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Subsistence Wildlife Harvests in Kotzebue, Alaska, 2013–2014

by

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and

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January 2016

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

Symbols and Abbreviations

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

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Measures (fisheries)

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

Mathematics, statistics

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

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

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

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ABSTRACT

This report summarizes the results of big game subsistence harvest surveys conducted in Kotzebue in the spring of 2014. Since 1999, the Alaska Department of Fish and Game Division of Subsistence, with support from the Division of Wildlife Conservation, has conducted this limited-scope harvest survey in communities within game management units (GMUs) 22 and 23 that harvest from the Western Arctic caribou herd. The 2014 survey asked heads of households in Kotzebue about their harvests of caribou, moose, black and brown bears, and 2 furbearers (gray wolf and wolverine) between June 1, 2013 and May 31, 2014. Researchers documented the number, sex, harvest timing, and harvest locations for these subsistence resources, as well as observations and comments from survey respondents. Reported results from the random sample of 214 households were expanded to account for 620 unsurveyed households. In the 2013–2014 study year, Kotzebue hunters harvested an estimated 1,680 caribou, approximately 75 edible pounds per person. Most (77%) of the caribou were hunted in the fall, and 76% were reported as male. About 43% of households attempted to harvest caribou; 34% actually did so, and 84% of households reported using caribou.

Key words: caribou, moose, brown bear, black bear, furbearers, gray wolf, wolverine, Kotzebue, WAH, Western Arctic caribou herd, subsistence hunting.

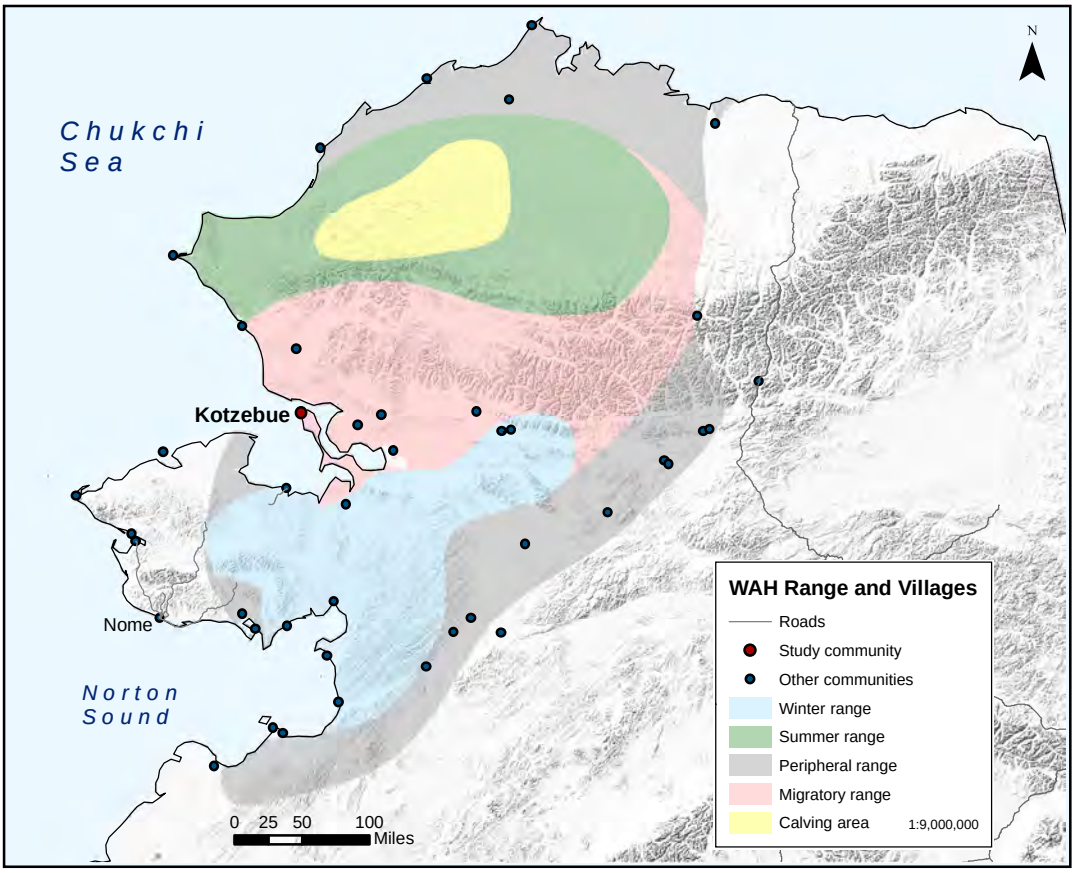

Figure 1.–Western Arctic caribou herd range and Kotzebue, Alaska.

INTRODUCTION

Caribou *Rangifer tarandus* are an important subsistence resource for communities in the Northwest, Arctic, and Interior regions of Alaska, as well as other areas of the state. In northern Alaska, people from more than 40 communities, from Wainwright in the north to Kotlik in the south, as well as from the regional centers of Barrow, Kotzebue, and Nome are known to harvest caribou from the Western Arctic caribou herd (WAH; Figure 1). This herd, which roams throughout an area of 140,000 square miles, is in decline, but is still the largest caribou herd in Alaska (Alaska Department of Fish and Game 2012). At its peak in 2003, the herd numbered 490,000 caribou. It declined at a rate of 4–6% annually between that census and 2011, when the herd numbered 325,000. The July 2013 census counted 235,000 animals, a decrease of about 27% since 2011. In May of 2014, Alaska Department of Fish and Game (ADF&G) reported:

> [It] appears that summer and winter weather combined with predators has affected survival during recent years… Disease does not appear to be a factor, caribou have generally been in good body condition throughout this decline, and we don't think harvests initiated it. But, if harvests remain stable, they will increasingly affect the population trend as herd size goes down. (ADF&G, Division of Wildlife Conservation 2014)

The role of caribou in the nutritional, cultural, and economic health of northwestern Alaska residents varies both between communities and through time. In some communities, caribou meat is a large portion of the total subsistence harvest each year. In communities where other resources are more abundant, caribou may represent a smaller portion of the total subsistence harvest. Because of a community's location, residents

may have only occasional access to the WAH. In communities located along key migration routes, residents might take caribou during several months of the year. A variety of other factors may also influence caribou harvests each year, including gasoline prices, user conflicts, weather, the success (or lack thereof) in harvesting other subsistence resources, migration timing, and so forth. Subsistence harvesters adapt to local conditions. Therefore, inter-annual variation in harvest numbers and characteristics is common, even within a single community or household.

It is the statutory responsibility of the ADF&G Division of Subsistence to provide information to the public, agencies, the Board of Fisheries, and the Board of Game about the role of subsistence hunting and fishing in the lives of Alaska residents (AS 16.05.094). The division studies and reports on the seasonality, methods, sharing and bartering, use areas, cultural and economic values, and trends of subsistence harvests and uses. This information is increasingly necessary as development projects are proposed throughout rural areas of Alaska. Documenting and understanding subsistence harvests is also necessary in order to evaluate reasonable opportunities for customary and traditional uses of wild resources. Other duties of the division set forth in statute include:

- quantifying the amount, nutritional value, and extent of dependency on foods acquired through subsistence hunting and fishing;
- evaluating the impacts of state and federal laws and regulations on subsistence hunting and fishing, and when corrective action is indicated, making recommendations to the department; and
- making recommendations to the Board of Game and the Board of Fisheries regarding adoption, amendment, and repeal of regulations affecting subsistence hunting and fishing.

Subsistence harvest surveys of varying scope have been conducted in over 250 Alaska communities since the division was formed in 1978. This research helps ADF&G estimate subsistence harvests and understand the role of subsistence in local economies. Each year since 1999, ADF&G, often in cooperation with the Maniilaq Association and Kawerak, Inc., has gathered big game harvest information in selected Kotzebue and Norton Sound area communities. In addition to the big game survey in Kotzebue in 2014, comprehensive harvest surveys were conducted in 2 other communities within the range of the WAH—Stebbins and Deering.[1]

1. Braem, Nicole M., D.S. Koster, M. Kostick, A.R. Godduhn, and E.H. Mikow. In prep. Chukchi Sea and Norton Sound Observation Network: Golovin, Noorvik, Point Lay, Stebbins, Diomede, Deering, Kotzebue, Point Hope, and Shishmaref, 2012–2014. Alaska Department of Fish and Game, Division of Subsistence technical paper, Fairbanks.

Table 1.–Demographic characteristics of sampled households, Kotzebue, 2013–2014.

Characteristics	Community Kotzebue
Sampled households	214
Eligible households	834
Percentage sampled	25.7%
Household size	
Mean	3.7
Minimum	1.0
Maximum	16.0
Age	
Mean	30.2
Minimum[a]	0.0
Maximum	88.0
Median	27.0
Sex	
Estimated male	
Number	1,539.4
Percentage	50.3%
Estimated female	
Number	1,519.9
Percentage	49.7%
Alaska Native	
Estimated households[b]	
Number	661.7
Percentage	79.3%
Estimated population	
Number	2,568.25
Percentage	83.9%

Source ADF&G Division of Subsistence household surveys, 2014.

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

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

METHODS

In 2014, division staff collected subsistence harvest information in Kotzebue with the survey instrument found in Appendix A. All data were processed and analyzed by the division. Survey data from participating households were expanded to account for unsurveyed households in our estimates.

In accordance with Division of Subsistence policy, the division requested and obtained approval from the Native Village of Kotzebue before conducting research. Survey timing was designed to coincide with the end of a major harvest period. In late May of 2014, Division of Subsistence staff traveled to Kotzebue, where they hired and trained local surveyors and helped conduct surveys. Kotzebue households were asked about their harvests of caribou, other large game, and furbearers between June 1, 2013 and May 31, 2014. Funding for the big game survey was provided by ADF&G divisions of Wildlife Conservation and Subsistence.

Survey Design in 2014

The Division of Subsistence standard method for collecting harvest information in smaller communities is to attempt to survey every household, usually by talking to the head or heads of each household. Before starting the project, survey workers compile an updated list of every household present in the community during the study period. In larger communities such as Kotzebue, the division uses a random sampling approach; the sampling goal for this study was 25% of the community. For this project, division staff created a database of occupied housing units and used the random sampling design. Confidentiality is protected by using randomly assigned household numbers instead of names on the survey form. Participation in surveys is voluntary—people may refuse to answer any or all questions. Surveyors try to contact each selected household on 3 separate occasions on different days. If no contact is made, then that household is recorded as "no contact." There are a variety of reasons that a household may be marked "no contact:" household members may be out of town during the survey effort; they may have moved to another community; or they may have passed away during or after the study year. Surveyors often go door to door, but make appointments for surveys when necessary.

In Kotzebue, 301 out of 834 existing (2013–2014) households were contacted, and 214 households were successfully surveyed for a 26% sample. Of those who were contacted but not surveyed, 71 refused, 3 were eligible but not available for surveying and 16 did not meet the 6 month minimum residency requirement. The big game survey used in 2014 gathered demographic information for each household member: their age, sex, and relationship to the head(s) of household, and whether they were Alaska Native (Table 1).

The survey (Appendix A) included questions about harvests and uses of caribou, moose *Alces alces*, brown bears *Ursus arctos*, black bears *Ursus americanus*, gray wolves *Canis lupus*, and wolverines *Gulo gulo* (gray wolves and wolverines are classified as both big game and as furbearers by the Board of Game). In the interest of brevity, other big game species were left off the survey. Researchers also asked about sharing (i.e., if a household gave away a resource to other households or if the household received one). Harvest location was recorded by ADF&G Division of Wildlife Conservation Uniform Coding Unit (UCU). These units are geographical areas that can vary in size from just a few square miles to several thousand square miles. Respondents were asked about the locations of harvests, the sexes of harvested animals, and the months in which harvests occurred. In recent years, in cases that the month of harvest is unknown, the season of harvest has been recorded and included in the analysis. Respondents were also asked if they had any questions, comments, or concerns. The surveys typically took less than 5 minutes each to administer, but sometimes took longer with heavy harvesters.

The estimated population of Kotzebue was 3,059 individuals, of whom 50% were male and 50% female (Table 1). The mean household size was 3.7 people, with a minimum of 1 and a maximum of 16 people. The mean age of the surveyed population was 30 years with a minimum of 0 (infant[s] less than 1) and

a maximum of 88. Approximately 84% of the surveyed population was Alaska Native, and about 79% of households had at least 1 Alaska Native head of household.

Analysis

Since its establishment in 1978, the Division of Subsistence Information Management (IM) team has adopted standards based on observations and findings to analyze subsistence harvest resource data. The base unit for the majority of surveys is the household. IM generates harvest estimates and participation rates at the community level. The statistical program SPSS[2] is used to analyze data and prepare tables.

Results from surveyed households were entered into the division's data repository in MS SQL Server. Each survey was entered 2 times by different staff members. As the first step in data validation, the 2 versions were compared and corrected according to the actual values recorded on paper surveys. Once entered and validated, data were then extracted using SPSS v21.0 and analyzed using standard division methods. Harvest amounts and demographic information were extrapolated to unsurveyed households to derive total harvest and human population estimates for the community. Fractional estimates are the direct result of this expansion procedure and are rounded to the nearest tenth in accompanying report tables and usually to whole numbers for discussion in the text. Participation levels, presented in percentages, are derived directly from the sampled data, which are assumed to be representative of participation levels for the entire community.

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. The formula applied for this method is:

$$X_C = \frac{N}{n} \sum_{i=1}^{n} x_i$$

where:

x = household harvest

i = ith household in the community

n = number of sampled households in the community

N = number households in the community

X_C = total estimated community harvest

In addition to harvest estimates, the division reports confidence intervals (CI) to provide some context to the quality and accuracy of the sample. This value represents the relative precision of the mean, or likelihood that an unknown value falls within a certain distance from the mean. In the accompanying tables, the CI is expressed as a percent and applies to both the mean household harvest and total community harvest. The division standard is to use a 95% confidence interval. The formula applied to produce this value is:

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

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

where:

$t_{\alpha/2}$ = student's *t* statistic for alpha level ($\alpha = 0.95$) with n–1 degrees of freedom (95% CI with n–1 degrees of freedom). The commonly accepted standard is to use 1.96; however, for very small populations, less than about 140, the appropriate value must be identified from a look-up table (not applicable to this analysis)

s = the sample standard deviation

$\overline{x}$ = sample mean for the community

n = sample size for the community

N = total households in the 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 the 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%):

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

where:

s = the sample standard deviation

$\overline{x}$ = sample mean for the community

n = sample size for the community

N = total households in the community

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

RESULTS

Caribou

The total estimated study-year caribou harvest for Kotzebue was 1,680 animals (±27.9%), or about 2 caribou per household. The total estimated harvest provided approximately 228,438 edible pounds to the community, or about 75 lb per person (Table 2). Although only 34% of households reported harvesting caribou, 84% of Kotzebue households reported using the resource. This reflects traditional food distribution practices such as sharing, barter, and customary trade. More households gave away caribou than actually harvested them, which indicates that some of those who received caribou, in turn, gave it away (redistribution).

Table 2.–Estimated harvest and use of caribou, 2013–2014.

	Percentage of households					Estimated harvest			
Community	Using	Attempting harvest	Harvesting	Giving away	Receiving	Total amount	Mean amount per household	Pounds per capita	95% CI
Kotzebue	83.6%	42.5%	33.6%	41.6%	70.6%	1,679.7	2.0	74.7	27.9%

Source ADF&G Division of Subsistence household surveys, 2014.

Hunting success rates (roughly measured by dividing the percentage of households attempting to harvest by the percentage of households that did so) were relatively high: 79%. This measure of success does not, however, account for effort: the number of trips made, instances of trips made with no harvest, distance traveled, and the money spent on gasoline and other supplies. Caribou harvest in a given year is influenced by many factors, including location relative to herd range and migration routes, the availability and successful harvest of other resources (notably marine mammals), the availability and reliability of equipment, travel conditions, gas prices, food preferences, and others.

A majority of Kotzebue's caribou harvest (76%) was bulls, and 20% was cows (Table B1). Respondents were unable to recall the sex of the remaining 4% of harvested animals. Kotzebue hunters reported harvesting caribou in all months of the study year, with the exception of June. A large majority of caribou (77%) were taken in the fall (August through October; Figure 2) with a strong preference for bulls. Thirty-nine percent of the total caribou harvest occurred in September alone, and an additional 19% of the harvest occurred in the fall time (respondents who reported harvest in fall and were unable to recall the exact month of harvest). Lesser harvests occurred throughout the winter and into the spring, and cows were harvested at greater rates than bulls beginning in November. Detailed information on the harvests and uses of other resources is available in Table B2. For a complete breakdown of caribou harvest by sex and month, see Table B3.

Uncertainty about month of harvest can be attributed to a number of factors, including the length of the study period, the time between harvest of animals and survey administration, the sheer number of animals harvested by a particular hunter or household, and which member of the household answered the survey questions. Although surveyors attempt to speak to the hunters, they may survey other household heads if hunters are unavailable. For example, the spouse of an out-of-town hunter is often able to provide the number of caribou harvested and the season of harvest, but he or she may not be able to recall the sex or exact month of harvest.

Kotzebue's caribou harvest took place in 12 UCUs in 2013–2014 (Figure 3). Harvest by location is broken down in tabular form in Table B3. The survey did not ask where the caribou were hunted, but rather where they were killed. Thus, these data cannot be assumed to represent the totality of areas searched. Rather, the UCU data provide an indication of the most common harvest areas. Additionally, recording harvest

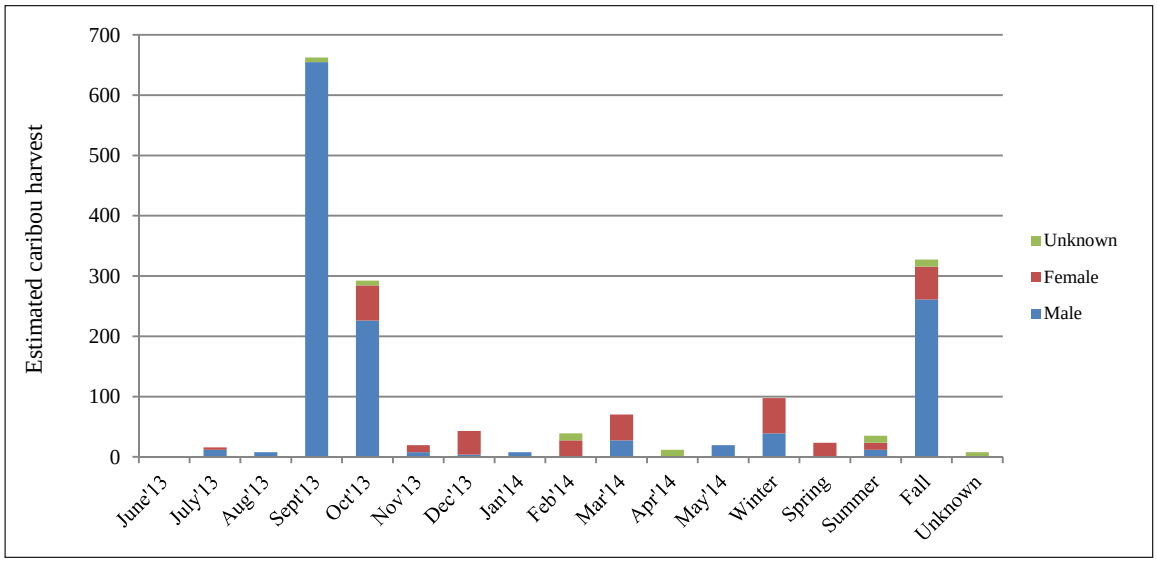

Figure 2.–Estimated caribou harvest by month, Kotzebue, 2013–2014.

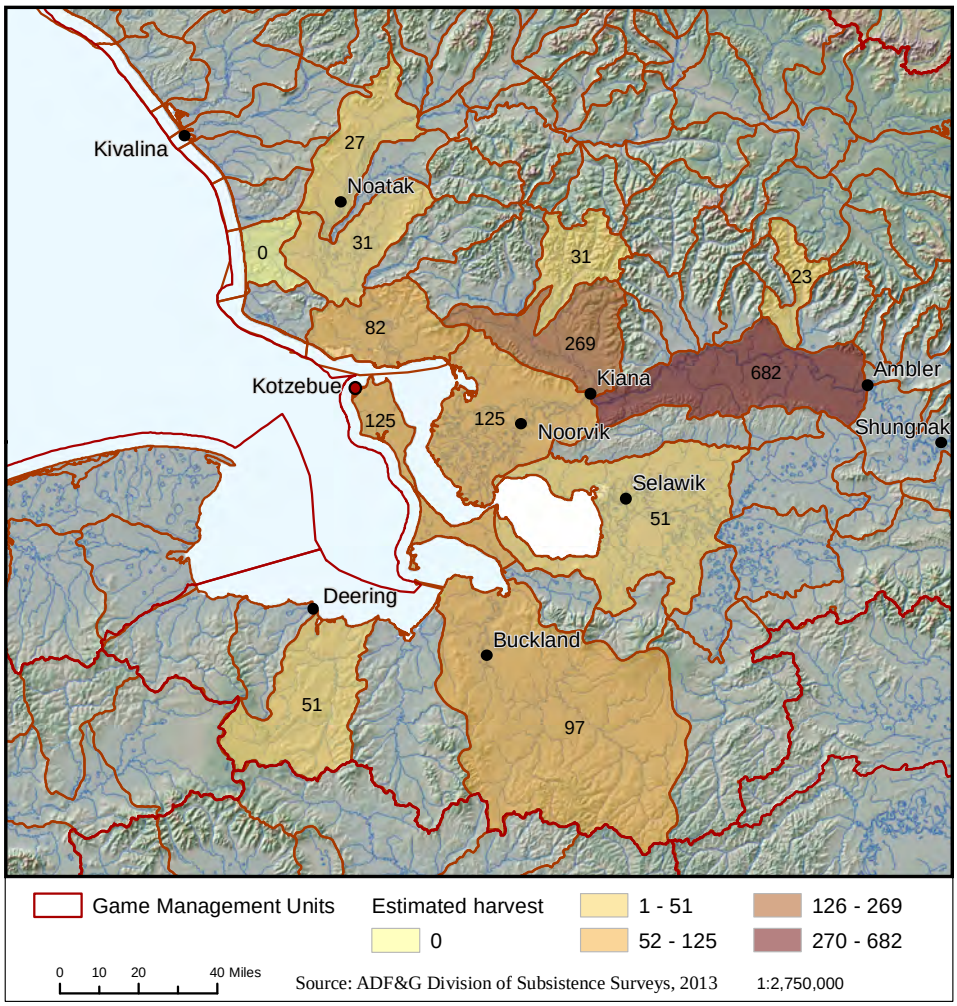

Figure 3.–Estimated caribou harvest by UCU, Kotzebue, 2013–2014.

locations by UCU is a very rough, generalized approach to location. In any year, hunters may use a vastly larger (or smaller) area than reflected in the map.

Almost one-half (48%) of Kotzebue's caribou harvest (an estimated 807 animals) came from 2 UCUs along the mainstem of the Kobuk River (Figure 3, Table B3). A majority of those caribou (40% of the total harvest, 682 animals) came from the unit that includes Onion Portage, where caribou migrations have crossed the Kobuk River for millennia. A third UCU that encompasses a portion of the Squirrel River drainage north of Kiana was another area of high harvest; Kotzebue hunters reported taking 269 caribou (16% of the total harvest) in this location. Hunters harvested an additional 176 caribou (10%) in the vicinity of Kotzebue, 125 of which were taken in the UCU containing the community and an additional 51 in the area of the Selawik River. Hunters also reported traveling across Eschcholtz Bay in pursuit of caribou, and harvested 148 caribou (9%) in the vicinity of the Kugruk River and in the area around Buckland. Another area of reported harvest was directly across the Hothman Inlet from Kotzebue; hunters harvested 140 caribou from the area of Sheshalik (Sisauliq) northwest of Kotzebue. Respondents were unable to recall the location of harvest for 86 caribou (5% of the total harvest).

Moose and Other Big Game

Moose were not as widely harvested, shared, or used as caribou in Kotzebue during the study year. A much lower percentage of households reported moose hunting (15%) than caribou hunting, and their success rate was lower as well: slightly less than one-half of those who hunted moose shot one (Table 3). However, harvests were only attributed to the household of the hunter who actually shot the animal, and some of the hunters who did not shoot a moose were part of a successful hunt with another household. An estimated 74 moose were harvested by 8% of Kotzebue households during the study year. This harvest contributed an estimated 39,837 lb or 13 lb per capita to community households (Table B2). Fewer households (44%) reported using moose than caribou; 15% of respondents gave moose away, and 36% received the resource.

Table 3.–Estimated harvest and use of moose, Kotzebue, 2013–2014.

	Percentage of households					Estimated harvest			
Community	Using	Attempting harvest	Harvesting	Giving away	Receiving	Total amount	Mean amount per household	Pounds per capita	95% CI
Kotzebue	43.5%	15.4%	7.5%	14.5%	36.4%	74.0	0.1	13.0	43.3%

Source ADF&G Division of Subsistence household surveys, 2014.

A majority of moose (79%) were harvested in the fall (August–October; Table 4). Of all the moose taken, 95% were bulls and 5% were cows.

Moose were harvested in many of the same UCUs as caribou (Table B4). Slightly more than one-half of Kotzebue's total moose harvest (53%, 39 animals) came from 2 UCUs located on the mainstem of the Kobuk River; hunters reported harvesting 27 moose in the vicinity of Noorvik, and an additional 12 moose upstream from Kiana. Hunters also reported harvesting 12 moose (16% of the total harvest) in the vicinity of the Noatak River near Sisauliq. An additional 12 moose were harvested in a UCU in the vicinity of Selawik, and hunters also reported harvesting 4 moose along the Squirrel River north of Kiana. Hunters were unable to recall the location of harvest for 8 moose (11% of the total harvest).

An estimated 12 brown bears were harvested during the study year, for approximately 1,006 edible pounds (0.3 lb per capita) (Table B2). Three percent of households reported hunting for brown bears, and 1% were successful. Two percent of households reported using the resource, which indicates sharing. Kotzebue hunters harvested an estimated 4 black bears during the study year, which contributed an estimated 343 edible pounds (0.1 lb per capita) to the total community harvest. Two percent of households reported hunting black bears, and 1% were successful.

Furbearers

The survey asked about the harvest and use of 2 big game furbearers: gray wolves and wolverines. An estimated 27 gray wolves were taken by the 2% of Kotzebue households which successfully hunted or trapped gray wolves (Table B2). Kotzebue households also harvested 12 wolverines.

Summary of Respondent Comments

Many comments indicated concern about the current caribou decline, and several worried how this might impact subsistence hunting in the Kotzebue area. Several respondents explained that they were following the situation and were anxious to see if and how restrictions to local hunters would change due to the decline. One respondent was particularly worried about the effect of lowered bag limits on heavy harvesters who hunt many caribou to share with multiple families. Some highlighted the importance of caribou — many households rely upon subsistence to feed their families —and emphasized the high cost of store-bought food. Some respondents also expressed concern over moose populations and felt they had declined. A few mentioned that they were worried about predation on moose and the WAH, stating that there are a lot of bears and wolves in the area.

Amidst the concerns over the steep decline of the WAH, many respondents had comments about the regulation and management of hunting. The most common comments revolved around nonlocal hunters, and several respondents took issue with nonlocal harvest of a declining caribou herd. Several remarked that hunting by nonlocal people should be eliminated before any restrictions are placed on local hunters. Many respondents expressed concern about transporter and guided hunts flying too low, disrupting the fall caribou migration, and wasting meat. One respondent said there should be a no-fly zone in place in order to avoid disruption to the fall migration, and another expressed frustration that transporters in particular are not held accountable.

Many survey respondents said they had not been able to hunt in the study year, most commonly because they did not have transportation. The high price of gas and the distance required were also cited as a hindrance to hunting. Many households said that caribou received from relatives and neighbors was critical to their families. At least 3 people commented about the survey itself. One respondent was concerned about how the results would be used and that they would be shared with the community, and 2 people said they were glad that this survey was being conducted. Survey comments are included as Appendix C.

Comparing the 2012–2013 Results with Previous Survey Data

Because both community size and harvest numbers vary from year to year, per capita harvest (pounds per person) is a useful analytical measure for comparison. For Kotzebue, pounds per capita calculations reflect these variations and also show a consistent reliance on the WAH (Figure 4).

This survey was the seventh documenting Kotzebue's caribou harvest since 1980 (Table B5). The Division of Subsistence conducted comprehensive harvest surveys for Kotzebue in 1986 and 1991, and a big game survey for 2012 and 2013 (Fall and Utermohle 1995; Georgette and Loon 1993; Godduhn et al. 2014). The 1991 harvest estimate of 3,782 caribou is considered likely to be an overestimate because the survey was administered only to households that had been surveyed for the 1986 study year—thus creating a bias toward long term residents who tend to have higher harvests than shorter term residents. The Native Village of Kotzebue, the local Indian Reorganization Act (IRA) council, completed surveys in 2002, 2003, and 2004 with tribal members (Whiting 2006). Although the 2002–2004 data may not be directly comparable because of the different scope in that study, the results are consistent with this study, estimating the average caribou harvest by tribal members for those years at 2,003 animals (Whiting 2006). Per capita harvest values are not available because that study did not calculate a population estimate based on its sample. For these reasons, this comparison is focused on the 1986, 2012, and 2013 study years with some reference to 1991 and 2002–2004.

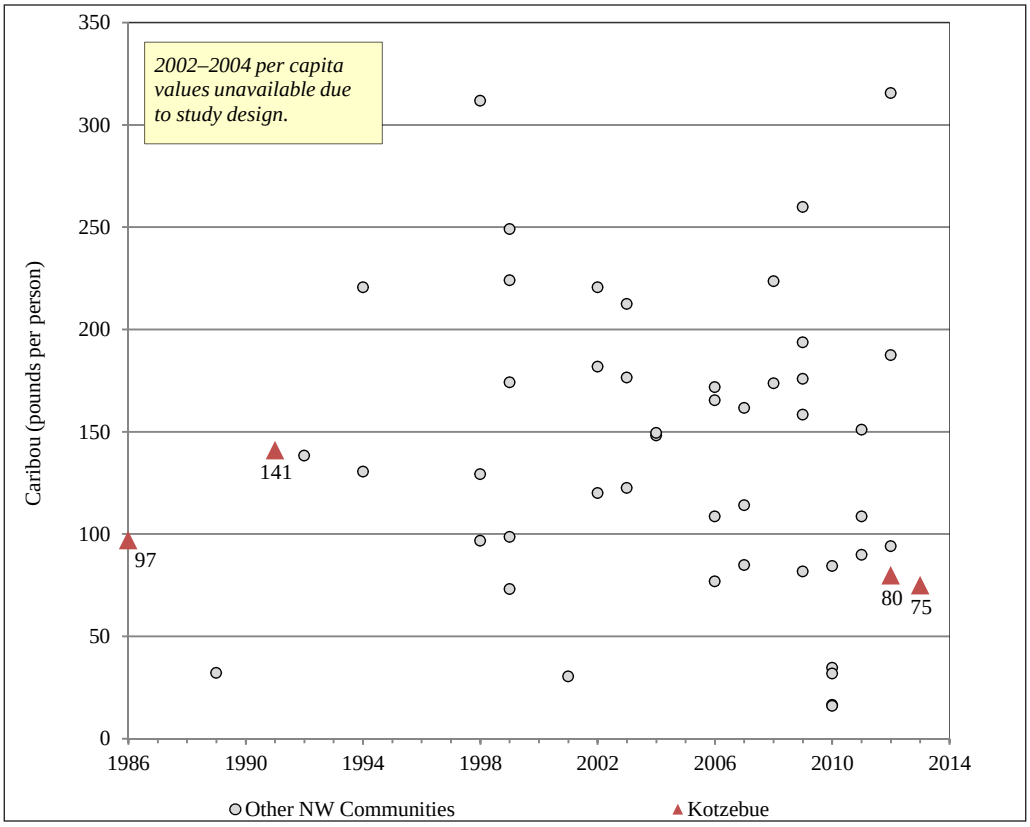

Figure 4.–Per person caribou harvests, Kotzebue and other Northwest Alaska communities, 1986–2013.

In all seven studies, caribou represented the vast majority of the reported (edible) big game harvest (86% to 95%). About 45% of households harvested caribou in 1986, compared with 44% in 2012–2013 and 43% in 2013–2014. High rates of sharing persisted between study years; the percentage of households using caribou were nearly double that of the percentage harvesting in all 3 years (88% in 1986, 82% in 2012, and 84% in 2013). The estimated 1986 harvest of 1,917 caribou composed about 24% of the total subsistence harvest and provided about 97 edible pounds of caribou per capita for the estimated population of 2,681, as compared to this study's estimates of 75 lb per capita among a population of 3,059 (Figure 4). The estimate of 141 pounds per capita for the 1991 study year is not directly comparable because of the sampling bias identified above. The population estimate for the 1991 study was substantially higher (3,649 people compared to 2,681 in 1986 and 3,059 in 2013), which likely is a result of the sampling approach.

An estimated 65 moose were harvested in 1986 by Kotzebue residents, which is again in line with the estimated 72 moose by the larger community population in 2012–2013. The 2013–2014 survey year was very similar to the year prior, 74 moose were harvested during the study period. In 1986, 27% of households hunted for moose and 8% harvested moose, which was shared so that 42% of households used it. In 2012–2013, about 18% hunted, 9% harvested, and 37% of households used moose. A smaller percentage of Kotzebue households hunted moose in 2013–2014 (15%), but a similar percentage was successful (8%). The 1986 moose harvest provided about 34,721 edible pounds, or about 13 lb per capita for the estimated population of 2,681 people. Those results are similar to the 2012–2013 estimates of 38,569 lb (13 lb per capita) and the 2013–2014 estimates of 39,837 lb (13 lb per capita). Moose harvest estimates in the survey of tribal households (2002–2004) ranged between 94 and 102 (Whiting 2006). A table summarizing selected results from this and prior studies documenting big game and furbearer harvests appears in Table B5.

Monitoring total annual harvest from the WAH is a complex task because the herd's range spans thousands of miles and at least 5 game management units. Caribou pass by or linger within a reasonable proximity to dozens of communities, only a few of which can be surveyed each year. ADF&G Division of Wildlife Conservation has developed a model to estimate harvests from the WAH as a result (Sutherland 2005). The model, which incorporates the results of community harvest surveys, allows department biologists to estimate rangewide caribou harvest annually based on factors such as community population and the herd's proximity (availability in a given year). Continued focus on the production of comparable harvest survey results is vital to the continued reliability and improvement of the model to aid in management of the herd.

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APPENDIX A

Survey Instrument

WESTERN ARCTIC CARIBOU HERD SUBSISTENCE SURVEY

KOTZEBUE, ALASKA

JUNE 2013 to MAY 2014

COOPERATING ORGANIZATIONS

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

(877) 646-7320

NATIVE VILLAGE OF KOTZEBUE

BOX 296
KOTZEBUE, AK 99752

(907) 485-2137

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

The survey asks how much game your household harvested last year, where you caught it, and the sex of the animal.

It also asks about how many people lived in your household and their age(s). We will NOT identify your household. We will NOT use this information for enforcement. Participation in this survey is voluntary. If you start a survey, you may stop at any time.

HOUSEHOLD ID:		
COMMUNITY ID:	KOTZEBUE	203
RESPONDENT ID:		
INTERVIEWER:		
INTERVIEW DATE:		
START TIME:		
STOP TIME:		
DATA CODED BY:		
DATA ENTERED BY:		
SUPERVISOR:		

HOUSEHOLD MEMBERS

HOUSEHOLD ID

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

Between JUNE 2013 to MAY 2014…
…who lived in your household?

ID#	How is this person related to head 1? *relation*	Is this person MALE or FEMALE? *circle*	How old is this person? *age*	Is this person Alaska Native? *circle*	Is this person answering questions *on this survey?* *circle*	Comments *enter text*
HEAD 1	SELF	M F		Y N	Y N	
01	1					

NEXT, enter spouse or partner. If household has a SINGLE HEAD, leave HEAD 2 blank.

HEAD 2	SPOUSE	M F		Y N	Y N	
02	2					

BELOW, enter children (oldest to youngest), grandchildren, grandparents, brothers, sisters, and other household members.

03		M F		Y N	Y N	
04		M F		Y N	Y N	
05		M F		Y N	Y N	
06		M F		Y N	Y N	
07		M F		Y N	Y N	
08		M F		Y N	Y N	
09		M F		Y N	Y N	
10		M F		Y N	Y N	
11		M F		Y N	Y N	
12		M F		Y N	Y N	
13		M F		Y N	Y N	
14		M F		Y N	Y N	
15		M F		Y N	Y N	

PERMANENT HH MEMBERS: 01 **KOTZEBUE: 203**

HARVESTS: LARGE LAND MAMMALS — HOUSEHOLD ID

Now I am going to ask about large land mammals such as caribou, moose, and bear.
Do members of your household USUALLY hunt large land mammals for subsistence?..... Y N

Between JUNE 2013 to MAY 2014…
…Did members of your household USE or TRY TO CATCH large land mammals?..... Y N

IF NO, go to the next harvest page.

If YES, continue on this page…

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

	In the last 12 months, did your household…				In the last 12 months, where did members of your HH catch _____?"			
					Each line is for 1 area, 1 sex, 1 amount, and 1 month. Four bulls killed in the same area in September should be on the same line. A cow killed in the same area would be on a new line. Do not enter the same animal in two lines!			
	Use?	Try to Harvest?	Give Away?	Receive?	WHERE were they harvested?	Were these MALE or FEMALE?	HOW MANY animals were killed?	In what MONTH were these animals harvested?
	circle one				*enter UCU*	*circle one*	*enter number*	*enter one month*
CARIBOU *Tuttu* 211000000	Y N	Y N	Y N	Y N		BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		

❖ If month of harvest is 'unknown', ask if respondent knows the season of harvest and write that in instead.

large land mammals continued on next page…

HARVESTS: LARGE LAND MAMMALS *(continued)*

HOUSEHOLD ID

	In the last 12 months… did your household…				In the last 12 months, where did members of your HH catch _____? *Each line is for 1 area, 1 sex, 1 amount, and 1 month. Four bulls killed in the same area in September should be on the same line. A cow killed in the same area would be on a new line. Do not enter the same animal in two lines!*			
	Use?	Try to Harvest?	Give Away?	Receive?	WHERE were they harvested?	Were these MALE or FEMALE?	HOW MANY animals were killed?	In what MONTH were these animals harvested?
	circle one				*enter UCU*	*circle one*	*enter number*	*enter one month*
MOOSE *Tinniikaq*	Y N	Y N	Y N	Y N		BULL COW ?		
211800000								
						BULL COW ?		
						BULL COW ?		
						BULL COW ?		
BROWN BEAR *Aklaq*	Y N	Y N	Y N	Y N		BOAR SOW ?		
210800000								
						BOAR SOW ?		
						BOAR SOW ?		
BLACK BEAR *Iyyagriq*	Y N	Y N	Y N	Y N		BOAR SOW ?		
210600000								
						BOAR SOW ?		
						BOAR SOW ?		

HARVESTS: FURBEARERS

WOLF *Amaguq*	Y N	Y N	Y N	Y N		n/a		
223200000								
WOLVERINE *Qavvik*	Y N	Y N	Y N	Y N		n/a		
223400000								

❖ If month of harvest is 'unknown', ask if respondent knows the season of harvest and write that in instead.

COMMENTS	HOUSEHOLD ID	

DO YOU HAVE ANY QUESTIONS, COMMENTS, OR CONCERNS?

INTERVIEW SUMMARY:

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

COMMENTS: 30	KOTZEBUE: 203

APPENDIX B

Additional Tables

Table B1.–Harvests of caribou by sex and month of harvest, Kotzebue, 2013–2014.

		2012							2013					Season					
Community	Sex	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Win	Spr	Sum	Fall	Unknown	**Total**
Kotzebue	Male	0.0	11.7	7.8	654.7	226.0	7.8	3.9	7.8	0.0	27.3	0.0	19.5	39.0	0.0	11.7	261.1	0.0	**1,278.3**
	Female	0.0	3.9	0.0	0.0	58.5	11.7	39.0	0.0	27.3	42.9	0.0	0.0	58.5	23.4	11.7	54.6	0.0	**331.3**
	Unknown	0.0	0.0	0.0	7.8	7.8	0.0	0.0	0.0	11.7	0.0	11.7	0.0	0.0	0.0	11.7	11.7	7.8	**70.1**

Source ADF&G Division of Subsistence household surveys, 2014.

Table B2.–Harvests and uses of wild resources, Kotzebue, 2013–2014.

	Percentage of households					Harvest weight (lb)[a]			Harvest quantity (individual)		
Resource	Using	Attempting harvest	Harvesting	Giving away	Receiving	Total	Per household	Per capita	Total	Per household	95% CI (±%)
Land mammals	87.4%	45.3%	34.6%	43.9%	76.2%	269,623.6	323.3	88.1	1,808.3	2.2	27.0%
Large land mammals	87.4%	44.9%	34.6%	43.9%	76.2%	269,623.6	323.3	88.1	1,769.3	2.1	27.3%
Black bear	1.4%	2.3%	0.5%	0.5%	0.9%	343.0	0.4	0.1	3.9	0.0	170.0%
Brown bear	1.9%	3.3%	1.4%	0.9%	0.9%	1,005.5	1.2	0.3	11.7	0.0	97.7%
Caribou	83.6%	42.5%	33.6%	41.6%	70.6%	228,438.1	273.9	74.7	1,679.7	2.0	27.9%
Moose	43.5%	15.4%	7.5%	14.5%	36.4%	39,837.1	47.8	13.0	74.0	0.1	43.3%
Small land mammals	6.1%	5.6%	2.3%	2.3%	3.7%	0.0	0.0	0.0	39.0	0.0	82.6%
Gray wolf	6.1%	5.6%	2.3%	2.3%	3.7%	0.0	0.0	0.0	27.3	0.0	87.0%
Wolverine	0.9%	1.4%	0.9%	0.9%	0.5%	0.0	0.0	0.0	11.7	0.0	126.4%

Source ADF&G Division of Subsistence household surveys, 2014.

a. A harvest weight of 0 (zero) pounds for a resource with a non-zero harvest quantity indicates that the resource was used exclusively for fur and not eaten.

Table B3.–Harvests of caribou by sex, month and location of harvest, Kotzebue, 2013–2014.

		2013							2014					Season					
Polygon	Sex	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Win	Spr	Sum	Fall	Unknown	**Total**
23ZA003101	Male	0.0	0.0	0.0	39.0	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0	3.9	0.0	**62.4**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0	**7.8**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**11.7**
23ZA003102	Male	0.0	11.7	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0	**27.3**
	Female	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**3.9**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZA003103	Male	0.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**3.9**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.4	0.0	0.0	0.0	0.0	**23.4**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZB001101	Male	0.0	0.0	0.0	50.7	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0	3.9	0.0	0.0	**66.3**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.2	0.0	3.9	7.8	0.0	**42.9**
	Unknown	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	**15.6**
23ZB001201	Male	0.0	0.0	7.8	362.4	105.2	0.0	0.0	0.0	0.0	19.5	0.0	19.5	0.0	0.0	0.0	89.6	0.0	**604.1**
	Female	0.0	0.0	0.0	0.0	58.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**58.5**
	Unknown	0.0	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.7	0.0	0.0	**19.5**
23ZB001301	Male	0.0	0.0	0.0	140.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	89.6	0.0	**237.7**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.2	0.0	**31.2**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZB001302	Male	0.0	0.0	0.0	0.0	31.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**31.2**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZB001801	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.4	0.0	**23.4**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZH000301	Male	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6	0.0	**19.5**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	31.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**31.2**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZH000501	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	**7.8**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.3	23.4	0.0	0.0	0.0	19.5	7.8	0.0	0.0	**77.9**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.7	0.0	0.0	0.0	0.0	0.0	0.0	**11.7**
23ZH000601	Male	0.0	0.0	0.0	35.1	23.4	7.8	0.0	7.8	0.0	0.0	0.0	0.0	15.6	0.0	0.0	7.8	0.0	**97.4**
	Female	0.0	0.0	0.0	0.0	0.0	11.7	7.8	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	3.9	0.0	**27.3**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZH004901	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZL000701	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0	23.4	0.0	**27.3**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5	0.0	0.0	3.9	0.0	0.0	0.0	0.0	**23.4**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Missing	Male	0.0	0.0	0.0	19.5	42.9	0.0	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**70.1**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	**3.9**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	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	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.7	0.0	**11.7**

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

Table B4.–Harvests of moose by sex, month, and location of harvest, Kotzebue, 2013–2014.

		2013							2014					Season					
Polygon	Sex	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Win	Spr	Sum	Fall	Unknown	**Total**
23ZA003101	Male	0.0	0.0	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	**11.7**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZB001101	Male	0.0	0.0	7.8	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0	**23.4**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	**3.9**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZB001201	Male	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0	**11.7**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZB001301	Male	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**3.9**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZH004901	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
23ZL000701	Male	0.0	0.0	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	**11.7**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	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	Male	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**7.8**
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	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, 2014.

Table B5.–Comparison of 2013 estimates with previous survey results, Kotzebue.

Kotzebue	Estimated number harvested							Per capita pounds harvested						
Resource	1986[a]	1991[b]	2002[c]	2003[c]	2004[c]	2012[d]	2013[e]	1986	1991	2002[f]	2003[f]	2004[f]	2012	2013
Black bear	20	32	1	0	3	0	4	0.7	0.8	–	–	–	0.0	0.1
Brown bear	9	8	8	1	1	11	12	0.3	0.2	–	–	–	0.3	0.3
Caribou	1917	3782	2376	1719	1915	1804	1680	97.2	141.0	–	–	–	79.7	74.7
Moose	65	235	102	94	95	72	74	13.0	34.6	–	–	–	12.5	13
Gray wolf	22	24	16	12	22	45	0.0	0.0	0.0	–	–	–	0.0	0.0
Wolverine	20	49	11	13	20	8	0.0	0.0	0.0	–	–	–	0.0	0.0

a. *Source* Georgette and Loon 1993.
b. *Source* Fall and Untermohle 1995.
c. *Source* Whiting 2006.
d. *Source* Godduhn et al. 2014.
e. *Source* ADF&G Division of Subsistence household surveys, 2013.
f. The study did not calculate a population estimate.

APPENDIX C

SURVEY COMMENTS

Appendix C.–Survey comments, Kotzebue,2013–2014.

The following comments are those that some respondents chose to write in the space provided for comments or concerns at the end of the survey.
I am following pretty close what's going on with the caribou population.
Five caribous a day is great for us.
Decline early part of hunting season.
Hunting pretty good. Usually we get winter time caribou but they didn't come close enough to town this year. There wasn't enough snow to get out and get them when they were close to town.
Hopes guides are monitored more to the extend that maybe they (but definitely sport hunting) is temporarily and indefinitely restricted.
Did not hunt this last year because 3 oldest children left the household so there was less consumption (and more food left over). Will hunt this year (and in the future).
I really appreciate family that brings caribou and fish.
Concern: moose population having low cow to bull ratio and the RM80 being usually for cows can the population bounce back under the circumstances? Caribou number declining. Bear numbers still high, predate young caribou.
Moose hunt near Nome because don't own boat to go near here. Sometimes go after brown bears since they go after moose.
Get the sport hunters to get the locals to teach how to hunt the game instead of scare them away. Sport hunters go hunt just for the antlers, let the local hunters hunt first then the sport hunters. Sport hunters scare the herds trail north.
Too many wolf and bears around, not much caribou.
No– like Native food.
Try to hunt wolf no luck.
None
Too much wolves in Kobuk Valley and Noatak bears too many.
Lived at camp for a couple of years. He moved back to Kotzebue in October. Moose for cow hunting move back to Oct 1 to hunt with boat. Hunt with boat freeze up too late. Too much nonlocal hunters with low count of moose. Give hunters first hunt.
Too many non-Native hunters flying around from what I was told.
Sad that the caribou here numbers are declining
Fallout of radiation from Fukishima– Does that impact caribou, eating the lichen? Concerned with radiation with all resources, particularly fish.
Received about 5 pounds (of caribou) from family members.
Outside hunters should have second chance, worried by-waste. Airplanes can bother caribou– change migration.
Hunting restrictions.
Lots of salmon
Permit, no time to hunt.

-continued-

A transporter last year in the fall scared away caribous. We reported it but never heard back about it. We expect an answer back when we are told we should report back. It happened up on the Kobuk River, at Onion Portage. The pilot was flying on the north side of the river.

No vehicles to hunt.

Caribou herd; WACH, steep decline– hardship to come for those heavily reliant on caribou for subsistence. Worried about– heightened enfocement, worried about– harvest cut down from 5-2 a day which will cause high harvesters will have less to share with others. Worsened by competition with outside hunters. Competition bad especially when transporters is a problem because takes are unmonitored. Which also causes herd deflected further from Kotzebue, high cost of fuel then more people will have to target moose for subsistence. Decline was anticipated but steepness wasn't. Federal may have to step in... enforcing regulations then state loses money on tourism if keeping them out is necessary. Regulation and cuts to guides dates to hunt effects their income and the economy in general. Sport hunting tourism, if game is regulated heavy enough that it can only be taken for subsistence.

Outside hunters should be restricted first– concerns over waste.

Caribou decline (wanting to hear the latest). Moose decline? (Particularly cows)

No vehicles to go hunting. "I don't know why we fill these surveys out when we can't hunt."

A lot of females taken last year because the migration was late– it's later and later. The weather is different and affects their behavior. Transporters are the biggest problem though. They have a cabin on the Noatak and sometimes planes are flying all day. They take a straight line and like to look at the caribou but it slows them down or turns them. There should be a no-fly zone [during] the migration. They like the money and are glad to share, but they (outsiders) need to figure out how to not disrupt the migration.

Why do hunters nonlocal fly in and they're trophy hunting. Why do Native need permits never had to.

Price of fuel - limits where people go for subsistence. Worry about exploitation of game from outside hunters. Now targeting WACH– 600+ outside hunters. Never wasted, but now exploited by outsiders. Transporters– unattended, they shoot anything on 4 legs. Worried over crash of herd– leading to over-regulation will negatively impact subsistence. Not going to be hunt caribou in the future it's inevitable. It's politics, not concerned with health of population. Crisis management strategy, doesn't allow for population regains, fear for the fate of the species.

It has been a steep decline both for the herd and for people to get meat in the freezer for the past 5 years. I might as well get $350 worth of beef instead of gas. I listen to the meetings year after year - it's the same year after year. I don't think their meetings help. Nothing is being done. It's being more and more difficult all year around to subsist. For the past 2 years, two husbands in the family have not been able to bring meat for their family. My brother for the 1st time had to haul his 4-wheeler to the country to get the animals, since they are not around. 10 years ago it was not an issue. There was plenty of everything. We used to eat 50 to 75% subsistence– now it's the other way around. We grew up mostly on caribou and fish and also moose and bear. There are so many factors that it's not possible to just identify one. It's the same for the birds. The past couple of years have been terrible. Global warming has to be a contributing factor. This year the winter was very mild. I work outside all day and this year I didn't have to wear any ski pants. What separates the guides and transporters from the locals is that if the animals don't come to us they can go there. It has to deal with economics too. You can't blame any one factor there are lots.

None - grandson gives food, some hunters when they come. No one in house hunts.

Will accept caribou meat.

-continued-

I am happy you are doing this survey.

I love to be out in the country. Haven't had a chance to this year. This area (Kotzebue) is scarce on a lot of things. Things are pretty plentiful around Selawik. This survey might be very different from any other year. Differs month by month. Gas is so expensive. If you don't have gas, can't go out. Fossil fuels are easier but then you have to get the fuel. If you have dogs, you have to feed them. It would be nice if there was a program where people could get fuel for subsistence if they say they will share their catch. Then people would also maybe comply with giving back their catch numbers too, because they would have a reason to. People won't remember how much they catch because they go out so much. It's hard to keep track. It's "we caught this many," not "I caught, you caught." We hunt and fish together.

Received muskox, go ice fishing.

Help caribou and moose and wolf and got the fur and some meat.

Gas too much

Used to hunt a lot– miss getting out in his Cub and knowing where all the game was.

Snow machine broken so couldn't caribou hunt.

Family and friends mom giving food. Don't get furs.

Too many wolves, bears.

Received whale and muktuk (beluga) from 1st catches.

Where/ when will the results of these surveys be made available to locals of Kotzebue? How will these be used and what impacts will they have?

Too many white people hunting in our land.

Why can't we kill or shoot wolves from snow machine? Can it be changed?

Only gave away to family members. 1 caribou was for feeding dogs. Rest is for family. Gave away 1 hind leg, 1 heart/ tongue, 1 liver and ribs. They made wolf hat and sold them and made wolf gloves and sold as well. Made hat and gloves and got licks, kept the ha1 and gloves sold.

Planes following river not following regulations.

It is a good survey. Keep it up.
We usually hunt this time of year (spring) and fall time/end of August. We give to elders first and keep what's left. That's what we live off of– caribou and fish and berries.

The state seems unwilling to help nonresidents figure out the rules. Even the regulation book is hard to understand and she's an attorney. Neighbor wasted some fish from the porch to the ice in front... does Fish and Game want reports about that? I said not necessarily because there isn't really anything to be done about it.

Caribou migration has changed over the years. It's getting later and later– lots of people are dropped off by guides and they change the migration pattern of the migration (route and timing).

Source ADF&G Division of Subsistence household surveys, 2014.