clients. Purchased foods are not included. Differences between harvest and use percentages reflect sharing between households, which resulted in a wider distribution of wild foods.

The total harvest for all subsistence resources in 2005 for New Stuyahok was 163,927 lb, or 389 lb per person (Table 6-3). Table 6-4 lists the top 10 resources harvested, in terms of pounds per capita, and the 10 resources used by the most New Stuyahok households. Fishes constituted the largest portion of the harvest, with 91,128 lb (56%, or 216 lb per person) (Table 6-3 and Figure 6-2). In 2005, 90% of New Stuyahok households used salmon and 74% harvested salmon. The total of 79,316 lb of salmon (188 lb per person) included 47,434 lb of Chinook salmon (113 lb per person), 14,028 lb of fresh sockeye salmon (33 lb per person), 9,062 lb of coho salmon (22 lb person), 7,519 lb of chum salmon (18 lb per person), 5 lb of pink salmon (<1 lb per person), and 1,269 lb of spawning sockeye salmon (3 lb per person) (Table 6-3 and Figure 6-3).

Non-salmon fishes were also an important resource, making up 7% of the total harvest of wild resources (Table 6-3 and Figure 6-2). In 2005, New Stuyahok residents harvested 11,812 lb of non-salmon fishes, or 28 lb per person. Figure 6-4 shows the 2005 harvest of non-salmon fishes by percentage of total pounds in New Stuyahok. The major species harvested included northern pike (3,884 lb, or 9 lb per person) at 34% of the harvest of all non-salmon fishes, Arctic grayling with 23% (2,758 lb, or 7 lb per person), and whitefishes at 19% (2,219 lb, or 5 lb per person) (Table 6-3). Other important freshwater fishes included longnose suckers at 17% of the harvest (1,998 lb, or 5 lb per person), char at 3%, rainbow smelt at 3%, and rainbow trout at 1% (Figure 6-4). Longnose suckers were frequently caught in nets that were targeting other species. They were boiled or dried and consumed by elders or used for dog food. In terms of diversity of harvest, New Stuyahok has one of the most diverse harvests of nonsalmon fishes, as seen in Figure 6-4.

Large land mammals (Table 6-3) were another major source of wild foods in New Stuyahok in 2005, with 58,482 lb harvested (139 lb per person). Fifty-four percent of this harvest was moose (31,739 lb, or 75 lb per person). Forty-six percent of usable large land mammal meat by weight was caribou at 46% (26,743 lb, or 64 lb per person). In addition to moose and caribou, black

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provision that allowed hunting the same day as aircraft travel ("same-day airborne") in GMU 17C (New Stuyahok), as well as GMUs 9B and 17B east of the Nushagak River.

bears and brown bears were the other large land mammals used by the residents of New Stuyahok.

Porcupines and beavers were important small land mammal resources. In 2005, New Stuyahok residents harvested 1,003 lb of porcupines (2 lb per person) and 926 lb of beavers (2 lb per person; Table 6-3).

In addition, harvests of waterfowl by residents of New Stuyahok in 2005 included ducks (1,104 lb, or 3 lb per person) and geese (950 lb, or 2 lb per person) (Table 6-3). Berries were an important resource, with a harvest of 7,723 lb (18 lb person). Other plants and greens accounted for a harvest of 1,951 lb in 2005 (5 lb per person).

GENERAL HUNTING, FISHING, AND GATHERING AREAS

New Stuyahok residents' wild resource harvests in 2005 were focused along the Nushagak River, both upstream and downstream from the village; along the Mulchatna, Nuyakuk, Kokwok, and Koktuli rivers; and adjacent land areas ranging from Igushik on Nushagak Bay upriver to Tikchik, Nuyakuk, and Chauekuktuli lakes, and to Kemuk Mountain and east to the Kvichak River (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report). The Nushagak River was an important location for the harvest of salmon and other fishes (Figure 6-5). Additionally, the other waterways and lakes noted above were important for the harvest of non-salmon fishes and migratory birds (Figure 6-6), as well as for access to other resources, including berries and plants (Figure 6-7). During 2005, caribou hunting activities involved the largest area of use (Figure 6-8).

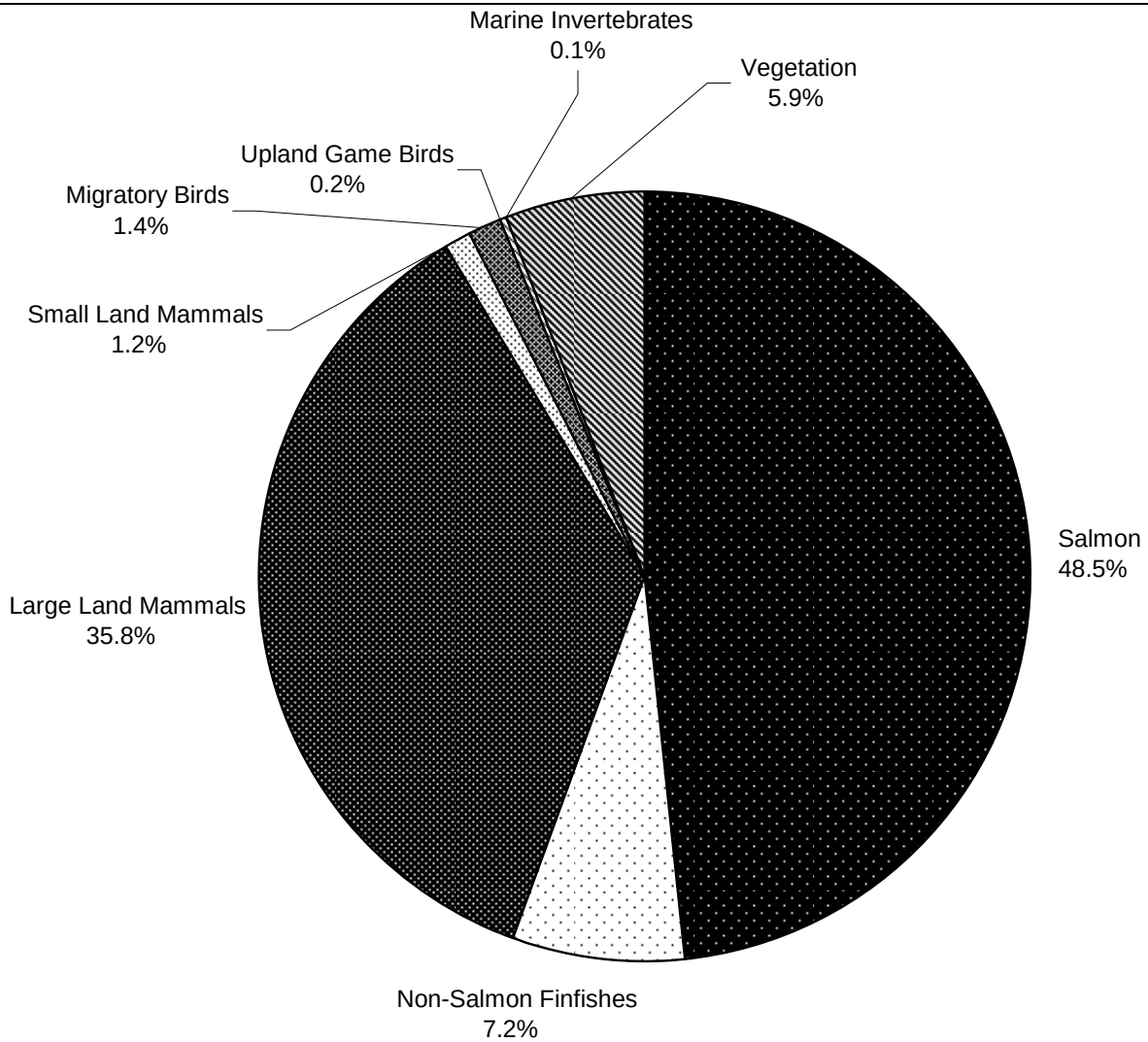

Figure 6-2.–New Stuyahok composition of wild resource harvests, pounds usable weight, 2005.

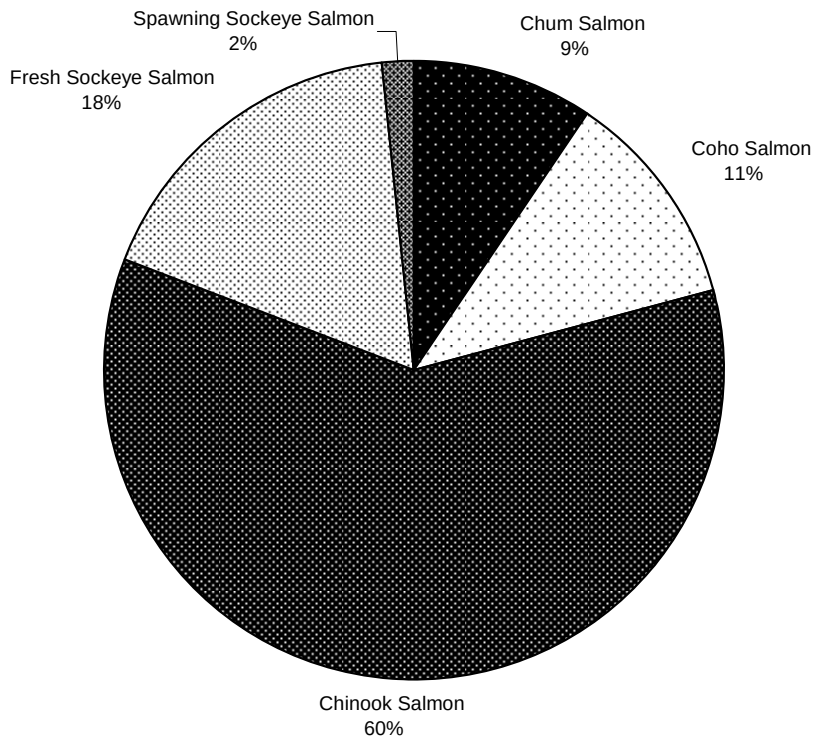

Figure 6-3. – New Stuyahok composition of salmon harvests, pounds usable weight, 2005.

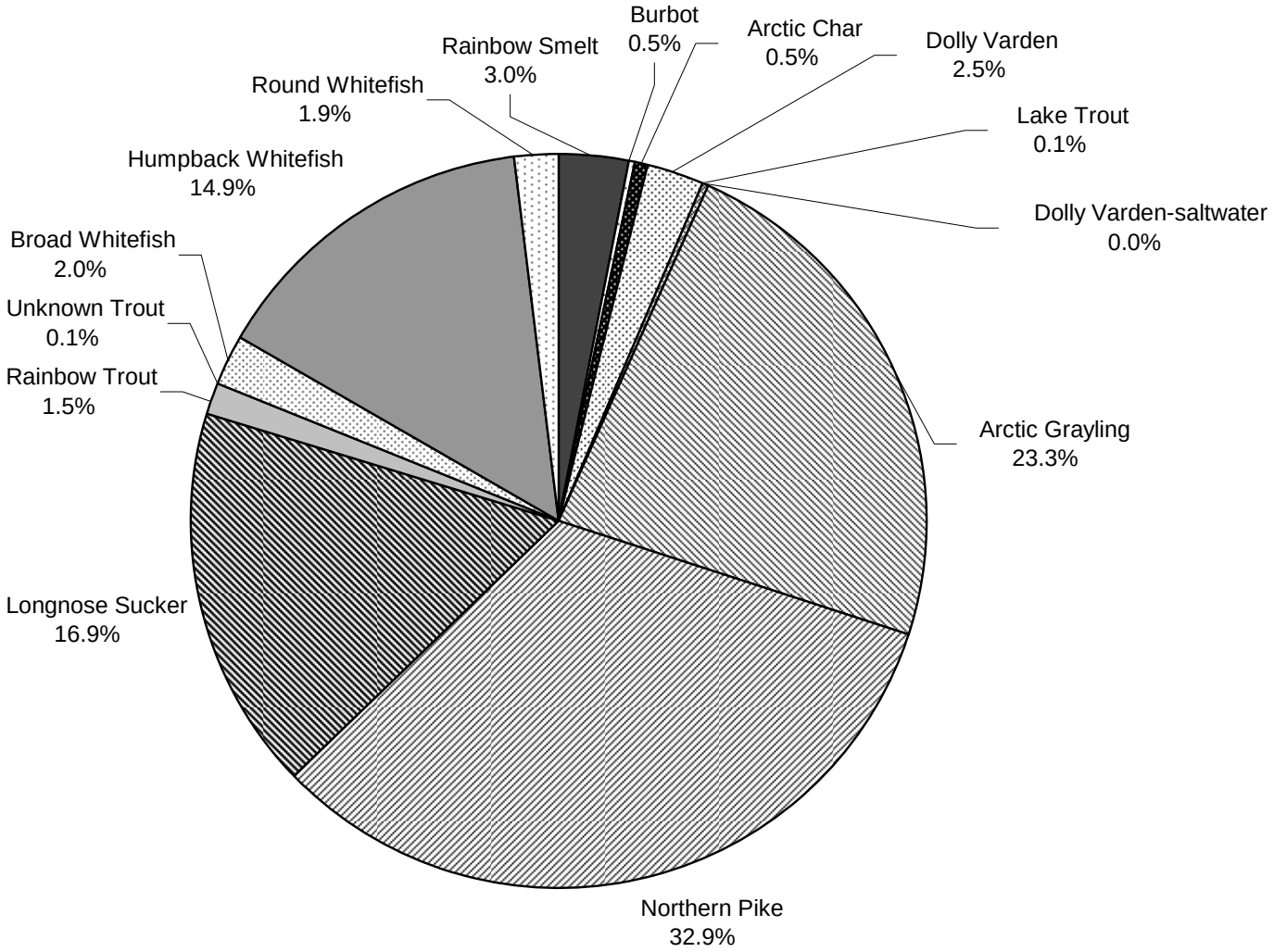

Figure 6-4.–New Stuyahok composition of non-salmon fish harvests, pounds usable weight, 2005.

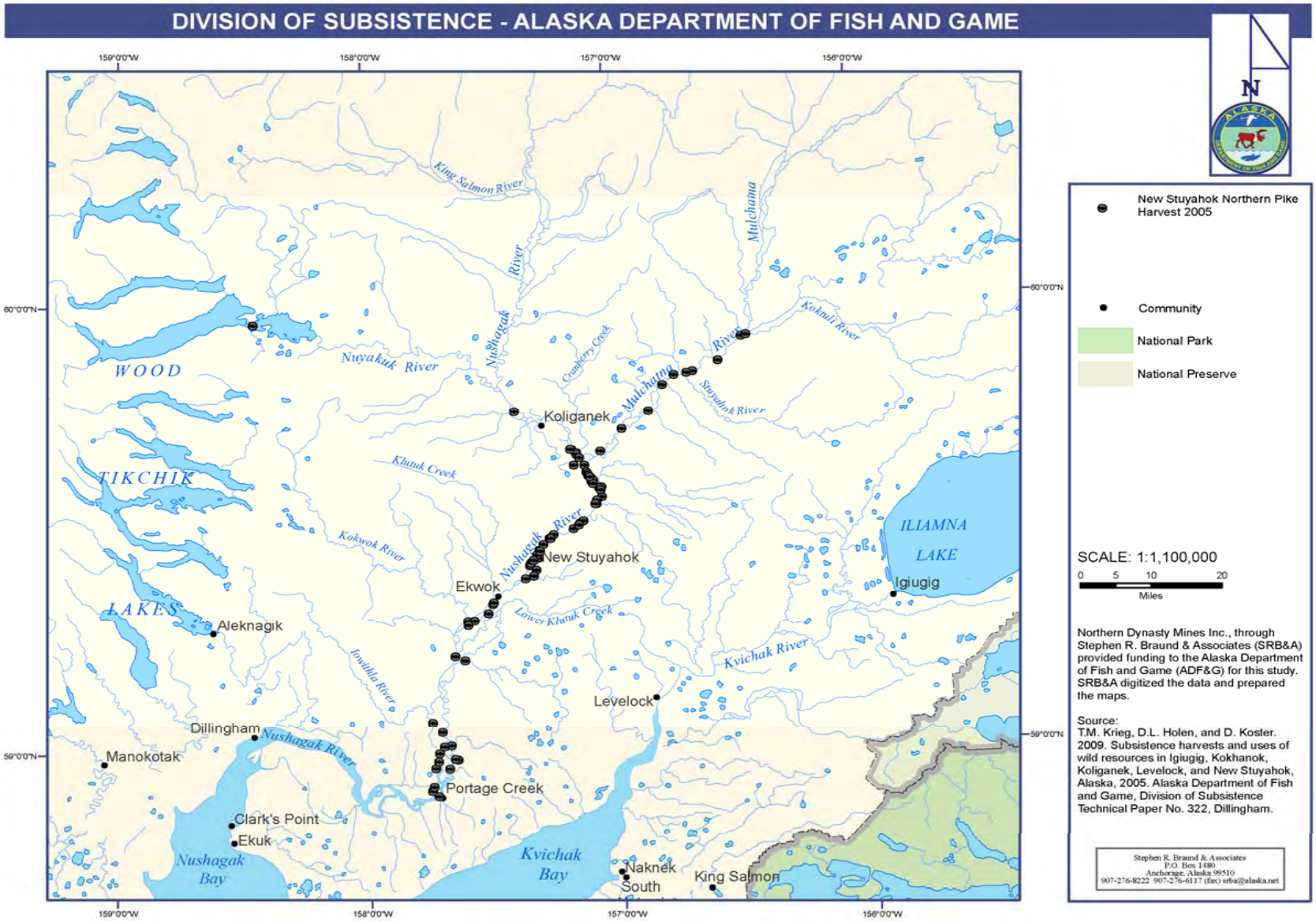

Figure 6-5.–Northern pike harvest locations, New Stuyahok, 2005.

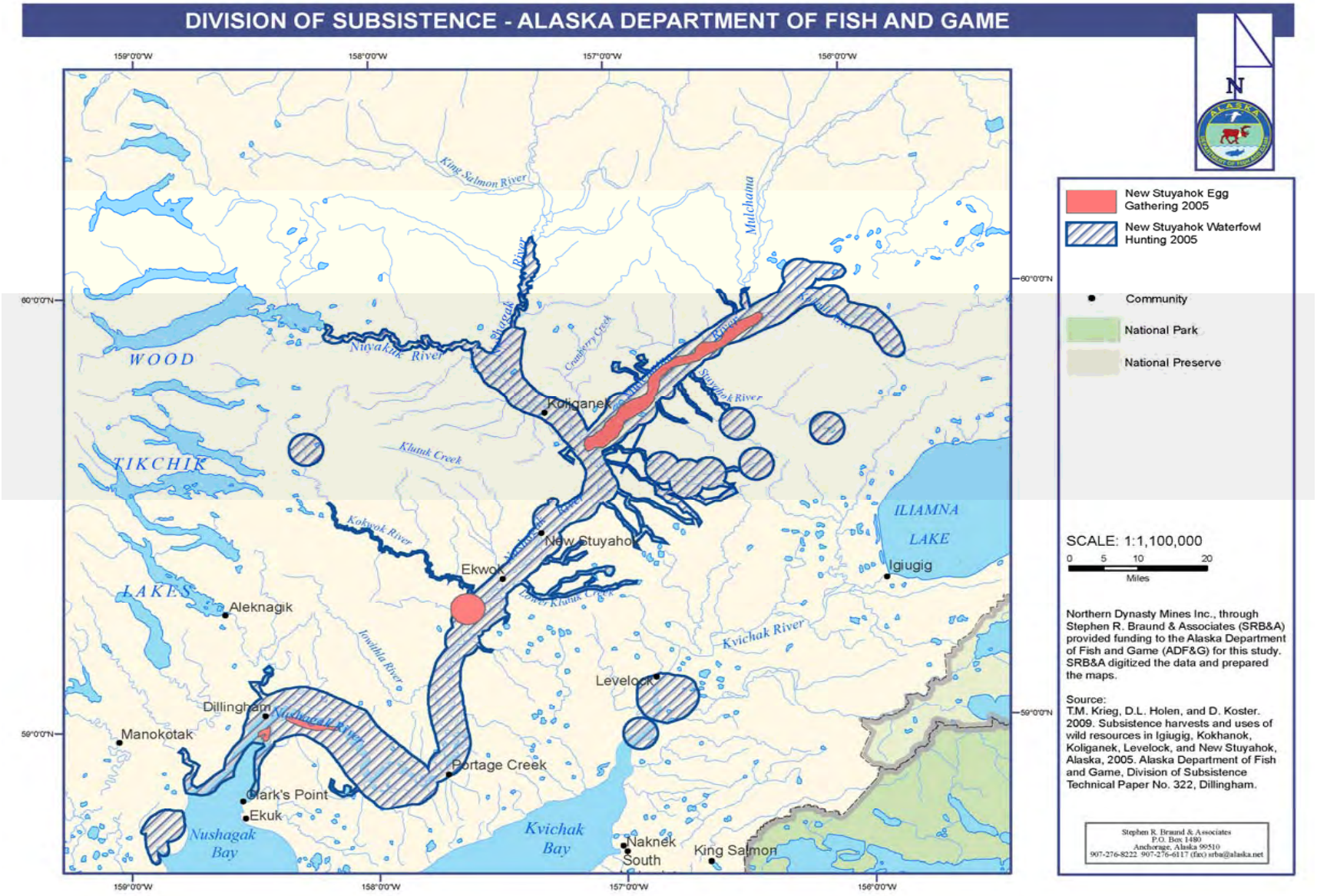

Figure 6-6.–Egg gathering and waterfowl hunting locations, New Stuyahok, 2005.

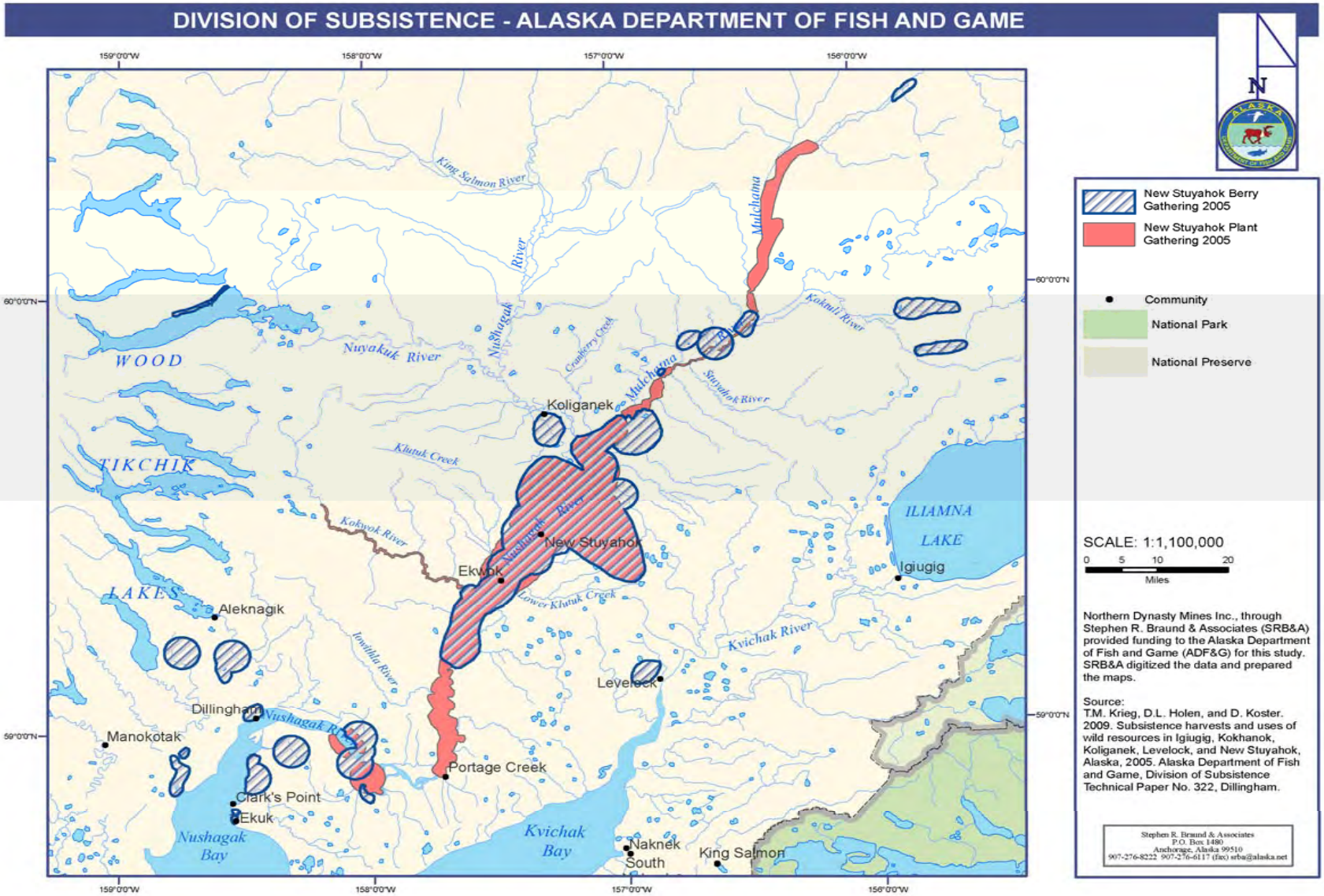

Figure 6-7.–Berry and plant gathering locations, New Stuyahok, 2005.

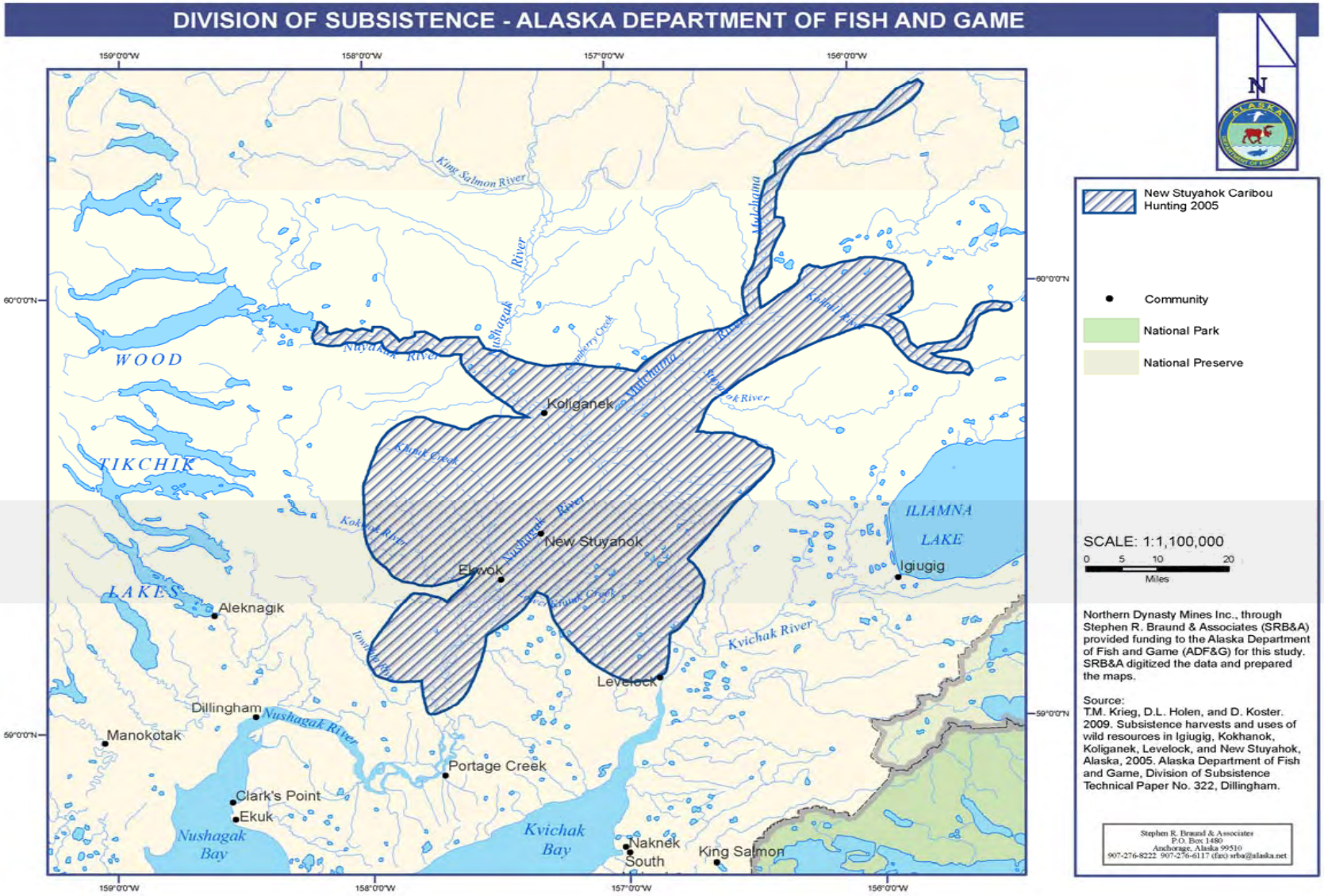

Figure 6-8.–Caribou hunting locations, New Stuyahok, 2005.

SHARING AND RECEIVING WILD RESOURCES

In New Stuyahok in 2005, 98% of households received wild resources from other households and 74% of households gave resources away (Tables 1-14 and 6-3). Households received an average of 8 resources and gave away an average of 7 resources (Table 1-14). Large land mammals were used by 100% of the households, and they were among the most commonly shared resources, with 82% of households receiving and 51% of households giving away large land mammals (Table 6-3). Fishes, used by 94% of the households, also were widely shared: 82% of the households received and 63% gave fishes to other households (Table 6-3).

In 2005, those New Stuyahok households that were interviewed reported no marine mammal harvests, yet 51% of the households used marine mammals. Marine mammal products were received from residents of other communities. Fifty-one percent of New Stuyahok households received marine mammals and 10% gave marine mammals to other households. In 2005, 45% of households used seals, with 43% receiving seals and 6% giving away seals (examples of redistribution of received resources). Sixteen percent received beluga whale products and 8% gave them to other households. Walruses were received by 8% of the households and given away by 2% of the households (Table 6-3).

Forty-three percent of the households gave away birds and eggs and 57% received them. Twelve percent of the New Stuyahok households gave away bird eggs and 41% received them. For the category of migratory birds, 41% of the households gave away and 31% received them. This was the only major category where the giving exceeded the receiving. That the percentage of giving households exceeded the percentage of receiving households was the case for most of the species of salmon, some of the non-salmon fishes, and for plants other than berries. For wild plants, including berries, 39% of the households received and 35% gave them to other households. For plants other than berries, 12% of the households gave and 8% received them (Table 6-3).

USE AND HARVEST CHARACTERISTICS BY RESOURCE CATEGORY

SALMON

In 2005, New Stuyahok residents harvested 88% of the total salmon harvest for home use, in pounds usable weight, with setnets (Table 6-5). Portions of the harvests of chum salmon (<1%), Chinook salmon (almost 2%), and sockeye salmon (just over 3%) were removed from commercial catches for use by New Stuyahok residents. Four percent of all New Stuyahok households removed chum salmon from their commercial catches and 6% of the households removed Chinook and sockeye salmon from their commercial catches (Tables 1-15 and 6-5). In addition to subsistence setnets and removal from commercial catches, 11% of the harvest of usable pounds of salmon by New Stuyahok residents was taken by rod and reel gear (Table 6-5). Chinook salmon were the main species harvested (Table 6-3), of which just less than 92% were taken in setnets and 7% were taken with rod and reel. Sockeye salmon were mostly taken by setnet (94%) as were chum salmon (97%). Coho salmon were harvested by setnet (56%) and rod and reel (44%). A number of households indicated that they liked using rod and reel to catch a few fresh coho salmon from the Nushagak River adjacent to New Stuyahok, as needed for meals. Post-spawn sockeye salmon were taken by setnet (78%) and rod and reel (22%).

NON-SALMON FINFISHES

Table 6-6 lists the percentage, by gear type, of each non-salmon fish species harvested by New Stuyahok residents in 2005. Residents usually caught fishes other than salmon by ice fishing. For example, 100% each of rainbow smelt and lake trout were harvested while ice fishing. Northern pike and Arctic grayling were the 2 most harvested non-salmon fishes by weight (Table 6-3), and 70% of northern pike and 98% of Arctic grayling were caught while ice fishing (Table 6-6). Species caught mainly with setnets were humpback whitefish (97%) and longnose suckers (82%). Twenty-five percent of northern pike and 39% of round whitefish were harvested by setnet (Table 6-6). Rod and reel fishing was most prominent for Dolly Varden and rainbow trout, of which 44% and 43% of the harvests, respectively, were taken during rod and reel fishing (Table 6-6). Most of the remainder of the harvest of Dolly Varden and rainbow trout was obtained by ice fishing. Harvest locations for non-salmon fishes were focused along the Nushagak and Mulchatna rivers and the 3 Wood–Tikchik lakes mentioned above (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

LARGE LAND MAMMALS

In 2005, large land mammals made up 36% of the harvest in pounds for New Stuyahok (Figure 6-2). In 2005, 69% of the households in New Stuyahok attempted to harvest caribou and 59% were successful. Moose followed a similar pattern, with 65% of households attempting to harvest moose; 51% were successful. Moose were 54% of the large land mammal harvest and caribou were 46%, in terms of usable weight (178 caribou harvested compared to 59 moose; Table 6-3). The caribou hunting area for New Stuyahok was about twice as large as the moose hunting area in 2005. The caribou hunting area essentially overlapped the moose hunting area, which extended downstream on the Nushagak River to Portage Creek and upstream to Harris Creek. Within the Mulchatna River drainage, moose hunting was more prevalent and hunters traveled over a larger area than they did for caribou hunting (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

SMALL LAND MAMMALS/FURBEARERS

The total harvest of edible meat from small land mammals by New Stuyahok residents in 2005 was 1,929 lb, or almost 5 lb per person. All of this was from porcupines (1,003 lb) and beavers (926 lb, Table 6-3). Two percent of the households harvested foxes and martens and 4% harvested wolves; these furbearers were not eaten. The hunting area for small land mammals included a large area around New Stuyahok, as well as lands along the Nushagak and Mulchatna rivers and their tributaries (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report).

MARINE MAMMALS

Although there were no attempted harvests of marine mammals reported by New Stuyahok residents in 2005, 51% of the households used marine mammals, including various seals, walruses, and beluga whale products (Table 6-3). The reported seal use was nearly all as seal oil, with Togiak frequently mentioned as the source. Walruses were used by 8% of the households and beluga whales by 16%.

Table 6-5.–Estimated percentages of salmon harvest by gear type, resource, and total salmon harvest, New Stuyahok, 2005.

				Subsistence methods											
		Removed from commercial catch[a]		Setnet		Seine		Other		Subsistence gear; any method		Rod and reel		Any method	
Resource	Percentage base	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
Salmon	Gear type	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Resource	1.4%	1.5%	86.0%	87.6%	0.0%	0.0%	0.0%	0.0%	86.0%	87.6%	12.6%	10.9%	100.0%	100.0%
	Total	1.4%	1.5%	86.0%	87.6%	0.0%	0.0%	0.0%	0.0%	86.0%	87.6%	12.6%	10.9%	100.0%	100.0%
Chum salmon	Gear type	1.3%	0.9%	14.9%	10.4%	0.0%	0.0%	0.0%	0.0%	14.9%	10.4%	2.6%	2.1%	13.1%	9.3%
	Resource	0.1%	0.1%	97.4%	97.4%	0.0%	0.0%	0.0%	0.0%	97.4%	97.4%	2.5%	2.5%	100.0%	100.0%
	Total	0.0%	0.0%	12.8%	9.1%	0.0%	0.0%	0.0%	0.0%	12.8%	9.1%	0.3%	0.2%	13.1%	9.3%
Coho salmon	Gear type	0.0%	0.0%	11.6%	8.4%	0.0%	0.0%	0.0%	0.0%	11.6%	8.4%	61.2%	52.5%	17.7%	13.1%
	Resource	0.0%	0.0%	56.4%	56.4%	0.0%	0.0%	0.0%	0.0%	56.4%	56.4%	43.6%	43.6%	100.0%	100.0%
	Total	0.0%	0.0%	10.0%	7.4%	0.0%	0.0%	0.0%	0.0%	10.0%	7.4%	7.7%	5.7%	17.7%	13.1%
Chinook salmon	Gear type	39.7%	63.0%	38.7%	61.4%	0.0%	0.0%	0.0%	0.0%	38.7%	61.4%	20.0%	37.4%	36.4%	58.8%
	Resource	1.6%	1.6%	91.5%	91.5%	0.0%	0.0%	0.0%	0.0%	91.5%	91.5%	6.9%	6.9%	100.0%	100.0%
	Total	0.6%	0.9%	33.3%	53.8%	0.0%	0.0%	0.0%	0.0%	33.3%	53.8%	2.5%	4.1%	36.4%	58.8%
Pink salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sockeye salmon	Gear type	59.0%	36.1%	30.0%	18.4%	0.0%	0.0%	0.0%	0.0%	30.0%	18.4%	6.7%	4.9%	27.5%	17.2%
	Resource	3.1%	3.1%	93.9%	93.9%	0.0%	0.0%	0.0%	0.0%	93.9%	93.9%	3.1%	3.1%	100.0%	100.0%
	Total	0.8%	0.5%	25.8%	16.1%	0.0%	0.0%	0.0%	0.0%	25.8%	16.1%	0.8%	0.5%	27.5%	17.2%
Landlocked salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spawning sockeye	Gear type	0.0%	0.0%	4.8%	1.4%	0.0%	0.0%	0.0%	0.0%	4.8%	1.4%	9.4%	3.2%	5.3%	1.6%
	Resource	0.0%	0.0%	77.8%	77.8%	0.0%	0.0%	0.0%	0.0%	77.8%	77.8%	22.2%	22.2%	100.0%	100.0%
	Total	0.0%	0.0%	4.2%	1.2%	0.0%	0.0%	0.0%	0.0%	4.2%	1.2%	1.2%	0.3%	5.3%	1.6%
Unknown salmon	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source ADF&G Division of Subsistence household surveys, 2005.

a. Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

Table 6-6.–Estimated percentages of fishes other than salmon harvested by gear type, resource, and total harvest, New Stuyahok, 2005.

			Subsistence gear								
Resource	Percentage base	Removed from commercial catch[a]	Setnet	Seine	Hand line gear	Dip net	Ice fishing	Subsistence gear (other)	Subsistence gear, any gear	Rod and reel	Any method
Non-salmon fishes	Gear type	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	100.0%	100.0%	100.0%
	Resource	0.0%	37.6%	0.0%	0.0%	2.9%	52.3%	0.0%	92.8%	3.1%	100.0%
	Total	0.0%	37.6%	37.6%	0.0%	2.9%	52.3%	0.0%	92.8%	3.1%	100.0%
Rainbow smelt	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	5.7%	0.0%	3.2%	0.0%	3.0%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	3.0%	0.0%	3.0%	0.0%	3.0%
Burbot	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.3%	0.0%	0.5%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	48.3%	0.0%	48.3%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%	0.0%	0.5%
Arctic char	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.5%	1.5%	0.5%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	90.9%	0.0%	90.9%	9.1%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.5%	0.0%	0.5%
Dolly Varden	Gear type	0.0%	0.4%	0.0%	0.0%	0.0%	2.4%	0.0%	1.5%	34.7%	2.4%
	Resource	0.0%	5.7%	0.0%	0.0%	0.0%	50.5%	0.0%	56.2%	43.8%	100.0%
	Total	0.0%	0.1%	0.1%	0.0%	0.0%	1.2%	0.0%	1.4%	1.1%	2.4%
Dolly Varden–saltwater	Gear type	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Resource	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Lake trout	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%
Arctic grayling	Gear type	0.0%	0.1%	0.0%	0.0%	0.0%	43.9%	0.0%	24.8%	11.3%	23.3%
	Resource	0.0%	0.1%	0.0%	0.0%	0.0%	98.4%	0.0%	98.5%	1.5%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	23.0%	0.0%	23.0%	0.3%	23.3%
Northern pike	Gear type	0.0%	22.0%	0.0%	0.0%	31.8%	43.9%	0.0%	34.7%	22.6%	32.9%
	Resource	0.0%	25.1%	0.0%	0.0%	2.8%	69.9%	0.0%	97.9%	2.1%	100.0%
	Total	0.0%	8.3%	8.3%	0.0%	0.9%	23.0%	0.0%	32.2%	0.7%	32.9%

-continued-

Table 6-6. Page 2 of 2.

Resource	Percentage base	Removed from commercial catch[a]	Subsistence gear: Setnet	Seine	Hand line gear	Dip net	Ice fishing	Subsistence gear (other)	Subsistence gear any gear	Rod and reel	Any method
Longnose sucker	Gear type	0.0%	37.1%	0.0%	0.0%	0.0%	0.0%	0.0%	15.0%	0.0%	16.9%
	resource	0.0%	82.4%	0.0%	0.0%	0.0%	0.0%	0.0%	82.4%	0.0%	100.0%
	Total	0.0%	13.9%	13.9%	0.0%	0.0%	0.0%	0.0%	13.9%	0.0%	16.9%
Rainbow trout	Gear type	0.0%	0.1%	0.0%	0.0%	0.0%	1.5%	0.0%	0.9%	20.4%	1.5%
	Resource	0.0%	3.2%	0.0%	0.0%	0.0%	54.0%	0.0%	57.1%	42.9%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.8%	0.6%	1.5%
Unknown trout	Gear type	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%
	Resource	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%
Broad whitefish	Gear type	0.0%	0.0%	0.0%	0.0%	68.2%	0.0%	0.0%	2.1%	0.0%	2.0%
	Resource	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Total	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	2.0%	0.0%	2.0%
Humpback whitefish	Gear type	0.0%	38.3%	0.0%	0.0%	0.0%	0.4%	0.0%	15.7%	9.4%	14.9%
	Resource	0.0%	96.7%	0.0%	0.0%	0.0%	1.4%	0.0%	98.1%	1.9%	100.0%
	Total	0.0%	14.4%	14.4%	0.0%	0.0%	0.2%	0.0%	14.6%	0.3%	14.9%
Round whitefish	Gear type	0.0%	2.0%	0.0%	0.0%	0.0%	0.6%	0.0%	1.2%	0.0%	1.9%
	Resource	0.0%	39.1%	0.0%	0.0%	0.0%	17.4%	0.0%	56.5%	0.0%	100.0%
	Total	0.0%	0.7%	0.7%	0.0%	0.0%	0.3%	0.0%	1.1%	0.0%	1.9%

Note This table lists only those resources for which there was a harvest in the 2005 study year.

a. Regulations allow commercial fishers to retain fish for their own noncommercial uses (5 AAC 39.010).

Source ADF&G Division of Subsistence household surveys, 2005.

MARINE INVERTEBRATES

Butter clams were the only marine invertebrates harvested and used by 4% of the New Stuyahok households in 2005. Two percent of the households harvested butter clams and 2% of the households reported receiving butter clams (Table 6-3).

BIRDS AND EGGS

In 2005, New Stuyahok residents harvested waterfowl along the Nushagak, Mulchatna, Koktuli, Nuyakuk, and Kokwok rivers (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report). Egg gathering also took place along the Mulchatna River and from locations on the lower Nushagak River. New Stuyahok residents harvested 2,209 lb of migratory birds (5 lb per person) and 354 lb of upland birds (almost 1 lb per person) in 2005 (Table 6-3). Bird eggs accounted for 64 lb of the harvest of wild resources, or <1 lb per person (Table 6-3).

WILD PLANTS

New Stuyahok residents traveled long distances to harvest plants and berries in 2005 (see Appendix D, "Harvest Use Area Maps by Community," published in hard copy on a CD-ROM attached to the back cover of this report). The berry harvest was concentrated in a large area around New Stuyahok, but berries were also harvested at numerous other locations ranging from the upper Mulchatna and Koktuli rivers to Nuyakuk Lake as well as at locations on Nushagak Bay. The gathering of other plants took place in many of the berry picking areas, as well as larger areas along the Mulchatna River and lower Nushagak River. Residents of New Stuyahok harvested 7,723 lb of berries (18 lb per person) and 1,951 lb of other plants (5 lb per person; Table 6-3).

COMPARING HARVESTS AND USES IN 2005 WITH PREVIOUS YEARS

Fifty-nine percent of New Stuyahok households indicated that their overall harvest and uses of resources in 2005 were about the same as in recent years (the last 5 years); 33% said their harvest was less than in recent years. Very few households (8%) reported an increase in their 2005 harvests. Table 6-7 summarizes respondents' assessments for each major resource category (see also Figure 6-9). For example, 67% of households reported that their uses of salmon in 2005 were the same in recent years, 6% reported that they used more salmon in 2005, while 27% used fewer. For large land mammals, 76% of the households said that they used the same, 18% said that they used fewer and 6% said they used more. For the wild plants category, almost 72% of the households said that they used the same amount, 20% said they used fewer, and 8% said they used more.

Table 6-8 lists the reasons, by resource category, that residents of New Stuyahok gave for changes in their harvests and uses. This was an open-ended question and respondents could provide more than one reason for changes. Project staff grouped the responses into categories, such as competition for resources, regulations hindering or helping residents harvest resources, sharing of harvests, effects of weather on animals and subsistence activities, changes in the animal populations, personal reasons such as work and health, and other outside effects on residents' opportunities to engage in subsistence activities.

Personal reasons, reductions in sharing, and changes in animal populations (or plant availability) were 3 major reasons given for changes. Some households gave a combination of reasons. Of the households that said they harvested and used fewer salmon, personal reasons were cited by 39%. For non-salmon finfishes, of the households that said they harvested and used fewer, 30% gave personal reasons and 30% said that people were sharing less. For large land mammals, 33% of the households that said they harvested and used fewer cited "other outside effects" as the reason. For small land mammals/furbearers, the most common response, at 38%, was that people were sharing less. For birds and eggs, of those households that said that they harvested and used fewer, 67% said that the reason was changes in animal populations. For wild plants, 50% of the households said personal reasons accounted for less harvest and uses.

Figure 6-10 reports the percentage of New Stuyahok households that cited particular reasons for less uses of any resource category in 2005 compared to other recent years. As noted above, reductions in harvests and uses were said by residents to be due to changes in animal populations (or plant availability), personal reasons, and reductions in sharing. Fifty-four percent reported less uses of any resource in 2005 due to animal population changes, 47% for personal reasons, and 29% because people were sharing less. Less sharing was the main reason given for less use of marine mammals, since no household harvested them (Table 6-3). Most respondents (38%) reporting diminished harvests of furbearers (Table 6-8) also cited less sharing as an explanation of the change.

Table 6-7.–Comparison of household harvests and uses in recent years: Kvichak and Nushagak watersheds comprehensive subsistence baseline update, New Stuyahok, 2005.

Resource	Estimated households	No response		Valid responses		Fewer		Same		More	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Salmon	96	2.0	2.0%	94.0	98.0%	25.5	27.1%	62.7	66.7%	5.9	6.2%
Non-salmon finfishes	96	2.0	2.0%	94.0	98.0%	19.6	20.8%	68.6	72.9%	5.9	6.2%
Marine invertebrates	96	11.8	12.2%	84.2	87.8%	2.0	2.3%	82.3	97.7%	0.0	0.0%
Large land mammals	96	0.0	0.0%	96.0	100.0%	17.6	18.4%	72.5	75.5%	5.9	6.1%
Small land mammals/furbearers	96	3.9	4.1%	92.1	95.9%	15.7	17.0%	74.5	80.9%	2.0	2.1%
Marine mammals	96	5.9	6.1%	90.1	93.9%	7.8	8.7%	78.4	87.0%	3.9	4.4%
Birds and eggs	96	5.9	6.1%	90.1	93.9%	17.6	19.6%	60.7	67.4%	11.8	13.0%
Wild plants	96	0.0	0.0%	96.0	100.0%	19.6	20.4%	68.6	71.4%	7.8	8.2%
Overall	96	0.0	0.0%	96.0	100.0%	31.4	32.7%	56.8	59.2%	7.8	8.2%
Any resource	96	0.0	0.0%	96.0	100.0%	54.9	57.1%	94.0	98.0%	23.5	24.5%

Source ADF&G Division of Subsistence household surveys, 2005.

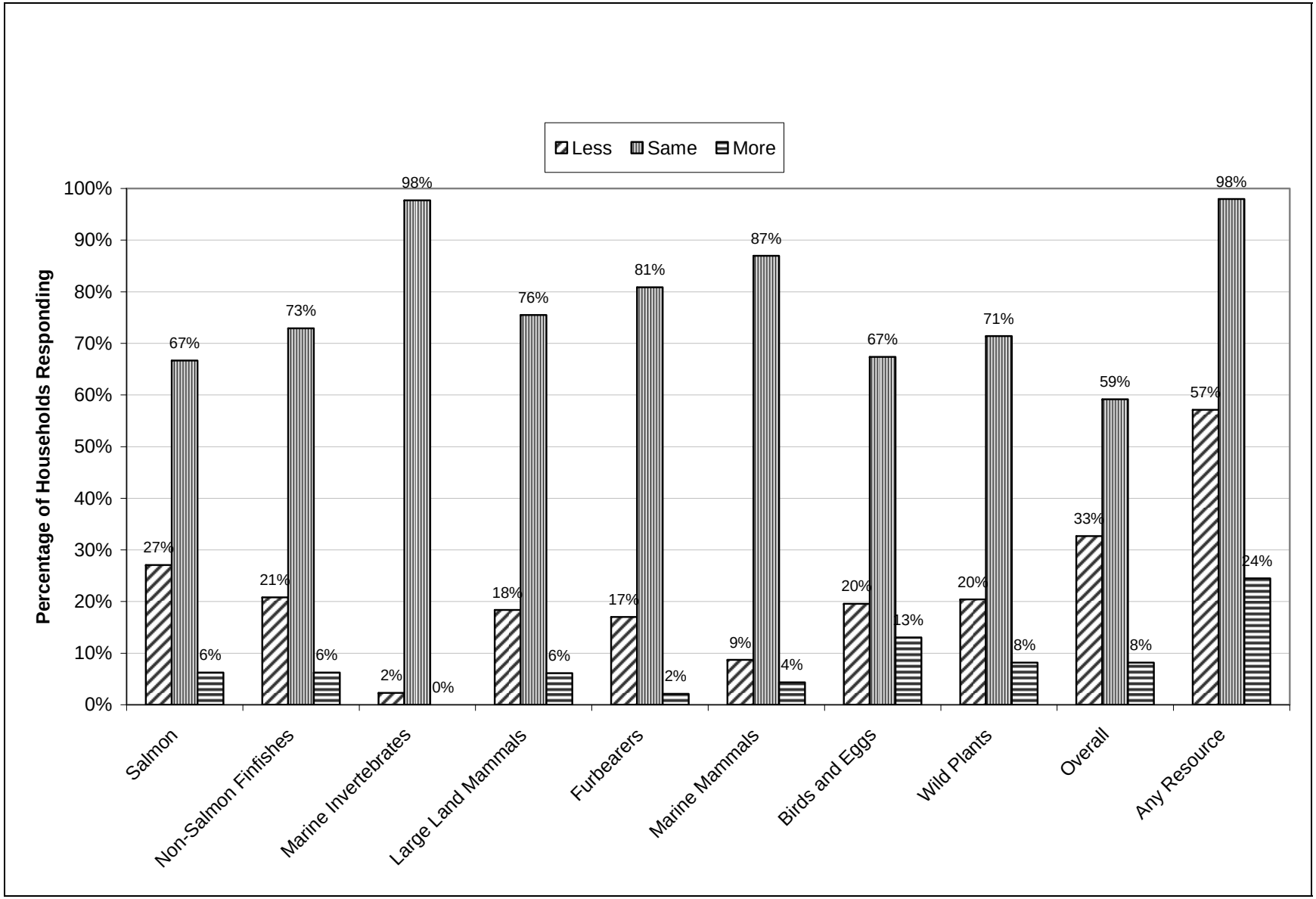

Figure 6-9.–New Stuyahok households' assessment of harvest and uses of wild resources in 2005 compared to recent years.

Table 6-8.–New Stuyahok respondents' reasons for change in harvests and uses in recent years.

			Percentage of responses by category[a]							
Resource category	Use fewer or more	Estimated number of households[b]	No reason given	Competition	Regulations	People are sharing less	Weather	Animal population changes[c]	Personal reasons (work/health)	Other outside effects
Salmon	Fewer	25.5	7.7%	7.7%	0.0%	23.1%	0.0%	15.4%	38.5%	23.1%
Salmon	More	5.9	0.0%	0.0%	0.0%	33.3%	0.0%	33.3%	33.3%	0.0%
Non-salmon finfishes	Fewer	19.6	0.0%	0.0%	0.0%	30.0%	20.0%	20.0%	30.0%	0.0%
Non-salmon finfishes	More	5.9	0.0%	0.0%	0.0%	33.3%	0.0%	0.0%	66.7%	0.0%
Marine invertebrates	Fewer	2.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Large land mammals	Fewer	17.6	0.0%	22.2%	0.0%	22.2%	11.1%	11.1%	22.2%	33.3%
Large land mammals	More	5.9	0.0%	0.0%	0.0%	33.3%	0.0%	66.7%	0.0%	0.0%
Small land mammals/furbearers	Fewer	15.7	0.0%	0.0%	0.0%	37.5%	25.0%	25.0%	25.0%	12.5%
Small land mammals/furbearers	More	2.0	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Marine mammals	Fewer	7.8	0.0%	0.0%	0.0%	75.0%	0.0%	0.0%	25.0%	25.0%
Marine mammals	More	3.9	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Birds and eggs	Fewer	17.6	0.0%	0.0%	0.0%	11.1%	11.1%	66.7%	22.2%	22.2%
Birds and eggs	More	11.8	0.0%	0.0%	0.0%	66.7%	0.0%	16.7%	33.3%	0.0%
Wild plants	Fewer	19.6	0.0%	0.0%	0.0%	10.0%	0.0%	40.0%	50.0%	20.0%
Wild plants	More	7.8	25.0%	0.0%	0.0%	0.0%	0.0%	25.0%	50.0%	0.0%
Overall	Fewer	31.3	6.3%	6.3%	0.0%	6.3%	18.8%	12.5%	50.0%	31.3%
Overall	More	7.8	0.0%	0.0%	0.0%	25.0%	0.0%	50.0%	50.0%	0.0%
Any resource	Fewer	54.9	3.6%	10.7%	0.0%	28.6%	17.9%	53.6%	46.4%	25.0%
Any resource	More	23.5	8.3%	8.3%	0.0%	58.3%	0.0%	41.7%	41.7%	0.0%

a. Percentage of estimated number of households that reported less or more uses of the resource category who cited this reason.

b. Estimated number of households citing a change in uses. For number of valid responses, see Table 6-7. Estimated total households in community = 96.

c. Includes changes in size of population and/or changes in geographic distribution of animals during hunting seasons that affected harvest opportunities and success.

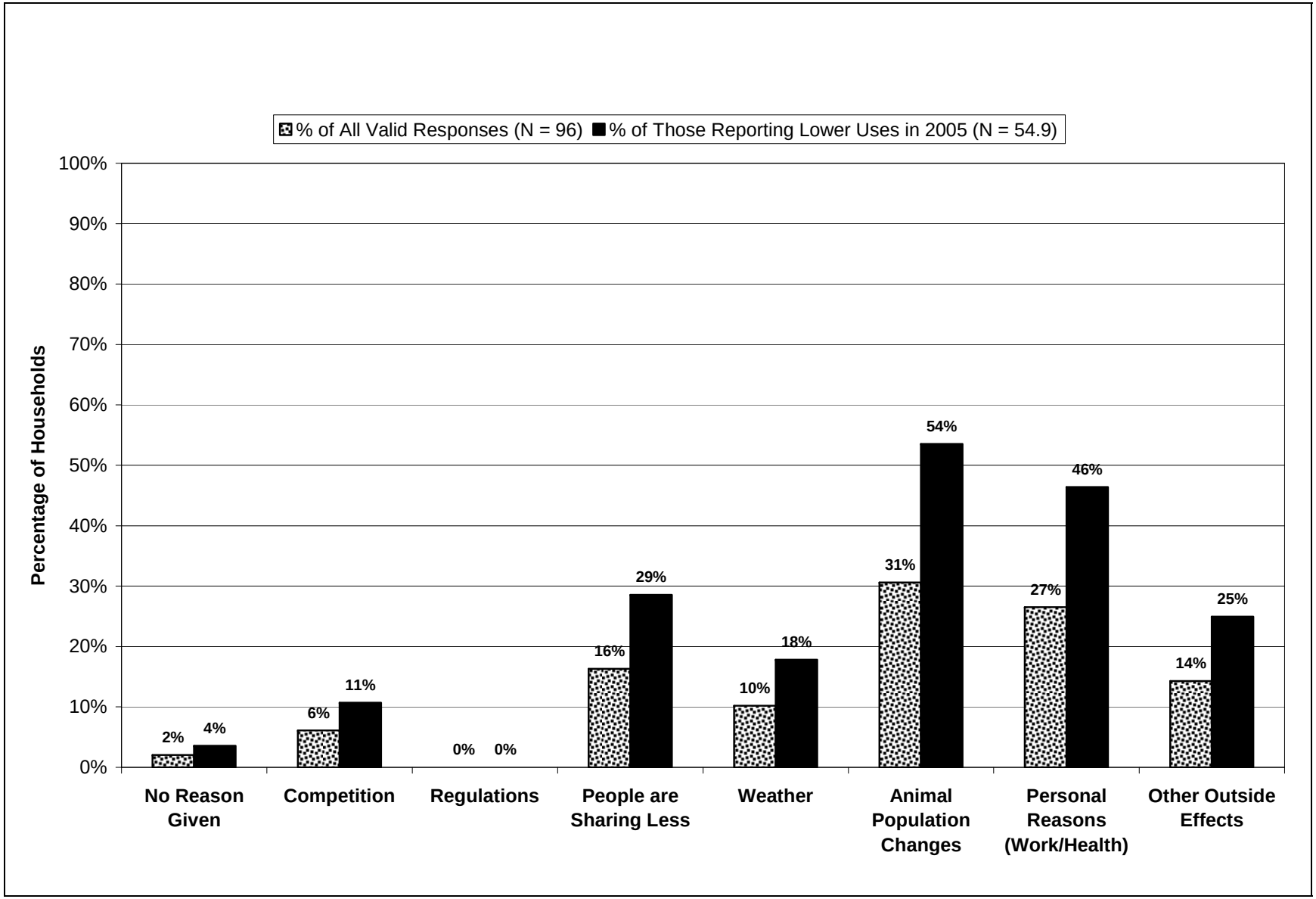

Figure 6-10.–Reasons cited by New Stuyahok households for lower uses of any resource in 2005 compared to other recent years.

Changes in New Stuyahok residents' resource harvests can also be discerned through comparisons with findings from other study years. Comprehensive household harvest surveys were administered in New Stuyahok in 1973 (Gasbarro and Utermohle *Unpublished*) and 1987 (Schichnes and Chythlook 1991), as well as during this study for 2005 (Tables 6-9 and 6-10). Surveys of only large land mammal harvests took place for 2001 (Holen et al. 2005) and those results are not discussed in this report.

Table 6-9.–New Stuyahok wild resource harvests by resource category, all study years.

	Pounds usable weight per capita harvest		
Resource	1973	1987	2005
Salmon	175.0	408.6	188.3
Non-salmon fishes	77.4	36.0	28.0
Large land mammals	315.8	189.9	138.8
Small land mammals	38.2	47.3	4.6
Marine mammals	0.0	0.6	0.0
Birds and eggs	10.6	3.9	6.2
Vegetation		13.7	23.0
All resources	617.0	700.4	389.2

Table 6-10.–Composition of wild resource harvests by category, New Stuyahok, all study years.

	Percentage of total harvest		
Resource	1973	1987	2005
Salmon	28.4%	58.3%	48.4%
Non-salmon fishes	12.5%	5.1%	7.2%
Large land mammals	51.2%	27.1%	35.7%
Small land mammals	6.2%	6.8%	1.2%
Marine mammals	0.0%	0.1%	0.0%
Birds and eggs	1.7%	0.6%	1.6%
Vegetation		2.0%	5.9%
All resources	100.0%	100.0%	100.0%

With the exception of the category of vegetation, no 2005 harvests in any other category exceeded that of either of the previous years for which there are comprehensive data (Figure 6-11). Striking reductions in the harvest amounts of salmon, large land mammals, and small land mammals occurred in 2005 (Table 6-9). The harvest of salmon in 1987 in pounds usable weight (409) was more than twice the harvest amounts in 2005 and 1973, which were fairly comparable (188 lb and 175 lb, respectively). Based on these very limited data, it appears that there were declines over these years in the harvest amounts of non-salmon fishes and large and small land mammals (Table 6-9). It should be noted that, in spite of the magnitude of the salmon harvest in 1987 compared to that of 2005 (Table 6-10), salmon in 2005 still contributed almost one-half of the total harvest (48% compared to 58%). Per capita usable weight harvests over the 3 study years show no clear trend; however, 2005 harvests are the lowest on record (Table 6-9). Participants reviewing the study findings presented at a New Stuyahok community meeting held November 3, 2006, raised questions about the trends in subsistence harvests suggested by these

comparisons of survey data. In their view, harvests of non-salmon fishes and large land mammals were higher in 2005 than indicated by the survey results, and harvests of these foods had not declined. Specifically regarding non-salmon fishes, they stated that trout and Arctic grayling harvests for the community were greater than indicated by the survey results, and that the Arctic grayling harvest area on the Nuyakuk River, as mapped by surveyed households, should extend as far as the "Fork Lakes." Meeting participants also stated the harvests of longnose suckers appeared high, with longnose suckers mostly used for dog food. One person stated that the effort to harvest non-salmon fishes in the study year had increased because several families were unable to fish for salmon. At the meeting, community residents also stated that, in their view, New Stuyahok residents' harvests of salmon, birds, and eggs were higher in 2005 than were indicated by the survey results. In general, they expressed skepticism that the community's subsistence harvests had declined from 700 lb per person in 1987 to 389 lb per person in 2005 (Tables 6-9 and 6-10). They wondered if many active subsistence harvesting households had been missed in the random sample that was used to generate the community estimate.

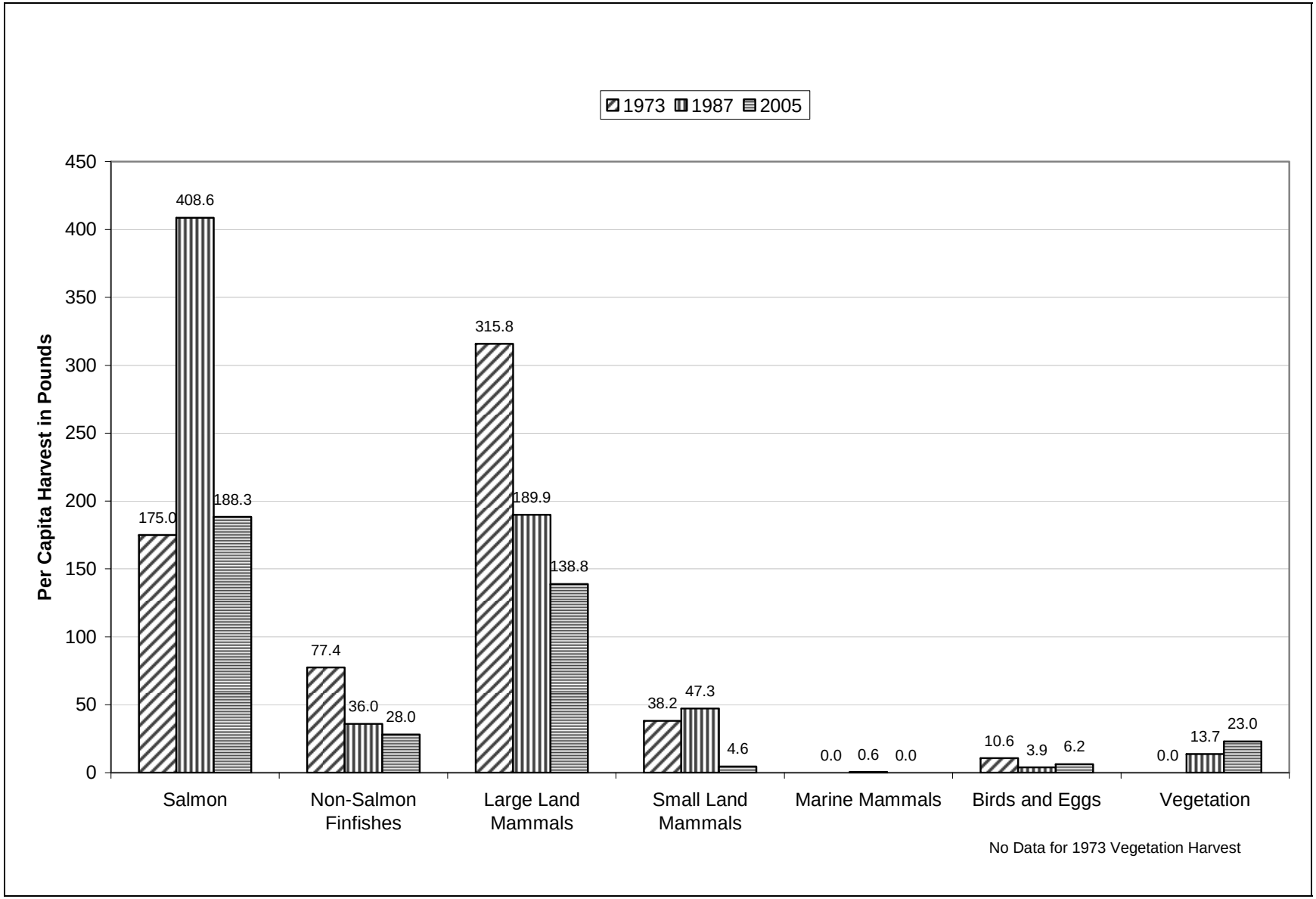

Figure 6-11.–New Stuyahok wild resource harvests over time.

LOCAL OBSERVATIONS OF RESOURCE POPULATIONS AND TRENDS

SALMON

Comments about salmon from interviewed New Stuyahok households contained only a few concerns about the health of the runs. One household commented that there were too many sport fishers, which, in their view, reduced the availability of salmon, primarily Chinook salmon, upstream during the season. On the other hand, another household indicated that the salmon run in 2005 was good; this family harvested more than in other years. According to respondents, run timing and fishing locations were the most likely causes of reduced salmon harvests, not the overall health of the salmon return. For example, a few households said they did not have the time to go to the Lewis Point fish camp in 2005 and as a result, they caught fewer salmon. A member of one of the households indicated that his household had to stay in New Stuyahok because of his job. A number of households also indicated that the price of gasoline was too high for them to travel to their traditional fishing locations, so they caught fewer fish. One of those households indicated that, in addition to the problem of expensive gasoline, they were given fewer salmon than usual. Some also indicated that they did not have the necessary gear. For instance, one household said that their sockeye salmon net was stolen, which left them only with Chinook salmon gear (larger mesh), so they fished only for Chinook salmon. Others said that they lacked access to skiffs.

The careful use, and not waste, of salmon was a theme common to several households' comments; e.g., "[We] only get enough [i.e. what we need], so we know it will last."

One respondent said that when people were filleting salmon last summer, there was no meat on the bones behind the dorsal fin near the tail. There was no locally given explanation for this observation, and the frequency of this occurrence was not indicated.

One household offered an observation about coho salmon, saying there were "hardly any silvers in the river. [I] had to go find them in the sloughs." The respondent indicated that this was unusual compared to other years and he was not sure what had caused this change.

NON-SALMON FINFISHES

One resident's observation was that there were "more whitefish last fall when they ran up [during annual migration] to the lakes [Tikchik and Nuyakuk lakes]." One household indicated that they used a net with small mesh to catch round whitefish and a net with pink salmon-sized mesh to catch humpback whitefish. One respondent stated that the "old timers" said that sheefish used to be found in the New Stuyahok area, although their fish were not quite as big as those found to the north. One household observed that there were not many Dolly Varden in the New Stuyahok area.

Residents said that warmer weather and the resulting poor ice conditions limited the harvest of non-salmon fishes during the ice fishing season. They said that ice fishing was especially important during Russian Orthodox Lent, when fresh fish were the main food source for those observing dietary proscriptions. Households also indicated that their fishing efforts were down for a number of personal reasons, including smaller household sizes and deaths in the family. One household indicated that 2005 was unusual because their friends did not give them cod and

other ocean fishes, as they had in the past. Being given fewer fish than usual may have been the result of reduced harvest by those households that usually shared, according to one respondent.

MARINE INVERTEBRATES

One household reported that they used to dig clams while commercial herring fishing at Togiak. They also reported that freshwater clams could be found in the Swan River and that they intended to try to harvest some from there. They said that they also used to find freshwater clams at Okstukuk Lake. Another household said that they used to get freshwater clams 30 years ago. One household reported receiving crabs and clams frequently in the past but not recently.

LARGE LAND MAMMALS

One household stated that the fall caribou season opened too late: the caribou had already migrated through the area. This household stated that there were too many hunters from Dillingham in the area downstream from New Stuyahok, so New Stuyahok hunters had to go to the Mulchatna River to hunt moose. Another household reported that it was hard to find moose in December 2005 because there were too many hunters and the ground conditions were slippery and icy. Another household reported that they had to hunt more often in 2005 due to poor hunting in the fall. They also reported that there were too many sport hunters and this was affecting the local hunting. One household reported that it was a good year for caribou because the animals were close to the village and thus easy to get. It was also reported that moose were found closer to the village. This was expressed as a general statement, not necessarily referring to moose availability during the hunting season.

The following general statements were made about the seasonal uses of red meat. One household stated that they ran out of caribou in early April 2005, but that the caribou season was still open; accordingly, they were waiting for someone to harvest a caribou so that they could make "dry" (dried) meat. Another household stated that meat was always consumed first and that they saved their fish for Lent because a lot of fish was eaten at that time.

Reasons given for no hunting effort or diminished harvest amounts during the study year were the high cost of fuel, a lack of equipment, and equipment failures.

The following statements concerning large land mammals expressed the community values of avoiding waste and sharing resources:

- "We don't get more than we have a need for."
- "We get the same amount every year. If we don't get it, then someone will give us just enough."

MARINE MAMMALS

One household reported that they hunted for beluga whales and seals "every few years," but that they did not do so in 2005. Another reported that they had received some freshwater seals from Newhalen in the past. Several households reported receiving more seal oil in the past than during the study year. One household reported that they received the seal oil they needed from relatives in Togiak, who "just send a little."

SMALL LAND MAMMALS/FURBEARERS

One elder stated, "The muskrats are lost because people stopped hunting them. The value of fur dropped and people stopped hunting them… after [they] eat it, they [used to] sell the skin, but the price fell, so people stopped hunting them, so the muskrat aren't around anymore."

It was reported that there were fewer beavers and porcupines in 2005. One respondent said that there were fewer porcupines and that he no longer tried to hunt small game. He used small game only if people gave him some. Residents said that porcupines were usually hunted opportunistically during the course of other activities.

It was generally remarked that there was currently less trapping occurring because of the low prices for furs. One hunter said that he had not trapped in 15 years because of the low prices. Another person said that he would be trapping if he had the time and did not have to work at his job.

During 2005, a few respondents gave weather conditions as factors that weighed on their opportunities to hunt or trap small land mammals:

- "Early on in the year the snow conditions were bad."
- "Lack of snow, less travel."

One household reported that they caught 2 beavers and kept the meat but gave the fur away. Less sharing of small land mammals was also reported in 2005.

BIRDS AND EGGS

The migratory bird hunting area for New Stuyahok was large, and as with salmon, location and timing may have been the most important factors for successful harvests. If hunters were able to travel extensively, their harvests were likely to be better because they could reach the birds, which were not always in the areas closer to New Stuyahok. One household indicated that they had smaller harvests and uses of migratory birds in 2005 because of "late breakup … and the birds are getting earlier and earlier … tougher to get around [because the river was not ice-free]." Other households stated that the birds were "harder to find than in the past years … maybe the population was down," and that they "caught less geese than recent years," and that there were "less birds around." One household speculated that there was "maybe less birds due to bird flu."

One household indicated that 2005 was "better hunting … got more ducks," and another household indicated that they were given more ducks than usual in 2005. One household "hunted more due to working less." Another hunter stated that since he had practiced shooting by using clay pigeons, he shot better, and therefore he had harvested more birds.

One household said that they usually gathered bird eggs while they were at fish camp, but that they did not go to fish camp in 2005. One respondent said that, in 2005, someone from New Stuyahok shot a duck in Nushagak Bay, and when the hunter grabbed the tail feathers to remove it from the water, the entire tail came off. He said that this bird did not have much meat on it so as a result, they did not use this bird. He said that the way to see if a bird was good was by looking at the color of the tail: if the tail was black or discolored, the bird was not good to use for food.

WILD PLANTS

Respondents' comments focused on berries. Harvest locations may have been critical factors in harvest success. Most people had favorite berry picking spots, so they reported the availability of berries in those areas, which may not necessarily have reflected on the availability of berries in all areas. One household reported, "Red berries [cranberry species] were less this year than the year before." Conversely, another household said that there were no berries other than cranberry species, because the berries did not grow in 2005. Another household said that it was a good year for blackberries (crowberries). A number of households said that there were fewer berries in 2005 because they did not grow well.

One respondent said that he picked more berries because he worked less while another said that they did not have enough gasoline to go berry picking. Other comments included:

- "It all depends on the weather with berries … black berries [crowberries] and salmonberries are the main ones affected by weather."
- "Some years, certain berries don't grow."
- "I did not get out as much … some weather dried up growing areas."

One respondent described a healthy aspect of subsistence berry picking connected to good health: "Picked more … went out more … have freedom picking berries … get away from everything, just picking berries out in the wilderness."

GENERAL OBSERVATIONS

Residents made 2 general observations on the effects of weather on travel for subsistence: "Getting too warm out and [so we] can't do much traveling," and "Tougher travel with low water and lack of snow." The price of fuel, lack of transportation, demands of work and child care, injuries, and deaths in the family were other factors hindering participation in subsistence activities, according to survey respondents.

LOCAL CONCERNS REGARDING RESOURCES

GENERAL OVERVIEW

One household provided these concerns, which reflected a summary of New Stuyahok residents' major concerns about resources:

- "Bird flu: it's getting closer to Alaska … migrating birds could be affected."
- "My biggest concern right now is [to] stop that mine [the Pebble Project]".
- "Head [trophy] hunters [are a problem]."
- "Too many damn wolves … need to hunt them off."

PEBBLE PROJECT

By far the greatest concern expressed by surveyed households in New Stuyahok during the 2005 study year was the development of the Pebble Project. A number of comments concerning the project are included in their entirety.

One elder stated:

- "I am all the way against the mine. There will be no more fish. All the animals will die. Every animal drinks water, even little birds, even us. [Northern] Dynasty will not give us food … moose and caribou, porcupine, ptarmigan, duck … [these] are our food. We eat fish from the Nushagak River all our lives. Our mommas, daddies lived off the land. They used harpoon before net, they used nets in 1936. If mine leaks, no more beluga whales, seals, even walrus … the tide will bring it [mine leakage] here and there. All the way [to] Pribilof Islands, past Togiak, maybe [to] Bethel. We'll have to eat white man food all the time. Animals will die and it will kill the whole river [Nushagak/Mulchatna]."

Another elder offered these comments:

- "I am worried about Pebble Mine location. Before Pebble Mine, I used to go up near [the] mine site for subsistence. I'm concerned about animals and fish. My culture, old villagers [and] grandparents, knew the value and location of gold. They would never introduce that to Caucasians because they just fight over it. Native people don't tell where gold is. People need to speak for the animals. Culture is nourished by cultural subsistence foods. I am concerned about hard rock mining and the subsistence resources. If they open up that mine there goes everything. One little mistake [and] it'll go into the Koktuli, then the Mulchatna, then it opens up to everything. They'll be no more subsistence then. We'd be the first ones affected by it … tributaries, ground water, everything."

These comments by an elder were translated by the local research assistant from Yup'ik to English:

- "I'm fearful of mine development because the Koktuli will be contaminated, animals will die and then the people will die. Elders don't know about contaminants and poisons. If these get into Nushagak River systems, they will eat the poison animals and die. Yellow Creek will also be affected. And the main of that [drainage] is above Levelock. I'm scared of that hard rock mining. I don't want to see it happen.

  If mine goes in, villages closest to the mine will suffer first: they will die first. Subsistence would be endangered if the mine were developed [due to] the tailings.

  I'm worried about animals because of environmental damage from mine, and water and fish damage from chemicals. Day by day, it will run downriver, too … it will kill streams … 'Klutak' [Lower Klutuk Creek], and all the plants on the Klutak. Do not let Northern Dynasty develop mine: I don't want to die too early."

Other comments related to concerns about the Pebble Project offered by New Stuyahok survey respondents included the following:

- "People are worried about the effect the mine will have on all subsistence resources."
- "Kids swim in the water."
- "Don't want the mine to go through because when they are done they will leave a big mess."
- "The mine will change everything … it will bring in too many people."
- "Don't believe the mine won't contaminate the area."

- "The mine will ruin the lands."

WOLVES

After the topic of the Pebble Project, the concern that there were too many wolves in the area was the most often-mentioned by New Stuyahok survey respondents. Comments included the following:

- "There are too many wolves. I would like to see [an] aerial wolf hunt due to seeing moose carcasses and caribou left behind. I did not see any bullet holes … but I skinned the legs off for dog meat. [Wolf control is needed] to keep wolf numbers at a minimum. The herds are followed by wolf packs."
- "Too many wolves. Every two to three months I see a dead moose. They kill them and pull them into the woods. Only bulls left … they catch them in the flats and drag them into the woods to eat them."
- "There are too many wolves. They are killing off our moose and caribou and they get really close to the village. Aerial wolf hunting should be started again; [I] don't know why it was stopped."

COMPETITION WITH SPORT HUNTERS AND FISHERS

New Stuyahok survey respondents expressed concerns about the effects of "sport hunters" who, in the view of local residents, targeted animals not so much for their meat but for their trophy size antlers, unlike local hunters. According to the key respondents, the "sport hunters" were usually from outside of the area but in some cases, respondents may have included hunters from Dillingham in this category. Residents gave the following comments:

- "Too many moose hunters. Too many head hunters in Mulchatna … you see moose carcasses right in the river, no hide, no head, just the body… and with the mine you may have no more moose, no more fish, no more good water."
- "How long is subsistence going to last? Each year big game hunters come around and take our hunting lifestyle away. They come shoot the animals and take the head and leave the meat to spoil."
- "Too many guided hunters after the caribou and too many sport fishing people coming in from Kenai … last two years more from Kenai and Anchorage coming in. The sports hunters with Super Cubs [light aircraft] can land anywhere and change the direction of the caribou if they are coming in our direction. With the warmer weather, more bugs are keeping them [caribou] on higher ground … everything is affecting the caribou … more Outside [from the Lower 48 states] nonresident hunters, too."

AVIAN INFLUENZA

Avian influenza ("bird flu") was a concern frequently expressed by New Stuyahok survey respondents. This topic was especially fresh in peoples' minds during the study year because the topic was frequently in the news media. After seeing such a story, one household said "Swans are getting sick from bird flu; that's what I heard in news. They are burning them." This household saw avian influenza as a main threat to subsistence, and they added, "Bird flu … Pebble Mine is trying to wipe out our subsistence life, and bird flu. I got a couple birds that weren't looking too good."

RISING FUEL COSTS

The cost of fuel was also a concern expressed by New Stuyahok residents, because, they said, it restricted travel for subsistence activities. Statements from survey respondents illustrated this point:

- "Didn't go to the Mulchatna … stayed close to the village because of the price of fuel."
- "The high fuel costs have slowed me down. I did less hunting due to high costs."

CONCERNS ABOUT ONE YEAR OF HARVEST DATA

The New Stuyahok Tribal Council met on February 9, 2006, and approved this project. At that time, council members expressed a concern that the survey documented just one year of subsistence harvests and uses, and would not document all of the areas that were important to the community for subsistence hunting, fishing, and gathering. In addition, they expressed concerns that some of the people who had significant information concerning historical subsistence uses of the area were not available for the mapping previously done by SRB&A.[14] The movement of caribou determined the areas that people hunted, they said. In the past, council members said, New Stuyahok hunters traveled great distances in order to harvest caribou, including to those areas near Iliamna Lake that were part of the Pebble Project operation areas. Also, council members said that the high price of gasoline in the last few years restricted the amount of travel that the hunters could do.

OTHER CONCERNS

Other concerns that New Stuyahok residents raised during this project included the following:

- "The decline of the Mulchatna caribou herd …that maybe the herd is overgrazing the food in the New Stuyahok area."
- "The water level in the Nushagak River the last few years has been low and it traps salmon along the river."
- "Lots of beaver dams … hardly any trappers."

One household generally stated that longer seasons were needed so that there would be more hunting time.

One elder made this observation: "Little by little subsistence is declining. Waterfowls are declining from when they put in the [Trans-Alaska oil] pipeline."

The following household comment provides a closing summary about resource concerns expressed by New Stuyahok residents:

- "I want to make sure renewable resources, migratory game, and birds are preserved as long as possible. It is the main livelihood for the region and New Stuyahok. It is the main employment. Without subsistence, we would have a difficult time surviving. I'm worried mine development may impact resources and subsistence."

[14] SRB&A had planned to return to New Stuyahok for additional mapping, and did so a short time after this meeting.

CHAPTER 7: DISCUSSION AND CONCLUSIONS

SUBSISTENCE HARVEST PATTERNS AND TRENDS, 1960 to 2005

OVERVIEW OF FINDINGS FOR THE STUDY COMMUNITIES, 2005.

Table 7-1 summarizes selected findings regarding demography, cash economy, and wild resource uses in 2005 in 5 communities in the Bristol Bay area: Igiugig, Kokhanok, Koliganek, Levelock, and New Stuyahok. The population of every community was primarily Alaska Native, ranging from 56% in Levelock and 82% in Igiugig, to nearly all the population of Koliganek (96%), Kokhanok (98%), and New Stuyahok (99%). According to federal census data, the population of the 5 study communities was 1,002 in 2000 (see Table 1-1). Estimates from the Alaska Department of Labor and Workforce Development (ADLWD 2009) for July 1, 2005, totaled 911. Population estimates, as generated by this study as of December 31, 2005, which specifically included only year-round residents, reflected a lower total population (804) than either the federal census for 2000 or the ADLWD estimate for July 1, 2005. ADF&G Division of Subsistence household surveys also resulted in lower population estimates, compared to those generated by ADLWD, for each study community. Although the ADF&G exclusion of seasonal residents from the 2005 population estimate may explain, in part, the lower totals, the population of the study communities appears to have declined since 2000 for a variety of reasons. These reasons were discussed in the chapters on each community.

In regards to the cash sectors of the local economies during the 2005 study year, only in the small community of Igiugig did most adults who had jobs work year-round (63%) while seasonal employment predominated in the other 4 study communities (Table 7-1). Cash incomes in 2005 reflected the scarcity of year-round jobs. The highest per capita income was earned by Levelock residents at $13,966 per person, followed by Igiugig ($8,471), Koliganek ($7,260), Kokhanok ($5,970), and New Stuyahok ($4,321) residents. For comparison, the per capita income for the state of Alaska in 2000 was $22,660 (ADLWD 2009).

Figure 7-1 illustrates subsistence harvest estimates in 2005 for each study community in pounds usable weight per person. Koliganek had the highest harvest with 899 lb per person, followed by Kokhanok (680 lb per person), Igiugig (542 lb per person), Levelock (527 lb per person), and New Stuyahok (389 lb per person). These were substantial harvests, especially considering that the average American family purchases from stores and brings into its home about 222 lb of meat, fish, and poultry per person per year (Fall 1990:77). Harvests were also diverse: in Igiugig, there were 23 different resources used by more than one-half the community's households. In Koliganek, this number was 20, followed by New Stuyahok (15 resources), Levelock (12 resources), and Kokhanok (10 resources) (Table 7-1).

Table 7-1.–Comparison of selected study findings for Kvichak watershed, comprehensive subsistence baseline update, 2005.

	Igiugig	Kokhanok	Koliganek	Levelock	New Stuyahok
Demography					
Population	41	158	150	34	421
Percentage Alaska Native	81.6%	97.7%	96.0%	56.0%	98.6%
Percentage of household heads born in Alaska	78.9%	91.4%	91.1%	100.0%	97.6%
Average length of residency, household heads, years	29	26	31	39	41
Cash economy					
Percentage of jobs located in community	73.1%	76.0%	56.8%	50.0%	72.5%
Average number of months employed	9.4	6.5	6.5	7.9	7.3
Percentage of employed adults working year-round	62.5%	16.7%	25.5%	22.2%	31.3%
Average household income	$26,825	$22,516	$25,929	$24,939	$18,958
Per capita income	$8,471	$5,970	$7,260	$13,966	$4,321
Resource harvest and uses					
Per capita harvest, pounds usable weight	542.0	679.6	977.3	526.7	389.2
Average household harvest, pounds usable weight	1,716.2	2,563.0	3,490.3	940.6	1,707.6
Number of resources used by 50% or more of households	23.0	10.0	20.0	12.0	15.0
Average number of resources used per household	20.9	14.0	20.5	16.6	18.3
Average number of resources attempted to harvest, per household	17.1	11.9	15.3	12.9	14.0
Average number of resources harvested, per household	15.8	10.7	14.3	11.8	13.3
Average number of resources received, per household	9.9	5.7	8.1	8.0	7.5
Average number of resources given away, per household	10.5	6.3	8.8	9.0	6.9
Percentage of total harvest taken by top 25%	43.0%	52.3%	40.4%	35.4%	42.8%
Percentage of households taking 70% of harvest	41.7%	31.4%	25.0%	35.7%	38.8%
Per capita harvest of lowest 50% of households	73.2	115.4	309.7	138.0	50.1
Percentage of total harvest taken by lowest 50% of households	13.5%	17.0%	31.7%	26.2%	12.9%
Average number of resources used by lowest 50 % of households	13.5	11.5	18.2	13.3	13.0
Average number of resources used by top 25% of households	35.5	18.0	23.0	32.0	22.1

The 2 most important resources in the study communities were salmon and land mammals (Figure 7-2). Salmon were the primary resource in 3 communities, ranging from 75% of the total harvest in Kokhanok, to 63% in Koliganek, and to 48% in New Stuyahok. Land mammals, mostly moose and caribou (and bears, in some communities) and small game, including porcupines, hares, and beavers, were second to salmon in these communities. In contrast, land mammals were the major resources in Levelock (49% of the total) and Igiugig (38% of the total) Salmon were the second most harvested resource. Non-salmon fishes ranked third in all the communities. Wild plants, birds and eggs, marine mammals, and marine invertebrates made smaller contributions to the total resource harvests in 2005, as measured in usable pounds.

Total Harvest Levels in 2005 and Comparisons with Other Years

Every household in the 5 study communities of Igiugig, Kokhanok, Koliganek, Levelock, and New Stuyahok used subsistence foods in the 2005 study year. Most residents engaged in subsistence activities (Figure 7-3): 40% hunted (an estimated 322 people), 64% fished (515 people), 20% trapped (161 people), 76% gathered wild plants (611 people), 86% were involved in at least one harvest activity (691 people), and 86% processed subsistence resources (691 people). For the 5 communities combined, the subsistence harvest in 2005 was 555 lb per person, or about 1.5 lb per person per day. Although the bulk was salmon, followed by large land mammals and other fishes, almost all households used wild plants, and many used birds, bird eggs, and small game. Many also used marine mammal products often received from other communities. Sharing of subsistence resources bound families together in networks of mutual support and obligation. Further, subsistence activities and uses created a context in which people shared traditional knowledge about harvest locations, fish and wildlife populations and behavior, and respectful relationships with the natural world. In short, as they had been for centuries, subsistence hunting, fishing, and gathering were vital components of the economies and way of life in these communities in 2005.

Nevertheless, many participants in this study reported that subsistence harvests and uses were changing in their communities. Total subsistence harvests, in terms of usable pounds per person, appeared to have varied considerably in the study communities since 1973–1974, the first year for which comprehensive survey data were available. The 2005 harvest estimates, according to ADF&G data, were lower than in any previous year, with the exception of Koliganek which had the highest harvest levels of the study communities (with total wild resources, in pounds usable weight per person, of 899 lb, Figure 7-4).

The rate of reductions in 2005 harvest levels in the 4 communities that reflected lower harvests, when compared to either 1992 (for Levelock, Kokhanok, and Igiugig) or 1987 (for New Stuyahok), measured 25% in Igiugig and 44% in Kokhanok. The greatest reduction was in New Stuyahok, where the 2005 harvest represented just over one-half (56%) of the harvest in 1987, followed by Levelock, where the 2005 harvest was 60% of that in 1992 (Figure 7-5). In spite of these reductions, subsistence harvests amounts in 2005, in terms of usable pounds per person, in all communities but New Stuyahok represented at least 500 lb or more: a substantial harvest amount, as noted above. While the New Stuyahok 2005 reduction in harvests relative to the other communities was striking, residents of this community, during a meeting held to review the findings of the 2005 survey, expressed the view that the survey underestimated their total harvests. With just 3 years of data, any conclusion about trends in total subsistence harvests would be premature.

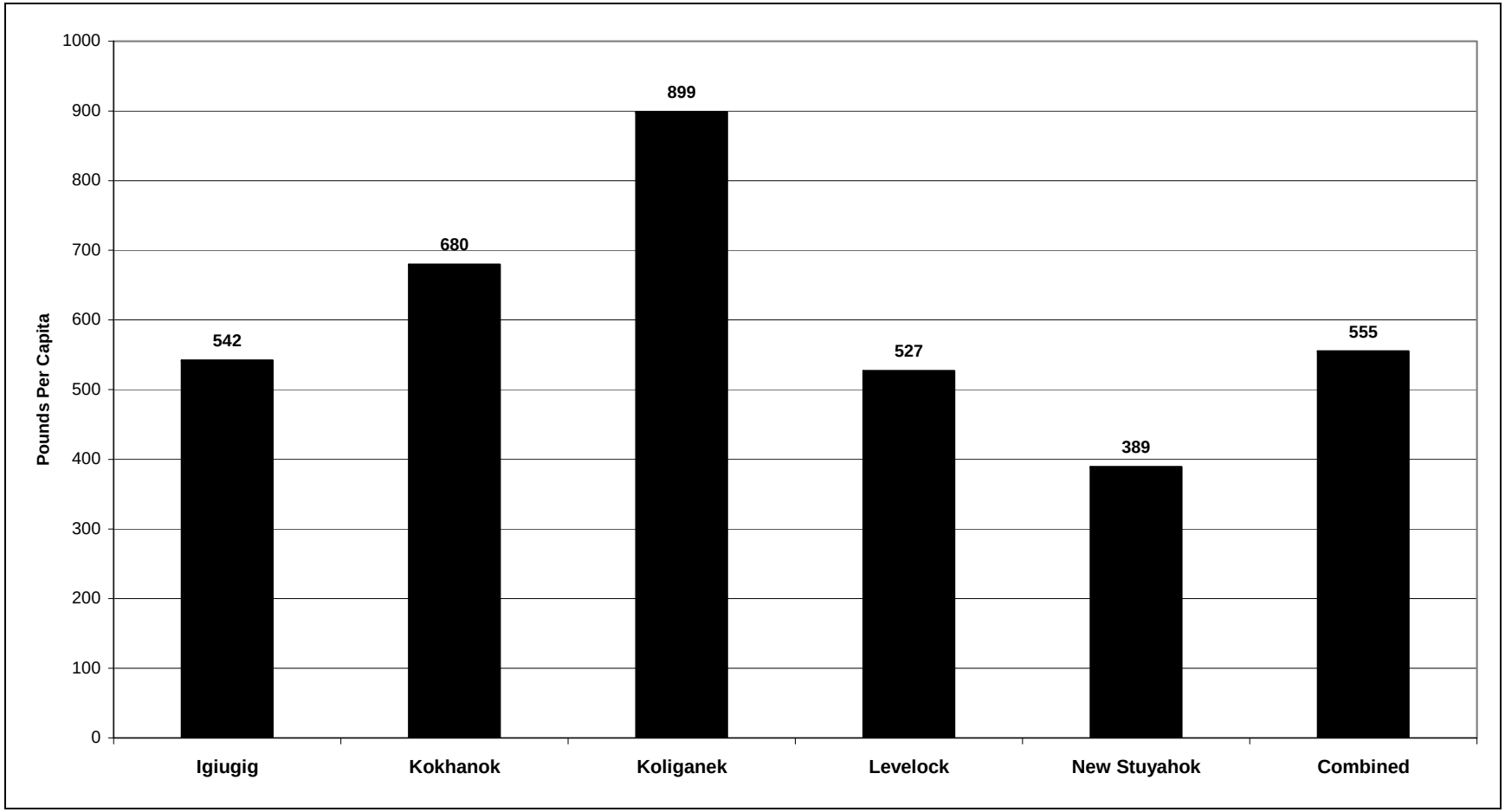

Figure 7-1.–Harvests of wild resources in pounds usable weight per person, study communities, 2005.

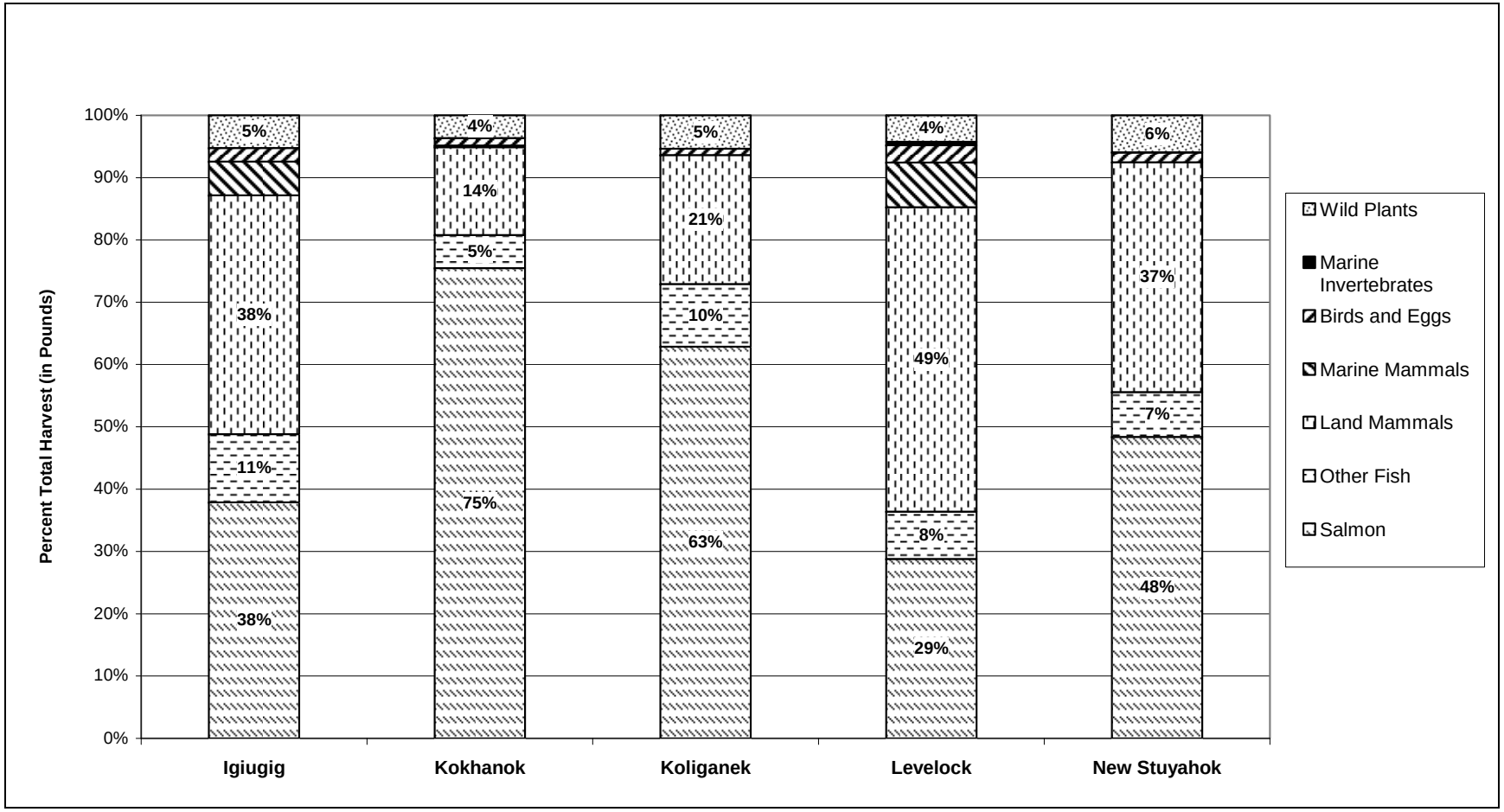

Figure 7-2.–Community harvest composition by resource category, 2005.

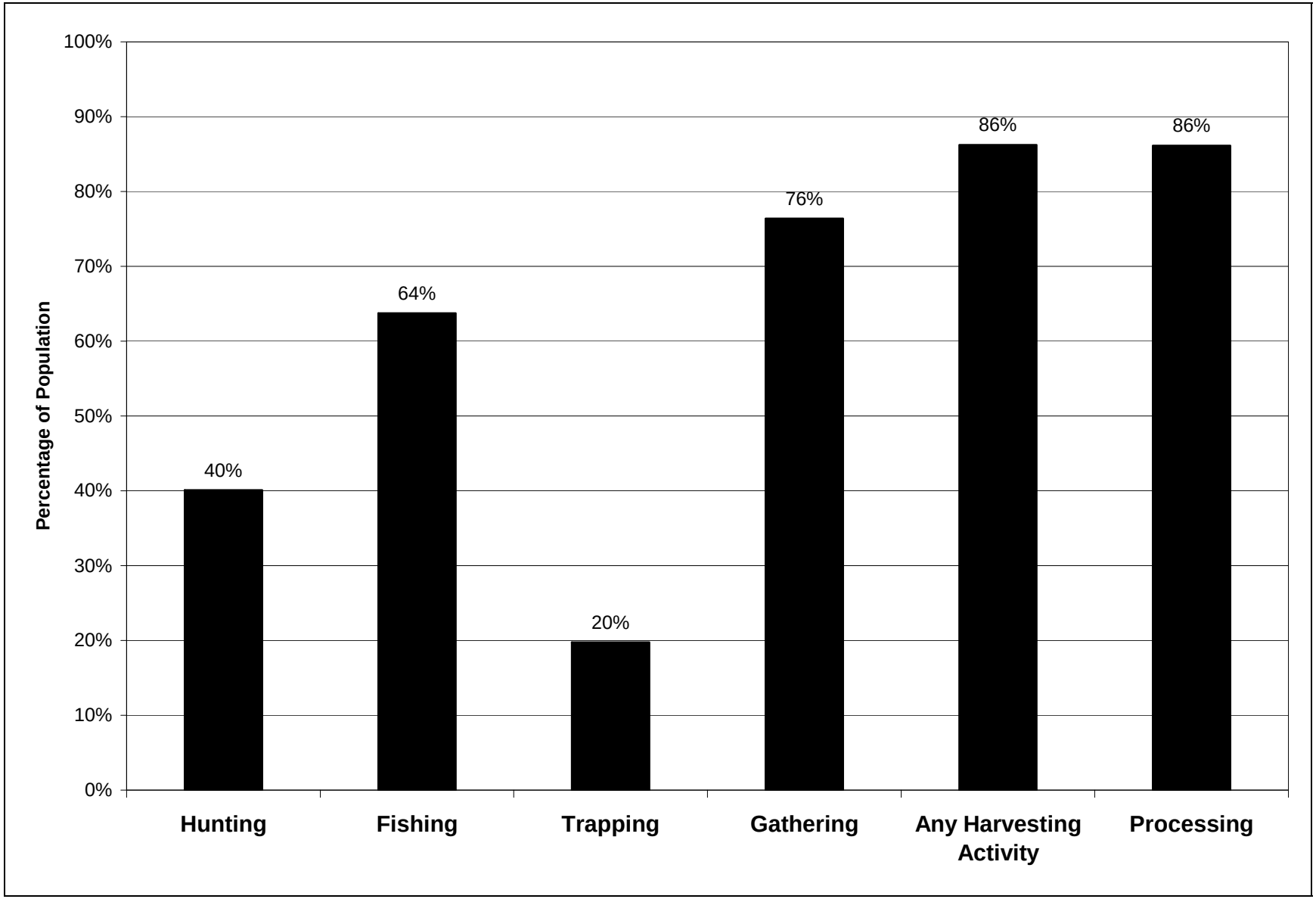

Figure 7-3.–Individual involvement in subsistence activities, all study communities combined, 2005.

Interviewed households' assessments of trends in total subsistence harvests over the last 5 years were mixed (Figure 7-5). A majority, about 60% or more of the households in each study community, and 60% in the combined 5 communities, said that, overall, their subsistence harvests and uses had stayed about the same. In total, 29% of the interviewed households said their subsistence uses and harvests were reduced in 2005. The rate of reduction ranged from 38% in Levelock, 33% in Stuyahok, 29% in Koliganek, 25% in Igiugig, to 20% in Kokhanok. As shown in Figure 7-6, the most common reason given for less subsistence uses were personal ones, such as health or job responsibilities or reduced family size, which were cited by 46% of households with less uses. "Other outside effects" ranked second (23%), followed by weather (19%), changes in animal populations, such as abundance, movements, or locations (18%), competition with other harvesters (8%), and less sharing in the community (5%). The reduction in sharing is likely a result of lower harvests of key resources that are frequently shared, such as caribou and moose.

In spite of the limitations represented by the absence of comprehensive data from many years in these communities, trends in harvest levels were analyzed by examining the proportionate uses of 3 key resources (salmon, moose, caribou) in overall harvests (Figure 7-7). The combined total of these 3 resources in 2005 harvests made up at least 70% (Igiugig) and as much as 88% of the total in Kokhanok (Figure 7-7). Changes in the harvest of any one of these 3 resources would have a major effect on overall subsistence patterns.

Salmon

As noted, in Chapters 2 through 6, salmon ranked first or second (after large land mammals) in the total subsistence harvests of the study communities in 2005.[15] As estimated in usable pounds, salmon comprised 75% of the subsistence harvest in Kokhanok, 63% in Koliganek, 48% in New Stuyahok, 38% in Igiugig, and 29% in Levelock (Figure 7-7). Most (56%) interviewed households said their harvests and uses of salmon in 2005 were about the same in 2005 as in other recent years (the last 5 years or so) (Figure 7-8). A majority of households in 4 of the study communities reported steady harvests and uses of salmon over the last 5 years. Kokhanok was the exception, where 51% of the households reported higher salmon harvests and uses in 2005. This was likely due to improved escapements of sockeye salmon into the Kvichak system. Of all households that reported lower harvests and uses of salmon in 2005 compared to other recent years, 49% cited personal reasons as the cause; "other outside effects" ranked second (14%); and less sharing of salmon ranked third (13%) (Figure 7-9).

[15] For a discussion in trends in the Kvichak District subsistence salmon fishery, see Fall et al. 2001 and Fall et al. 2006:215-219.

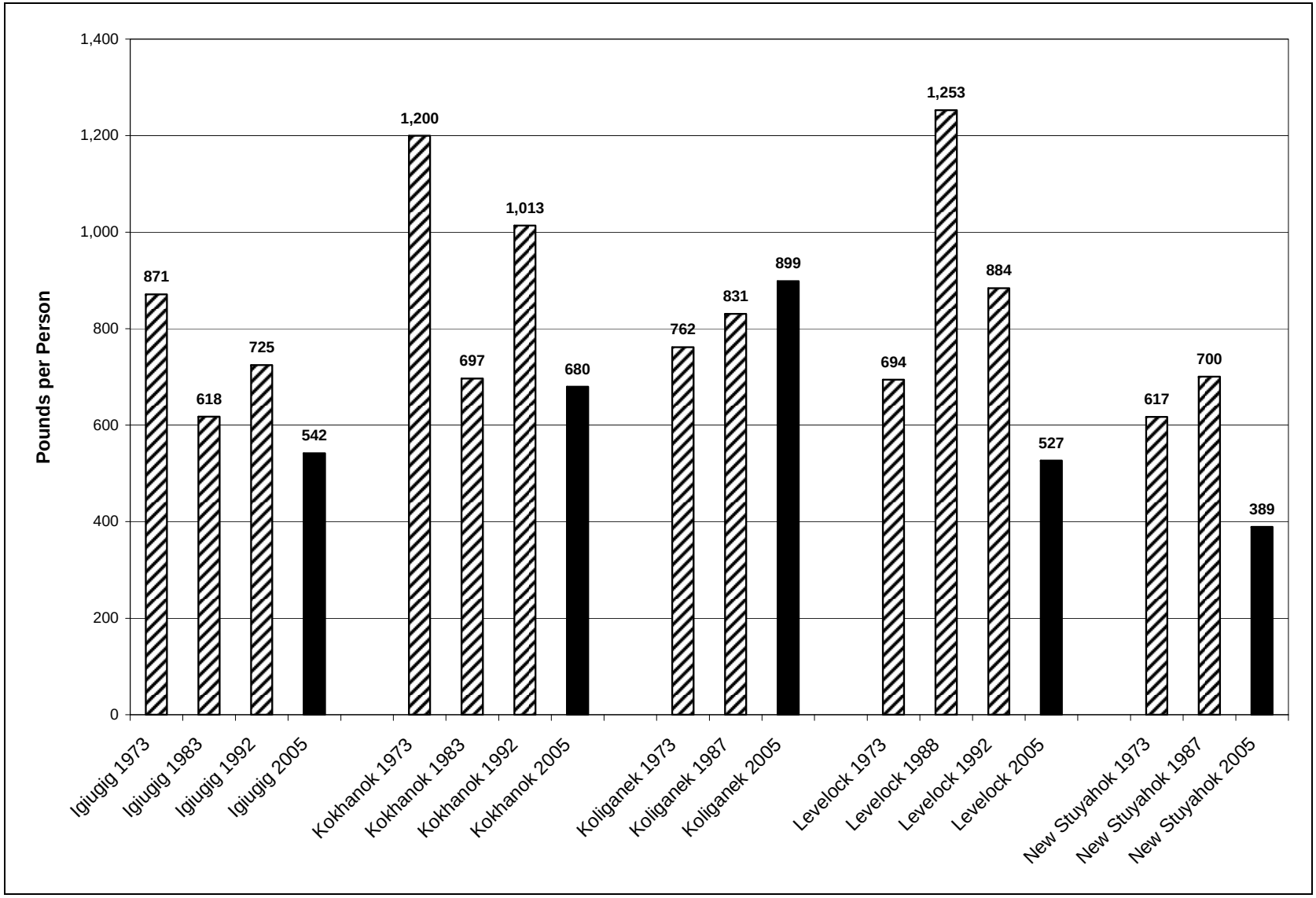

Figure 7-4.–Subsistence harvest, pounds usable weight per person, study communities, all study years.

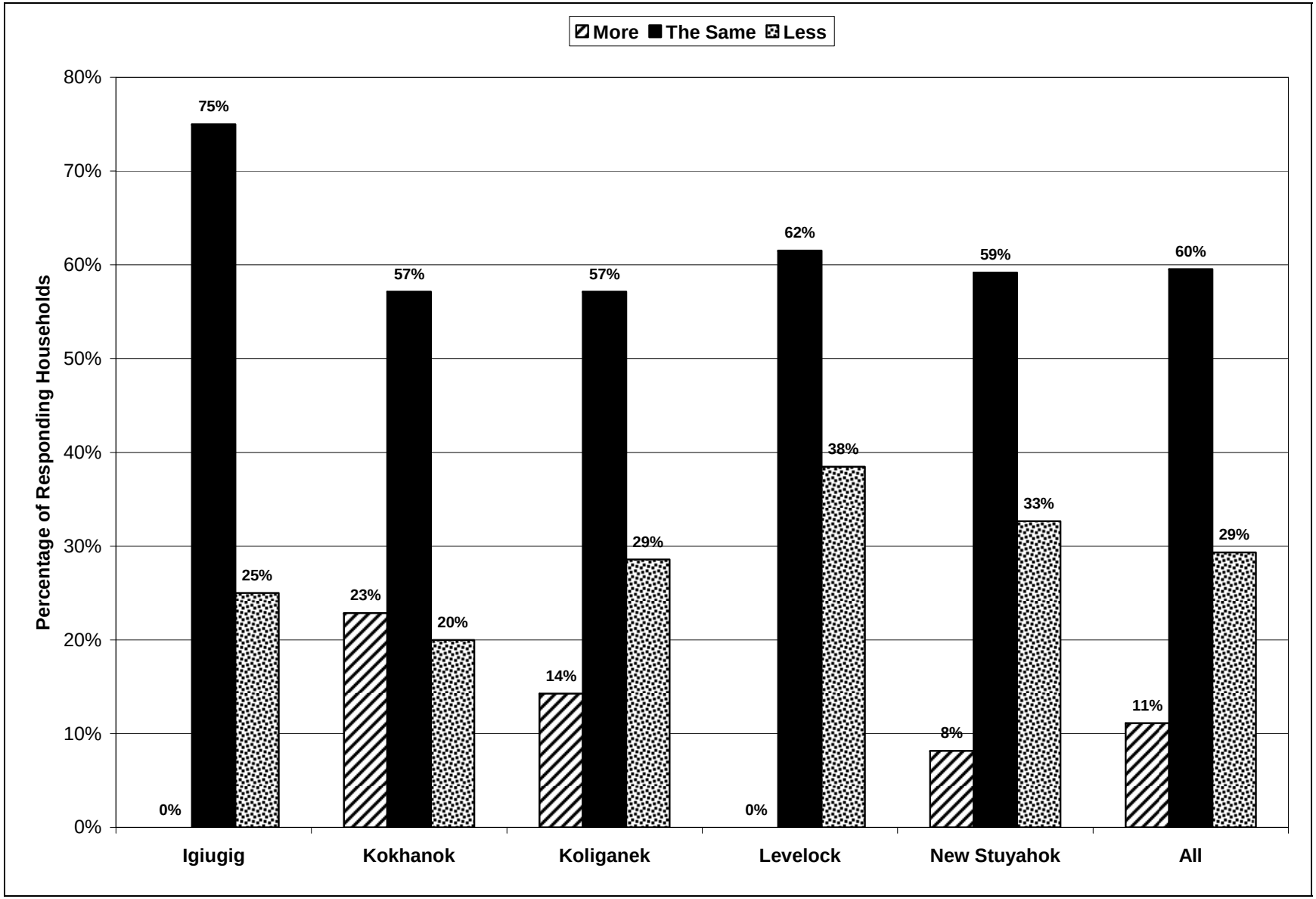

Figure 7-5.–Households' assessments of overall subsistence harvests and uses in 2005 compared to other recent years (about the last 5 years).

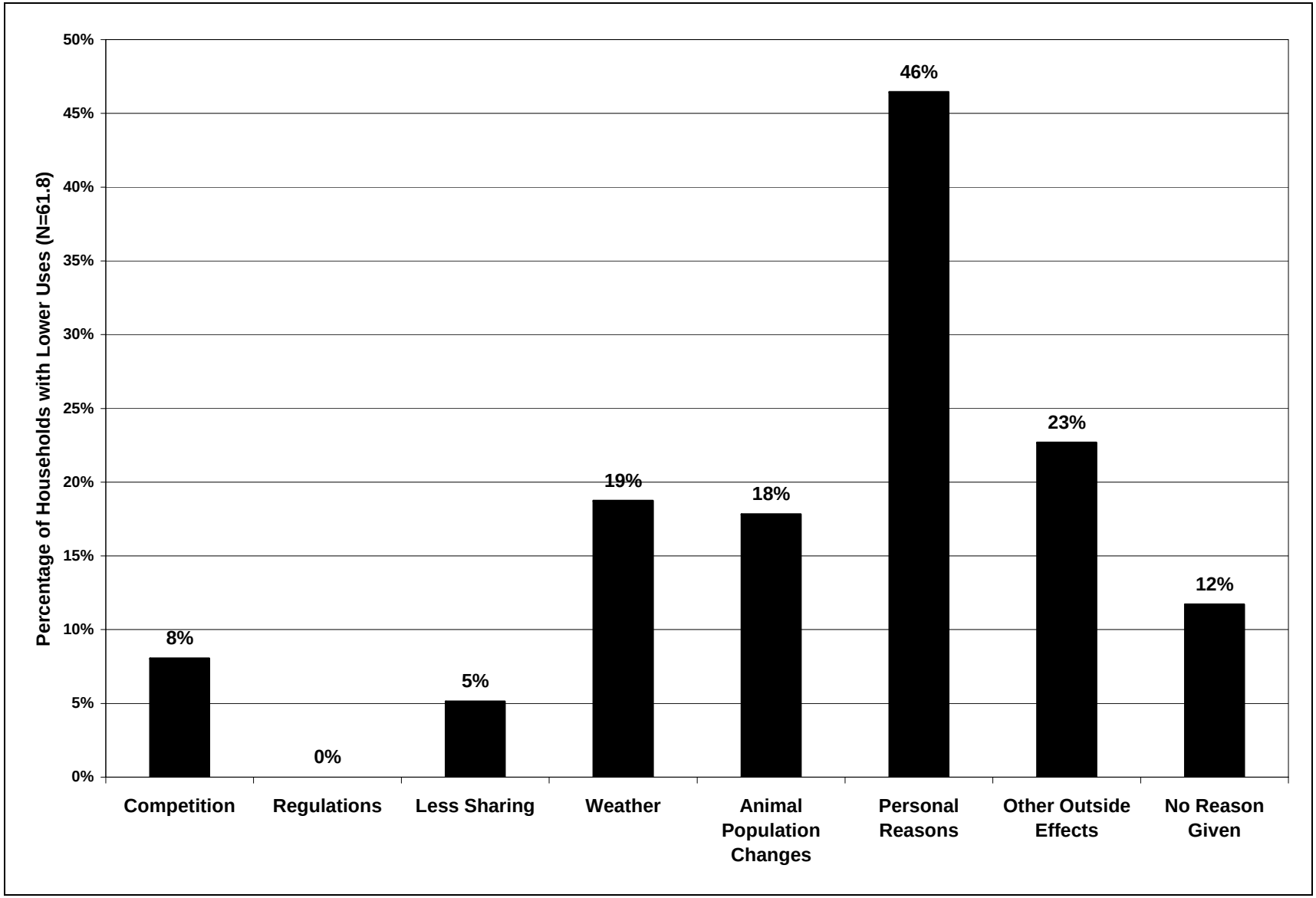

Figure 7-6.–Reasons for lower overall subsistence harvests and uses, all study communities, 2005.

Data from ADF&G Division of Subsistence household surveys suggested that there have been declines in subsistence salmon harvests in Igiugig and Levelock since the 1970s and 1980s (Figure 7-10). The estimated harvest of 929 lb per person of salmon at Kokhanok in 1973–1974 was the highest recorded. More recent estimates were similar to each other: 509 lb per person in 1983, 563 lb per person in 1992, and 513 lb per person in 2005. This suggests steady harvest levels over the 22 year period. Only 3 survey estimates are available for Koliganek. The estimated harvest of 565 lb of salmon per person for 2005 was substantially higher than estimates for 1973–1974 (370 lb per person) and 1987 (363 lb per person). No pattern is evident from the 3 survey estimates for New Stuyahok. The estimate for 2005 of 188 lb per person was similar to the estimate of 175 lb per person in 1973, but much lower than the 409 lb per person estimate for 1987.

Estimates of subsistence harvests of salmon based on ADF&G subsistence permit returns, available since 1963, provide a longer annual timeline for discerning trends in the subsistence salmon harvests in each study community.[16] Table 7-2 and Figures 7-11, 7-12, and 7-13 report estimated subsistence sockeye salmon harvests by permit holders who were residents of the 3 communities in the Kvichak District from 1963 to 2005, in addition to averages for each decade and for the entire 43 years of the permit fishery. This table focuses on sockeye salmon because it was, by far, the dominant species in subsistence salmon harvests in this district.

Subsistence sockeye salmon harvests for Igiugig, Kokhanok, and Levelock, based on permit returns, generally displayed a downward trend (Table 7-2). For example, the long term (43 year) average annual harvest for Igiugig was 421 lb of sockeye salmon per person (Figure 7-11). Annual harvests of sockeye salmon averaged 472 lb per person in the 1960s, 850 lb per person in the 1970s, and 553 lb in the 1980s, compared to 175 lb per person in the 1990s and 123 lb per person in the 2000s (Figure 7-11). For Kokhanok, the long term average harvest was 560 lb of sockeye salmon per person since 1963, with an average of 677 lb per person in the 1960s, 892 lb per person for the 1970s, and 756 lb per person in the 1980s (Figure 7-12). In contrast, subsistence sockeye salmon harvests averaged 387 lb per person per year in the 1990s and 289 lb per person in the 2000s (Figure 7-12). For Levelock, the long term average annual harvest was 172 lb per person of sockeye salmon, including an annual average for the 1970s of 274 lb per person and for the 1980s of 301 lb per person.[17] In contrast, the annual average was 109 lb per person in the 1990s and 54 lb per person in the 2000s (Figure 7-13).[18]

Similar trends are suggested by subsistence salmon permit data for the 2 study communities in the Nushagak District. For this analysis, all 5 species of Pacific salmon that are found in Alaska were included, since all appeared in annual subsistence harvests. Subsistence permit holders

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[16] Since the 1960s, state subsistence regulations have required that subsistence fishers in the Bristol Bay Management Area obtain a subsistence permit, keep a harvest record of daily catches on the back of the permit, and return the permit and harvest record to ADF&G at the end of the calendar year. Presently, ADF&G staff consider the permit records to provide a reliable estimate of subsistence salmon harvests, but records for the early years of the program (1960s and 1970s) are likely incomplete.

[17] Estimated subsistence sockeye salmon harvests for Levelock based on permits for the years 1963–1972 are curiously low (see Table 7-2). Reasons are uncertain, but incomplete participation in the permit system by subsistence fishers may be a likely explanation.

[18] Average sockeye salmon harvests per person and per permit have also declined in the Kvichak watershed subsistence fishery overall. For a discussion, see Fall et al. 2006:215-219.

from New Stuyahok averaged harvests of 174 lb per person per year for 1983–2005 (Figure 7-14).[19] However, average annual harvests dropped from 257 lb per person per year in the 1980s, to 162 lb per person per year in the 1990s, and 122 lb per person per year in the 2000s. For Koliganek, annual subsistence salmon harvests since 1983 have averaged 211 lb per person (Figure 7-15). The annual average for the 1980s was 385 lb per person, but this dropped to 152 lb per person in the 1990s and to 157 lb per person in the 2000s, suggesting stability in the last 2 decades.

Reasons for changes in subsistence salmon harvests, from year to year and over the long term, are complex. Factors that influence harvest levels may vary from district to district, from community to community, and from family to family. Explanations could include changes in salmon abundance, competition, and changing demographic, economic, social, and cultural conditions. It is beyond the scope of this report to explore these multiple reasons in depth. Chapters 2 through 6 offered some discussion of reasons for changes in salmon harvests over the last 5 years, but more research is necessary in order to understand any trends in subsistence harvests in the study communities and in the Bristol Bay subsistence salmon fishery in general.

Moose

Moose contributed between 10% (Kokhanok and Koliganek) and 25% (Levelock) of the total subsistence harvest (in usable pounds) in the study communities in 2005 (Figure 7-7).[20] Most households used moose, from 83% in Kokhanok, 86% in Koliganek, 93% in Levelock, 94% in New Stuyahok, to 100% in Igiugig (Tables 2-3, 3-3, 4-3, 5-3, and 6-3). The estimated total moose harvest in the 5 communities was 119, and ranged from 7 moose in Igiugig to about 59 in New Stuyahok (Table 7-3).

[19] Annual harvests by species for Nushagak District communities prior to 1983 are not available in the ADF&G Alaska Subsistence Salmon Fisheries Database and are not reported in annual management reports for the Bristol Bay Area.

[20] Holen et al. (2005) includes discussion of moose harvest trends. This report presents an update of that discussion.

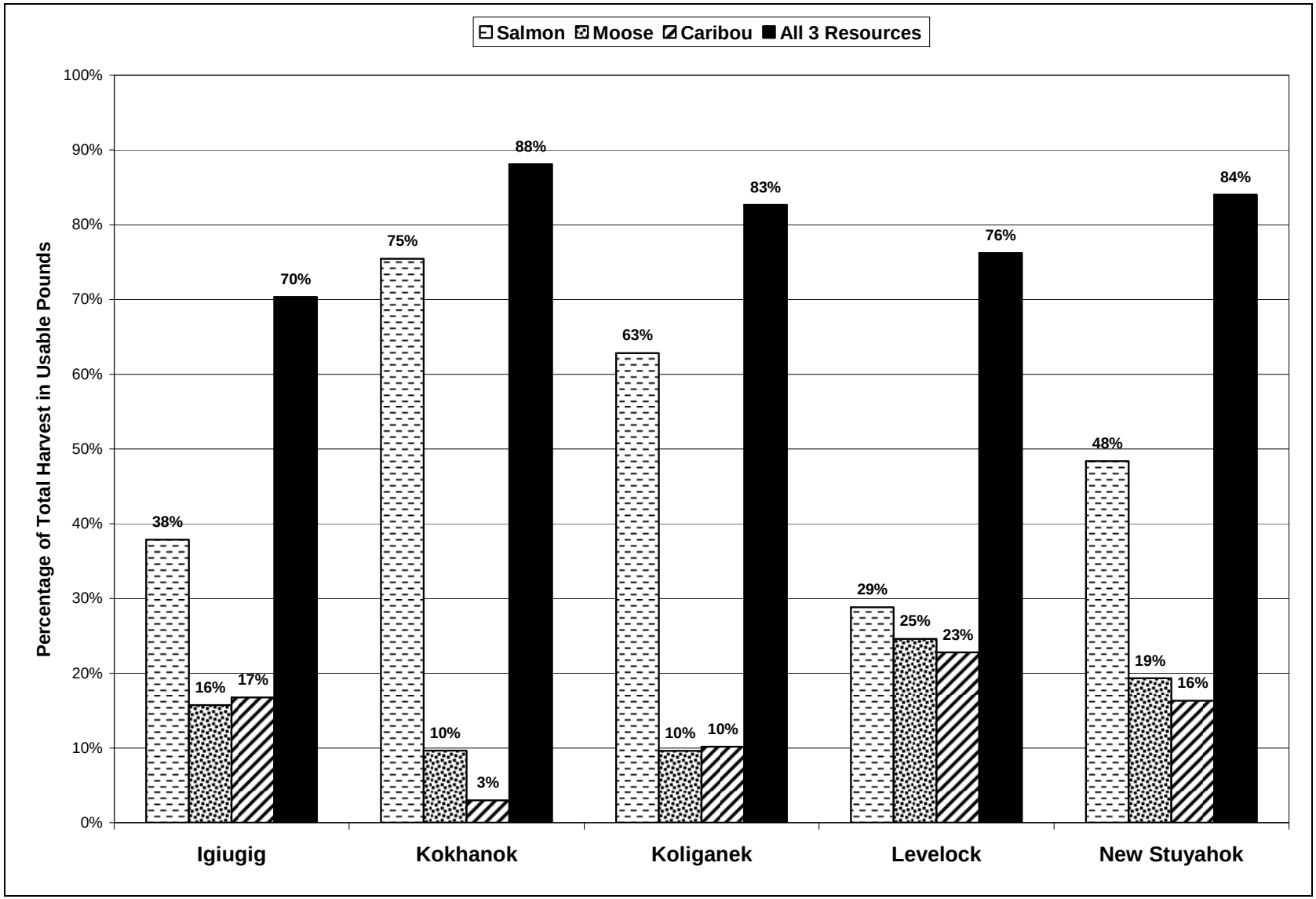

Figure 7-7.–Percentage of total harvest composed of salmon, moose, and caribou, study communities, 2005.

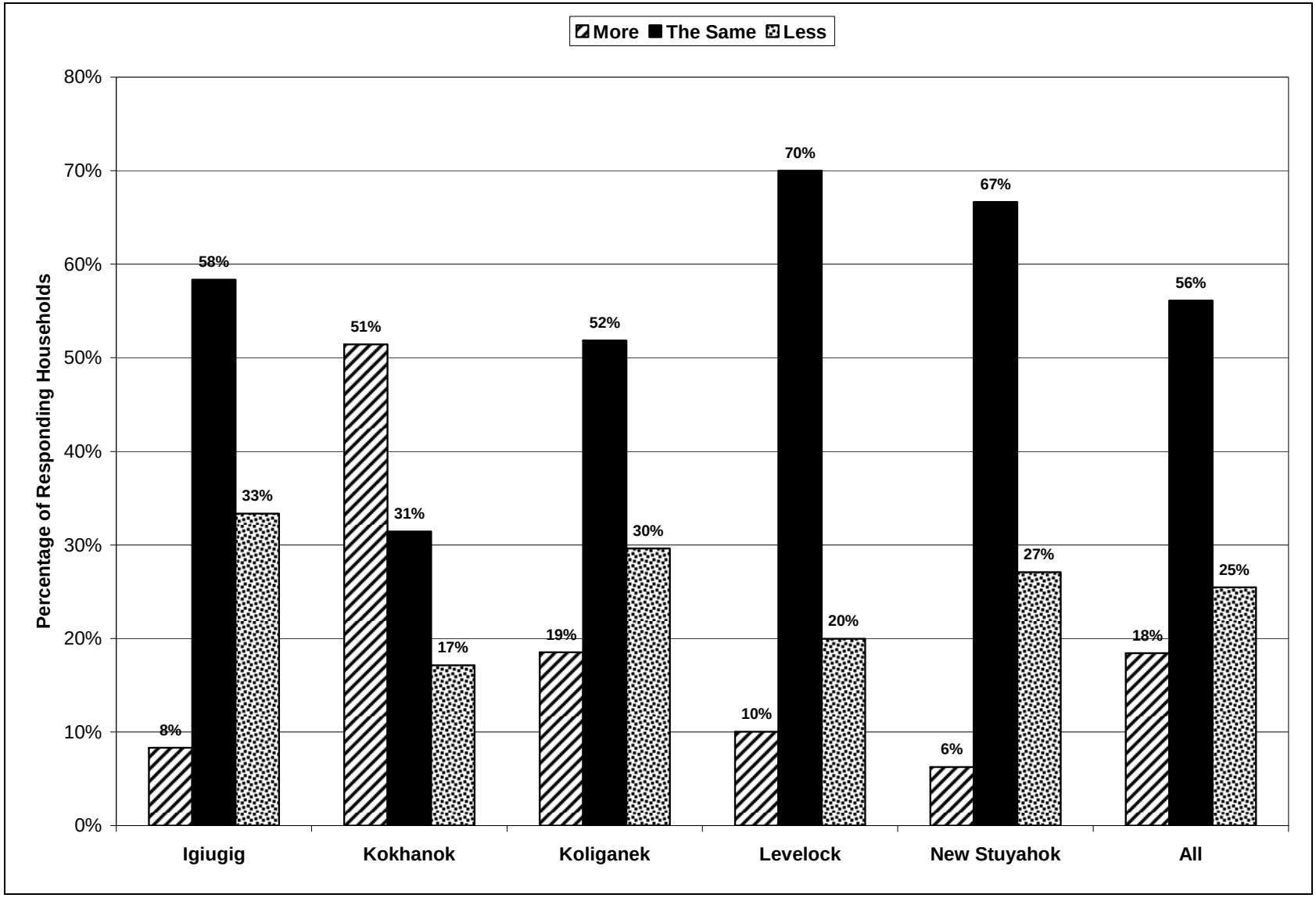

Figure 7-8.–Households' assessment of subsistence harvests and uses of salmon in 2005 compared to other recent years (about the last 5 years).

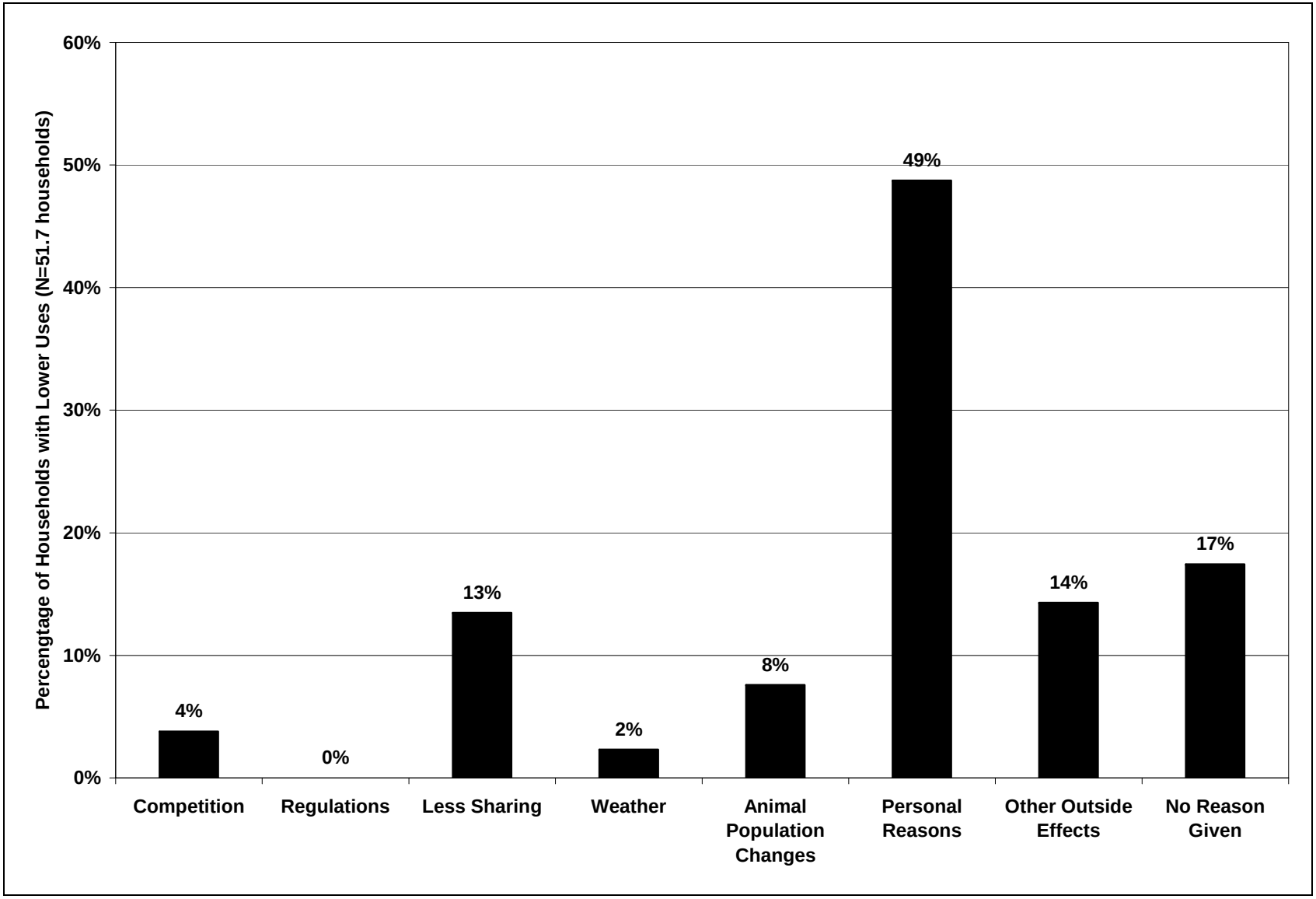

Figure 7-9.–Reasons for lower harvests or uses of salmon, all study communities combined, 2005.

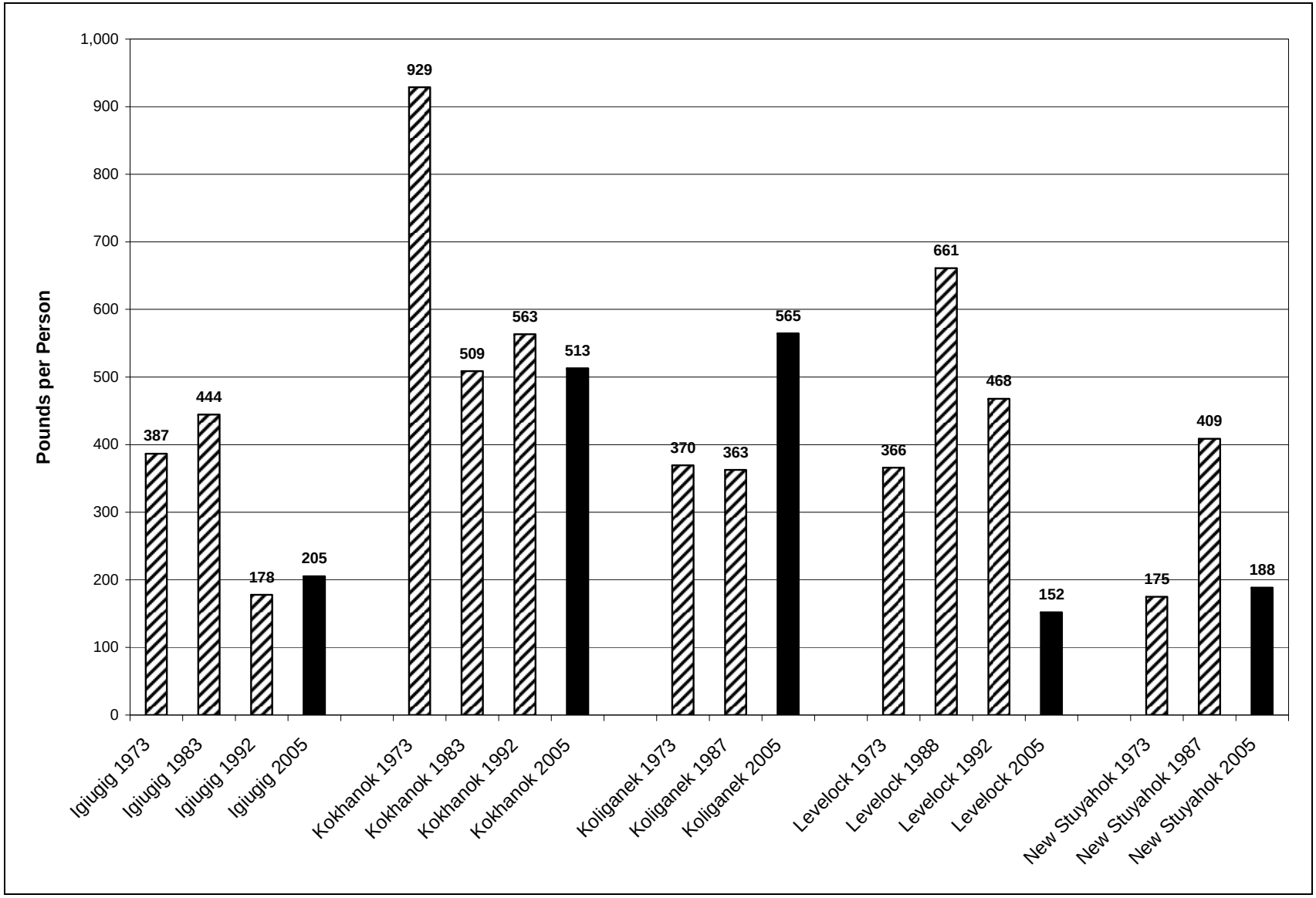

Figure 7-10.–Harvests of salmon, per pounds usable weight per person, study communities, all study years.

Table 7-2.–Estimated per capita harvests of sockeye salmon, Igiugig, Kokhanok, and Levelock, 1963–2005.

	Igiugig			Kokhanok			Levelock		
	Harvest	Population	Fish per person	Harvest	Population	Fish per person	Harvest	Population	Fish per person
1963	[a]	36		7,000	57	122.8	600	88	6.8
1964	4,000	36	111.1	8,000	61	130.3	1,000	86	11.6
1965	3,300	36	91.7	10,200	66	154.9	1,000	84	11.9
1966	1,200	36	33.3	10,500	70	149.4	600	82	7.3
1967	3,400	36	94.4	10,200	75	136.6	1,400	80	17.5
1968	4,800	36	133.3	10,200	79	129.0	1,400	78	17.9
1969	5,100	36	141.7	15,000	84	179.6	1,000	76	13.2
1970	11,200	36	311.1	22,300	88	253.4	1,600	74	21.6
1971	6,500	36	182.1	12,800	88	146.3	1,600	75	21.5
1972	2,200	35	62.1	8,300	87	95.4	1,600	75	21.3
1973	2,200	35	62.7	9,200	87	106.4	4,800	76	63.6
1974	6,200	35	178.2	21,500	86	250.0	8,600	76	113.2
1975	6,400	35	185.5	18,000	86	210.5	5,300	77	69.3
1976	6,800	34	198.8	17,100	85	201.2	5,300	77	68.8
1977	6,000	34	177.0	14,300	85	169.2	2,600	78	33.5
1978	8,800	34	261.9	23,700	84	282.1	8,900	78	114.1
1979	6,600	33	198.2	16,200	84	194.0	4,400	79	56.1
1980	8,100	33	245.5	22,600	83	272.3	6,100	79	77.2
1981	5,400	33	163.6	16,500	90	183.5	6,600	82	80.9
1982	1,900	33	57.6	16,600	97	171.5	5,400	84	64.1
1983	3,300	33	100.0	20,100	104	193.8	4,800	87	55.3
1984	6,300	33	190.9	24,400	111	220.6	8,100	89	90.6
1985	3,400	33	103.0	21,900	118	186.4	6,600	92	71.7
1986	1,600	33	48.5	18,300	124	147.1	6,400	95	67.7
1987	[a]	33		16,500	131	125.7	5,700	97	58.6
1988	[a]	33		14,400	138	104.2	3,500	100	35.1
1989	1,200	33	36.4	13,000	145	89.6	5,100	102	49.8
1990	2,200	33	66.7	12,400	152	81.6	4,700	105	44.8
1991	1,712	35	48.9	17,184	154	111.4	1,029	107	9.7
1992	1,056	37	28.5	11,477	156	73.4	4,374	108	40.5
1993	1,397	39	35.8	18,810	159	118.6	4,699	110	42.9
1994	1,201	41	29.3	15,771	161	98.1	1,467	111	13.2
1995	497	43	11.6	14,412	163	88.4	3,756	113	33.4
1996	2,309	45	51.3	14,011	165	84.8	1,120	114	9.8
1997	2,067	47	44.0	8,722	167	52.1	1,062	116	9.2
1998	1,659	49	33.9	10,418	170	61.4	2,454	117	21.0
1999	1,608	51	31.5	10,725	172	62.4	1,276	119	10.8
2000	1,981	53	37.4	7,175	174	41.2	1,467	122	12.0
2001	779	55	14.2	9,447	172	54.9	908	107	8.5
2002	2,138	43	49.7	9,847	179	55.0	625	83	7.5
2003	1,081	50	21.6	9,771	181	54.0	737	70	10.5
2004	1,026	54	19.0	11,869	166	71.5	1,000	58	17.2
2005	1,017	50	20.3	16,801	178	94.4	914	54	16.9

-continued-

Table 7-2. Page 2 of 2.

	Igiugig			Kokhanok			Levelock		
	Harvest	Population	Fish per person	Harvest	Population	Fish per person	Harvest	Population	Fish per person
Average, 1960s	3,633	36	100.9	10,157	70	144.6	1,000	82	12.2
Average, 1970s	6,290	35	181.5	16,340	86	190.6	4,470	76	58.6
Average, 1980s	3,900	33	118.2	18,430	114	161.6	5,830	91	64.3
Average, 1990s	1,571	42	37.4	13,393	162	82.7	2,594	112	23.2
Average, 2000s	1,337	51	26.3	10,818	175	61.8	942	82	11.4
Average, all years	3,491	38	90.0	14,364	120	119.7	3,293	90	36.7

a. No subsistence permits issued; harvest unknown.

Table 7-3.–Estimated harvests of moose, study communities, 1973–2005.

	Estimated harvest of moose						
Community	1973	1983	1987	1988	1992	2001	2005
Igiugig	4	4			8	2	7
Kokhanok	14	14			43	26	22
Levelock	20			24	27	16	8
Koliganek	31		48			29	24
New Stuyahok	68		54			82	59
Total	**137**	**18**	**102**	**24**	**78**	**155**	**119**

Note Totals may not equal sum of years, as individual year sums and totals were rounded independently.

Sources Gasbarro and Utermohle *Unpublished*; Scott et al. *Unpublished*; ADF&G Division of Subsistence household surveys, 2006.

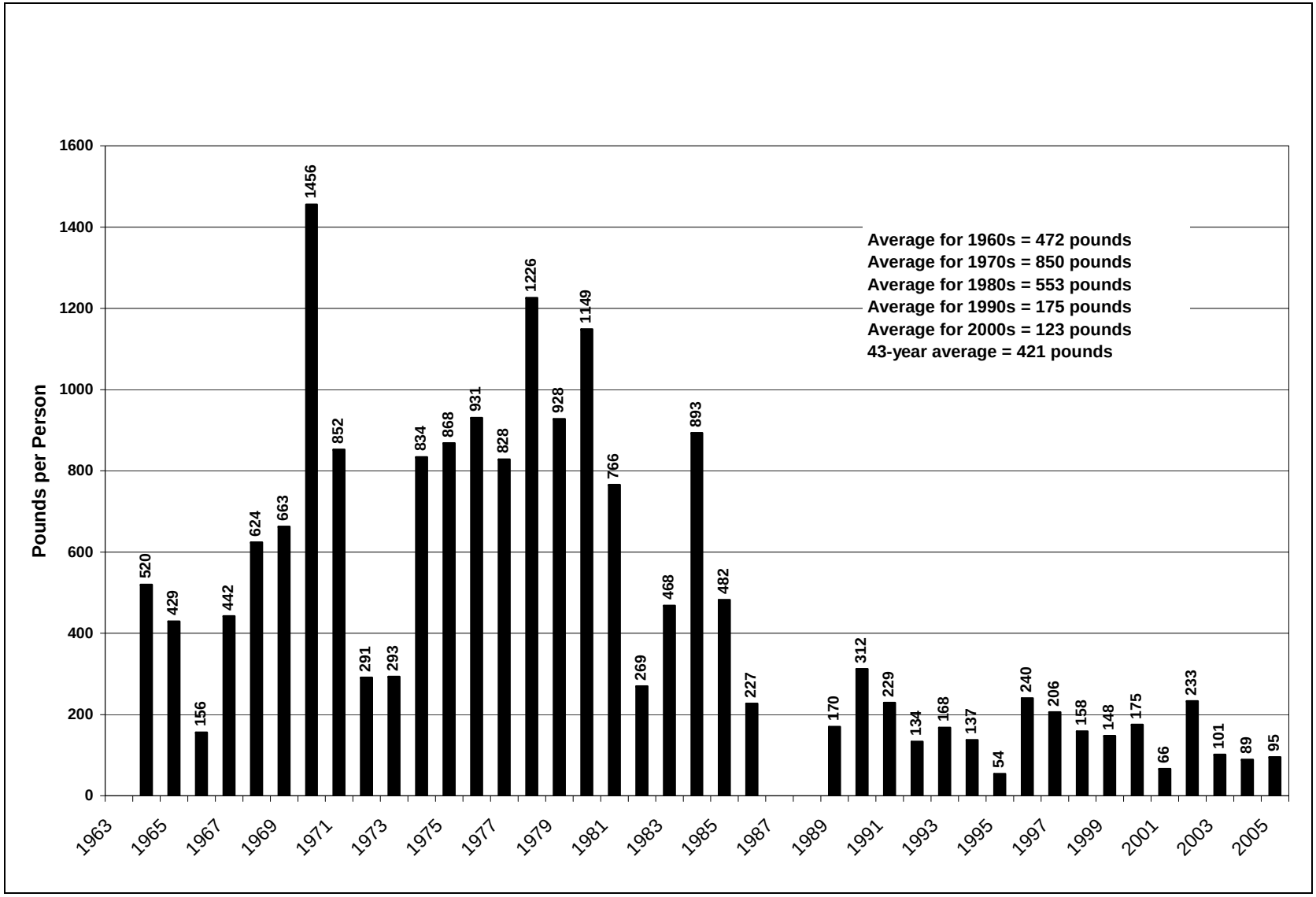

Figure 7-11.–Subsistence sockeye salmon harvests, Igiugig, pounds usable weight per person, 1963–2005.

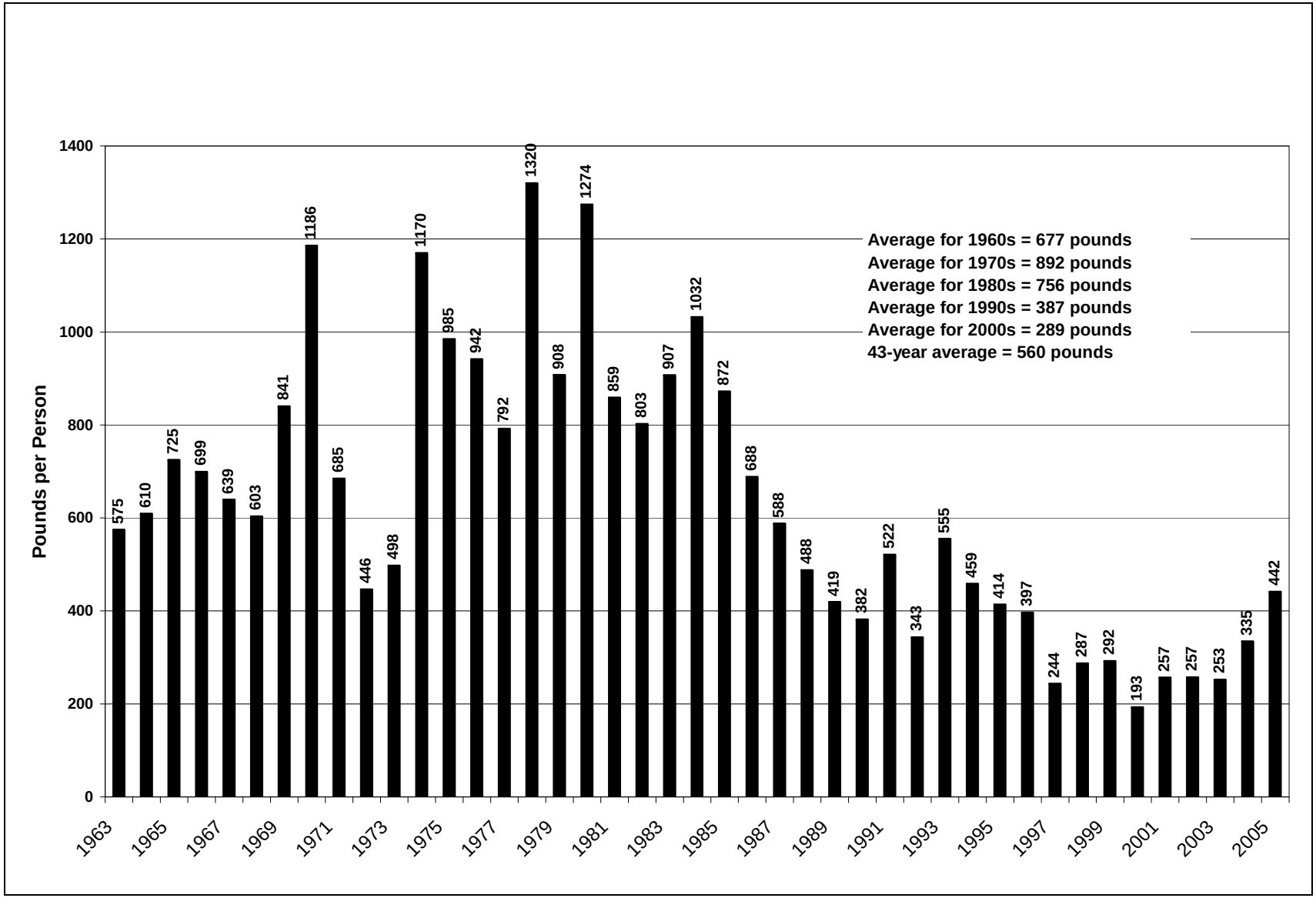

Figure 7-12.–Subsistence sockeye salmon harvests, Kokhanok, pounds usable weight per person, 1963–2005.

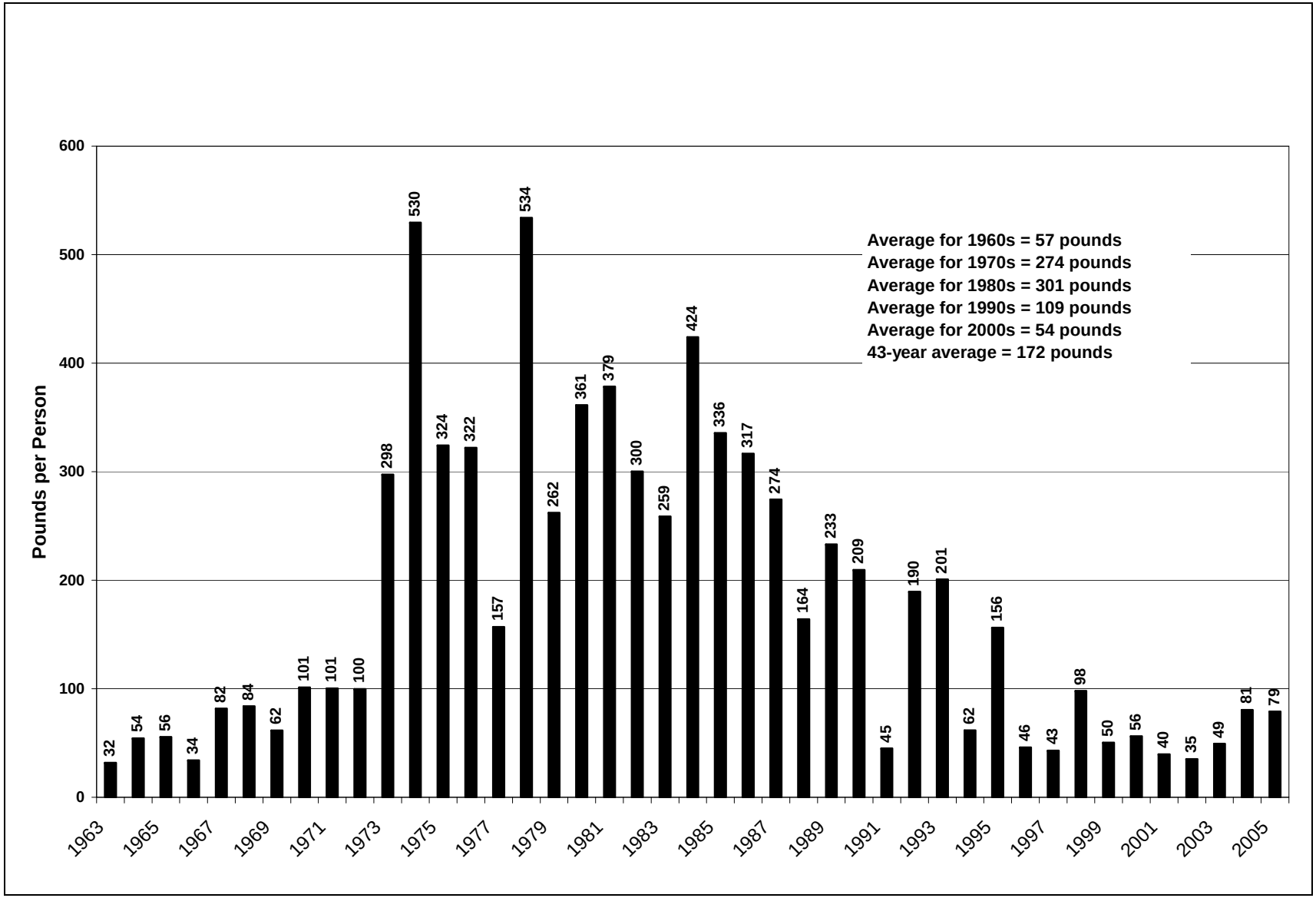

Figure 7-13.–Subsistence sockeye salmon harvests, Levelock, pounds usable weight per person, 1963–2005.

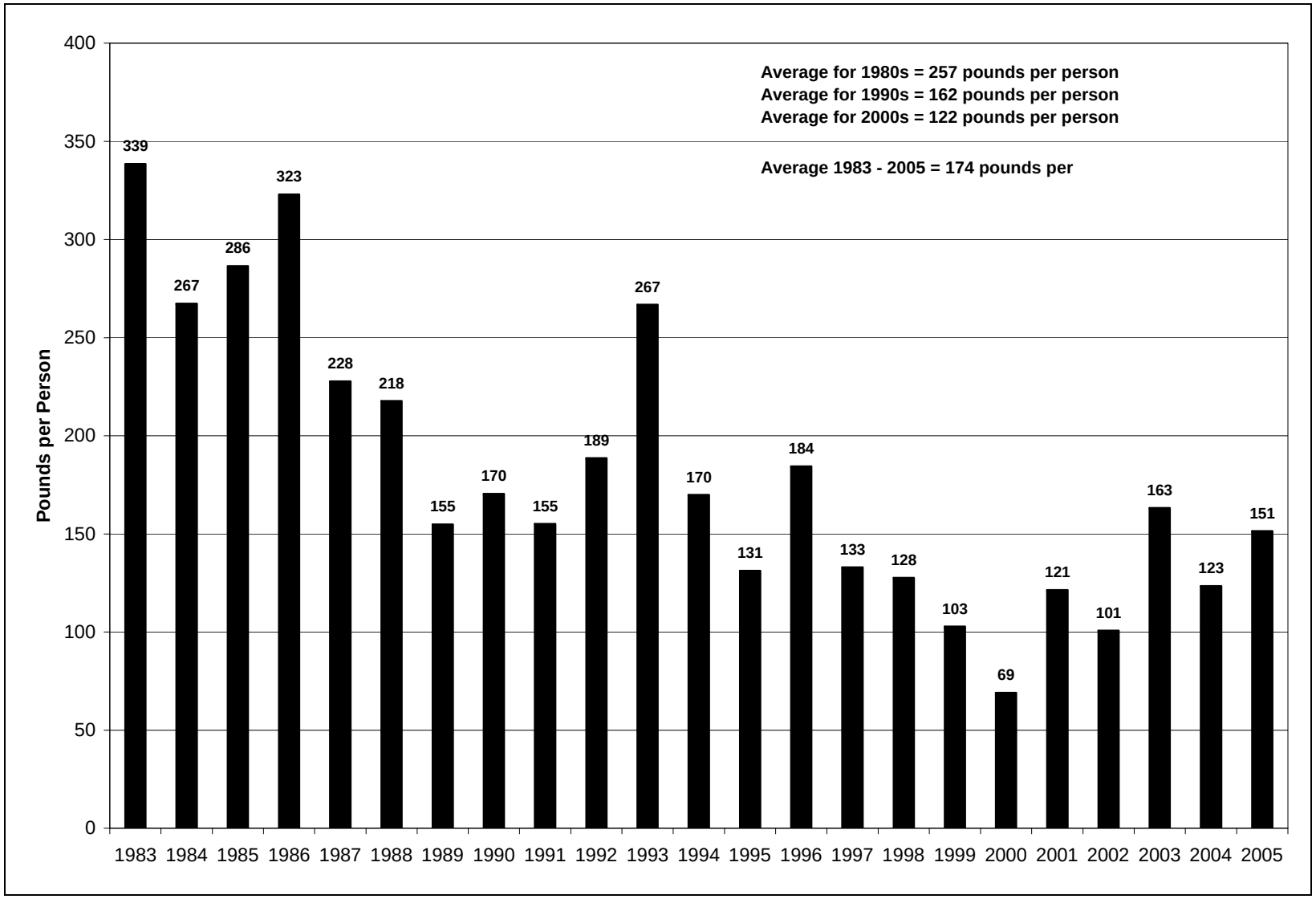

Figure 7-14.–Subsistence salmon harvests, pounds usable weight per person, New Stuyahok, 1983–2005.

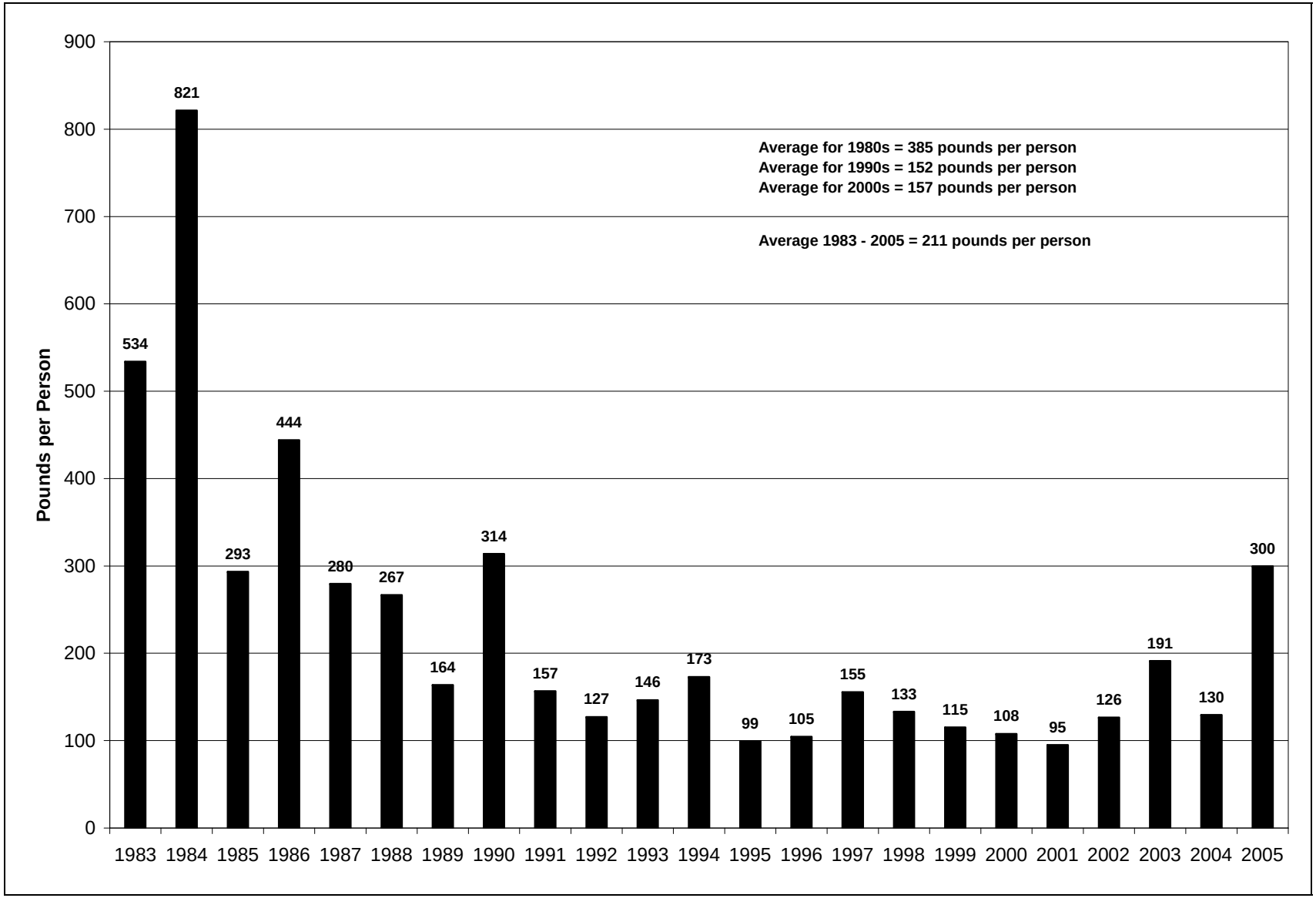

Figure 7-15.–Subsistence salmon harvests, pounds usable weight per person, Koliganek, 1983–2005.

As discussed in Holen et al. (2005:54–73), harvest ticket data appear to have underestimated moose hunting and moose harvests by residents of the Bristol Bay area. For example, for the 2001–2002 regulatory year, harvest ticket data suggested that 77 residents of the 5 study communities hunted moose, with a reported harvest of 26 animals. In contrast, household surveys generated an estimate of a total of 204 moose hunters in the 5 communities in 2001–2002, with a harvest of 156 moose.

In total, moose harvests reported from Division of Subsistence surveys were lower in the 5 study communities in 2005 (119) compared to the previous estimate for 2001–2002 (155). Most of this apparent change took place at New Stuyahok. Hunters there took an estimated 82 moose in 2001–2002 (0.17 moose per person) compared to 59 moose (0.14 per person) in 2005 (Tables 7-3 and 7-4). Levelock resident's moose harvest dropped from 16 in 2001–2002 to 8 in 2005. With the exception of Igiugig, moose harvests per capita were lower in 2005 in the study communities than in most other years for which household survey data are available (Table 7-4).

Table 7-4.–Estimated per capita harvests of moose, study communities, 1973–2005.

	Estimated number of moose harvested per capita						
Community	1973	1983	1987	1988	1992	2001	2005
Igiugig	0.10	0.05			0.18	0.07	0.16
Kokhanok	0.18	0.10			0.25	0.20	0.14
Levelock	0.26			0.22	0.25	0.26	0.24
Koliganek	0.27		0.26			0.16	0.16
New Stuyahok	0.35		0.15			0.17	0.14

Sources Scott et al. *Unpublished*; Holen et al. 2005; ADF&G Division of Subsistence household surveys, 2006.

Surveyed households' assessments of recent trends in large land mammal harvests (generally referring to moose and caribou) were mixed (Figure 7-16). For the 5 communities combined, 62% said their harvests and uses were about the same in 2005 as over the last 5 years, while 32% said large land mammal harvests and uses were lower, and 6% reported higher harvests and uses. Most households in New Stuyahok (76%), Levelock (57%), Igiugig (50%), and Koliganek (50%), as well as 49% in Kokhanok, reported their harvests and uses of large land mammals had remained about the same in 2005 compared to the last 5 years. However, many households in each community reported lower uses, ranging from 50% in Koliganek, to 49% in Kokhanok, 33% in Igiugig, 29% in Levelock, and 18% in New Stuyahok.

By far, changes in animal populations (such as abundance of animals, timing of movements, or location during hunting seasons) was the primary explanation households offered for lower harvests and uses of large land mammals (Figure 7-17). Of all households with less use, 43% cited population changes as the cause. Personal reasons, such as health, conflicts with work, or a change to household size, ranked second (20%), and "other outside effects" ranked third (16%).

Caribou

Caribou contributed between 3% (Kokhanok) and 23% (Levelock) of the total wild resource harvests in the study communities in 2005 (Figure 7-7).[21] A large majority of the households used caribou in 2005, ranging from 80% at Kokhanok to 89% in Koliganek, 94% in New Stuyahok, and 100% at Igiugig and Levelock. The estimated total harvest by residents of the study communities was 344 caribou, ranging from about 22 for Kokhanok, to 25 for Igiugig, 27 for Levelock, 92 for Koliganek, and 178 for New Stuyahok (Table 7-5).

[21] Holen et al. (2005) includes a discussion of trends in caribou harvests. This report presents an update of that discussion.

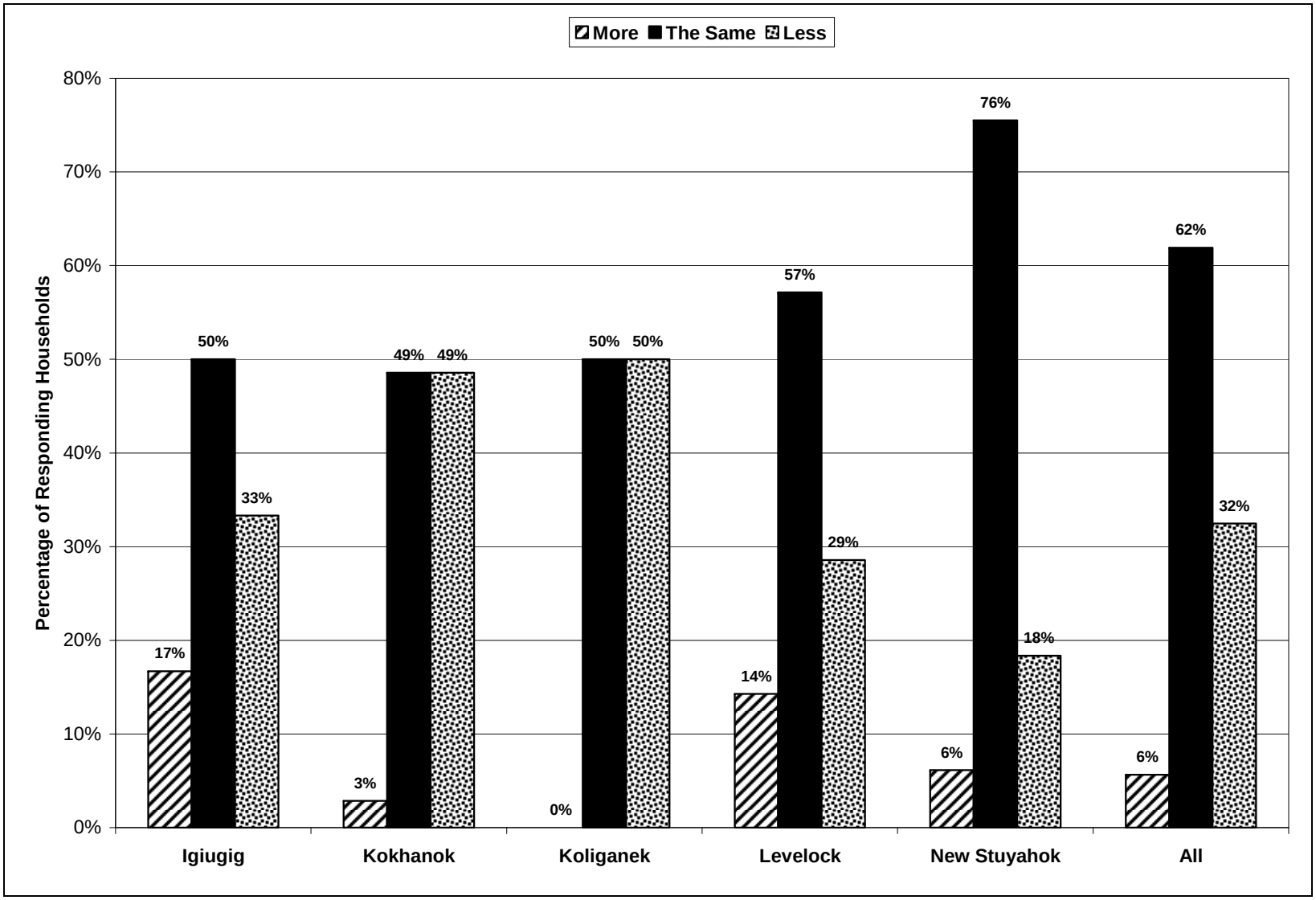

Figure 7-16.–Households' assessments of subsistence harvests and uses of large land mammals in 2005 compared to other recent years (about the last 5 years).

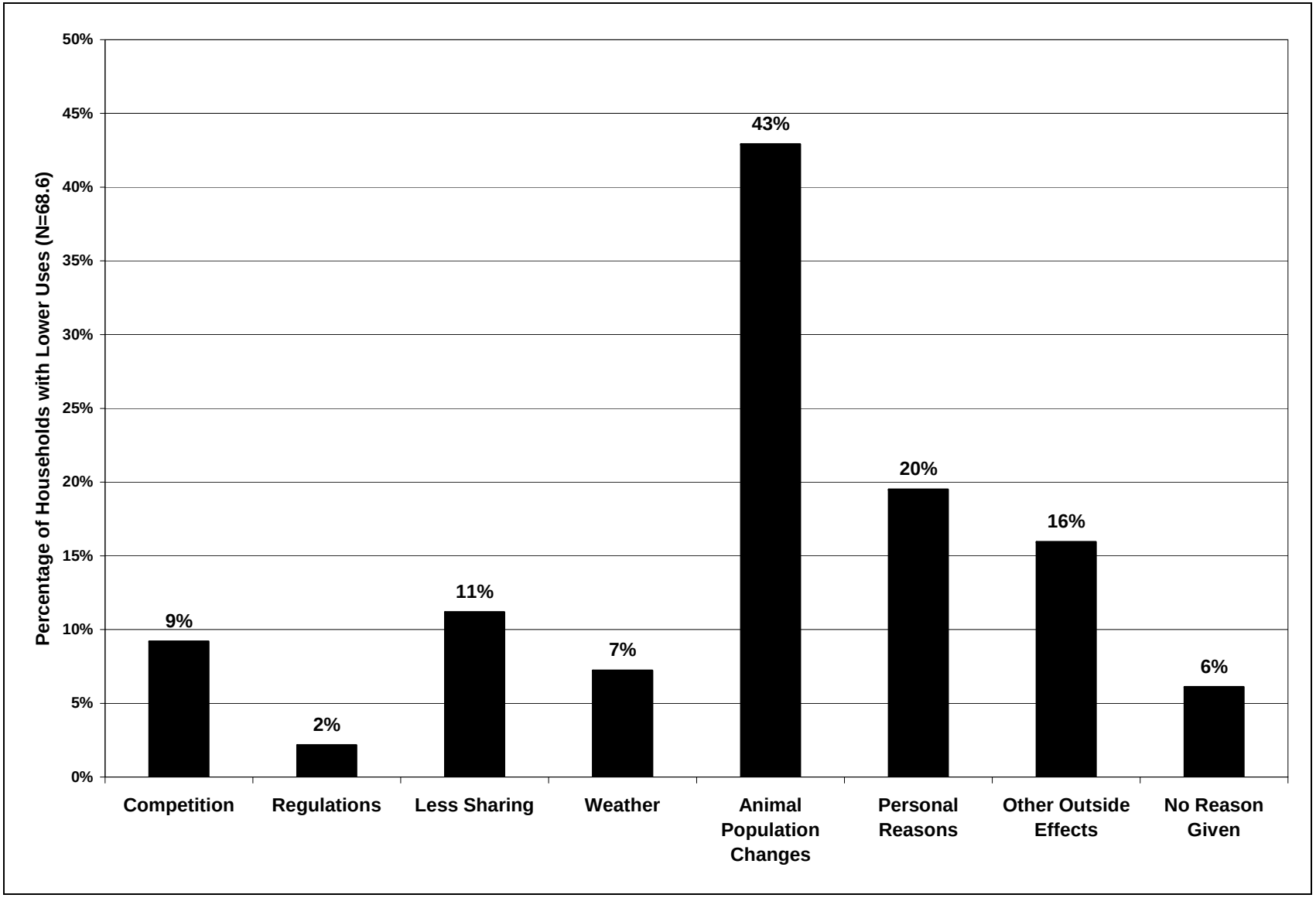

Figure 7-17.–Reasons for lower harvests or uses of large land mammals, all study communities combined, 2005.

The estimated size of the Mulchatna caribou herd was 14,231 animals in October 1974. Between 1981 and 1996, this herd increased at an annual rate of 17%. The population peaked in 1996 at about 200,000 caribou, and has since been in decline. Population estimates were 175,000 caribou in July 1999, 147,000 caribou in June 2002, 85,000 caribou in July 2004, and 45,000 in 2006. Signs of stress in the herd included an outbreak of "foot rot" (hoofrot, *Spherophorous necrophorous*) in 1998 and low calf: cow ratios. Much of the herd's range showed signs of heavy use: since about 1990 the herd had been expanding into new winter and summer ranges to the north and west, areas of excellent habitat that had not had significant numbers of caribou in over 100 years (Woolington 2005:21–22, 29, 32; Woolington 2007).

The number of hunters targeting Mulchatna caribou, as estimated from ADF&G harvest tickets, increased from 1,464 in 1991–1992 to 4,140 in 1999–2000, and has since declined. Harvest ticket returns documented 3,080 hunters in 2003–2004. In the peak hunter year of 1999–2000, 54% were non-Alaska residents, 36% were nonlocal Alaska residents, and 7% were local residents (residents of communities within the herd's range).[22] Reported harvests peaked at 4,770 caribou in 1998–1999 and dropped to 3,175 caribou in 2003–2004 (Woolington 2005:34–35).

These estimates, based on harvest ticket data, appear to have underestimated Bristol Bay resident's participation in the Mulchatna caribou herd hunt as well as the size of harvests by residents when compared to Division of Subsistence household survey data. For example, for 2001–2002, harvest ticket data identified 70 residents of the 5 study communities who hunted caribou and 60 who were successful. In contrast, household surveys for 2001–2002 estimated 204 caribou hunters in the 5 communities, 172 successful hunters, and a harvest of 424 animals (Holen et al. 2005:43).

Table 7-5.–Estimated harvests of caribou, study communities, 1973–2005.

	Estimated harvest of caribou						
Community	1973	1983	1987	1988	1992	2001	2005
Igiugig	64	7			62	23	25
Kokhanok	12	1			137	20	22
Levelock	36			86	86	28	27
Koliganek	108		186			93	92
New Stuyahok	164		253			260	178
Total	**384**	**8**	**439**	**86**	**285**	**424**	**344**

Sources Gasbarro and Utermohle *Unpublished*; Scott et al. *Unpublished*; Holen et al. 2005; ADF&G Division of Subsistence household surveys, 2006.

[22] These percentages do not equal 100% because the residency of about 3% of hunters was unknown.

As shown in Table 7-5 and Table 7-6, caribou harvests in the study communities were generally about the same in 2005 as in 2001 (the last year for which survey data were available) for all of the study communities except New Stuyahok, where an estimated 178 caribou were harvested in 2005 compared to 260 in 2001. According to household survey results, caribou harvests in the study communities have varied widely since the early 1970s. Generally, harvests appeared to have been highest in the late 1980s and early 1990s, corresponding with the peak population size for the Mulchatna herd.

Table 7-6.–Estimated per capita harvests of caribou, study communities, 1973–2005.

	Estimated number of caribou harvested per capita						
Community	1973	1983	1987	1988	1992	2001	2005
Igiugig	1.66	0.11			1.33	0.85	0.60
Kokhanok	0.14	0.01			0.79	0.15	0.14
Levelock	0.46			0.79	0.78	0.45	0.79
Koliganek	0.95		1.00			0.51	0.61
New Stuyahok	0.85		0.72			0.53	0.42

Sources Scott et al. Unpublished; Holen et al. 2005; ADF&G Division of Subsistence household surveys, 2006.

As discussed in the above section on moose, 32% of respondents in the combined 5 study communities said that uses of large land mammals in 2005 were lower than in other recent years. Most cited changes in resource populations as the cause of the decline in their harvests or uses (Figures 7-16 and 7-17).

CONCLUSION

This study has documented the continuing importance of subsistence hunting, fishing, and gathering to the residents of the Southwest Alaska communities of Igiugig, Kokhanok, Koliganek, Levelock, and New Stuyahok. In the 2005 study year, virtually every person in the 5 communities participated in subsistence activities and used wild resources. Subsistence harvests were large and diverse in 2005, supplying a large portion of each community's food supply. Sockeye salmon, other fishes, caribou, moose, and wild plants were the primary subsistence foods as measured in usable pounds, but many households also used small game, birds and their eggs, marine mammals, and clams. In addition to their own harvests, most households also received subsistence resources through extensive sharing networks. People reported sharing their traditional knowledge of wild resources and harvest areas while engaged in subsistence activities.

Many participants in this study also reported that their subsistence uses and harvests have changed over their lifetimes and in the last 5 years. Results of the household surveys, as well as subsistence salmon permit data, suggested a long term trend towards lower subsistence harvests of salmon, although this trend varied by community and family. Harvests of moose and caribou by residents of the 5 study communities were generally lower in 2005 than in other years for which household survey data were available. Reasons local residents cited for these changes included reduced resource abundance, shifts in the locations of moose and caribou, competition with nonlocal sport hunters, and personal reasons such as health, work, or changing household

size. Causes of changes in subsistence harvests and uses are complex and require additional research that must involve collaboration with local communities.

Given the importance of subsistence resources and observations of changing harvest and use patterns, it is not surprising that residents of the study communities expressed concerns about their future opportunities to hunt, fish, and gather wild resources in a manner consistent with their traditions and at levels that meet their harvest goals. As demonstrated by the study findings, subsistence uses of healthy fish and wildlife populations meaningfully link people to their past, are vital to the present health of each community, and encourage optimism about the future. In addition, providing opportunities for subsistence hunting and fishing is a mandate of state and federal law. Local residents desire to continue subsistence activities, not only for themselves, but also for their children and other future generations. The intent of this report has been to provide information that will help the communities work towards their goal of sustaining their way of life.

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APPENDIX A: SURVEY INSTRUMENT, YEAR 2

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

HH ID: _____ START TIME: _____ INTERVIEWER: _____

COMMUNITY: _____ STOP TIME: _____ DATE: _____

ID # OF PERSON RESPONDING TO SURVEY: ____ CODER: _____

FIELD SUPERVISOR: _____

HOUSEHOLD INFORMATION - WHO WERE MEMBERS OF THIS HOUSEHOLD BETWEEN JANUARY 1 AND DECEMBER 31, 2005 ?

							IN THE STUDY YEAR, DID YOU FISH/HUNT/PROCESS:							
							LM/MM/BIRDS*		FISH/MI**		FURBEARERS		PLANTS	
PERSON ID#	M/F	RELATION TO HH HEAD	BIRTHDATE (MM/DD/YR)	RESIDENCE OF PARENT WHEN BORN	TOTAL YEARS IN COMM.	ETHNICITY	HUNT? Y/N	PROCESS? Y/N	FISH? Y/N	PROCESS? Y/N	HUNT/TRAP? Y/N	PROCESS? Y/N	GATHER? Y/N	PROCESS? Y/N
HEAD 1														
1		1												
HEAD 2														
2		2												
3														
3														
4														
4														
5														
5														
6														
6														
7														
7														
8														
8														

* LM/MM/BIRDS - should include harvesting/attempting to harvest large and small game, birds, and marine mammals.

** FISH/MI - should include harvesting/attempting to harvest marine invertebrates, eg., clam digging, etc.

STEPHEN R. BRAUND & ASSOC.

COMMUNITY ID:_____ HH ID:_____ DEMOGRAPHY (0,1)

DO YOU HAVE ANY OTHER QUESTIONS, COMMENTS, OR CONCERNS? _____

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

INTERVIEW SUMMARY: _____

COMMUNITY ID:_____ HH ID:_____ SUMMARY (30B)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

COMMERCIAL FISHING - SALMON.

DID MEMBERS OF YOUR HOUSEHOLD PARTICIPATE IN COMMERCIAL SALMON FISHING BETWEEN JANUARY 1 AND DECEMBER 31, 2005? YES ____ NO ____

IF YES: PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS, IF POUNDS THEN EDIBLE WEIGHT):

IF NO: DID YOU INCIDENTALLY HARVEST SALMON WHILE COMMERCIAL FISHING OTHER SPECIES?

	COMMERCIAL FISHED?		REMOVED FOR OWN USE	GAVE AWAY			ID #'S OF FISHERS		
				TO CREW	TO OTHERS				
SPECIES	Y/N	INCIDENTAL*	#	#	#	UNITS	PERMIT HOLDER	CREW	**NOTES:**
CHINOOK SALMON						IND			
113000001						1			
CHUM SALMON						IND			
111000001						1			
SOCKEYE SALMON						IND			
115000001						1			
PINK SALMON						IND			
114000001						1			
COHO SALMON						IND			
112000001						1			
UNKNOWN SALMON						IND			
119000001						1			

* Incidental harvest - Check only if household was not engaged in commercial salmon fishing for that specific resource.

NOTES:

COMMUNITY ID:_____ HH ID:_____ COMMERCIAL FISHING - SALMON (3A)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

COMMERCIAL FISHING - NON-SALMON FISH

DID MEMBERS OF YOUR HOUSEHOLD PARTICIPATE IN COMMERCIAL FISHING (OTHER THAN SALMON) BETWEEN JANUARY 1 AND DECEMBER 31, 2005?

Yes: _____; No:_____

IF YES: PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT):

IF NO: DID YOU INCIDENTALLY HARVEST OTHER FISH WHILE COMMERCIAL FISHING FOR SALMON?

	COMMERCIAL FISHED?		FOR OWN USE	TO CREW	TO OTHERS		ID #'S OF FISHERS		
SPECIES	Y/N	INCIDENTAL	#	#	#	UNITS	PERMIT HOLDER	CREW	**NOTES:**
HERRING						GAL			
120200001						4			
SPAWN ON KELP						GAL			
120306001						4			
HERRING SAC ROE						GAL			
120304001						4			
STURGEON						IND			
125899001						1			
LINGCOD						IND			
121606001						1			
PACIFIC COD (GRAY)						IND			
121004001						1			
SABLEFISH (BLACK COD)						IND			
122800001						1			
UNKNOWN FLOUNDER						IND			
121499001						1			
SOLE						IND			
123699001						1			
HALIBUT						LBS			
121800001						2			
BLACK ROCKFISH*						IND			
122602001						1			
RED ROCKFISH**						IND			
122604001						1			
UNKNOWN ROCKFISH						IND			
122699001						1			

* BLACK ROCKFISH = DARK DUSKY, BLACK, LIGHT DUSKY, SILVERGRAY, WIDOW, YELLOWTAIL, "SEA BASS" OR "BLACK BASS".

** RED ROCKFISH = YELLOWEYE (RED SNAPPER), ROUGHEYE, PACIFIC OCEAN PERCH, DARK BLOTCHED, HARLEQUIN, NORTH, COPPER, QUILLBACK, ROSETHORN, REDSTRIPE, CANARY, SHORTRAKER, BLACKQUILL, RED BANDED, TIGER, AND "IDIOTFISH" OR "SHORTSPINE THORNYHEAD".

COMMUNITY ID:_____ HH ID:_____ COMMERCIAL FISHING - NON-SALMON FINFISH (3B)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

COMMERCIAL FISHING - NON-SALMON FISH

	COMMERCIAL FISHED?		REMOVED FOR OWN USE	GAVE AWAY TO CREW	GAVE AWAY TO OTHERS		ID #'S OF FISHERS		
SPECIES	Y/N	INCIDENTAL	#	#	#	UNITS	PERMIT HOLDER	CREW	**NOTES:**
GREENLING						IND			
121699001						1			
WOLF EEL (WOLFFISH)						IND			
124200001						1			
SHARK						IND			
123299001						1			
WALLEYE POLLOCK (WHITING)						IND			
121012001						1			
SEA RUN DOLLY VARDEN									
125006021									

NOTES:

COMMUNITY ID:_____ HH ID:_____ COMMERCIAL FISHING - NON-SALMON FINFISH (3B)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

COMMERCIAL FISHING - MARINE INVERTEBRATES

DID MEMBERS OF YOUR HOUSEHOLD PARTICIPATE IN COMMERCIAL FISHING FOR MARINE INVERTEBRATES BETWEEN JANUARY 1 AND DECEMBER 31, 2005?

Yes:_____; No:_____ **IF YES:** PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD BE EDIBLE WEIGHT):

IF NO: DID YOU INCIDENTALLY HARVEST MARINE INVERTEBRATES WHILE COMMERCIAL FISHING FOR OTHER SPECIES?

	COMMERCIAL FISHED?		FOR OWN USE	TO CREW	TO OTHERS		SHELLS ON?	ID #'S OF FISHERS		
SPECIES	Y/N	INCIDENTAL	#	#	#	UNITS	Y/N	PERMIT HOLDER	CREW	**NOTES:**
RAZOR CLAMS						GAL				
500612001						4				
PACIFIC LITTLENECK CLAMS (STEAMERS)						GAL				
500608001						4				
DUNGENESS CRAB						IND				
501004001						1				
KING CRAB						IND				
501008991						1				
TANNER CRAB						IND				
501012991						1				
OCTOPUS						IND				
502200001						1				
SHRIMP						LBS				
503400001						2				
SCALLOPS						LBS				
502699001						2				

NOTES: _____

COMMUNITY ID:_____ HH ID:_____ COMMERCIAL FISHING - MARINE INVERTEBRATES (3C)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

NON-COMMERCIAL FISHING: SALMON.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE SALMON BETWEEN JANUARY 1 AND DECEMBER 31, 2005? YES: ___ NO: ___

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS UNLESS NOTED OTHERWISE. POUNDS SHOULD BE EDIBLE WEIGHT):

			NUMBER HARVESTED BY:								
	USED?	TRIED TO HARVEST	SET NET	SEINE	ROD & REEL	OTHER GEAR			RECEIVED	GAVE AWAY	
SPECIES	Y/N	Y/N	#	#	#	TYPE	#	UNITS	Y/N	Y/N	**NOTES/LOCATIONS OFF MAP**
CHINOOK (KING) SALMON								IND			
113000000								1			
SOCKEYE SALMON								IND			
115000000								1			
CHUM SALMON								IND			
111000000								1			
PINK SALMON								IND			
114000000								1			
COHO (SILVER) SALMON								IND			
112000000								1			
SPAWNING REDS								IND			
117050000								1			
LANDLOCKED SALMON								IND			
116000000								1			
UNKNOWN SALMON								IND			
119000000								1			

* 'ROD & REEL' INCLUDES TROLLING IN OPEN WATER

Was your household's harvest and use of salmon typical of recent years? LESS_____ SAME_____ MORE_____

If different (less or more), how and why was it different? _____

COMMUNITY ID:_____ HH ID:_____ SALMON (4A)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

NON-COMMERCIAL FISHING: NON-SALMON FINFISH.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE FISH OTHER THAN SALMON BETWEEN JANUARY 1 AND DECEMBER 31, 2005?

Yes:_____; No:_____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS UNLESS NOTED OTHERWISE. POUNDS SHOULD BE EDIBLE WEIGHT):

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	ROD & REEL #	DIP NET #	HAND LINE* #	SET NET #	ICE FISHING #	SEINE #	OTHER GEAR TYPE	OTHER GEAR #	UNITS	RECEIVED Y/N	GAVE AWAY Y/N	NOTES
DOLLY VARDEN											IND			
125006000											1			
ARCTIC CHAR											IND			
125000000											1			
LAKE TROUT											IND			
125010000											1			
RAINBOW TROUT											IND			
126204000											1			
STEELHEAD											IND			
126206000											1			
TROUT, UNKNOWN											IND			
126299000											1			
GRAYLING											IND			
125200000											1			
NORTHERN PIKE											IND			
125499000											1			
ROUND WHITEFISH**											IND			
126412000											1			
HUMPBACK WHITEFISH											IND			
126408000											4			
BROAD WHITEFISH											IND			
126404000											4			
LEAST CISCO***											GAL			
126406060											4			
BULLHEAD SCULPIN											IND			
12304000											4			
BURBOT											IND			
124800000											1			
BLACKFISH											IND			
124600000											1			
LONGNOSE SUCKER											IND			
126000000											1			

COMMUNITY ID:_____ HH ID:_____ NON-SALMON FINFISH (6A)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	ROD & REEL #	DIP NET #	HAND LINE* #	SET NET #	ICE FISHING #	SEINE #	OTHER GEAR TYPE	OTHER GEAR #	UNITS	RECEIVED Y/N	GAVE AWAY Y/N	NOTES
SMELT											GAL			
120100000											1			
STICKLEBACKS											IND			
123800000											1			
Ocean Species														
HERRING											GAL			
120200000											1			
HALIBUT											LBS			
121800000											1			
ROCKFISH											IND			
122600000											2			
LINGCOD											IND			
121606000											1			
COD, UNKNOWN											IND			
121099000											1			
FLOUNDER											IND			
121400000											1			
SPAWN ON KELP											IND			
120306000											1			

Was your household's harvest and use of non-salmon fish typical of recent years? LESS____ SAME____ MORE____

If different (less or more), how and why was it different? _____

* Hand line used in open water.
**Sometimes called candlefish in the Iliamna Lake area.
***Sometimes called freshwater herring in the Iliamna Lake area.

COMMUNITY ID:_____ HH ID:_____ NON-SALMON FINFISH (6A)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

NON-COMMERCIAL FISHING: MARINE INVERTEBRATES [SHELLFISH].

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE MARINE INVERTEBRATES BETWEEN JANUARY 1 AND DECEMBER 31, 2005? YES: _____ NO: _____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS UNLESS NOTED OTHERWISE. POUNDS SHOULD BE EDIBLE WEIGHT):

SPECIES	USED?	TRIED TO HARVEST	HARVESTED		RECEIVED	GAVE AWAY	NOTES/LOCATION OFF MAP
	Y/N	Y/N	#	UNITS	Y/N	Y/N	
FRESHWATER CLAMS				GAL			
500604002				4			
BUTTER CLAMS				GAL			
500602002				4			
RAZOR CLAMS				GAL			
500612002				4			
LITTLENECK CLAMS (STEAMERS)				GAL			
500608002				4			
PINKNECK (SURF) CLAMS				GAL			
500610002				4			
HORSE CLAMS (GAPER)				GAL			
500606002				4			
UNKNOWN CLAMS				GAL			
500699002				4			
DUNGENESS CRAB				IND			
501004002				1			
KING CRAB				IND			
501008992				1			
TANNER CRAB, BAIRDI (SNOW CRAB)				IND			
501012022				1			
UNKNOWN CRABS				IND			
501099002				1			
COCKLES				GAL			
500899002				4			
SCALLOPS				LBS			
502699002				2			
MUSSELS				GAL			
502099002				4			

COMMUNITY ID:_____ HH ID:_____ MARINE INVERTABRATES (8A)

Was your household's harvest and use of marine invertebrates typical of recent years? LESS____ SAME____ MORE____

If different (less or more), how and why was it different? _____

_____

_____

_____

_____

_____

_____

_____

_____

COMMUNITY ID:_____ HH ID:_____ MARINE INVERTABRATES (8A)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

LARGE LAND MAMMALS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE LARGE LAND MAMMALS BETWEEN JANUARY 1 AND DECEMBER 31, 2005? YES: ____ NO: ____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD BE INDIVIDUALS):

			HARVESTED							
	USED?	TRIED TO HARVEST	TOTAL	FOR FOOD (MEAT/FAT)	FOR FAT ONLY	HIDE ONLY		RECEIVED	GAVE AWAY	
SPECIES	Y/N	Y/N	#	#	#	#	UNITS	Y/N	Y/N	**NOTES/LOCATION OFF MAP**
BLACK BEAR							IND			
210600000							1			
BROWN BEAR							IND			
210800000							1			
CARIBOU							IND			
211000000							1			
MOOSE							IND			
211800000							1			
DALL SHEEP							IND			
212200000							1			
							IND			
							1			
							IND			
							1			

Was your household's harvest and use of large land mammals typical of recent years? LESS_____ SAME_____ MORE_____

If different (less or more), how and why was it different?

COMMUNITY ID:_____ HH ID:_____ LARGE LAND MAMMALS (10A)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

MARINE MAMMALS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE MARINE MAMMALS BETWEEN JANUARY 1 AND DECEMBER 31, 2005? YES: ____ NO: ____
IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS ARE INDIVIDUALS. POUNDS SHOULD BE EDIBLE WEIGHT.):

				NUMBER HARVESTED						
SPECIES	USED*? Y/N	TRIED TO HARVEST? Y/N	SALVAGE?** Y/N	FOR FOOD #	FOR HIDE ONLY #	TOTAL #	UNITS	RECEIVED Y/N	GAVE AWAY Y/N	NOTES/LOCATIONS OFF MAP
FRESHWATER SEAL							IND			
300806000							1			
HARBOR SEAL (Issuriq)							IND			
300806040							1			
RINGED SEAL (Nayiq)							IND			
300810000							1			
BEARDED SEAL (Mukluk)							IND			
300802000							1			
STELLER SEA LION							IND			
301200000							1			
BELUGA WHALE							IND			
301602000							1			
SEA OTTER							IND			
301000000							1			
							IND			
							1			

* Use includes meat and/or oil, and/or fur.
** For animal found dead or incidently caught in a subsistence net.
Was your household's harvest and use of marine mammals typical of recent years? LESS____ SAME____ MORE____
If different (less or more), how and why was it different?

COMMUNITY ID:_____ HH ID:_____ MARINE MAMMALS (12A)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

SMALL LAND MAMMALS/FURBEARERS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE SMALL LAND MAMMALS/FURBEARERS BETWEEN JANUARY 1 AND DECEMBER 31, 2005? YES:____ NO:____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS).

		TRIED TO	NUMBER HARVESTED						GAVE			
	USED?	HARVEST	FOOD	FUR ONLY	FOOD &	TOTAL		RECEIVED	AWAY	NUMBER	AVERAGE	
SPECIES	Y/N	Y/N	#	#	FUR #	#	UNITS	Y/N	Y/N	SOLD	PRICE	**NOTES/LOCATION OFF MAP**
RED FOX							IND					
220804000							1					
BEAVER							IND					
220200000							1					
COYOTE							IND					
220400000							1					
SNOWSHOE HARE							IND					
221004000							1					
LAND OTTER							IND					
221200000							1					
LYNX							IND					
221600000							1					
MARMOT							IND					
221800000							1					
MARTEN							IND					
222000000							1					
MINK							IND					
222200000							1					
MUSKRAT							IND					
222400000							1					
PORCUPINE							IND					
222600000							1					
WEASEL							IND					
223000000							1					
WOLF							IND					
223200000							1					
WOLVERINE							IND					
223400000							1					
TREE SQUIRREL (RED)							IND					
222804000							1					
PARKA SQUIRREL (GROUND)							IND					
222802000							1					

COMMUNITY ID:_____ HH ID:_____ FURBEARERS (14A)

Was your household's harvest and use of small land mammals typical of recent years? LESS____ SAME____ MORE____

If different (less or more), how and why was it different? _____

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

BIRDS AND EGGS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE BIRDS OR EGGS BETWEEN JANUARY 1 AND DECEMBER 31, 2005? YES: ____ NO: ____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD BE INDIVIDUALS).

SPECIES	USED?	TRIED TO HARVEST	NUMBER HARVESTED BY SEASON (MONTHS)					RECEIVED	GAVE AWAY
			SPRING	SUMMER	FALL	WINTER			
	Y/N	Y/N	A M J	J A	S O N	D J F M	UNIT	Y/N	Y/N
GOLDENEYE (COPPERHEAD)							IND		
410210990							1		
BUFFLEHEAD (BUTTERBALL)							IND		
410202000							1		
GOLDEN EYE (COPPERHEAD)							IND		
430299000							1		
MALLARD							IND		
410214000							1		
PINTAIL							IND		
410220000							1		
AMERICAN WIGEON							IND		
410236020							1		
SHOVELER							IND		
410230000							1		
DUCKS, UNKNOWN							IND		
410299000							1		
WHITE-FRONTED GEESE							IND		
410410000							1		
SNOW GOOSE							IND		
410408000							1		
CANADA GEESE, LESSER							IND		
410404080							1		
CANADA GEESE, DUSKY							IND		
410404060							1		
CANADA GEESE, UNKNOWN							IND		
410404990							1		
UNKNOWN GEESE							IND		
410499000							1		
TUNDRA SWAN (WHISTLING)							IND		
410604000							1		
SANDHILL CRANE							IND		
410802000							1		

COMMUNITY ID:_____ HH ID:_____ BIRDS (15A)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

SPECIES	USED?	TRIED TO HARVEST	NUMBER HARVESTED BY SEASON (MONTHS) SPRING	SUMMER	FALL	WINTER		RECEIVED	GAVE AWAY
	Y/N	Y/N	A M J	J A	S O N	D J F M	UNIT	Y/N	Y/N
LOONS							IND		
411216990							1		
GROUSE							IND		
421802000							1		
PTARMIGAN							IND		
421804990							1		
GEESE EGGS							IND		
430499000							1		
DUCK EGGS, UNKNOWN							IND		
430299000							1		
GULL EGGS							IND		
431212000							1		
TERN EGGS							IND		
431226000							1		
UNKNOWN EGGS							IND		
439900000							1		

Was your household's harvest and use of birds and eggs typical of recent years? LESS_____ SAME_____ MORE_____

If different (less or more), how and why was it different? _____

COMMUNITY ID:_____ HH ID:_____ BIRDS (15A)

WILD PLANTS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE WILD PLANTS (INCLUDING FIREWOOD) BETWEEN JANUARY 1 AND DECEMBER 31, 2005? YES: ____ NO: ____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT).

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	AMOUNT HARVESTED #	AMOUNT HARVESTED UNIT	RECEIVED Y/N	GAVE AWAY Y/N	WHAT KIND WERE USED (EITHER HARVESTED OR RECEIVED) FOR BOTH BERRIES AND PLANTS IN 2005
BERRIES				GAL			
601000000				4			
PLANTS/GREENS/MUSHROOMS				GAL			
602000000				4			
WOOD				CORDS			
604000000				6			

Was your household's harvest and use of wild plants typical of recent years? LESS____ SAME____ MORE____

If different (less or more), how and why was it different? _____

COMMUNITY ID:_____ HH ID:_____ PLANTS (17A)

Was your household's overall harvest and use of subsistence resources typical of recent years? LESS_____ SAME_____ MORE_____

If different (less or more), how and why was it different?_____

COMMUNITY ID:_____ HH ID:_____ MISCELLANEOUS (24)

KVICHAK AND NUSHAGAK WATERSHEDS COMPREHENSIVE SUBSISTENCE BASELINE UPDATE 2005

EMPLOYMENT.

PLEASE INDICATE THE FOLLOWING INFORMATION FOR ALL JOBS HELD BY THE EMPLOYED PERMANENT HOUSEHOLD MEMBERS 16 OR OLDER LISTED ON PAGE 1 BETWEEN JANUARY 1 AND DECEMBER 31, 2005.
FOR THOSE NOT EMPLOYED, PLEASE SPECIFY RETIRED, UNEMPLOYED, DISABLED, STUDENT, OR HOMEMAKER.

PERSON ID #	JOB #	JOB TITLE	SOC	EMPLOYER TYPE	SIC	LOCATION	WHICH MONTHS WORKED IN 2005	HOURS/ WEEK	WORK ** SCHEDULE	PERSONAL GROSS INCOME***
							J F M A M J J A S O N D			
							J F M A M J J A S O N D			
							J F M A M J J A S O N D			
							J F M A M J J A S O N D			
							J F M A M J J A S O N D			
							J F M A M J J A S O N D			
							J F M A M J J A S O N D			
							J F M A M J J A S O N D			
							J F M A M J J A S O N D			
							J F M A M J J A S O N D			

* PERSON ID # = PERSON NUMBER FROM FIRST PAGE OF SURVEY.
** WORK SCHEDULE = (1) FULLTIME (35+ HOURS/WK) (2) PARTTIME (<35 HOURS/WEEK) (3) SHIFT (2 WEEKS ON/2 OFF, 1 WEEK ON/1 OFF, ETC.) (4) COMMERCIAL FISHING, AND OTHER IRREGULAR, AS REQUIRED POSITIONS (5) SHIFT - PART TIME
*** COMMERCIAL FISHING AND BUSINESS OWNERS - ADJUSTED GROSS AFTER EXPENSES. IF LESS THAN ZERO, ENTER 0.

NOTES:_____

COMMUNITY ID:_____ HH ID:_____ EMPLOYMENT (23)

OTHER INCOME.

ANSWER ALL THAT APPLY. INDICATE ANNUAL AMOUNT FOR THE PERIOD OF JANUARY 1 AND DECEMBER 31, 2005.
IT IS OKAY TO LEAVE BLANK IF NOT APPLICABLE OR TO STATE SOME AMOUNT. MARK A -8 IF AMOUNT IS UNKNOWN AND IT EXISTED.

AK PERMANENT FUND* (32)	$		ADULT TEMPORARY ASSISTANCE PROGRAM (02)	$		DIVIDENDS/INTEREST (14)	$	
SOCIAL SECURITY (07)	$		PENSION/RETIREMENT (05)	$		ADULT PUBLIC ASSISTANCE (03)	$	
SUPP. SECURITY INCOME (SSI) (10)	$		WORK COMP/INSURANCE (08)	$		ENERGY ASSISTANCE (09)	$	
NATIVE CORP. DIVIDEND (13)	$		FOOD STAMPS (11)	$		UNEMPLOYMENT (12)	$	
						OTHER: _____ (_____)	$	

*[AK PERMANENT FUND 2004: 1- $845.76 2- $1691.52 3- $2537.28 4- $3383.04 5- $4228.80 6- $5074.56 7- $5920.32 8- $6766.08 9- $7611.84 10- $8457.60

FOOD:

PLEASE ESTIMATE YOUR MONTHLY EXPENSES TO PURCHASE FOOD: $_____ /MONTH

WHAT PERCENTAGE OF ALL THE MEAT, FISH, AND BIRDS THAT YOU ATE IN THE LAST YEAR WAS FROM WILD RESOURCES? [33]

____ (1) NONE ____ (2) 1-25% ____ (3) 26-50% ____ (4) 51-75% ____ (5) 76-99% ____ (6) ALL

APPENDIX B: KEY INFORMANT INTERVIEW PROTOCOL, 2005

KEY INFORMANT INTERVIEWS
KVICHAK AND NUSHAGAK WATERSHEDS
SUBSISTENCE BASELINE UPDATE 2005

1. What is your yearly subsistence activity like, and how has it changed over time?

2. Have you noticed changes in the environment that you think may have affected fishing or hunting over time?

3. Do people have to travel further from the village to get fish, caribou, moose or other subsistence food?

4. In the past if there was a decline in animals or fish, for example the caribou herd was smaller, what did you do?

5. Traditionally, is there a method(s) used to care for the subsistence resources? Can you give examples.

6. Are there specific hunting and fishing areas that are used more frequently than others?

7. Are there camp sites used for hunting, or fishing that have been abandoned over the years?

8. Where are they located?

9. When were they abandoned and why?

10. Do you think that humans have affected subsistence resources over the years? Why?

11. Do you think there are more people using subsistence resources now? Do you think this has affected the availability of subsistence resources?

12. Where are these areas located?

13. How have regulations influenced your fishing and hunting (gear restrictions, etc.)?

14. Do subsistence regulations make it more or less difficult to access subsistence resources?

APPENDIX C: CONVERSION FACTORS FOR KVICHAK AND NUSHAGAK WATERSHEDS, 2006

Appendix C.–Conversion factors for Kvichak and Nushagak watersheds, 2006.

Resource	Reported units	Conversion to pounds
Chum salmon	Ind	4.88
Coho salmon	Ind	5.10
Chinook salmon	Ind	11.09
Pink salmon	Ind	2.99
Sockeye salmon	Ind	4.29
Landlocked salmon	Ind	1.50
Spawning sockeye salmon	Ind	2.00
Pacific herring	Gal	6.00
Pacific herring sac roe	Gal	7.00
Pacific herring spawn on kelp	Gal	7.00
Rainbow smelt	Ind	0.25
Rainbow smelt	Gal	6.00
Pacific (gray) cod	Ind	3.20
Walleye pollock (whiting)	Ind	1.40
Unknown cod	Ind	3.20
Flounder	Ind	3.00
Unknown flounder	Ind	3.00
Lingcod	Ind	4.00
Unknown greenling	Ind	1.00
Pacific halibut	Ind	23.50
Pacific halibut	Lb	1.00
“Black” rockfish	Ind	1.50
“Red” rockfish	Ind	4.00
Sablefish (black cod)	Ind	3.10
Slimy sculpin (bullhead)	Ind	0.50
Unknown shark	Ind	9.00
Unknown sole	Ind	1.00
Stickleback (needlefish)	Ind	0.20
Bering wolffish	Ind	0.50
Alaska blackfish	Ind	0.07
Burbot	Ind	1.00
Arctic char	Ind	1.40
Dolly Varden	Ind	1.40
Lake trout	Ind	1.40
Arctic grayling	Ind	0.70
Unknown northern pike	Ind	2.80
Sheefish	Ind	5.50
Unknown sturgeon	Ind	34.00
Longnose sucker	Ind	1.50
Rainbow trout	Ind	1.40
Steelhead trout	Ind	1.40
Broad whitefish	Ind	4.00
Least cisco	Ind	0.40
Humpback whitefish	Ind	1.75
Round whitefish	Ind	1.00
Black bear	Ind	58.00
Brown bear	Ind	340.00

-continued-

Appendix C. Page 2 of 3.

Resource	Reported units	Conversion to pounds
Caribou	Ind	150.00
Moose	Ind	540.00
Dall sheep	Ind	104.00
Beaver	Ind	8.75
Snowshoe hare	Ind	2.00
Lynx	Ind	4.00
Alaska marmot	Ind	5.00
Muskrat	Ind	0.75
Porcupine	Ind	8.00
Arctic ground (parka) squirrel	Ind	0.50
Red (tree) squirrel	Ind	0.50
Harbor seal	Ind	56.00
Harbor seal (salt water)	Ind	56.00
Steller sea lion	Ind	200.00
Beluga whale	Ind	831.00
Bufflehead	Ind	0.40
Unknown goldeneye	Ind	0.80
Mallard	Ind	1.00
Merganser	Ind	0.60
Northern pintail	Ind	0.80
Scaup	Ind	0.90
Northern shoveler	Ind	0.60
Green-winged teal	Ind	0.30
American wigeon	Ind	0.70
Dusky Canada goose	Ind	3.60
Lesser Canada goose (“taverner”, “parvipes”)	Ind	1.20
Snow goose	Ind	2.30
White-fronted goose	Ind	2.40
Tundra (whistling) swan	Ind	6.00
Sandhill crane	Ind	8.40
Unknown loon	Ind	3.00
Tern	Ind	1.00
Arctic tern	Ind	1.00
Grouse	Ind	0.70
Unknown ptarmigan	Ind	0.70
Unknown duck egg	Ind	0.15
Unknown goose egg	Ind	0.30
Gull egg	Ind	0.30
Tern egg	Ind	0.05
Butter clam	Gal	3.00
Butter clam	Qt	0.75
Freshwater clam	Gal	3.00
Horse clam (gaper)	Gal	3.00
Pacific littleneck (steamer) clam	Gal	3.00
Pinkneck (surf) clam	Gal	3.00
Razor clam	Gal	3.00
Unknown clam	Gal	3.00

-continued-

Appendix C. Page 3 of 3.

Resource	Reported units	Conversion to pounds
Unknown cockle	Gal	3.00
Dungeness crab	Ind	0.70
King crab	Ind	2.30
Tanner crab	Ind	1.60
Unknown Tanner crab	Ind	1.60
Unknown mussel	Gal	1.50
Octopus	Ind	4.00
Unknown scallop	Lb	1.00
Shrimp	Ind	0.04
Shrimp	Lb	1.00
Berry	Gal	4.00
Plants/greens/mushrooms	Lb	1.00
Plants/greens/mushrooms	Gal	4.00

Sources Scott et al. *Unpublished*; Fall et al. 1995; Fall et al. 2006; Holen et al. 2005; Krieg et al. 2005.

APPENDIX D: HARVEST USE AREA MAPS BY COMMUNITY

DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME

Igiugig Humpback Whitefish Harvest 2005

Igiugig Round Whitefish Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

Northern Dynasty Mines Inc., through Stephen R. Braund & Associates (SRB&A) provided funding to the Alaska Department of Fish and Game (ADF&G) for this study. SRB&A digitized the data and prepared the maps.

Source:
T.M. Krieg, D.L. Holen, and D. Koster. 2009. Subsistence harvests and uses of wild resources in Igiugig, Kokhanok, Koliganek, Levelock, and New Stuyahok, Alaska, 2005. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 322, Dillingham.

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DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME

N

Igiugig Upland Bird Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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Igiugig Lake Trout Harvest 2005

Igiugig Rainbow Trout Harvest 2005

Igiugig Steelhead Trout Harvest 2005

Igiugig Unknown Trout Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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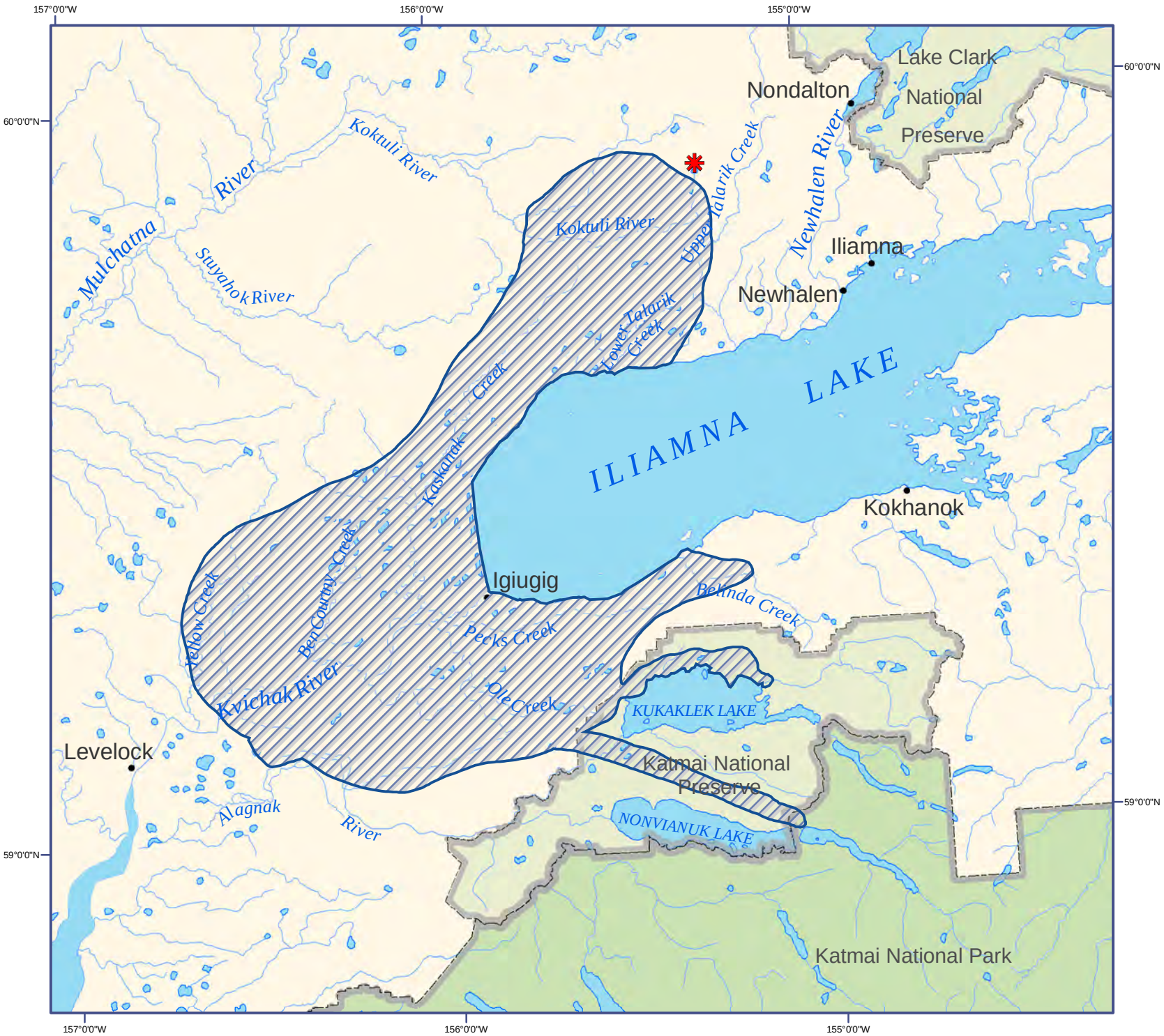

Igiugig Small Land Mammal Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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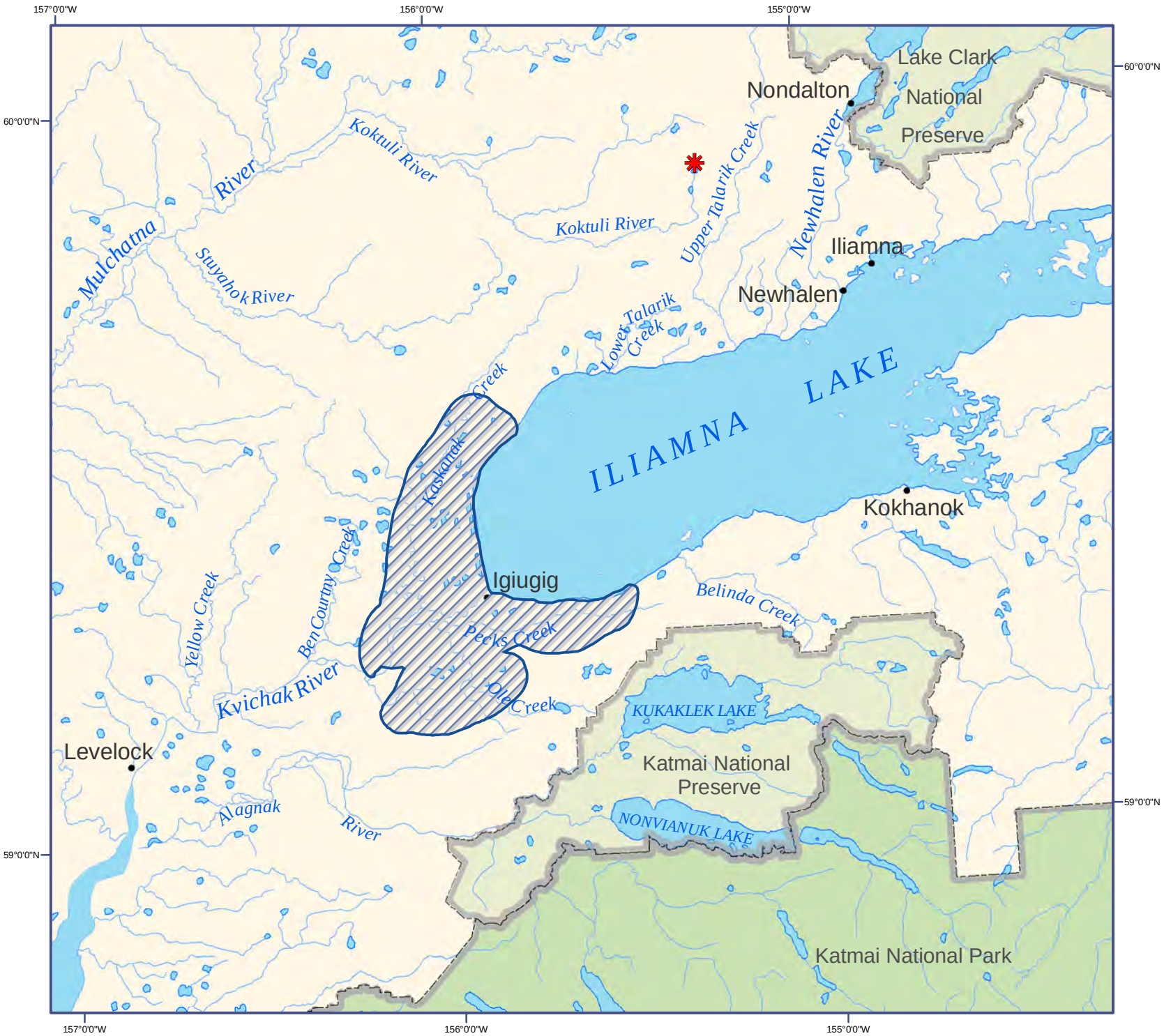

Igiugig Moose Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME

Igiugig Longnose Sucker Harvest 2005

Igiugig Smelt Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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Igiugig Chinook Salmon Harvest 2005

Igiugig Sockeye Salmon Harvest 2005

Igiugig Spawning Sockeye Salmon Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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N

Igiugig Arctic Grayling Harvest 2005

Igiugig Northern Pike Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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Igiugig Egg Gathering 2005

Igiugig Waterfowl Hunting 2005

* Egg gathering also occurs on islands too small to appear on map, including this island group.

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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Igiugig Chum Salmon Harvest 2005

Igiugig Pink Salmon Harvest 2005

Igiugig Coho Salmon Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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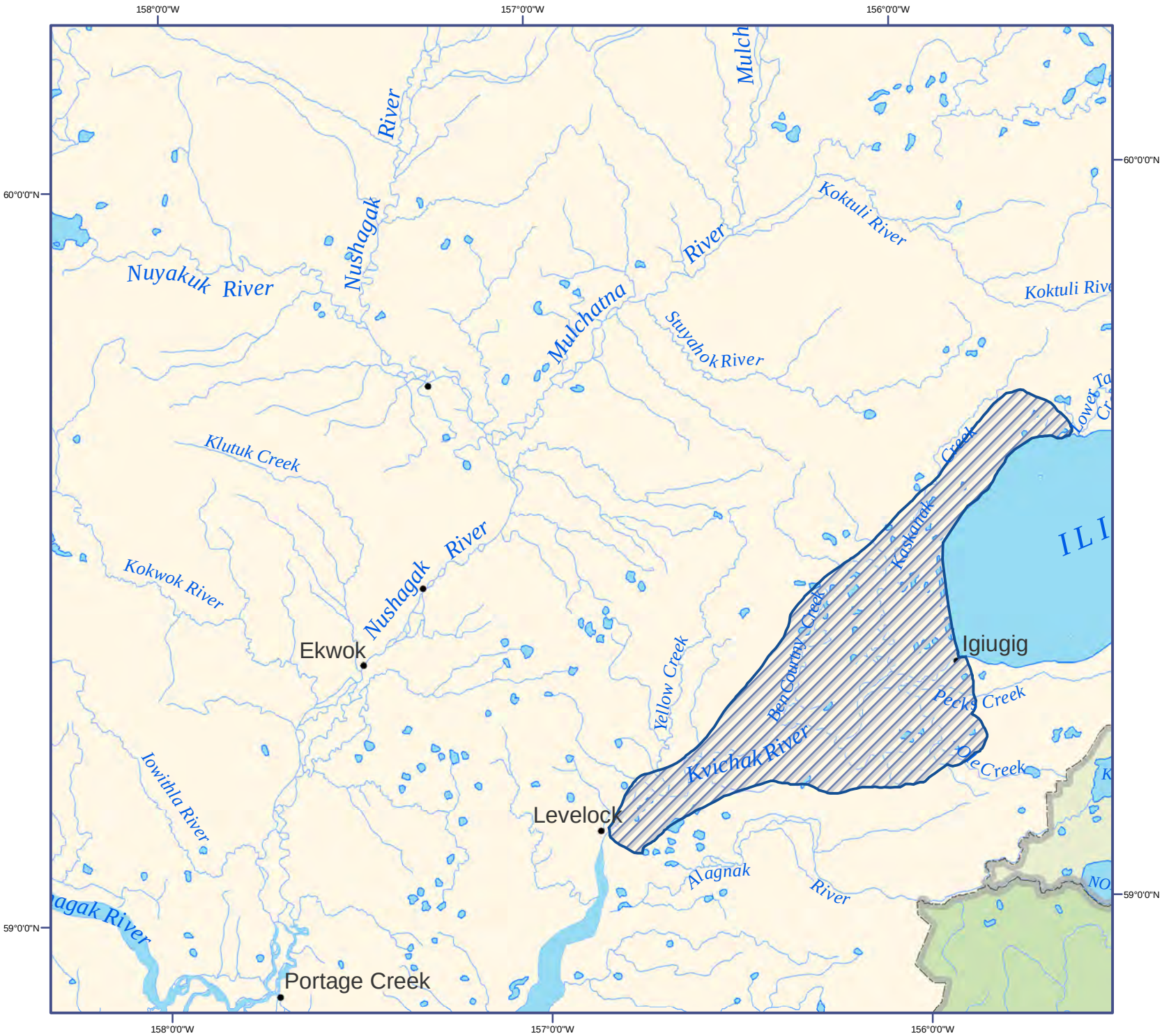

Igiugig Caribou Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME

Igiugig Brown Bear Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME

Igiugig Alaska Blackfish Harvest 2005

Igiugig Burbot Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

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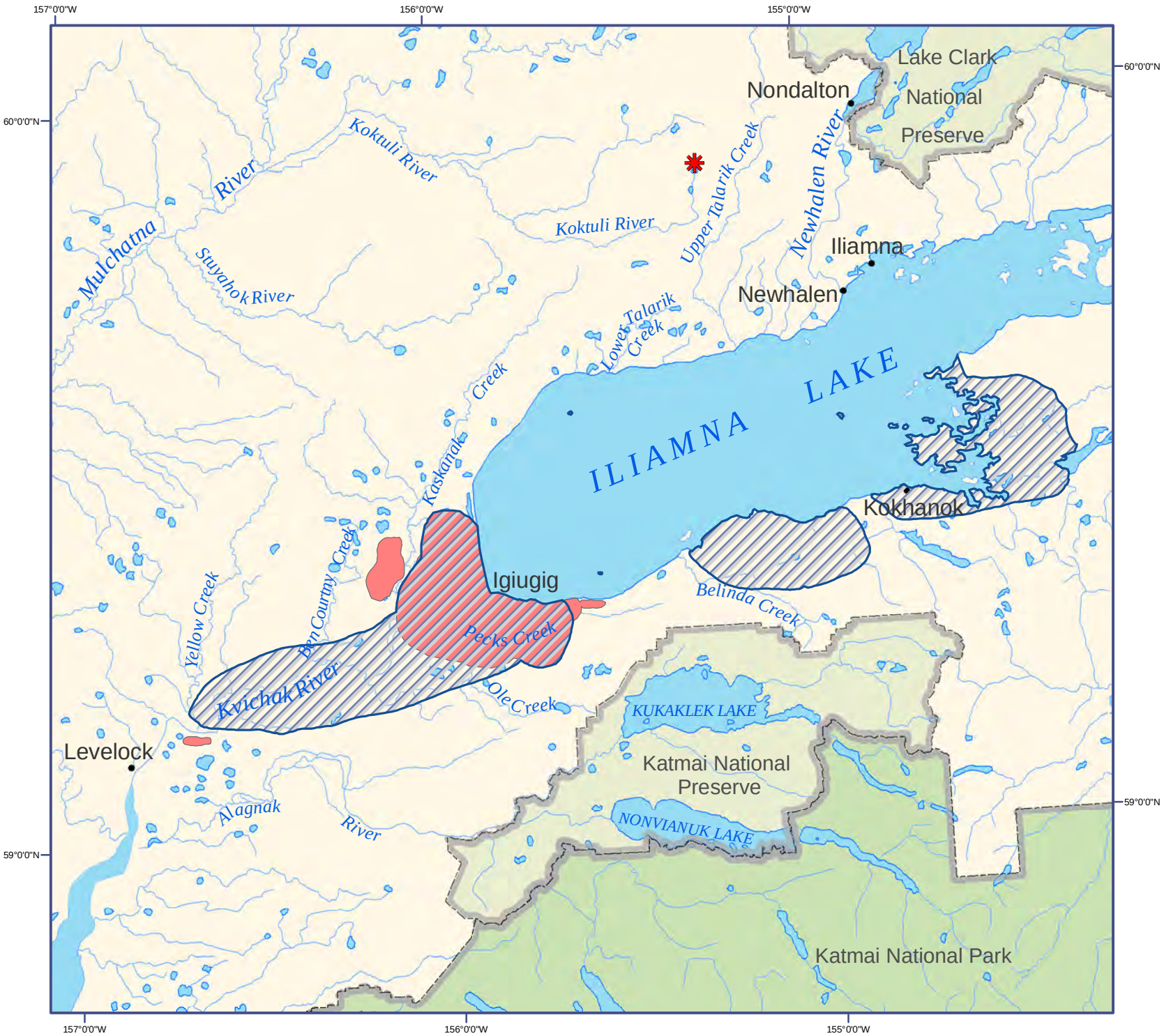

Igiugig Berry Gathering 2005

Igiugig Plant Gathering 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

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DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME

N

Igiugig Beluga Whale Hunting 2005

Igiugig Seal Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

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N

Igiugig Arctic Char Harvest 2005

Igiugig Dolly Varden Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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Igiugig Wood Gathering 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

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DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME

Kokhanok Broad Whitefish Harvest 2005

Kokhanok Humpback Whitefish Harvest 2005

Kokhanok Round Whitefish Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

Miles

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Kokhanok Upland Bird Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

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DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME

Kokhanok Lake Trout Harvest 2005

Kokhanok Rainbow Trout Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

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DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME

Kokhanok Smelt Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

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Kokhanok Small Land Mammals Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

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Kokhanok Freshwater Seal Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

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N

Kokhanok Moose Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

Miles

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Kokhanok Chinook Salmon Harvest 2005

Kokhanok Sockeye Salmon Harvest 2005

Kokhanok Spawning Sockeye Salmon Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

Miles

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Kokhanok Arctic Grayling Harvest 2005

Kokhanok Northern Pike Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

Miles

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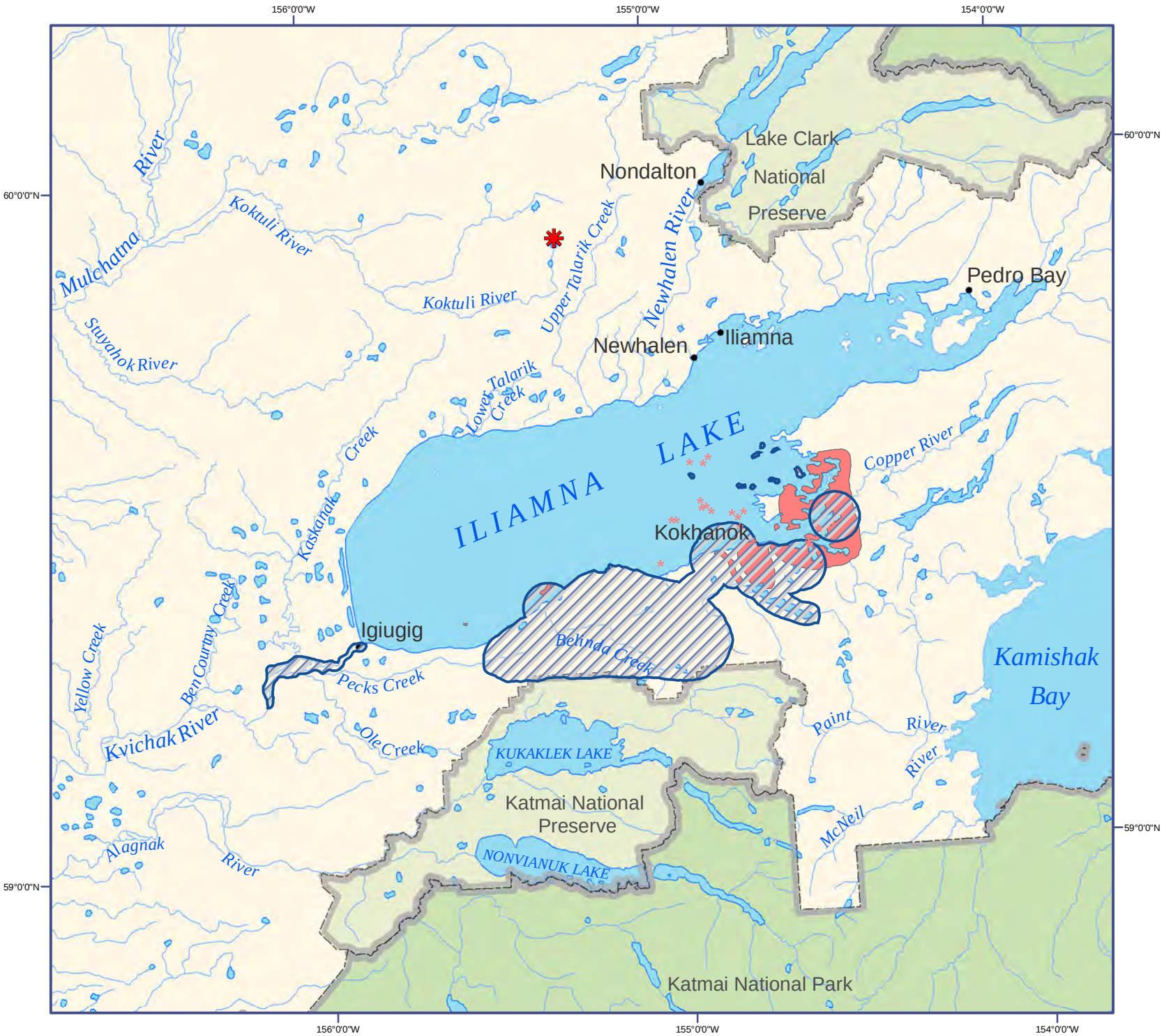

Kokhanok Egg Gathering 2005

Kokhanok Waterfowl Hunting 2005

* Egg gathering also occurs on islands too small to appear on map, including these island groups.

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

Miles

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Kokhanok Chum Salmon Harvest 2005

Kokhanok Pink Salmon Harvest 2005

Kokhanok Coho Salmon Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

Miles

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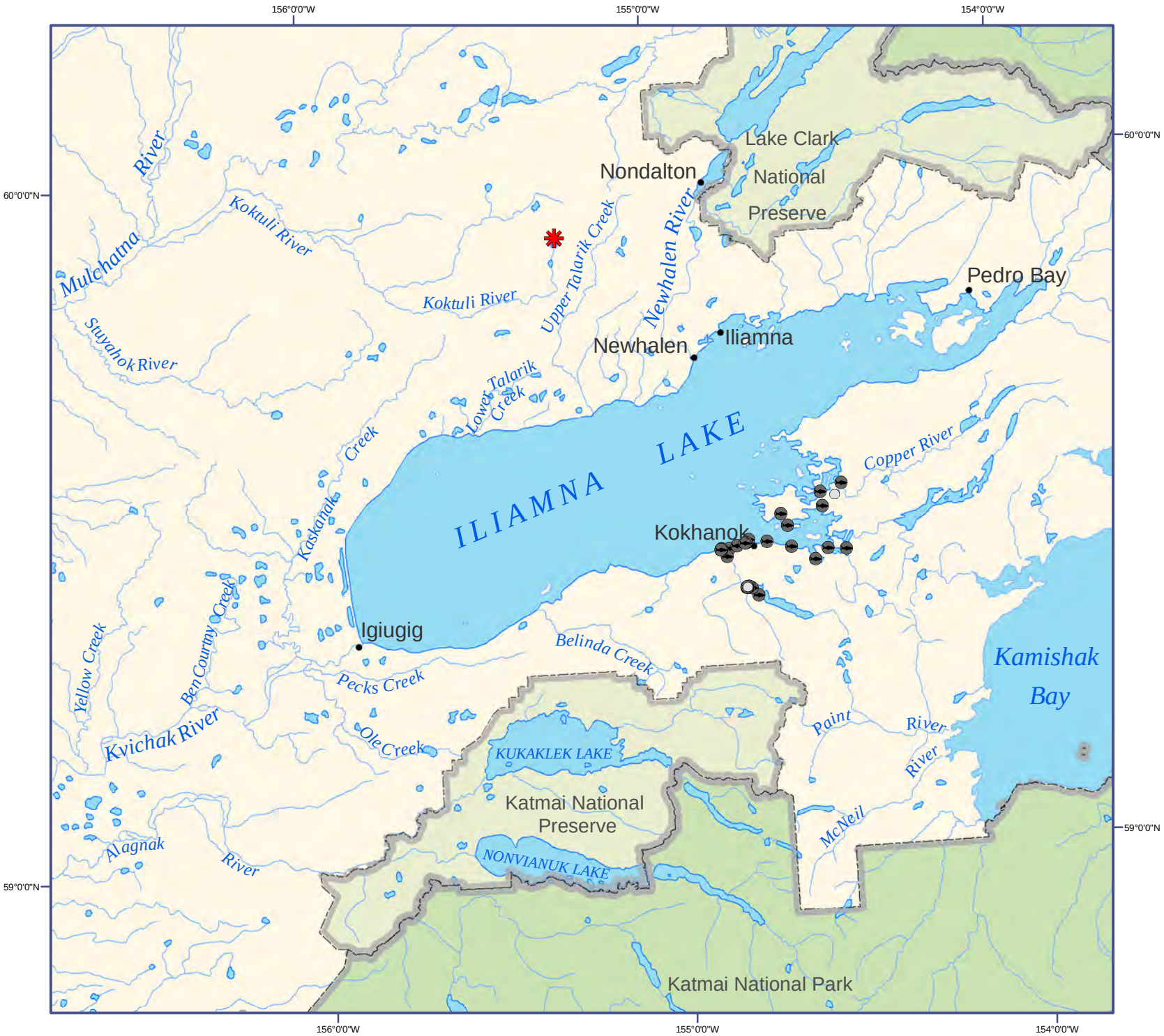

Kokhanok Arctic Char Harvest 2005

Kokhanok Dolly Varden Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

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Kokhanok Caribou Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

Miles

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Kokhanok Berry Gathering 2005

Kokhanok Plant Gathering 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

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Miles

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Kokhanok Black Bear Hunting 2005

Kokhanok Brown Bear Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

Miles

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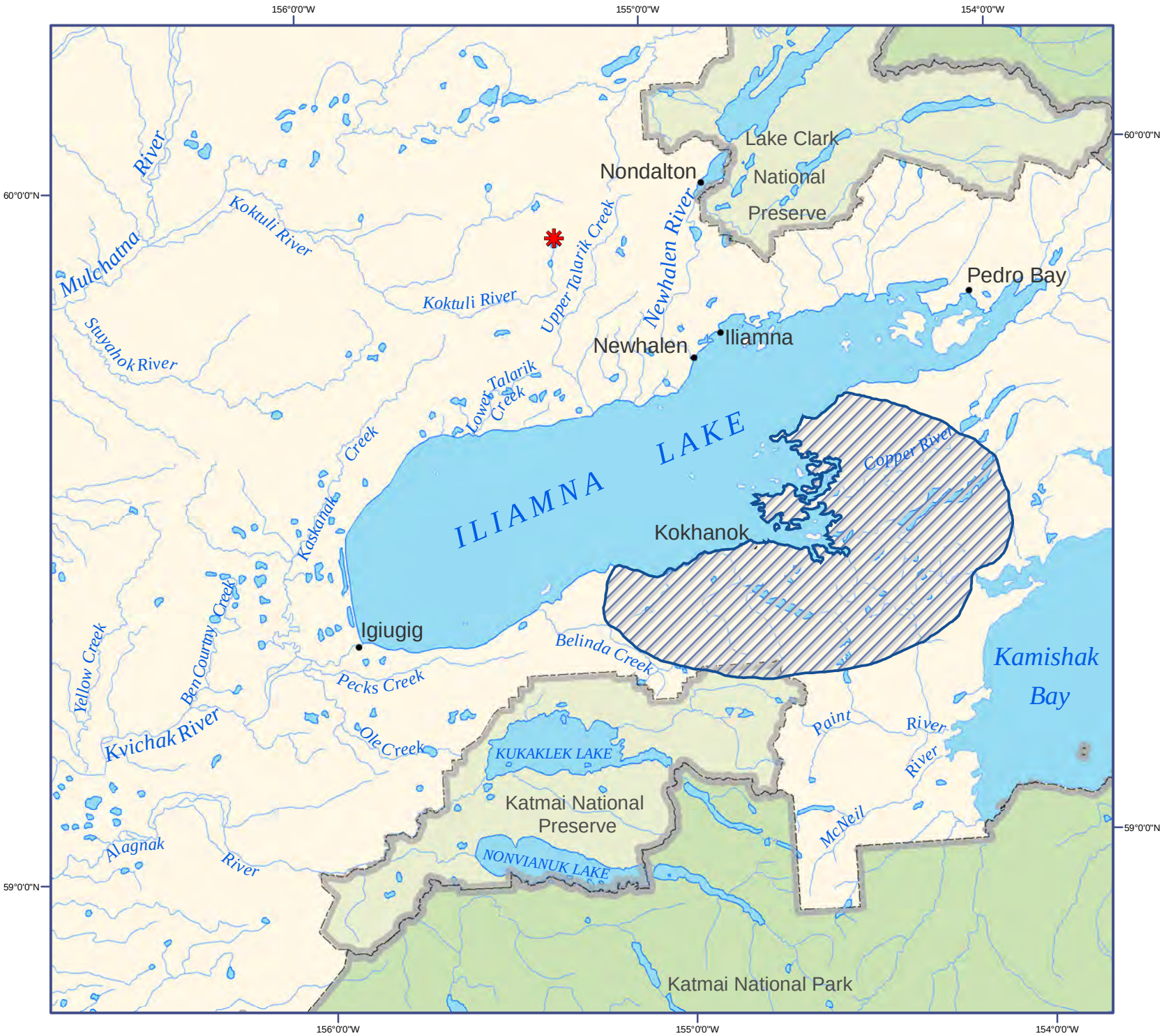

N

Kokhanok Wood Gathering 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:850,000

0 5 10 20

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Kokhanok Broad Whitefish Harvest 2005

Kokhanok Humpback Whitefish Harvest 2005

Kokhanok Round Whitefish Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

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Kokhanok Upland Bird Hunting 2005

Community

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Pebble Mine Site

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DIVISION OF SUBSISTENCE - ALASKA DEPARTMENT OF FISH AND GAME

Kokhanok Lake Trout Harvest 2005

Kokhanok Rainbow Trout Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

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Kokhanok Smelt Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

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Kokhanok Small Land Mammals Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

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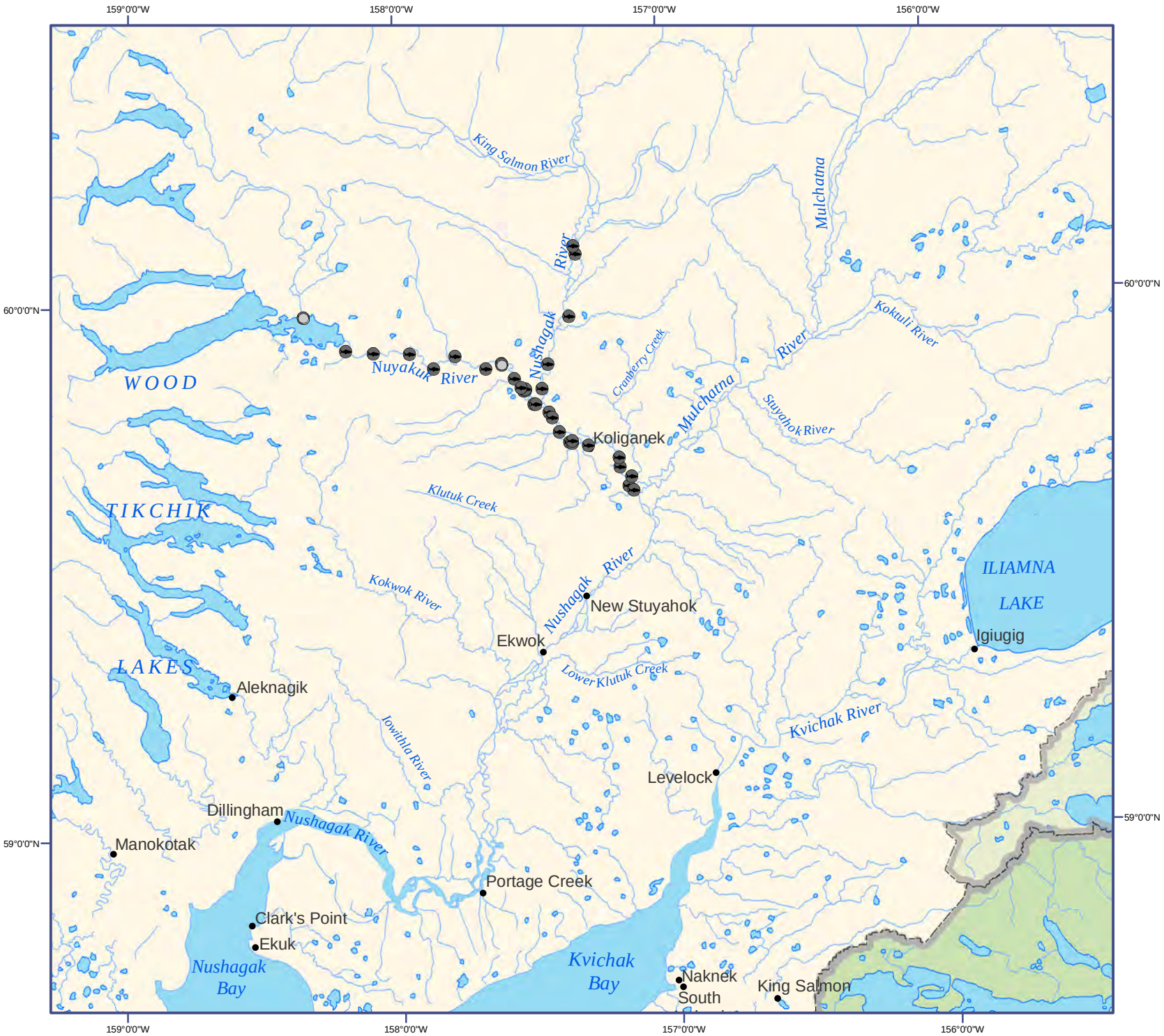

Koliganek Broad Whitefish Harvest 2005

Koliganek Humpback Whitefish Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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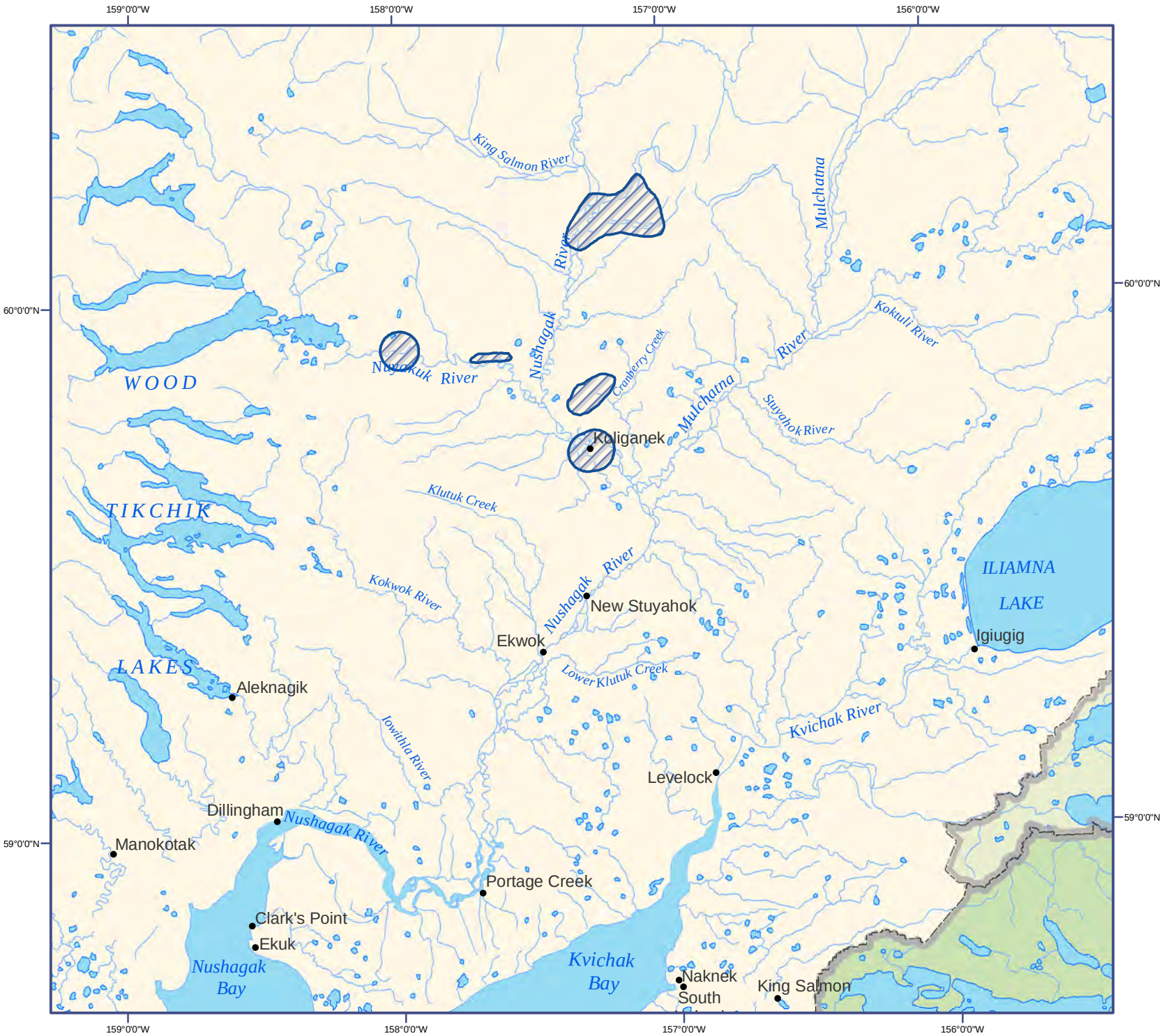

N

Koliganek Upland Bird Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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Koliganek Small Land Mammal Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

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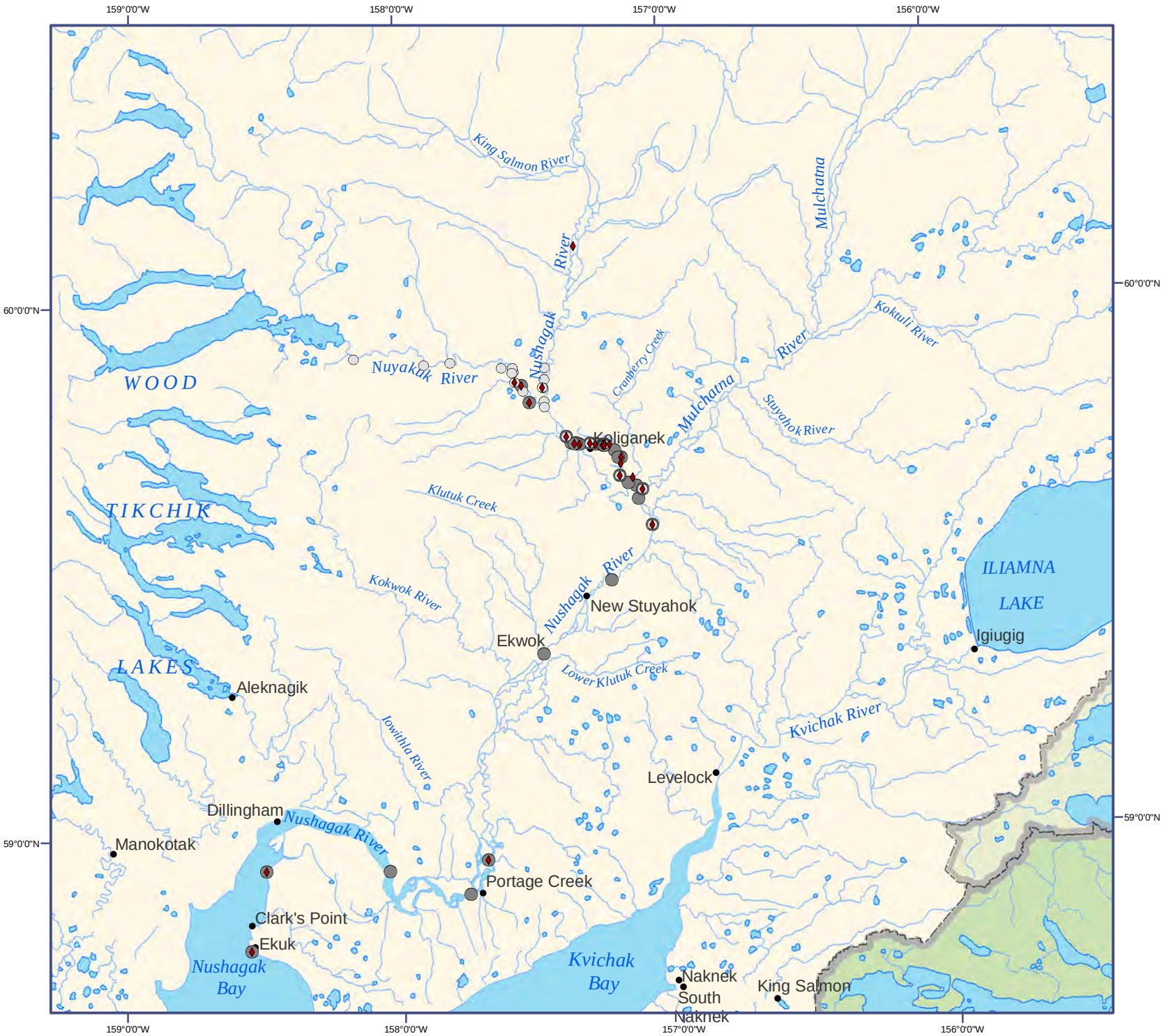

Koliganek Chinook Salmon Harvest 2005

Koliganek Sockeye Salmon Harvest 2005

Koliganek Spawning Sockeye Salmon Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

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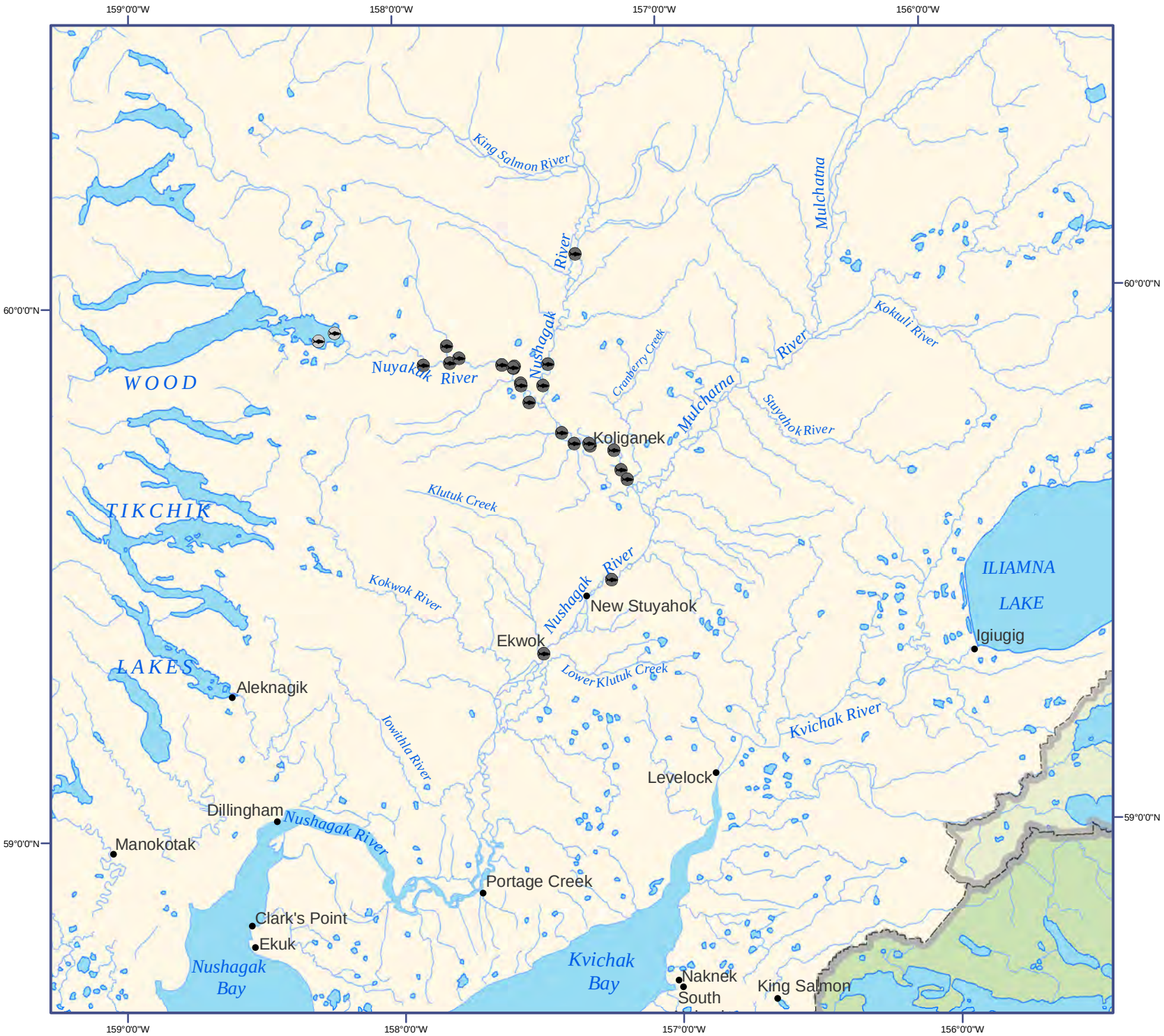

N

Koliganek Lake Trout Harvest 2005

Koliganek Rainbow Trout Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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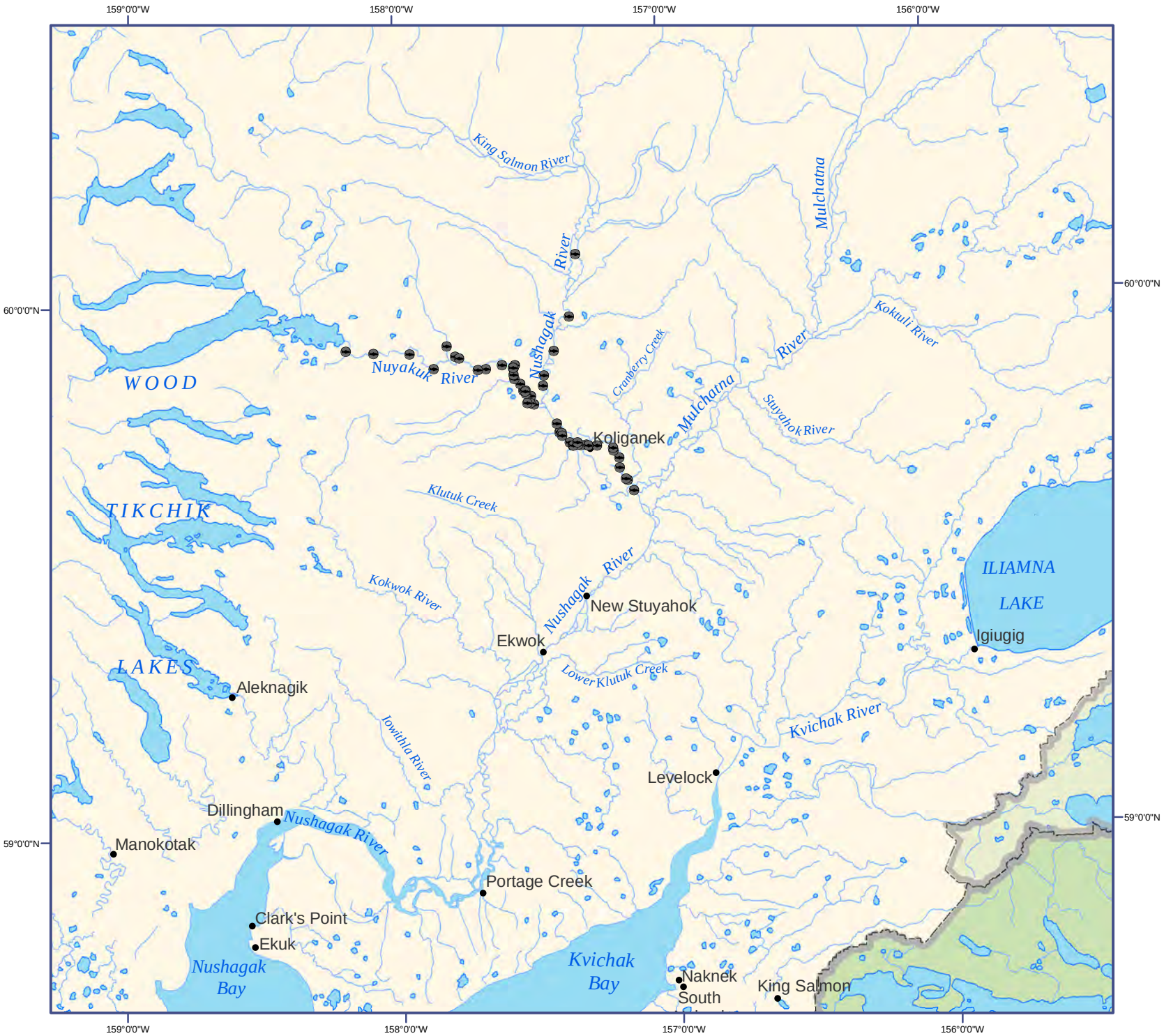

Koliganek Northern Pike Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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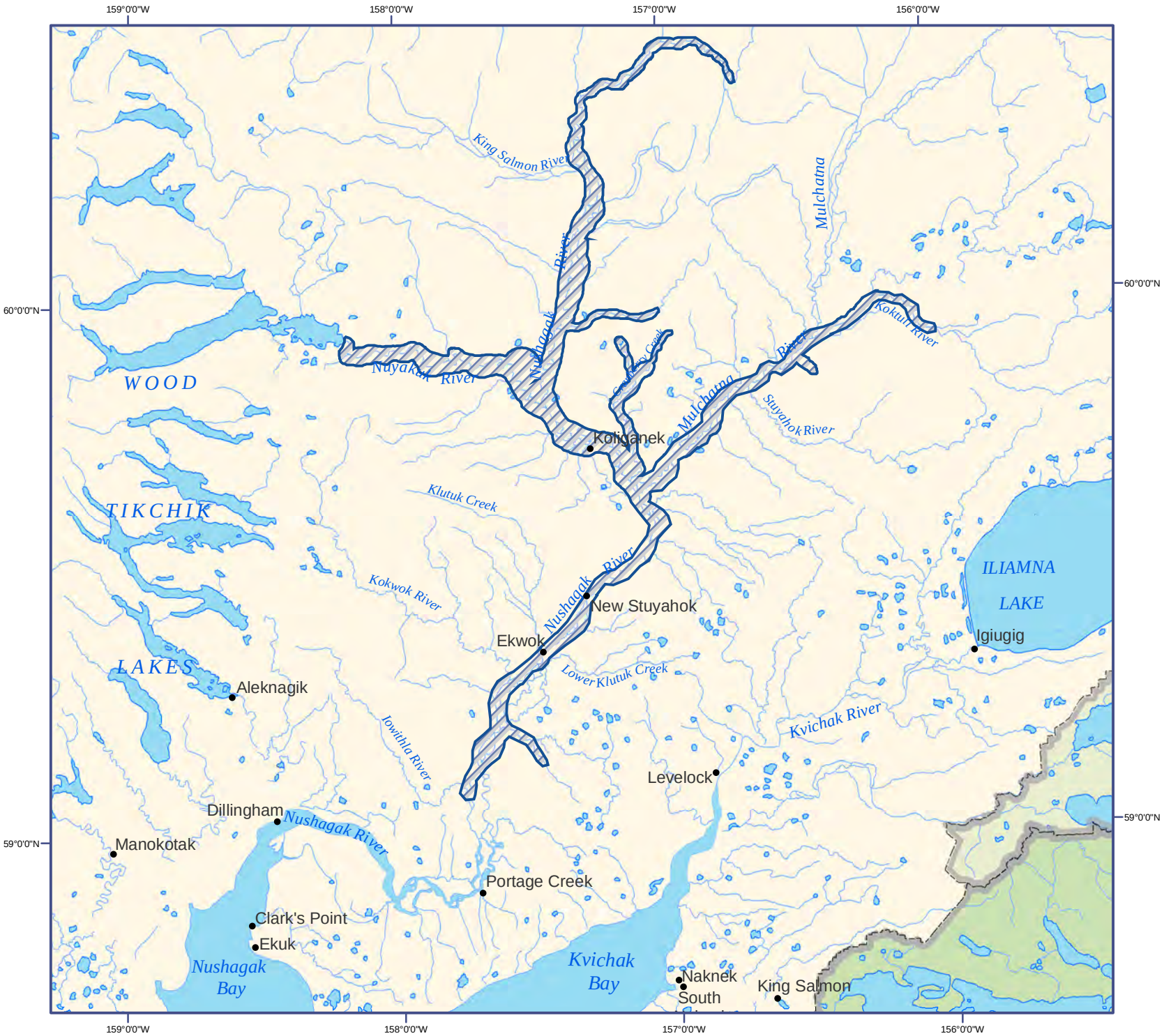

Koliganek Moose Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

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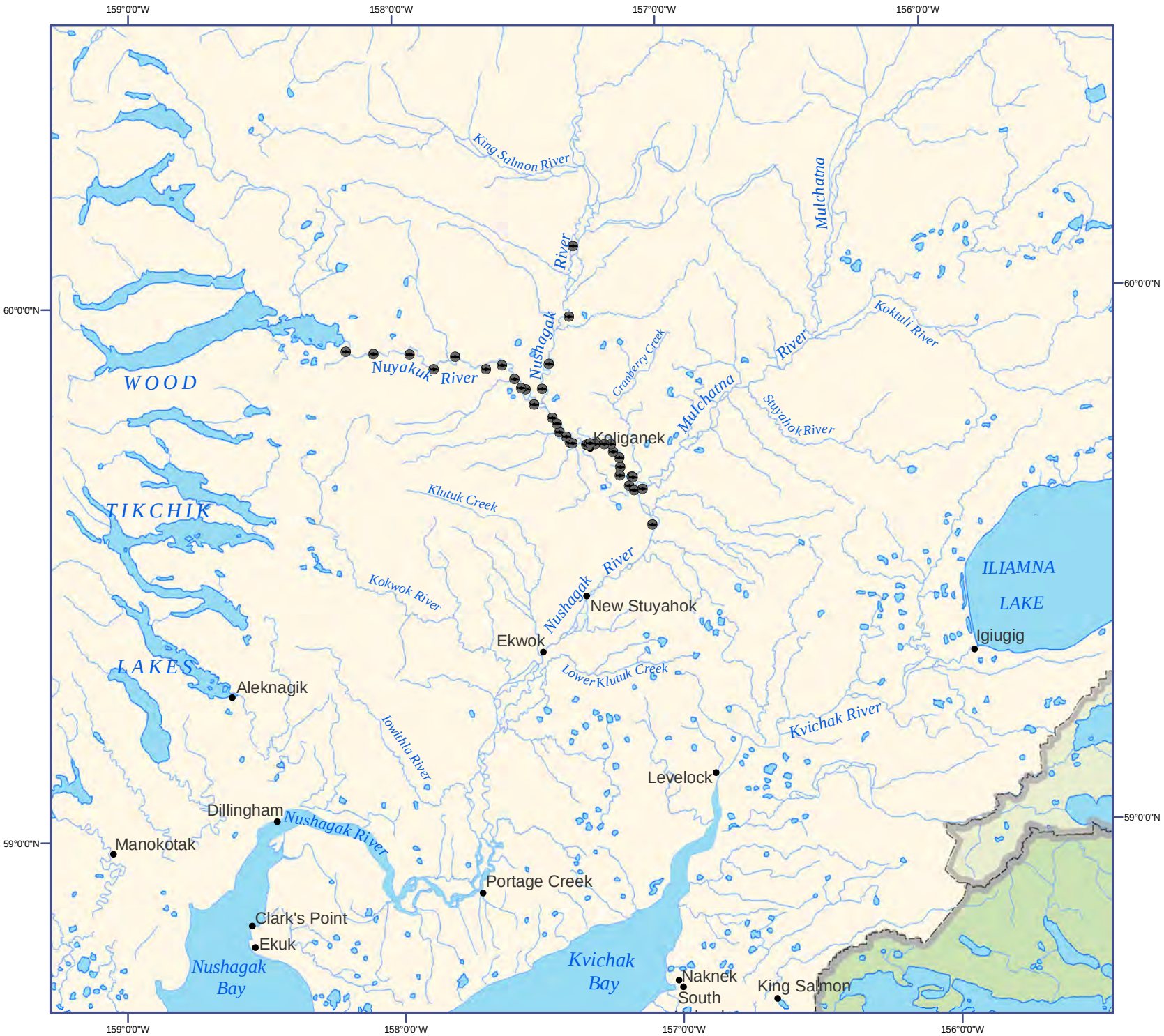

Koliganek Longnose Sucker Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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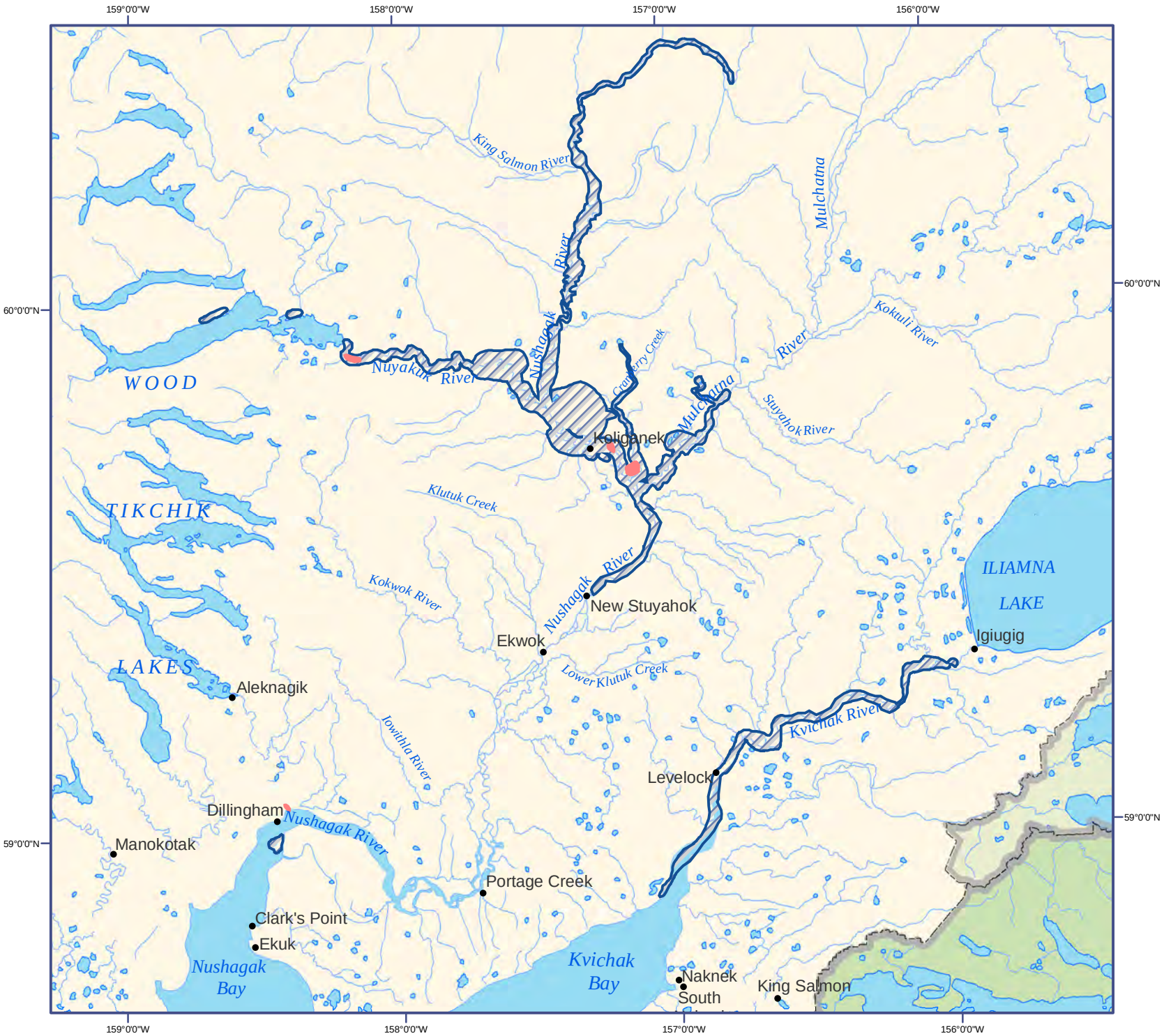

N

Koliganek Egg Gathering 2005

Koliganek Waterfowl Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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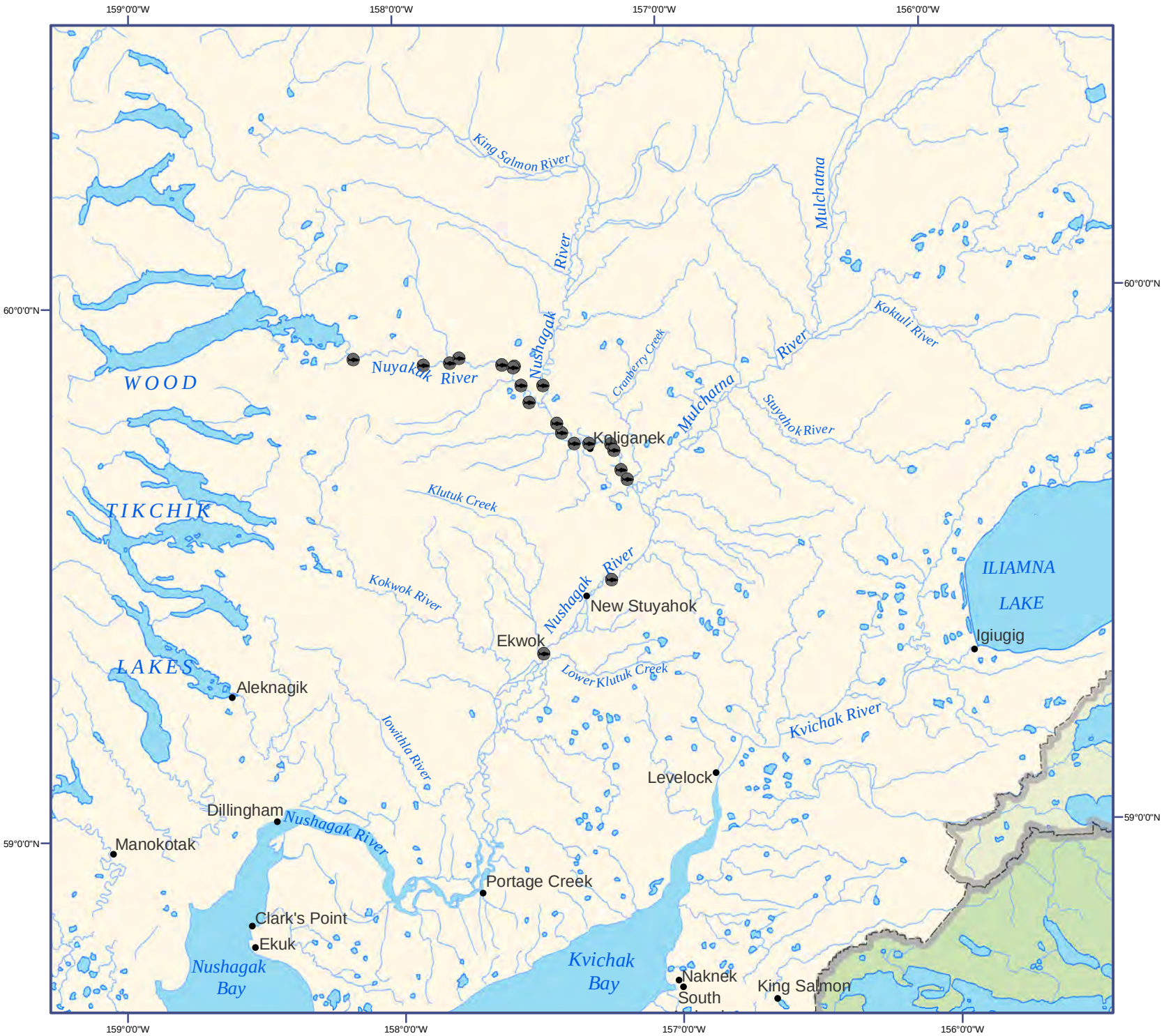

Koliganek Dolly Varden Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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Koliganek Chum Salmon Harvest 2005

Koliganek Pink Salmon Harvest 2005

Koliganek Coho Salmon Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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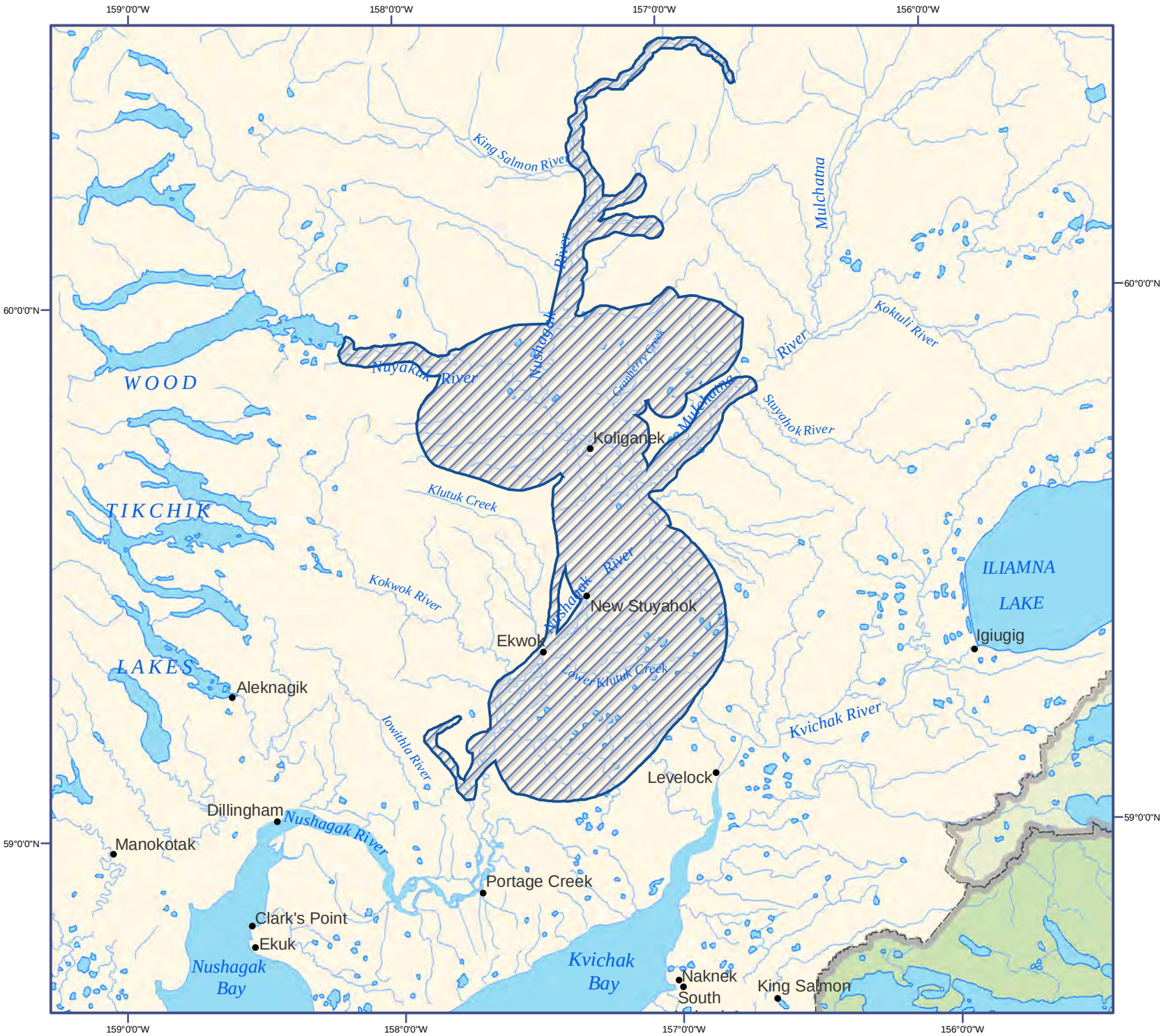

Koliganek Caribou Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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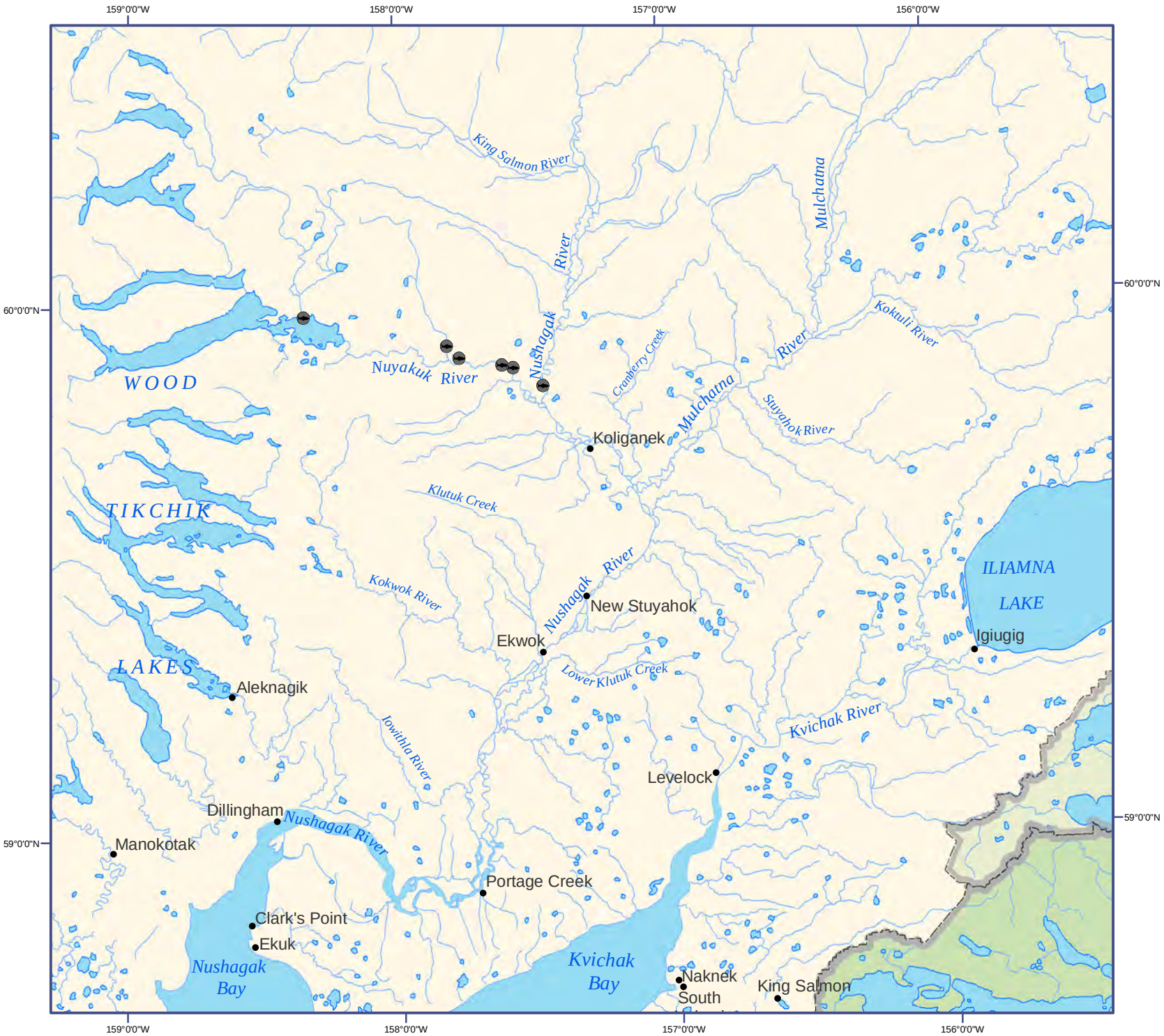

Koliganek Burbot Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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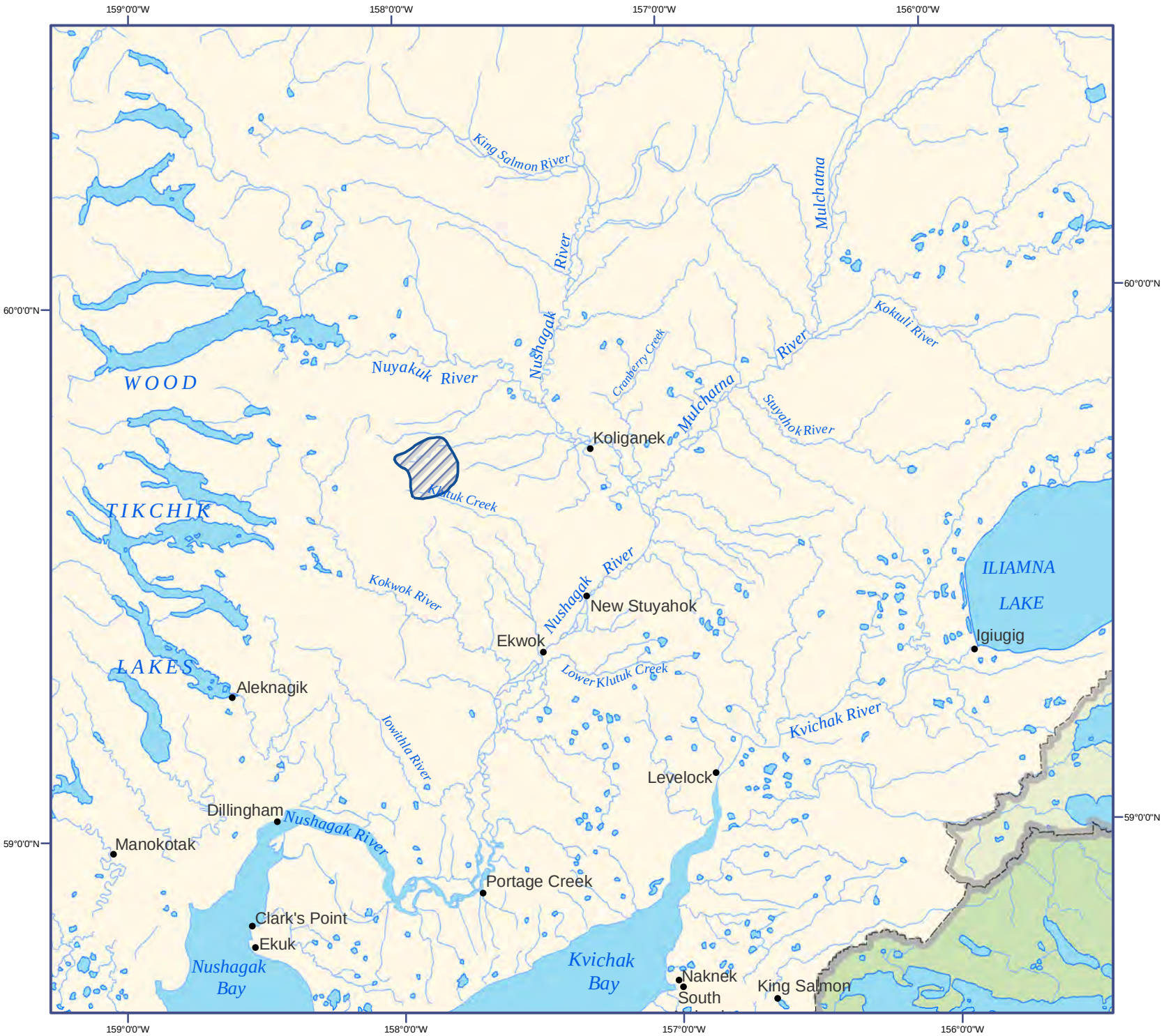

Koliganek Brown Bear Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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N

Koliganek Berry Gathering 2005

Koliganek Plant Gathering 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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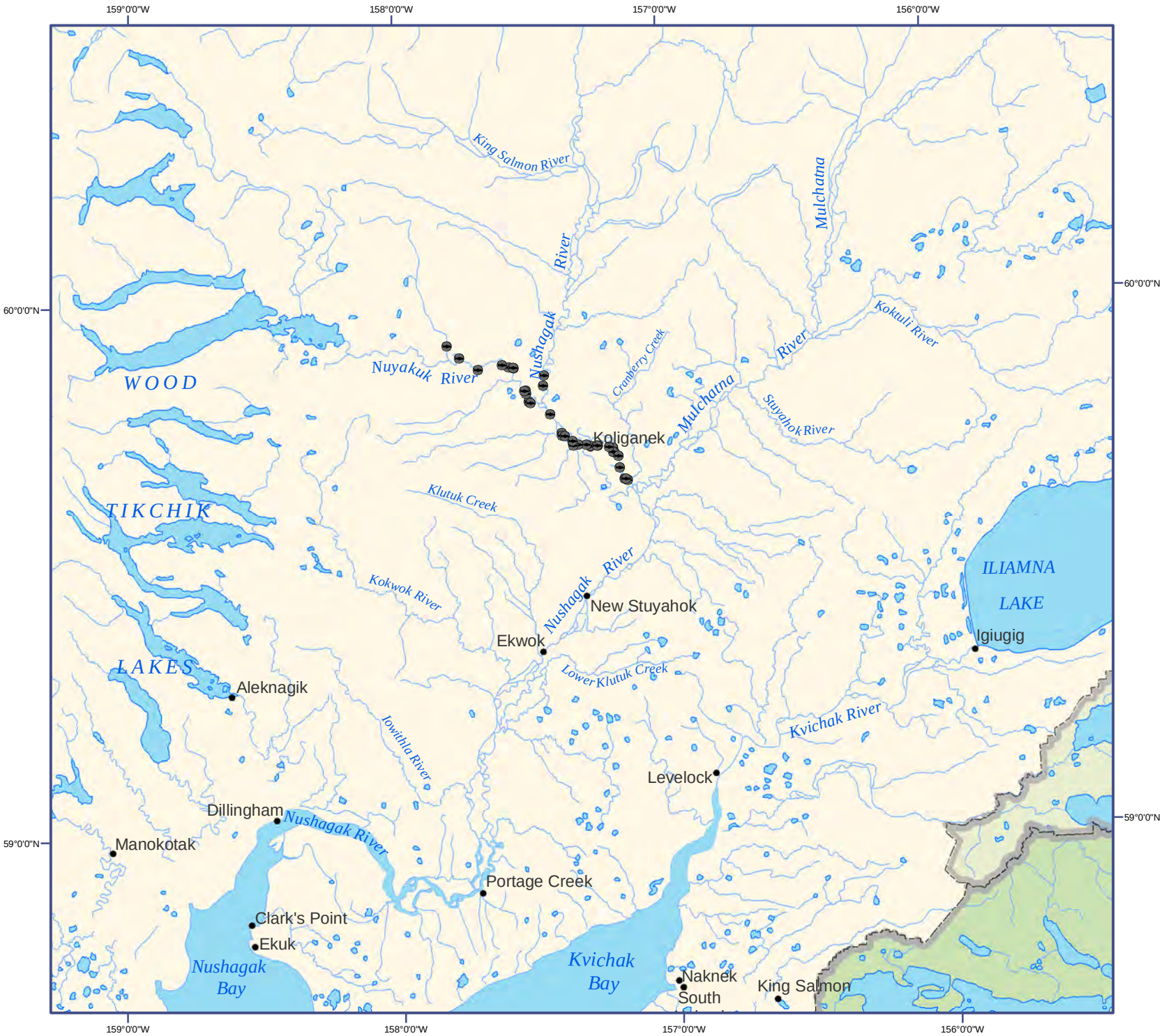

Koliganek Arctic Grayling Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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N

Koliganek Wood Gathering 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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N

Levelock Upland Bird Hunting 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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N

Levelock Lake Trout Harvest 2005

Levelock Rainbow Trout Harvest 2005

Levelock Unknown Trout Harvest 2005

Community

National Park

National Preserve

SCALE: 1:800,000

0 5 10 20

Miles

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Levelock Smelt Harvest 2005

Community

National Park

National Preserve

SCALE: 1:800,000

0 5 10 20

Miles

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N

Levelock Small Land Mammal Hunting 2005

Community

National Park

National Preserve

SCALE: 1:800,000

0 5 10 20

Miles

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Levelock Northern Pike Harvest 2005

Community

National Park

National Preserve

SCALE: 1:800,000

0 5 10 20

Miles

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N

Levelock Moose Hunting 2005

Community

National Park

National Preserve

SCALE: 1:800,000

0 5 10 20

Miles

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N

Levelock Chinook Salmon Harvest 2005

Levelock Sockeye Salmon Harvest 2005

Community

National Park

National Preserve

SCALE: 1:800,000

0 5 10 20

Miles

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N

Levelock Egg Gathering 2005

Levelock Waterfowl Hunting 2005

Egg gathering also occurs on islands too small to appear on map, including these island groups.

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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N

Levelock Chum Salmon Harvest 2005

Levelock Pink Salmon Harvest 2005

Levelock Coho Salmon Harvest 2005

Community

National Park

National Preserve

SCALE: 1:800,000

0 5 10 20

Miles

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N

Levelock Arctic Char Harvest 2005

Levelock Arctic Grayling Harvest 2005

Levelock Broad Whitefish Harvest 2005

Levelock Dolly Varden Harvest 2005

Levelock Humpback Whitefish Harvest 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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N

Levelock Caribou Hunting 2005

Community

National Park

National Preserve

SCALE: 1:800,000

0 5 10 20

Miles

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N

Levelock Berry Gathering 2005

Levelock Plant Gathering 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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Levelock Beluga Whale Hunting 2005

Levelock Seal Hunting 2005

Community

National Park

National Preserve

SCALE: 1:800,000

0 5 10 20

Miles

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N

Levelock Wood Gathering 2005

Community

National Park

National Preserve

Pebble Mine Site

SCALE: 1:800,000

0 5 10 20

Miles

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N

New Stuyahok Humpback Whitefish Harvest 2005

New Stuyahok Round Whitefish Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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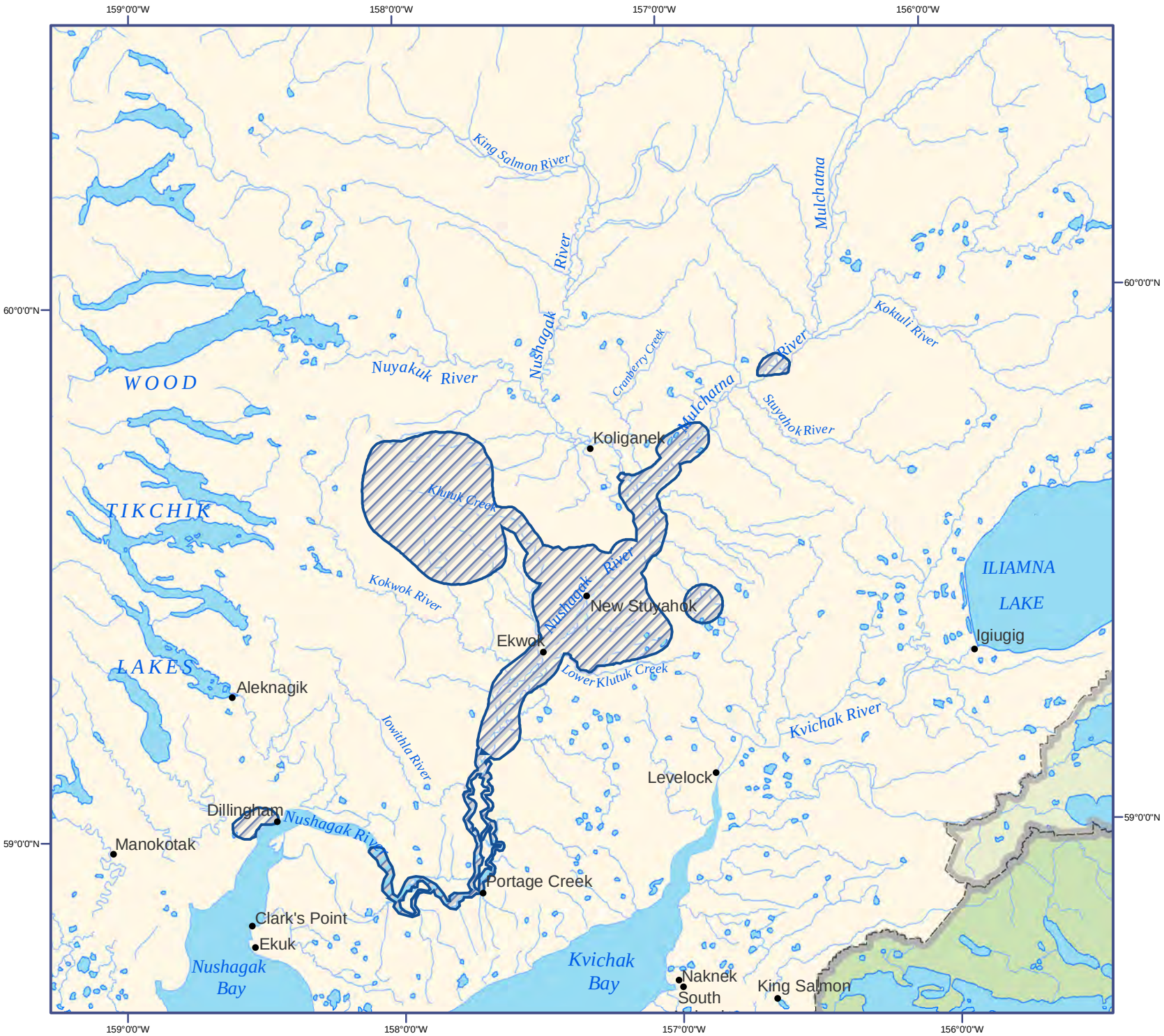

N

New Stuyahok Upland Bird Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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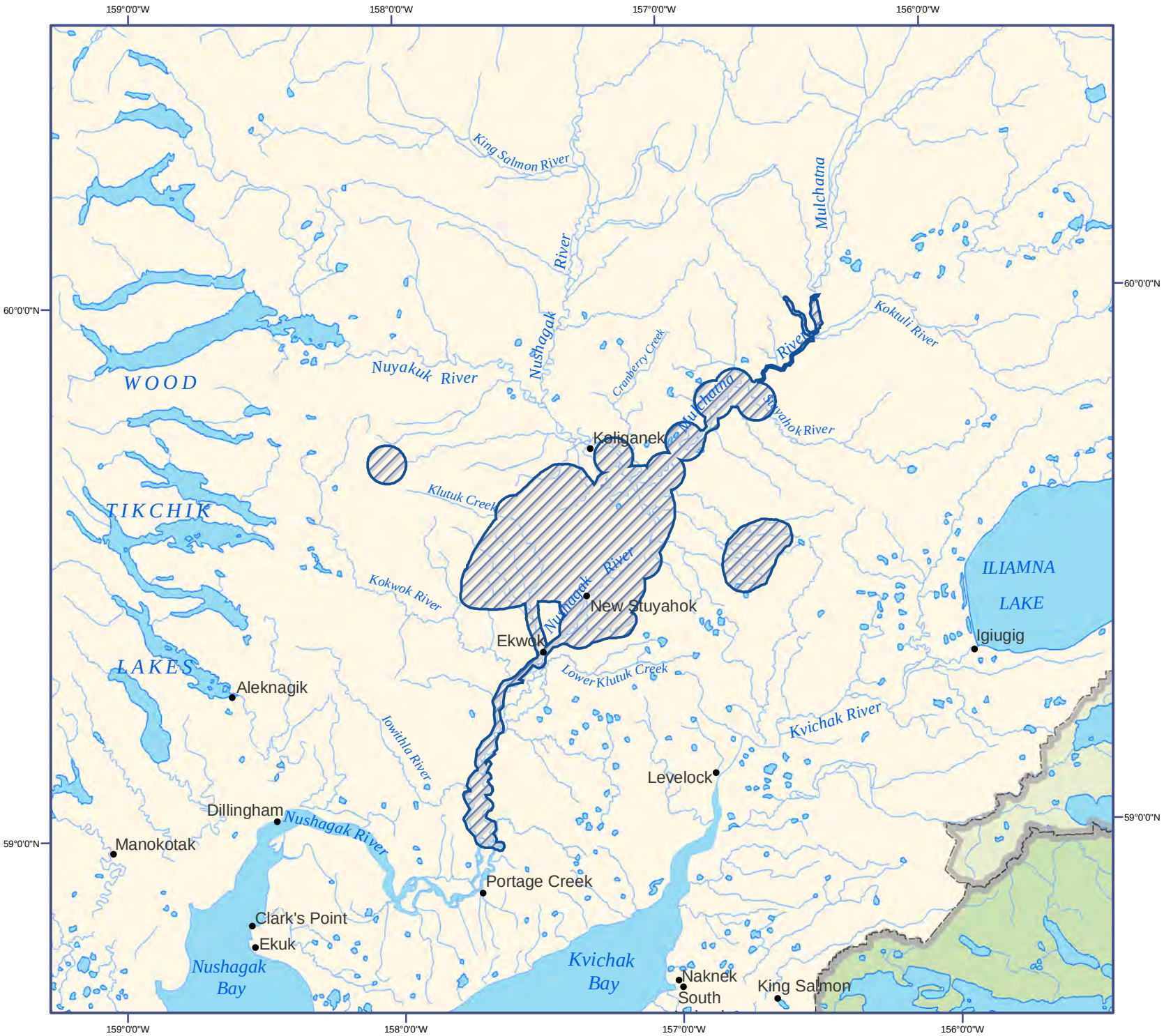

N

New Stuyahok Small Land Mammal Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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N

New Stuyahok Chinook Salmon Harvest 2005

New Stuyahok Sockeye Salmon Harvest 2005

New Stuyahok Spawning Sockeye Salmon Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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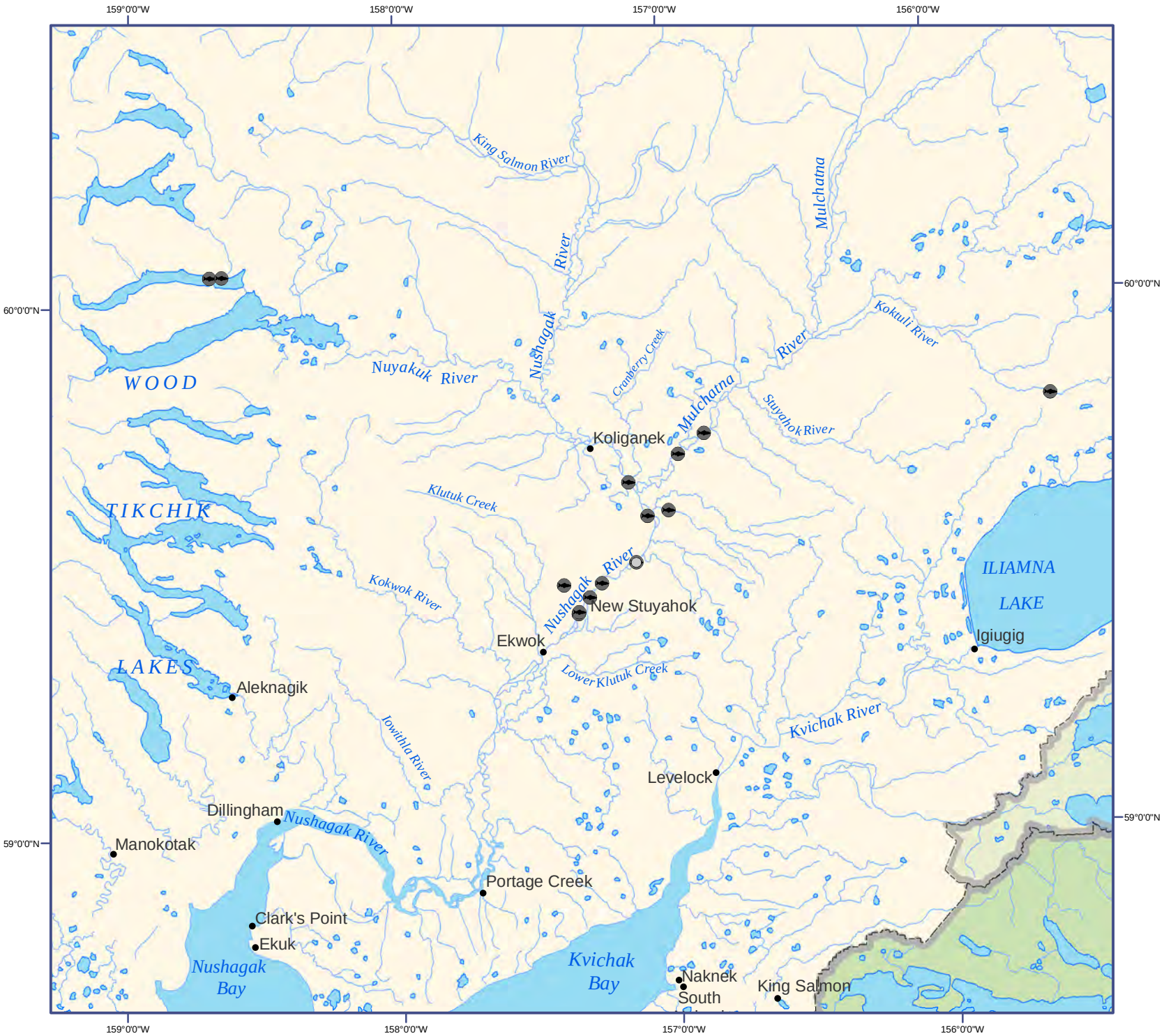

N

New Stuyahok Rainbow Trout Harvest 2005

New Stuyahok Unknown Trout Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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N

New Stuyahok Northern Pike Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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New Stuyahok Moose Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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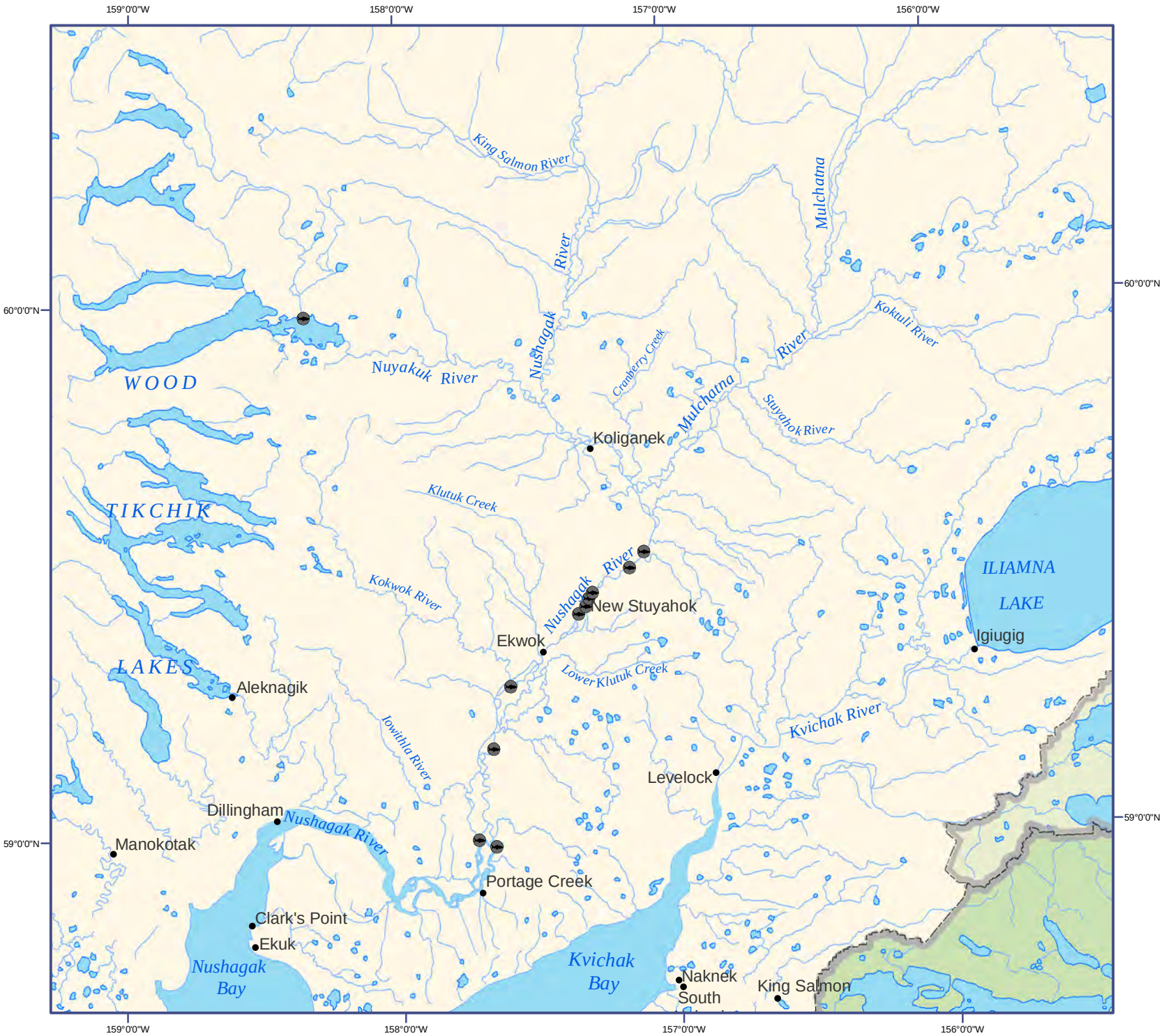

New Stuyahok Longnose Sucker Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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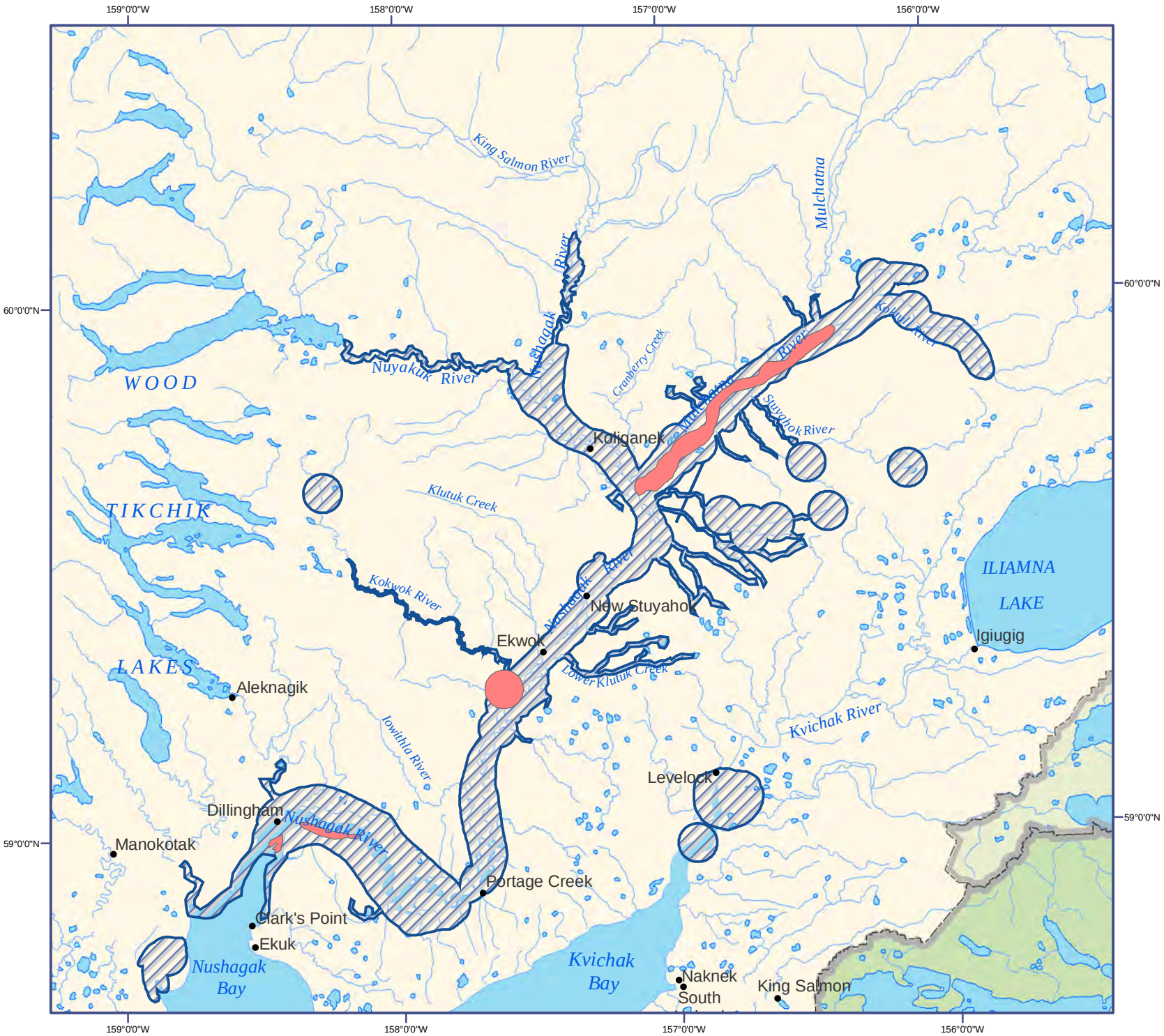

New Stuyahok Egg Gathering 2005

New Stuyahok Waterfowl Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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N

New Stuyahok Chum Salmon Harvest 2005

New Stuyahok Pink Salmon Harvest 2005

New Stuyahok Coho Salmon Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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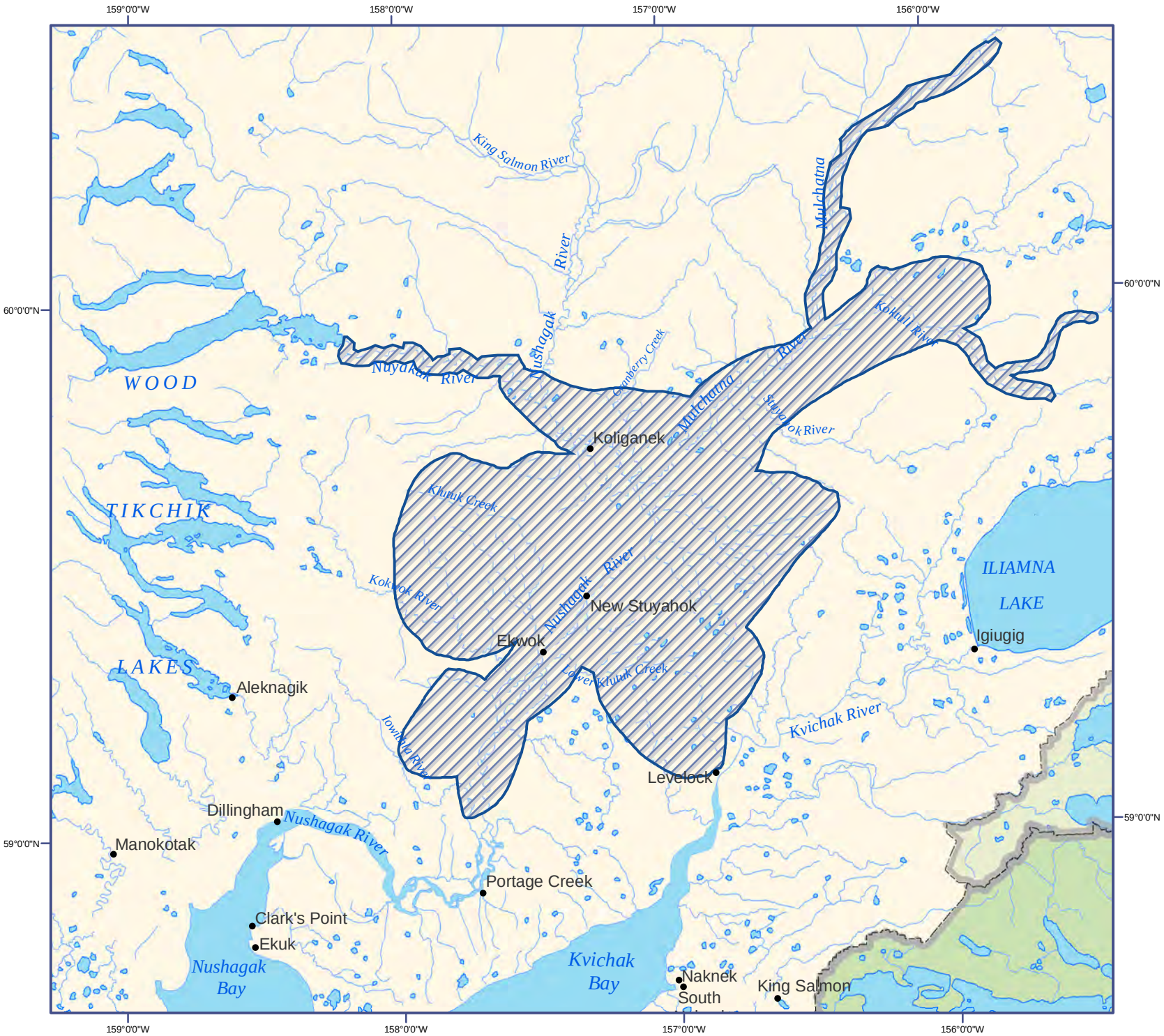

N

New Stuyahok Caribou Hunting 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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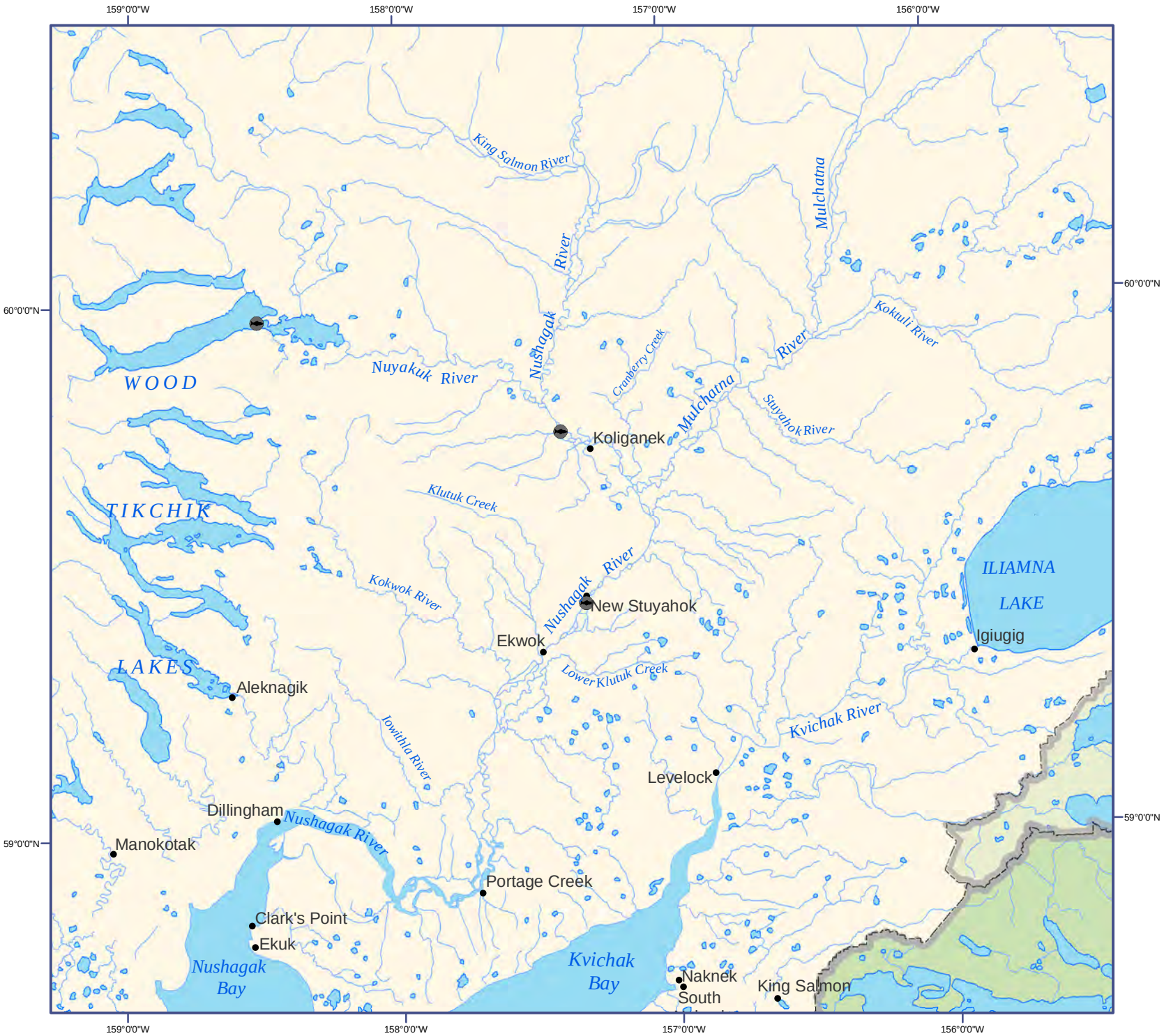

N

New Stuyahok Burbot Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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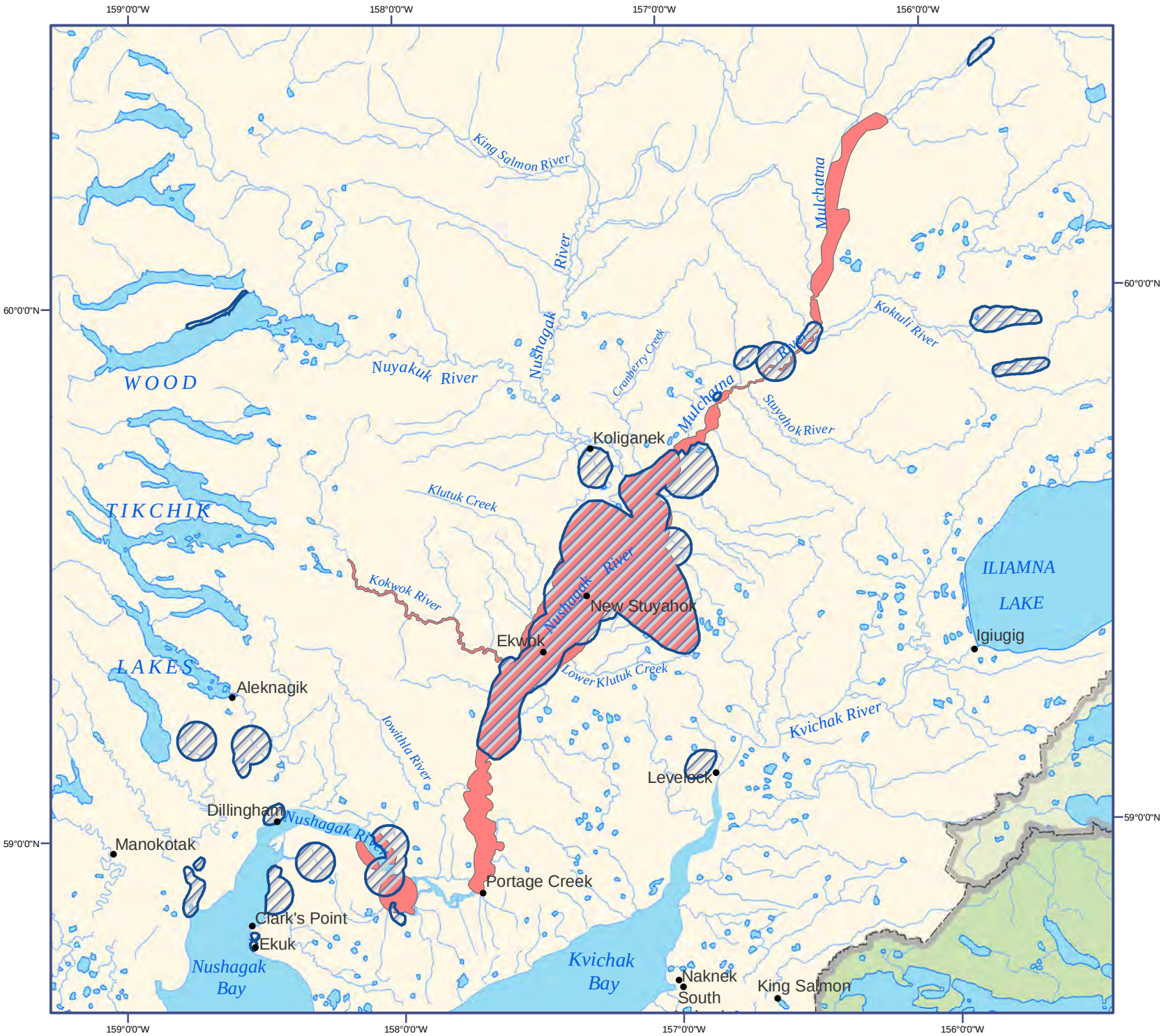

N

New Stuyahok Berry Gathering 2005

New Stuyahok Plant Gathering 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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N

New Stuyahok Arctic Grayling Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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N

New Stuyahok Arctic Char Harvest 2005

New Stuyahok Dolly Varden Harvest 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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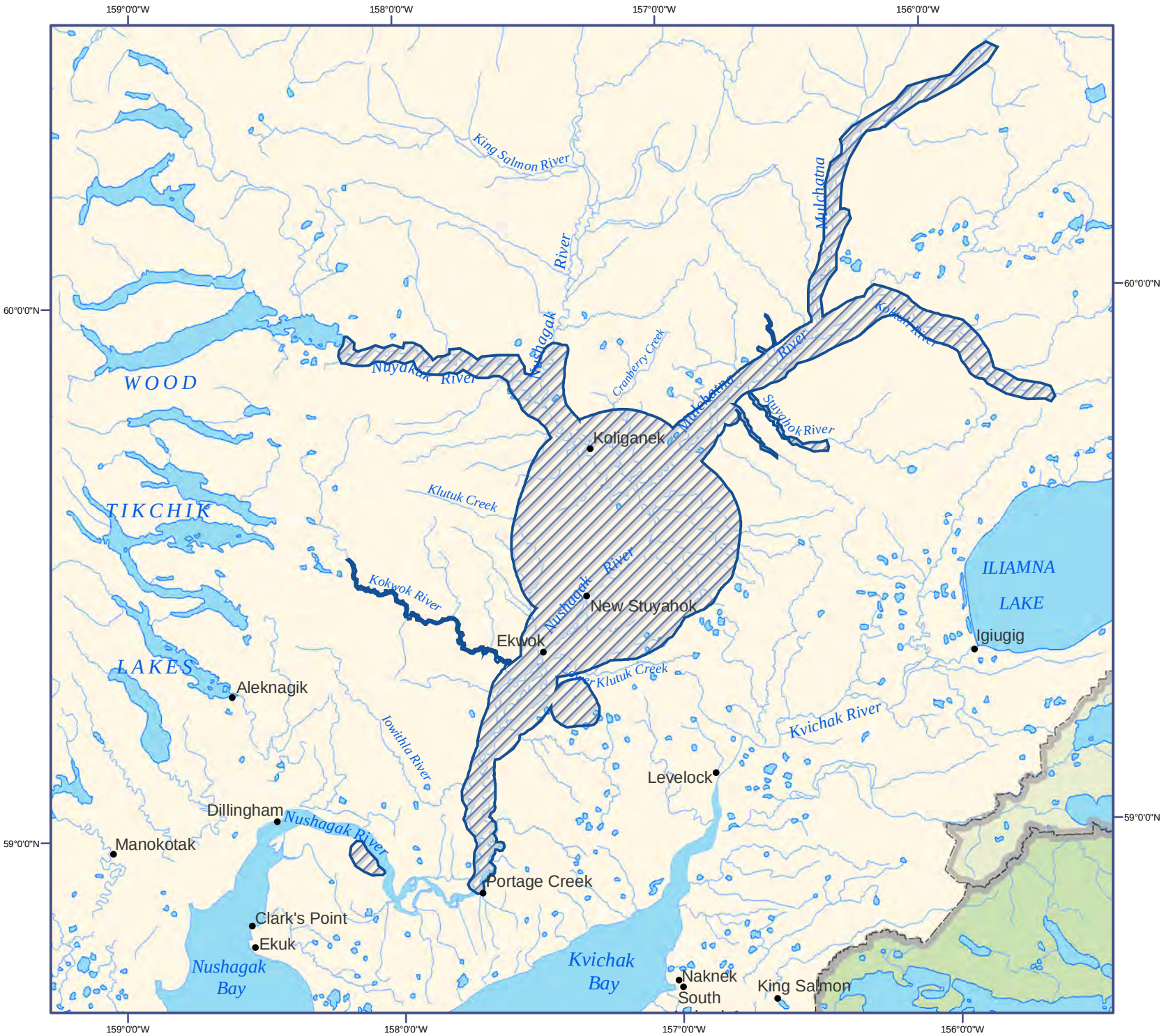

N

New Stuyahok Wood Gathering 2005

Community

National Park

National Preserve

SCALE: 1:1,100,000

0 5 10 20

Miles

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APPENDIX E: OVERVIEW OF STUDY FINDINGS

Appendix E

Subsistence Harvests and Uses of Wild Resources in Igiugig, Kokhanok, Koliganek, Levelock, and New Stuyahok, Alaska, 2005

An Overview of Study Findings

Division of Subsistence
Alaska Department of Fish and Game

April 2008

Background

The following is a brief overview of research conducted by the Division of Subsistence of the Alaska Department of Fish and Game (ADF&G) on subsistence harvests of all resources by residents of Igiugig, Kokhanok, Koliganek, Levelock, and New Stuyahok. The study period covers January 1 to December 31, 2005. Funding for this project was provided by Stephen R. Braund and Associates (ADF&G Agreement Number IHP-06-050). Phase I of this study, to document subsistence uses and harvests as well as demographic and other economic data for the study year of 2004, took place in the communities of Iliamna, Newhalen, Nondalton, Pedro Bay, and Port Alsworth in 2005. These findings are reported in Subsistence Harvest and Uses of Wild Resources in Iliamna, Newhalen, Nondalton, Pedro Bay, and Port Alsworth, Alaska, 2004 (ADF&G Division of Subsistence Technical Paper No. 302).

Methods

The primary data gathering method was systematic household surveys using the ADF&G Division of Subsistence standard data-gathering instrument. The surveys were conducted face-to-face in resident's homes. The goal was to interview representatives of all households in each of the five study communities except the larger community of New Stuyahok which had a random sample. In total, 138 households were interviewed, 73% of the year-round resident households. With the help of local research assistants, household interviews were conducted to collect harvest and use information for all wild resources. Each household had accompanying mapping conducted as well for each resource including use area and/or harvest location, amount of harvest, and month of harvest. Participation was voluntary, and individual and household-level data are confidential as well as mapped harvest locations for large land mammal species. In addition subsistence users were asked to discuss their observations about resource use and abundance and their concerns relating to subsistence resources and their continuing opportunities to harvest subsistence resources.

Findings

Figure 1 illustrates subsistence harvest estimates for each study community in 2005 in pounds usable weight per person. In 2005, virtually every person in each community participated in subsistence activities and used wild resources. Subsistence harvests were large and diverse. Estimated wild resource harvests were 542 lbs usable weight per person in Igiugig, 680 lbs per person in Kokhanok, 899 lbs per person in Koliganek, 527 lbs per person in Levelock, and 389 lbs per person in New Stuyahok.

Figure 2 shows the composition by resource category of each community's harvest in 2005. Each community was varied in the distribution of their harvest. Both salmon and large land mammals were important sources of wild foods in all five communities in 2005.

Appendix E

Figure 1. Harvests of Wild Resources in Pounds Usable Weight per Person, Study Communities, 2005

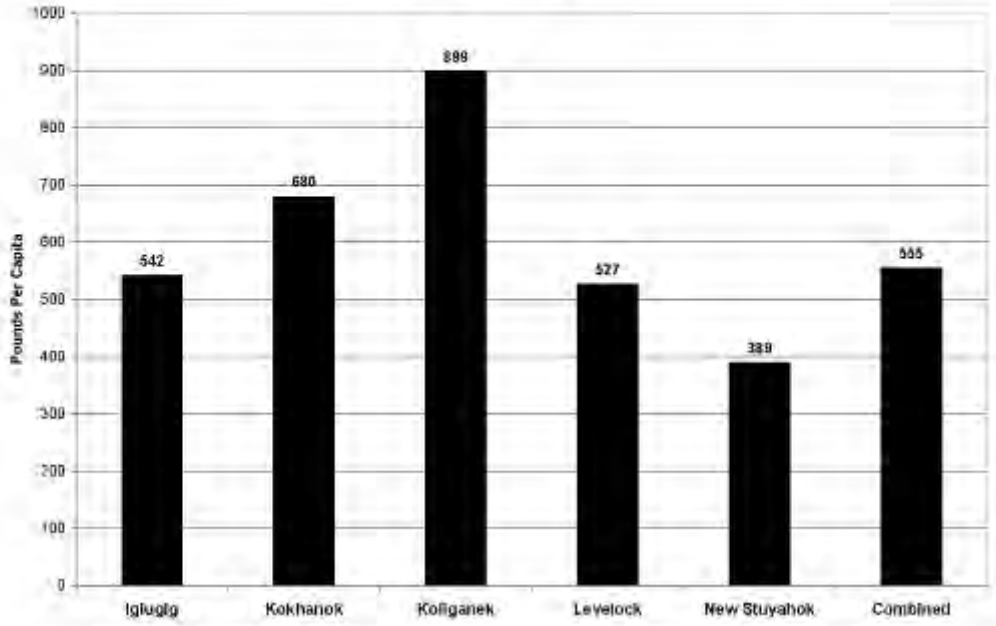
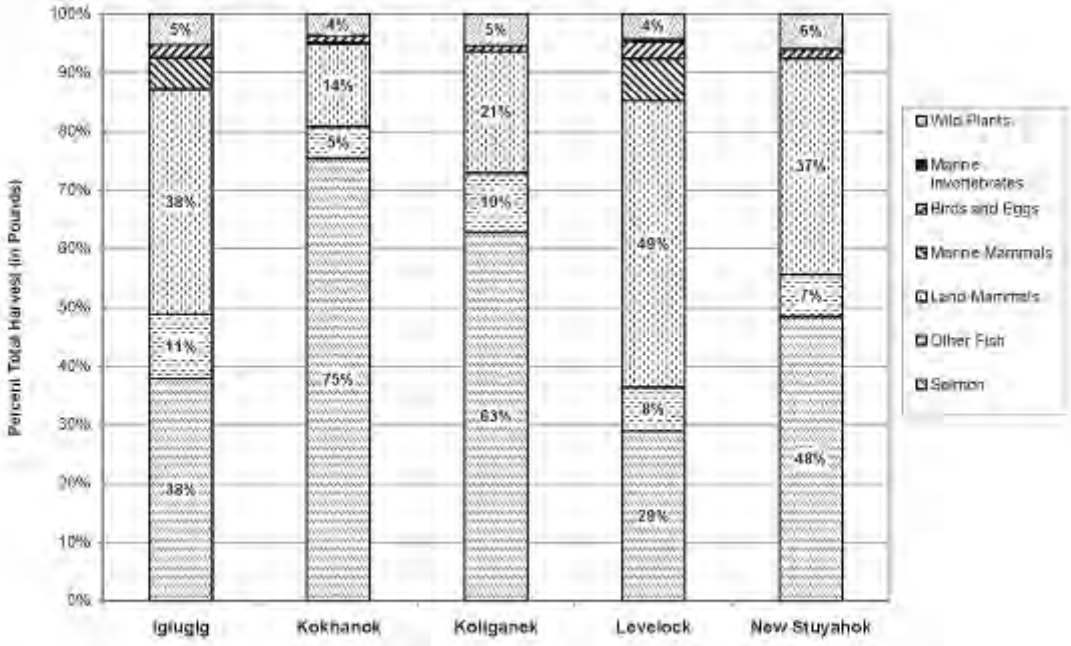


Figure 2. Community Harvest Composition by Resource Category, 2005



Every household in the 5 study communities of Igiugig, Kokhanok, Koliganek, Levelock, and New Stuyahok used subsistence foods in the 2005 study year. Most residents engaged in subsistence activities (see Figure 3). For the 5 communities combined, the subsistence harvest in 2005 was 555 pounds per person, almost two pounds per person per day. Although the bulk was salmon and large land mammals, almost all households used other fish, wild plants, and many used birds, bird eggs, small game, marine invertebrates, and marine mammals. Sharing of these resources bound families together in networks of mutual support and obligation. Further, subsistence activities and uses created a context in which people shared traditional knowledge about harvest locations, fish and wildlife populations and behavior, and respectful relationships with the natural world. In short, subsistence hunting, fishing, and gathering were vital components of the economy and way of life of these communities in 2005, as they have been for centuries.

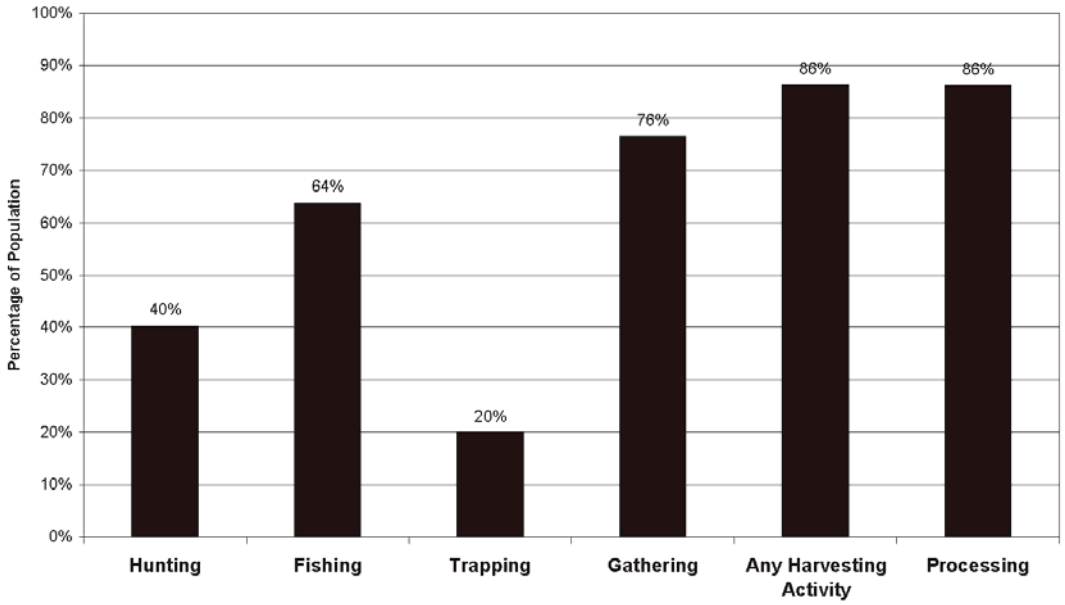
Continuing Research

The Division of Subsistence, in cooperation with Stephen R. Braund and Associates and local communities, has continuted research in two subsequent years. In March of 2008 subsistence harvest and use surveys were conducted King Salmon, Naknek, South Naknek, and Lime Village (see Map). In March of 2009 subsistence harvest and use surveys were conducted in Aleknagik, Clark's Point, and Manokotak.

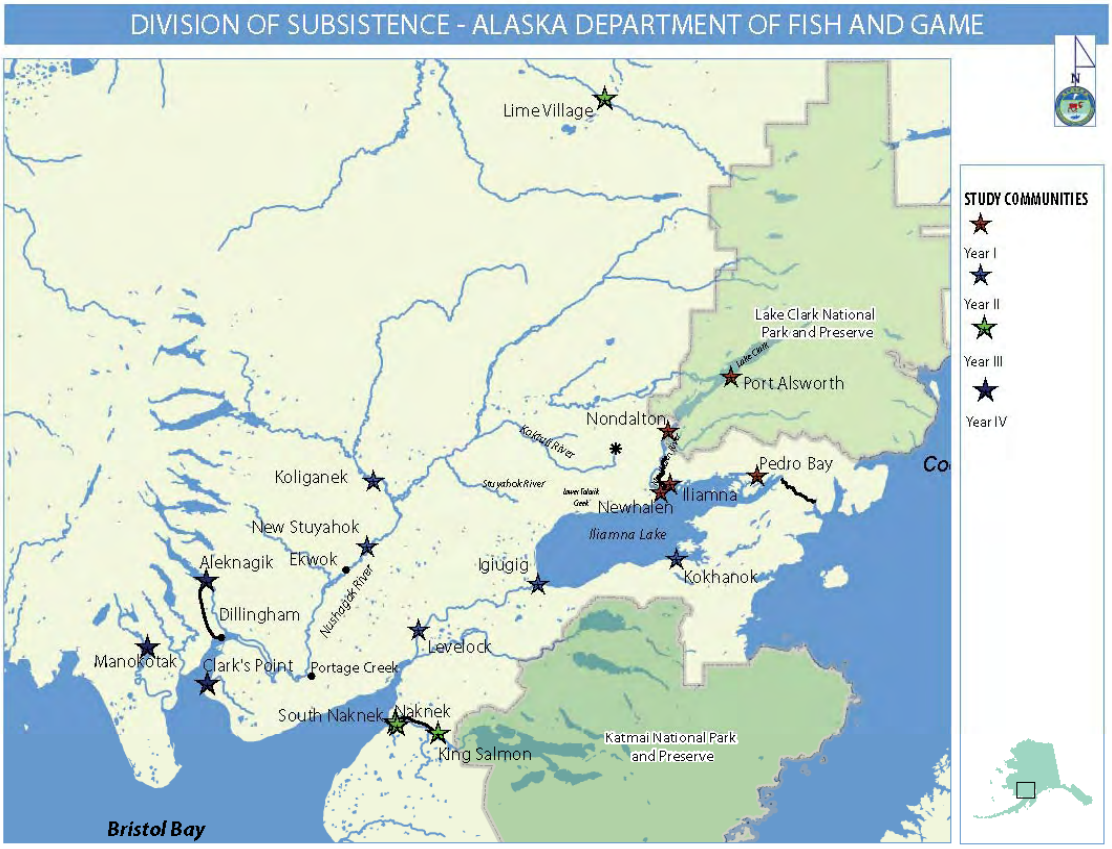
For More Information:

Complete results for this project appear in: *T. M. Krieg , D. L. Holen, and D. Koster. 2008. Subsistence harvests and uses of wild resources in Igiugig, Kokhanok, Koliganek, Levelock, and New Stuyahok, Alaska, 2005. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 322, Dillingham.* Technical Paper series reports are available through the Alaska State Library and on the Internet: *www.subsistence.adfg.state.ak.us.*

Figure 3. Individual Involvement in Subsistence Activities, All Study Communities Combined, 2005



Appendix E



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